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September 22, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01 Quad 3A
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of Quino Checkerspot Butterfly Surveys for the Lakeview Substation and Transmission Line Project, Riverside County, California

Dear Mr. Keller:

This Letter Report presents the results of focused surveys for the Quino checkerspot butterfly (*Euphydryas editha quino*) on the Lakeview Substation and Transmission Line Project (hereafter referred to as the "Project site") located in Riverside County, California (Exhibit 1). The purpose of the surveys was to determine the presence or absence of the Quino checkerspot butterfly on the Project site. Surveys were conducted by biologists that hold the necessary Federal Endangered Species Act (FESA) survey permit and according to guidelines established by the U.S. Fish and Wildlife Service (USFWS).

PROJECT LOCATON AND DESCRIPTION

The Project site is located on the U.S. Geological Survey's (USGS) Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation on Moreno Beach Drive in the City of Moreno Valley to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Mountains to the Ramona Expressway. The Project site includes a Proposed and Alternative Substation Site, the Proposed Subtransmission Source Line Route, and the Proposed Telecommunications Route. Specifically, the survey area for the Quino checkerspot butterfly Quino checkerspot butterfly includes only the Proposed Telecommunications Route (New Cable to Moval), including a 50-foot buffer on either side of the route (Exhibit 2). Suitable habitat is not present on any other portion of the Project site.

Land uses in the immediate Project vicinity are primarily agricultural and residential. Open space is present in the Bernasconi Hills in the northwestern portion of the Project site and the Lakeview Mountains to the southeast of the Project site. Topography in the Project vicinity is mostly flat in the northern portion and varied in the southern portion with an approximate elevation range from 1,400 feet to 2,200 feet above mean sea level (msl).

BACKGROUND

The Quino checkerspot butterfly is federally listed as Endangered. This species is known to occur in San Diego and Riverside Counties, as well as Baja California Norte, Mexico. The historic range of this species included much of

coastal California south of Ventura County and the inland valleys south of the Tehachapi Mountains. The distribution and abundance of the Quino checkerspot butterfly has been dramatically reduced during the past century as a result of agricultural and urban development and other land-use changes in Southern California (USFWS 2003). According to the recovery plan, more than 75 percent of the Quino checkerspot butterfly's historic range has been lost, including more than 90 percent of its coastal mesa and bluff distribution. The recovery plan also states that Quino checkerspot butterfly populations appear to have been reduced in number and size by more than 95 percent range-wide, primarily due to direct and indirect human impacts including habitat loss and fragmentation, infestation of non-native plant species, and disrupted fire regimes.

The following excerpts describing the Quino checkerspot butterfly's life cycle are from the 2003 Recovery Plan for this species. The life cycle of the Quino checkerspot butterfly typically includes one generation of adults per year, with a four- to six-week flight period beginning from late January to early March and continuing as late as early May, depending on weather conditions (Emmel and Emmel 1973, USFWS 2003). If a sufficient amount of rain falls in late summer or early fall, a rare second generation of reduced numbers may occur (Mattoni et al. 1997). Females are usually mated on the day they emerge from pupae, and lay one or two egg clusters per day for most of their adult life. Adults live from 10 to 14 days; however, adult emergence from pupae is staggered, resulting in a 1 to 2 month flight season. Peak emergence in most brush-footed butterfly species, and probably for the Quino checkerspot butterfly as well, occurs shortly after the beginning of the flight season, usually in the second week. Eggs deposited by adults hatch in 10 to 14 days. As many as 7 larval molts (instars) may occur prior to pupation. During larval development, the host plants age, eventually drying out and becoming inedible (senescence). At the time of host plant senescence, if larvae are old enough and have accumulated sufficient reserves, they are able to enter diapause, a resting state that enables larvae to maintain a low metabolic rate and survive harsh environmental conditions that could not typically be tolerated. Like many other related butterflies, Quino checkerspot butterfly larvae can live for several years. One mechanism that generates longevity is repeated diapause (Singer and Ehrlich 1979), which occurs when larvae emerge from diapause, feed, and then re-enter diapause, postponing development until the next year. It has been suggested that Quino checkerspot butterfly larvae may also be able to survive without "breaking" diapause to feed in extremely dry years (USFWS 2003). It is not known if Quino checkerspot butterfly larvae can store enough energy reserves to prolong diapause without feeding at all for more than a year.

The Quino checkerspot butterfly is a member of the brush-footed butterfly family, Nymphalidae. The dorsal (top) sides of the wings have a red, black, and cream-colored checkered pattern, with a distinctively larger orange subterminal band on the lower hind wings. The ventral (bottom) sides are dominated by a checkered red and cream pattern with heavy black lines separating the colors. The abdomen of the Quino checkerspot butterfly has three red bands, which is distinct from the three checkerspot species that could co-occur with the Quino: Chalcedon checkerspot (*E. chalcedona*) have red bands with white dots; Gabb's checkerspot (*Charidryas gabbii*) have orange bands and no dots; and Leanira checkerspots (*Thessalia leanira wrightii*) have cream bands and no dots. The larva of the Quino checkerspot butterfly can be distinguished after their second molt by the characteristic dark-black coloration and row of eight to nine orange tubercles on their back. Larvae feed on specific plants (host plants), primarily two types of plantain (*Plantago erecta* and *P. patagonica*) when developing. Secondary host plants that may be utilized when plantain is not available include white snapdragon (*Anterrhinum coulterianum*), bird's beak (*Cordlyanthus rigidus*), purple owl's clover (*Castilleja exserta*), Chinese houses (*Collinsia* spp.), and possibly Indian paintbrush (*Castilleja affinis* ssp. *affinis*).

On April 15, 2002, the USFWS published the final rule on critical habitat for the Quino checkerspot. This final rule designated as critical habitat a total of 171,605 acres of land in Riverside and San Diego Counties, California. Following lawsuits, the USFWS published a revised critical habitat designation on January 17, 2008. This proposed rule was finalized on June 17, 2009. The current final critical habitat designation covers 62,125 acres of land in San Diego and Riverside Counties (USFWS 2009). The Project site is not located in final critical habitat for the Quino checkerspot butterfly.

SURVEY METHODOLOGY

All Quino checkerspot butterfly surveys were conducted utilizing guidelines from the 2002 USFWS Survey Protocol Information (USFWS 2002) to maximize detection of adults during the flight season. The Carlsbad USFWS office web page (USFWS 2010) for monitored Quino checkerspot butterfly reference site information was checked periodically to determine the likely "beginning" of the flight season in the Project site vicinity.

Protocol surveys consist of an initial site assessment to determine if the site contains areas recommended for butterfly surveys. If the site is determined to be comprised solely of excluded areas (described below), surveys are not recommended. If a site has areas suitable for butterfly surveys (non-excluded areas), then surveys should be conducted for those portions of the site. Butterfly emergence from pupae varies according to environmental factors, so the butterfly flight season varies regionally and annually. Generally, the Quino checkerspot butterfly usually begins flying in February or early March.

Site Assessment

A Quino checkerspot butterfly site assessment was conducted prior to the first focused butterfly survey in order to identify which portions of the Project site provide suitable habitat and should therefore be surveyed for Quino checkerspot butterfly. BonTerra Consulting Biologist Lindsay Messett (USFWS Permit No. PRT-067064-1) conducted the assessment on March 10, 2010. Orchards, developed areas, or small in-fill parcels (plots smaller than an acre completely surrounded by urban development) largely dominated by non-native vegetation; active/in-use agricultural fields; closed-canopy forests or riparian areas; dense chaparral; and small openings (less than an acre) completely enclosed within dense chaparral were considered unsuitable and designated as excluded areas. All non-excluded areas (regardless of the presence/absence of host plants and nectar sources) were regarded as potential habitat that require focused adult Quino checkerspot butterfly surveys. All wildlife observed or detected in the survey area during the focused surveys was recorded (Attachment A).

Butterfly Survey Areas

All areas that were not excluded were surveyed for butterflies, regardless of Quino checkerspot butterfly host plant presence, absence, and/or density. The Quino checkerspot butterfly is generally associated with sage scrub, open chaparral, grasslands, and vernal pools. Within these communities they are usually observed in open or sparsely vegetated areas (including trails and dirt roads), and on hilltops and ridgelines.

Surveyors utilized butterfly nets and appropriate reference materials to identify butterflies observed in the field. General survey forms (included as Attachment B) were filled out for each survey, noting weather conditions, survey date, and start and end times.

Existing Plant Communities

During the Quino checkerspot butterfly surveys, all plant species observed were recorded in field notes. Plant species were identified in the field or collected for subsequent identification. Plants were identified using keys in Hickman (1993) and Munz (1974). Taxonomy follows Hickman (1993) and current scientific data (e.g., scientific journals) for scientific and common names. Nomenclature for vegetation types generally follows that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003).

Focused Surveys

Ms. Messett conducted five focused survey visits in the survey area. The surveys were conducted once per week (weather permitting) on non-consecutive days during the peak of the flight season on March 19 and 26, and April 8, 14 and 19, 2010. Surveys focused on likely breeding areas (host plant patches), feeding areas (nectaring plant patches), and topographical features conducive to detecting the Quino checkerspot butterfly (ridgelines, hilltops, rock outcrops, dirt roads, and open ground with clay soils). Survey areas were walked at an average rate of 10 to 15 acres per hour. Binoculars were also utilized to identify the majority of butterfly species that could not be seen at close range. Butterfly species that were definitely not a checkerspot species but that could not be identified on the fly were netted, identified, and released. Site photographs were also taken (Exhibit 3).

SURVEY RESULTS

Vegetation Types

Vegetation types and other areas that occur within the survey area include annual grassland, Riversidean sage scrub, ruderal, agriculture, and disturbed. Focused surveys for the Quino checkerspot butterfly were conducted within all suitable habitat that contained host plants and/or nectar sources. Annual grassland vegetation included non-native grasses and forbs such as ripgut grass (*Bromus diandrus*), Mediterranean barley (*Hordeum marinum* var. *gussoneanum*), and foxtail barley (*Hordeum murinum* var. *leporinum)*. Riversidean sage scrub vegetation within the survey area is dominated by native shrubs including California sagebrush (*Artemisia californica*), brittlebush (*Encelia farinosa*), interior flat-topped buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), deerweed (*Lotus scoparius*), and white sage (*Salvia apiana*). The ruderal areas are dominated by non-native grasses and forbs including black mustard (*Brassica nigra*), ripgut grass, foxtail chess (*Bromus madritensis* ssp. *rubens*), and wild radish (*Raphanus sativus*). Agriculture also occurs throughout the survey area. Common fields include alfalfa and sod farms or dry farming with barley.

Disturbed areas within the Quino checkerspot butterfly survey area are mostly unvegetated and consist of existing dirt roads associated with adjacent agriculture and the existing transmission lines.

Host Plant Distribution

No host plants were observed in the survey area during the focused surveys.

Nectaring Species

Additionally, several nectar sources occur throughout the survey area including popcorn flower (*Plagiobothrys* sp.), fiddleneck (*Amsinckia* sp.), red maids (*Calandrinia ciliata*), blue dicks (*Dichelostemma capitatum*), goldfields (*Lasthenia* sp.), and sun cups (*Camissonia campestris* ssp. *campestris*).

Focused Surveys

The survey area does provide several topographical features that provide suitable habitat for the Quino checkerspot butterfly, including rock outcrops, open soils, clay soils, and old roads. Additionally, nectaring sources were present throughout the survey area during the focused surveys. However, no Quino checkerspot butterfly larvae or adults were observed in the survey area during the focused surveys. Table 1 below summarizes the survey conditions during each of the five surveys.

TABLE 1
SUMMARY OF SURVEY CONDITIONS
IN THE SURVEY AREA

Survey	Date	Surveyor	Time		Temperature (°F)		Cloud Cover %		Wind Speed (mph)	
			Start	End	Start	End	Start	End	Start	End
1	March 19, 2010	L. Messett	0920	1500	65	75	0	0	0–1	0–4
2	March 26, 2010	L. Messett	0945	1515	61	70	0	0	0–1	0–2
3	April 8, 2010	L. Messett	0840	1435	62	79	0	0	0–1	0–2
4	April 14, 2010	L. Messett	1015	1420	63	73	10	5	0–1	0–4
5	April 19, 2010	L. Messett	0910	1430	67	76	10	0	0–4	0–2

If you have any comments or questions, please call Jeff Crain or Lindsay Messett at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Jeff S. Crain
Botanist/Restoration Ecologist

I certify that the information in this survey report and enclosed exhibits fully and accurately present my work.

Lindsay A. Messett
Biologist
(PRT # 067064-1)

Exhibit 1: Regional Location
Exhibit 2: Local Vicinity
Exhibit 3: Site Photographs

Attachments: A – Wildlife Species Observed
B – Data Sheets

cc: Ms. Sandy Marquez, USFWS

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REFERENCES

California Department of Fish and Game (CDFG). 2003 (September). *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the Natural Diversity Database.* Sacramento, CA: CDFG, Natural Heritage Division.

Emmel, T.C. and J. F. Emmel. 1973. The Butterflies of Southern California. *Natural History Museum of Los Angeles County Science Series 26*. Los Angeles, CA: Natural History Museum of Los Angeles County.

Hickman, J.C., Ed. 1993. *The Jepson Manual of Higher Plants of California*. Berkeley, CA: University of California Press.

Mattoni, R.H.T., G.F. Pratt, T.R. Longcore, J.F. Emmel, and J.N. George. 1997. The endangered Quino checkerspot butterfly, *Euphydrays editha quino* (Lepidoptera: Nympalidae). *Journal of Research on the Lepidoptera* 34:99-118. The Lepidoptera Research Foundation, Inc.

Munz, P.A. 1974. *A Flora of Southern California*. Berkeley, CA: University of California Press.

Singer, M.C. and P.R. Elrich. 1979. Population dynamics of the checkerspot butterfly *Euphydryas editha*. *Fortschritte der Zoologie* 25:53-60. Stuttgart, Germany: Deutsche Zoologische Gesellschaft.

U.S. Fish and Wildlife Service (USFWS). 2010. Quino Checkerspot Butterfly (Euphydryas editha quino) Monitored Reference Site Information. Washington, D.C.: USFWS. http://www.fws.gov/carlsbad/Rules/QuinoDocuments/Quinohtms/2010%20Quino%20monitoring%20info.htm. ———. 2009 (June 17). Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Quino Checkerspot Butterfly (Euphydryas editha quino); Final Rule. *Federal Register* 74(115): 28776–28862. Washington, D.C.: USFWS.

———. 2003 (August). *Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*).* Portland, OR: USFWS, Pacific Region. http://ecos.fws.gov/docs/recovery_plans/2003/030917.pdf.

———. 2002. *Quino Checkerspot Butterfly (Euphydryas editha quino): Survey Protocol Information.* Carlsbad, CA: Carlsbad Fish and Wildlife Office.

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Regional Location

Exhibit 1

Lakeview Substation and Transmission Line Project

N W E S

10 5 0 10 Miles

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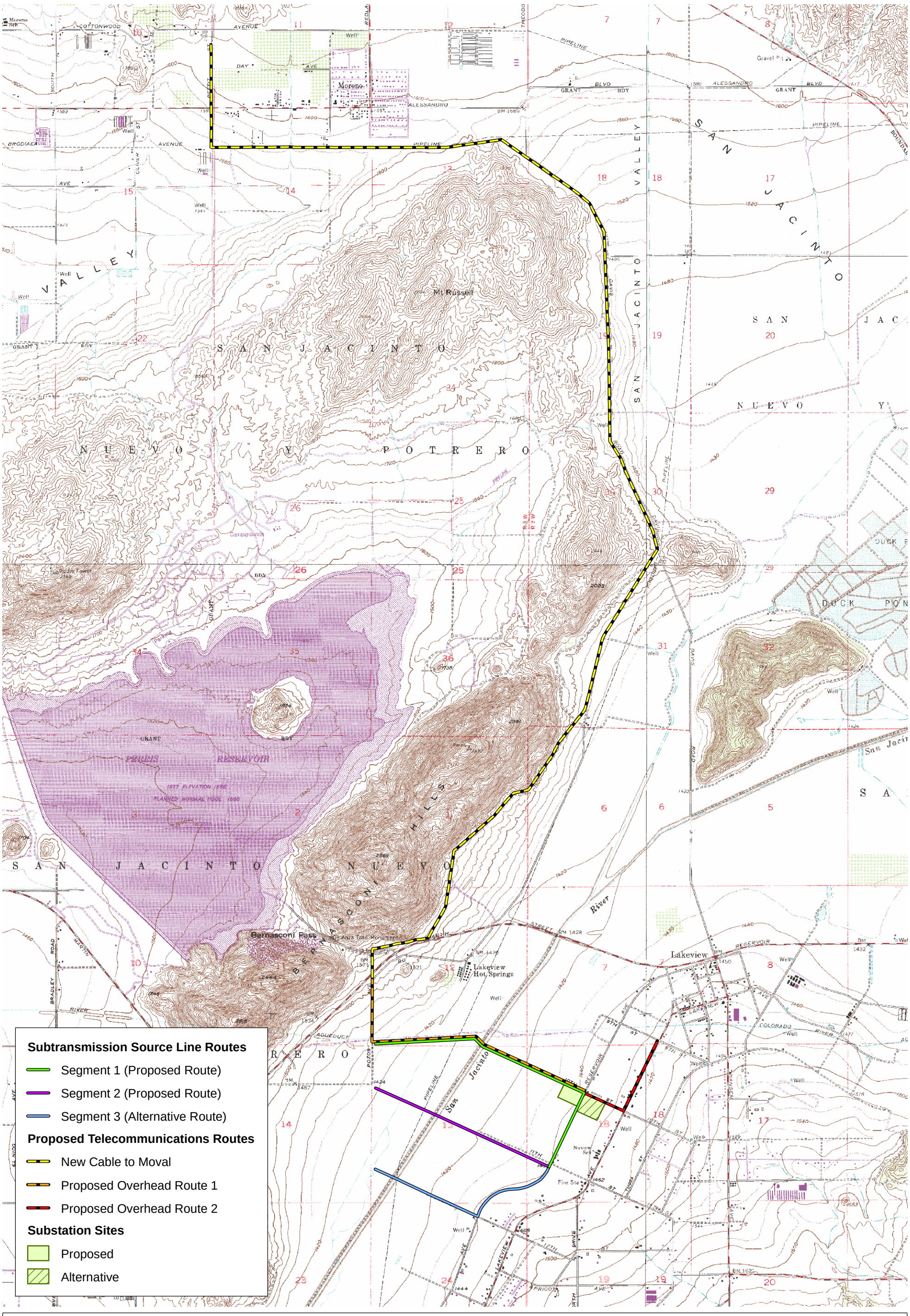

Local Vicinity

Exhibit 2

Lakeview Substation and Transmission Line Project

N W E S

3,000 1,500 0 3,000 Feet

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Representative site photograph depicting QCB survey area, looking northwest.

Representative site photograph depicting the QCB survey area, looking north-east.

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Site Photographs

Exhibit 3

Lakeview Substation and Transmission Line Project

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ATTACHMENT A

WILDLIFE COMPENDIUM

WILDLIFE SPECIES OBSERVED DURING QUINO CHECKERSPOT BUTTERFLY SURVEYS ON THE PROJECT SITE

Species
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
Sceloporus occidentalis western fence lizard
Uta stansburiana side-blotched lizard
TEIIDAE - WHIPTAIL LIZARDS
Aspidoscelis [Cnemidophorus] tigris stejnegeri coastal western whiptail
COLUBRIDAE - COLUBRID SNAKES
Masticophis flagellum coachwhip
Pituophis catenifer gopher snake
Birds
ANATIDAE - WATERFOWL
Anas platyrhynchos mallard
ODONTOPHORIDAE - QUAILS
Callipepla californica California quail
ARDEIDAE - HERONS
Ardea alba great egret
CATHARTIDAE - NEW WORLD VULTURES
Cathartes aura turkey vulture
ACCIPITRIDAE - HAWKS
Circus cyaneus northern harrier
Accipiter cooperii Cooper's hawk
Buteo jamaicensis red-tailed hawk
FALCONIDAE - FALCONS
Falco sparverius American kestrel
COLUMBIDAE - PIGEONS & DOVES
Columba livia * rock pigeon
Zenaida macroura mourning dove
CUCULIDAE - CUCKOOS & ROADRUNNERS
Geococcyx californianus greater roadrunner

WILDLIFE SPECIES OBSERVED DURING QUINO CHECKERSPOT BUTTERFLY SURVEYS ON THE PROJECT SITE (Continued)

Species
APODIDAE - SWIFTS
Aeronautes saxatalis white-throated swift
TROCHILIDAE - HUMMINGBIRDS
Calypte anna Anna's hummingbird
Calypte costae Costa's hummingbird
Selasphorus sasin Allen's hummingbird
PICIDAE - WOODPECKERS
Melanerpes formicivorus acorn woodpecker
TYRANNIDAE - TYRANT FLYCATCHERS
Sayornis nigricans black phoebe
Sayornis saya Say's phoebe
Tyrannus vociferans Cassin’s kingbird
LANIIDAE - SHRIKES
Lanius ludovicianus loggerhead shrike
CORVIDAE - JAYS & CROWS
Aphelocoma californica western scrub-jay
Corvus brachyrhynchos American crow
Corvus corax common raven
HIRUNDINIDAE - SWALLOWS
Hirundo rustica barn swallow
Tachycineta bicolor tree swallow
Stelgidopteryx serripennis northern rough-winged swallow
Petrochelidon pyrrhonota cliff swallow
AEGITHALIDAE - BUSHTITS
Psaltriparus minimus bushtit
TROGLODYTIDAE - WRENS
Salpinctes obsoletus rock wren
Catherpes mexicanus canyon wren

WILDLIFE SPECIES OBSERVED DURING QUINO CHECKERSPOT BUTTERFLY SURVEYS ON THE PROJECT SITE (Continued)

Species
Thryomanes bewickii Bewick's wren
SYLVIIDAE - GNATCATCHERS
Polioptila caerulea blue-gray gnatcatcher
TIMALIIDAE - WRENTITS
Chamaea fasciata wrentit
MIMIDAE - THRASHERS
Mimus polyglottos northern mockingbird
Oreoscoptes montanus sage thrasher
Toxostoma redivivum California thrasher
STURNIDAE - STARLINGS
Sturnus vulgaris * European starling
EMBERIZIDAE - SPARROWS & JUNCOS
Pipilo maculatus spotted towhee
Pipilo crissalis California towhee
Aimophila ruficeps rufous-crowned sparrow
Chondestes grammacus lark sparrow
Amphispiza belli sage sparrow
Melospiza melodia song sparrow
Zonotrichia leucophrys white-crowned sparrow
ICTERIDAE - BLACKBIRDS
Agelaius phoeniceus red-winged blackbird
Agelaius tricolor tricolored blackbird
Sturnella neglecta western meadowlark
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Spinus [Carduelis] psaltria lesser goldfinch
PASSERIDAE - OLD WORLD SPARROWS
Passer domesticus house sparrow *

WILDLIFE SPECIES OBSERVED DURING QUINO CHECKERSPOT BUTTERFLY SURVEYS ON THE PROJECT SITE (Continued)

Species
Mammals
LEPORIDAE - HARES & RABBITS
Sylvilagus audubonii desert cottontail
Lepus californicus black-tailed jackrabbit
SCIURIDAE - SQUIRRELS
Spermophilus beecheyi California ground squirrel
GEOMYIDAE - POCKET GOPHERS
Thomomys bottae Botta's pocket gopher
CANIDAE - WOLVES & FOXES
Canis latrans coyote
Invertebrates
PAPILIONIDAE - SWALLOWTAIL BUTTERFLIES
Papilio rutulus western tiger swallowtail
PIERIDAE - WHITES, SULFURS, & ORANGETIPS
Anthocharis sara Sara orangetip
Pontia protodice common (checkered) white
NYMPHALIDAE - BRUSH-FOOTED BUTTERFLIES
Vanessa cardui painted lady
Vanessa annabella west coast lady
LYCAENIDAE - BLUES, HAIRSTREAKS, & COPPERS
Leptotes marina marine blue
Icaricia acmon acmon blue
Everes amyntula western tailed blue
HESPERIIDAE - SKIPPERS
Erynnis funeralis funereal duskywing
* introduced species

ATTACHMENT B

DATA SHEETS

Quino Checkerspot General Form **Adult Survey**

Location Lakeview Survey Segment New Cable to Moval
Surveyor L Messett Date 3/19/10 Survey Week Number 1
Survey Partner(s) _____
Total Acres: _____ Portion Surveyed: Davis Rd - Ramona Exp. Elevation: Max 1500 Min 1400

Time (24 hr)	% Cloud	Sky					Wind (range)	Temp (*F*)
Start 0920	0	clear	patchy	overcast	drizzle	shower	0-1	65
1030	0	clear	patchy	overcast	drizzle	shower	0-1	65
1135	0	clear	patchy	overcast	drizzle	shower	0-3	67
1255	0	clear	patchy	overcast	drizzle	shower	0-6	71
|	|	clear	patchy	overcast	drizzle	shower	|	|
|	|	clear	patchy	overcast	drizzle	shower	|	|
Stop 1500	0	clear	patchy	overcast	drizzle	shower	0-4	75

Habitat onsite (circle as applicable): hilltops, ridges, rock outcrops, open soils, soil crusts, clay soils, old roads, *Plantago*, *Castilleja*, *Cordylanthus*, *Antirrhinum*, nectar sources.

Butterfly Species	Count (Total)	Hill-topping	Butterfly Species	Count (Total)	Hill-topping
Nymphalidae (Brush Footed Butterflies)			*Leptotes marina* (Marine Blue)		
Euphydras editha quino (Quino Checkerspot)			*Philotes sonorensis* (Sonoran Blue)		
Euphydras chalcedona (Chalcedon Checkerspot)			*Plebejus melissa* (Melissa Blue)		
Charidryas gabbii (Gabb's Checkerspot)			*Everes* amyntula (Western Tailed-Blue)		
Phycoides mylitta (Mylitta Crescent)			*Brephidium exilis* (Western Pygmy-Blue)		
Thessalia leanira (Leanira Checkerspot)			**Riodinidae (Metalmarks)**		
Nymphalis antiopa (Mourning Cloak)			*Apodemia mormo* (Mormon Metalmark)		
Basilarchia lorquini (Lorquin's Admiral)			**Papilionidae (Swallowtails)**		
Junonia coenia (Common Buckeye)			*Papilio eurymedon* (Pale Swallowtail)		
Vanessa annabella (West Coast Lady)			*Papilio rutulus* (Western Tiger Swallowtail)		
Vanessa atalanta (Red Admiral)			*Papilio zelicaon* (Anise Swallowtail)		
Vanessa cardui (Painted Lady)	HHT 1		**Pieridae (Whites and Orangetips)**		
Vanessa virginiensis (American Lady)			*Anthocharis cethura* (Desert Orangetip)		
Danaidae			*Anthocharis sara* (Sara's Orangetip)		
Danaus gilippus (Queen)			*Pieris rapae* (Cabbage White)		
Danaus plexippus (Monarch)			*Pontia protodice* (Checkered White)		
Hesperidae			*Colias eurytheme* (Orange Sulphur)		
Heliopetes ericetorum (Northern White-Skipper)			*Colias* harfordii (Harford's Sulphur)		
Hylephila phyleus (Fiery Skipper)			*Eurema nicippe* (Sleepy Orange)		
Pyrgus albescens (White Checkered-Skipper)			**Satyridae (Satyrids)**		
Erynnis funeralis (Funereal Duskywing)			*Coenonympha californica* (Common California Ringlet)		
Erynnis tristis (Mournful Duskywing)			**OTHERS:**		
Erynnis propertius (Propertius Duskywing)					
Ochlodes agricola (Rural Skipper)					
Lycaenidae (Hairstreaks)					
Atlides halesus (Great Purple Hairstreak)					
Incisalia augustinus (Western Brown Elfin)					
Callophrys perplexa (Perplexing Hairstreak)					
Strymon melinus (Gray Hairstreak)					
Glaucopsyche lygdamus (Southern Blue)					
Icarcia acmon (Acmon Blue)	11				
Celastrina ladon (Echo Blue)					

Surveyor L. Messett Segment # New Cable to Moval Date: 3/19/10

Comments: The project site is linear and follows existing transmission lines. The survey area also included a 50 ft buffer on either side of the alignment. An existing dirt road follows the alignment. Surrounding land uses include agriculture and open space. There is sparse residential areas adjacent to the survey area as well.

Plant Communities and Habitat Information: Vegetation consists of annual grassland and Riverside sage scrub (dominated by bottlebush) other shrubs include Ca sagebrush, and Ca buckwheat.

Host Plants Present: None observed

Nectar Plants Present: Popcorn flower, goldfields, fiddleneck, sun cups blue dicks

☐ Quino Sighting — Date: — GPS Location: —

Photographs Taken: —

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.

Quino Checkerspot General Form **Adult Survey**

Location Lakeview Survey Segment New Cable to Moval
Surveyor L. Messett Date 3/26/10 Survey Week Number 2
Survey Partner(s) —
Total Acres: _____ Portion Surveyed: Davis Rd to Ramona Exp. Elevation: Max 1500 Min 1400

Time (24 hr)	% Cloud	Sky	Wind (range)	Temp (*F*)
Start 0945	0	clear patchy overcast drizzle shower	0-1	61
1030	0	clear patchy overcast drizzle shower	0-1	61
1215	0	clear patchy overcast drizzle shower	0-2	64
1430	0	clear patchy overcast drizzle shower	0-1	69
|	|	clear patchy overcast drizzle shower	|	|
|	|	clear patchy overcast drizzle shower	|	|
Stop 1515	0	clear patchy overcast drizzle shower	0-2	70

Habitat onsite (circle as applicable): hilltops, ridges, rock outcrops, open soils, soil crusts, clay soils, old roads, *Plantago*, *Castilleja*, *Cordylanthus*, *Antirrhinum*, nectar sources.

Butterfly Species	Count (Total)	Hill-topping	Butterfly Species	Count (Total)	Hill-topping
Nymphalidae (Brush Footed Butterflies)			*Leptotes marina* (Marine Blue)	1	
Euphydras editha quino (Quino Checkerspot)			*Philotes sonorensis* (Sonoran Blue)		
Euphydras chalcedona (Chalcedon Checkerspot)			*Plebejus melissa* (Melissa Blue)		
Charidryas gabbii (Gabb's Checkerspot)			*Everes* amyntula (Western Tailed-Blue)		
Phycoides mylitta (Mylitta Crescent)			*Brephidium exilis* (Western Pygmy-Blue)		
Thessalia leanira (Leanira Checkerspot)			**Riodinidae (Metalmarks)**		
Nymphalis antiopa (Mourning Cloak)			*Apodemia mormo* (Mormon Metalmark)		
Basilarchia lorquini (Lorquin's Admiral)			**Papilionidae (Swallowtails)**		
Junonia coenia (Common Buckeye)			*Papilio eurymedon* (Pale Swallowtail)		
Vanessa annabella (West Coast Lady)			*Papilio rutulus* (Western Tiger Swallowtail)		
Vanessa atalanta (Red Admiral)			*Papilio zelicaon* (Anise Swallowtail)		
Vanessa cardui (Painted Lady)			**Pieridae (Whites and Orangetips)**		
Vanessa virginiensis (American Lady)	~~HH~~		*Anthocharis cethura* (Desert Orangetip)		
Danaidae			*Anthocharis sara* (Sara's Orangetip)		
Danaus gilippus (Queen)			*Pieris rapae* (Cabbage White)		
Danaus plexippus (Monarch)			*Pontia protodice* (Checkered White)	11	
Hesperidae			*Colias eurytheme* (Orange Sulphur)		
Heliopetes ericetorum (Northern White-Skipper)			*Colias* harfordii (Harford's Sulphur)		
Hylephila phyleus (Fiery Skipper)			*Eurema nicippe* (Sleepy Orange)		
Pyrgus albescens (White Checkered-Skipper)			**Satyridae (Satyrids)**		
Erynnis funeralis (Funereal Duskywing)			*Coenonympha californica* (Common California Ringlet)		
Erynnis tristis (Mournful Duskywing)			**OTHERS:**		
Erynnis propertius (Propertius Duskywing)					
Ochlodes agricola (Rural Skipper)					
Lycaenidae (Hairstreaks)					
Atlides halesus (Great Purple Hairstreak)					
Incisalia augustinus (Western Brown Elfin)					
Callophrys perplexa (Perplexing Hairstreak)					
Strymon melinus (Gray Hairstreak)					
Glaucopsyche lygdamus (Southern Blue)					
Icarcia acmon (Acmon Blue)	111				
Celastrina ladon (Echo Blue)					

Surveyor L. Messett Segment # New Cable to Moval Date: 3/26/10

Comments: As of second survey no host plants have been observed. All suitable habitat has grasses growing w/in or immediately adjacent.

Plant Communities and Habitat Information: See week 1

Host Plants Present: See week 1

Nectar Plants Present: See week 1

☐ Quino Sighting — Date: — GPS Location: —

Photographs Taken: —

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.

Quino Checkerspot General Form **Adult Survey**

Location Lakeview Survey Segment New Cable to Moval
Surveyor L. Messett Date 4/8/10 Survey Week Number 3
Survey Partner(s) —
Total Acres: _____ Portion Surveyed: Davis Rd - Romory Exp. Elevation: Max 1500 Min 1400

Time (24 hr)	% Cloud	Sky	Wind (range)	Temp (*F*)
Start 0840	0	clear patchy overcast drizzle shower	0-1	62
1000	0	clear patchy overcast drizzle shower	0-1	68
1110	0	clear patchy overcast drizzle shower	0-2	74
1220	0	clear patchy overcast drizzle shower	0-1	75
|	|	clear patchy overcast drizzle shower	|	|
|	|	clear patchy overcast drizzle shower	|	|
Stop 1435	0	clear patchy overcast drizzle shower	0-2	79

Habitat onsite (circle as applicable): hilltops, ridges, rock outcrops, open soils, soil crusts, clay soils, old roads, *Plantago, Castilleja*, *Cordylanthus*, *Antirrhinum*, nectar sources.

Butterfly Species	Count (Total)	Hill-topping	Butterfly Species	Count (Total)	Hill-topping
Nymphalidae (Brush Footed Butterflies)			*Leptotes marina* (Marine Blue)		
Euphydras editha quino (Quino Checkerspot)			*Philotes sonorensis* (Sonoran Blue)		
Euphydras chalcedona (Chalcedon Checkerspot)			*Plebejus melissa* (Melissa Blue)		
Charidryas gabbii (Gabb's Checkerspot)			*Everes* amyntula (Western Tailed-Blue)		
Phycoides mylitta (Mylitta Crescent)			*Brephidium exilis* (Western Pygmy-Blue)		
Thessalia leanira (Leanira Checkerspot)			**Riodinidae (Metalmarks)**		
Nymphalis antiopa (Mourning Cloak)			*Apodemia mormo* (Mormon Metalmark)		
Basilarchia lorquini (Lorquin's Admiral)			**Papilionidae (Swallowtails)**		
Junonia coenia (Common Buckeye)			*Papilio eurymedon* (Pale Swallowtail)		
Vanessa annabella (West Coast Lady)	II		*Papilio rutulus* (Western Tiger Swallowtail)	I	
Vanessa atalanta (Red Admiral)			*Papilio zelicaon* (Anise Swallowtail)		
Vanessa cardui (Painted Lady)	~~HH~~		**Pieridae (Whites and Orangetips)**		
Vanessa virginiensis (American Lady)			*Anthocharis cethura* (Desert Orangetip)		
Danaidae			*Anthocharis sara* (Sara's Orangetip)	IIII	
Danaus gilippus (Queen)			*Pieris rapae* (Cabbage White)		
Danaus plexippus (Monarch)			*Pontia protodice* (Checkered White)	III	
Hesperidae			*Colias eurytheme* (Orange Sulphur)		
Heliopetes ericetorum (Northern White-Skipper)			*Colias* harfordii (Harford's Sulphur)		
Hylephila phyleus (Fiery Skipper)			*Eurema nicippe* (Sleepy Orange)		
Pyrgus albescens (White Checkered-Skipper)			**Satyridae (Satyrids)**		
Erynnis funeralis (Funereal Duskywing)			*Coenonympha californica* (Common California Ringlet)		
Erynnis tristis (Mournful Duskywing)			**OTHERS:**		
Erynnis propertius (Propertius Duskywing)					
Ochlodes agricola (Rural Skipper)					
Lycaenidae (Hairstreaks)					
Atlides halesus (Great Purple Hairstreak)					
Incisalia augustinus (Western Brown Elfin)					
Callophrys perplexa (Perplexing Hairstreak)					
Strymon melinus (Gray Hairstreak)					
Glaucopsyche lygdamus (Southern Blue)					
Icarcia acmon (Acmon Blue)	III				
Celastrina ladon (Echo Blue)					

Surveyor L. Messett Segment # New Cable to Moval Date: 4/8/10

Comments: When I arrived onsite today there were two tracktors mowing the vegetation on the east side of the alignment. It appears that they are mowing the entire area from the Pamona Expressway up to the transmission line alignment. I spoke w/ one of the tracktor operators and he said it was for the San Jacinto Wildlife Area - need to mow the grassland veg. for fire prevention. This mowing removed some of the suitable habitat for QCB (along w/ nectar sources).

Plant Communities and Habitat Information: See week 1

Host Plants Present: See week 1

Nectar Plants Present: See week 1

☐ Quino Sighting — Date: — GPS Location: —

Photographs Taken: —

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.

Quino Checkerspot General Form **Adult Survey**

Location Lakeview Survey Segment New Cable to Ukiah
Surveyor L. Messett Date 4/14/10 Survey Week Number 4
Survey Partner(s) —
Total Acres: _____ Portion Surveyed: Davis Rd - Ramona Exp. Elevation: Max 1500 Min 1400

Time (24 hr)	% Cloud	Sky	Wind (range)	Temp (*F*)
Start 1015	10	clear patchy overcast drizzle shower	0-1	63
1100	10	clear patchy overcast drizzle shower	0-6	65
1235	10	clear patchy overcast drizzle shower	0-5	68
1340	10	clear patchy overcast drizzle shower	0-3	70
|	|	clear patchy overcast drizzle shower	|	|
|	|	clear patchy overcast drizzle shower	|	|
Stop 1420	5	clear patchy overcast drizzle shower	0-4	73

Habitat onsite (circle as applicable): hilltops, ridges, rock outcrops, open soils, soil crusts, clay soils, old roads, *Plantago*, *Castilleja*, *Cordylanthus*, *Antirrhinum*, nectar sources.

Butterfly Species	Count (Total)	Hill-topping	Butterfly Species	Count (Total)	Hill-topping
Nymphalidae (Brush Footed Butterflies)			*Leptotes marina* (Marine Blue)	11	
Euphydras editha quino (Quino Checkerspot)			*Philotes sonorensis* (Sonoran Blue)		
Euphydras chalcedona (Chalcedon Checkerspot)			*Plebejus melissa* (Melissa Blue)		
Charidryas gabbii (Gabb's Checkerspot)			*Everes* amyntula (Western Tailed-Blue)	1111	
Phycoides mylitta (Mylitta Crescent)			*Brephidium exilis* (Western Pygmy-Blue)		
Thessalia leanira (Leanira Checkerspot)			**Riodinidae (Metalmarks)**		
Nymphalis antiopa (Mourning Cloak)			*Apodemia mormo* (Mormon Metalmark)		
Basilarchia lorquini (Lorquin's Admiral)			**Papilionidae (Swallowtails)**		
Junonia coenia (Common Buckeye)			*Papilio eurymedon* (Pale Swallowtail)		
Vanessa annabella (West Coast Lady)			*Papilio rutulus* (Western Tiger Swallowtail)		
Vanessa atalanta (Red Admiral)			*Papilio zelicaon* (Anise Swallowtail)		
Vanessa cardui (Painted Lady)	111		**Pieridae (Whites and Orangetips)**		
Vanessa virginiensis (American Lady)			*Anthocharis cethura* (Desert Orangetip)		
Danaidae			*Anthocharis sara* (Sara's Orangetip)	~~111~~ 1111	
Danaus gilippus (Queen)			*Pieris rapae* (Cabbage White)		
Danaus plexippus (Monarch)			*Pontia protodice* (Checkered White)	111	
Hesperidae			*Colias eurytheme* (Orange Sulphur)		
Heliopetes ericetorum (Northern White-Skipper)			*Colias* harfordii (Harford's Sulphur)		
Hylephila phyleus (Fiery Skipper)			*Eurema nicippe* (Sleepy Orange)		
Pyrgus albescens (White Checkered-Skipper)			**Satyridae (Satyrids)**		
Erynnis funeralis (Funereal Duskywing)	11		*Coenonympha californica* (Common California Ringlet)		
Erynnis tristis (Mournful Duskywing)			**OTHERS:**		
Erynnis propertius (Propertius Duskywing)					
Ochlodes agricola (Rural Skipper)					
Lycaenidae (Hairstreaks)					
Atlides halesus (Great Purple Hairstreak)					
Incisalia augustinus (Western Brown Elfin)					
Callophrys perplexa (Perplexing Hairstreak)					
Strymon melinus (Gray Hairstreak)					
Glaucopsyche lygdamus (Southern Blue)					
Icarcia acmon (Acmon Blue)	11				
Celastrina ladon (Echo Blue)					

Surveyor L. Messett Segment # New Cable to Moval Date: 4/14/10

Comments: The survey area on the west side of the alignment is getting very grassy. Grasses are over 1 ft high in some areas - lowering quality of OCB habitat. Nectar sources are still present but are drying up. The two tractors are continuing to mow east of alignment.

Plant Communities and Habitat Information: See week 1

Host Plants Present: See week 1

Nectar Plants Present: See week 1

☐ Quino Sighting — Date: — GPS Location: —

Photographs Taken: —

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.

Quino Checkerspot General Form **Adult Survey**

Location Lakeview Survey Segment New Cable to Moval
Surveyor L. Messett Date 4/19/10 Survey Week Number 5
Survey Partner(s) —
Total Acres: _____ Portion Surveyed: Davis Rd- Ramona Exp. Elevation: Max 1500 Min 1400

Time (24 hr)	% Cloud	Sky	Wind (range)	Temp (*F*)
Start 0910	10	clear patchy overcast drizzle shower	0-4	67
1000	0	clear patchy overcast drizzle shower	0-2	71
1100	0	clear patchy overcast drizzle shower	0-1	73
1215	0	clear patchy overcast drizzle shower	0-2	73
1345	0	clear patchy overcast drizzle shower	0-2	75
1	1	clear patchy overcast drizzle shower	1	1
Stop 1430	0	clear patchy overcast drizzle shower	0-2	76

Habitat onsite (circle as applicable): hilltops, ridges, rock outcrops, open soils, soil crusts, clay soils, old roads, *Plantago*, *Castilleja*, *Cordylanthus*, *Antirrhinum*, nectar sources.

Butterfly Species	Count (Total)	Hill-topping	Butterfly Species	Count (Total)	Hill-topping
Nymphalidae (Brush Footed Butterflies)			*Leptotes marina* (Marine Blue)	1	
Euphydras editha quino (Quino Checkerspot)			*Philotes sonorensis* (Sonoran Blue)		
Euphydras chalcedona (Chalcedon Checkerspot)			*Plebejus melissa* (Melissa Blue)		
Charidryas gabbii (Gabb's Checkerspot)			*Everes* amyntula (Western Tailed-Blue)		
Phycoides mylitta (Mylitta Crescent)			*Brephidium exilis* (Western Pygmy-Blue)		
Thessalia leanira (Leanira Checkerspot)			**Riodinidae (Metalmarks)**		
Nymphalis antiopa (Mourning Cloak)			*Apodemia mormo* (Mormon Metalmark)		
Basilarchia lorquini (Lorquin's Admiral)			**Papilionidae (Swallowtails)**		
Junonia coenia (Common Buckeye)			*Papilio eurymedon* (Pale Swallowtail)		
Vanessa annabella (West Coast Lady)	1111		*Papilio rutulus* (Western Tiger Swallowtail)	11	
Vanessa atalanta (Red Admiral)			*Papilio zelicaon* (Anise Swallowtail)		
Vanessa cardui (Painted Lady)	~~HH~~ ~~HH~~ 1		**Pieridae (Whites and Orangetips)**		
Vanessa virginiensis (American Lady)			*Anthocharis cethura* (Desert Orangetip)		
Danaidae			*Anthocharis sara* (Sara's Orangetip)	~~HH~~ ~~HH~~	
Danaus gilippus (Queen)			*Pieris rapae* (Cabbage White)		
Danaus plexippus (Monarch)			*Pontia protodice* (Checkered White)	~~HH~~ 1	
Hesperidae			*Colias eurytheme* (Orange Sulphur)		
Heliopetes ericetorum (Northern White-Skipper)			*Colias* harfordii (Harford's Sulphur)		
Hylephila phyleus (Fiery Skipper)			*Eurema nicippe* (Sleepy Orange)		
Pyrgus albescens (White Checkered-Skipper)			**Satyridae (Satyrids)**		
Erynnis funeralis (Funereal Duskywing)	111		*Coenonympha californica* (Common California Ringlet)		
Erynnis tristis (Mournful Duskywing)			**OTHERS:**		
Erynnis propertius (Propertius Duskywing)					
Ochlodes agricola (Rural Skipper)					
Lycaenidae (Hairstreaks)					
Atlides halesus (Great Purple Hairstreak)					
Incisalia augustinus (Western Brown Elfin)					
Callophrys perplexa (Perplexing Hairstreak)					
Strymon melinus (Gray Hairstreak)					
Glaucopsyche lygdamus (Southern Blue)					
Icarcia acmon (Acmon Blue)	11				
Celastrina ladon (Echo Blue)					

Surveyor L. Messett Segment # New Cable to Moval Date: 4/19/10

Comments: Most nectar sources are dried up - however there is still some flowering (popcorn flower). The area on the west side of the alignment is very grassy now amount of open soil is decreased significantly since first survey. The tractors continue to plow on the east side of alignment adjacent to buffer area that was included in the survey area.

No QCB were observed on the project site during the focused surveys.

Plant Communities and Habitat Information: See week 1

Host Plants Present: See week 1

Nectar Plants Present: See week 1

☐ Quino Sighting — Date: — GPS Location: —

Photographs Taken: —

1.	2.	3.
4.	5.	6.
7.	8.	9.
10.	11.	12.

BIOLOGICAL TECHNICAL REPORT

LAKEVIEW SUBSTATION AND TRANSMISSION LINE PROJECT, RIVERSIDE COUNTY, CALIFORNIA

Prepared for

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June 2010

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APPENDICES

A Plant and Wildlife Compendia

EXECUTIVE SUMMARY

Project:	Lakeview Substation and Transmission Line Project
Project Proponent:	Southern California Edison
Principal Investigator:	BonTerra Consulting 151 Kalmus Drive, Suite E-200 Costa Mesa, California 92626 (714) 444-9199

At the request of Southern California Edison (SCE), BonTerra Consulting conducted a biological resources assessment for the Lakeview Substation and Transmission Line Project (hereafter referred to as "the Project") which proposes to create a new substation and a new transmission line segment to connect the substation to SCE's existing telecommunications system. The assessment included focused biological surveys and habitat suitability assessments for special status plant and wildlife species within two potential substation sites and six potential transmission line segments selected for the Project. The sites are referred to in this Biological Technical Report as the Proposed Substation Site, the Alternative Substation Site, the Proposed Subtransmission Source Line Route (Segments 1 and 2), the Alternative Subtransmission Source Line Route (Segment 3), and the Proposed Telecommunications Route (New Cable to Moval and Proposed Overhead Routes 1 and 2); these correspond with the Proponent's Environmental Assessment (PEA). A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Routes.

The purpose of the biological resources assessment is to provide an overview-level assessment of the biological resources present and potentially present in the Survey Area, and to determine which focused surveys and pre-construction biological clearance surveys may be necessary prior to construction to minimize impacts on special status species that may be present in the Survey Area.

1.0 INTRODUCTION

This Biological Technical Report has been prepared to support California Environmental Quality Act (CEQA) documentation for the proposed Lakeview Substation and Transmission Line Project (hereafter referred to as "the Project"). This information has been reported in accordance with accepted scientific and technical standards that are consistent with the requirements of the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG).

1.1 PROJECT DESCRIPTION AND LOCATION

The purpose of this study is to document the biological resources associated with the proposed Project located in Riverside County, California (Exhibit 1). The Project's purpose is to construct a new substation and a new transmission line segment to connect the substation to Southern California Edison's (SCE's) existing telecommunication system. The Project's Survey Area consists of the following: the Proposed Substation Site, the Alternative Substation Site, the Proposed Subtransmission Source Line Route (Segments 1 and 2), the Alternative Subtransmission Source Line Route (Segment 3), and the Proposed Telecommunications Route (New Cable to Moval and Proposed Overhead Routes 1 and 2). A 50-foot buffer is also included on either side of all the Subtransmission Source Line Routes and the Proposed Telecommunications Routes (Exhibit 2).

The Survey Area is located on the U.S. Geological Survey's (USGS's) Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Survey Area is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route (New Cable to Moval) runs from the Moval Substation (on Moreno Beach Drive in the City of Moreno Beach) to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Hills to the Ramona Expressway.

Land uses in the immediate Project vicinity are primarily agricultural and residential. Open space is present in the Bernasconi Hills in the northwestern portion of the Survey Area and the Lakeview Mountains to the southeast of the Survey Area. Topography in the Survey Area is mostly flat in the northern portion and varied in the southern portion with an approximate range of elevation from 1,400 feet to 2,200 feet above mean sea level (msl). Soils in the Survey Area consist of Domino fine sandy loam, saline-alkali; Domino silt loam; Domino silt loam, saline-alkali; Exeter sandy loam; Exeter sandy loam, deep; Gorgonio loamy sand; Gorgonio loamy sand, deep; Greenfield sandy loam; Hanford coarse sandy loam; Metz loamy fine sand, sandy loam substratum; Metz loamy sand; Pachappa fine sandy loam; Placentia fine sandy loam; Ramona sandy loam; Riverwash; Rockland; San Emigdio fine sandy loam; San Emigdio loam; Terrace escarpments; Willows silty clay; Willows silty clay, saline-alkali; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (USDA NRCS 2007; Exhibits 3A–3O).

1.1.1 Site-Specific Information

Proposed Substation Site

The Proposed Substation Site is located on the southwestern corner of Reservoir Avenue and 10th Street. Soils on the Proposed Substation Site consist of Exeter sandy loam, deep; Hanford coarse sandy loam; and Pachappa fine sandy loam (Exhibit 3L).

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Regional Location

Exhibit 1

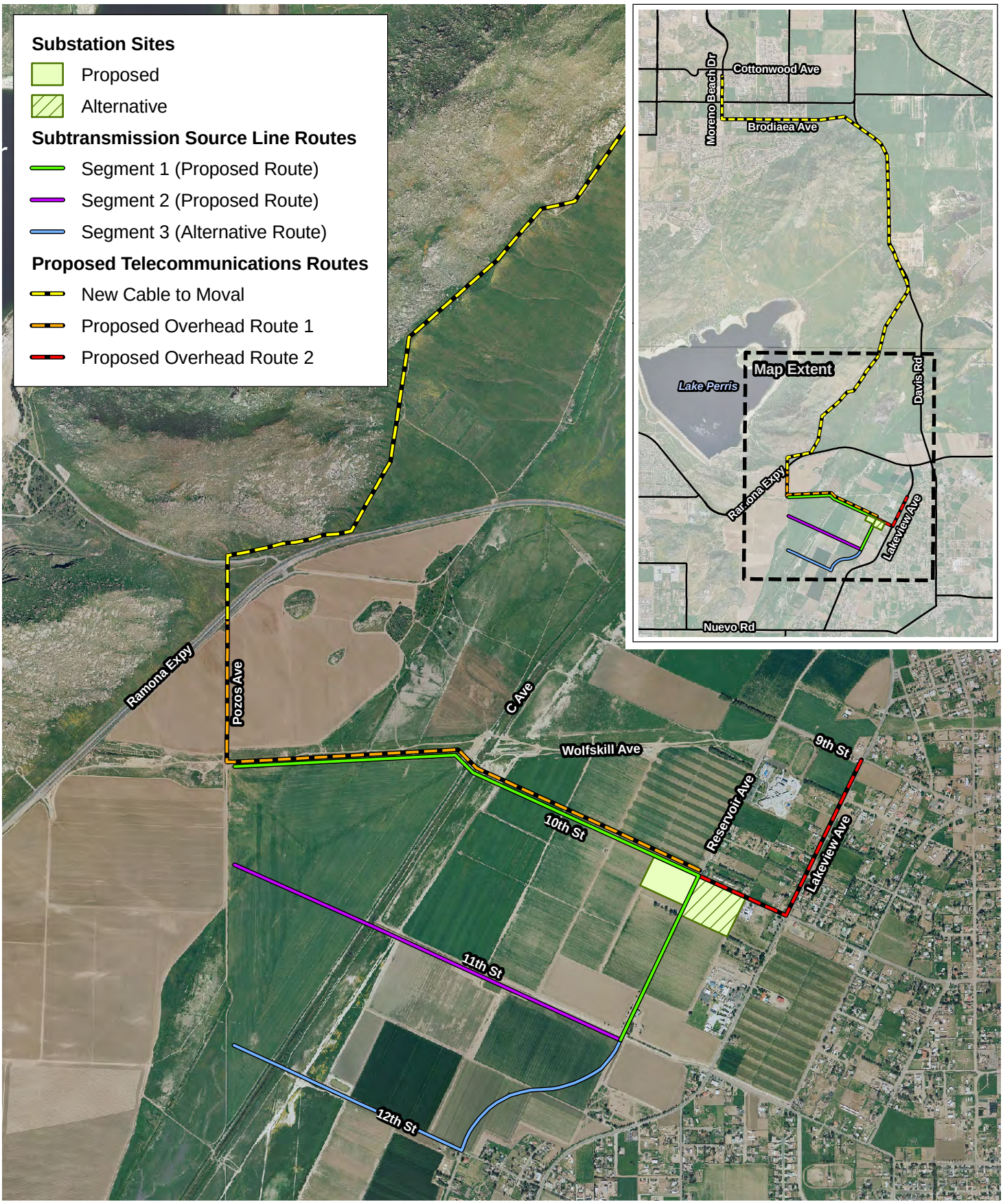
Lakeview Substation and Transmission Line Project

N W E S

10 5 0 10 Miles

BonTerra CONSULTING

(Rev 03/11/10 CJS) PAS\Projects\Edison\J025\Graphics\BioTech\Ex1_RL.pdf



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Local Vicinity

Exhibit 2

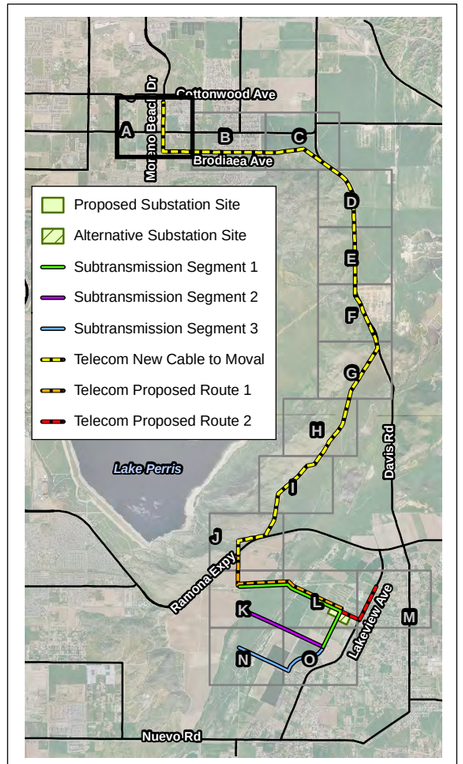
Lakeview Substation and Transmission Line Project

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(rev 06/02/10 CJS) PAS/Projects/Edison/J025/BioTech/Ex2_LV_aerial.pdf



Soil Types

- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- PaC2, Pachappa fine sandy loam, 2 to 8 percent slopes, eroded
- SeA, San Emigdio fine sandy loam, 0 to 2 percent slopes
- SeC2, San Emigdio fine sandy loam, 2 to 8 percent slopes, eroded
- SgC, San Emigdio loam, 2 to 8 percent slopes

Soil Types — Exhibit 3A

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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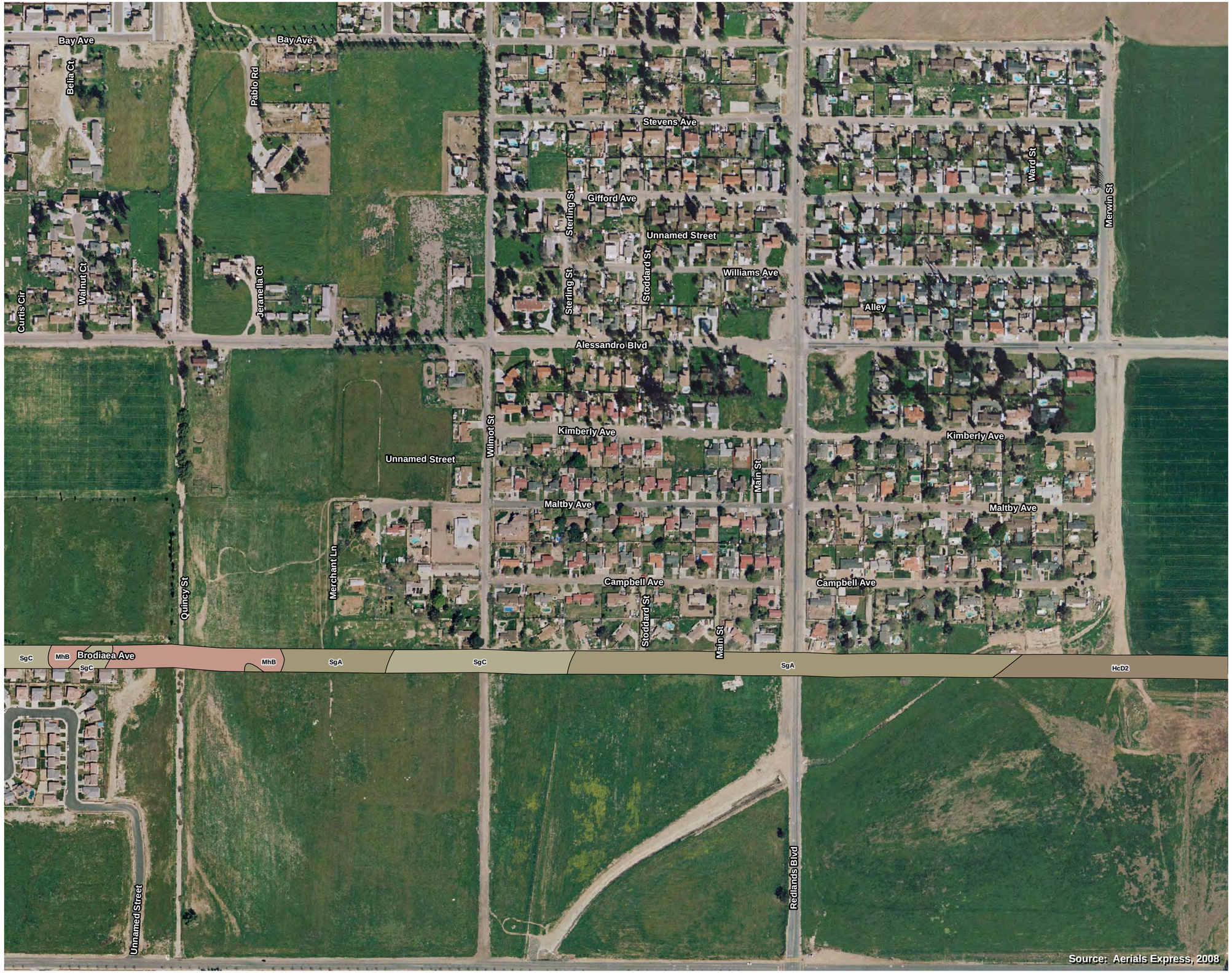

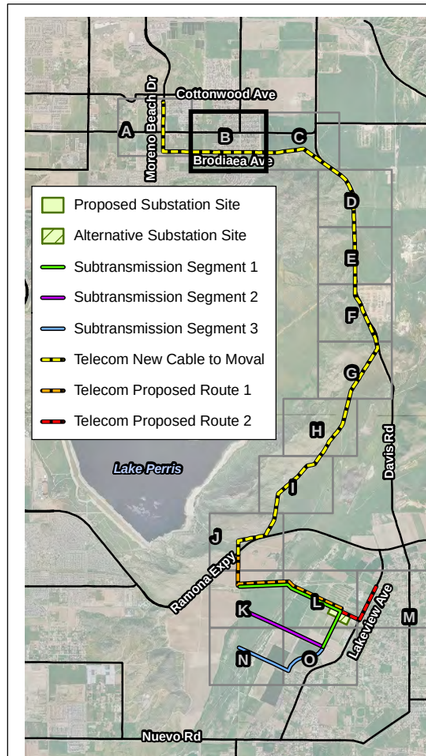

Soil Types

- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- MhB, Metz loamy fine sand, sandy loam substratum, 0 to 5 percent slopes
- SgA, San Emigdio loam, 0 to 2 percent slopes
- SgC, San Emigdio loam, 2 to 8 percent slopes

Soil Types — Exhibit 3B

Lakeview Substation and Transmission Line Project

0 400 Feet

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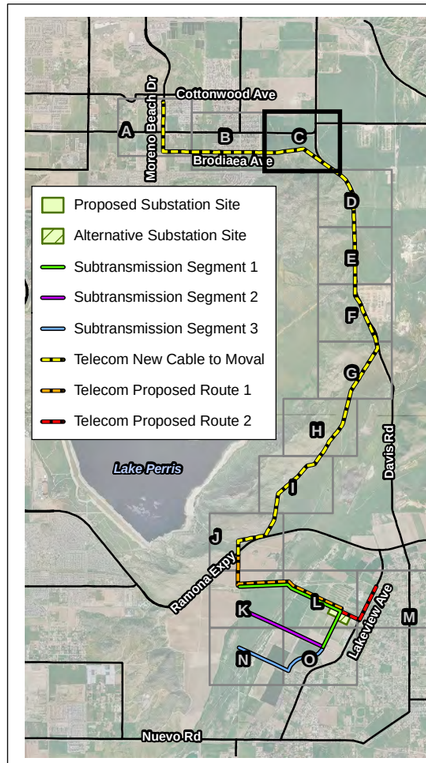

Soil Types

- GhC, Gorgonio loamy sand, 0 to 8 percent slopes
- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- MdC, Metz loamy sand, 2 to 8 percent slopes
- RtF, Rockland
- SgC, San Emigdio loam, 2 to 8 percent slopes

Soil Types — Exhibit 3C

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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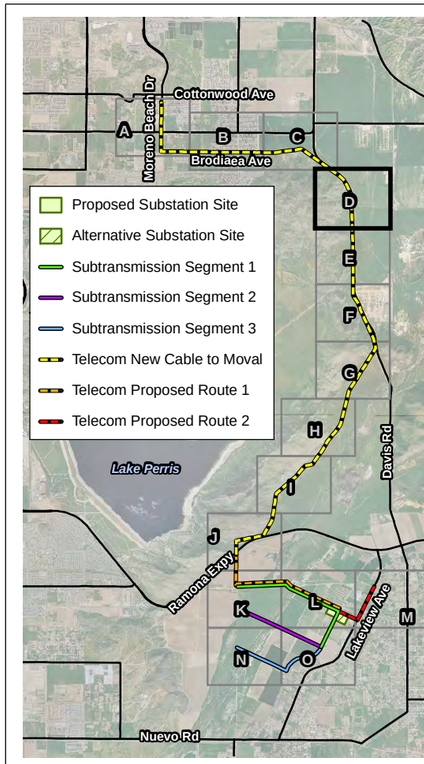

Soil Types

- GyA, Greenfield sandy loam, 0 to 2 percent slopes
- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- RtF, Rockland

Soil Types — Exhibit 3D

Lakeview Substation and Transmission Line Project

0 400 Feet

BonTerra CONSULTING

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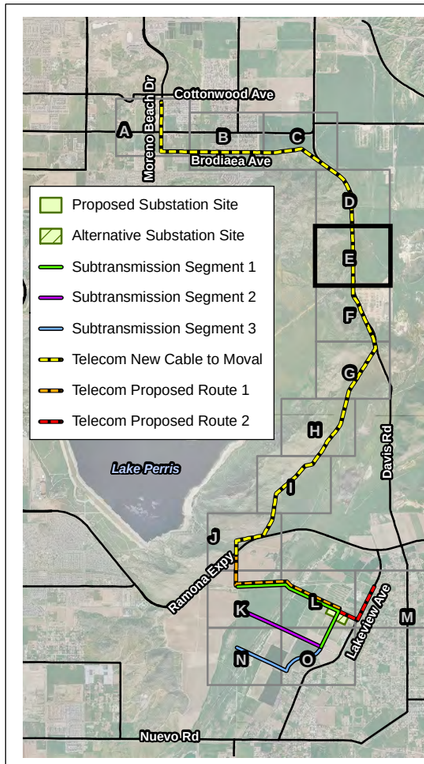

Soil Types

- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes

Soil Types

Exhibit 3E

Lakeview Substation and Transmission Line Project

0 400 Feet

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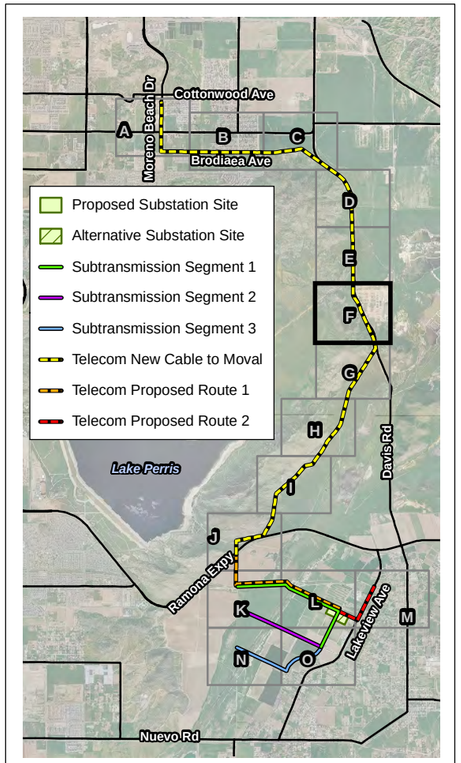

Soil Types

- GlC, Gorgonio loamy sand, deep, 2 to 8 percent slopes
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- RtF, Rockland
- TeG, Terrace escarpments

Soil Types

Exhibit 3F

Lakeview Substation and Transmission Line Project

0 400 Feet

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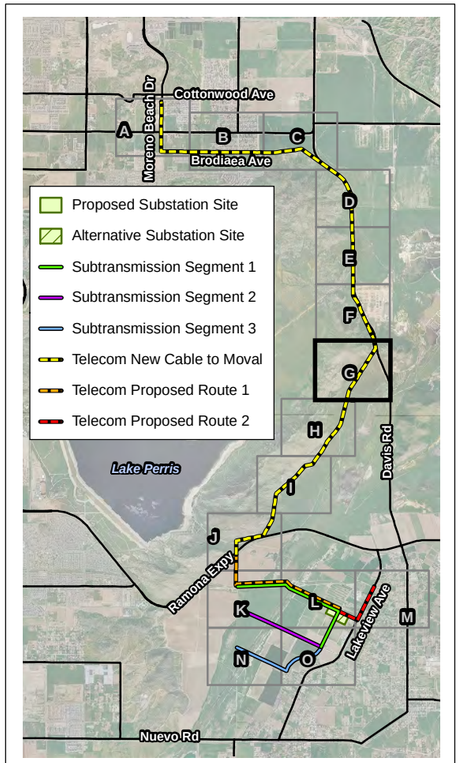

Soil Types

- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- PlB, Placentia fine sandy loam, 0 to 5 percent slopes
- RtF, Rockland
- TeG, Terrace escarpments

Soil Types — Exhibit 3G

Lakeview Substation and Transmission Line Project

0 400 Feet

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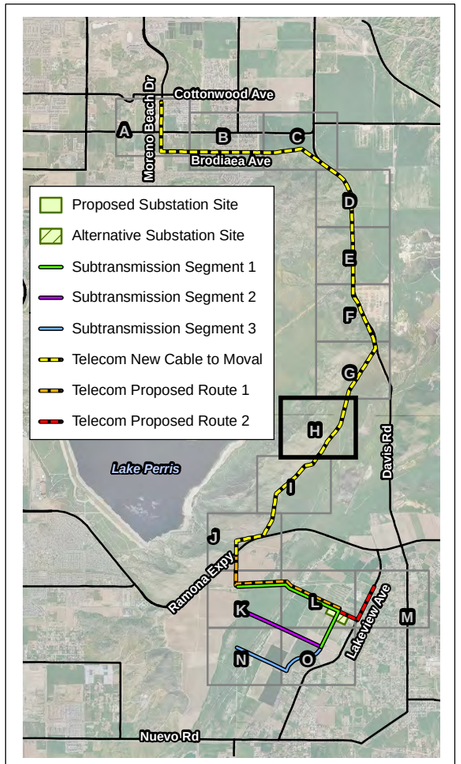

Soil Types

- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- RtF, Rockland
- TeG, Terrace escarpments

Soil Types — Exhibit 3H

Lakeview Substation and Transmission Line Project

0 400 Feet

BonTerra CONSULTING

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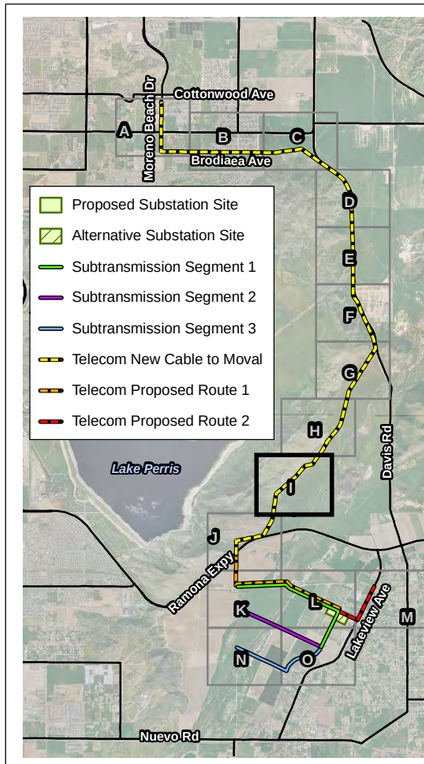

Soil Types

- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- RtF, Rockland
- TeG, Terrace escarpments

Soil Types — Exhibit 3I

Lakeview Substation and Transmission Line Project

0 400 Feet

BonTerra CONSULTING

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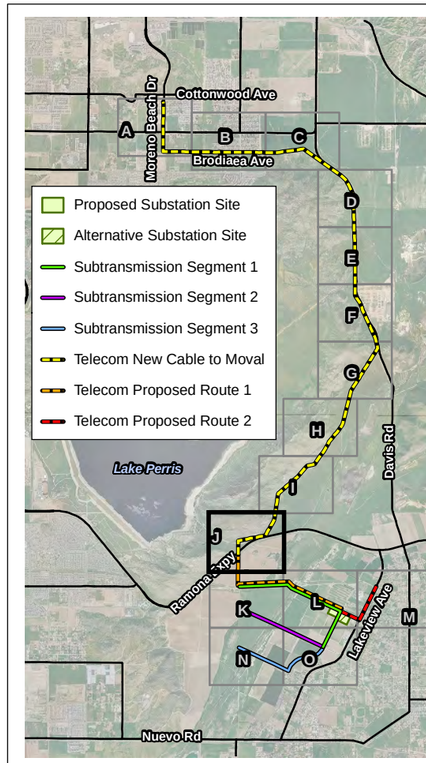

Soil Types

- EnC2, Exeter sandy loam, 2 to 8 percent slopes, eroded
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- HcD2, Hanford coarse sandy loam, 8 to 15 percent slopes, eroded
- RtF, Rockland
- TeG, Terrace escarpments

Soil Types

Exhibit 3J

Lakeview Substation and Transmission Line Project

0 400 Feet

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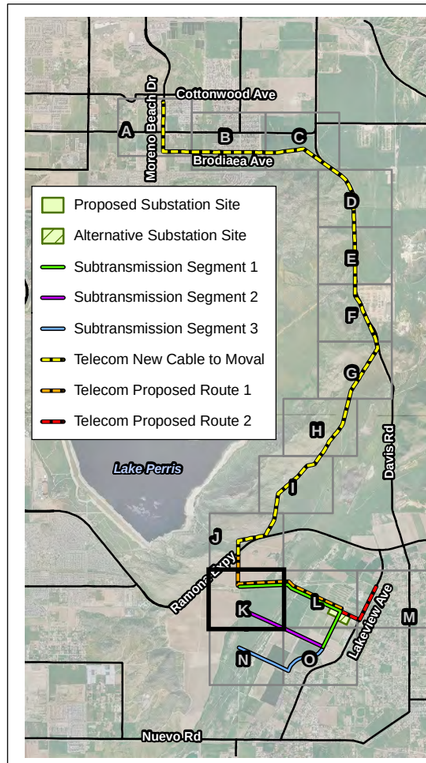

Soil Types

- Dv, Domino silt loam, saline-alkali
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- RsC, Riverwash
- Wf, Willows silty clay
- Wg, Willows silty clay, saline-alkali
- Wh, Willows silty clay, strongly saline-alkali
- Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types — Exhibit 3K

Lakeview Substation and Transmission Line Project

0 400 Feet

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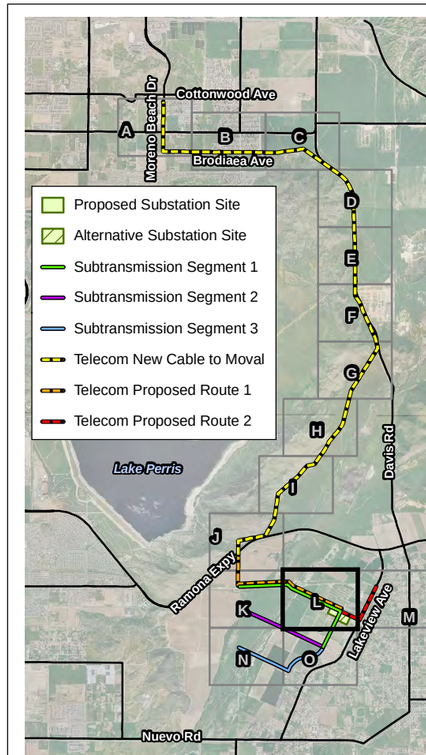

Soil Types

- Dt, Domino fine sandy loam, saline-alkali
- Du, Domino silt loam
- Dv, Domino silt loam, saline-alkali
- EpC2, Exeter sandy loam, deep, 2 to 8 percent slopes, eroded
- GyA, Greenfield sandy loam, 0 to 2 percent slopes
- HcC, Hanford coarse sandy loam, 2 to 8 percent slopes
- PaA, Pachappa fine sandy loam, 0 to 2 percent slopes
- PaC2, Pachappa fine sandy loam, 2 to 8 percent slopes, eroded
- RaA, Ramona sandy loam, 0 to 2 percent slopes
- RsC, Riverwash
- Wg, Willows silty clay, saline-alkali
- Wh, Willows silty clay, strongly saline-alkali
- Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types

Exhibit 3L

Lakeview Substation and Transmission Line Project

0 400 Feet

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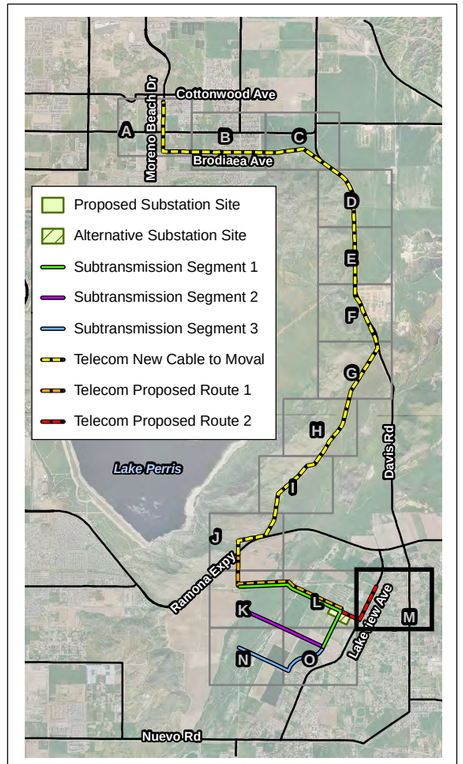

Soil Types

- GyA, Greenfield sandy loam, 0 to 2 percent slopes
- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- HgA, Hanford fine sandy loam, 0 to 2 percent slopes

Soil Types — Exhibit 3M

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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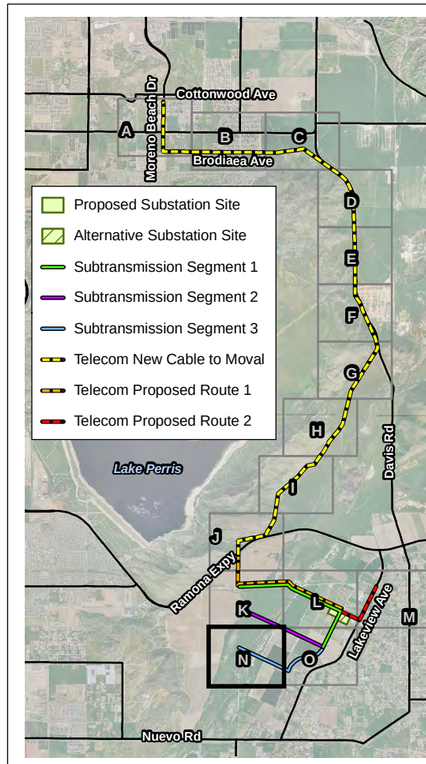

Soil Types

- Dv, Domino silt loam, saline-alkali
- EpA, Exeter sandy loam, deep, 0 to 2 percent slopes
- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- RsC, Riverwash
- Wf, Willows silty clay
- Wg, Willows silty clay, saline-alkali
- Wn, Willows silty clay, deep, strongly saline-alkali

Soil Types — Exhibit 3N

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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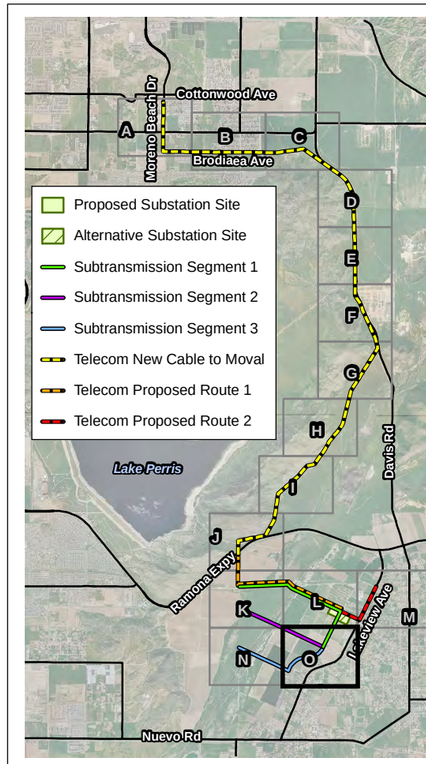

Soil Types

- Dv, Domino silt loam, saline-alkali
- EpA, Exeter sandy loam, deep, 0 to 2 percent slopes
- GyC2, Greenfield sandy loam, 2 to 8 percent slopes, eroded
- PaA, Pachappa fine sandy loam, 0 to 2 percent slopes
- RaA, Ramona sandy loam, 0 to 2 percent slopes
- Wh, Willows silty clay, strongly saline-alkali

Soil Types — Exhibit 3O

Lakeview Substation and Transmission Line Project

0 — 400 Feet

BonTerra CONSULTING

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Alternative Substation Site

The Alternative Substation Site is located on the southeast corner of Reservoir Avenue and 10th Street. Soils on the Alternative Substation Site consist of Greenfield sandy loam; Hanford coarse sandy loam; and Pachappa fine sandy loam (Exhibit 3L).

Proposed Subtransmission Source Line Route, Segment 1

Segment 1 is located along Reservoir Avenue between 11th Street and 10th Street, then runs along 10th Street to Pozos Avenue. Soils along the Proposed Subtransmission Source Line Route, Segment 1 consist of Domino silt loam; Domino silt loam, saline-alkali; Domino fine sandy loam, saline-alkali; Exeter sandy loam, deep; Greenfield sandy loam; Hanford coarse sandy loam; Pachappa fine sandy loam; Ramona sandy loam; Riverwash; Willows silty clay, saline-alkali; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (Exhibits 3K and 3L).

Proposed Subtransmission Source Line Route, Segment 2

The Proposed Subtransmission Source Line Route, Segment 2 is located along 11th Street between Reservoir Avenue and Pozos Avenue. Soils along the Proposed Subtransmission Source Line Route, Segment 2 consist of Domino silt loam, saline-alkali; Exeter sandy loam, deep; Hanford coarse sandy loam; Ramona sandy loam; Riverwash; Willows silty clay; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (Exhibits 3K and 3O).

Alternative Subtransmission Source Line Route, Segment 3

The Alternative Subtransmission Source Line Route, Segment 3 is located along 12th Street and then crosses agricultural fields to join Segments 1 and 2. Soils along the Alternative Subtransmission Source Line Route, Segment 3 consist of Domino silty loam, saline-alkali; Exeter sandy loam, deep; Greenfield sandy loam; Riverwash; Willows silty clay; Willows silty clay, saline-alkali; and Willows silty clay, deep, strongly saline-alkali (Exhibits 3N and 3O).

Proposed Telecommunications Route, New Cable to Moval

The New Cable to Moval runs along Pozos Avenue north of the terminus of the Proposed Subtransmission Source Line Route, Segment 1. It then runs northeasterly along the Bernasconi Hills after crossing the Ramona Expressway. It follows Davis Road, crosses to Moreno Beach Drive to the west, and then runs along Moreno Beach Drive and ends north of Alessandro Boulevard. Soils along the New Cable to Moval consist of Greenfield sandy loam; Gorgonio loamy sand; Gorgonio loamy sand, deep; Hanford coarse sandy loam; Metz loamy fine sand, sandy loam; Metz loamy sand; Pachappa fine sandy loam; Rockland; Placentia fine sandy loam; San Emigdio fine sandy loam; San Emigdio loam; and Terrace escarpments (Exhibits 3A–3J).

Proposed Telecommunications Route, Proposed Overhead Route 1

The Proposed Overhead Route 1 is located along Reservoir Avenue between 11th Street and 10th Street, then runs along 10th Street to Pozos Avenue. Soils along the Proposed Overhead Route 1 consist of Domino silt loam; Domino fine sandy loam, saline-alkali; Exeter sandy loam, deep; Exeter sandy loam; Greenfield sandy loam; Hanford coarse sandy loam; Pachappa fine sandy loam; Riverwash; Willows silty clay, saline-alkali; Willows silty clay, strongly saline-alkali; and Willows silty clay, deep, strongly saline-alkali (Exhibits 3J–3L).

Proposed Telecommunications Route, Proposed Overhead Route 2

The Proposed Overhead Route 2 is located along Lakeview Avenue between 9th Street and 10th Street. Soils along the Proposed Overhead Route 2 consist of Greenfield sandy loam and Hanford fine sandy loam (Exhibit 3L and 3M).

1.2 REGIONAL ENVIRONMENTAL SETTING

The Survey Area is located along the San Jacinto River between Perris Valley to the west and San Jacinto Valley to the east. The Bernasconi Hills/Lake Perris State Recreation Area borders the northwestern portion of the Survey Area and the Lakeview Mountains are located to the southeast. Farther west lie the the Santa Ana Mountains/Cleveland National Forest, and farther east lie the San Jacinto Mountains/San Bernardino National Forest.

The Survey Area is located within the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) area. In the MSHCP, the Survey Area is considered to be within the Riverside Lowlands Bioregion. This bioregion generally occurs at elevations below 2,000 feet and is characterized by Riversidean sage scrub and annual grasslands. It has a relatively arid climate, in part as a result of the rain shadow cast by the Santa Ana Mountains. This bioregion has a high level of disturbance and urbanization.

1.3 REGULATORY SETTING

1.3.1 Federal

Federal Endangered Species Act (16 United States Code [USC] 153 et seq.)

The Federal Endangered Species Act of 1973 (FESA) protects plants and animals that are listed by the federal government as “Endangered” or “Threatened”. The FESA is implemented by enforcing Sections 7 and 9 of the Act. A federally listed species is protected from unauthorized “take” pursuant to Section 9 of the FESA. “Take”, as defined by the FESA, means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt to engage in any such conduct”. All persons are presently prohibited from taking a federally listed species unless and until: (1) the appropriate Section 10(a) permit has been issued by the USFWS or (2) an incidental Take Statement is obtained as a result of formal consultation between a federal agency and the USFWS pursuant to Section 7 of the FESA and the implementing regulations that pertain to it (50 *Code of Federal* Regulations [CFR] 402). “Person” is defined in the FESA as “an individual, corporation, partnership, trust, association, or any private entity; any officer, employee, agent, department or instrument of the federal government; any State, Municipality, or political subdivision of the state; or any other entity subject to the jurisdiction of the United States”. The Project Applicant is a “person” for purposes of the FESA.

Section 404 and 401 of the Clean Water Act of 1972 (33 USC 1251 et seq.)

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged or fill material into “Waters of the U.S.”, including wetlands. The U.S. Army Corps of Engineers (USACE) is the designated regulatory agency responsible for administering the 404 permit program and for making jurisdictional determinations. This permitting authority applies to all “Waters of the U.S.” where the material has the effect of (1) replacing any portion of “Waters of the U.S.” with dry land or (2) changing the bottom elevation of any portion of “Waters of the U.S.”. These fill materials would include sand, rock, clay, construction debris, wood chips, and materials used to create any structure or infrastructure in “Waters of the U.S.”. Dredge and fill activities are

typically associated with development projects; water-resource related projects; infrastructure development and wetland conversion to farming; forestry; and urban development.

Under Section 401 of the CWA, an activity requiring a USACE Section 404 permit must obtain a State Water Quality Certification (or waiver thereof) to ensure that the activity will not violate established State water quality standards. The State Water Resources Control Board (SWRCB), in conjunction with the nine California Regional Water Quality Control Boards (RWQCBs), is responsible for administering the Section 401 water quality certification program.

Under Section 401 of the federal CWA, an activity involving discharge into a water body must obtain a federal permit and a State Water Quality Certification to ensure that the activity will not violate established water quality standards. The U.S. Environmental Protection Agency (USEPA) is the federal regulatory agency responsible for implementing the CWA. However, it is the SWRCB in conjunction with the nine RWQCBs who essentially have been delegated the responsibility to administer the water quality certification (401) program.

Migratory Bird Treaty Act of 1918 (16 USC 703–711)

The Migratory Bird Treaty Act of 1918, as amended in 1972 (MBTA), makes it unlawful, unless permitted by regulations, to ”pursue; hunt; take; capture; kill; attempt to take, capture or kill; possess; offer for sale; sell; offer to purchase; purchase; deliver for shipment; ship; cause to be shipped; deliver for transportation; transport; cause to be transported; carry or cause to be carried by any means whatever; receive for shipment, transportation, or carriage; or export, at any time, or in any manner, any migratory bird. . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird” (16 USC 703).

In 1972, the MBTA was amended to include protection for migratory birds of prey (e.g., raptors). Six families of raptors occurring in North America were included in the amendment: Accipitridae (kites, hawks, and eagles), Cathartidae (New World vultures), Falconidae (falcons and caracaras), Pandionidae (ospreys), Strigidae (typical owls), and Tytonidae (barn owls). The provisions of the 1972 amendment to the MBTA protect all species and subspecies of these families.

Bald and Golden Eagle Protection Act (16 USC 668)

This Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of these bird species. The 1972 amendments increased penalties for violating provisions of the Act and strengthened other enforcement measures. A 1978 amendment authorizes the Secretary of the Interior to permit the taking of golden eagle nests that interfere with resource development or recovery operations. A 1994 Memorandum (59 CFR 22953, April 29, 1994) from President William J. Clinton to the heads of Executive Agencies and Departments sets out the policy concerning collection and distribution of eagle feathers for Native American religious purposes.

1.3.2 State

California Endangered Species Act (California Fish and Game Code, Section 2050 et seq.)

Pursuant to the California Endangered Species Act (CESA) and Section 2081 of the *California Fish and Game Code*, an incidental take permit from the CDFG is required for projects that could result in the take of a State-listed Threatened or Endangered species. Under the CESA, “take” is defined as an activity that would directly or indirectly kill an individual of a species, but the definition does not include “harm” or “harass”, as the federal act does. As a result, the

threshold for a take under the CESA is higher than that under the FESA. A CDFG-authorized Incidental Take Permit would be required where a project could result in the take of a State-listed Threatened or Endangered species. The application for an incidental take permit under Section 2081(b) has a number of requirements including the preparation of a conservation plan, generally referred to as a Habitat Conservation Plan.

The State of California considers an Endangered Species to be one whose prospects of survival and reproduction are in immediate jeopardy; a Threatened Species as one present in such small numbers throughout its range that it is likely to become an Endangered Species in the near future in the absence of special protection or management; and a Rare Species as one present in such small numbers throughout its range that it may become Endangered if its present environment worsens. The Rare Species designation applies only to California native plants. The CESA authorizes the CDFG to issue permits authorizing incidental take of Threatened and Endangered Species. A California Species of Special Concern is an informal designation which the CDFG uses for some declining wildlife species that are not State Candidates for listing. This designation does not provide legal protection, but signifies that these species are recognized as special status by the CDFG.

California Environmental Quality Act (California Fish and Game Code, Section 1802)

State law confers upon the CDFG the trustee responsibility and authority for the public trust resource of wildlife in California. The CDFG may play various roles under the CEQA process. By State law, the CDFG has jurisdiction over the conservation, protection, and management of the wildlife, native plants, and habitat necessary to maintain biologically sustainable populations. The CDFG shall consult with lead and responsible agencies and shall provide the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities.

As a trustee agency, the CDFG has jurisdiction over certain resources held in trust for the people of California. Trustee agencies are generally required to be notified of CEQA documents relevant to their jurisdiction, whether or not these agencies have actual permitting authority or approval power over aspects of the underlying project (14 *California Code of Regulations* [CCR], §15386). The CDFG, as a trustee agency, must be notified of CEQA documents regarding projects involving fish and wildlife of the State, as well as Rare and Endangered native plants, wildlife areas, and ecological reserves. Although as a trustee agency the CDFG cannot approve or disapprove a project, lead and responsible agencies are required to consult with the CDFG. The CDFG, as the trustee agency for fish and wildlife resources, shall provide the requisite biological expertise to review and comment upon environmental documents and impacts arising from project activities, and shall make recommendations regarding those resources held in trust for the people of California (*California Fish and Game Code*, §1802).

California Fish and Game Code (Sections 1600 through 1616)

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that support wildlife resources and/or riparian vegetation are subject to CDFG regulations pursuant to Sections 1600 through 1603 of the *California Fish and Game Code*. Under Section 1602, it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream, or lake designated by the CDFG as waters within their jurisdiction. Additionally, a person cannot use any material from the streambeds without first notifying the CDFG of such activity. For a project that may affect stream channels and/or riparian vegetation regulated under Sections 1600 through 1603, CDFG authorization is required in the form of a Streambed Alteration Agreement.

Additional Fish and Game Codes

Sections 1900 et seq., or Native Plant Protection Act

This section lists Threatened, Endangered, and Rare plants so designated by the California Fish and Game Commission.

Sections 3511, 4700, 5050, and 5515

These sections provide a provision for the protection of bird, mammal, reptile, amphibian, and fish species that are "fully protected". Fully protected animals may not be harmed, taken, or possessed.

Sections 3503, 3503.5, and 3513

This section states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by any regulation made pursuant to this code. Section 3503.5 explicitly provides protection for all birds of prey, including their eggs and nests. Section 3513 makes it unlawful to take or possess any migratory non-game bird as designated in the MBTA.

Title 14, California Code of Regulations, Sections 670.2 and 670.5

These sections list animals designated as Threatened or Endangered in California. The CDFG designates species considered to be indicators of regional habitat changes or candidate species for future State listing as "California Species of Special Concern" (SSC).

California Porter-Cologne Water Quality Control Act

Pursuant to the California Porter-Cologne Water Quality Control Act, the SWRCB and the nine RWQCBs may require permits (known as "Waste Discharge Requirements" or "WDRs") for the fill or alteration of the "Waters of the State". The term "Waters of the State" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (*California Water Code*, §13050[e]). The SWRCB and RWQCBs have interpreted their authority to require WDRs to extend to any proposal to fill or alter "Waters of the State", even if those same waters are not under USACE jurisdiction. Pursuant to this authority, the SWRCB and RWQCBs may require the submission of a "report of waste discharge" under Section 13260, which is treated as an application for WDRs.

1.3.3 County

Western Riverside County Multiple Species Habitat Conservation Plan

The Western Riverside MSHCP is a comprehensive, multi-jurisdictional plan that focuses on conservation of species and their associated habitats in western Riverside County. The MSHCP allows Riverside County and its cities to better control local land use decisions and to maintain a strong economic climate in the region while addressing the requirements of the CESA and FESA. The MSHCP Plan Area encompasses 1.26 million acres in western Riverside County. The MSHCP serves as a Habitat Conservation Plan pursuant to Section 10(a)(1)(B) of the FESA, and as a Natural Communities Conservation Plan (NCCP) under the NCCP Act of 2001. The MSHCP is used to allow the participating jurisdictions to authorize "take" of plant and wildlife species identified within the Plan Area. Under the MSHCP, the wildlife agencies (i.e., the

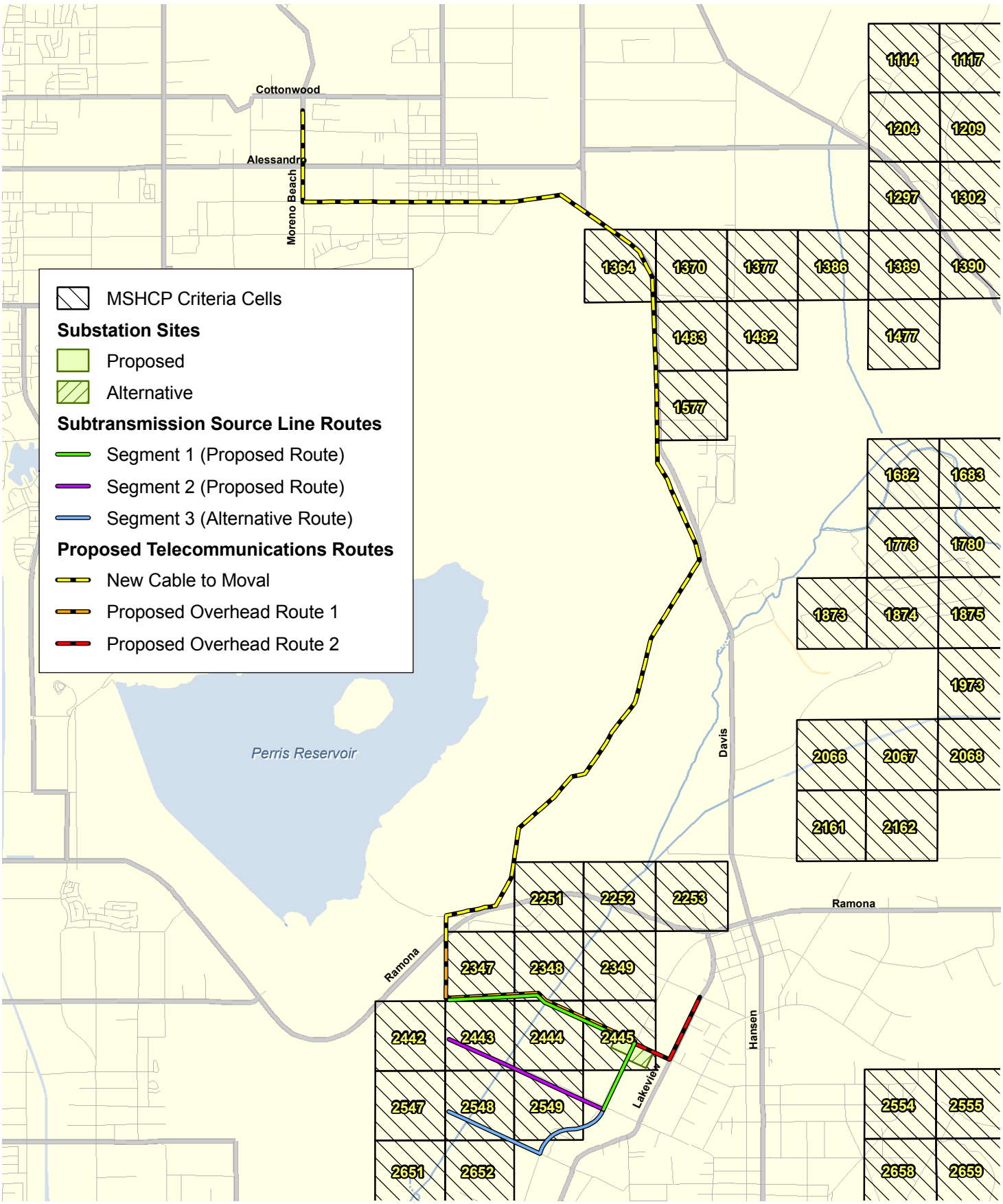
USFWS and the CDFG) will grant "Take Authorization" for otherwise lawful actions. Southern California Edison is given the option of utilizing the MSHCP as a "Participating Special Entity".[1]

The MSHCP has 146 "Covered Species" (including 14 Narrow Endemic plant species). Of the 146 "covered species", 118 species (including 13 of the 14 Narrow Endemic plant species) are considered "adequately conserved" within the MSHCP area. A covered species is considered adequately conserved when enough designated "Criteria Area" (i.e., geographic area, soils, and/or habitat that supports, or has the potential to support, the Covered Species) has been acquired, or designated for acquisition, for that species in the MSHCP. For species not deemed adequately conserved, additional dedication and/or purchase of conservation land may be required, as determined on a case-by-case basis. A Narrow Endemic species has a limited geographic distribution (e.g., Santa Rosa Plateau or San Jacinto River Valley), an affinity for a particular soil-type (e.g., Domino, Travers, or Willow), and/or is restricted to a specific habitat (e.g., coastal sage scrub, vernal pools).

The MSHCP requires that project sites be evaluated for a number of factors to assess how they meet the criteria identified in the MSHCP. As part of this evaluation, the Survey Area has been assessed for riparian/riverine resources, vernal pools, areas under USACE and/or CDFG jurisdiction, urban/wildlands interface issues, and potential for special status species. If it is determined that there is potential for one of these resources and/or if the site is located within a Criteria Area that indicates potential for particular wildlife species or narrow endemic plant species, focused surveys may be required. Focused surveys must follow MSHCP protocol guidelines, which typically limit surveys to certain seasonal time periods and require a set number of surveys to be conducted. In addition, Criteria Area requirements may restrict the level of development allowable within the site.

The Survey Area occurs within the Lakeview/Nuevo Area Plan of the MSHCP. The target conservation acreage range for this area is 7,390–10,975 acres. This Area Plan contains a large portion of Proposed Constrained Linkage 20, a large portion of Proposed Extension of Existing Core 4, the western two-thirds of Proposed Noncontiguous Habitat Block 5, and a portion of Existing Core H. A total of 13 MSHCP Criteria Cells and 6 Cell Groups overlap the Survey Area (Exhibit 4). Table 1 lists these Criteria Cells, the Cell Groups, and the conservation criteria for each portion of the Survey Area. The planning species considered for these Cells and Cell Groups include Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), Davidson's saltscale (*Atriplex serenana var. davidsonii*), San Jacinto Valley crownscale (*Atriplex coronata* var. *notatio*), Moran's navarretia (*Navarretia fossalis*), thread-leaved brodiaea (*Brodiaea filifolia*), vernal barley (*Hordeum intercedens*), Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*), Riverside fairy shrimp (*Streptocephalus woottoni*), vernal pool fairy shrimp (*Brachinecta lynchi*), Quino checkerspot butterfly (*Euphydryas editha quino*), arroyo toad (*Anaxyrus californicus* [*Bufo*] *microscaphus californicus*]), western pond turtle (*Actinemys mamorata pallida*), Bell's sage sparrow (*Amphispiza belli belli*), white-faced ibis (*Plegadis chihi*), coastal California gnatcatcher (*Polioptila californica californica*), least Bell's vireo (*Vireo bellii pusillus*), loggerhead shrike (*Lanius ludovicianus*), mountain plover (*Charadrius montanus*), tricolored blackbird (*Agelaius tricolor),* Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), southwestern willow flycatcher (*Empidonax trallii extimus*), bobcat (*Lynx rufus*), Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), and Stephens' kangaroo rat (*Dipodomys stephensi*).

[1] A "Participating Special Entity" is any regional public facility provider, such as a utility company, a public district or agency, that operates and/or owns land within the MSHCP Plan Area and that applies for Take Authorization pursuant to Section 11.8 of the Implementing Agreement.



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MSHCP Criteria Cells

Exhibit 4

Lakeview Substation and Transmission Line Project

N W E S

5,000 2,500 0 5,000 Feet

BonTerra CONSULTING

(rev 06/02/10 CJS) PAS/Projects/Edison/J025/BioTech/Ex4_MSHCP.pdf

TABLE 1
MSHCP CRITERIA CELLS WITHIN THE PROJECT LIMITS

Project Section	Criteria Cell	Cell Group	Target Criteria
Proposed Substation Site	2445	H	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat and agricultural land adjacent to the San Jacinto River. Conservation within this Cell Group will range from 55% to 65% and focus on the western portion of the Cell Group.
Alternative Substation Site	2445	H	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat and agricultural land adjacent to the San Jacinto River. Conservation within this Cell Group will range from 55% to 65% and focus on the western portion of the Cell Group.
Proposed Subtransmission Source Line Route, Segment 1	2347, 2348, 2443, 2444, 2445	G, H, I	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat, agricultural land, and grassland habitat adjacent to the San Jacinto River. Conservation within Cell Group G will range from 50% to 60% and focus on the eastern portion of the Cell Group. Conservation within Cell Group H will range from 55% to 65% and focus on the western portion of the Cell Group. Conservation within Cell Group I will range from 60% to 70% and focus on the eastern portion of the Cell Group.
Proposed Subtransmission Source Line Route, Segment 2	2443, 2444, 2549	G, H	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat, agricultural land, and grassland habitat adjacent to the San Jacinto River. Conservation within Cell Group G will range from 50% to 60% and focus on the eastern portion of the Cell Group. Conservation within Cell Group H will range from 55% to 65% and focus on the western portion of the Cell Group. Conservation within Cell 2549 will range from 25% to 35% and focus on the northwestern portion of the Cell.
Alternative Subtransmission Source Line Route, Segment 3	2548, 2549, 2652	E, F	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat and agricultural land adjacent to the San Jacinto River. Conservation within Cell Group E will range from 70% to 80% and focus on the western portion of the Cell Group. Conservation within Cell Group F will range from 60% to 70% and focus on the eastern portion of the Cell Group. Conservation within Cell 2549 will range from 25% to 35% and focus on the northwestern portion of the Cell.
New Cable to Moval	1364, 1370, 1483, 1577, 2251, 2347	I, D	Conservation contributes to the assembly of Proposed Extension of Existing Core 4 and Existing Core H; conservation will focus on playas/vernal pool habitat and grassland adjacent to the San Jacinto River and agricultural land. Conservation within Cell Group I will range from 60% to 70% and focus on the eastern portion of the Cell Group. Conservation within Cell Group D will be approximately 5% and focus on the southeastern portion of the Cell Group. Conservation within Cell 2251 will range from 35% to 45% and focus on the southern portion of the Cell.

TABLE 1 (Continued)
MSHCP CRITERIA CELLS WITHIN THE PROJECT LIMITS

Project Section	Criteria Cell	Cell Group	Target Criteria
Proposed Overhead Route 1	2347, 2348, 2443, 2444, 2445	G, H, I	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat, agricultural land, and grassland habitat adjacent to the San Jacinto River. Conservation within Cell Group G will range from 50% to 60% and focus on the eastern portion of the Cell Group. Conservation within Cell Group H will range from 55% to 65% and focus on the western portion of the Cell Group. Conservation within Cell Group I will range from 60% to 70% and focus on the eastern portion of the Cell Group.
Proposed Overhead Route 2	2445	H	Conservation contributes to the assembly of Proposed Extension of Existing Core 4; conservation will focus on playas/vernal pool habitat and agricultural land adjacent to the San Jacinto River. Conservation within this Cell Group will range from 55% to 65% and focus on the western portion of the Cell Group.

2.0 SURVEY METHODOLOGIES

The data provided in this report is derived from general and focused surveys of the Project site conducted by BonTerra Consulting in 2009 and 2010.

2.1 LITERATURE REVIEW

The biological resources section is based on background data review and field reconnaissance surveys. Prior to field surveys, a literature review was performed to identify special status plants, wildlife, and habitats known to occur in the vicinity of the Survey Area. This search included a review of the USGS's Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangles in the California Native Plant Society's (CNPS's) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010) and the CDFG's California Natural Diversity Database (CNDDB) (CDFG 2010a). In addition, the Assesor's Parcel Numbers (APNs) for the Survey Area were run through the Riverside County Integrated Project (RCIP) Conservation Summary Report Generator for the Western Riverside County MSHCP (RCIP 2010).

2.2 VEGETATION MAPPING AND GENERAL BIOLOGICAL SURVEYS

Biological reconnaissance surveys were conducted to describe and map the vegetation present in the Survey Area and to evaluate the potential of the habitats to support special status plant and wildlife species. BonTerra Consulting Botanist/Restoration Ecologist Jeff Crain and Biologists Kim Oldehoeft and Lindsay Messett performed general plant and wildlife surveys on the Substation Sites, Subtransmission Source Line Routes, and Proposed Overhead Routes 1 and 2 in February and June of 2009, and in February of 2010 for the New Cable to Moval (Exhibit 2). Vegetation was mapped in the field on an aerial photograph at a scale of 1 inch equals 200 feet (1″=200′). Nomenclature for vegetation types generally follows that of *The Vegetation Classification and Mapping Program: List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database* (CDFG 2003).

Plant species were identified in the field or collected for subsequent identification using keys in Hickman (1993) and Munz (1974). Taxonomy follows Hickman (1993) and current scientific data

(e.g., scientific journals) for scientific and common names. A list of observed plant species is included as Appendix A-1.

2.3 GENERAL WILDLIFE SURVEYS

Vegetation mapping and general wildlife surveys were conducted concurrently. General observations of wildlife were also noted during all focused surveys in 2009 and 2010. All wildlife species observed were recorded in field notes and are listed in Appendix A-2.

During the surveys, each vegetation type was evaluated for its potential to support special status species that are known or expected to occur in the region. Active searches for reptiles and amphibians included lifting, overturning, and carefully replacing rocks and debris. Birds were identified by visual and auditory recognition. Surveys for mammals were conducted during the day and involved searching for and identifying diagnostic signs including scat, footprints, scratch-outs, dust bowls, burrows, and trails. Taxonomy and nomenclature for wildlife generally follows Stebbins (2003) for amphibians and reptiles, American Ornithologists Union (2009) for birds, and Baker et al. (2003) for mammals.

2.4 FOCUSED SURVEYS

Due to the presence of suitable habitat and/or soils, focused surveys for special status plant species were conducted (1) in 2009 for the Proposed Subtransmission Source Route, Segment 2; Proposed Overhead Routes 1 and 2; and Alternative Subtransmission Source Line Route, Segment 3 and (2) in 2010 for the Proposed Subtransmission Source Line Route, Segment 1 and New Cable to Moval. Focused burrowing owl (*Athene cunicularia*) surveys were conducted in 2009 for the Proposed Substation Site; the Proposed Subtransmission Source Line Routes; the Alternative Substation Site; and the Alternative Subtransmission Source Line Route, Segment 3. Focused Quino checkerspot butterfly and California gnatcatcher surveys were conducted in 2010 along the New Cable to Moval.

2.4.1 Special Status Plant Species

Special status plant surveys were conducted on April 7, 2009 by BonTerra Consulting Botanist Jeff Crain and Ecologist Allison Rudalevige; May 18, 2009 by Mr. Crain and Botanist David Bramlet; April 1, 2010 by Mr.Crain, Senior Botanist Sandy Leatherman, Ms. Rudalevige, and Ecologist Jennifer Pareti; May 4, 2010 by Mr. Crain, Ms. Leatherman, and Senior Biolgist Amber Oneal; May 5, 2010 by Ms. Leatherman and Mr. Crain; and June 2 and 3, 2009, and February 18, 2010, by Mr. Crain. The 2010 surveys are in progress and only partial results are given in this report. Prior to the surveys, known reference populations of the focal species were visited to ensure survey times were appropriate. All areas of the Project site with potentially suitable habitat for special status plant species were surveyed using meandering transects. Field notes were taken during the surveys. The location of each special status plant population found on the Project site was mapped using a hand-held Garmin Global Positioning System (GPS) unit. Voucher specimens were collected and will be deposited in the Rancho Santa Ana Botanic Garden Herbarium or at the University of California, Riverside Herbarium.

2.4.2 Quino Checkerspot Butterfly

Quino checkerspot butterfly focused surveys were conducted utilizing guidelines from the 2002 USFWS Survey Protocol Information (USFWS 2002) to maximize detection of adults during the flight season. The Carlsbad USFWS officeweb page for monitored Quino checkerspot butterfly reference site information was checked periodically to determine the likely “beginning” of the flight season in the vicinity of Survey Area.

Protocol surveys consist of an initial site assessment to determine if the site contains areas recommended for butterfly surveys. If the site is determined to be comprised solely of excluded areas (described below), surveys are not recommended. If a site has areas suitable for butterfly surveys (non-excluded areas), then surveys should be conducted for those portions of the site. Butterfly emergence from pupae varies according to environmental factors, so the butterfly flight season varies regionally and annually. Generally, the Quino checkerspot butterfly usually begins flying in February or early March.

Site Assessments

Site assessments should be conducted before the first butterfly survey to identify which portions of a site should be surveyed for the Quino checkerspot. These assessments involve conducting a general field survey of the site and broadly mapping excluded areas and butterfly survey areas on a USGS 7.5-minute (1:24,000) topographic quadrangle map that has been enlarged 200 percent.

Excluded Areas

The following areas are not recommended for butterfly surveys: orchards, developed areas, or small in-fill parcels (plots smaller than one acre that are completely surrounded by urban development) largely dominated by non-native vegetation; active/in-use agricultural fields without natural or remnant inclusions of native vegetation (i.e., fields completely without any fallow sections, unplowed areas, and/or rocky outcrops); closed-canopy forests; or riparian areas, dense chaparral, and small openings (less than one acre) completely enclosed within dense chaparral.

Butterfly Survey Areas

All areas that are not excluded should be surveyed for butterflies, regardless of Quino checkerspot butterfly host plant presence, absence, and/or density. The Quino checkerspot butterfly is generally associated with sage scrub, open chaparral, grasslands, and vernal pools. Within these communities, they are usually observed in open or sparsely vegetated areas (including trails and dirt roads) and on hilltops and ridgelines.

Ms. Messett conducted surveys for Quino checkerspot butterflies once per week for five weeks throughout the flight season on March 19 and 26, and on April 8, 14, and 19, 2010. Quino checkerspot protocol surveys were not conducted concurrently with any other focused survey (e.g., a coastal California gnatcatcher survey). All non-excluded portions of the site were thoroughly surveyed for butterflies during each weekly survey at an average rate of 10 to 15 acres (4.05–6.07 hectares) per hour.

2.4.3 Burrowing Owl

Focused surveys for burrowing owl followed a methodology based on the Burrowing Owl Survey Instructions for the Western Riverside County MSHCP (County of Riverside 2006). The Western Riverside County MSHCP survey instructions are the most current protocol described for the species. The guidelines outline a survey methodology that has been officially approved by the CDFG and the USFWS. Surveys for the burrowing owl are conducted during the breeding season, which extends from March 1 to August 31. These surveys are done in three phases: (1) habitat assessment; (2) burrow surveys; and (3) focused owl surveys.

Habitat Assessment

A habitat assessment was conducted in winter 2009 by BonTerra Consulting Biological Resources Manager Marc Blain. Mr. Blain conducted the assessment by walking and/or driving the Project site to visually inspect the Survey Area and assess its potential for burrowing owls.

Burrow Survey

Ms. Oldehoeft conducted burrow surveys on May 19, June 29, July 3, and August 11, 2009. Ms. Odehoeft walked transects at regularly spaced intervals to achieve 100 percent visual coverage of all potential habitat within the Survey Area. Any natural or man-made cavities large enough to allow entry to a burrowing owl were inspected for evidence of occupation. Evidence of occupation may include prey remains, cast pellets, white-wash, feathers, and observations of owls adjacent to burrows. The burrow survey was not conducted within five days of rain, which could have washed away potential sign.

Focused Burrowing Owl Surveys

If owls or potentially occupied burrows or cavities are located during the burrow survey, then crepuscular (dawn or dusk) focused burrowing owl surveys are required. Focused surveys were conducted within several portions of the Survey Area where burrowing owl had a potential to occur based on the results of the habitat assessment and burrow survey. These surveys were conducted from either one hour before sunrise to two hours after, or from two hours before sunset to one hour after. These surveys are conducted only with sufficient light to follow burrowing owl flights. Ms. Oldehoeft conducted focused surveys on July 10, 13, 14, 15, and 16 and on August 11, 17, 18, 26, and 31, 2009. All potential habitat within the Survey Area was surveyed to achieve 100 percent visual coverage of the area. Binoculars were used to inspect holes; crevices; and potential perches such as rocks, fence posts, and other elevated structures for the presence of owls while listening for owl calls.

2.4.4 Coastal California Gnatcatcher

Focused surveys for the coastal California gnatcatcher followed USFWS presence/absence survey protocol (USFWS 1997). Ms. Messett (TE-067064-1) conducted surveys on April 9, 16, and 27, and on May 4, 20 and 27, 2010. Six surveys were conducted at least one week apart during the breeding season (between March 15 and June 30). These surveys covered all potentially suitable habitat for the coastal California gnatcatcher in the Survey Area. Tape recordings of coastal California gnatcatcher songs and other vocalizations were played in appropriate habitat to solicit a response. The locations where gnatcatchers were first observed were plotted on an aerial photograph. The number of birds (individuals or pairs) was noted at each sighting. Data regarding general habitat characteristics for each gnatcatcher was also collected. The surveys were conducted during appropriate weather conditions and generally between dawn and noon.

3.0 EXISTING BIOLOGICAL RESOURCES

This section describes the biological resources that occur or potentially occur in the Survey Area. Vegetation types, wildlife populations, and movement patterns; special status vegetation types; and special status plant and wildlife species that are either known to occur or have the potential to occur in the Survey Area are discussed below.

3.1 VEGETATION TYPES AND OTHER AREAS

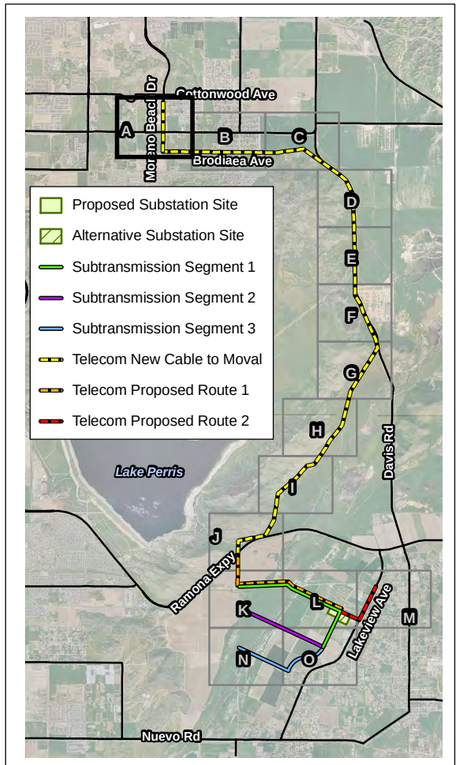
Fifteen vegetation types and other areas occur in the Survey Area (Exhibits 5A–5O; Table 2). Vegetation types and other areas mapped in the Survey Area include alkali grassland, annual grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, Riversidean sage scrub, disturbed Riversidean sage scrub, southern willow scrub, ruderal, agriculture, ornamental, detention basin, irrigation ditch, disturbed, and developed.

TABLE 2
VEGETATION TYPES AND OTHER AREAS WITHIN EACH PORTION OF THE SURVEY AREA

Vegetation Types or Other Areas	Proposed Substation Site	Alternative Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Alternative Subtransmission Source Line Route, Segment 3	New Cable to Moval	Proposed Overhead Route 1	Proposed Overhead Route 2
Alkali Grassland	-	-	0.77	-	-	-	0.77	-
Annual Grassland	-	-	0.22	-	-	50.66	0.22	-
Alkali Scrub Playa	-	-	-	0.29	1.27	-	-	-
Disturbed Alkali Scrub Playa	-	-	-	0.03	-	-	-	-
Alkali Wetland	-	-	-	-	0.06	-	-	-
Riversidean Sage Scrub	-	-	-	-	-	3.68	-	-
Disturbed Riversidean Sage Scrub	-	-	-	-	-	5.42	-	-
Southern Willow Scrub	-	-	-	0.06	-	-	-	-
Ruderal	-	-	0.29	0.74	0.47	11.85	0.29	1.71
Agriculture	7.09	10.60	18.70	7.90	9.47	9.01	14.17	0.79
Ornamental	-	-	0.21	-	-	1.09	-	0.07
Detention Basin	-	-	-	0.19	-	-	-	-
Irrigation Ditch	-	-	-	-	-	1.22	-	-
Disturbed	0.98	1.13	2.67	5.73	4.43	24.32	1.72	4.11
Developed	-	0.01	0.84	-	0.40	11.50	-	0.57
Total	***8.07***	***11.74***	***23.70***	***14.94***	***16.10***	***118.75***	***17.17***	***7.25***

3.1.1 Alkali Grassland

Alkali grassland occurs along the Proposed Subtransmission Source Line Route, Segment 1 and the Proposed Overhead Route 1. This vegetation type is dominated by non-native grasses including Mediterranean barley (*Hordeum murinum* var. *gussoneanum*) and foxtail barley (*Hordeum murinum* var. *leporinum*); however, the native component of this vegetation type includes salt grass (*Distichilis spicata*), vernal barley (*Hordeum intercedens*), and alkali weed (*Cressa truxillensis*). The area is fairly disturbed but maintains at least ten percent cover by native grasses and forbs.



Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5A

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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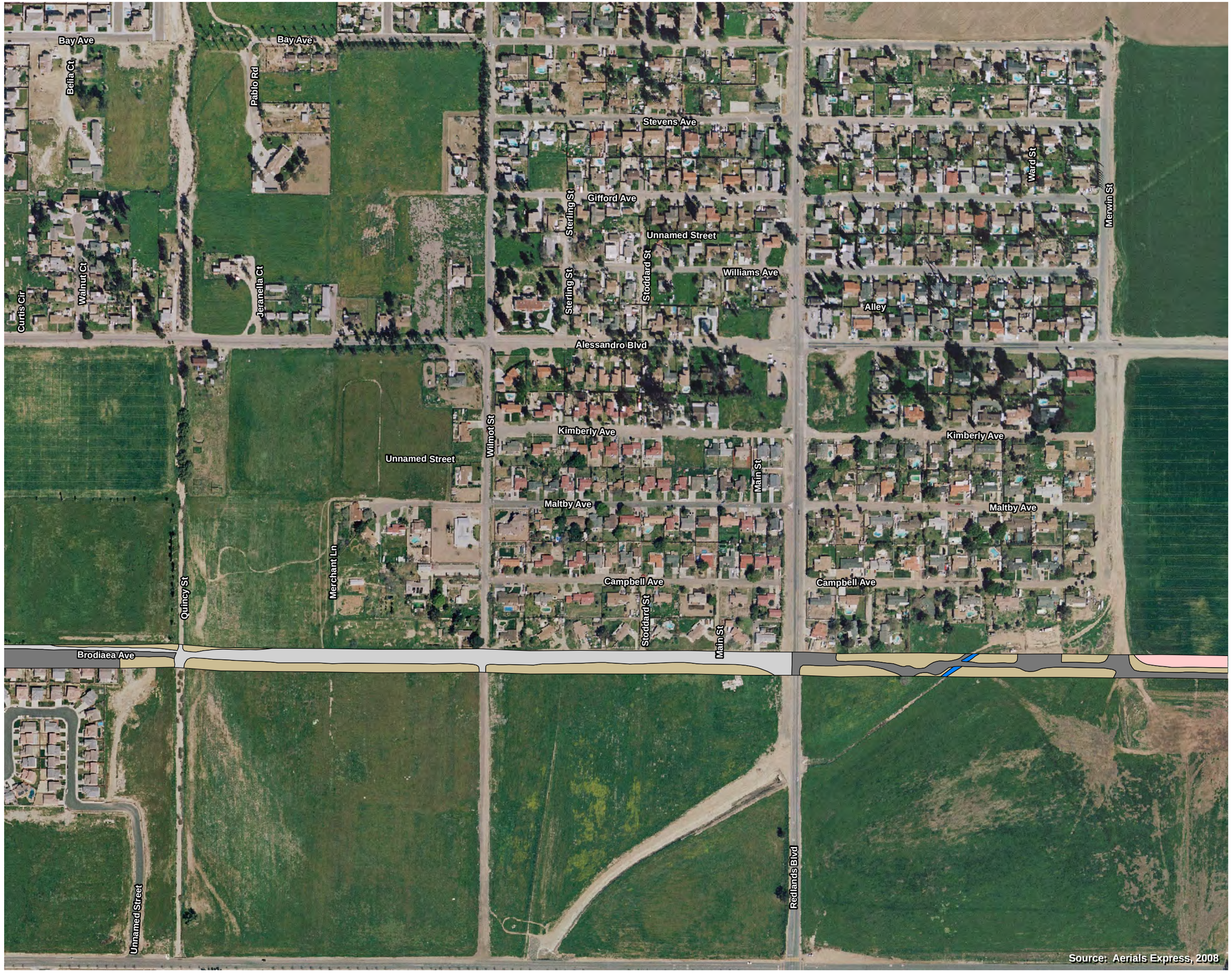

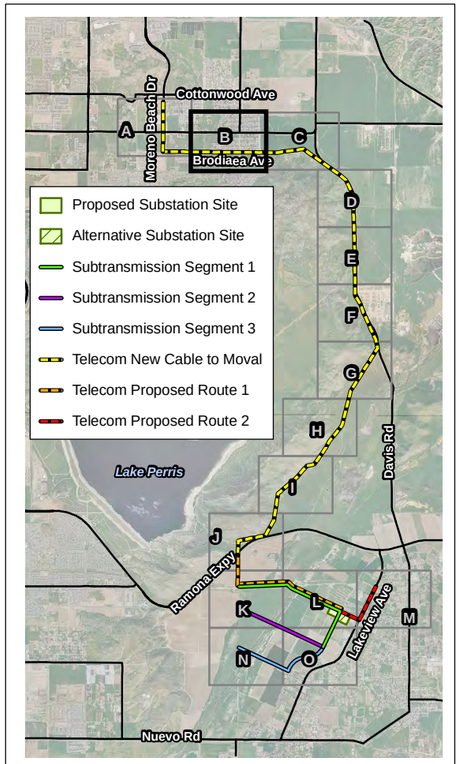

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5B

Lakeview Substation and Transmission Line Project

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BonTerra CONSULTING

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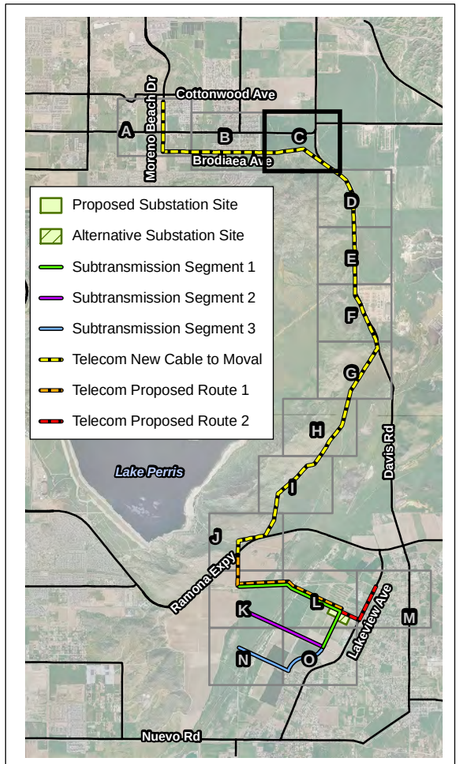

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5C

Lakeview Substation and Transmission Line Project

0 400 Feet

BonTerra CONSULTING

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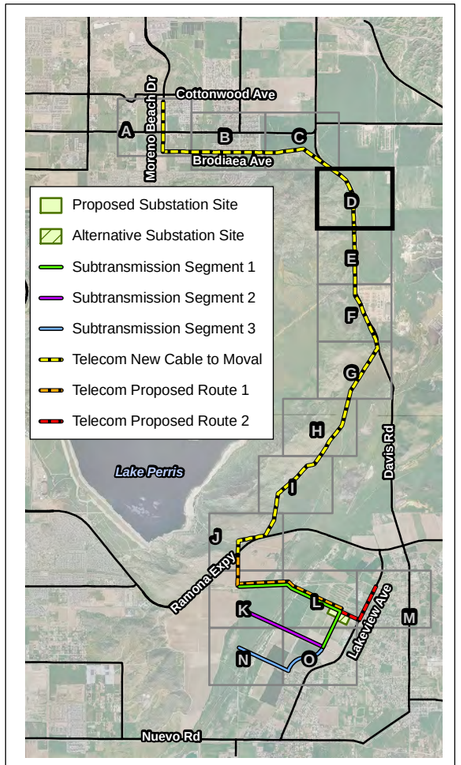

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5D

Lakeview Substation and Transmission Line Project

0 400 Feet

BonTerra CONSULTING

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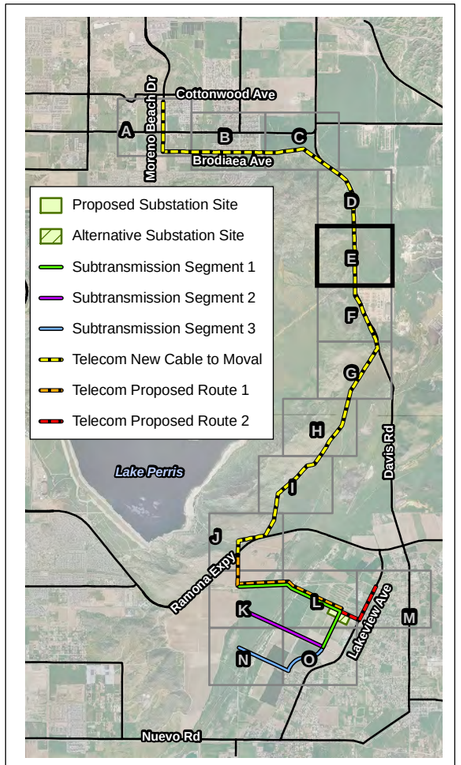

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5E

Lakeview Substation and Transmission Line Project

0 400 Feet

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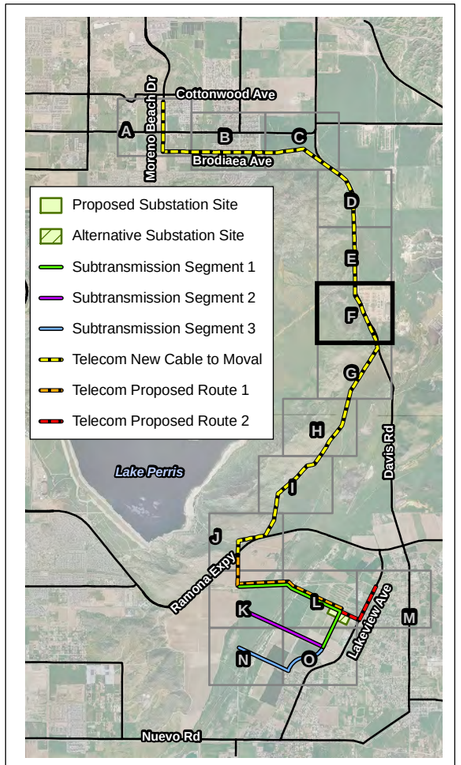

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5F

Lakeview Substation and Transmission Line Project

0 400 Feet

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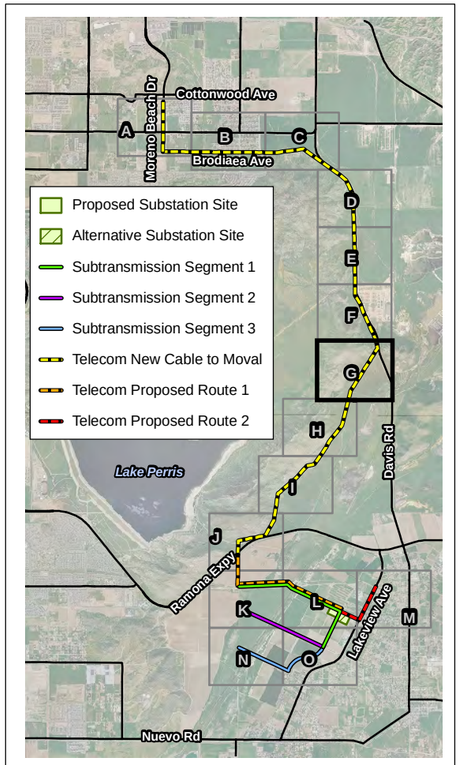

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types

Exhibit 5G

Lakeview Substation and Transmission Line Project

0 400 Feet

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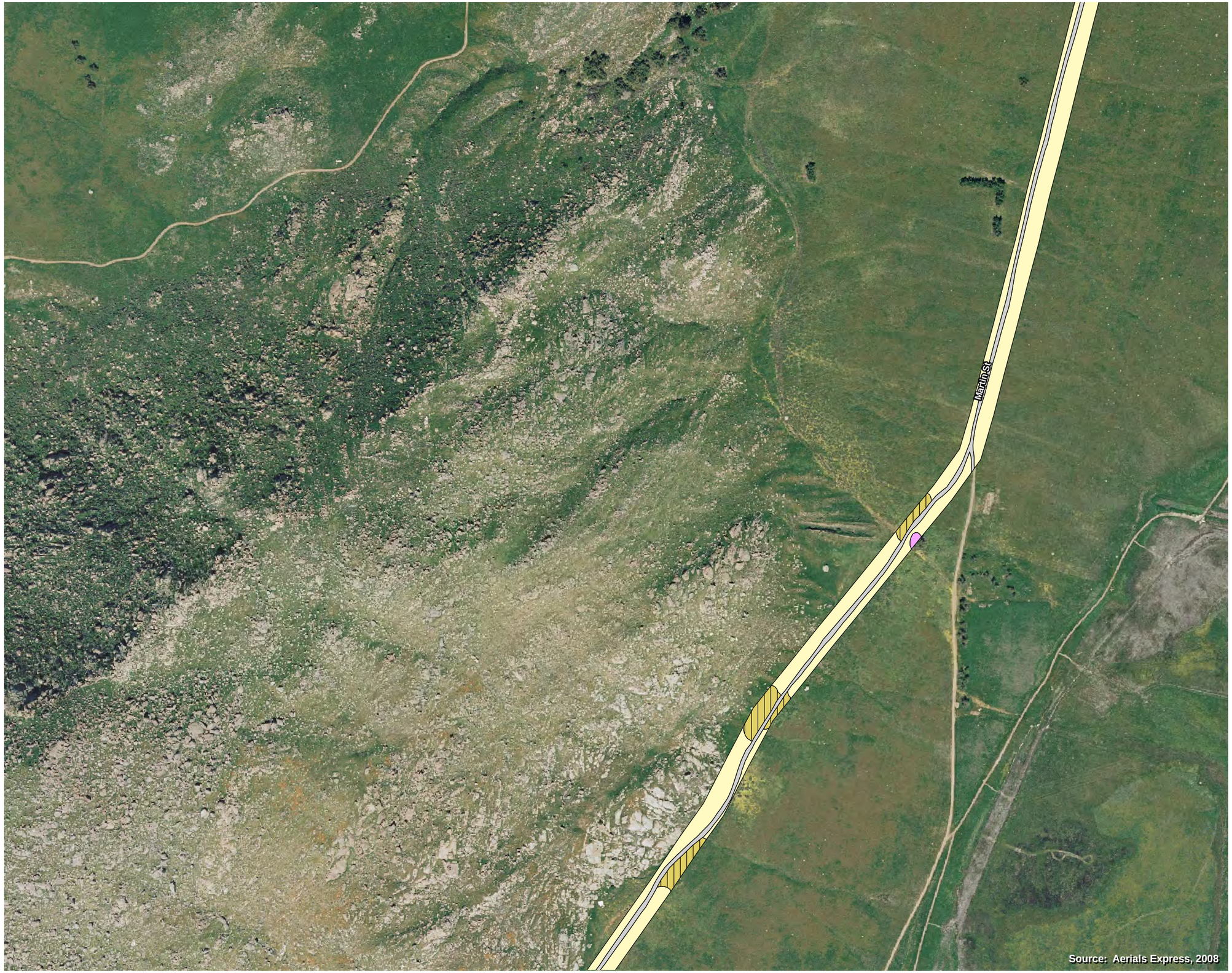

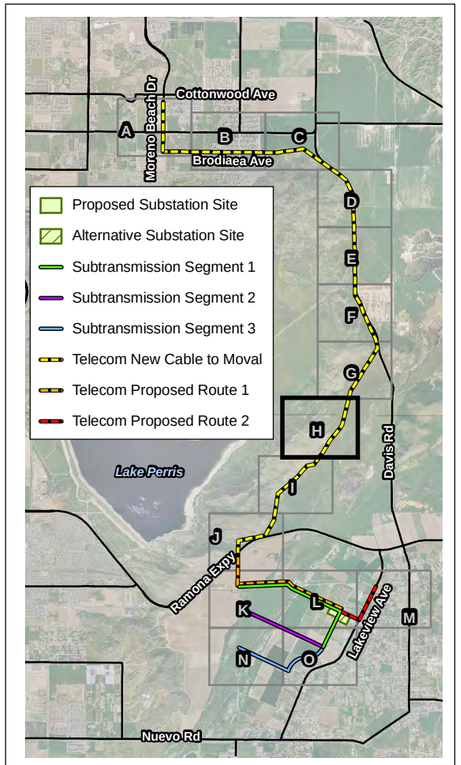

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5H

Lakeview Substation and Transmission Line Project

0 400 Feet

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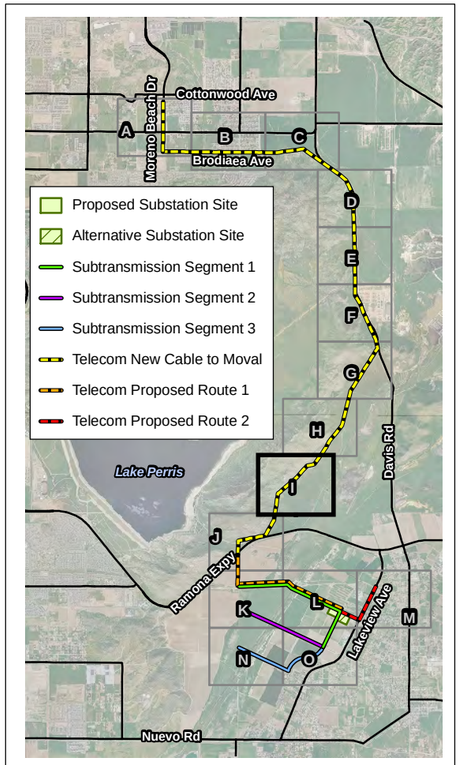

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5I

Lakeview Substation and Transmission Line Project

0 400 Feet

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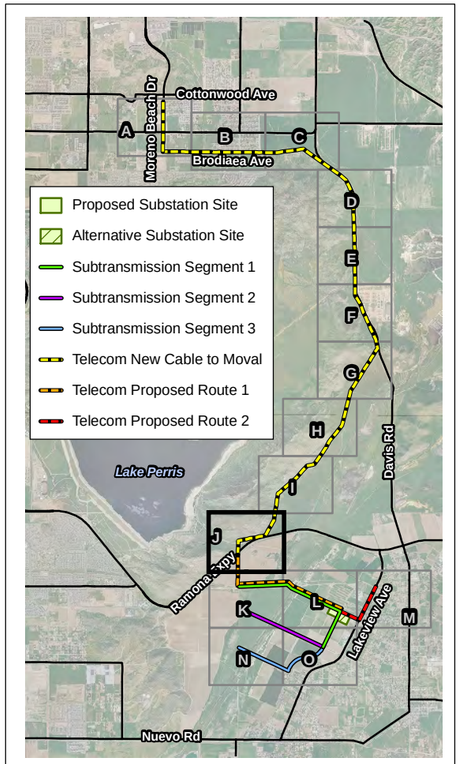

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types

Exhibit 5J

Lakeview Substation and Transmission Line Project

0 400 Feet

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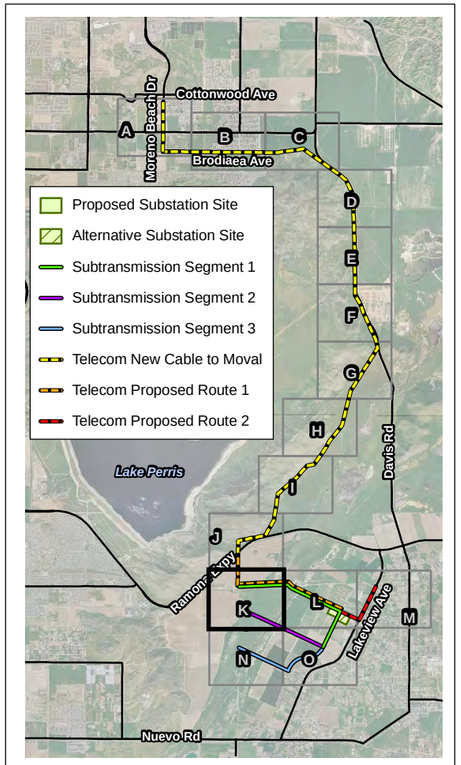

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5K

Lakeview Substation and Transmission Line Project

0 400 Feet

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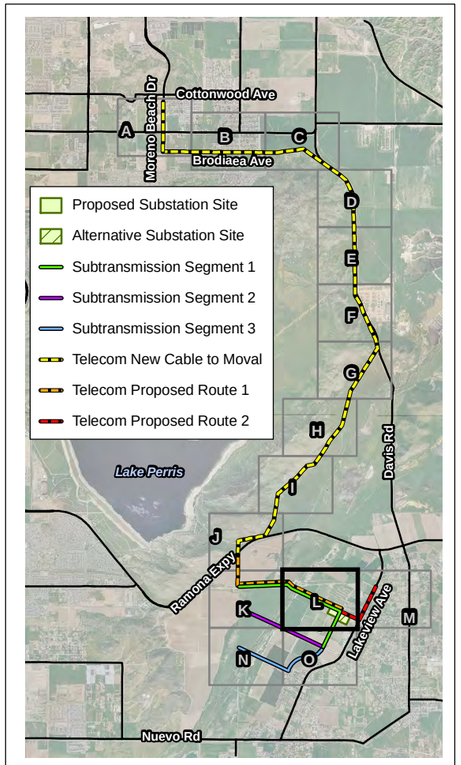

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5L

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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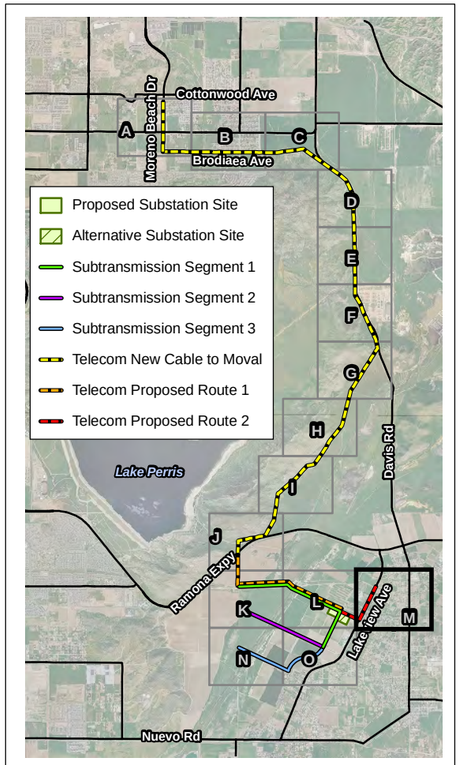

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5M

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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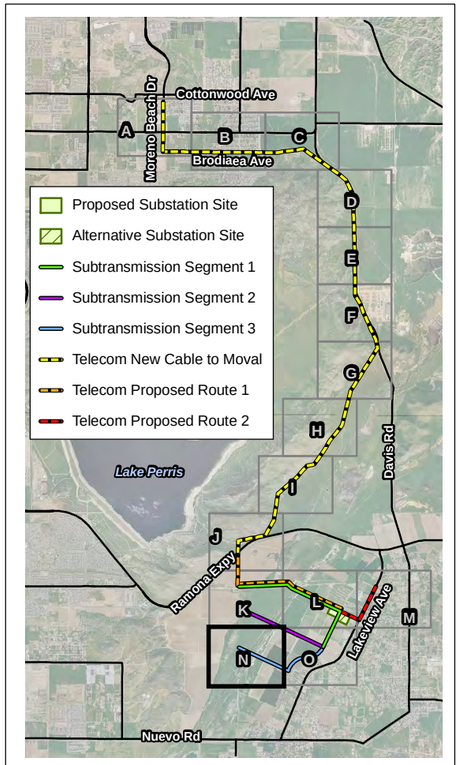

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5N

Lakeview Substation and Transmission Line Project

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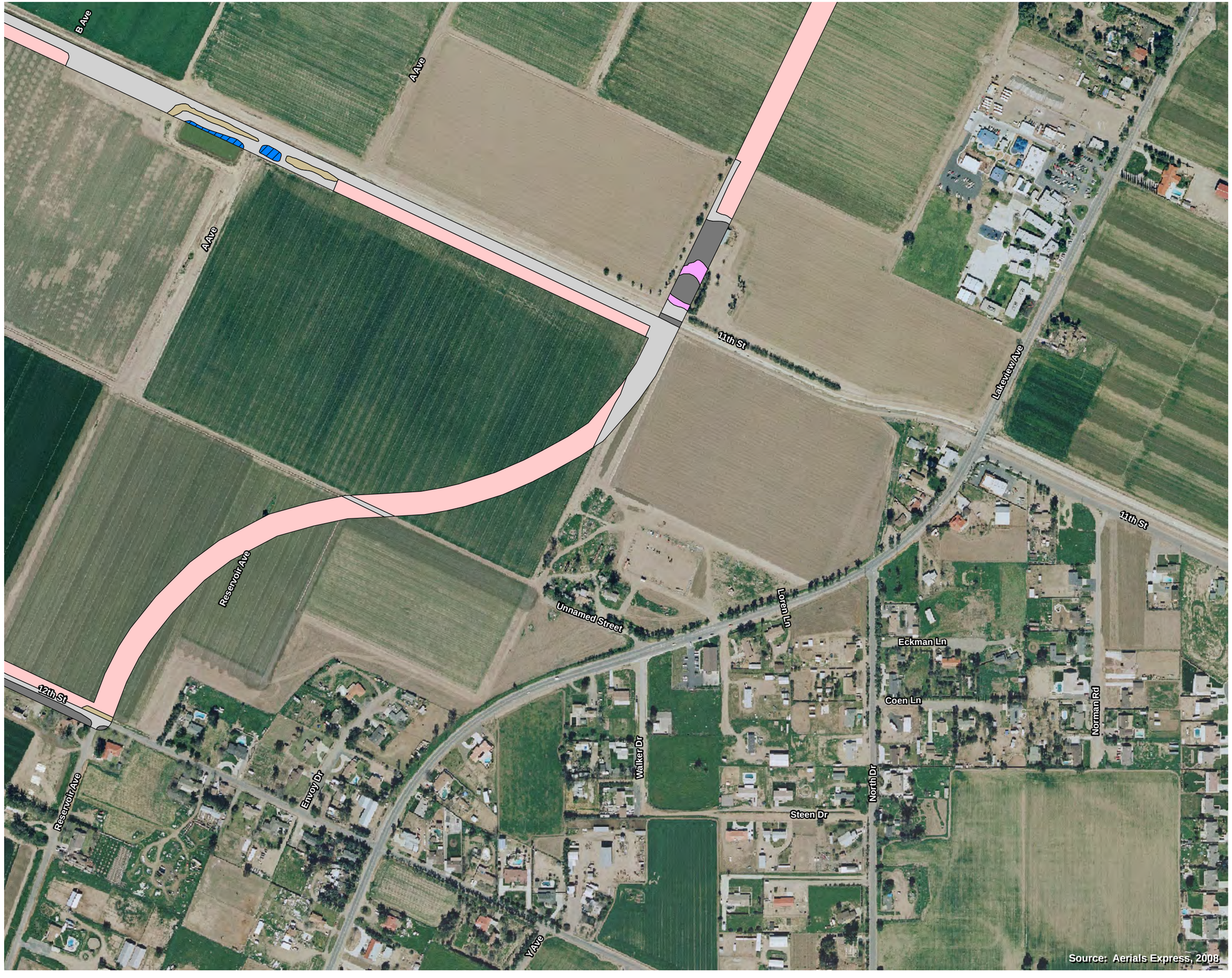

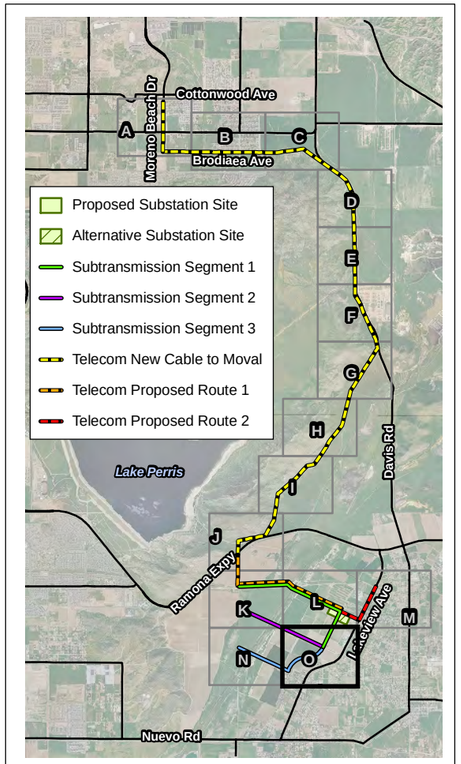

Vegetation Types and Other Areas

- Alkali Grassland
- Annual Grassland
- Alkali Scrub Playa
- Disturbed Alkali Scrub Playa
- Alkali Wetland
- Riversidean Sage Scrub
- Disturbed Riversidean Sage Scrub
- Southern Willow Scrub
- Ruderal
- Agriculture
- Ornamental
- Irrigation Ditch
- Detention Basin
- Disturbed
- Developed

Vegetation Types — Exhibit 5O

Lakeview Substation and Transmission Line Project

0 — 400 Feet

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3.1.2 Annual Grassland

Annual grassland occurs along the Proposed Subtransmission Source Line Route, Segment 1, the New Cable to Moval, and the Proposed Overhead Route 1. This vegetation type is dominated by non-native grasses and forbs including ripgut grass (*Bromus diandrus*), Mediterranean barley, foxtail barley, perennial ryegrass (*Lolium perenne*), little-seed canary grass (*Phalaris minor*), small saltbush (*Atriplex suberecta*), five-hook bassia (*Bassia hyssopifolia*), and Russian thistle (*Salsola tragus*). Native components include Mojave silver scale (*Atriplex argentea* ssp. *mohavensis*), alkali weed, summer cypress (*Kochia scoparia*), and bush seepweed (*Suaeda moquinii*).

3.1.3 Alkali Scrub Playa

Alkali scrub playa occurs in flat alkali clay soils along the Proposed Subtransmission Source Line Route, Segment 2 and the Alternative Subtransmission Source Line Route, Segment 3. This vegetation type is dominated by native, alkali-tolerant shrubs including Mojave silver scale, alkali weed, summer cypress, Nuttall's monolepis (*Monolepis nutalliana*), and bush seepweed. Non-native components include five-hook bassia, garden beet (*Beta vulgaris*), and Russian thistle.

3.1.4 Disturbed Alkali Scrub Playa

Disturbed alkali scrub playa occurs along the Proposed Subtransmission Source Line Route, Segment 2. Species composition was similar to alkali scrub playa above; however, these areas have been subject to disturbance from off-road activity and had much higher non-native cover than the alkali scrub playa. Species present include Mediterranean barley and foxtail barley.

3.1.5 Alkali Wetland

Alkali wetland occurs along the Alternative Subtransmission Source Route, Segment 3. This vegetation type is associated with the San Jacinto River and is dominated by native species including mule fat (*Baccharis salicifolia*), alkali heliotrope (*Heliotropium curassavicum*), alkali heath (*Frankenia salina*), California bulrush (*Scirpus californica*), and bush seepweed. Non-native components include black mustard (*Brassica nigra*) and bull thistle (*Cirsium vulgare*).

3.1.6 Riversidean Sage Scrub

Riversidean sage scrub occurs along the New Cable to Moval. This vegetation type is dominated by native shrubs including California sagebrush (*Artemisia californica*), brittlebush (*Encelia farinosa*), interior flat-topped buckwheat (*Eriogonum fasciculatum* var. *foliolosum),* deerweed (*Lotus scoparius*), and white sage (*Salvia apiana*).

3.1.7 Disturbed Riversidean Sage Scrub

Disturbed Riversidean sage scrub occurs along the New Cable to Moval. This vegetation type has identical dominant shrubs to Riversidean sage scrub above; however, these areas have been disturbed to varying degrees by off-road vehicle use and are now dominated by non-native grasses including ripgut grass, Mediterranean barley, and shortpod mustard (*Hirschfeldia incana*).

3.1.8 Southern Willow Scrub

Southern willow scrub occurs along the Proposed Subtransmission Source Line Route, Segment 2. This vegetation type is dominated by native trees and shrubs including black willow (*Salix gooddingii*) and mule fat. The understory consists of native herbs, including southern cattail (*Typha domingensis*) and California bulrush, and non-native herbs, including black mustard and Italian thistle (*Carduus pycnocephalus*).

3.1.9 Ruderal

Ruderal occurs in nearly every segment of the Survey Area and are associated with heavy disturbance. This vegetation type is dominated by non-native grasses and forbs including black mustard, ripgut grass, foxtail chess, wild radish (*Raphanus sativus*), field charlock (*Sinapsis arvensis*), and London rocket (*Sisymbrium irio*).

3.1.10 Agriculture

Agriculture occurs throughout the Survey Area. Common fields include alfalfa and sod farms or dry farming with barley.

3.1.11 Ornamental

Ornamental vegetation occurs along the Proposed Subtransmission Source Line Route, Segment 1, the New Cable to Moval, and the Proposed Overhead Route 2, and is most often associated with developed areas. Ornamental species observed include oleander (*Nerium oleander*), gum tree (*Eucalyptus* sp.), Canary Island date palm (*Phoenix canariensis*), and Mexican fan palm (*Washingtonia robusta*).

3.1.12 Detention Basin

A detention basin occurs along the Proposed Subtransmission Source Line Route, Segment 2 as part of the adjacent agricultural fields. The basin consists of an earthen berm and filled basin. There was no vegetation present within the basin or on the berm at the time of the survey.

3.1.13 Irrigation Ditch

An irrigation ditch occurs along the New Cable to Moval. This area is regularly cleared of vegetation to enhance water flow. The sparse vegetation that does occur includes common knotweed (*Polygonum arenastrum*) and Persian knotweed (*Polygonum argyrocoleon*).

3.1.14 Disturbed

Disturbed areas are mostly unvegetated and are used as access roads for equipment and vehicle movement around active fields, residential dirt roads, and the shoulders of paved roads. They are found throughout the Survey Area.

3.1.15 Developed

Developed areas are found throughout the Survey Area. This mapping unit includes paved roads, parking areas, and buildings (e.g., residences, commercial buildings, and dairy facilities). These areas are mostly unvegetated or contain ornamental landscaping.

3.2 COMMON WILDLIFE

The Survey Area provides suitable habitat for several wildlife species. No fish or amphibian species were observed or detected in the Survey Area during the biological survey, and only limited habitat is present. One reptile species, side-blotched lizard (*Uta stansburiana*), was observed in the Survey Area during the biological survey. Common reptile species such as western fence lizard (*Sceloporus occidentalis*) and gopher snake (*Pituophis catenifer*) are expected to occur in the Survey Area as well.

Bird species observed include California quail (*Callipepla californica*), common peafowl (*Pavo cristatus*), great egret (*Ardea alba*), white-faced ibis, northern harrier (*Circus cyaneus*), Cooper's hawk (*Accipiter cooperii*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), killdeer (*Charadrius vociferus*), long-billed curlew (*Numenius americanus*), rock pigeon (*Columba livia*), band-tailed pigeon (*Patagioenas fasciata*), mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), Cassin's kingbird (*Tyrannus vociferans*), western kingbird (*Tyrannus verticalis*), loggerhead shrike, American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), California horned lark (*Eremophila alpestris*), cliff swallow (*Petrochelidon pyrrhonota*), barn swallow (*Hirundo rustica*), bushtit (*Psaltriparus minimus*), house wren (*Troglodytes aedon*), northern mockingbird (*Mimus polyglottos*), European starling (*Sturnus vulgaris*), lark sparrow (*Chondestes grammacus*), red-winged blackbird (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), Brewer's blackbird (*Euphagus cyanocephalus*), brown-headed cowbird (*Molothrus ater*), house finch (*Carpodacus mexicanus*), lesser goldfinch (*Spinus* [*Carduelis*] *psaltria*), American goldfinch (*Spinus* [*Carduelis*] *tristis*), and house sparrow (*Passer domesticus*).

Mammals, or their sign, observed in the Survey Area include desert cottontail (*Sylvilagus audubonii*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), domestic dog (*Canis familiaris*), raccoon (*Procyon lotor*), domestic cat (*Felis catus*), horse (*Equus ferus caballus*), and domestic goat (*Capra aegagrus hircus*).

3.2.1 Wildlife Movement

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated "islands" of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially the larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because they prohibit the infusion of new individuals and genetic information (MacArthur and Wilson 1967; Soule 1987; Harris and Gallagher 1989; Bennett 1990). Corridors mitigate the effects of this fragmentation by (1) allowing animals to move between remaining habitats, thereby permitting depleted populations to be replenished and promoting genetic exchange; (2) providing escape routes from fire, predators and human disturbances, thus reducing the risk that catastrophic events, such as fire or disease, will result in population or local species extinction; and (3) serving as travel routes for individual animals as they move in their home ranges in search of food, water, mates, and other necessary resources (Noss 1983; Farhig and Merriam 1985; Simberloff and Cox 1987; Harris and Gallagher 1989).

Wildlife movement activities usually fall into one of three movement categories: (1) dispersal (e.g., juvenile animals from natal areas or individuals extending range distributions); (2) seasonal migration; and (3) movements related to home range activities (e.g., foraging for

food or water, defending territories, or searching for mates, breeding areas, or cover). A number of terms such as "wildlife corridor", "travel route", "habitat linkage", and "wildlife crossing" have been used in various wildlife movement studies to refer to areas where wildlife move from one area to another. To clarify the meaning of these terms and to facilitate the discussion on wildlife movement in this analysis, these terms are defined as follows:

- ***Travel route:*** A landscape feature (such as a ridgeline, drainage, canyon, or riparian strip) within a larger natural habitat area that is used frequently by animals to facilitate movement and to provide access to necessary resources (e.g., water, food, cover, den sites). The travel route is generally preferred because it provides the least amount of topographic resistance in moving from one area to another. It contains adequate food, water, and/or cover while moving among habitat areas and provides a relatively direct link between target habitat areas.

- ***Wildlife corridor:*** A piece of habitat, usually linear in nature, that connects two or more habitat patches and would otherwise be fragmented or isolated from one another. Wildlife corridors are usually bound by urban land areas or other areas unsuitable for wildlife. The corridor generally contains suitable cover, food, and/or water to support species and to facilitate movement while in the corridor. Larger, landscape-level corridors, often referred to as "habitat or landscape linkages", can provide both transitory and residential habitat for a variety of species.

- ***Wildlife crossing:*** A small, narrow area, relatively short in length and generally constricted in nature, that allows wildlife to pass under or through an obstacle or barrier that otherwise hinders or prevents movement. Crossings typically are man made and include culverts, underpasses, drainage pipes, and tunnels to provide access across or under roads, highways, pipelines, or other physical obstacles. These often represent "choke points" along a movement corridor and may impede wildlife movement and increase the risk of predation.

In a large open space area where there are few or no man-made or naturally occurring physical constraints to wildlife movement, wildlife corridors (as defined above) may not yet exist. Given an open space area that is both large enough to maintain viable populations of species and to provide a variety of travel routes (e.g., canyons, ridgelines, trails, riverbeds, and others), wildlife will use these "local" routes while searching for food, water, shelter, and mates and will not need to cross into other large open space areas. Based on their size, location, vegetative composition, and availability of food, some of these movement areas (e.g., large drainages and canyons) are used for longer lengths of time and serve as source areas for food, water, and cover, particularly for small- and medium-sized animals. This is especially true if the travel route is within a larger open space area. However, once open space areas become constrained and/or fragmented as a result of urban development or construction of physical obstacles (e.g., roads and highways), the remaining landscape features or travel routes that connect the larger open space areas become corridors as long as they provide adequate space, cover, food, and water and do not contain obstacles or distractions (e.g., man-made noise, lighting) that would generally hinder wildlife movement.

The Project occurs within a land use matrix of primarily agricultural and residential areas. Open space occurs around Lake Perris to the northwest, with the Bernasconi Hills and the San Jacinto River adjacent to the New Cable to Moval. This area occurs within the MSHCP Existing Core H (Dudek 2003). These areas may provide a connection to core areas in the Badlands and the middle reach of the San Jacinto River. Open space also occurs in the Lakeview Mountains to the southeast. This area is Proposed Noncontiguous Habitat Block 5 in the MSHCP (Dudek 2003). It is connected to other MSHCP conservation lands via Proposed

Constrained Linkage 20 (i.e., the connection between Lake Perris in the north and the Lakeview Mountains in the south). This connection is important to reduce the likelihood of species extirpation as a result of population isolation in the Lakeview Mountains.

The abundance of active agriculture surrounding the proposed Project, the fact that the majority of transmission routes run along existing roads, and the adjacency to existing indirect effects of urban development (e.g., night lighting, noise, and general human activity) presently limit the movement of wildlife species in the Survey Area.

The Proposed Subtransmission Source Line Route, Segment 1; the Proposed Subtransmission Source Line Route, Segment 2; the Alternative Subtransmission Source Line Route, Segment 3; and the Proposed Overhead Route 1 cross the San Jacinto River. This river functions as a wildlife movement corridor and live-in habitat for wildlife species. It is identified in the MSHCP as an example of a landscape linkage that serves as a movement corridor across the central portion of the MSHCP Plan Area for species such as the bobcat (Dudek 2003). The construction of these segments may temporarily impact wildlife movement along the San Jacinto River.

3.3 SPECIAL STATUS BIOLOGICAL RESOURCES

The following section addresses special status biological resources observed, reported, or that have the potential to occur in the vicinity of the Project. These resources include plant and wildlife species that have been afforded special status and/or are recognized by federal and State resource agencies, as well as private conservation organizations. In general, the principal reason an individual taxon (i.e., species, subspecies, or variety) is given such recognition is the documented or perceived decline or limitations of its population size, geographic range, and/or distribution resulting in most cases from habitat loss. Tables 4 and 5 provide a summary of special status plant and wildlife species known to occur in the Project vicinity, including information on the status, likelihood for occurrence, and definitions for the various status designations. In addition, special status biological resources include vegetation types and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. These resources have been defined by federal, State, and local government conservation programs. Sources used to determine the special status of biological resources are as follows:

- ***Plants:*** Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2010); California Natural Diversity Database (CDFG 2010a); various Federal Register notices from the USFWS regarding listing status of plant species; and *List of Special Vascular Plants, Bryophytes, and Lichens* (CDFG 2010b).

- ***Wildlife:*** California Natural Diversity Database (CDFG 2010a); various Federal Register notices from the USFWS regarding listing status of wildlife species; and *List of Special Animals* (CDFG 2009b).

- ***Habitats:*** California Natural Diversity Database (CDFG 2010a).

3.3.1 Definitions of Special Status Biological Resources

A **federally listed Endangered species** is one facing extinction throughout all, or a significant portion of, its geographic range. A **federally listed Threatened species** is one likely to become Endangered within the foreseeable future throughout all or a significant portion of its range. The presence of any federally Threatened or Endangered species on a project site generally imposes severe constraints on development, particularly if development would result in “take” of the species or its habitat. The definition of the term “take” is “to harass, harm, pursue, hunt,

shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct". "Harm" in this sense can include any disturbance of habitats used by the species during any portion of its life history.

Proposed species or **Candidate species** are those officially proposed by the USFWS for addition to the federal Threatened and Endangered species list. Because proposed species may soon be listed as Threatened or Endangered, these species could become listed prior to or during implementation of a proposed development project.

The State of California considers an **Endangered species** as one whose prospects of survival and reproduction are in immediate jeopardy, a **Threatened species** as one present in such small numbers throughout its range that it is likely to become an Endangered species in the near future in the absence of special protection or management, and a **Rare species** as one present in such small numbers throughout its range that it may become Endangered if its present environment worsens. "Rare species" only applies to California native plants. State Threatened and Endangered species are fully protected against take unless an Incidental Take Permit is obtained from the wildlife agencies.

California Species of Special Concern is an informal designation used by the CDFG for some declining wildlife species that are not State Candidates. This designation does not provide legal protection but signifies that these species are recognized as special status by the CDFG. Recently, the CDFG downlisted several species from Species of Special Concern to the **Watch List**. Although not considered special status, Watch List species are tracked by the CNDDB.

Species that are **California Fully Protected** and **Protected** include those protected by special legislation for various reasons, such as the mountain lion (*Felis concolor*) and white-tailed kite (*Elanus leucurus*). Fully Protected species may not be taken or possessed at any time. California Protected species include those species that may not be taken or possessed at any time except under special permit from the CDFG, issued pursuant to Sections 650 and 670.7 of the *California Code of Regulations* or Section 2081 of the *California Fish and Game Code.*

A species that is considered a **Special Animal** is one that is tracked by the California Natural Diversity Database (CDFG 2010a). **Species of Local Concern** are those that have no official status with the resource agencies, but are being watched because either there is a unique population in the region or the species is declining in the region.

The CNPS is a local resource conservation organization that has developed an inventory of California's special status plant species (CNPS 2010). This inventory is a summary of information on the distribution, rarity, and endangerment of California's vascular plants, and is comprised of four lists. The CNPS presumes that **List 1A** plant species are extinct in California because they have not been seen in the wild for many years. The CNPS considers **List 1B** plants as Rare, Threatened, or Endangered throughout their range. **List 2** plant species are considered Rare, Threatened, or Endangered in California but more common in other states. **List 3** is a "review" list of plants for which more information is needed, and **List 4** is a "watch" list of plants that have limited distribution. The CNPS also assigns a threat rank extension to the List categories. An extension of **.1** is assigned to plants that are considered "seriously threatened" in California (high degree/immediacy of threat). Extension **.2** indicates the plant is "fairly threatened" in California (moderate degree/immediacy of threat). Extension **.3** is assigned to plants that are considered "not very threatened" in California (low degree/immediacy of threat or no current threats known).

3.3.2 Special Status Vegetation Types

In addition to providing an inventory of special status plant and wildlife species, the CNDDB also provides an inventory of vegetation types that are considered special status by the State and federal resource agencies, academic institutions, and various conservation groups (such as the CNPS). Determination of the sensitivity level is based on the Nature Conservancy Heritage Program Status Ranks that rank both species and vegetation types on a global and statewide basis according to the number and size of remaining occurrences and recognized threats (e.g., proposed developments, habitat degradation, and non-native species invasion).

The CNDDB reports the following special status vegetation types in the Project vicinity: southern coast live oak riparian forest, southern cottonwood willow riparian forest, southern riparian scrub, and southern sycamore alder riparian woodland. None of these vegetation types have been reported from the Survey Area. Resource agencies generally consider vegetation types to have special status if they support concentrations of special status plant or wildlife species, are of relatively limited distribution, or offer particular value to wildlife. While some special status vegetation types are not afforded legal protection unless they support protected species, others may be protected by ordinance, code, or regulation under which conformance typically requires a permit or other discretionary action prior to impacting the vegetation. Alkali scrub playa, disturbed alkali scrub playa, alkali wetland, Riversidean sage scrub, disturbed Riversidean sage scrub, and southern willow scrub may be considered special status vegetation types by the CDFG on the Project site.

Alkali Playa Community

Alkali playa communities are considered rare by the CDFG. Alkali scrub playa or disturbed alkali scrub playa occur in the Survey Area along the Proposed Subtransmission Source Line Route, Segment 2 and the Alternative Subtransmission Source Line Route, Segment 3.

Coastal Sage Scrub

Coastal sage scrub has declined by approximately 70 to 90 percent in its historic range in California (Noss and Peters 1995). It has largely been lost to land use changes in Southern California basins and foothills. This vegetation type supports many special status plant and wildlife species. The ecological function in Southern California's remaining coastal sage scrub is threatened by habitat fragmentation, invasive non-native species, livestock grazing, off-highway vehicles, altered fire regime, and perhaps air pollution (O'Leary 1995). Coastal sage scrub vegetation types in the Survey Area include Riversidean sage scrub and disturbed Riversidean sage scrub along the New Cable to Moval.

Southern Willow Scrub

Southern willow scrub is considered rare by the CDFG. This vegetation type occurs along the Proposed Subtransmission Source Line Route, Segment 2. This vegetation type, along with other riparian vegetation (e.g., alkali wetland) that occurs along perennial or intermittent drainages subject to seasonal flooding, are ranked as special status by the CDFG. Most natural riparian vegetation in Southern California has been lost or degraded by land use conversions to agricultural, urban, and recreational uses; channelization for flood control; sand and gravel mining; ground water pumping; water impoundments; and various other changes. It is estimated that as much as 95 to 97 percent of historic riparian habitats in Southern California have been lost (Faber et al. 1989). Riparian habitats are biologically productive as well as diverse, and are the exclusive habitat of several special status species.

Jurisdictional Areas

Riparian habitats are often under USACE and/or CDFG jurisdiction due to their association with wetlands, "Waters of the U.S.", or streambeds. However, it should be noted that the riparian habitats described above are not equivalent to delineated areas subject to USACE and/or CDFG jurisdiction. Only the portion of these habitats associated within a discernable streambed and/or adjacent wetlands that meet certain criteria are within USACE and/or CDFG jurisdiction.

Drainages, which include "Waters of the U.S.", are protected under Section 404 of the CWA and are under the jurisdiction of the USACE. "Waters of the U.S." include navigable coastal and inland waters, lakes, rivers, streams and their tributaries; interstate waters and their tributaries; wetlands adjacent to such waters; intermittent streams; and other waters that could affect interstate commerce. According to the USACE, areas considered to be a "wetland" (and subject to the regulatory jurisdiction of the USACE) must exhibit hydrology, hydric soils, and hydrophilic vegetation that meet federal criteria, as indicated in the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008).

The RWQCB is the primary agency responsible for protecting water quality within California through the regulation of discharges to surface waters under the CWA and the California Porter-Cologne Water Quality Control Act (Porter-Cologne Act). The RWQCB's jurisdiction extends to all "Waters of the State" and to all "Waters of the U.S.", including wetlands (isolated and non-isolated).

Section 401 of the CWA provides the RWQCB with the authority to regulate, through a Water Quality Certification, any proposed federally permitted activity that may affect water quality. Among such activities are discharges of dredged or fill material permitted by the USACE pursuant to Section 404 of the CWA. Section 401 requires the RWQCB to provide "certification that there is reasonable assurance that an activity which may result in the discharge to 'waters of the U.S.' will not violate water quality standards". Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which contain numeric and narrative objectives that can be found in each of the nine RWQCBs' Basin Plans.

An RWQCB CWA Section 401 Water Quality Certification is required before the USACE will issue a Section 404 permit. In addition, if drainages in the Survey Area meet the criteria established by Section 1600 of the *California Fish and Game Code*, the CDFG may require a Streambed Alteration Agreement prior to any modification of the bed, bank, or channel of streambeds in the Survey Area. CDFG jurisdiction generally includes the streambed and the canopy of associated riparian vegetation.

Multiple features in the Survey Area may be under the jurisdiction of the USACE and/or the CDFG (Table 3). These features include the San Jacinto River, the detention basin, and the irrigation ditch. The irrigation ditch empties into the San Jacinto River.

TABLE 3
PROJECT LOCATIONS POTENTIALLY CONTAINING JURISDICTIONAL RESOURCES

Location	Areas potentially under the jurisdiction of:		
	USACE	CDFG	RWQCB
Proposed Substation Site			
Alternative Substation Site			
Proposed Subtransmission Source Line Route, Segment 1	X	X	X
Proposed Subtransmission Source Line Route, Segment 2	X	X	X
Alternative Subtransmission Source Line Route, Segment 3	X	X	X
New Cable to Moval	X	X	X
Proposed Overhead Route 1	X	X	X
Proposed Overhead Route 2			

3.3.3 Special Status Plants

Special status plant species that are known to occur in the vicinity of the Project are discussed below and summarized in Table 4, along with habitat suitability and the potential for occurrence on each portion of the Survey Area. A brief description of special status plant species that are known from the region are listed below alphabetically according to their scientific name. Some species may occur on some sites due to the presence of potentially suitable habitat or were observed while conducting various field surveys. Plant surveys have been completed for the Proposed Subtransmission Source Line Route, Segments 1 and 2; the Proposed Overhead Routes 1 and 2; and the Alternative Subtransmission Source Line Route, Segment 3. Surveys are in progress for the New Cable to Moval. Of these potentially occurring species, five are listed species and include Munz's onion (*Allium munzii*), San Jacinto Valley crownscale, thread-leaved brodiaea, Moran's navarretia, and California Orcutt grass (*Orcuttia californica*).

TABLE 4
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE PROJECT VICINITY

Species	Status			Potential For Occurrence on Each Site							
	USFWS	CDFG	CNPS	Proposed Substation Site	Alternative Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Alternative Subtransmission Source Line Route, Segment 3	New Cable to Moval	Proposed Overhead Route 1	Proposed Overhead Route 2
Chaparral sand-verbena (*Abronia villosa* var. *aurita*)	—	—	1B.1	N	N	N	N	N	NOS	N	N
Munz's Onion (*Allium munzii*)	FE	ST	1B.1	N	N	N	N	N	NOS	N	N
San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*)	FE	—	1B.1	N	N	O (1,999)	NOS	O (532)	NOS	O (1,999)	N
South Coast saltscale (*Atriplex pacifica*)	—	—	1B.2	N	N	NOS	NOS	NOS	NOS	NOS	N
Parish's brittlescale (*Atriplex parishii*)	—	—	1B.1	N	N	NOS	N	NOS	NOS	NOS	N
Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)	—	—	1B.2	N	N	NOS	NOS	NOS	NOS	NOS	N
Thread-leaved brodiaea (*Brodiaea filifolia*)	FT	SE	1B.1	N	N	NOS	N	NOS	NOS	NOS	N
Intermediate mariposa lily (*Calochortus weedii* var. *intermedius*)	—	—	1B.2	N	N	N	N	N	Y	N	N
Smooth tarplant (*Centromadia pungens* ssp. *laevis*)	—	—	1B.1	N	N	O (75)	O (65)	NOS	Y	O (75)	N
Parry's spineflower (*Chorizanthe parryi* var. *parryi*)	—	—	1B.1	N	N	NOS	NOS	NOS	NOS	NOS	N
Long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)	—	—	1B.2	N	N	NOS	N	N	NOS	NOS	N
Slender-horned spineflower (*Dodecahema leptoceras*)	FE	SE	1B.1	N	N	N	N	N	NOS	N	N
Vernal barley (*Hordeum intercedens*)	—	—	3.2	N	N	O (4,000)	O (150)	O (9,200)	NOS	O (4,000)	N
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)	—	—	1B.1	N	N	NOS	O (1)	O (6,250)	NOS	NOS	N
Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*)	—	—	1B.2	N	N	N	N	N	NOS	N	N
Mud nama (*Nama stenocarpum*)	—	—	2.2	N	N	N	N	N	N	N	N
Moran's navarretia (*Navarretia fossalis*)	FT	—	1B.1	N	N	NOS	NOS	NOS	N	NOS	N
California Orcutt grass (*Orcuttia californica*)	FE	SE	1B.1	N	N	N	N	NOS	N	N	N
Salt Spring checkerbloom (*Sidalcea neomexicana*)	—	—	2.2	N	N	NOS	NOS	NOS	N	NOS	N

TABLE 4 (Continued)
SPECIAL STATUS PLANT SPECIES KNOWN TO OCCUR IN THE PROJECT VICINITY

	Status			Potential For Occurrence on Each Site							
Species	**USFWS**	**CDFG**	**CNPS**	**Proposed Substation Site**	**Alternative Substation Site**	**Proposed Subtransmission Source Line Route, Segment 1**	**Proposed Subtransmission Source Line Route, Segment 2**	**Alternative Subtransmission Source Line Route, Segment 3**	**New Cable to Moval**	**Proposed Overhead Route 1**	**Proposed Overhead Route 2**
Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*)	—	—	2.1	N	N	Y	NOS	NOS	Y	Y	N

LEGEND:

Federal (USFWS)

FE Endangered
FT Threatened

State (CDFG)

SE Endangered
ST Threatened

Potential to Occur on the Site

Y Potential to occur, suitable habitat
N Not expected to occur; no suitable habitat
O Observed, number observed in parenthesis
NOS Not observed, suitable habitat

California Native Plant Society (CNPS) List Categories
List 1A Plants Presumed Extinct in California
List 1B Plants Rare, Threatened, or Endangered in California and Elsewhere
List 2 Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
List 3 Plants About Which We Need More Information – A Review List
List 4 Plants of Limited Distribution – A Watch List

California Native Plant Society (CNPS) Threat Code Extensions
None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened)

Chaparral Sand Verbena (*Abronia villosa* var. *aurita*)

Chaparral sand verbena is a CNPS List 1B.1 species (CNPS 2010). It typically blooms January through September (CNPS 2010). This annual herb occurs in chaparral, coastal scrub, and desert dunes (CNPS 2010). Historically, this variety is known from Imperial, Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties as well as parts of Arizona and Baja California (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; chaparral sand verbena was not observed within the Survey Area.

Munz's Onion (*Allium munzii*)

Munz's onion is a federally Endangered, State-Threatened, and CNPS List 1B.1 species (CNPS 2010). It typically blooms from March through May (CNPS 2010). This bulbiferous herb occurs in chaparral, cismontane woodland, coastal scrub, pinyon and juniper woodland, and mesic, clay valley and foothill grasslands (CNPS 2010). Historically, this species is known only from Riverside County (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Munz's onion was not observed within the SurveyArea.

San Jacinto Valley Crownscale (*Atriplex coronata* var. *notatior*)

San Jacinto Valley crownscale is a federally Endangered and CNPS List 1B.1 species (CNPS 2010). It typically blooms from April through August (CNPS 2010). This annual herb occurs in playas, mesic valley and foothill grasslands, and alkaline vernal pools (CNPS 2010). Historically, this variety is known from Kern and Riverside Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; San Jacinto Valley crownscale was observed adjacent to the Proposed Subtransmission Source Line Route, Segment 1 (1,999 individuals) and the Proposed Overhead Route 1 (1,999 individuals); and on the Alternative Subtransmission Source Line Route, Segment 3 (532 individuals) (Exhibit 6).

South Coast Saltscale (*Atriplex pacifica*)

South Coast saltscale is a CNPS List 1B.2 species (CNPS 2010). It typically blooms March through October (CNPS 2010). This annual herb occurs in coastal bluff scrub, coastal dunes, coastal scrub, and playas (CNPS 2010). Historically, this species is known from Los Angeles, Orange, Riverside, Santa Barbara, San Diego and Ventura Counties; Anacapa, San Clemente, Santa Catalina, Santa Cruz, San Nicholas, and Santa Rosa Islands; and parts of Arizona, Baja California, and Sonora, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; south coast saltscale was not observed within the Survey Area.

Parish's Brittlescale (*Atriplex parishii*)

Parish's brittlescale is a CNPS List 1B.1 species (CNPS 2010). It typically blooms June through October (CNPS 2010). This annual herb occurs in chenopod scrub, playas, and alkaline vernal pools (CNPS 2010). Historically, this species is known from Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties, as well as parts of Baja California (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Parish's brittlescale was not observed within the Survey Area.

MAP A

MAP B

San Jacinto Valley Crownscale Point*

San Jacinto Valley Crownscale*

Substation Sites

Proposed

Alternative

Subtransmission Source Line Routes

Segment 1 (Proposed Route)

Segment 2 (Proposed Route)

Segment 3 (Alternative Route)

Proposed Telecommunications Routes

New Cable to Moval

Proposed Overhead Route 1

Proposed Overhead Route 2

*Note: Data is based on 2009 focused surveys and incomplete 2010 surveys. Additional rare plant populations may be added as 2010 surveys are completed.

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San Jacinto Valley Crownscale

Exhibit 6

Lakeview Substation and Transmission Line Project

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Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)

Davidson's saltscale is a CNPS List 1B.2 species (CNPS 2010). It typically blooms April through October (CNPS 2010). This annual herb occurs in coastal bluff scrub and alkaline coastal scrub (CNPS 2010). Historically, this variety is known from Los Angeles, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, and Ventura Counties; Santa Catalina, Santa Cruz, and Santa Rosa Islands; and parts of Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Davidson's saltscale was not observed within the Survey Area.

Thread-leaved Brodiaea (*Brodiaea filifolia*)

Thread-leaved brodiaea is a federally Threatened, State-Endangered, and CNPS List 1B.1 species (CNPS 2010). It typically blooms March through June (CNPS 2010). This perennial bulbiferous herb occurs in chaparral, cismontane woodland, coastal scrub, playas, valley and foothill grasslands, and vernal pools (CNPS 2010). Historically, this species is known from Los Angeles, Orange, Riverside, San Bernardino, San Diego, and San Luis Obispo Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; thread-leaved brodiaea; was not observed within the Survey Area.

Intermediate Mariposa Lily (*Calochortus weedii* var. *intermedius*)

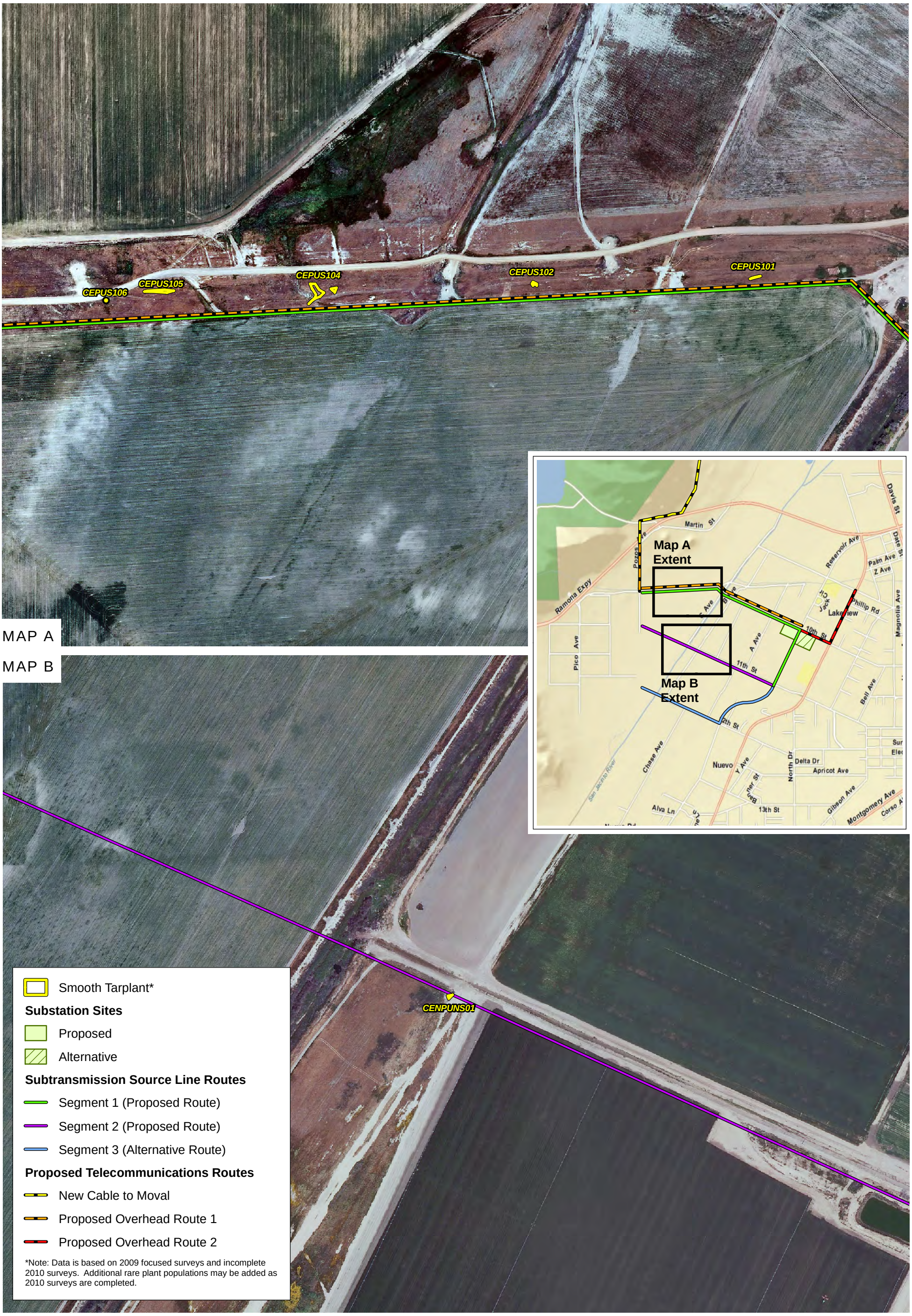
Intermediate mariposa lily is a CNPS List 1B.2 species (CNPS 2010). It typically blooms May through July (CNPS 2010). This perennial bulbiferous herb occurs in chaparral, coastal scrub, and calcareous valley and foothill grasslands (CNPS 2010). Historically, this variety is known from Los Angeles, Orange, Riverside, and San Bernardino Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Intermediate mariposa lily was not observed within the Survey Area.

Smooth Tarplant (*Centromadia pungens* ssp. *laevis*)

Smooth tarplant is a CNPS List 1B.1 species (CNPS 2010). It typically blooms April through September (CNPS 2010). This annual herb occurs in chenopod scrub, meadows and seeps, playas, riparian woodland, and alkaline valley and foothill grasslands (CNPS 2010). Historically, this subspecies is known from Riverside, San Bernardino, and San Diego Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; smooth tarplant was observed adjacent to or on the Proposed Subtransmission Source Line Route, Segment 1 (75 individuals) and Segment 2 (65 individuals); and Proposed Overhead Route 1 (75 individuals) (Exhibit 7).

Parry's Spineflower (*Chorizanthe parryi* var. *parryi*)

Parry's spineflower is a CNPS List 1B.1 species (CNPS 2010). It typically blooms April through June (CNPS 2010). This annual herb occurs in chaparral, cismontane woodland, coastal scrub, and valley and foothill grasslands in sandy or rocky openings (CNPS 2010). Historically, this variety is known from Los Angeles, Riverside, and San Bernardino Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Parry's spineflower was not observed within the Survey Area.



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Smooth Tarplant

Exhibit 7

Lakeview Substation and Transmission Line Project

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Long-spined Spineflower (*Chorizanthe polygonoides* var. *longispina*)

Long-spined spineflower is a CNPS List 1B.2 species (CNPS 2010). It typically blooms April through July (CNPS 2010). This annual herb occurs in chaparral, coastal scrub, meadows and seeps, valley and foothill grasslands, and vernal pools (CNPS 2010). Historically, this variety is known from Orange, Riverside, Santa Barbara, and San Diego Counties, as well as parts of Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; long-spined spineflower was not observed within the Survey Area.

Slender-horned Spineflower (*Dodecahema leptoceras*)

Slender-horned spineflower is a federally and State-listed Endangered species and a CNPS List 1B.1 species. It typically blooms April through June (CNPS 2010). This annual herb occurs in chaparral, cismontane woodland, and sandy areas of coastal scrub in alluvial fans (CNPS 2010). Historically, this species is found in Los Angeles, Riverside, and San Bernardino Counties (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; slender-horned spineflower was not observed within the Survey Area.

Vernal Barley (*Hordeum intercedens*)

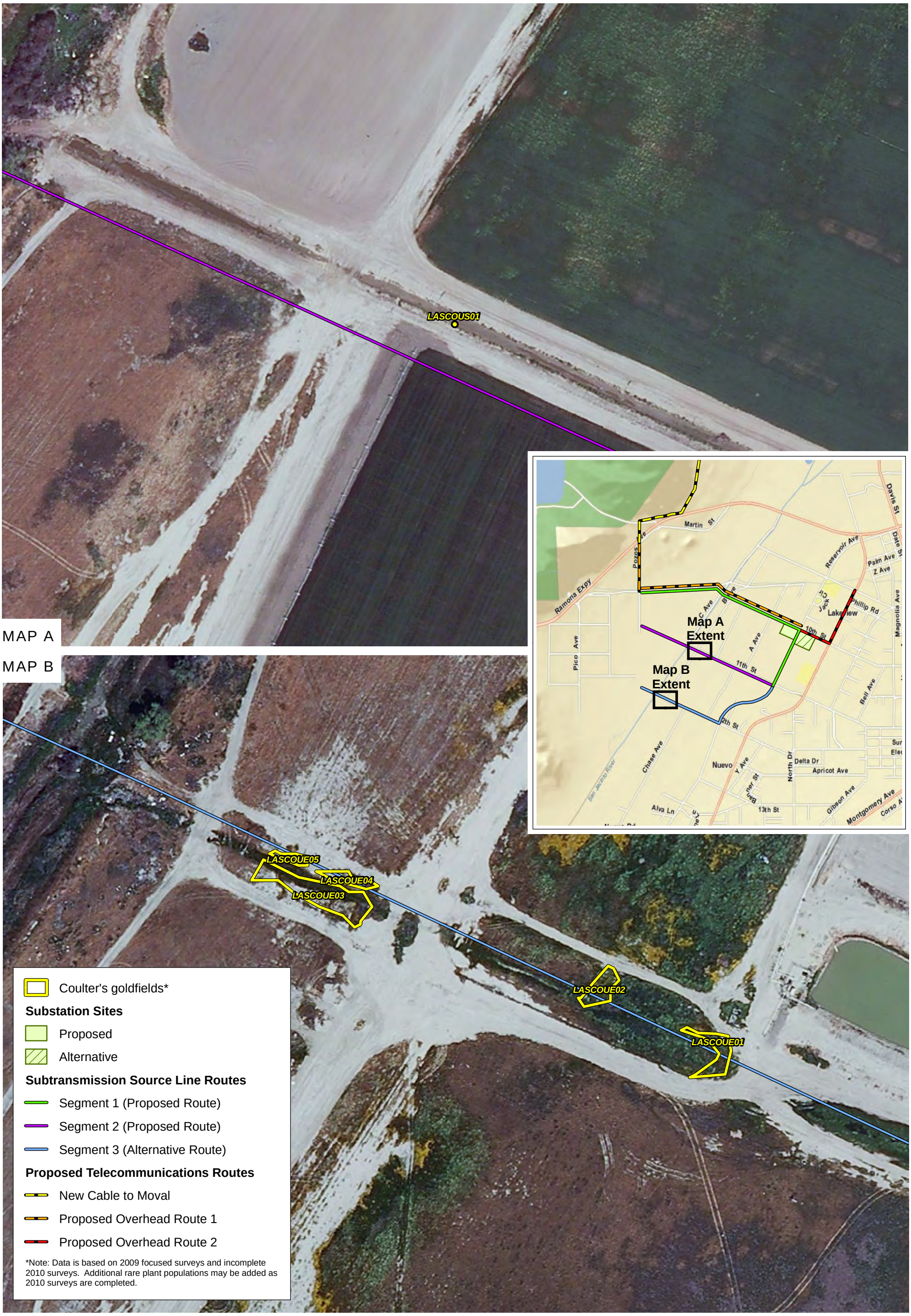
Vernal barley is a CNPS List 3.2 species (CNPS 2010). It typically blooms March through June (CNPS 2010). This annual herb occurs in coastal dunes, coastal scrub, saline flats and depressions in valley and foothill grasslands, and vernal pools. Historically, this species is found in Fresno, Kings, Los Angeles, Mono, Orange, Riverside, Santa Barbara, San Benito, San Diego, San Mateo, and Ventura Counties; Anacapa, Santa Barbara, San Clemente, Santa Catalina, Santa Cruz, San Miguel, San Nicolas, and Santa Rosa Islands; and Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; vernal barley was observed on the Proposed Subtransmission Source Line Route, Segment 1 (4,000 individuals) and Segment 2 (150 individuals); the Alternative Subtransmission Source Line Route, Segment 3 (9,200 individuals); and the Proposed Overhead Route 1 (4,000 individuals).

Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)

Coulter's goldfields is a CNPS List 1B.1 species (CNPS 2010). It typically blooms February through June (CNPS 2010). This annual herb occurs in marshes and swamps, playas, and vernal pools (CNPS 2010). Historically, this subspecies is known from Colusa, Kern, Los Angeles, Merced, Orange, Riverside, Santa Barbara, San Luis Obispo, Tulare, San Bernardino, Ventura, and San Diego Counties; Santa Rosa Island; and parts of Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Coulter's goldfields was observed adjacent to the Proposed Subtransmission Source Line Route, Segment 2 (1 individual) and on the Alternative Subtransmission Source Line Route, Segment 3 (6,250 individuals) (Exhibit 8).

Robinson's Pepper-grass (*Lepidium virginicum* var. *robinsonii*)

Robinson's pepper-grass is a CNPS List 1B.2 species (CNPS 2010). It typically blooms January through July (CNPS 2010). This annual herb occurs in chaparral and coastal scrub (CNPS 2010). Historically, this variety is known from Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, and San Diego Counties; Santa Cruz Island; and parts of Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were



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Coulter's Goldfields

Exhibit 8

Lakeview Substation and Transmission Line Project

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conducted in spring/summer 2009 and 2010; Robinson's pepper-grass was not observed within the Survey Area.

Mud nama (*Nama stenocarpum*)

Mud nama is a CNPS List 2.2 species (CNPS 2010). It typically blooms January through July (CNPS 2010). This perennial herb occurs in marshes and swamps (CNPS 2010). Historically, this species is known from Imperial, Los Angeles, Orange, Riverside, and San Diego Counties; San Clemente Island; and parts of Arizona and Baja California, Mexico (CNPS 2010). There is no suitable habitat for mud nama on the Project site.

Moran's navarretia (*Navarretia fossalis*)

Moran's navarretia is a federally Threatened and a CNPS List 1B.1 species (CNPS 2010). It typically blooms April through June (CNPS 2010). This annual herb occurs in chenopod scrub, marshes and swamps, playas and vernal pools (CNPS 2010). Historically, this species is known from Los Angeles, Riverside, San Luis Obispo and San Diego Counties as well as parts of Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Moran's navarretia was not observed within the Survey Area.

California Orcutt Grass (*Orcuttia californica*)

California Orcutt grass is a federally and State-listed Endangered species and a CNPS List 1B.1 species (CNPS 2010). It typically blooms April through August (CNPS 2010). This annual herb occurs in vernal pools (CNPS 2010). Historically, this species is found in Los Angeles, Riverside, San Diego, and Ventura Counties as well as Baja California, Mexico (CNPS 2010). There is no suitable habitat for California Orcutt grass within the Survey Area with the exception of the Alternative Subtransmission Source Line Route, Segment 3.

Salt Spring checkerbloom (*Sidalcea neomexicana*)

Salt Spring checkerbloom is a CNPS List 2.2 species (CNPS 2010). It typically blooms March through June (CNPS 2010). This perennial herb occurs in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and alkaline playas (CNPS 2010). Historically, this species is known from Kern, Los Angeles, Orange, Riverside, San Bernardino, Ventura, and San Diego Counties; parts of Arizona, Nevada, Utah, and New Mexico; and Sonora and Baja California, Mexico (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010; Salt Spring checkerbloom was not observed within the Survey Area.

Wright's trichocoronis (Trichocoronis *wrightii* var. *wrightii*)

Wright's trichocoronis is a CNPS List 2.1 species (CNPS 2010). It typically blooms May through September (CNPS 2010). This annual herb occurs in meadows and seeps, marshes and swamps, riparian forest, and alkaline vernal pools (CNPS 2010). Historically, this variety is known from Colusa, Merced, Riverside, San Joaquin, and Sutter Counties, as well as parts of Texas (CNPS 2010). Focused surveys for special status plant species were conducted in spring/summer 2009 and 2010. Wright's trichocoronis was not observed within the Survey Area; however, the 2010 surveys are still in progress. Wright's trichocoronis has potential to occur on the Proposed Subtransmission Source Line Route, Segment 1; the Proposed Overhead Route 1; and the New Cable to Moval.

3.3.4 Special Status Wildlife

Several special status wildlife species have been reported in the vicinity of the Project based on the results of the literature review described above. A brief description of these special status wildlife species and their potential to occur in the Survey Area are discussed below (Table 5). Note that they are grouped by type and listed in taxonomic order.

Focused efforts to determine the presence or absence were conducted for the Quino checkerspot butterfly, burrowing owl, and coastal California gnatcatcher for the Proposed Substation Site, Alternative Substation Site, Subtransmission Source Line Routes, and the Proposed Telecommunications Routes. These surveys were limited to the areas that contain potentially suitable habitat.

TABLE 5
SPECIAL STATUS WILDLIFE SPECIES
KNOWN TO OCCUR IN THE PROJECT VICINITY

Species	Status		Potential For Occurrence on Each Site							
	USFWS	CDFG	Proposed Substation Site	Alternative Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Alternative Subtransmission Source Line Route, Segment 3	New Cable to Moval	Proposed Overhead Route 1	Proposed Overhead Route 2
Invertebrates										
Vernal pool fairy shrimp (*Brachinecta lynchi)*	FT	–	NE	NE	NE	NE	NE	NE	NE	NE
Riverside fairy shrimp (*Streptocephalus woottoni*)	FE	–	NE	NE	NE	NE	MAY	NE	NE	NE
Quino checkerspot butterfly (*Euphydryas editha quino*)	FE	–	NE	NE	NE	NE	NE	NEF	NE	NE
Amphibians										
Western spadefoot (*Spea* [*Scaphiopus*] *hammondii*)	–	SSC	NE	NE	NE	NE	NE	MAY	NE	NE
Arroyo toad (*Anaxyrus californicus* [*Bufo microscaphus californicus*])	FE	SSC	NE	NE	NE	NE	NE	NE	NE	NE
Reptiles										
Southwestern pond turtle (*Actinemys* [Emys] *marmorata pallida*)	–	SSC	NE	NE	NE	NE	NE	NE	NE	NE
Coast [San Diego] horned lizard (*Phrynosoma coronatum* [*blainvillii* population])	–	SSC	NE	NE	NE	NE	NE	MAY	NE	NE
Orange-throated whiptail (*Aspidoscelis hyperytha* [*Cnemidophorus hyperythus beldingi*])	–	SSC	NE	NE	NE	NE	NE	MAY	MAY	NE
Silvery legless lizard (*Anniella pulchra pulchra*)	–	SSC	NE	NE	NE	NE	NE	MAY	MAY	NE
Coast patch-nosed snake (*Salvadora hexalepis virgultea*)	–	SSC	NE	NE	NE	NE	NE	MAY	NE	NE
Two-striped garter snake (*Thamnophis hammondii*)	–	SSC	NE	NE	NE	NE	NE	NE	NE	NE
Northern red-diamond rattlesnake (*Crotalus ruber ruber*)	–	SSC	NE	NE	NE	NE	NE	MAY	NE	NE
Birds										
White-faced ibis (*Plegadis chihi*)	–	WL	NEB, MAYF	NEB, MAYF	MAY	MAY	NEB, MAYF	NEB, MAYF	MAY	MAY
Cooper's hawk (*Accipiter cooperii*) (nesting)	–	WL	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	RO	NEB, MAYF	MAY
Golden eagle (*Aquila chrysaetos*) (nesting & nonbreeding/wintering)	–	WL/FP	NEB, MAYF	NEB, MAYF	RO	NEB, MAYF	NEB, MAYF	RO	RO	NE
Ferruginous hawk (*Buteo regalis*) (nonbreeding/wintering)	–	WL	EXP	EXP	RO, FO	NEB, MAYF	NEB, MAYF	EXP	RO, FO	NE
Swainson's hawk (*Buteo swainsoni*) (nesting)	–	ST	NEB, TO	NEB, TO	NEB, TO	NEB, TO	NEB, TO	NEB, TO	NEB, TO	NE

TABLE 5 (Continued)
SPECIAL STATUS WILDLIFE SPECIES
KNOWN TO OCCUR IN THE PROJECT VICINITY

Species	Status		Potential For Occurrence on Each Site							
	USFWS	CDFG	Proposed Substation Site	Alternative Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Alternative Subtransmission Source Line Route, Segment 3	New Cable to Moval	Proposed Overhead Route 1	Proposed Overhead Route 2
Northern harrier (*Circus cyaneus*) (nesting)	–	SSC	EXP	EXP	NEB, MAYF	NEB, MAYF	EXP	RO	NEB, MAYF	NE
White-tailed kite (*Elanus leucurus*) (nesting)	–	FP	EXP	EXP	NEB, MAYF	MAY	EXP	RO	NEB, MAYF	NE
Bald eagle (*Haliaeetus leucocephalus*) (nesting and wintering)	Delisted	SE, FP	NE	NE	NE	NE	NE	NE	NE	NE
Merlin (*Falco columbarius*) (nonbreeding/wintering)	–	WL	EXP	EXP	NEB, MAYF	NEB, MAYF	EXP	RO	NEB, MAYF	NE
Prairie falcon (*Falco mexicanus*) (nesting)	–	WL	EXP	EXP	NEB, MAYF	NEB, MAYF	EXP	RO	NEB, MAYF	NE
American peregrine falcon (*Falco peregrinus anatum*)	Delisted	SCD/FP	EXP	EXP	NEB, MAYF	NEB, MAYF	NEB, MAYF	RO	NEB, MAYF	NE
mountain plover (*Charadrius montanus*) (nonbreeding/wintering)	–	SSC	RO	RO	RO	RO	RO	NE	RO	RO
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) (nesting)	FC	SE	NE	NE	NE	NE	NE	NE	NE	NE
Long-eared owl (*Asio otus*) (nesting)	–	SSC	NE	NE	NE	NE	NE	RO	NE	NE
Burrowing owl (*Athene cunicularia*) (burrow sites and some wintering sites)	–	SSC	NEF	NEF	NEF	NEF	NEF	MAY	NEF	MAY
Southwestern willow flycatcher (*Empidonax traillii extimus*) (nesting)	FE	SE	NE	NE	NE	NE	NE	NE	NE	NE
Loggerhead shrike (*Lanius ludovicianus*) (nesting)	–	SSC	MAY	MAY	OBS	MAY	MAY	MAY	OBS	MAY
Least Bell's vireo (*Vireo bellii pusillus*) (nesting)	FE	SE	NE	NE	NE	NE	NE	NE	NE	NE
California horned lark (*Eremophila alpestris actia*)	–	WL	EXP	EXP	EXP	EXP	EXP	NE	EXP	NE
Cactus wren (*Campylorhynchus brunneicapillus sandiegensis* [coastal population])	–	–[a]	NE	NE	NE	NE	NE	NE	NE	NE
Coastal California gnatcatcher (*Polioptila californica californica*)	FT	SSC	NE	NE	NE	NE	NE	NEF	NES	NE
Yellow warbler (*Dendroica petechia brewsteri*) (nesting)	–	SSC	NE	NE	NE	NE	NE	NE	NE	NE
Yellow-breasted chat (*Icteria virens*) (nesting)	–	SSC	NE	NE	NE	NE	NE	NE	NE	NE

TABLE 5 (Continued)
SPECIAL STATUS WILDLIFE SPECIES
KNOWN TO OCCUR IN THE PROJECT VICINITY

Species	Status		Potential For Occurrence on Each Site							
	USFWS	CDFG	Proposed Substation Site	Alternative Substation Site	Proposed Subtransmission Source Line Route, Segment 1	Proposed Subtransmission Source Line Route, Segment 2	Alternative Subtransmission Source Line Route, Segment 3	New Cable to Moval	Proposed Overhead Route 1	Proposed Overhead Route 2
Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	_	WL	NE	NE	NES	NE	NE	RO	NES	NE
Oregon vesper sparrow (*Pooecetes gramineus affinis*) (wintering)	_	SSC	NE	NE	MAY	LIM	MAY	MAY	MAY	NE
Grasshopper sparrow (*Ammodramus savannarum*) (nesting)	–	SSC	NE	NE	MAY	NE	NE	MAY	MAY	NE
Bell's sage sparrow (*Amphispiza belli belli*) (nesting)	–	WL	NE	NE	NE	NE	NE	RO	NE	NE
Tricolored blackbird (*Agelaius tricolor*) (nesting colony)	–	SSC	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	NEB, MAYF	NE
Mammals										
Western yellow bat (*Lasiurus xathinus*)	–	SSC	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NE
Western mastiff bat (*Eumops perotis californicus*)	–	SSC	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NER, MAYF	NE
San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)	–	SSC	MAY	MAY	MAY	MAY	MAY	MAY	MAY	NES
Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	–	SSC	NE	NE	MAY	LIM	NE	MAY	MAY	NE
Stephens' kangaroo rat (*Dipodomys stephensi*)	FE	ST	NE	NE	MAY	LIM	NE	RO	MAY	NE
Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)	–	SSC	NE	NE	MAY	LIM	NE	MAY	MAY	NE
San Diego desert woodrat (*Neotoma lepida intermedia*)	–	SSC	NE	NE	NES	NE	NE	MAY	NES	NE
Southern grasshopper mouse (*Onychomys torridus ramona*)	–	SSC	NE	NE	MAY	LIM	NE	MAY	MAY	NE
American badger (*Taxidea taxus*)	–	SSC	NES	NES	LIM	NE	NE	MAY	LIM	NE

LEGEND:

Federal (USFWS)

FE Endangered
FT Threatened
FC Candidate
FP Fully Protected
SCD State Candidate for delisting

State (CDFG)

SE Endangered
ST Threatened
SSC Species of Special Concern

Potential to Occur on the Site

OBS Observed foraging on site
EXP Expected to occur; suitable habitat
MAY May occur; potentially suitable habitat
LIM Limited potential to occur; limited potentially suitable habitat
NEB, MAYF Not expected for breeding; may occur for foraging
NEB, TO Not expected for breeding; transient only
NER, MAYF Not expected for roosting; may occur for foraging
NE Not expected to occur; no suitable habitat
NEF Not expected to occur; suitable habitat present, but not observed during focused surveys
NES Not expected to occur; limited suitable habitat present, other factors preclude occupation
RO Recent occurrences in vicinity; suitable habitat and expected to occur
RO, FO Recent occurrences, may occur for foraging

[a] The coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*) is restricted to San Diego and Orange Counties; however, the taxonomy is not yet settled and all coastal populations of cactus wren appear to be declining.

Invertebrates

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

Vernal pool fairy shrimp is a federally listed Threatened species. It is found primarily in the Central Valley and the foothills of the Sierra Nevada Mountains in Northern California north to Oregon (Eriksen and Belk 1999; USFWS 2003). In Southern California, the species is known only from western Riverside County (Dudek 2003). This species is restricted to seasonal vernal pools, preferring cool-water pools that have low to moderate dissolved solids, are unpredictable, and are often short lived (Dudek 2003). In the vicinity of the Survey Area, this species is known from Skunk Holow, the Santa Rosa Plateau, Salt Creek, and near the Pechanga Indian Reservation (Dudek 2003). There is no suitable habitat for this species in the Survey Area.

On August 6, 2003, the USFWS published a final rule designating 839,460 acres of land as critical habitat for the vernal pool fairy shrimp in Oregon south to Ventura County, California (USFWS 2003). Following lawsuits, the USFWS proposed a revised critical habitat designation on December 28, 2004. This proposed rule was finalized on February 10, 2006. The current final critical habitat designation covers 597,821 acres from Oregon south to Ventura County, California (USFWS 2005b). The Survey Area is not located in final critical habitat for the vernal pool fairy shrimp.

Riverside Fairy Shrimp (*Streptocephalus woottoni*)

Riverside fairy shrimp is a federally listed Endangered species. This species occurs in vernal pools and ephemeral ponds in coastal Southern California from Ventura County south to northwestern Baja California, Mexico (USFWS 2005d). Riverside fairy shrimp typically occur in deep, long-lived vernal pools on coastal plateaus and terraces that have emergent vegetation (USFWS 2005d). In the vicinity of the Survey Area, this species has been reported from the Santa Rosa Plateau, Skunk Hollow, Murrieta, Wildomar, Lake Elsinore, and Alberhill (Dudek 2003). Suitable habitat for this species occurs in the Survey Area along the Alternative Subtransmission Source Line Route, Segment 3. Therefore, Riverside fairy shrimp may occur at this site.

On May 30, 2001, the USFWS published a final rule designating 6,870 acres of land as critical habitat for the Riverside fairy shrimp in Los Angeles, Orange, Riverside, San Diego, and Ventura Counties (USFWS 2001). Following lawsuits, the USFWS proposed a revised critical habitat designation on April 27, 2004. This proposed rule was finalized on April 12, 2005. The current final critical habitat designation covers 306 acres of land in Orange, San Diego, and Ventura Counties (USFWS 2005d). The Survey Area is not located in final critical habitat for Riverside fairy shrimp.

Quino Checkerspot Butterfly (*Euphydryas editha quino*)

Quino checkerspot butterfly is a federally listed Endangered species. This butterfly is associated with meadow habitats or clearings in scrub or chaparral vegetation types. Other habitat characteristics are clay soils with low-growing herbaceous annuals that include the larval host plants dwarf plantain (*Plantago erecta*) and owl's clover (*Castilleja exserta*). Throughout its range, the Quino checkerspot is restricted to areas that support its larval host plants (Mattoni et al. 1997). Adults often occur on open or sparsely vegetated rounded hilltops, ridgelines, and occasionally rocky outcrops (Dudek 2003). This butterfly is currently known from southern San Diego County, western Riverside County, and northwestern Baja California, Mexico (USFWS 1999b). In the vicinity of the Survey Area, this subspecies has been reported approximately three miles southwest of Winchester and five miles southwest of Sun City

(CDFG 2010a). Focused surveys were conducted for the QCB during the 2010 flight season along the New Cable to Moval and this species was not observed.

On April 15, 2002, the USFWS published the final rule on critical habitat for Quino checkerspot. This final rule designated as critical habitat a total of 171,605 acres of land in Riverside and San Diego Counties, California. Following lawsuits, the USFWS published a revised critical habitat designation on January 17, 2008. This proposed rule was finalized on June 17, 2009. The current final critical habitat designation covers 62,125 acres of land in San Diego and Riverside Counties (USFWS 2009b). The Survey Area is not located in final critical habitat for the Quino checkerspot butterfly.

Amphibians

Western Spadefoot (*Spea* [*Scaphiopus*] *hammondii*)

Western spadefoot is a California Species of Special Concern. It occurs in the Great Valley and bordering foothills, and in the Coast Ranges from Monterey Bay south to Baja California, Mexico (Stebbins 2003). From the Santa Clara River Valley in Los Angeles and Ventura Counties southward, an estimated 80 percent of habitat for this species has been lost (Stebbins 2003). The western spadefoot breeds in quiet streams, vernal pools and temporary ponds, and is rarely encountered outside of the breeding season (January to March) given that it aestivates and hibernates in burrows during the driest summer months and coldest winter months, respectively, emerging occasionally to forage during suitable conditions (Lannoo 2005). In the vicinity of the Survey Area, this species has been reported near the San Jacinto River one mile north of Nuevo and in the vicinity of the Perris Reservoir (CDFG 2010a). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval. Therefore, western spadefoot may occur at this site.

Arroyo Toad (*Anaxyrus californicus* [*Bufo microscaphus californicus*])

Arroyo toad is a federally listed Endangered species and a California Species of Special Concern. This toad only occurs in streams of southwestern California and northwestern Baja California, Mexico (USFWS 1994a). In California, it primarily occurs along the Coast Ranges from San Luis Obispo County south to San Diego County, but also occurs at a few locations on the western edge of the desert (Jennings and Hayes 1994). The arroyo toad is generally found in semi-arid regions near washes or intermittent streams (Zeiner et al. 1988). However, this species has highly specialized habitat requirements such as breeding pools within approximately 300 feet of juvenile and adult habitat consisting of shoreline with stable, sandy terraces and little herbaceous cover (Jennings and Hayes 1994). Streams must be of low velocity with sand or gravel substrate (Dudek 2003). In the vicinity of the Survey Area, this species has been reported from the San Jacinto River (Dudek 2003). The arroyo toad is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

On April 13, 2005, the USFWS published a final rule designating critical habitat for arroyo toad (USFWS 2005c). This final rule designated 11,695 acres in Santa Barbara, Ventura, Los Angeles, San Bernardino, and Riverside Counties as critical habitat. Following lawsuits, the USFWS proposed a revised designation of critical habitat on October 13, 2009. The revised critical habitat would cover 109,110 acres of land in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties. The Survey Area is not located in designated or newly proposed critical habitat for this species.

Reptiles

Southwestern Pond Turtle (*Actinemys* [*Emys*] *marmorata pallida*)

Southwestern pond turtle is a California Species of Special Concern. The southwestern pond turtle occurs primarily in freshwater rivers, streams, lakes, ponds, vernal pools, and seasonal wetlands, and requires basking sites such as logs, banks, or other suitable areas above water level. This subspecies of the western pond turtle (*Actinemys* [*Emys*] *marmorata*) occurs from approximately the San Francisco Bay area south through the Coast Ranges to northern Baja California, Mexico (Stebbins 2003). The western pond turtle is estimated to be in decline throughout 75 to 80 percent of its range (Stebbins 2003). The current range is similar to the historic range, but populations have become fragmented by agriculture and urban development. In addition to loss of habitat, this species is also threatened by grazing, non-native species, and disease (Jennings and Hayes 1994). In the vicinity of the Survey Area, the western pond turtle has been historically reported from Perris (CDFG 2010a; 1933 record). The southwestern pond turtle is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

Coast [San Diego] Horned Lizard (*Phrynosoma coronatum* [*blainvillii population*])

Coast [San Diego] horned lizard (blainvillii population) is a California Species of Special Concern. The two former subspecies of the coast horned lizard, (P. c. *blainvillii* and P. c. *frontale*) have recently been eliminated in scientific literature, such as Stebbins (2003), based on current scientific studies on this species. Coast horned lizard is a small, spiny, somewhat rounded lizard that occurs in scrubland, grassland, coniferous forests, and broadleaf woodland vegetation types. The coast horned lizard prefers open areas for basking and loose, friable soil for burrowing (Stebbins 2003). The coast horned lizard occurs throughout much of California, west of the desert and Cascade-Sierra highlands south to Baja California, Mexico (Stebbins 2003). However, many of the populations in lowland areas have been reduced or eliminated due to urbanization and agricultural expansion (Stebbins 2003). Three factors have contributed to its decline: loss of habitat, overcollecting, and the introduction of exotic ants. In the vicinity of the Survey Area, this species has been reported from Perris (CDFG 2010a). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval. Therefore, coast [San Diego] horned lizard may occur at this site.

Orange-throated Whiptail (*Aspidoscelis hyperytha* [*Cnemidophorus hyperythus beldingi*])

Orange-throated whiptail is a California Species of Special Concern. The two former subspecies of the orange-throated whiptail (C. h. *hyperythrus* and C. h. *beldingi*) have recently been eliminated in scientific literature, such as Stebbins (2003), based on current scientific studies on this species. The orange-throated whiptail occurs in washes and in open areas of sage scrub and chaparral with gravelly soils, often with rocks. It prefers the well drained, friable soil on slopes that are barren or only sparsely covered with vegetation and that have a southern exposure. This species occurs between sea level and 2,000 feet above msl in the western Peninsular Ranges from Orange and San Bernardino Counties south to Baja California, Mexico (Stebbins 2003). Approximately 75 percent of the former range has been lost to development, and remaining populations are highly fragmented (Stebbins 2003). In the vicinity of the Survey Area, this species has been reported from approximately 2.5 miles south of the Perris Reservoir and from the Lakeview Mountains (CDFG 2010a). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval and the Proposed Overhead Route 1. Therefore, orange-throated whiptail may occur at these two sites.

Silvery Legless Lizard (*Anniella pulchra pulchra*)

Silvery legless lizard is a California Species of Special Concern. It is a small, secretive lizard that spends most of its life beneath the soil; under stones, logs, or debris; or in leaf litter. The silvery legless lizard requires areas with loose sandy soil, moisture, warmth, and plant cover. It occurs in chaparral, pine-oak woodland, beach, and riparian vegetation types at elevations ranging from sea level to approximately 5,100 feet above msl (Stebbins 2003). The silvery legless lizard occurs in the Coast, Transverse, and Peninsular ranges from Contra Costa County south to Baja California, Mexico (Stebbins 2003). This species is naturally rare since it specializes in substrates with a high sand content, but it is also threatened by grazing, off-road vehicle activity, sand mining, beach erosion, excessive recreational use of coastal dunes, and the introduction of exotic plants (Jennings and Hayes 1994). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval and the Proposed Overhead Route 1. Therefore, silvery legless lizard may occur at these two sites.

Coast Patch-nosed Snake (*Salvadora hexalepis virgultea*)

Coast patch-nosed snake is a California Species of Special Concern. It inhabits open sandy areas and rocky outcrops in scrub, chaparral, grassland, and woodland vegetation types. It occurs from sea level to approximately 7,000 feet above msl (Stebbins 2003). The coast patch-nosed snake ranges along the coast of California from San Luis Obispo County south into Baja California, Mexico. This subspecies is threatened by development, grazing, and fire control activities (Jennings and Hayes 1994). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval. Therefore, coast patch-nosed snake may occur at this site.

Two-striped Garter Snake (*Thamnophis hammondii*)

Two-striped garter snake is a California Species of Special Concern. It occurs primarily in wetlands and is found in freshwater marsh and riparian habitats with perennial water. The two-striped garter snake feeds on small fishes, frogs, and tadpoles (Stebbins 2003). This highly aquatic species occurs from Monterey County south to Rio Rosario in Baja California, Mexico (Stebbins 2003). It is considered locally rare in southwestern California. The two-striped garter snake is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

Northern Red-diamond Rattlesnake (*Crotalus ruber ruber*)

Northern red-diamond rattlesnake is a California Species of Special Concern. It inhabits open scrub, chaparral, woodland, and grassland vegetation types. This species ranges from approximately eastern Orange County and Riverside County south to Baja California, Mexico at elevations from sea level to about 5,000 feet above msl (Stebbins 2003; Zeiner 1988). This species is threatened by development and human disturbance (Jennings and Hayes 1994). In the vicinity of the Survey Area, this species has been reported from less than 0.5 mile from the Perris Reservoir (CDFG 2010a). Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval. Therefore, northern red-diamond rattlesnake may occur at this site.

Birds

White-faced Ibis (*Plegadis chihi*)

White-faced ibis is a CDFG Watch List species; rookery sites are protected. This former California Species of Special Concern has increased substantially in the region since the 1980s (Shuford and Gardali 2008) and now nests locally in the region (Unitt 2004). This species nests

in extensive marshes with tall marsh plants (Garrett and Dunn 1981). The ibis feeds in fresh emergent wetland, shallow ponds or lakes, and the muddy ground of wet meadows of irrigated pastures and croplands (Zeiner et al. 1990a). It feeds by probing into the mud or in shallow water, consuming earthworms, insects, crustaceans, amphibians, small fish, and other miscellaneous invertebrates (Zeiner et al. 1990a). In the vicinity of the Survey Area, this species has been reported near San Jacinto Lake and Mystic Lake (CDFG 2010a). This species was observed within one mile of the Survey Area. This species may occur for foraging only at the Proposed Substation Site; the Alternative Substation Site; the Alternative Subtransmission Source Line Route, Segment 3; and the New Cable to Moval. Potentially suitable habitat for this species occurs in the Survey Area along the Proposed Subtransmission Source Line Route, Segment 1; Proposed Subtransmission Source Line Route, Segment 2; and Proposed Overhead Routes 1 and 2. Therefore, white-faced ibis may occur at these four sites.

Cooper's Hawk (*Accipiter cooperi*)

Cooper's hawk is a CDFG Watch List species; nesting individuals are protected. Breeding populations of this former California Species of Special Concern have increased in recent years as they have expanded into urban areas (Shuford and Gardali 2008). Wintering Cooper's hawks are often seen in wooded urban areas and native woodland vegetation types. Preferred nesting habitats are oak and riparian woodlands dominated by sycamores (*Platanus* sp.) and willows. Cooper's hawks prey on small birds and rodents that live in woodland, scrub, and chaparral vegetation types. This species breeds throughout the contiguous U.S., southern Canada, and northwestern and north-central Mexico (Rosenfield and Bielefeldt 2006). This species is relatively tolerant of man-altered landscapes; however, threats to this species include the loss of appropriate woodlots for breeding and foraging, collisions with man-made objects, and possibly pesticides (Curtis and Rosenfield 2006). In the vicinity of the Survey Area, this species has been reported nesting near the intersection of Highway 79 and Highway 60 (CDFG 2010a). This species was observed in the immediate vicinity of the Survey Area and has potential to occur for foraging throughout the Survey Area due the presence of suitable foraging habitat. Suitable habitat for this species occurs in the Survey Area along the New Cable to Moval and Proposed Overhead Route 2. Therefore, Cooper's hawk may occur for nesting at these two sites.

Golden Eagle (*Aquila chrysaetos*)

Golden eagle is a CDFG Watch List species and a California Fully Protected species, and is protected by the federal Bald Eagle Act; both nesting and wintering individuals are protected. Habitat for this species generally consists of grasslands, deserts, savannas, and early successional stages of forest and shrub habitats. Broad expanses of open country are required for foraging while nesting is primarily restricted to rugged mountainous areas with large trees or on cliffs (Johnsgard 2001). The golden eagle is an uncommon resident throughout Southern California except in the Colorado Desert and Colorado River where it is a casual winter visitor (Garrett and Dunn 1981). In the vicinity of the Survey Area, this species has been reported nesting approximately six miles west of Winchester. Suitable foraging habitat is present throughout the Survey Area, except along Proposed Overhead Route 2. Suitable habitat for this species occurs in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1 and the New Cable to Moval. Therefore, golden eagle may occur for nesting at these two sites.

Ferruginous Hawk (*Buteo regalis*)

Ferruginous hawk is a CDFG Watch List species; wintering individuals are protected. It occupies open, dry habitats such as grasslands, shrublands, rangelands, and plowed agricultural fields. This raptor only occurs as a winter resident in California (Bechard and Schmutz 1995). Along

the coast of Southern California, it is rare to uncommon during the winter season (Garrett and Dunn 1981). In the vicinity of the Survey Area, this species has been reported near Moreno, Homeland, San Jacinto, and Winchester (CDFG 2010a). Suitable foraging, but not nesting, habitat is present along Proposed Subtransmission Source Line Route, Segment 1; Proposed Subtransmission Source Line Route, Segment 2; and Alternative Subtransmission Source Line Route, Segment 3. Suitable foraging and nesting habitat is present at the Proposed Substation Site; the Alternative Substation Site; the New Cable to Moval; and the Proposed Overhead Route 1.

Swainson's Hawk (*Buteo swainsoni*)

Swainson's hawk is a State-listed Threatened species; nesting individuals are protected. It forages over the grassland and ruderal vegetation types during migration to and from South America, primarily feeding on small rodents, reptiles, and some insects within these habitats. It is a very rare migrant along the coast of Southern California (Garrett and Dunn 1981). This species formerly bred along the coast in Southern California, but breeding is now mostly limited to the Sacramento and San Joaquin Valleys, the extreme northeastern part of California, as well as Mono and Inyo Counties (England et al. 1997). This species is threatened by loss of habitat, habitat deterioration on the South American wintering grounds, human disturbance at nest sites, shooting, and possibly pesticides (Remsen 1978). In the vicinity of the Survey Area, migrating individuals have been reported from the Prado Basin, Temecula, the Badlands, Wildomar, Winchester, Sycamore Canyon Regional Park, Box Springs Mountain, and Vail Lake/Wilson Valley (Dudek 2003). Swainson's hawk does not breed in western Riverside County; therefore, this species is not expected to breed in the Survey Area. It may occur as a transient in all portions of the Survey Area except Proposed Overhead Route 2.

Northern Harrier (*Circus cyaneus*)

Northern harrier is a California Species of Special Concern; nesting individuals are protected. It is a regular winter migrant in marshes and fields throughout Southern California, but is very scarce as a local breeder (Garrett and Dunn 1981). Breeding habitat includes prairie, savannah, slough, wet meadow, and marsh vegetation types. The northern harrier can be expected at any time of the year and can be seen foraging in grassland, scrub, and riparian vegetation types. This species is threatened by loss of habitat, pesticides (Ehrlich et al. 1988), and loss of suitable breeding habitat (Grinnell and Miller 1944). In the vicinity of the Survey Area, this species has been reported nesting approximately 1.5 miles southeast of Winchester (CDFG 2010a). This species may occur for foraging, but not nesting, at the Proposed Subtransmission Source Line Route, Segment 1; the Proposed Subtransmission Source Line Route, Segment 2; and the Proposed Overhead Route 1. Suitable foraging and nesting habitat occurs at the Proposed Substation Site; the Alternative Substation Site; the Alternative Subtransmission Source Line Route, Segment 3; and the New Cable to Moval. Therefore, northern harrier may forage and nest at these four sites.

White-tailed Kite (*Elanus leucurus*)

White-tailed kite is a California Fully Protected species; nesting individuals are protected. Kites nest primarily in oaks, willows, and sycamores; they forage in grassland and scrub vegetation types. White-tailed kites show strong site fidelity to nest groves and trees. This species is an uncommon to locally fairly common resident in coastal Southern California as well as a rare visitor and local nester on the western edge of the deserts (Garrett and Dunn 1981). Many populations in North America declined in the 1980s and 1990s, including those in Southern California (Dunk 1995). In the vicinity of the Survey Area, this species has been reported near Winchester. This species may occur for foraging, but not nesting, at Proposed

Subtransmission Source Line Route, Segment 1. Suitable foraging and nesting habitat occurs at the Proposed Substation Site; the Alternative Substation Site; the Proposed Subtransmission Source Line Route, Segment 2; the Alternative Subtransmission Source Line Route, Segment 3; the New Cable to Moval; and the Proposed Overhead Route 1. Therefore, white-tailed kite may foraging and nest at these six sites.

Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagle is a State-listed Endangered Species, a California Fully Protected species, and is also protected by the federal Bald Eagle Act; nesting and wintering individuals are protected. This species was delisted by the USFWS in 2007, and will be monitored for 20 years as part of the Post-delisting Monitoring Plan for the species, currently in draft form (USFWS 2007a). This species requires large bodies of water or free-flowing rivers with abundant fish with adjacent snags or perches (Zeiner et al. 1990a). The bald eagle nests in large, old-growth trees or snags in remote stands near water (Zeiner et al. 1990a). In western Riverside County, the bald eagle is primarily a migrant and wintering species (Dudek 2003). In the vicinity of the Survey Area, this species has been reported from Lake Perris and attempting to breed at Lake Skinner (Dudek 2003). The bald eagle is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

Merlin (*Falco columbarius*)

Merlin is a CDFG Watch List species; wintering individuals are protected. The species breeds throughout Canada and the northwestern U.S., and winters in the western and southern U.S., south to northern South America (Warkentin et al. 2005). The merlin occupies a wide variety of habitats, breeding in open country and wintering in open woodland, grasslands, cultivated fields, marshes, estuaries, and sea coasts (Dudek 2003). In California, it is an uncommon winter migrant from September to May (Dudek 2003). In the vicinity of the Survey Area, this species has been reported from the Lakeview Mountains (Dudek 2003). This species may occur for foraging, but not nesting, at the Proposed Subtransmission Source Line Route, Segment 1; the Proposed Subtransmission Source Line Route, Segment 2; and the Proposed Overhead Route 1. Suitable nesting habitat occurs at Proposed Substation Site; the Alternative Substation Site; the Alternative Subtransmission Source Line Route, Segment 3; and the New Cable to Moval. Therefore, merlin may forage and nest at these four sites.

Prairie Falcon (*Falco mexicanus*)

Prairie falcon is a CDFG Watch List species; nesting individuals are protected. Preferred foraging habitats include grassland and scrub vegetation types. Prairie falcons nest almost exclusively on cliffs (Clark and Wheeler 2001). It is an uncommon year-round resident in the interior of Southern California (Garrett and Dunn 1981). The prairie falcon has become an increasingly scarce winter resident and very rare summer resident along the Southern California coast (Unitt 1984; Lehman 1994; Hamilton and Willick 1996). In the vicinity of the Survey Area, wintering individuals have been reported from Lake Perris; a breeding record is documented historically for the Hemet area (possibly the Lakeview Mountains) and potentially in the Vail Lake area (Dudek 2003). This species may occur for foraging, but not nesting, at the Proposed Subtransmission Source Line Route, Segment 1; the Proposed Subtransmission Source Line Route, Segment 2; and the Proposed Overhead Route 1. Suitable nesting habitat occurs at the Proposed Substation Site; the Alternative Substation Site; the Alternative Subtransmission Source Line Route, Segment 3; and the New Cable to Moval. Therefore, prairie falcon may forage and nest at these four sites.

American Peregrine Falcon (*Falco peregrinus anatum*)

American peregrine falcon is a California Fully Protected species; nesting individuals are protected. It was formerly a federally and State-listed Endangered species, but has since recovered and was delisted by the USFWS and the CDFG in 1999 and 2009, respectively. As a delisted species, the peregrine falcon will continue to be periodically monitored until 2015 (USFWS 2006). Peregrine falcons prey almost exclusively on birds and use a variety of habitats, particularly wetlands and coastal areas. This falcon is a rare summer resident in Southern California although it is more common during migration and the winter season. For nesting, this falcon prefers inaccessible areas such as cliffs, high building ledges, bridges, or other such structures. In the vicinity of the Survey Area, this species has been reported from Lake Perris; a nesting pair was reported on a County Building in downtown Riverside (Dudek 2003). This species may occur for foraging, but not nesting, at the Proposed Subtransmission Source Line Route, Segment 1; the Proposed Subtransmission Source Line Route, Segment 2; the Alternative Subtransmission Source Line Route, Segment 3; and the Proposed Overhead Route 1. Suitable nesting habitat occurs at the Proposed Substation Site; the Alternative Substation Site; and the New Cable to Moval. Therefore, prairie falcon may forage and nest at these three sites.

All designated critical habitat for American peregrine falcon was removed upon publication of the final rule delisting this species (USFWS 1999a).

Mountain Plover (*Charadrius montanus*)

Mountain plover is a California Species of Special Concern; wintering individuals are protected. This species winters from California south to Baja California, Mexico and east to Texas and northern mainland Mexico; it does not breed in California (Dudek 2003). This species winters in shortgrass plains, plowed fields, open sagebrush areas, and sandy deserts (Dudek 2003). In the vicinity of the Survey Area, this species has been reported from the Lake Perris/San Jacinto Wildlife Area and the San Jacinto River (Dudek 2003). Suitable habitat is present throughout the Survey Area, except along the New Cable to Moval. Therefore, mountain plover may occur throughout the Survey Area, with the exception of the New Cable to Moval.

Western Yellow-billed Cuckoo (*Coccyzus americanus occidentalis*)

Western yellow-billed cuckoo is a State-listed Endangered species and a federal Candidate for listing by the USFWS; nesting individuals are protected. The western yellow-billed cuckoo requires broad areas of old-growth riparian habitats dominated by willows and cottonwoods (*Populus* sp.) with dense understory vegetation. California's population was once estimated to be over 15,000 pairs, but in less than 100 years, it has declined to less than 30 pairs (Hughes 1999). Along the coast, breeding cuckoos currently persist along the Santa Ana River in Riverside County and perhaps along the San Luis Rey River in San Diego County (Zeiner et al. 1990a). Transients are rarely observed away from known breeding populations (Garrett and Dunn 1981). The Santa Ana River, specifically Prado Basin, is the only area in the region with riparian woodlands extensive enough to support breeding western yellow-billed cuckoos, and a few birds have persisted there until recently. In the vicinity of the Survey Area, this species has been reported from the Poorman Reservoir in Moreno Valley (CDFG 2010a). Western yellow-billed cuckoo is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

Long-eared Owl (*Asio otus*)

Long-eared owl is a California Species of Special Concern; nesting individuals are protected. This owl hunts mostly at night over grasslands and other open habitats (Marks et al. 1994). Nesting occurs in dense trees such as oaks and willows where it occupies the stick nests of other species, particularly raptors and corvids (Marks et al. 1994; Bloom 1994). This species is an uncommon resident in the deserts, and is quite rare coastally (Garrett and Dunn 1981). Long-eared owls have declined in Southern California due to the loss of riparian and grassland habitats to development (Marks et al. 1994). Suitable habitat for this species is present in the Survey Area along the New Cable to Moval. Therefore, long-eared owl may occur at this site.

Burrowing Owl (*Athene cunicularia*)

Burrowing owl is a California Species of Special Concern; burrow sites are protected. Although the burrowing owl was recently proposed as a State Candidate for listing, the CDFG determined that the species did not warrant listing in consideration of its population throughout the State. However, this species is considered a species of local concern because it is much less common in Southern California than in the Central Valley. In Southern California, burrowing owls breed and forage in grasslands and prefer flat to low, rolling hills in treeless terrain. They are small owls that nest in burrows, typically in open habitats most often along banks and roadsides. There is a historical record of burrowing owls in the immediate vicinity of the Survey Area and suitable habitat is present throughout the Survey Area. However, focused surveys for this species were conducted in some portions of the Survey Area, and the burrowing owl was not observed. Suitable habitat is present along the New Cable to Moval and the Proposed Overhead Routes 1 and 2. Therefore, burrowing owl may occur at these sites.

Southwestern Willow Flycatcher (*Empidonax traillii extimus*)

Southwestern willow flycatcher is a federally and State-listed Endangered species; nesting individuals are protected. This subspecies was once considered a common breeder in coastal Southern California. However, it has declined drastically due to loss of breeding habitat and nest parasitism by the brown-headed cowbird (*Molothrus ater*). It occurs in riparian habitats along rivers, streams, or other wetlands where dense growths of willows, baccharis (*Baccharis* sp.), arrowweed (*Pluchea* sp.), tamarisk (*Tamarix* sp.), or other plants are present, often with a scattered overstory of cottonwood (USFWS 2005a). In the vicinity of the Survey Area, this species has been reported from approximately two miles west of Beaumont (CDFG 2010a). The southwestern willow flycatcher is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

On October 19, 2005, the USFWS published a final rule designating critical habitat for the southwestern willow flycatcher (USFWS 2005a). This final rule designated 120,824 acres in Arizona, California, Nevada, New Mexico, and Utah as critical habitat. Of that, 17,212 acres were designated in Kern, Santa Barbara, San Bernardino, and San Diego Counties. The Survey Area is not located in designated critical habitat for this species.

Loggerhead Shrike (*Lanius ludovicianus*)

Loggerhead shrike is a California Species of Special Concern; nesting individuals are protected. Shrikes inhabit open habitats with short vegetation such as pastures, agricultural fields, riparian areas, and open woodlands (Yosef 1996). They can often be found perched on fences and posts from which prey items (e.g., large insects, small mammals, and lizards) can be seen. This species was widely distributed across North America but has declined throughout most of its range in recent decades (Yosef 1996). It was considered to be a fairly common year-round

resident in Southern California (Garrett and Dunn 1981), but has recently shown declines in its California population (Small 1994; Hamilton and Willick 1996). In the vicinity of the Survey Area, this species has been reported breeding in the vicinity of Winchester and the Lakeview Mountains (CDFG 2010a). Suitable habitat for this species is present in all portions of the Survey Area; this species was observed along the Proposed Subtransmission Source Line Route, Segment 1 and the Proposed Overhead Route 1. Therefore, loggerhead shrike may occur throughout the Survey Area.

Least Bell's Vireo (*Vireo bellii pusillus*)

Least Bell's vireo is a federally and State-listed Endangered species; nesting individuals are protected. This subspecies was formerly considered to be a common breeder in riparian habitats throughout the Central Valley and other low-elevation river systems in California and Baja California, Mexico (Franzreb 1989). It is now a rare and local summer resident of Southern California's lowland riparian woodlands. The least Bell's vireo breeds primarily in riparian habitats dominated by willows with dense understory vegetation (USFWS 1986). A dense shrub layer two to ten feet above ground is the most important habitat characteristic for this subspecies (Goldwasser 1981; Franzreb 1989). While destruction of lowland riparian habitats has played a large role in driving this subspecies to its present precarious situation, brood parasitism by brown-headed cowbirds is the most important factor in its decline (Garrett and Dunn 1981). In the vicinity of the Survey Area, this species has been reported from the Lake Perris State Recreational Area (CDFG 2010a). Least Bell's vireo is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

On February 2, 1994, the USFWS published a final critical habitat for the least Bell's vireo, designating approximately 37,560 acres of land in California's Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties (USFWS 1994b). The Survey Area is not located in designated critical habitat for this species.

California Horned Lark (*Eremophila alpestris actia*)

California horned lark is a CDFG Watch List species. This subspecies requires open habitats such as grasslands or agricultural fields that support little to no vegetation or short vegetation. It is found along the coast of Northern California, in the San Joaquin Valley, in the Coast Ranges south of San Francisco Bay, and in Southern California west of the deserts (Grinnell and Miller 1944). The horned lark occurs from Alaska and the Canadian arctic south to Mexico; the northern populations are strongly migratory and the southern populations are primarily year-round residents (Beason 1995). Along the Southern California coast, Garrett and Dunn (1981) found this species to be a common migrant and winter resident that remains to breed locally. In the vicinity of the Survey Area, this subspecies has been reported northeast of Perris (CDFG 2010a). Suitable habitat for this species is present in all portions of the Survey Area except the New Cable to Moval and the Proposed Overhead Route 2; this species was observed along Proposed Subtransmission Source Line Route, Segment 1. Therefore, California horned lark may occur throughout the Survey Area, except at the New Cable to Moval and the Proposed Overhead Route 2.

Coastal Cactus Wren (*Campylorhynchus brunneicapillus sandiegensis*)

Coastal cactus wren is a California Species of Special Concern in San Diego and Orange Counties only; in Riverside County it is not considered to have special status. Some authorities consider the taxonomic status of cactus wrens in the southwestern U.S. to be uncertain (Proudfoot et al. 2000). Coastal populations of the cactus wren are found in Southern California from San Diego County north to Ventura County (Garrett and Dunn 1981),

and are declining due to loss of habitat. Except for the Banning Pass area west of Palm Springs, the coastal populations of cactus wren appear to be isolated from interior populations. On the coastal slope of Southern California, cactus wrens inhabit coastal sage scrub and alluvial sage scrub habitats that have sufficient amounts of prickly pear cactus and/or cholla (*Opuntia* spp.). In the vicinity of the Survey Area, this species has been reported approximately 5.5 miles northeast of Lakeview (CDFG 2010a). Coastal cactus wren is not expected to occur in any portion of the Survey Area due to lack of suitable habitat.

Coastal California Gnatcatcher (*Polioptila californica californica*)

Coastal California gnatcatcher is a federally listed Threatened species and a California Species of Special Concern. In California, this subspecies is an obligate resident of coastal sage scrub vegetation types. It occurs in most of Baja California, Mexico's arid regions, but this subspecies is extremely localized in the U.S., where it predominantly occurs in coastal regions of highly urbanized Los Angeles, Orange, Riverside, and San Diego Counties (Atwood 1992). Brood parasitism by brown-headed cowbirds and loss of habitat to urban development have been cited as causes of coastal California gnatcatcher population decline (Unitt 1984; Atwood 1990). In the vicinity of the Survey Area, this subspecies has been reported south of the San Jacinto River approximately three miles south of Perris (CDFG 2010a). Suitable habitat for this subspecies is present along the New Cable to Moval; however, this species was not observed during the 2010 focused surveys. Therefore, coastal California gnatcatcher is not expected to occur at this site.

On December 19, 2007, the USFWS published a Final Rule revising critical habitat for the coastal California gnatcatcher. The revised critical habitat designates 197,303 acres of land in Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties, California (USFWS 2007b). The Survey Area is not located in designated critical habitat for this species.

Yellow Warbler (*Dendroica petechia brewsteri*)

Yellow warbler is a California Species of Special Concern; nesting individuals are protected. This subspecies breeds in Southern California (Dunn and Garrett 1997); most yellow warblers are migrants. This subspecies occurs in coastal areas from northwestern Washington south to western Baja California, Mexico (Dunn and Garrett 1997). In Southern California, it breeds locally in riparian woodlands, but during migration, it can forage in a variety of different habitat types. This subspecies is threatened by loss of habitat and nest parasitism by brown-headed cowbirds (Remsen 1978). In the vicinity of the Survey Area, this subspecies has been reported from Lake Perris/Mystic Lake (Dudek 2003). Yellow warbler is not expected to occur in any portion of the Survey Area due to the lack of suitable habitat.

Yellow-breasted Chat (*Icteria virens*)

Yellow-breasted chat is a California Species of Special Concern; nesting individuals are protected. This species requires dense, brushy tangles near water and riparian woodlands supporting a thick understory for breeding. The yellow-breasted chat occurs as an uncommon and local summer resident in Southern California along the coast and in the deserts (Garrett and Dunn 1981). This large warbler was once a fairly common summer resident in riparian woodlands throughout California, but is now much reduced in numbers, especially in Southern California (Remsen 1978). This species is threatened by loss of habitat and possibly nest parasitism by the brown-headed cowbird (Remsen 1978). In the vicinity of the Survey Area, this species has been reported from the Poorman Reservoir in Moreno Valley (CDFG 2010a). Yellow-breasted chat is not expected to occur in any portion of the Survey Area due to the lack of suitable habitat.

Southern California Rufous-crowned Sparrow (*Aimophila ruficeps canescens*)

Southern California rufous-crowned sparrow is a CDFG Watch List species. In coastal Southern California, rufous-crowned sparrows are considered fairly common in scrub vegetation types and other habitats with grasses and widely spaced, low shrubs. They also prefer slopes with rock outcroppings. This subspecies is present throughout the year in Southern California, but is threatened by loss of habitat due to development. In the vicinity of the Survey Area, this species has been reported near the San Jacinto River at Goetz Road (CDFG 2010a). Suitable habitat is present in the Survey Area along the New Cable to Moval. Therefore, Southern California rufous-crowned sparrow is expected to occur at this site.

Oregon Vesper Sparrow (*Pooecetes gramineus affinis*)

Oregon vesper sparrow is a California Species of Special Concern; wintering individuals are protected. In western North America, this species is regularly found in sagebrush and other open shrublands mixed with grasses as well as open pinyon-juniper woodlands (Andrews and Righter 1992). Suitable habitat is present in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1; Alternative Subtransmission Source Line Route, Segment 3; New Cable to Moval; and Proposed Overhead Route 1; limited potentially suitable habitat occurs along Proposed Subtransmission Source Line Route, Segment 2. Therefore, Oregon vesper sparrow may occur at four sites and has limited potential to occur at one site.

Grasshopper Sparrow (*Ammodramus savannarum*)

Grasshopper sparrow is a California Species of Special Concern; nesting individuals are protected. It breeds from eastern Washington to southern Maine and south to Southern California, Virginia, and northernmost Mexico (Dudek 2003). It is a year round resident in the western states. This species occupies open grasslands and prairies with patchy, bare ground (Dudek 2003). In California, the species occurs on slopes and mesas, frequenting dense, dry, or well-drained grassland with a thick cover of grasses and forbs (Dudek 2003). In the vicinity of the Survey Area, this species has been reported from the Lake Perris area (Dudek 2003). Suitable habitat is present in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1; New Cable to Moval; and Proposed Overhead Route 1. Therefore, grasshopper sparrow may occur at these three sites.

Bell's Sage Sparrow (*Amphispiza belli belli*)

Bell's sage sparrow is a CDFG Watch List species; nesting individuals are protected. This coastal subspecies is an uncommon to fairly common local resident in the interior foothills of coastal Southern California. It breeds in low, dense chamise chaparral and in dry scrub vegetation types, often with stands of cactus (Garrett and Dunn 1981). This subspecies is threatened by loss of habitat due to development and likely nest parasitism by the brown-headed cowbird (Ehrlich et al. 1988). In the vicinity of the Survey Area, this species has been reported south of the San Jacinto River at Goetz Road (CDFG 2010a). Suitable habitat occurs in the Survey Area along the New Cable to Moval. Therefore, Bell's sage sparrow is expected to occur at this site.

Tricolored Blackbird (*Agelaius tricolor*)

Tricolored blackbird is a California Species of Special Concern; nesting colonies are protected. These colonially nesting birds prefer to breed in marsh vegetation of bulrushes and cattails and have also been recorded nesting in willows, blackberries, and mustard (Beedy et al. 1991). During winter months, they are often found foraging in wet pastures, agricultural fields, and

seasonal wetlands. Tricolored blackbirds are nomadic, wandering during the nonbreeding season and occupying colony sites intermittently (Unitt 1984). In the vicinity of the Survey Area, this species has been reported from the San Jacinto Wildlife Area, approximately two miles north of Lakeview (CDFG 2010a). Suitable foraging, but not nesting, habitat occurs throughout the Survey Area with exception of the Proposed Overhead Route 2.

Mammals

Western Yellow Bat (*Lasiurus xanthinus*)

Western yellow bat is a California Species of Special Concern. Little is known about its habitat, but it is known to roost in leafy vegetation (Best et al. 1998). This species is associated with dry thorny vegetation of the Mexican Plateau, coastal western Mexico, and the deserts of the southwestern U.S. (Best et al. 1998). In the vicinity of the Survey Area, this species has been reported from Homeland, Sun City, Sunnymead, and Moreno Valley (CDFG 2010a). Suitable foraging, but not roosting, habitat occurs throughout the Survey Area except along the Proposed Overhead Route 2. Therefore, western yellow bat may occur throughout the Survey Area for foraging except along Proposed Overhead Route 2.

Western Mastiff Bat (*Eumops perotis californicus*)

Western mastiff bat is a California Species of Special Concern. It is found in many open semi-arid to arid habitats including conifer and deciduous woodlands, coastal scrub, grasslands, palm oases, chaparral, desert scrub, and urban areas (Zeiner et al. 1990b). The western mastiff bat is a very wide-ranging and high-flying insectivore that typically forages in open areas with high cliffs. It roosts in small colonies in crevices on cliff faces. It occurs in the southeastern San Joaquin Valley and Coastal Ranges from Monterey County southward through Southern California, and from the coast eastward to the Colorado Desert (Zeiner et al. 1990b). Threats to this subspecies include loss of habitat due to development, drainage of marshes, and conversion of land to agriculture (Williams 1986). In the vicinity of the Survey Area, this species has been reported from Lake Perris. Suitable foraging, but not roosting, habitat occurs throughout the Survey Area except along the Proposed Overhead Route 2. Therefore, western mastiff bat may occur throughout the Survey Area for foraging except along the Proposed Overhead Route 2.

San Diego Black-tailed Jackrabbit (*Lepus californicus bennettii*)

The San Diego black-tailed jackrabbit is a California Species of Special Concern. This species occurs in intermediate canopy stages of shrub habitats as well as within open shrub, herbaceous tree habitats. This species can be found in coastal sage scrub habitats in Southern California. In the vicinity of the Survey Area, this species has been reported near Sun City, Winchester, and Beaumont (CDFG 2010a). Suitable habitat is present throughout the Survey Area except along Proposed Overhead Route 2. Therefore, San Diego black-tailed jackrabbit may occur throughout the Survey Area except along Proposed Overhead Route 2.

Northwestern San Diego Pocket Mouse (*Chaetodipus fallax fallax*)

Northwestern San Diego pocket mouse is a California Species of Special Concern. It occupies a variety of habitats including chaparral, coastal sage scrub, and grassland. This subspecies ranges from southwestern San Bernardino County south to northern Baja California, Mexico. The primary threat to this species is loss of habitat due to development. In the vicinity of the Survey Area, this species has been reported near the Perris Reservoir and the San Jacinto River at the Ramona Expressway (CDFG 2010a). Suitable habitat is present in the Survey Area

along Proposed Subtransmission Source Line Route, Segment 1; the New Cable to Moval; and the Proposed Overhead Route 1. Limited potentially suitable habitat is present along Proposed Subtransmission Source Line Route, Segment 2. Therefore, northwestern San Diego pocket mouse may occur at three sites and has limited potential to occur at one site.

Stephens' Kangaroo Rat (*Dipodomys stephensi*)

Stephens' kangaroo rat is a federally listed Endangered species and a State-listed Threatened species. It primarily occurs in annual and perennial grasslands, but also occurs in coastal sage scrub habitats with sparse canopy cover. Habitats occupied by Stephens' kangaroo rat characteristically occur on level to gently sloping terrain, although the species has occasionally been found on relatively steep slopes. Soils in habitats harboring Stephens' kangaroo rat are typically loamy in nature, while soils dominated by clay or sand very rarely contain this species (Price and Endo 1989, O'Farrell 1990, O'Farrell and Uptain 1987). In the vicinity of the Survey Area, this species has been reported from the Perris Reservoir and the San Jacinto River near Sun City (CDFG 2010a). Suitable habitat is present in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1; the New Cable to Moval; and the Proposed Overhead Route 1. Limited potentially suitable habitat is present along Proposed Subtransmission Source Line Route, Segment 2. Therefore, Stephens' kangaroo rat may occur at three sites and has limited potential to occur at one site.

No critical habitat has been proposed for the Stephens' kangaroo rat.

Los Angeles Pocket Mouse (*Perognathus longimembris brevinasus*)

Los Angeles pocket mouse is a California Species of Special Concern. This species occurs in lower elevation grasslands and coastal sage scrub vegetation. It prefers areas with open ground and fine sandy soils. The Los Angeles pocket mouse may shelter under vegetation instead of digging extensive burrows. It is a subspecies of the little pocket mouse. Los Angeles pocket mouse occurs from the Los Angeles Basin from approximately Burbank and San Fernando in the northwest to San Bernardino in the northeast, and Cabazon, Hemet, and Aguanga in the east and southeast (Williams 1986). In the vicinity of the Survey Area, this species has been reported northwest of the Perris Reservoir (CDFG 2010a). Suitable habitat is present in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1; the New Cable to Moval; and the Proposed Overhead Route 1. Limited potentially suitable habitat is present along Proposed Subtransmission Source Line Route, Segment 2. Therefore, Los Angeles pocket mouse may occur at three sites and has limited potential to occur at one site.

San Diego Desert Woodrat (*Neotoma lepida intermedia*)

San Diego desert woodrat is a California Species of Special Concern. This subspecies occupies arid areas with sparse vegetation, especially those comprised of cactus and other thorny plants. The San Diego subspecies is restricted to the Pacific slope in a range that stretches from San Luis Obispo south to northwestern Baja California, Mexico (Hall and Kelson 1959). Threats to this species involve the loss of habitat due to development. In the vicinity of the Survey Area, this species has been reported north of the San Jacinto River and west of Gilman Hot Springs (CDFG 2010a). Suitable habitat for this species is present in the Survey Area along the New Cable to Moval. Therefore, San Diego desert woodrat may occur at this site.

Southern Grasshopper Mouse (*Onychomys torridus ramona*)

Southern grasshopper mouse is a California Species of Special Concern. It is a territorial, predatory rodent of grassland and sparse scrub vegetation types and prefers sandy soils. It

occurs along the coast of Southern California from Los Angeles County south through San Diego County (Hall and Kelson 1959). The primary threat to this subspecies is the loss of habitat due to development. In the vicinity of the Survey Area, this species has been historically reported from Perris (CDFG 2010a; 1923 record). Suitable habitat is present in the Survey Area along Proposed Subtransmission Source Line Route, Segment 1; the New Cable to Moval; and the Proposed Overhead Route 1. Limited potentially suitable habitat is present along Proposed Subtransmission Source Line Route, Segment 2. Therefore, Southern grasshopper mouse may occur at three sites and has limited potential to occur at one site.

American Badger (*Taxidea taxus*)

American badger is a California Species of Special Concern. This species occupies a wide variety of habitats and ranges throughout the State except for the coastal redwood forests of the extreme northwest. In Southern California, this species is most commonly associated with grasslands and other relatively open habitats with friable, uncultivated soils. In the vicinity of the Survey Area, this species has been reported from the San Jacinto Wildlife Area (CDFG 2010a). Suitable habitat is present in the Survey Area along the New Cable to Moval; limited potentially suitable habitat is present along the Proposed Subtransmission Source Line Route, Segment 1 and the Proposed Overhead Route 1. Therefore, American badger may occur at one site and has limited potential to occur at two sites.

4.0 PROJECT IMPACTS

4.1 INTRODUCTION

The determination of impacts in this analysis is based on a comparison of maps depicting project limits and maps of biological resources in the Survey Area. All construction activities, including staging, stockpile areas, haul roads and equipment areas, are assumed to be within the limits of the Survey Area boundaries. Should any of the impact areas extend beyond the limits shown, additional analysis may be required. Both direct and indirect impacts on biological resources have been evaluated. Direct impacts are those that involve the initial loss of habitats due to grading, construction, and construction-related activities. Indirect impacts are those that would be related to impacts on the adjacent remaining habitat due to construction activities (e.g., noise, dust) or operation of the Project (e.g., human activity).

Biological impacts associated with the proposed Project are evaluated with respect to the following special status biological issues:

- federally or State-listed Endangered or Threatened species of plants or wildlife;
- non-listed species that meet the criteria in the definition of Rare or Endangered in the CEQA Guidelines (i.e., §15380);
- species designated as California Species of Special Concern;
- streambeds, wetlands, and their associated vegetation;
- habitats suitable to support federally or State-listed Endangered or Threatened plant or wildlife species;
- habitat, other than wetlands, considered special status by regulatory agencies (e.g., the USFWS, the CDFG) or resource conservation organizations;
- criteria in the western Riverside County MSHCP; and
- other species or issues of concern to regulatory agencies or conservation organizations.

4.2 SIGNIFICANCE CRITERIA

The environmental impacts relative to biological resources are assessed using impact significance criteria that mirror the policy contained in CEQA Section 21001(c) of the *California Public Resources Code.* Accordingly, the State Legislature has established it to be the policy of the State to:

> Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities.

Determining whether or not a project may have a significant effect or impact plays a critical role in the CEQA process. According to CEQA Section 15064.7 (Thresholds of Significance), each public agency is encouraged to develop and adopt, by ordinance, resolution, rule or regulation, their own significance thresholds that the agency would use in determining the impact of environmental effects. A significance threshold defines the quantitative, qualitative, or performance limits of a particular environmental effect. If these thresholds are exceeded, the agency would consider it to be significant.

In the development of significance thresholds for impacts to biological resources, CEQA provides guidance primarily in Section 15065, Mandatory Findings of Significance, and the CEQA Guidelines, Appendix G, Environmental Checklist Form. Section 15065(a) states that a project may have a significant effect where:

> The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species.

Appendix G of the CEQA Guidelines is more specific in addressing biological resources and encompasses a broader range of resources to be considered, including candidate, sensitive, or special status species; riparian habitat or other special status natural communities; federally protected wetlands; fish and wildlife movement corridors; local policies or ordinances protecting biological resources; and adopted habitat conservation plans. These factors are considered through the checklist of questions answered during the Initial Study process used to determine a project's appropriate environmental documentation (i.e., Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report [EIR]). Because these questions are derived from standards employed in other laws, regulations and commonly used thresholds, it is reasonable to use these standards as a basis for defining significance thresholds in an EIR. For each of the thresholds identified below, the section of CEQA upon which the threshold is based has been provided. For the purpose of this analysis, impacts to biological resources are considered significant (before calculating the offsetting impacts of mitigation measures) if one or more of the following conditions would result from implementation of the proposed Project:

1. The project has the potential to substantially degrade the quality of the environment (§15065[a]).

2. The project has the potential to substantially reduce the habitat of any fish or wildlife species (§15065[a]).

3. The project will cause fish or wildlife populations to drop below self-sustaining levels (§15065[a]).

4. The project will threaten to eliminate a plant or animal community (§15065[a]).

5. The project will reduce the number or restrict the range of an Endangered, Rare, or Threatened species (§15065[a]).[2]

6. The project has a substantial adverse effect, either directly or through habitat modifications, on any species identified as a Candidate or special status species in local or regional plans, policies, or regulations, or by the CDFG or the USFWS (CEQA Guidelines, Appendix G, IV[a]).

7. The project has a substantial adverse effect on any riparian habitat or other special status natural community identified in local or regional plans, policies, regulations, or by the CDFG or the USFWS (CEQA Guidelines, Appendix G, IV[b]).

8. The project has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, among others) through direct removal, filling, hydrological interruption, or other means (CEQA Guidelines, Appendix G, IV[c]).

9. The project interferes substantially with the movement of any native or migratory fish or wildlife species; inhibits established native resident or migratory wildlife corridors; or impedes the use of native wildlife nursery sites (CEQA Guidelines, Appendix G, IV[d]).

10. The project conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance (CEQA Guidelines, Appendix G, IV[e]).

11. The project conflicts with the provisions of an adopted Habitat Conservation Plan; Natural Community Conservation Plan; or other approved local, regional, or State Habitat Conservation Plan (CEQA Guidelines, Appendix G, IV[f]).

In order to evaluate whether an impact on biological resources would result in a “substantial adverse effect”, both the resource itself and how that resource fits into a regional context must be considered. The proposed Project’s regional setting includes the Western Riverside County MSHCP.

For impact analysis purposes, a “substantial adverse effect” is defined as the loss or harm of a magnitude which, based on current scientific data and knowledge, would (1) substantially diminish population numbers of a species or distribution of a habitat type within the region or (2) eliminate the functions and values of a biological resource in the region.

[2] Endangered and Threatened species, as used in this threshold, are those listed by the USFWS and/or the CDFG as Threatened or Endangered. Section 15380 of CEQA indicates that a lead agency can consider a non-listed species (e.g., CNPS List 1B plants) to be Endangered, Rare, or Threatened for the purposes of CEQA if the species can be shown to meet the criteria in the definition of “Rare” or “Endangered”. For the purposes of this discussion, the current scientific knowledge on the population size and distribution for each special status species was considered in determining if a non-listed species met the definitions for “Rare” and “Endangered” according to Section 15380 of CEQA.

4.3 DIRECT IMPACTS

The actual and potential occurrence of biological resources in the Survey Area was correlated with the significance criteria described above to determine whether impacts from the proposed Project on these resources would be significant. Potential direct impacts are described below.

4.3.1 Vegetation Types

The amount of vegetation impacted depends upon the sites selected. The Project may impact the following types of vegetation: annual grassland, ruderal, agriculture, and ornamental vegetation. In addition, the Project may impact disturbed and developed areas. These impacts are discussed below and summarized in Tables 6 through 13.

Proposed Substation Site

The Proposed Substation Site would impact a total of 8.07 acres (7.09 acres agriculture; 0.98 acre disturbed) (Table 6). These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant and no Mitigation Measures (MMs) would be required.

TABLE 6
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE PROPOSED SUBSTATION SITE

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Agriculture	7.09	7.09
Disturbed	0.98	0.98
Total	***8.07***	***8.07***

Alternative Substation Site

The Alternative Substation Site would impact a total of 11.74 acres (10.60 acres agriculture; 1.13 acres disturbed; 0.01 acre developed) (Table 7). These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant and no MMs would be required.

TABLE 7
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE ALTERNATIVE SUBSTATION SITE

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Agriculture	10.60	10.60
Disturbed	1.13	1.13
Developed	0.01	0.01
Total	***11.74***	***11.74***

Proposed Subtransmission Source Line Route, Segment 1

The Proposed Subtransmission Source Line Route, Segment 1 would impact a total of 22.71 acres (Table 8). A total of 0.29 acre of ruderal, 18.70 acres of agriculture, 0.21 acre of ornamental, 2.67 acres of disturbed, and 0.84 acre of developed land would be impacted. These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant and no MMs would be required.

In addition, the Proposed Subtransmission Source Line Route, Segment 1 is not expected to impact the San Jacinto River or any of the drainage ditches (irrigation channels) that may be under USACE and/or CDFG jurisdiction. These features would be avoided by direct grading and construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be potentially significant. The potential of this impact would be reduced to less than significant levels with implementation of Best Management Practices (BMPs).

TABLE 8
VEGETATION TYPES AND OTHER AREAS IMPACTED BY
THE PROPOSED SUBTRANSMISSION SOURCE LINE ROUTE, SEGMENT 1

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Alkali Grassland	0.77	0.00
Annual Grassland	0.22	0.00
Ruderal	0.29	0.29
Agriculture	18.70	18.70
Ornamental	0.21	0.21
Disturbed	2.67	2.67
Developed	0.84	0.84
Total	***23.70***	***22.71***

Proposed Subtransmission Source Line Route, Segment 2

The Proposed Subtransmission Source Line Route, Segment 2 would impact a total of 14.37 acres (Table 9). A total of 7.90 acres of agriculture, 0.74 acre of ruderal, and 5.73 acres of disturbed land would be impacted. These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. Therefore, impacts to these areas are considered less than significant and no MMs would be required.

The Proposed Subtransmission Source Line Route, Segment 2 supports a small amount of alkali scrub playa, disturbed alkali scrub playa, and southern willow scrub, which may be considered special status vegetation types by the CDFG. Direct grading and construction impacts to these vegetations will be avoided, where possible. Potential impacts to these vegetation types will be reduced by implementing MM 6 listed below.

In addition, the Proposed Subtransmission Source Line Route, Segment 2 is not expected to impact the San Jacinto River or any of the drainage ditches (irrigation channels) that may be under USACE and/or CDFG jurisdiction. These features would be avoided by direct grading and

construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be potentially significant. The potential of these impacts would be reduced to less than significant levels with implementation of BMPs.

TABLE 9
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE PROPOSED SUBTRANSMISSION SOURCE LINE ROUTE, SEGMENT 2

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Alkali Scrub Playa	0.29	0.00
Disturbed Alkali Scrub Playa	0.03	0.00
Southern Willow Scrub	0.06	0.00
Ruderal	0.74	0.74
Agriculture	7.90	7.90
Detention Basin	0.19	0.00
Disturbed	5.73	5.73
Total	***14.94***	***14.37***

Alternative Subtransmission Source Line Route, Segment 3

The Alternative Subtransmission Source Line Route, Segment 3 would impact a total of 14.77 acres (Table 10). A total of 9.47 acres of agriculture; 0.47 acre of ruderal; 0.40 acre of developed; and 4.43 acres of disturbed land would be impacted. These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant and no MMs would be required.

The Alternative Subtransmission Source Line Route, Segment 3 supports a small amount of alkali scrub playa and disturbed alkali scrub playa, which may be considered special status vegetation types by the CDFG. Direct grading and construction impacts to these vegetations will be avoided, where possible. Potential impacts to these vegetation types will be reduced by implementing MM 6 listed below.

In addition, the Proposed Subtransmission Source Line Route, Segment 3 is not expected to impact the San Jacinto River or any of the drainage ditches (irrigation channels) that may be under USACE and/or CDFG jurisdiction. These features would be avoided by direct grading and construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be potentially significant. The potential of these impacts would be reduced to less than significant levels with implementation of BMPs.

TABLE 10
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE ALTERNATIVE SUBTRANSMISSION SOURCE LINE ROUTE, SEGMENT 3

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Alkali Scrub Playa	1.27	0.00
Alkali Wetland	0.06	0.00
Ruderal	0.47	0.47
Agriculture	9.47	9.47
Disturbed	4.43	4.43
Developed	0.40	0.40
Total	***16.10***	***14.77***

New Cable to Moval

The New Cable to Moval would impact a total of 24.32 acres of disturbed area (Table 11). This area has low biological value because it is mainly composed of unvegetated areas. This area generally provides limited habitat for native plant and wildlife species although it may occasionally be used by native species. Therefore, impacts to this area are considered less than significant, and no MMs would be required.

TABLE 11
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE NEW CABLE TO MOVAL

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Annual Grassland	50.66	0.00
Riversidean Sage Scrub	3.68	0.00
Disturbed Riversidean Sage Scrub	5.42	0.00
Ruderal	11.85	0.00
Agriculture	9.01	0.00
Ornamental	1.09	0.00
Irrigation Ditch	1.22	0.00
Disturbed	24.32	24.32
Developed	11.50	0
Total	***118.75***	***24.32***

The New Cable to Moval supports a small amount of Riversidean sage scrub and disturbed Riversidean sage scrub, which may be considered special status vegetation types by the CDFG. Direct grading and construction impacts to these vegetations will be avoided, where possible. Potential impacts to these vegetation types will be reduced by implementing MM 6 listed below.

In addition, the New Cable to Moval is not expected to impact the San Jacinto River or any of the drainage ditches (irrigation channels) that may be under USACE and/or CDFG jurisdiction. These features would be avoided by direct grading and construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be

potentially significant. The potential of these impacts would be reduced to less than significant levels with implementation of BMPs.

Proposed Overhead Route 1

The Proposed Overhead Route 1 would impact a total of 16.40 acres (Table 12). A total of 0.22 acre of annual grassland, 14.17 acres of agriculture, 0.29 acre of ruderal, and 1.72 acres of disturbed land would be impacted. These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant, and no MMs would be required.

In addition, the Proposed Overhead Route 1 is not expected to impact the San Jacinto River or any of the drainage ditches (irrigation channels) that may be under USACE and/or CDFG jurisdiction. These features would be avoided by direct grading and construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be potentially significant. The potential of these impacts would be reduced to less than significant levels with implementation of BMPs.

TABLE 12
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE PROPOSED OVERHEAD ROUTE 1

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Alkali Grassland	0.77	**0.00**
Annual Grassland	0.22	**0.22**
Ruderal	0.29	**0.29**
Agriculture	14.17	**14.17**
Ornamental	0.00	**0.00**
Disturbed	1.72	**1.72**
Developed	0.00	**0.00**
Total	***17.17***	***16.40***

Proposed Overhead Route 2

The Proposed Overhead Route 2 would impact a total of 7.25 acres (Table 13). A total of 0.79 acres of agriculture, 1.71 acre of ruderal, 0.07 acre of ornamental, 0.57 acre of developed and 4.11 acres of disturbed land would be impacted. These areas have low biological value because they are mainly composed of unvegetated areas or are vegetated predominantly with non-native species. These areas generally provide limited habitat for native plant and wildlife species although they may occasionally be used by native species. Therefore, impacts to these areas are considered less than significant, and no MMs would be required.

TABLE 13
VEGETATION TYPES AND OTHER AREAS IMPACTED BY THE PROPOSED OVERHEAD ROUTE 2

Vegetation Types and Other Areas	Existing (Acres)	Total Impacts (Acres)
Ruderal	1.71	1.71
Agriculture	0.79	0.79
Ornamental	0.07	0.07
Disturbed	4.11	4.11
Developed	0.57	0.57
Total	***7.25***	***7.25***

4.3.2 Wildlife Impacts

To assess impacts on wildlife, the total impacts on particular vegetation types that provide habitat for wildlife was assessed. Exhibit 5 illustrates the vegetation types (i.e., wildlife habitat) that would be impacted as a result of proposed Project construction. The following discussion of wildlife impacts focuses on the common species occurring in the Survey Area.

General Habitat Loss and Wildlife Loss

Construction of the proposed Project would not result in the loss of native habitat (i.e., alkali grassland, alkali scrub playa, disturbed alkali scrub playa, alkali wetland, Riversidean sage scrub, disturbed Riversidean sage scrub, and southern willow scrub) that provides valuable nesting, foraging, roosting, and denning opportunities for a wide variety of wildlife species. Implementation of the proposed Project would result in the loss of up to 126.16 acres of non-native habitats (i.e., annual grassland, ruderal, agriculture, ornamental, disturbed, and developed areas) that provide lower-quality wildlife habitat and possibly nesting, foraging, roosting, and denning opportunities for some species.

Removing or altering habitats in the Survey Area would result in the loss of small mammals, reptiles, amphibians, and other slow-moving animals that live in the proposed Project's direct impact area. More mobile wildlife species that are now using the Survey Area would be forced to move into the remaining areas of open space, which would consequently increase competition for available resources in those areas. This situation would result in the loss of individuals that cannot successfully compete.

The loss of non-native habitats that provide wildlife habitat is considered an adverse impact. However, the loss of habitat would not be expected to reduce wildlife populations to below self-sustaining levels in the region. Therefore, this impact would be considered adverse, but less than significant.

The original Migratory Bird Treaty Act of 1918 implemented the 1916 Convention between the United States and Great Britain (for Canada) for the protection of migratory birds. Specific provisions of the statute establish a federal prohibition, unless permitted, to:

> pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of the

> Convention … for the protection of migratory birds … or any part, nest, or egg of any such bird.

Bird species protected under the provisions of the Migratory Bird Treaty Act are identified by the List of Migratory Birds (Title 50 of the *Code of Federal Regulations,* Section 10.13, as updated by the 1983 AOU Check-list and published supplements through 2009). The loss of any active nest occurring in the Survey Area would be considered significant. Impacts on active nests would be reduced to less than significant levels with the implementation of MMs 1, 2, and 6. These measures apply to the entire Survey Area.

Common raptor species such as red-tailed hawk have potential to nest in the Survey Area. Should an active raptor nest (common or special status species) be found in the Survey Area, the loss of the nest would be considered a violation of *California Fish and Game Code* Sections 3503, 3503.5, and 3513. The loss of any active raptor nest occurring in the Survey Area would be considered significant. Impacts on raptor nests would be reduced to less than significant with the implementation of MMs 1, 2, and 6. These measures apply to the entire Survey Area.

Wildlife Movement and Habitat Fragmentation

The proposed Project is located in a region dominated by agricultural and residential land uses. Wildlife movement opportunities in the area are already constrained by development in the Project vicinity. Therefore, the proposed Project is not expected to interfere substantially with the movement of any native resident or migratory fish or wildlife species.

The San Jacinto River is an important landscape linkage. This river is crossed by the Proposed Subtransmission Source Line Route, Segments 1 and 2; the Alternative Subtransmission Source Line Route, Segment 3; and the Proposed Overhead Route 1. Impacts on the San Jacinto River would be considered potentially significant. The Project is not expected to impact the San Jacinto River. This feature would be avoided by direct grading and construction impacts. However, incidental or accidental impacts (temporary impacts) could occur, and these impacts would be potentially significant. Potential impacts would be reduced by implementation of BMPs. These measures apply to the Proposed Subtransmission Source Line Route, Segments 1 and 2; the Alternative Subtransmission Source Line Route, Segment 3; and the Proposed Overhead Route 1.

4.3.3 Special Status Biological Resource Impacts

Implementation of the proposed Project could potentially result in impacts on special status plant and wildlife species if they occur in the Survey Area. Potential impacts on these species were evaluated by determining the impacts on habitat that the species are known or expected to occupy and their known or expected occurance based on the results of focused survey efforts.

Special Status Plants

Proposed Substation Site

The Proposed Substation Site would not have a substantial adverse effect, either directly or through habitat modifications, on any special status plant species. The Proposed Substation Site is not expected to support any special status plant species due to the lack of suitable habitat and soils. Therefore, construction and operation of the Proposed Substation Site will not impact special status plant species and no MMs are required.

Alternative Substation Site

The Alternative Substation Site would not have a substantial adverse effect, either directly or through habitat modifications, on any special status plant species. The Alternative Substation Site is not expected to support any special status plant species due to the lack of suitable habitat and soils. Therefore, construction and operation of the Alternative Substation Site will not impact special status plant species and no MMs are required.

Proposed Subtransmission Source Line Route, Segment 1

Segment 1 contains suitable habitat for special status plants including San Jacinto Valley crownscale, South Coast saltscale, Parish's brittlescale, Davidson's saltscale, thread-leaved brodiaea, smooth tarplant, Parry's spineflower, long-spined spineflower, vernal barley, Coulter's goldfields, Moran's navarretia, Salt Spring checkerbloom, and Wright's trichocoronis. A total of 1,999 San Jacinto Valley crownscale individuals, 4,000 vernal barley individuals, and 75 smooth tarplant individuals were observed during the 2010 plant surveys. Potential impacts to these species would be considered significant; however, implementation of MMs 2, 6, and 7 would reduce these impacts to less than significant levels.

Proposed Subtransmission Source Line Route, Segment 2

Segment 2 contains suitable habitat for special status plant species including San Jacinto Valley crownscale, South Coast saltscale, Davidson's saltscale, smooth tarplant, Parry's spineflower, vernal barley, Coulter's goldfields, Moran's navarretia, Salt Spring checkerbloom, and Wright's trichocoronis. A total of 65 smooth tarplant individuals, 150 vernal barley individuals, and 1 Coulter's goldfields were observed during the 2009 plant surveys. Potential impacts to these species would be considered significant; however, implementation of MMs 2 and 6 would reduce these impacts to less than significant levels.

Alternative Subtransmission Source Line Route, Segment 3

Segment 3 contains suitable habitat for special status plant species including San Jacinto Valley crownscale, South Coast saltscale, Parish's brittlescale, Davidson's saltscale, thread-leaved brodiaea, smooth tarplant, Parry's spineflower, vernal barley, Coulter's goldfields, Moran's navarretia, California Orcutt grass, Salt Spring checkerbloom, and Wright's trichocoronis. A total of 532 San Jacinto Valley crownscale individuals, 9,200 vernal barley individuals, and 6,250 Coulter's goldfields individuals were observed during the 2009 plant surveys. Potential impacts to these species would be considered significant; however, implementation of MMs 2, 6, and 7 would reduce these impacts to less than significant levels.

New Cable to Moval

Suitable habitat for special status plants is present on the New Cable to Moval, including chaparral sand-verbena, Munz's onion, San Jacinto Valley crownscale, South Coast saltscale, Parish's brittlescale, Davidson's saltscale, thread-leaved brodiaea, intermediate mariposa lily, smooth tarplant, Parry's spineflower, long-spined spineflower, vernal barley, Coulter's goldfields, Robinson's pepper-grass, and Wright's trichocoronis. Impacts on these species, if present, may be considered significant; however, implementation of MMs 2, 6, and 7 would reduce these impacts to less than significant levels.

Proposed Overhead Route 1

The Proposed Overhead Route 1 contains suitable habitat for special status plants including San Jacinto Valley crownscale, South Coast saltscale, Parish's brittlescale, Davidson's saltscale, thread-leaved brodiaea, smooth tarplant, Parry's spineflower, long-spined spineflower, Coulter's goldfields, Moran's navarretia, Salt Spring checkerbloom, and Wright's trichocoronis. A total of 1,999 San Jacinto Valley crownscale individuals, 75 smooth tarplant individuals, and 4,000 vernal barley individuals were observed during the 2009 plant surveys. Potential impacts to these species would be considered significant; however, implementation of MMs 2, 6, and 7 would reduce these impacts to less than significant levels.

Proposed Overhead Route 2

The Proposed Overhead Route 2 is not expected to support any special status plant species due to the lack of suitable habitat and/or soils. Therefore, construction and operation of the Proposed Overhead Route 2 will not impact special status plant species and no MMs would be required.

4.3.4 Special Status Wildlife

Proposed Substation Site

The Proposed Substation Site contains suitable habitat for ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, peregrine falcon, mountain plover, loggerhead shrike, California horned lark, and San Diego black-tailed jackrabbit. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant; therefore, no MMs would be required. Impacts on active nests would be reduced to less than significant with implementation of MM 1.

The burrowing owl is not currently expected to occur on the Proposed Substation Site because it was not observed during focused surveys conducted in 2009. However, suitable habitat for this species occurs on the site, and this species may occur occasionally as a migrant or winter visitor. If this species returns to the site, impacts on burrowing owls would be considered significant; therefore, implementation of MM 3 would reduce this impact to less than significant levels.

Suitable foraging habitat for white-faced ibis, Cooper's hawk, golden eagle, tricolored blackbird, western yellow bat, and western mastiff bat is present on the site as well. The construction of the Proposed Substation Site is expected to impact foraging opportunities for these species. Although construction activities may discourage use of the area within the immediate vicinity of the active work site, this disruption in foraging is expected to be extremely localized and temporary in nature. Impacts on foraging habitat for these species would be considered adverse, but would not be expected to appreciably affect the overall population of these species given the amount of potentially suitable foraging habitat in the immediate vicinity. Therefore, impacts on these species would be considered less than significant, and no MMs are required.

Alternative Substation Site

The Alternative Substation Site contains suitable habitat for ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, peregrine falcon, mountain plover, loggerhead shrike, California horned lark, and San Diego black-tailed jackrabbit. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these

species would be considered adverse but less than significant; therefore, no MMs would be required. Impacts on active nests would be reduced to less than significant with implementation of MM 1.

The burrowing owl is not currently expected to occur on the Alternative Substation Site because it was not observed during focused surveys conducted in 2009. However, suitable habitat for this species occurs on the site, and this species may occur occasionally as a migrant or winter visitor. If this species returns to the site, impacts on burrowing owls would be considered significant; therefore, implementation of MM 3 would reduce this impact to a less than significant level.

Suitable foraging habitat for white-faced ibis, Cooper's hawk, golden eagle, tricolored blackbird, western yellow bat and western mastiff bat is present on the Alternative Substation Site. The construction of the Alternative Substation Site is expected to impact foraging opportunities for these species. Although construction activities may discourage use of the area within the immediate vicinity of the active work site, this disruption in foraging is expected to be extremely localized and temporary in nature. This impact is considered less than significant given the large availability of foraging habitat in the region. Therefore, no MMs are required.

Proposed Subtransmission Source Line Route, Segment 1

Segment 1 provides suitable habitat or limited suitable habitat for special status wildlife species including white-faced ibis, golden eagle, mountain plover, loggerhead shrike, California horned lark, Oregon vesper sparrow (*Pooecetes gramineus affinis*), grasshopper sparrow, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, Los Angeles pocket mouse, southern grasshopper mouse (*Onychomys torridus ramona*), and American badger (*Taxidea taxus*). California horned lark was observed along Segment 1 during the 2009 surveys. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant; therefore, no MMs would be required. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

Segment 1 contains suitable habitat for Stephens' kangaroo rat, which is a federally Endangered and State Threatened species. Impacts to this species would be considered significant; however, implementation of MM 4 would reduce these impacts to less than significant.

The burrowing owl is not currently expected to occur along Segment 1 because it was not observed during focused surveys conducted in 2009. However, suitable habitat for this species occurs on the site, and this species may occur occasionally as a migrant or winter visitor. If this species returns to the site, impacts on burrowing owls would be considered significant; therefore, implementation of MM 3 would reduce this impact to a less than significant level.

Segment 1 provides suitable foraging habitat for Cooper's hawk, ferruginous hawk, northern harrier, white-tailed kite, merlin, prarie falcon, American peregrine falcon, tricolored blackbird, western yellow bat, and western mastiff bat. The construction of Segment 1 is expected to impact foraging opportunities for these species. Although construction activities may discourage use of the area within the immediate vicinity of the active work site, this disruption in foraging is expected to be extremely localized and temporary in nature. This impact is considered less than significant given the large availability of foraging habitat in the region. Therefore, no MMs are required.

Proposed Subtransmission Source Line Route, Segment 2

Segment 2 contains suitable habitat or limited suitable habitat for special status wildlife species including white-faced ibis, white-tailed kite, mountain plover, loggerhead shrike, California horned lark, Oregon vesper sparrow, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, Los Angeles pocket mouse, and southern grasshopper mouse. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant; therefore, no MMs would be required. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

Segment 2 contains limited suitable habitat for Stephens' kangaroo rat. Impacts to this species would be considered significant; however, implementation of MM 4 would reduce these impacts to less than significant levels.

The burrowing owl is not currently expected to occur on Segment 2 because it was not observed during focused surveys conducted in 2009. However, suitable habitat for this species occurs on the site, and this species may occur occasionally as a migrant or winter visitor. If this species returns to the site, impacts on burrowing owls would be considered significant; therefore, implementation of MM 3 would reduce this impact to less than significant levels.

Segment 2 contains suitable foraging habitat for Cooper's hawk, golden eagle, ferruginous hawk, northern harrier, merlin, prairie falcon, peregrine falcon, tricolored blackbird, western yellow bat, and western mastiff bat. Although construction activities may discourage use of the area within the immediate vicinity of the active work site, this disruption in foraging is expected to be extremely localized and temporary in nature. This impact is considered less than significant given the large availability of foraging habitat in the region. Therefore, no MMs are required.

Alternative Subtransmission Source Line Route, Segment 3

Segment 3 contains suitable habitat for special status wildlife species including northern harrier, white-tailed kite, merlin, prairie falcon, mountain plover, loggerhead shrike, California horned lark, Oregon vesper sparrow, and San Diego black-tailed jackrabbit. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant; therefore, no MMs would be required. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

Segment 3 provides suitable habitat for Riverside fairy shrimp. Impacts to this species would be considered significant; however, implementation of MM 5 would reduce these impacts to less than significant levels.

Segment 3 contains suitable foraging habitat for white-faced ibis, Cooper's hawk, golden eagle, ferruginous hawk, American peregrine falcon, tricolored blackbird, western yellow bat, and western mastiff bat. Although construction activities may discourage use of the area within the immediate vicinity of the active work site, this disruption in foraging is expected to be extremely localized and temporary in nature. This impact is considered less than significant given the large availability of foraging habitat in the region. Therefore, no MMs are required.

New Cable to Moval

The New Cable to Moval provides suitable habitat for the following listed species: Quino checkerspot butterfly, coastal California gnatcatcher, and Stephens' kangaroo rat. Focused surveys have been completed for Quino checkerspot butterfly and California gnatcatcher, and neither species were observed along the New Cable to Moval. Therefore, there would be no impact on these species and no MMs would be required.

Surveys for Stephens' kangaroo rat are currently in progress; therefore, impacts to this species would be considered significant if the species is found. However, implementation of MM 4 would reduce this impact to a less than significant level.

The New Cable to Moval provides suitable habitat and/or foraging habitat for special status wildlife species including western spadefoot, coast horned lizard, orange-throated whiptail, silvery legless lizard, coast patch-nosed snake, northern red-diamond rattlesnake, white-faced ibis, Cooper's hawk, golden eagle, ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, American peregrine falcon, mountain plover, long-eared owl, loggerhead shrike, California horned lark, Southern California rufous-crowned sparrow, Oregon vesper sparrow, grasshopper sparrow, Bell's sage sparrow, tricolored blackbird, western yellow bat, western mastiff bat, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, Los Angeles pocket mouse, San Diego desert woodrat, southern grasshopper mouse, and American badger. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant. However, potential impacts would be reduced by implementation of MMs 2 and 6. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

The New Cable to Moval provides suitable habitat for the burrowing owl. If this species occurs on the New Cable to Moval, impacts on this species would be considered significant; therefore, implementation of MM 3 would reduce this impact to less than significant levels.

Proposed Overhead Route 1

The Proposed Overhead Route 1 provides suitable habitat and/or foraging habitat for special status wildlife species including western spadefoot, coast horned lizard, orange-throated whiptail, silvery legless lizard (*Anniella pulchra pulchra*), coast patch-nosed snake (*Salvadora hexalepis virgultea*), northern red-diamond rattlesnake, white-faced ibis, Cooper's hawk, golden eagle, ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, American peregrine falcon, mountain plover, long-eared owl, loggerhead shrike, California horned lark, Southern California rufous-crowned sparrow, Oregon vesper sparrow, grasshopper sparrow, Bell's sage sparrow, tricolored blackbird, western yellow bat, western mastiff bat, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, Los Angeles pocket mouse, San Diego desert woodrat, southern grasshopper mouse, and American badger. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant. However, potential impacts would be reduced by implementation of MMs 2 and 6. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

The Proposed Overhead Route 1 provides suitable habitat for the burrowing owl. If this species occurs on the Proposed Overhead Route 1, impacts on this species would be considered significant; therefore, implementation of MM 3 would reduce this impact to less than significant levels.

The Proposed Overhead Route 1 provides limited suitable habitat for Stephens' kangaroo rat. Impacts to this species would be considered significant; however, implementation of MM 4 would reduce these impacts to less than significant levels.

Proposed Overhead Route 2

The Proposed Overhead Route 2 provides suitable habitat and/or foraging habitat for special status wildlife species including western spadefoot, coast horned lizard, orange-throated whiptail, silvery legless lizard, coast patch-nosed snake, northern red-diamond rattlesnake, white-faced ibis, Cooper's hawk, golden eagle, ferruginous hawk, northern harrier, white-tailed kite, merlin, prairie falcon, American peregrine falcon, mountain plover, long-eared owl, loggerhead shrike, California horned lark, Southern California rufous-crowned sparrow, Oregon vesper sparrow, grasshopper sparrow, Bell's sage sparrow, tricolored blackbird, western yellow bat, western mastiff bat, San Diego black-tailed jackrabbit, northwestern San Diego pocket mouse, Los Angeles pocket mouse, San Diego desert woodrat, southern grasshopper mouse, and American badger. Due to the limited amount of habitat loss relative to the availability of habitat for these species in the region, impacts on these species would be considered adverse but less than significant. However, potential impacts would be reduced by implementation of MMs 2 and 6. Impacts on active nests would be reduced to less than significant levels with implementation of MM 1.

The Proposed Overhead Route 2 provides suitable habitat for the burrowing owl. If this species occurs on the Proposed Overhead Route 2, impacts on this species would be considered significant; however, implementation of MM 3 would reduce this impact to a less than significant level.

4.4 INDIRECT IMPACTS

Indirect impacts are those related to disturbance by construction (such as noise, dust, and urban pollutants) and long-term use of the Survey Area and its effect on the adjacent habitat areas. The indirect impact discussion below includes a general assessment of the potential indirect effects (noise and lighting) from the construction and operation of the proposed Project.

4.4.1 Noise

Noise levels on the selected site are expected to increase over present levels during construction of the proposed Project. During construction, temporary noise impacts have the potential to disrupt foraging, nesting, roosting, and/or denning activities for wildlife species. Although noise impacts may also increase over present levels due to normal operation of the Project, the Project noise increase would be minor. Wildlife species stressed by noise may disperse from the habitat located in the vicinity of the selected site. This impact is considered adverse but less than significant.

4.4.2 Night Lighting

Night lighting of the project during and after construction is expected. This lighting could inadvertently affect the behavior patterns of nocturnal and crepuscular (active at dawn and dusk) wildlife adjacent to the selected site. Of greatest concern is the impact on small ground-dwelling animals that use the darkness to hide from predators, and on owls that are specialized night foragers. In addition, night lighting could deter wildlife movement and/or inhibit wildlife from using the habitat adjacent to lighted areas. This impact is considered adverse but less than significant.

5.0 MITIGATION MEASURES

SCE proposes the following MMs to avoid, minimize, correct, reduce, or eliminate impacts on special status biological resources

5.1 MITIGATION MEASURES

5.1.1 Mitigation Measure No. 1: Pre-Construction Surveys for Nesting Birds/Raptors

To minimize potential impacts to selected nesting special status birds, raptors, or other MBTA bird species, planned vegetation clearing will take place during the non-breeding season (between September 1 and January 31) to the extent feasible. This will discourage the species from nesting within the work area. Trees, shrubs, or other occupied vegetation that would provide suitable structure for nesting would be removed. If vegetation clearing must take place during nesting season (February 1–August 31), a Biologist shall conduct pre-construction nesting bird surveys prior to clearing for the sites that have potential to support nesting birds/raptors. If the Biologist finds an active nest within or adjacent to the construction area and determines that there may be impacts to the nest, s/he will delineate an appropriate buffer zone around the nest depending on the sensitivity of the species and the type of construction activity. Only construction activities (if any) approved by the Biologist will take place within the buffer zone until the nest is vacated. If nests are found and cannot be avoided by the project activities, or if work is scheduled to take place near an active nest, SCE shall coordinate with the CDFG and the USFWS and obtain written concurrence prior to moving the nest.

5.1.2 Mitigation Measure No. 2: Pre-Construction Surveys and Biological Monitoring

Pre-construction biological clearance surveys shall be performed at the Project site to minimize impacts on special status species. If special status species are present, Biological Monitors shall remain on site during project implementation in suitable habitat areas. Biological Monitors shall aid crews in implementing avoidance measures during project construction. If adequate avoidance cannot be established, SCE shall consider enrollment in the MSHCP as a Participating Special Entity or shall coordinate with the USFWS and the CDFG for further guidance as appropriate. Any significant findings during pre-construction surveys would be added to the Worker Environmental Awareness Program (WEAP) training described in Section 3.9 of Chapter 3.

5.1.3 Mitigation Measure No. 3: Burrowing Owl

Pre-construction burrowing owl surveys shall be conducted and active burrows found during survey efforts shall be mapped. If no active burrows are found, no further mitigation would be required. If nesting activity is present at an active burrow, the burrow shall be protected until nesting activity has ended. Nesting activity for burrowing owl in the region normally occurs between March and August. To protect the active burrow, the following restrictions to construction activities shall be required until the burrow is no longer active as determined by a Biologist: (1) Clearing limits shall be established within a 500-foot buffer around any active burrow, unless otherwise determined by a Biologist and (2) Access and surveying shall be restricted within 300 feet of any active burrow, unless otherwise determined by a Biologist. Any encroachment into the buffer area around the active burrow shall only be allowed if the Biologist determines that the proposed activity will not disturb the nest occupants. Construction can proceed when the Biologist has determined that fledglings have left the nest. If an active burrow is observed during the non-nesting season, the nest site will be monitored by a Biologist and, when the owl is away from the nest, the Biologist will either actively or passively relocate the

burrowing owl. The Biologist will then remove the burrow so the burrowing owl cannot return to the burrow.

5.1.4 Mitigation Measure No. 4: Stephens' Kangaroo Rat

A habitat assessment for Stephens' kangaroo rat shall be conducted by a Biologist qualified to conduct Stephens' kangaroo rat surveys along the Proposed Subtransmission Source Line Routes and Proposed Telecommunications Routes. If no potential occupied habitat is found during this assessment, then no further action is necessary. If potential for occupied habitat is found, protocol trapping surveys shall be conducted. The Proposed Telecommunications Route is within a Stephens' kangaroo rat fee area; therefore, if suitable habitat for this species is found, a fee shall be paid in lieu of further surveys (County of Riverside 1996).

5.1.5 Mitigation Measure No. 5: Riverside Fairy Shrimp

Impacts to Riverside fairy shrimp habitat will be avoided to the extent feasible in the final Project Design. Habitat areas will be marked as "off limits" in construction plans and specifications. If significant impacts to habitat are unavoidable, focused surveys will need to be conducted prior to construction activities. Riverside fairy shrimp surveys require either a wet season survey, followed by a consecutive dry season survey, or two wet season surveys done within a five-year period (USFWS 1996). If no Riverside fairy shrimp are found in this area during the focused surveys, no additional action is warranted. If this species is found, SCE shall consider (1) avoidance measures; (2) enrollment in the MSHCP as a Participating Special Entity; or (3) approvals through the USFWS. Appropriate avoidance, minimization, and compensation measures may be required.

5.1.6 Mitigation Measure No. 6: Native or Special Status Vegetation and Special Status Plant Populations Avoidance

Impacts to native vegetation types, those that may support special status species, and known populations of special status plants will be avoided to the extent feasible in the final Project Design. Native vegetation and special status plant populations will be marked as "off limits" in construction plans and specifications. If significant impacts to native vegetation and/or special status plants are unavoidable, a Biologist will be selected to prepare and implement a mitigation plan, which will include detailed descriptions of maintenance appropriate for the mitigation site, monitoring requirements, and annual report requirements, and will have the full authority to suspend any operation which is, in the Biologist's opinion, not consistent with the mitigation plan. This plan will be submitted for review to the appropriate agencies.

5.1.7 Mitigation Measure No. 7: Avoidance of San Jacinto Valley Crownscale Populations

In order to avoid potential impacts to known populations of San Jacinto Valley crownscale populations, an Environmentally Sensitive Area (ESA) will be developed prior to construction to the extent feasible in the final Project Design (Exhibit 6). If significant impacts to San Jacinto Valley crownscale are unavoidable, a Biologist will be selected to prepare and implement a mitigation plan, which will include detailed descriptions of maintenance appropriate for the mitigation site, monitoring requirements, and annual report requirements, and will have the full authority to suspend any operation which is, in the Biologist's opinion, not consistent with the mitigation plan. This plan will be submitted for review to the appropriate agencies.

6.0 REFERENCES

American Ornithologists' Union (AOU). 2009. *Check-list of North American Birds* (7th ed., as revised through 50th Supplement). Washington, D.C.: AOU. http://www.aou.org/checklist/north/index.php.

Andrews, R. and R. Righter. 1992. *Colorado Birds: A Reference to Their Distribution and Habitat*. Denver, CO: Denver Museum of Natural History Press.

Atwood, J.L. 1992. Rare, Local, Little-Known, and Declining North American Breeders – A Closer Look. *Birding* 25: 228–233. Colorado Springs, CO: American Birding Association.

———. 1990. *Status Review of the California Gnatcatcher (*Polioptila californica*)*. Manomet, MA: Manomet Bird Observatory.

Baker, R.J., L.C. Bradley, R.D. Bradley, J.W. Dragoo, M.D. Engstrom, R.S. Hoffmann, C.A. Jones, F. Reid, D.W. Rice, and C. Jones. 2003 (December). Revised Checklist of North American Mammals North of Mexico, 2003. *Occasional Papers (No. 229).* Waco, TX: Museum of Texas Tech University.

Beason, R.C. 1995. Horned Lark (*Eremophila alpestris*)*. The Birds of North America*, No.195 (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Bechard, M.J. and J.K. Schmutz. 1995. Ferruginous Hawk (*Buteo regalis*)*. The Birds of North America, No. 172* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Beedy, E.C., S.D. Sanders, and D.A. Bloom. 1991 (June). *Breeding Status, Distribution, and Habitat Associations of the Tricolored Blackbird* (Agelaius tricolor)*, 1850–1889* (JSA 88–187, prepared for the U.S. Fish and Wildlife Service)*.* Sacramento, CA: Jones and Stokes Associates, Inc.

Bennett, A.F. 1990. Habitat Corridors and the Conservation of Small Mammals in the Fragmented Forest Environment. *Landscape Ecology* 4(2–3):109–122. New York, NY: International Association for Landscape Ecology.

Best, T.L., J.S. Altenbach, and M.J. Harvey. 1998. Bats of Alabama (Poster, with text). Alabama Agricultural Experiment Station. Montgomery, AL: Alabama Department of Conservation and Natural Resources, State Lands Division.

Bloom, P.H. 1994. The Biology and Current Status of the Long-eared Owl in Coastal Southern California. *Bulletin of the Southern California Academy of Sciences* 93(1): 1–12. Los Angeles, CA: The Academy.

BonTerra Consulting. 2010a. *Results of the 2009 Special Status Plant Surveys for the Lakeview Substation Project*. Costa Mesa, Ca: BonTerra Consulting.

———. 2010b. *Results of Western Burrowing Owl Surveys for the Lakeview Substation in the Cities of Lakeview and Nuevo and Unincorporated Riverside County, California*. Costa Mesa, Ca: BonTerra Consulting.

California Department of Fish and Game (CDFG). 2010a. California Natural Diversity Database. Records of Occurrence for USGS Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. Sacramento, CA: CDFG, Natural Heritage Division.

———. 2010b (January). *Special Vascular Plants, Bryophytes, and Lichens List.* Sacramento, CA: CDFG, Natural Heritage Division.

———. 2009a (November 24). Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Sacramento, CA: CDFG.

———. 2009b (July). *Special Animals.* Sacramento, CA: CDFG, Natural Heritage Division.

———. 2003 (September). *List of California Terrestrial Natural Communities Recognized by the Natural Diversity Data Base.* Sacramento, CA: CDFG, Natural Heritage Division.

California Native Plant Society (CNPS). 2010. Electronic Inventory of Rare and Endangered Vascular Plants of California. Records of Occurrence for USGS Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. Sacramento, CA: CNPS. http://www.cnps.org/inventory.

Clark, W.S. and B.K. Wheeler. 2001. *A Field Guide to Hawks of North America* (2nd ed.) Boston, MA: Houghton-Mifflin Company.

Curtis, O.E. and R.N. Rosenfield. 2006. Cooper's Hawk (Accipiter cooperii). *The Birds of North America, No. 75* (A. Poole, Ed.). Ithaca, NY: Cornell Lab of Ornithology.

Dudek and Associates, Inc. (Dudek). 2003. Western Riverside County Multiple Species Habitat Conservation Plan (Prepared for the Riverside County Integrated Project). Encinitas, CA: Dudek. http://www.wrc-rca.org/Permits_Docs.html.

Dunk, J.R. 1995. White-tailed Kite (*Elanus leucurus*). *The Birds of North America, No. 178* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Dunn, J.L. and K.L. Garrett. 1997. *A Field Guide to Warblers of North America* (Peterson's Field Guide Series 49). Boston, MA: Houghton Mifflin Company.

Ehrlich, P.R., D.S. Dobkin, and D. Wheye. 1988. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. New York, NY: Simon and Schuster.

England, A.S., M.J. Bechard, and C.S. Houston. 1997. Swainson's Hawk (*Buteo swainsoni*). *The Birds of North America, No. 265* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual* (Technical Report Y-87-1). Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Eriksen, C. and D. Belk. 1999. *Fairy Shrimps of California's Puddles, Pools, and Playas*. Eureka, CA: Mad River Press, Inc.

Faber, P., E. Keller, A. Sands, B. Massey. 1989. *The Ecology of Riparian Habitats of the Southern California Coastal Region: A Community Profile* (Biological Report 85 [7.27]). Washington, D.C: U.S. Fish and Wildlife Service, Research and Development, National Wetlands Research Center.

Fahrig, L. and G. Merriam. 1985. Habitat Patch Connectivity and Population Survival. *Ecology* 66(6): 1762–1768. Tempe, AZ: Ecological Society of America.

Franzreb, K.E. 1989. *Ecology and Conservation of the Endangered Least Bell's Vireo* (Biological Report 89[1]) Washington, D.C.: USFWS, Endangered Species Office.

Garrett, K. and J. Dunn. 1981. *Birds of Southern California: Status and Distribution*. Los Angeles, CA: Audubon Press.

Goldwasser, S. 1981. *Habitat Requirements of the Least Bell's Vireo* (Final Report, Job IV-38.1). Sacramento, CA: CDFG.

Grinnell, J. and A.H. Miller. 1944. The Distribution of the Birds of California. *Pacific Coast Avifauna No. 27.* Albuquerque, NM: Cooper Ornithological Society.

Hall, E.R. and K.R. Kelson. 1959. *The Mammals of North America* (Vols I and II). New York, NY: The Ronald Press Co.

Hamilton, R.A. and D.R. Willick. 1996. *The Birds of Orange County, California: Status and Distribution*. Irvine, CA: Sea and Sage Audubon Society.

Harris, L.D. and P.B. Gallagher. 1989. New Initiatives for Wildlife Conservation: The Need for Movement Corridors (pp. 11–34). *Preserving Communities and Corridors* (G. Mackintosh, Ed.). Washington, D.C.: Defenders of Wildlife.

Hickman, J.C., Ed. 1993. *The Jepson Manual of Higher Plants of California*. Berkeley, CA: University of California Press.

Hughes, J.M. 1999. Yellow-billed Cuckoo (*Coccyzus americanus*). *The Birds of North America, No. 418* (A. Poole and F. Gill, Eds.). Philadelphia, PA: The Academy of Natural Sciences.

Jennings, M.R. and M.P. Hayes. 1994. *Amphibian and Reptile Species of Special Concern in California* (Contract No. 8023). Sacramento, CA: CDFG, Inland Fisheries Division.

Johnsgard, P.A. 2001. *Hawks, Eagles, and Falcons of North America: Biology and Natural History.* Washington, D.C.: Smithsonian Institution Press.

Lannoo, M. 2005. *Amphibian Declines: The Conservation Status of United States Species*. Berkeley, CA: University of California Press.

Lehman, P.E. 1994. *The Birds of Santa Barbara County, California*. Santa Barbara, CA: Vertebrate Museum, University of California.

MacArthur, R.H. and E.O. Wilson. 1967. *The Theory of Island Biogeography*. Princeton, NJ: Princeton University Press.

Marks, J.S., D.L. Evans, and D.W. Holt. 1994. Long-eared Owl (*Asio otus*). *The Birds of North America, No. 133* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Mattoni, R., G.F. Pratt, T.R. Longcore, J.F. Emmel, and J.N. George. 1997. The Endangered Quino Checkerspot Butterfly, *Euphydryas editha quino* (Lepidoptera: Nymphalidae). *Journal of Research on the Lepidoptera* 34:99–118.

Munz, P.A. 1974. *A Flora of Southern California*. Berkeley, CA: University of California Press.

Noss, R.F. 1983. A Regional Landscape Approach to Maintain Diversity. *BioScience.* 33(11): 700–706. Washington, D.C.: American Institute of Biological Sciences.

Noss, R.F. and R.L. Peters. 1995. *Endangered Ecosystems: a Status Report on America's Vanishing Habitat and Wildlife.* Washington, D.C.: Defenders of Wildlife.

O'Farrell, M.J. 1990. Stephens' Kangaroo Rat: Natural History, Distribution, and Current Status. *Memoirs of the Natural History Foundation of Orange County* (Vol. 3, pp. 77–84). (P.J. Brant and J. Remington, Eds.). Newport Beach, CA: Natural History Foundation of Orange County.

O'Farrell, M.J. and C.E. Uptain. 1987. Distribution and Aspects of the Natural History of Stephens' Kangaroo Rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego County, California. *The Wasmann Journal of Biology.* 45:34–48. San Francisco, CA: University of San Francisco.

O'Leary, J. 1995. Coastal Sage Scrub: Threats and Current Status. *Fremontia.* 23(4): 27–31. Sacramento, CA: California Native Plant Society.

Price, M.V. and P.R. Endo. 1989. Estimating the Distribution and Abundance of a Cryptic Species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and Implications for Management. *Conservation Biology* 3(3): 293–301. Boston, MA: Blackwell Scientific Publications.

Proudfoot, G.A., D.A. Sherry, and S. Johnson. 2000. Cactus Wren (*Campylorhynchus brunneicapillus*). *The Birds of North America, No. 558* (A. Poole and F. Gills, Eds.). Philadelphia, PA: The Birds of North America, Inc.

Remsen, J.V., Jr. 1978. *Bird Species of Special Concern in California: An Annotated List of Declining or Vulnerable Bird Species* (Administrative Report No. 78-1). Sacramento, CA: CDFG, Wildlife Management Branch.

Riverside, County of. 2006 (as amended). *Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area.* Riverside, CA: the County. http://www.tlma.co.riverside.ca.us/epd/documents/Burrowing_Owl_Survey_ Instructions.pdf.

———. 1996 (September 5). *Ordinance No. 663.10: An Ordinance of the County of Riverside Amending Ordinance No. 633 Establishing the Riverside County Stephens' Kangaroo Rat Habitat Conservation Plan Plan Fee Assessment Area and Setting Mitigation Fees.* Riverside, CA: the County. http://www.clerkoftheboard.co.riverside.ca.us/ ords/600/663.htm.

Riverside County Integrated Project (RCIP). 2010. Conservation Summary Report Generator. http://www.rctlma.org/online/content/rcip_report_generator.aspx.

Rosenfield, R.N. and J. Bielefeldt. 1993. Cooper's Hawk (*Accipiter cooperii*). *The Birds of North America, No. 75* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Shuford, W.D. and T. Gardali (Eds.). 2008. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. *Studies of Western Birds 1*. Camarillo, CA and Sacramento, CA: Western Field Ornithologists and CDFG (respectively).

Simberloff, D. and J. Cox. 1987. Consequences and Costs of Conservation Corridors. *Conservation Biology* 1(1): 63–71. Boston, MA: Blackwell Scientific Publications.

Small, A. 1994. *California Birds: Their Status and Distribution*. Vista, CA: Ibis Publishing Company.

Soule, M.E. 1987. *Viable Populations for Conservation*. New York, NY: Cambridge University Press.

Stebbins, R.C. 2003. *A Field Guide to Western Reptiles and Amphibians* (3rd ed.). Boston, MA: Houghton-Mifflin Company.

Unitt, P. 2004. *San Diego County Bird Atlas* (San Diego Society of Natural history, No. 39). San Diego, CA: Ibis Publishing Co.

———. 1984. *The Birds of San Diego County* (Memoir 13). San Diego, CA: San Diego Society of Natural History.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* (J.S. Wakeley, R.W. Lichvar, and C.V. Noble, Eds.). Vicksburg, MS: U.S. Army Engineer Research and Development Center.

———. 1987. *Corps of Engineers Wetlands Delineation Manual* (Technical Report Y–87-1). Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station, Environmental Laboratory.

U.S. Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2007 (January 10). Soil Survey Geographic (SSURGO) Database for Orange and Western Part of Riverside Counties, California. Fort Worth, TX: USDA, NRCS.

U.S. Fish and Wildlife Service (USFWS). 2009a (October 13). Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Arroyo Toad (*Anaxyrus californicus*); Proposed Rule. *Federal Register* 74(196): 52611–52664. Washington, D.C.: USFWS.

———. 2009b (June 17). Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Quino Checkerspot Butterfly (Euphydryas editha quino); Final Rule. *Federal Register* 74(115): 28776–28862. Washington, D.C.: USFWS.

———. 2007a (June). *Draft Post-Delisting Monitoring Plan for the Bald Eagle (Haliaeetus leucocephalus)*. Washington, D.C.: USFWS, Bald Eagle Monitoring Team. http://ecos.fws.gov/docs/species/doc1062.pdf.

———. 2007b (December 19). Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*); Final Rule. *Federal Register* 72(243): 72009–72213. Washington, D.C.: USFWS.

———. 2006 (October 13). Post-delisting Monitoring Results for the American Peregrine Falcon (*Falco peregrinus anatum*), 2003. *Federal Register* 71(198): 60563. Washington, D.C.: USFWS.

———. 2005a (October 19). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Southwestern Willow Flycatcher (*Empidonax traillii extimus*); Final Rule. *Federal Register* 70(201): 60885–61009. Washington, D.C.: USFWS.

———. 2005b (August 11). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. *Federal Register* 68(151): 46683–46867. Washington, D.C.: USFWS.

———. 2005c (April 13). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Arroyo Toad (*Bufo californicus*); Final Rule. *Federal Register* 70(70): 19561–19633. Washington, D.C.: USFWS.

———. 2005d (April 12). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Riverside Fairy Shrimp (*Streptocephalus woottoni*); Final Rule. *Federal Register* 70(69): 19153–19204. Washington, D.C.: USFWS.

———. 2003 (August 6). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Final Rule. *Federal Register* 68(151): 46683–46867. Washington, D.C.: USFWS.

———. 2002. *Quino Checkerspot Butterfly (Euphydryas editha quino): Survey Protocol Information.* Carlsbad, CA: Carlsbad Fish and Wildlife Office.

———. 2001 (May 30). Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Riverside Fairy Shrimp; Final Rule. *Federal Register* 66(104): 29383–29414. Washington, D.C.: USFWS.

———. 1999a (August 25). Endangered and Threatened Wildlife and Plants; Final Rule to Remove the American Peregrine Falcon from the Federal List of Endangered and Threatened Wildlife, and to Remove the Similarity of Appearance Provision for Free-flying Peregrines in the Conterminous United States; Final Rule. *Federal Register* 64(164): 46541–46558. Washington, D.C.: USFWS.

———. 1999b (January 25). *Survey Protocol for the Endangered Quino Checkerspot Butterfly (*Euphydryas editha quino*) for the 1999 Field Season.* Washington, D.C.: USFWS.

———. 1997 (July 28). *Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Protocol.* Washington, D.C.: USFWS.

———. 1996. *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods*. Washington, D.C.: USFWS.

———. 1994a (December 16). Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Arroyo Southwestern Toad. *Federal Register* 59(241): 64859–64867. Washington, D.C.: USFWS.

———. 1994b (February 2). Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo. *Federal Register* 59(22): 4845–4867. Washington, D.C.: USFWS.

———. 1986 (May 2). Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Least Bell's Vireo. *Federal Register* 51(85):16474–16482. Washington, D.C.: USFWS.

Warkentin, I.G., N.S. Sodhi, R.H.M. Espie, and A.F. Poole. 2005. Merlin (*Falco columbarius*). *The Birds of North America*, *No. 44* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Williams, D.F. 1986. *Mammalian Species of Special Concern in California* (Administrative Report 86-1). Sacramento, CA: CDFG.

Yosef, R. 1996. Loggerhead Shrike *(Lanius ludovicianus). The Birds of North America, No. 231* (A. Poole and F. Gill, Eds.). Philadelphia, PA and Washington, D.C.: The Academy of Natural Sciences and the AOU (respectively).

Zeiner, D.C., W.F. Laudenslayer Jr., K.E. Mayer, M. White (Eds.). 1990a. *California's Wildlife, Vol. 2: Birds.* Sacramento, CA: CDFG, The Resources Agency.

———. 1990b. *California's Wildlife Vol. 3: Mammals.* Sacramento, CA: CDFG, The Resources Agency.

———. 1988. *California's Wildlife, Vol. 1: Amphibians and Reptiles*. Sacramento, CA: CDFG, The Resources Agency.

APPENDIX A

PLANT AND WILDLIFE COMPENDIA

A-1
PLANT COMPENDIUM

Plants
FLOWERING PLANTS
CLASS DICOTYLEDONES (DICOTS)
AIZOACEAE - FIG-MARIGOLD FAMILY
*Mesembryanthemum nodiflorum**   slender-leaved iceplant
ANACARDIACEAE - SUMAC FAMILY
Malosma laurina   laurel sumac
Rhus ovata   sugar bush
APOCYNACEAE - DOGBANE FAMILY
*Nerium oleander**   oleander
ASTERACEAE (COMPOSITAE) - SUNFLOWER FAMILY
Ambrosia acanthicarpa   annual bursage
Ambrosia psilostachya   western ragweed
Artemisia californica   California sagebrush
Artemisia dracunculus   tarragon
Baccharis salicifolia   mule fat
*Carduus pycnocephalus**   Italian thistle
Centromadia pungens* ssp. *laevis   **smooth tarplant**
*Chamomilla suaveolens**   common pineapple weed
*Cirsium vulgare**   bull thistle
Conyza canadensis   common horseweed
*Cotula australis**   brass buttons
Encelia farinosa   brittlebush
Eriophyllum confertiflorum   golden yarrow
Helianthus annuus   western sunflower
Heterotheca grandiflora   telegraph weed
Isocoma menziesii var. *vernonioides*   coastal goldenbush
*Lactuca serriola**   prickly lettuce

PLANT COMPENDIUM
(Continued)

Plants
Lasthenia californica California goldfields
Lasthenia glabrata* ssp. *coulteri **Coulter's goldfields**
Lepidospartum squamatum scale-broom
Lessingia filaginifolia California aster
Malacothrix saxatilis cliff malacothrix
*Oncosiphon piluliferum** stink net
Psilocarphus brevissimus woolly marbles
Rafinesquia californica California chicory
*Sonchus asper** prickly sow-thistle
*Sonchus oleraceus** common sow-thistle
BIGNONIACEAE - BIGNONIA FAMILY
Chilopsis linearis ssp. *arcuata* desert willow
BORAGINACEAE - BORAGE FAMILY
Amsinckia menziesii var. *intermedia* common fiddleneck
Heliotropium curassavicum salt heliotrope/alkali heliotrope
Pectocarya linearis ssp. *ferocula* slender pectocarya
Plagiobothrys leptocladus Wirestem popcorn flower
BRASSICACEAE (CRUCIFERAE) - MUSTARD FAMILY
*Brassica nigra** black mustard
*Hirschfeldia incana** shortpod mustard
Lepidium dictyotum var. *acutidens* sharp-tooth peppergrass
Lepidium dictyotum var. *dictyotum* alkali peppergrass
*Raphanus sativus** wild radish
*Sinapis arvensis** field charlock
*Sisymbrium irio** London rocket
*Spergularia bocconei** Boccone's sand spurrey

PLANT COMPENDIUM
(Continued)

Plants
Spergularia marina salt-marsh sand spurrey
CAPRIFOLIACEAE - HONEYSUCKLE FAMILY
Sambucus mexicana blue elderberry
CHENOPODIACEAE - GOOSEFOOT FAMILY
Atriplex argentea ssp. *mohavensis* Mojave silver scale
Atriplex coronata* var. *notatior **San Jacinto Valley crownscale**
*Atriplex suberecta** small saltbush
Bassia hyssopifolia five-hook bassia
*Beta vulgaris** garden beet
*Chenopodium album** lamb's quarters
Kochia scoparia *Summer cypress*
Monolepis nuttalliana Nuttall's monolepis
Salicornia subterminales Parish's pickleweed
*Salsola tragus** Russian thistle
Suaeda moquinii bush seepweed
CONVOLVULACEAE - MORNING-GLORY FAMILY
Calystegia macrostegia morning-glory
Cressa truxillensis alkali weed
CRASSULACEAE - STONECROP FAMILY
Crassula connata pigmy-weed
EUPHORBIACEAE - SPURGE FAMILY
Croton californicus California croton
Eremocarpus setigerus doveweed/turkey mullein
*Ricinus communis** castor bean
FABACEAE (LEGUMINOSAE) - LEGUME FAMILY
Lotus scoparius deerweed/California broom
Lupinus bicolor miniature lupine

PLANT COMPENDIUM
(Continued)

Plants
*Medicago polymorpha**   California burclover
*Melilotus indica**   sourclover
FRANKENIACEAE - ALKALI HEATH FAMILY
Frankenia salina   alkali heath
GERANIACEAE - GERANIUM FAMILY
*Erodium cicutarium**   red-stemmed filaree
HYDROPHYLLACEAE - WATERLEAF FAMILY
Eucrypta chrysanthemifolia   common eucrypta
Eriodictyon crassifolium   thick-leaf yerba santa
Phacelia cicutaria   caterpillar phacelia
LAMIACEAE (LABIATAE) - MINT FAMILY
*Marrubium vulgare**   common horehound
Salvia apiana   white sage
Salvia columbariae   chia
LOASACEAE - STICK-LEAF FAMILY
Mentzelia laevicaulis   stick-leaf
LYTHRACEAE - LOOSESTRIFE FAMILY
*Lythrum hyssopifolium**   grass poly
MALVACEAE - MALLOW FAMILY
Malacothamnus fasciculatus   chaparral bushmallow
*Malva parviflora**   cheeseweed
Malvella leprosa   alkali mallow
MYRTACEAE - MYRTLE FAMILY
*Eucalyptus camaldulensis**   river red gum
NYCTAGINACEAE - FOUR-O'CLOCK FAMILY
Abronia villosa* var. *aurita   **chaparral sand-verbena**
OLEACEAE - OLIVE FAMILY
*Olea europaea**   olive

PLANT COMPENDIUM
(Continued)

Plants
ONAGRACEAE - EVENING PRIMROSE FAMILY
Camissonia californica mustard-like evening primrose
Camissonia campestris ssp. *campestris* sun cups
PLATANACEAE - SYCAMORE FAMILY
Platanus racemosa western sycamore
PLANTAGINACEAE - PLANTAIN FAMILY
Plantago elongata California alkali plantain
PLUMBAGINACEAE - LEADWORT FAMILY
*Limonium sinuatum** winged sea-lavender
POLYGONACEAE - BUCKWHEAT FAMILY
Eriogonum fasciculatum var. *foliolosum* interior flat-topped buckwheat
*Polygonum arenastrum** common knotweed
*Polygonum argyrocoleon** Persian knotweed
*Rumex crispus** curly dock
Rumex maritimus golden dock
ROSACEAE - ROSE FAMILY
Adenostoma fasciculatum chamise
Rosa californica California wild rose
Rubus ursinus California blackberry
SALICACEAE - WILLOW FAMILY
Populus fremontii ssp. *fremontii* Fremont cottonwood
Salix gooddingii black willow
SCROPHULARIACEAE - FIGWORT FAMILY
Mimulus guttatus seep monkeyflower
Veronica peregrina ssp. *xalapensis* purslane speedwell
SOLANACEAE - NIGHTSHADE FAMILY
Datura wrightii jimson weed
*Nicotiana glauca** tree tobacco

PLANT COMPENDIUM
(Continued)

Plants
Nicotiana quadrivalvis Wallace's tobacco
CLASS MONOCOTYLEDONES (MONOCOTS)
ARECACEAE (PALMAE) - PALM FAMILY
*Phoenix canariensis** Canary Island date palm
*Washingtonia robusta** Mexican fan palm
CYPERACEAE - SEDGE FAMILY
Eleocharis macrostachya perennial spike rush
Scirpus californicus California bulrush
POACEAE [GRAMINEAE] - GRASS FAMILY
*Avena fatua** wild oat
*Bromus diandrus** ripgut grass
Bromus inermis ssp. *inermis** smooth brome
Bromus madritensis ssp. *rubens** foxtail chess
*Bromus tectorum** cheat grass
*Crypsis schoenoides** swamp timothy
Distichlis spicata salt grass
Hordeum intercedens **vernal barley**
Hordeum marinum var. *gussoneanum** Mediterranean barley
Hordeum murinum var. *leporinum** foxtail barley
*Hordeum vulgare** cultivated barley
*Lamarckia aurea** goldentop grass
*Lolium perenne** perennial ryegrass
*Phalaris minor** little-seed canary grass
*Phalaris paradoxa** paradox canary grass
*Polypogon monspeliensis** annual beard grass
*Schismus barbatus** Mediterranean schismus
*Triticum aestivum** cereal wheat

PLANT COMPENDIUM
(Continued)

Plants
*Vulpia myuros**   foxtail fescue
TYPHACEAE - CATTAIL FAMILY
Typha domingensis   southern cattail
** introduced species*

A-2
WILDLIFE COMPENDIUM

Wildlife
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
Uta stansburiana side-blotched lizard
Birds
PHASIANIDAE - PHEASANTS & UPLAND GAME BIRDS
Gallus gallus domesticus * domestic fowl
Pavo cristatus * common peafowl
ODONTOPHORIDAE - QUAILS
Callipepla californica California quail
ARDEIDAE - HERONS
Ardea alba great egret
THRESKIORNITHIDAE - IBIS
Plegadis chihi white-faced ibis
ACCIPITRIDAE - HAWKS
Accipiter cooperii Cooper's hawk
Buteo jamaicensis red-tailed hawk
FALCONIDAE - FALCONS
Falco sparverius American kestrel
CHARADRIIDAE - PLOVERS
Charadrius vociferus killdeer
SCOLOPACIDAE - SANDPIPERS & PHALAROPES
Numenius americanus long-billed curlew
Limnodromus sp. unknown dowitcher
COLUMBIDAE - PIGEONS & DOVES
Columba livia * rock pigeon
Patagioenas fasciata band-tailed pigeon
Zenaida macroura mourning dove
TROCHILIDAE - HUMMINGBIRDS
Calypte anna Anna's hummingbird

WILDLIFE COMPENDIUM
(Continued)

Wildlife
TYRANNIDAE - TYRANT FLYCATCHERS
Sayornis nigricans black phoebe
Sayornis saya Say's phoebe
Tyrannus vociferans Cassin's kingbird
Tyrannus verticalis western kingbird
LANIIDAE - SHRIKES
Lanius ludovicianus loggerhead shrike
CORVIDAE - JAYS & CROWS
Corvus brachyrhynchos American crow
Corvus corax common raven
ALAUDIDAE - LARKS
Eremophila alpestris horned lark
HIRUNDINIDAE - SWALLOWS
Petrochelidon pyrrhonota cliff swallow
Hirundo rustica barn swallow
AEGITHALIDAE - BUSHTITS
Psaltriparus minimus bushtit
TROGLODYTIDAE - WRENS
Troglodytes aedon house wren
MIMIDAE - THRASHERS
Mimus polyglottos northern mockingbird
STURNIDAE - STARLINGS
Sturnus vulgaris * European starling
EMBERIZIDAE - SPARROWS & JUNCOS
Chondestes grammacus lark sparrow
ICTERIDAE - BLACKBIRDS
Agelaius phoeniceus red-winged blackbird
Sturnella neglecta western meadowlark
Euphagus cyanocephalus Brewer's blackbird
Molothrus ater brown-headed cowbird

WILDLIFE COMPENDIUM
(Continued)

Wildlife
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Carduelis psaltria lesser goldfinch
Carduelis tristis American goldfinch
PASSERIDAE - OLD WORLD SPARROWS
Passer domesticus house sparrow *
Mammals
LEPORIDAE - HARES & RABBITS
Sylvilagus audubonii desert cottontail
Lepus californicus black-tailed jackrabbit
SCIURIDAE - SQUIRRELS
Spermophilus beecheyi California ground squirrel
GEOMYIDAE - POCKET GOPHERS
Thomomys bottae Botta's pocket gopher
CANIDAE - WOLVES & FOXES
Canis latrans coyote
*Canis lupus familiaris** domestic dog
FELIDAE - CATS
*Felis catus** domestic cat
EQUIDAE - HORSES, DONKEYS & ZEBRAS
*Equus ferus caballus** horse
BOVIDAE - CLOVEN-HOOFED MAMMALS
*Capra aegagrus hircus** domestic goat
* introduced species

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June 17, 2010

Mr. Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, G01, Quad 3A
Rosemead, California 91770

VIA EMAIL
andrew.keller@sce.com

Subject: Results of Western Burrowing Owl Surveys for the Lakeview Substation in the Cities of Lakeview and Nuevo and unincorporated Riverside County, California

Dear Mr. Keller:

This Letter Report presents the results of focused surveys for the western burrowing owl (*Athene cunicularia*) conducted during the species' nesting period (March 1 to August 31) on the Lakeview Substation Project Site located in the Cities of Lakeview and Nuevo and unincorporated Riverside County, California (Exhibit 1). The purpose of the survey was to determine the presence or absence of the western burrowing owl on the project site. The project site includes an approximate 40-mile alignment and a 50-foot buffer on either side of the alignment and proposed substation sites (Exhibit 2). The survey was completed in accordance with guidelines provided in the California Burrowing Owl Consortium (CBOC) survey protocol for this species (CBOC 1993) and in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP).

Project Location and Description

The project site consists of approximately 606 acres and 40 miles of alignment. It is located on the U.S. Geological Survey's (USGS) Perris, Lakeview, and El Casco 7.5-minute quadrangles for the State of California. The northern half of the project site falls within the San Jacinto, Nuevo y Potrero Land Grant and is outside of the public land survey system. The southern half of the project site is located within Sections 10, 11, 14, and 15 of Township 3S, Range 3W. It should be noted that the alignment is currently much smaller than that which was surveyed in 2009 for the western burrowing owl.

In general, the project site is bounded by the intersection of Davis Street and West Contour Road on the north, State Highway 74/Pinacate Road on the south, the intersection of Menifee Road and Nuevo Road on the west, and the intersection of Juniper Flats Road and Sanwood Road on the east (Exhibit 2).

The project site includes multiple land uses and habitat types, including developed areas, Riversidean sage scrub, active and fallow agriculture, California annual grassland, and riparian habitat. Topography on the project site is generally flat or gradually sloping with a few low hills. Elevations within the project site range from 1,470 to 1,630 feet above mean sea level (msl). Several drainages cross the project site. Surrounding land uses include residential subdivisions, commercial development, public facilities, and open space.

Background

The western burrowing owl is a grassland specialist distributed throughout western North America, where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. Burrowing owls use a wide variety of arid and semi-arid environments with well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground (Haug and Didiuk 1993, Dechant et al. 2003). Burrowing owls in Florida excavate their own burrows, but western burrowing owls are dependent upon the presence of burrowing mammals such as ground squirrels whose burrows are used for roosting and nesting (Haug and Didiuk 1993). The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities such as buried and non-functioning drain pipes, stand-pipes, and dry culverts. Burrowing mammals may burrow beneath rocks; debris; or large, heavy objects such as abandoned cars, concrete blocks, or concrete pads. Large, hard objects at burrow entrances stabilize the entrance from collapse, and may inhibit excavation by predators.

Burrowing owls often use “satellite” or non-nesting burrows, moving chicks into them from the nesting burrow, presumably to reduce the risk of predation (Desmond and Savidge 1998) and possibly to avoid nest parasites (Dechant et al. 2003). One pair may use up to ten satellite burrows (James and Seabloom 1968). Individual burrowing owls have a moderate to high site fidelity to previously used burrow complexes, often using the same burrows for nesting year after year.

The western burrowing owl was once abundant and widely distributed within coastal Southern California, but it has declined precipitously in Los Angeles, Orange, San Diego, Riverside, and San Bernardino Counties. A recent petition was submitted to list the California population of the western burrowing owl as an Endangered or Threatened species (CBD et al. 2003). The California Department of Fish and Game (CDFG) declined to list the burrowing owl as either Threatened or Endangered due to its distribution statewide. However, the CDFG considers the burrowing owl to be a California Species of Special Concern (CDFG 2009).

The burrowing owl is known to occur historically within areas of the San Jacinto Wildlife Area and along the road leading to it (i.e., Davis Road, Segment D; Exhibit 2). One historic location occurs one-half mile north of the intersection between Ramona Expressway and Davis Road and two historic locations occur approximately two miles north of the same intersection.

Survey Methodology

Surveys within the project site followed a methodology based on the Burrowing Owl Survey Instructions for the Western Riverside County MSHCP (County of Riverside 2006). The Western Riverside County MSHCP survey instructions are the most current protocol described for the species. The guidelines outline a survey methodology that has been officially approved by the CDFG and the U.S. Fish and Wildlife Service (USFWS). Surveys for the burrowing owl are conducted during the breeding season, which extends from March 1 to August 31. These surveys are done in three phases: (1) habitat assessment; (2) burrow surveys; and (3) focused owl surveys.

Habitat Assessment

The first step, habitat assessment, identifies whether the project site provides potential habitat for the species. This determination is made by a Biologist that is knowledgeable in burrowing

owl habitat, ecology, and identification. The Biologist conducts the assessment by walking the project site (which should include land within an approximate 500-foot buffer area, if it is accessible) to visually inspect the project site and assess its potential for burrowing owls. BonTerra Consulting Biological Resources Manager Marc Blain conducted a habitat assessment in winter 2009. Mr. Blain conducted the assessment by walking and/or driving the project site to visually inspect the study area and assess its potential for burrowing owls.

Burrow Survey

The second step, burrow survey, identifies suitable burrow(s) and location(s) of occupied burrow(s). A Biologist (with the qualifications identified in the first step) conducts the burrow survey by walking through suitable habitat within the project site via transects no more than approximately 100 feet apart in order to ensure 100 percent visual coverage of the ground surface. If no potentially active burrows are detected, then no focused owl surveys are required. BonTerra Consulting Biologist Kimberly Oldehoeft conducted burrow surveys on May 19, June 29, July 3, and August 11, 2009. Ms. Oldehoeft walked transects at regularly spaced intervals to achieve 100 percent visual coverage of all potential habitat within the project site. Any natural or man-made cavities large enough to allow a burrowing owl to enter were inspected for evidence of occupation. Evidence of occupation may include prey remains, cast pellets, white-wash, feathers, and observations of owls adjacent to burrows. The burrow survey was not conducted within five days of rain, which could have washed away potential sign. Survey times and weather conditions are summarized in Table 1 below.

TABLE 1
SURVEY DATA

Visit / Area[a]	Date	Time	Weather	Wind (mph)	Temperature (°F)	Results
Burrow Survey 1	May 19, 2009	0800-1700	Clear to 75% cover	3–16	71–91	No owls observed
Burrow Survey 2	June 29, 2009	0800-1700	Clear to 95% cover	0–18	77–96	No owls observed
Burrow Survey 3	July 3, 2009	0800-1700	Clear to 50% cover	0–16	68–93	No owls observed
Crepuscular Survey 1; Areas 1–2	July 10, 2009	0545-0745	10% to 20% cover	0–3	58–70	No owls observed
Crepuscular Survey 1; Areas 3–6	July 13, 2009	1800-2000	Clear	8–15	92–88	No owls observed
Crepuscular Survey 2; Areas 1–2	July 14, 2009	0545-0745	Clear to 5% cover	0	60–75	No owls observed
Crepuscular Survey 2; Areas 3–6	July 14, 2009	1800-2000	Clear	10–15	80–90	No owls observed
Crepuscular Survey 3; Areas 3–5	July 15, 2009	0545-0745	Clear	0	60–75	No owls observed
Crepuscular Survey 3; Areas 1–2 & 6	July 15, 2009	1800-2000	Clear to 5% cover	7–10	80–90	No owls observed
Crepuscular Survey 4; Areas 3–6	July 16, 2009	0545-0745	Clear	0–5	62–75	No owls observed
Crepuscular Survey 4; Areas 1–2	July 16, 2009	1800-2000	Clear to 10% cover	10–13	85–92	No owls observed
Burrow Survey 4	August 11, 2009	0800-1430	Clear	0–3	62–90	No owls observed
Crepuscular Survey 1; Area 7	August 11, 2009	1730-1930	Clear	7–12	80–88	No owls observed

TABLE 1 (Continued)
SURVEY RESULTS

Visit / Area[a]	Date	Time	Weather	Wind (mph)	Temperature (°F)	Results
Crepuscular Survey 1; Area 8–9	August 17, 2009	1730-1830	Clear	11–12	80–87	No owls observed
Crepuscular Survey 2; Area 7	August 17, 2009	1830-2000	Clear	10–12	72–80	No owls observed
Crepuscular Survey 2; Area 8–9	August 18, 2009	1800-1900	Clear	11–13	80–85	No owls observed
Crepuscular Survey 3; Area 7	August 18, 2009	1900-2000	Clear	5–11	73–85	No owls observed
Crepuscular Survey 3; Area 8–9	August 26, 2009	1800-1900	Clear	12–15	85–95	No owls observed
Crepuscular Survey 4; Area 7	August 26, 2009	1900-2000	Clear	11–12	70–85	No owls observed
Crepuscular Survey 4; Area 8–9	August 31, 2009	1900-2000	10% cover	6–10	82–95	No owls observed

[a] Area numbers refer to portions of the alignment as described in Exhibits 3A to 3K.

Focused Burrowing Owl Surveys

If owls or potentially-occupied burrows or cavities are located during the burrow survey, then crepuscular (dawn or dusk) focused burrowing owl surveys are required. Focused surveys were conducted within several portions of the project site where burrowing owls had a potential to occur based on the results of the habitat assessment and burrow survey. These surveys were conducted from either one hour before sunrise to two hours after, or from two hours before sunset to one hour after. These surveys are conducted only with sufficient light to follow burrowing owl flights. Focused crepuscular surveys were conducted by Ms. Oldehoeft on July 10, 13, 14, 15, 16, August 11, 17, 18, 26, and 31, 2009. All potential habitat within the project site was surveyed to achieve 100 percent visual coverage of the area (Exhibits 3A to 3K). Binoculars were used to inspect holes, crevices, and potential perches such as rocks, fence posts, and other elevated structures for the presence of owls while listening for owl calls.

Survey Results

Burrows suitable for burrowing owl occupation were observed in nine areas (Areas 1 to 9) throughout the project site (Exhibits 3A to 3K). These areas supported multiple California ground squirrel (*Spermophilus beecheyi*) burrows, crevices between boulders, or construction debris. No burrowing owls or owl sign (i.e., cast pellets, white-wash, feathers, or prey remains) were observed within the project site during focused burrowing owl surveys. A complete list of all wildlife species observed during the surveys is provided in Appendix A of this Letter Report.

Recommendations

The County of Riverside requires pre-construction surveys prior to any ground disturbance for development on the project site. As stated in the County of Riverside's Burrowing Owl Survey Instructions, "All project sites containing burrows or suitable habitat… require pre-construction surveys that shall be conducted within 30 days prior to ground disturbance to avoid direct take of burrowing owls" (County of Riverside 2006). Pre-construction surveys can be conducted at any time of year. Because the project site appears to be suitable for occupation by the burrowing owl, a pre-construction survey conducted during any time of year has a high

likelihood of locating burrowing owls if present on the project site. Results of the pre-construction burrowing owl surveys will be reported to the County of Riverside. If no active burrowing owl burrows or burrowing owl individuals are observed, grading can proceed. If active burrows are observed, consultation with the County will be required.

Thank you for the opportunity to prepare this Letter Report. If you have any questions or comments, please contact Jeff Crain or Kim Oldehoeft at (714) 444-9199.

Sincerely,

BONTERRA CONSULTING

Jeffrey S. Crain
Project Manager

Exhibit 1: Regional Location
Exhibit 2: Local Vicinity
Exhibits 3A to 3K: Survey Areas

Appendix A: Wildlife Species Observed

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References

California Burrowing Owl Consortium (CBOC). 1993. *Burrowing Owl Survey Protocol and Mitigation Guidelines*. Alviso, CA: CBOC. http://www.dfg.ca.gov/hcpb/species/stds_gdl/bird_sg/boconsortium.pdf.

California Department of Fish and Game (CDFG). 2009 (July). *Special Animals.* Sacramento, CA: CDFG, Natural Heritage Division.

Center for Biological Diversity, Defenders of Wildlife, California State Park Rangers Association, Santa Clara Valley Audubon Society, San Bernardino Valley Audubon Society, and Tri-county Conservation League (CBD et al.). 2003 (April 7). *Petition to the State of California Fish and Game Commission and Supporting Information for Listing the California Population of the Western Burrowing Owl (*Athene cunicularia hypugaea*) as an Endangered or Threatened Species under the California Endangered Species Act.* Oakland, CA: Center for Biological Diversity et al. http://www.biologicaldiversity.org/swcbd/species/b-owl/petition.pdf.

Dechant, J.A., M.L. Sondreal, D.H. Johnson, L.D. Igl, C.M. Goldade, P.A. Rabie, and B.R. Euliss (Dechant et al.). 2003. Effects of Management Practices on Grassland Birds: Burrowing Owl. Jamestown, ND: Northern Prairie Wildlife Research Center. http://www.npwrc.usgs.gov/ resource/literatr/grasbird/buow/buow.htm.

Desmond, M.J. and J.A. Savidge. 1998. Burrowing Owl Conservation in the Great Plains (page 9). Abstracts of the Second International Burrowing Owl Symposium. Ogden, Utah.

Dudek and Associates, Inc. (Dudek). 2003. Western Riverside County Multiple Species Habitat Conservation Plan (Prepared for the Riverside County Integrated Project). Encinitas, CA: Dudek. http://www.wrc-rca.org/Permits_Docs.html.

Haug, E.A. and A.B. Didiuk. 1993. Use of Recorded Calls to Detect Burrowing Owls. *Journal of Field Ornithology.* 64(2): 188–194. Lawrence, KS: Allen Press, Inc.

James, T.R. and R.W. Seabloom. 1968. Notes on the Burrow Ecology and Food Habits of the Burrowing Owl in Southwestern North Dakota. *Blue Jay*. 26: 83–84.

Riverside, County of. 2006 (as amended). *Burrowing Owl Survey Instructions for the Western Riverside Multiple Species Habitat Conservation Plan Area.* Riverside, CA: the County. http://www.tlma.co.riverside.ca.us/epd/documents/Burrowing_Owl_Survey_Instructions.pdf.

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Regional Location

Exhibit 1

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N W E S

10 5 0 10 Miles

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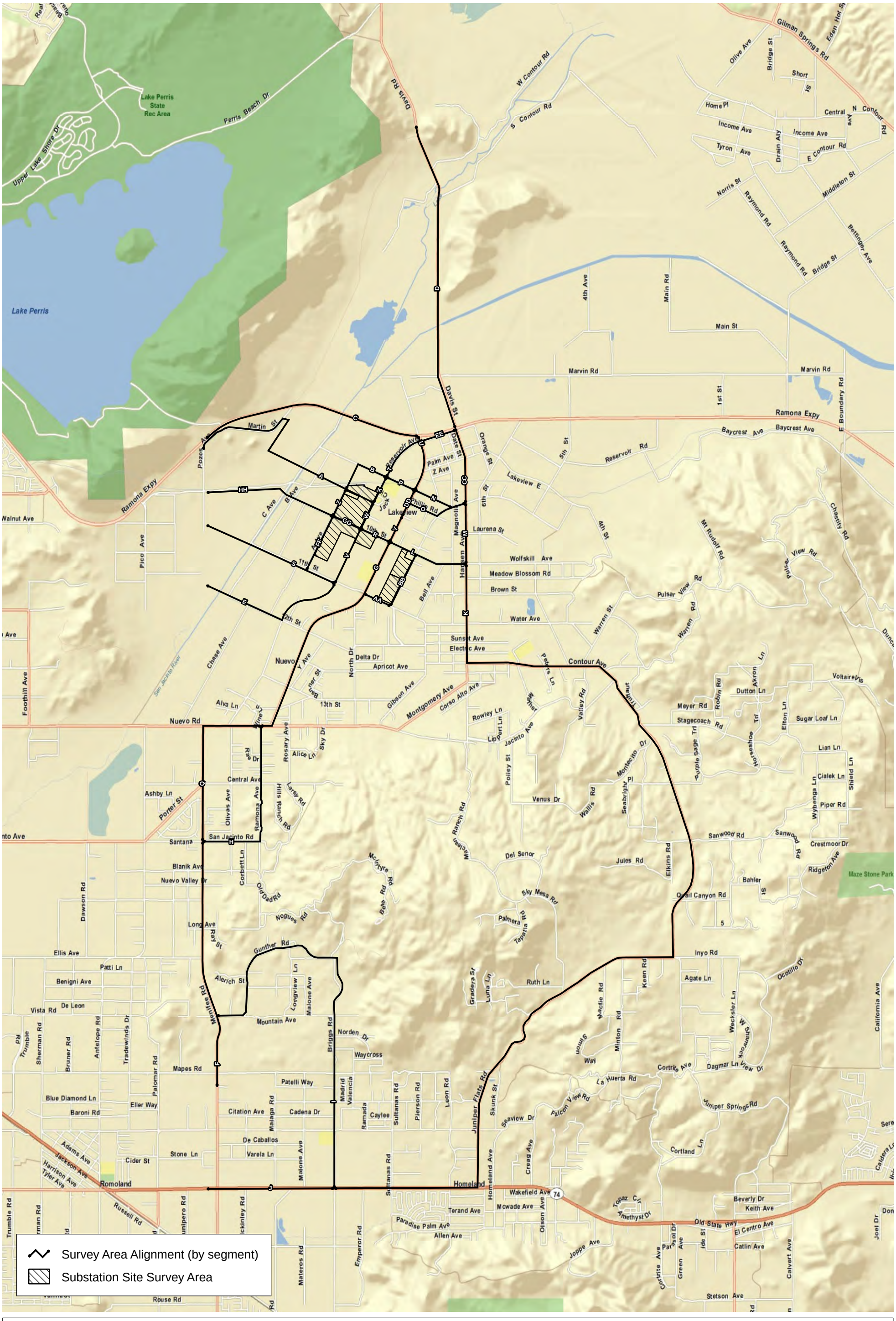

Local Vicinity

Exhibit 2

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N W E S

4,000 2,000 0 4,000 Feet

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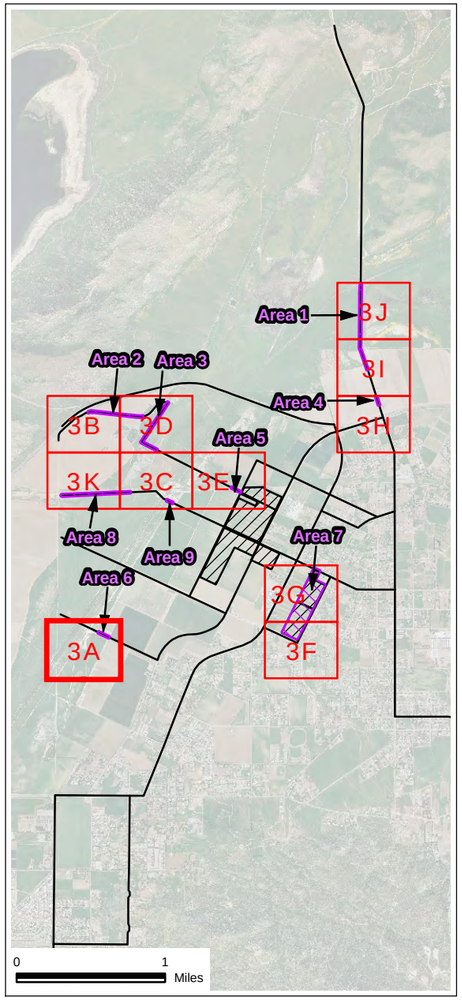

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 A

Focused Burrowing Owl Surveys 2009, Lakeview Substation

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W E
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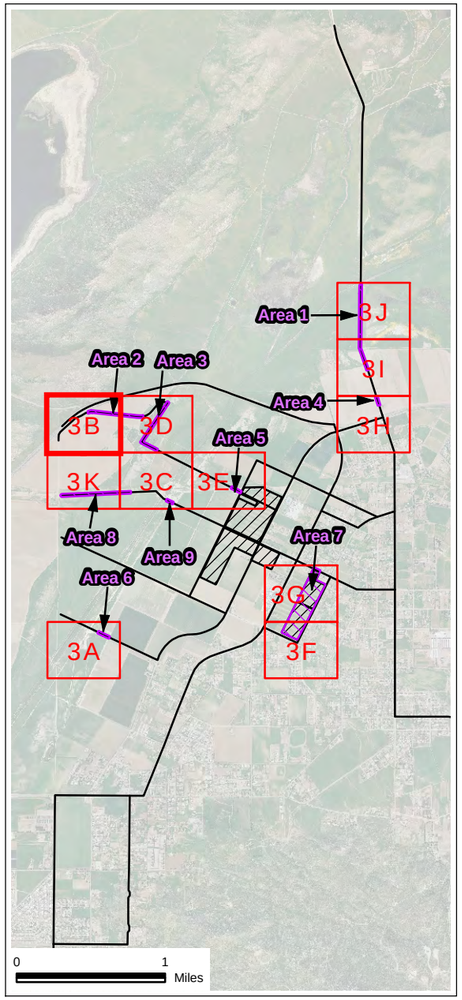

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 B

Focused Burrowing Owl Surveys 2009, Lakeview Substation

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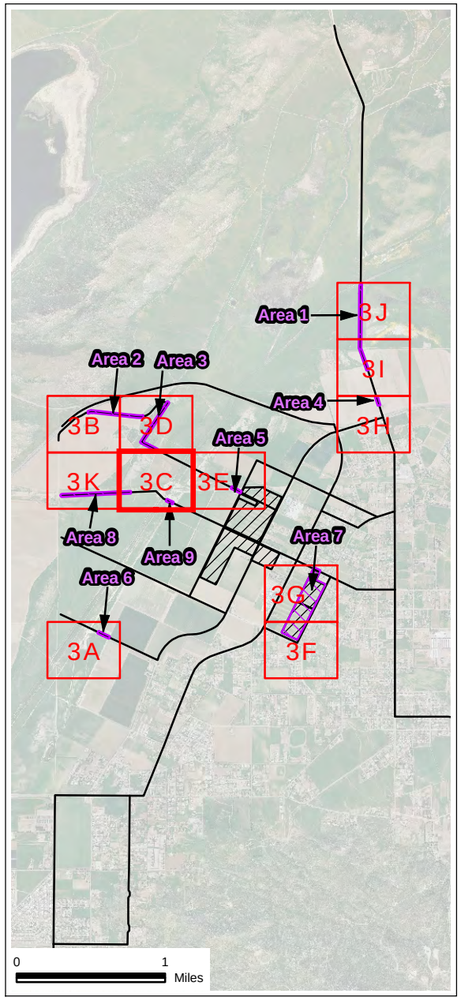

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 C

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
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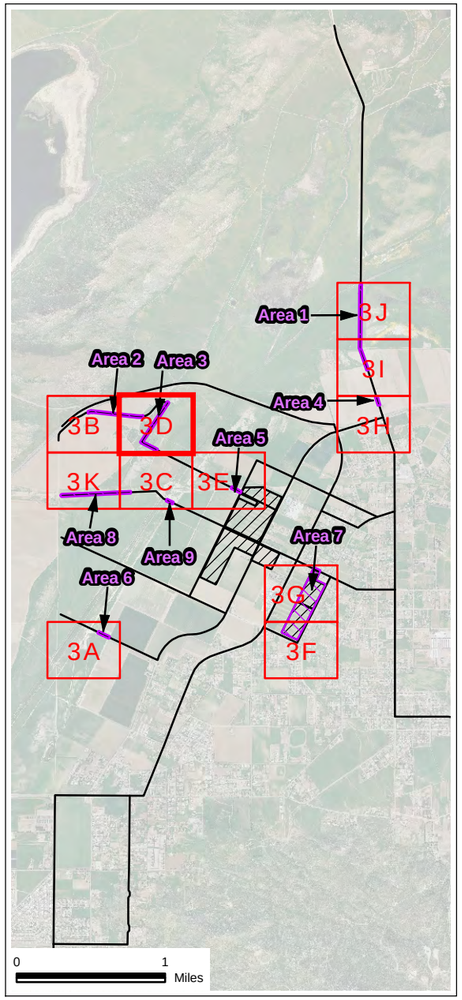

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 D

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
S

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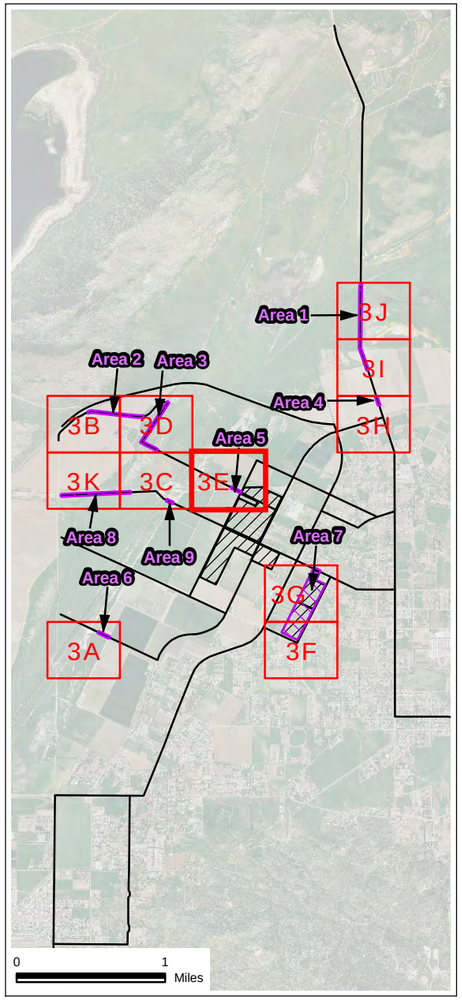

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 E

Focused Burrowing Owl Surveys 2009, Lakeview Substation

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W E
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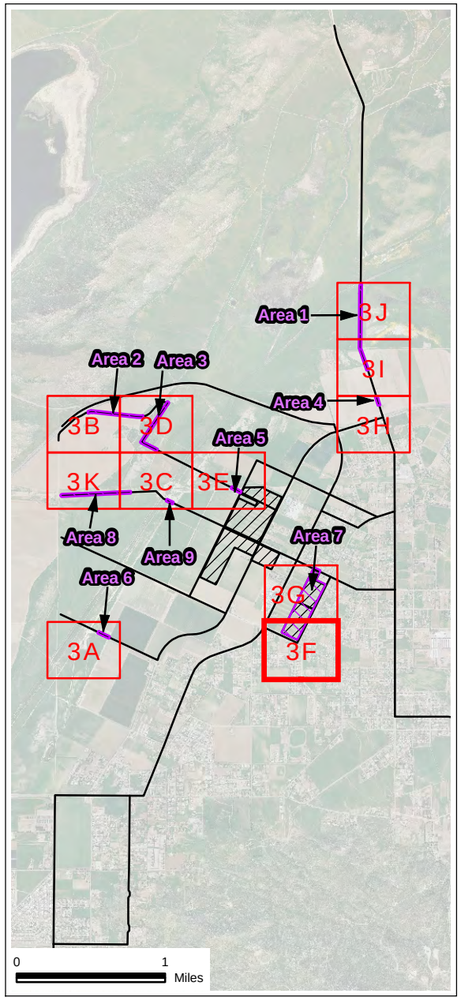

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 F

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
S

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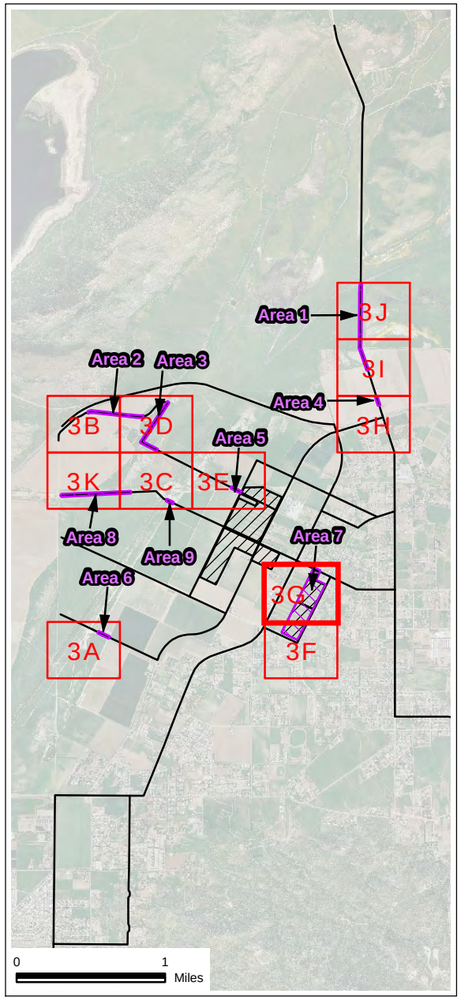

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas — Exhibit 3 G

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N W E S

0 200 Feet

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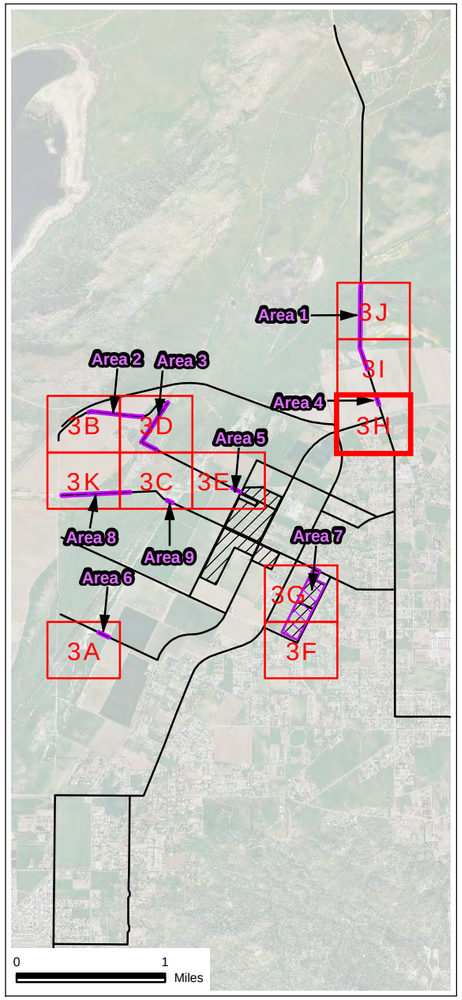

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 H

Focused Burrowing Owl Surveys 2009, Lakeview Substation

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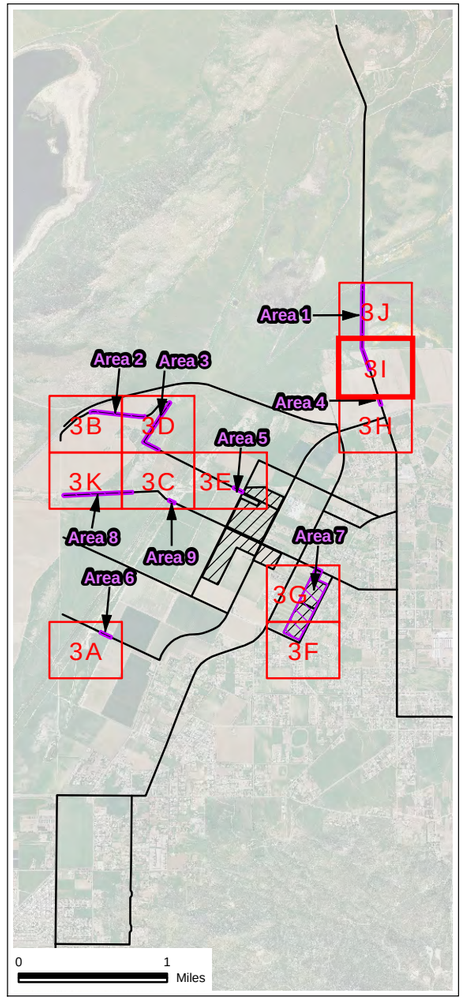

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 I

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
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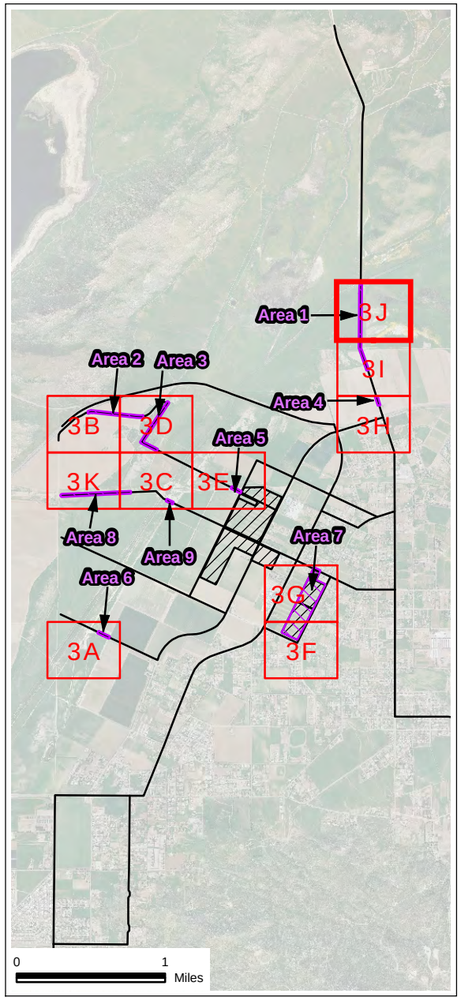

Segment Line Route

Crepuscular Survey Areas

Study Area

Survey Areas

Exhibit 3 J

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
S

0 200 Feet

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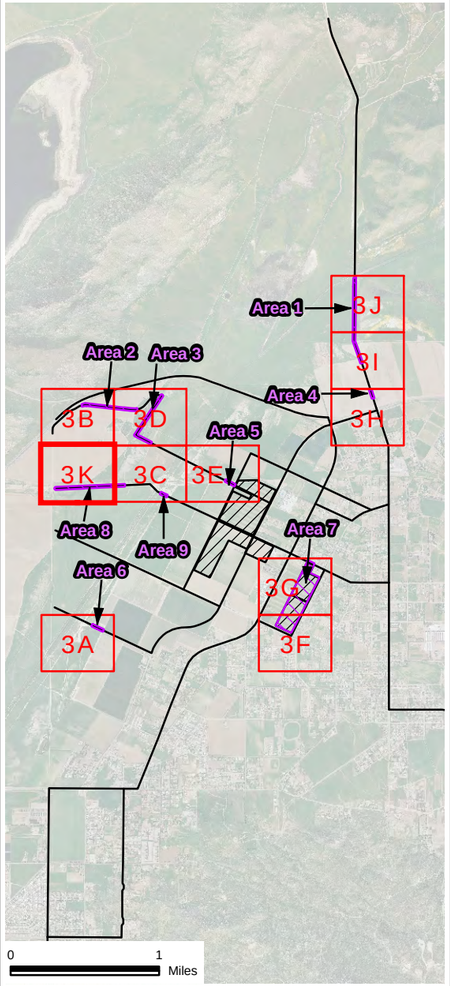

Segment Line Route

Crepuscular Survey Areas

Study Area

Source: Aerials Express, 2008

Survey Areas

Exhibit 3 K

Focused Burrowing Owl Surveys 2009, Lakeview Substation

N
W E
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0 200 Feet

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APPENDIX A

WILDLIFE SPECIES OBSERVED DURING BURROWING OWL SURVEYS

WILDLIFE SPECIES OBSERVED

Species
Reptiles
PHRYNOSOMATIDAE - ZEBRA-TAILED, FRINGE-TOED, SPINY, TREE, SIDE-BLOTCHED, AND HORNED LIZARDS
Uta stansburiana side-blotched lizard
Birds
PHASIANIDAE - PHEASANTS & UPLAND GAME BIRDS
Gallus gallus domesticus * domestic fowl
Pavo cristatus * common peafowl
ODONTOPHORIDAE - QUAILS
Callipepla californica California quail
ARDEIDAE - HERONS
Ardea alba great egret
THRESKIORNITHIDAE - IBIS
Plegadis chihi white-faced ibis
ACCIPITRIDAE - HAWKS
Accipiter cooperii Cooper's hawk
Buteo jamaicensis red-tailed hawk
Circus cyaneus northern harrier
FALCONIDAE - FALCONS
Falco sparverius American kestrel
CHARADRIIDAE - PLOVERS
Charadrius vociferus killdeer
SCOLOPACIDAE - SANDPIPERS & PHALAROPES
Numenius americanus long-billed curlew
Limnodromus sp. unknown dowitcher
COLUMBIDAE - PIGEONS & DOVES
Columba livia * rock pigeon
Patagioenas fasciata band-tailed pigeon
Zenaida macroura mourning dove
TROCHILIDAE - HUMMINGBIRDS
Calypte anna Anna's hummingbird

WILDLIFE SPECIES OBSERVED

Species
TYRANNIDAE - TYRANT FLYCATCHERS
Sayornis nigricans black phoebe
Sayornis saya Say's phoebe
Tyrannus vociferans Cassin's kingbird
Tyrannus verticalis western kingbird
LANIIDAE - SHRIKES
Lanius ludovicianus loggerhead shrike
CORVIDAE - JAYS & CROWS
Corvus brachyrhynchos American crow
Corvus corax common raven
ALAUDIDAE - LARKS
Eremophila alpestris horned lark
HIRUNDINIDAE - SWALLOWS
Petrochelidon pyrrhonota cliff swallow
Hirundo rustica barn swallow
AEGITHALIDAE - BUSHTITS
Psaltriparus minimus bushtit
TROGLODYTIDAE - WRENS
Troglodytes aedon house wren
MIMIDAE - THRASHERS
Mimus polyglottos northern mockingbird
STURNIDAE - STARLINGS
Sturnus vulgaris * European starling
EMBERIZIDAE - SPARROWS & JUNCOS
Chondestes grammacus lark sparrow
ICTERIDAE - BLACKBIRDS
Agelaius phoeniceus red-winged blackbird
Sturnella neglecta western meadowlark
Euphagus cyanocephalus Brewer's blackbird
Molothrus ater brown-headed cowbird

WILDLIFE SPECIES OBSERVED

Species
FRINGILLIDAE - FINCHES
Carpodacus mexicanus house finch
Carduelis psaltria lesser goldfinch
Carduelis tristis American goldfinch
PASSERIDAE - OLD WORLD SPARROWS
Passer domesticus house sparrow *
Mammals
LEPORIDAE - HARES & RABBITS
Sylvilagus audubonii desert cottontail
Lepus californicus black-tailed jackrabbit
SCIURIDAE - SQUIRRELS
Spermophilus beecheyi California ground squirrel
GEOMYIDAE - POCKET GOPHERS
Thomomys bottae Botta's pocket gopher
CANIDAE - WOLVES & FOXES
Canis latrans coyote
*Canis lupus familiaris** domestic dog
FELIDAE - CATS
*Felis catus** domestic cat
EQUIDAE - HORSES, DONKEYS & ZEBRAS
*Equus ferus caballus** horse
BOVIDAE - CLOVEN-HOOFED MAMMALS
*Capra aegagrus hircus** domestic goat
* introduced species

BonTerra CONSULTING

PASADENA COSTA MESA

T: (714) 444-9199 F: (714) 444-9599 | 151 Kalmus Drive, Suite E-200
www.BonTerraConsulting.com | Costa Mesa, CA 92626

October 13, 2011

Andrew Keller
Southern California Edison
2244 Walnut Grove Avenue, GO3
Rosemead, California 91770

VIA EMAIL
Andrew.Keller@sce.com

Subject: Results of a habitat assessment and trapping survey for three target sensitive small mammals, including: the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR); the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) (SKR); and the California sensitive (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM), along the proposed alignments for the SCE Lakeview Substation and Transmission Line Project, in the Lakeview area of Riverside County, California

Dear Mr. Keller:

This attached Letter Report provides the results of the 2011 trapping survey for three target sensitive small mammals, including: the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR); the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) (SKR); and the California sensitive (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM) conducted by Consulting Biologists Stephen J. Montgomery (TE745541-10) and Dr. Phil Brylski (TE148555-0) for the Lakeview Substation and Transmission Line Project (hereafter referred to as "Project site") in Riverside, California. The Project site is located on the U.S. Geological Survey's (USGS's) Perris, Lakeview, Romoland, Winchester, Sunnymead, and El Casco 7.5-minute quadrangle maps. The Project site is bordered by the Ramona Expressway to the north, Lakeview Avenue to the east, 12th Street to the south, and the Valley-Moval Subtransmission Line to the west. Additionally, the Proposed Telecommunications Route runs from the Moval Substation (on Moreno Beach Drive in the City of Moreno Valley) to Brodiaea Avenue, along Brodiaea Avenue to the east, and then south along the foot of the Bernasconi Hills to the Ramona Expressway. The methods and results of the surveys are discussed in the Letter Report attached. Trapping was conducted only in the section of the project South of Romona Expressway, as numerous previous studies had confirmed the presence of SKR and LAPM in the area to the north of Romona Expressway.

Results

A total of nine SKR and twelve LAPM were captured during the trapping survey. If you have any questions, please feel free to call Jeff Crain at 714-444-9199.

Sincerely,

BONTERRA CONSULTING

Jeffrey S. Crain
Senior Botanist

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ATTACHMENT A

Results of a habitat assessment and trapping survey for three target sensitive small mammals, including, the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR); the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) (SKR); and the California sensitive (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM), along the proposed alignments for the SCE Lakeview Substation and Transmission Line Project, in the Lakeview area of Riverside County, California, and for the installation of fiber optic telecommunication lines in the area of the San Jacinto Wildlife Area, Riverside County, California

SJM BIOLOGICAL CONSULTANTS

8 July 2011 SJMBC.812

Jeff Crain
BonTerra Consulting
151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626
(714) 444-9199

SUBJECT: Results of a habitat assessment and trapping survey for three target sensitive small mammals, including, the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR); the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) (SKR); and the California sensitive (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM), along the proposed alignments for the SCE Lakeview Substation and Transmission Line Project, in the Lakeview area of Riverside County, California, and for the installation of fiber optic telecommunication lines in the area of the San Jacinto Wildlife Area, Riverside County, California (Figures 1 and 2).

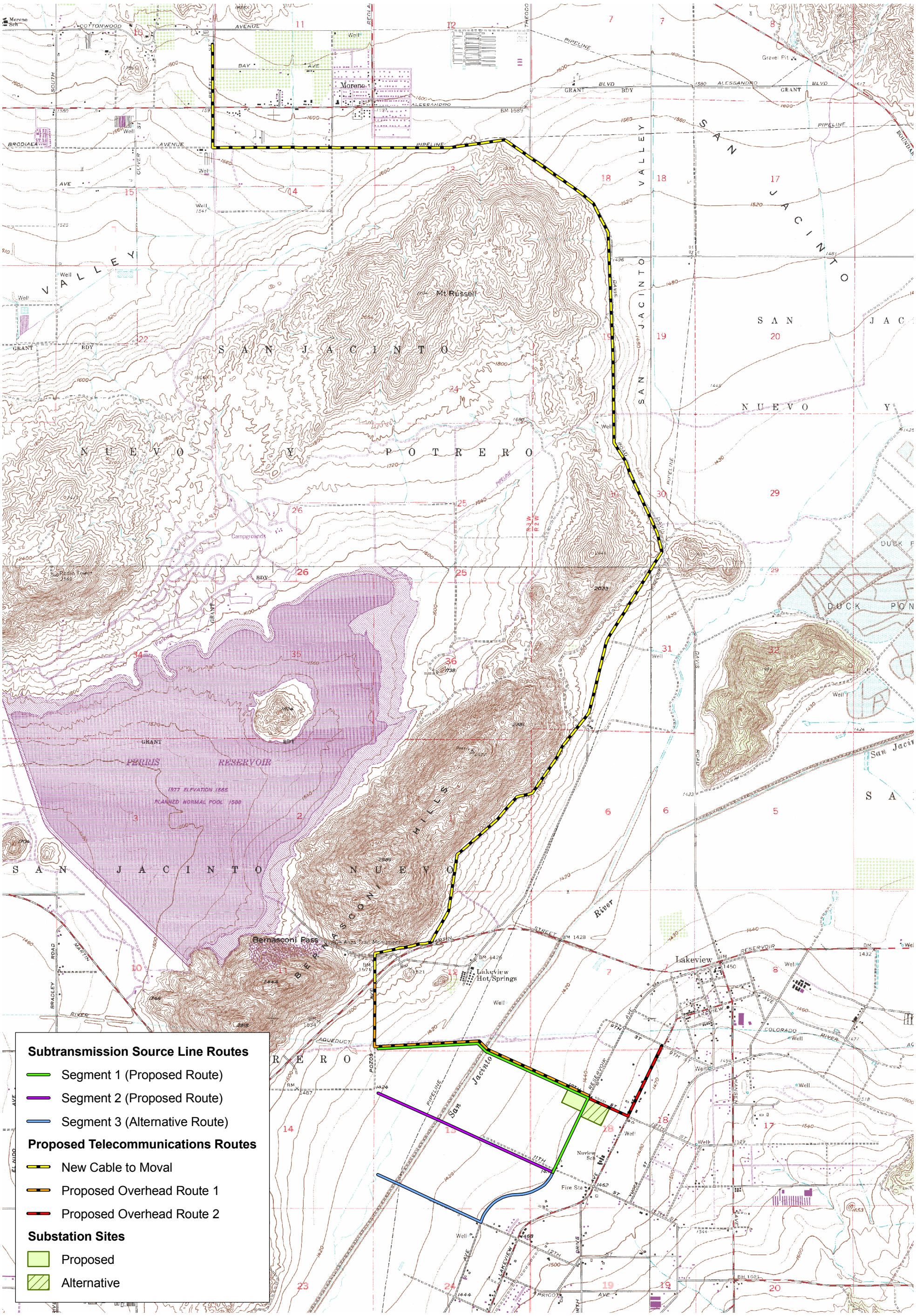
Dear Mr. Crain:

This report presents the results of the field investigation described above. The purpose of the habitat assessment and subsequent trapping survey was (a) to confirm the presence/absence of the three species in the proposed project area, and if one or more of these species is present, (b) to assess if the project would result in any impacts to the species.

INTRODUCTION

Project Area

The proposed project area is divided into two sections for the purposes of this report. The **North Section** includes lands located to the north of Ramona Expressway, and encompasses the California Departments of Parks and Recreation Lake Perris Recreation Area (LPRA) and the adjacent California Department of Fish and Game San Jacinto Wildlife Area (SJWA), as well as a small area beyond the northern end of the SJWA. The **South Section** includes lands southward



Local Vicinity

Exhibit 1

Lakeview Substation and Transmission Line Project

N W E S

3,000 1,500 0 3,000 Feet

BonTerra CONSULTING

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and eastward of the Ramona Expressway (depending on the particular section of the Expressway being referred to), and encompasses various cultivated and otherwise disturbed lands, portions of the community of Lakeview, and a short stretch of the channelized San Jacinto River (Figure 2).

South Section

Habitat conditions in the **South Section** vary considerably. An expansive deep-sandy field extends in a long gentle slope from the Ramona Expressway down to the flat lands that extend southward to and beyond the San Jacinto River. The northerly sandy slope was completely disked and unvegetated during August and October 2010, but was entirely in cultivation during the May 2011 trapping survey. In October 2010, very small patches of disturbed annual grassland vegetation occurred at scattered locations along the pole line that parallels Pozos Avenue, where vegetation had not been recently disturbed by disking. In May 2011, this road edge vegetation was no longer present.

The sandy slope is generally very suitable for and could theoretically be occupied by LAPM, a species which often occurs in association with sandy wash systems. However, the long history of intensive disking of this area undoubtedly has eliminated this small pocket mouse in most locations. The edges of this field also could be occupied by SKR, and theoretically by SBKR if the latter species was resident in the area; but again, intensive disking appears to have eliminated most or all small mammal activity in this stretch of the alignment.

The sandy soils of the slope extend out for a short distance into the flatlands to the south and exhibit general habitat conditions similar to those on the northerly slope. However, this narrow belt of flatland sandy habitat appears to have escaped cultivation for some time. Thus, it has retained its potential for occupation by small mammals. This narrow band of level sandy substrate then transitions into heavier finer-grained soils to the south.

The proposed SCE project alignment will follow the existing power line that occurs at the edge of the sandy (sometimes cultivated) slope along Pozos Avenue (see Map 1A in the Edison J025 Field Map Book). At the bottom of the slope it will turn eastward and follow the dirt road that skirts the edge of narrow band of sandy substrate. It will then turn eastward and eventually cross the San Jacinto River and extend into the area of Lakeview.

During the rainy season many of the lowlands – and especially those nearer the San Jacinto River - are very wet and often exhibit pools of water amidst impassable muddy substrates. These lowlands exhibit soils that are generally unsuitable for all of the target species. Farther east beyond the River and associated cultivated fields the alignment traverses some lands that are close to existing private home sites and existing paved roads or well maintained roads. The lands on the east side of the San Jacinto River have been continuously cultivated or otherwise heavily disturbed for many years, and any populations of the target species that historically occupied this area would for the most part have been eliminated by such disturbances. The same is generally true of the lands westward of the River; however, soils more suitable for the target species are more common on the westerly side of the River as one approaches the Bernasconi Hills and the Lake Perris Recreation Area.

In summary, the habitats with the highest potential for the target species occur on the westerly side of the San Jacinto River, and particularly in the northerly sandy fields and their immediately adjacent habitats.

North Section

Habitat conditions in the **North Section** include relatively undisturbed patches of sage scrub and chaparral vegetation, cultivated fields, disturbed annual grasslands, and otherwise disturbed lands. Soils in a great majority of this general area are loamy and suitable for SKR and LAPM. However, sandy soils typically occupied by SBKR are very rare in this section. Most of this area, which encompasses the SJWA, is maintained and in some cases managed for the benefit of both wildlife and outdoor enthusiasts. Thus, substrate disturbances are generally limited or are designed to benefit wildlife species. The lands adjacent to the north end of the SJWA are similar in habitat conditions to those in the SJWA but exhibit more off road vehicle disturbance.

Known Locations for Target Species Within the Project Area

Stephens' kangaroo rats and Los Angeles pocket mice are known to occur in the general area of the project, as well as within portions of the actual proposed alignments in both the North and South Sections of the current project (e.g. Dudek and Associates 2003; Montgomery 2002, 1994; O'Farrell and Uptain 1989; Vergne 2010). LAPM have been trapped in the sandy soil areas of the South Section, south and east of the Ramona Expressway in the specific area covered by the current field survey. San Bernardino kangaroo rats are known to occur outside of the project area, along the San Jacinto River at locations approximately six miles to the east of the project area and beyond (e.g. Montgomery 2010; Vergne 2010). The North Section occurs within the Lake Perris State Recreation Area/San Jacinto Wildlife Area Core SKR Preserve, while the South Section occurs within the SKR Habitat Conservation Plan Fee Area. (RCHCA 1995).

Proposed Project

In the **South Section**, the proposed project will string new power lines on existing poles, as well as construct new poles and lines in certain segments of the alignment. In the **North Section**, the project will string fiber optic telecommunication lines on existing power poles that are presently located immediately adjacent to existing dirt roads.

Background on SKR, SBKR and LAPM

SBKR

The SBKR was emergency listed in 1998 (USFWS 1998a) and then confirmed as "endangered" later that year by the U.S. Fish and Wildlife Service (USFWS 1998b). A 2011 court decision overturned a 2008 revised Critical Habitat (CR) designation for this species, thereby returning it to its original 2002 version (USFWS 2002). This final Critical Habitat includes portions of Cajon Wash and Lytle Creek alluvial systems, a major part of the eastern portion of Santa Ana River, and the eastern sections of the San Jacinto River up to the area of Hemet. However, the current SCE project area occurs entirely outside of CR for this species.

San Bernardino kangaroo rats are known to prefer habitats characterized by fine sandy soils, alluvial fan sage scrub vegetation, a relatively high percentage of bare (unvegetated or with minimal herb cover) ground and relatively low substrate disturbance by humans. Habitats exhibiting large-grain sandy or loamy soils, sage scrub and/or disturbed annual grassland or even chamise-chaparral vegetation types, a relatively high cover of herbaceous vegetation, and high human disturbance also occasionally harbor this species, but typically only when such conditions occur in close proximity to the more classical preferred habitat types described above (McKernan 1997; S.J. Montgomery, personal observation). Dangers to the long-term survival of this kangaroo rat include a variety of intensive human related disturbances and activities (e.g. sand/gravel mining, dam development and water diversion, housing developments, and agricultural developments) that have greatly reduced the overall area of habitat available to and occupied by this species (USFWS 1998a,b). Habitats suitable for SBKR are very rare in the project area, and no individuals of this species have been captured in proximity to any of the project alignments.

SKR

The Stephens' kangaroo rat is known to occur widely in Riverside County, in a few localities in southwestern San Bernardino County, and at several localities in San Diego County (Montgomery 1991; Montgomery et al. 1996/1997; O'Farrell and Uptain 1989; O'Farrell 1987, O'Farrell et al. 1986; Ogden 1998; SJM Biological Consultants 2003; Thomas 1975, 1973; USFWS 1997). The SKR is known to occur widely at Perris Lake State Recreation Area and San Jacinto Wildlife Area, and would be expected to occur in nearby lands that have not been heavily and completely disturbed by cultivation or other substrate disrupting activities.

General natural history features and habitat requirements of SKR are fairly well known (O'Farrell 1987, 1990). Habitats occupied by SKR characteristically occur on level to gently sloping terrain, although the species has occasionally been found on relatively steep slopes (e.g. Montgomery 1990; M.J. O'Farrell, pers. comm.). Soils in habitats harboring SKR are typically loamy in nature, while soils dominated by clay or sand very rarely contain this species (Price and Endo 1989; S.J. Montgomery, pers. observ.; O'Farrell 1987; O'Farrell and Uptain 1989).

Stephens' kangaroo rats typically occupy lands described as disturbed annual grassland and characterized by a relatively sparse cover of both shrubs and herbaceous vegetation. Although resident SKR have occasionally been found in relatively dense stands of sage scrub in Riverside County (S.J. Montgomery, pers. observ.), such occurrences are by far the exception to the rule. Occupied habitats commonly exhibit an abundance of bare soil during much of the year. Nonetheless, spring/early-summer flushes of forb (e.g. *Erodium sp.*) growth often temporarily reduce the amount of visible exposed ground. This phase of the yearly cycle of vegetation growth is subsequently transformed by the desiccating forces of the summer season, which cause non-grass herbaceous vegetation (i.e. forbs) to dry up and disarticulate, again revealing the bare ground that is so characteristic of occupied SKR habitat. Reflecting this preference for open ground, a high ratio of forbs to grasses increases the suitability of a grassland for SKR.

Stephens' kangaroo rats are capable of occupying small patches of favorable habitat amidst otherwise unsuitable (e.g. dense grassy) habitats. They also readily use narrow strips of open

habitat to move between larger blocks of suitable habitat (S. Montgomery, pers. observ; O'Farrell 1990; Price and Kelly 1992).

As mentioned above, an SKR Habitat Conservation Plan (HCP) was prepared by the Riverside County Habitat Conservation Agency in 1995 (RCHCA 1995). This plan established a number of SKR preserves throughout the species' range in the County, most of which encompass portions of existing public conservation lands such as the PLRA and SJWA. Within the boundaries of the current proposed SCE project, the South Section falls outside of the LPRA and SJWA core SKR preserve but within the SKR Plan Fee Area. The North Section occurs within the LPRA/SJWA core SKR preserve.

For lands that will be developed within the SKR HCP Fee Area, a $900/acre fee typically must be paid to the RCHCA. However, for public utility projects that will only minimally (and largely temporarily) disturb the existing substrates, and where most or all disturbed substrates can be restored to their original condition, the fee is not required (see Section 10 of Ordinance 663 of the SKR HCP).

LAPM

The LAPM is a California Department of Fish and Game Special Concern Species (CSC), but is not presently listed as endangered or threatened by either the CDFG or U.S. Fish and Wildlife Service. The species' sensitive status reflects the fact that its populations are declining in distribution and size, which increases their vulnerability to extinction. The goal of the CSC designation is to alert the biological community to a species' declining status and, hopefully, to halt or reverse its decline by addressing the factors responsible for the decline early enough to secure its continued existence.

The range of this species extends from "the Los Angeles Basin, from approximately Burbank and San Fernando in the northwest, to San Bernardino on the northeast, and Cabazon, Hemet and Aguanga on the east and southeast. Its range in the southwest is not clear but probably lies somewhere near the Hollywood Hills" (Williams 1986). Examples of noteworthy LAPM populations that have been confirmed in recent years include the following locations: (a) Lake Perris State Recreation Area and nearby lands (e.g. Dudek 2003; Montgomery 2003); (b) the outflow fan of Massacre Canyon, along the northern edge of the San Jacinto River floodplain just east of Sanderson Avenue (Montgomery 1994); (c) farther east (upstream) from Massacre Canyon in and adjacent to the San Jacinto River floodplain, at the Gilman Springs Bridge and beyond to the area of Soboba Indian Reservation (Montgomery 2002; Montgomery 2010); (d) to the south in the area of Skunk Hollow east of Murrieta Hot Springs (Montgomery 1994); (e) Double Butte County Park to the east of Sun City (Montgomery and Davenport 2005); (f) Aguanga and Vail Lake areas (Dudek and Associates 2003); (g) San Gorgonio Pass area and San Timoteo Canyon (Dudek and Associates 2003; CNDDB records); (h) Santa Ana River Wash west of Alabama Street near Redlands (Montgomery 2009); and (i) Fontana near Etiwanda Avenue and 6th Street (Montgomery 2010). Populations are known from a number of other locations in the County but most of these appear to be limited in size. In general, although the LAPM exhibits a fairly widespread distribution, sizable populations appear to be rare. As a

result, this pocket mouse may warrant formal listing as rare or endangered by state of federal conservation agencies.

Habitat conditions at sites harboring this species typical consist of alluvial systems exhibiting fine sandy soils, or areas immediately adjacent to such habitats (Dudek and Associates 2003; Montgomery 1994, 2002). Nonetheless, LAPM also have been captured a considerable distance from distinctly sandy soil habitats, occasionally in sandy loam soils, such as at the San Jacinto Wildlife Area and at March Air Force Base (S Montgomery, pers. observ.). The primary vegetation communities in which LAPM have been found include Riversidean alluvial fan sage scrub, disturbed (non-native) annual grassland and Riversidean sage scrub; however, chamise and red shank chaparral associations also are used by this pocket mouse. Volume II-B of the Riverside County Multiple Species Habitat Conservation Plan contains a thorough treatment of habitat requirements and related information for the LAPM (Dudek and Associates 2003).

METHODS

Habitat Assessment

A habitat assessment for the three target species was conducted along the entire alignment, including both South and North Sections of the project area, on 14-15 and 17 August 2010. The project area and specific alignments were checked for potential or definite signs of kangaroo rats (burrows, scat, tracks) and little pocket mice (diminutive burrows in light soils). Areas with a potential for the target species were noted on field maps and slated for subsequent final follow up field checks and, where required, live-trapping.

The North Section was considered occupied by both SKR and LAPM in most areas. Furthermore, SKR Incidental Take is generally not allowed in SKR Core Preserves, and the proposed project was not slated to disturb off-road habitats in this area. Thus, trapping was not considered necessary to the north of Ramona Expressway. In contrast, the non-preserve lands southward and eastward of Ramona Expressway, termed the South Section in this report, did exhibit some habitat areas suitable for and apparently occupied by SKR and LAPM. Therefore, trapping was considered necessary in certain suitable locations in this section, to confirm the presence/absence of SKR and LAPM.

Trapping Survey

An initial trapping program was conducted on 19-20 and then 27-30 October 2010. The objective of this survey was to determine the current presence/absence/distribution of LAPM in suitable sandy habitats, and the presence/absence/distribution of SKR in loamy and sandy habitats, along the existing and proposed alignments south and east of Ramona Expressway. This trapping effort consisted of (a) a long single more or less continuous trap line set out in suitable habitat areas along and in close proximity to Pozos Avenue from Ramona Expressway southward to the bottom of the slope, and (b) a continuous trap line along and adjacent to the east- and south-trending dirt roads at the bottom of the slope (see Figure 3). A total of 480 trap-nights was accrued during this 4-night survey in October 2010. When only one LAPM was captured in this trapping period (see results below), it was determined that the prevailing relatively low air and soil temperatures at this late point in the season could be limiting surface

activity in LAPM, and a follow-up trapping effort should be conducted in the following spring when air/soil temps were higher.

The second trapping program was then conducted in May 2011, to more reliably confirm presence/absence of LAPM in the project area. Traps during this trapping session were placed (a) near Ramona Expressway where the single LAPM was captured in October 2010, (b) in a continuous line in the narrow sandy habitat strip at the bottom (south edge) of the northerly sandy slope, and (c) along the roads extending eastward, westward and southward from the junction of Pozos Avenue and the unnamed road at the bottom of the slope (Figure 4). A total of 230 trap-nights was expended during the May trapping effort.

During all trapping periods, large-sized (12”) collapsible Sherman live-traps were set out in the late afternoon in each trapping area and baited with a mixture of millet and sunflower seeds. Traps were initially checked near midnight and then early each subsequent morning. All trapped animals were identified to species and released at the point of capture. Trapping was conducted by Stephen J. Montgomery and Dr. Phil Brylski (USFWS permit TE745541-10 and TE148555-0, respectfully, as well as CDFG MOU’s).

RESULTS

Habitat Assessment

Weather conditions during the habitat assessment included warm to hot air temperatures (75-100F), clear skies and low to moderate wind speeds (0-8mph).

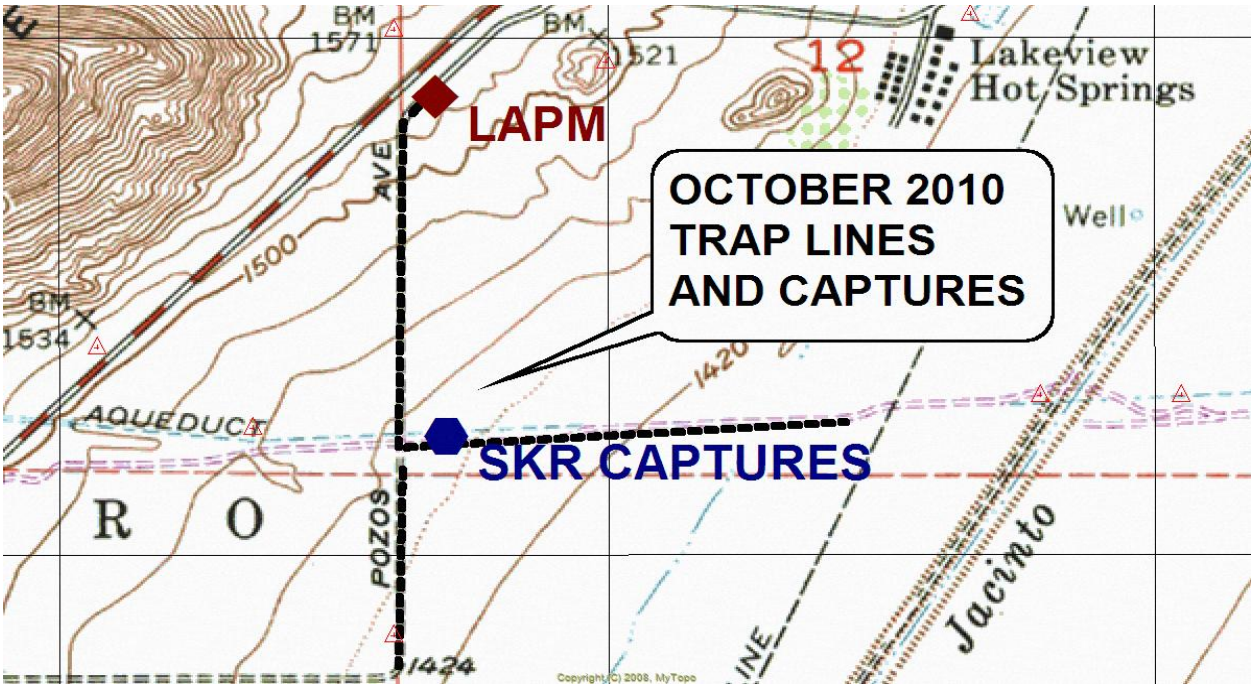


Figure 3. Location of October 2010 trap lines captures of LAPM and SKR.

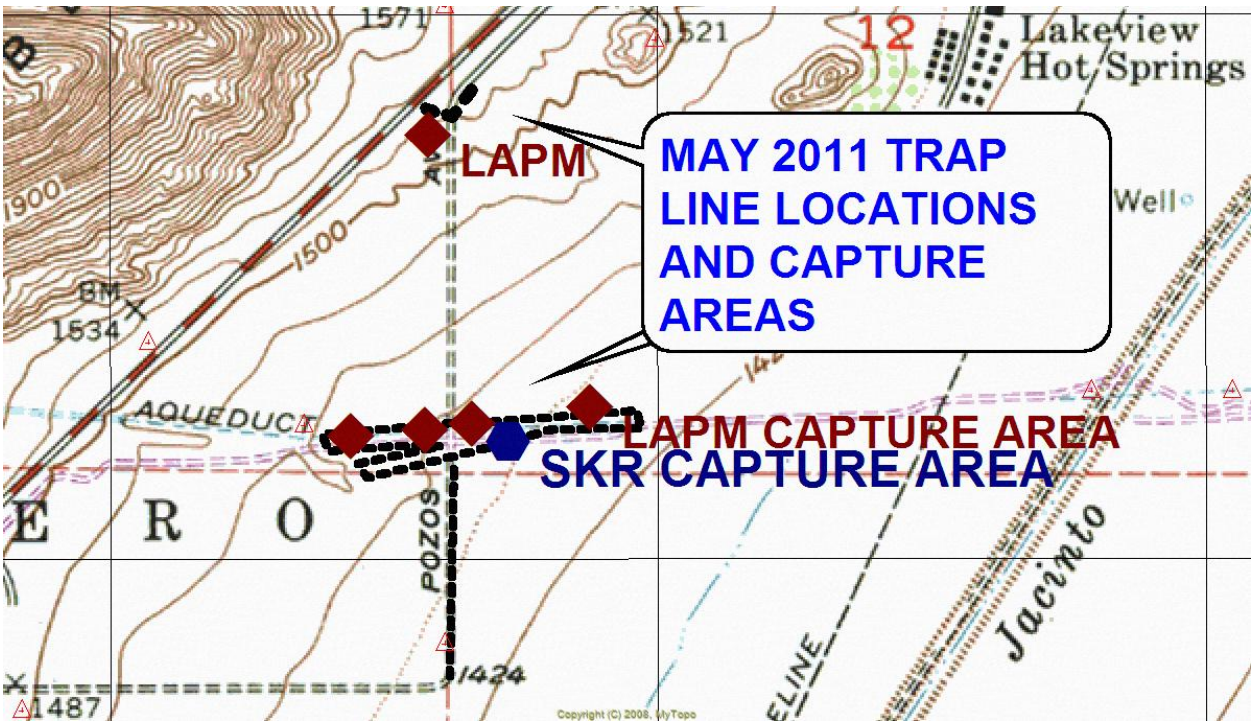


Figure 4. Location of May 2011 trap lines and captures of LAPM and SKR.

The habitat assessment confirmed the presence of numerous areas of habitat suitable for SKR and LAPM, primarily in the North Section but also in certain areas of the South Section. Areas with some potential for SBKR also were noted. However, sizable blocks of sandy alluvial and alluvial fan sage scrub habitat that typically harbor SBKR were not present in the project area. Thus, it appeared very unlikely that SBKR would be present in the project area. Furthermore, no previous field trapping studies in this area had yielded SBKR.

It was determined that no trapping was required in the **North Section** of the project area (northward of Ramona Expressway), for the following reasons. Numerous field trapping surveys in the past 20 years have confirmed the presence of both SKR and LAPM in this area; thus, these two species should be assumed to be present in most/all of this section of the project area. Trapping surveys in this area would only serve to confirm various occupied locations for both species. Furthermore, no take of SKR can occur in the LPRE/SJWA SKR Preserve, and take of LAPM in this Preserve area would require excessive mitigation actions. The proposed project in the North Section will only involve the stringing of fiber optic telecommunication lines on existing poles using vehicles, and these vehicles will remain on existing roads and not disturb adjacent habitats. Following this procedure, minimal mitigation actions would be required in this part of the project area. Nonetheless, a biological monitor would still need to be present for all activities performed in this portion of the project area. A final set of mitigation procedures will be developed for the project, once specific construction methods are finalized.

Proposed project actions in the South Section will include the construction of power poles. The trapping survey confirmed the location of SKR and the location of at least some LAPM in certain locations in the South Section of the project area.

Trapping Surveys in the South Section

Trapping surveys occurred in October 2010 and May 2010. The results of each survey are described separately below.

October 2010

Weather conditions during the October 2010 trapping survey included moderate to mild air temperatures (50-65F), 0-100% cloud cover, and low wind speeds (0-3/7). A light drizzle fell during trap pickup on 30 October 2010 (Table 1).

Eight SKR and one LAPM were captured during the October 2010 trapping survey (Table 2; Figure 3). Two additional species were recorded, including 37 captures of San Diego pocket mice (*Chaetodipus fallax fallax*) and 76 captures deer mice (*Peromyscus maniculatus*) (Table 2). No SBKR were captured during the trapping survey, and as stated above no evidence of this species was noted during the habitat assessment.

The sole LAPM captured during the trapping survey occurred in a narrow patch of relatively undisturbed annual grassland habitat adjacent to the paved frontage road just eastward of Ramona Expressway (Figure 3, Appendix A Photograph). Traps set in other nearby patches of similarly neglected habitat did not yield LAPM; however, individuals of this species may have been present but inactive above ground. This species typically retreats to underground burrows during the fall months (in September or later) and may not reemerge until the spring (e.g. March-April). Due to the late date of the trapping survey during which most LAPM may have been below ground and therefore undetectable, it is recommended that an additional trapping survey be conducted in appropriate sandy habitats in the South Section in spring 2011 (e.g. from approximately 1 April on) to confirm the results of the fall 2010 trapping effort.

The 8 SKR individuals were captured in a patch of very open minimally (recently) disturbed sandy loam habitat at the bottom of the sandy slope at the junction of "unnamed street" and Pozos Avenue (Figure 3; see Page 1A, Edison J025 Field Map Book). Minimal signs of kangaroo rats were observed adjacent to "unnamed street" (an eastward extension of Pozos Avenue) in the flat lowlands near the western end of the alignment shown in Map 2A (Edison J025 Field Map Book), but no captures of kangaroo rats were recorded at this location. As mentioned above, beyond a certain point, the soils in this area are very fine grained and often saturated during rainy periods.

May 2011

Weather conditions during the May 2011 trapping survey included mild air temperatures (55-68F), low wind speeds (2-4mph) and cloud cover ranging from 0-100% (Table 3).

One SKR and 11 LAPM were captured during the May trapping survey (Table 4, Figure 4). Also recorded were 9 captures of the San Diego pocket mouse, 25 individuals of the deer mouse, and a single California vole (*Microtus californicus*).No SBKR were captured during this trapping survey, and as stated above no evidence of this species was noted during the habitat assessment.

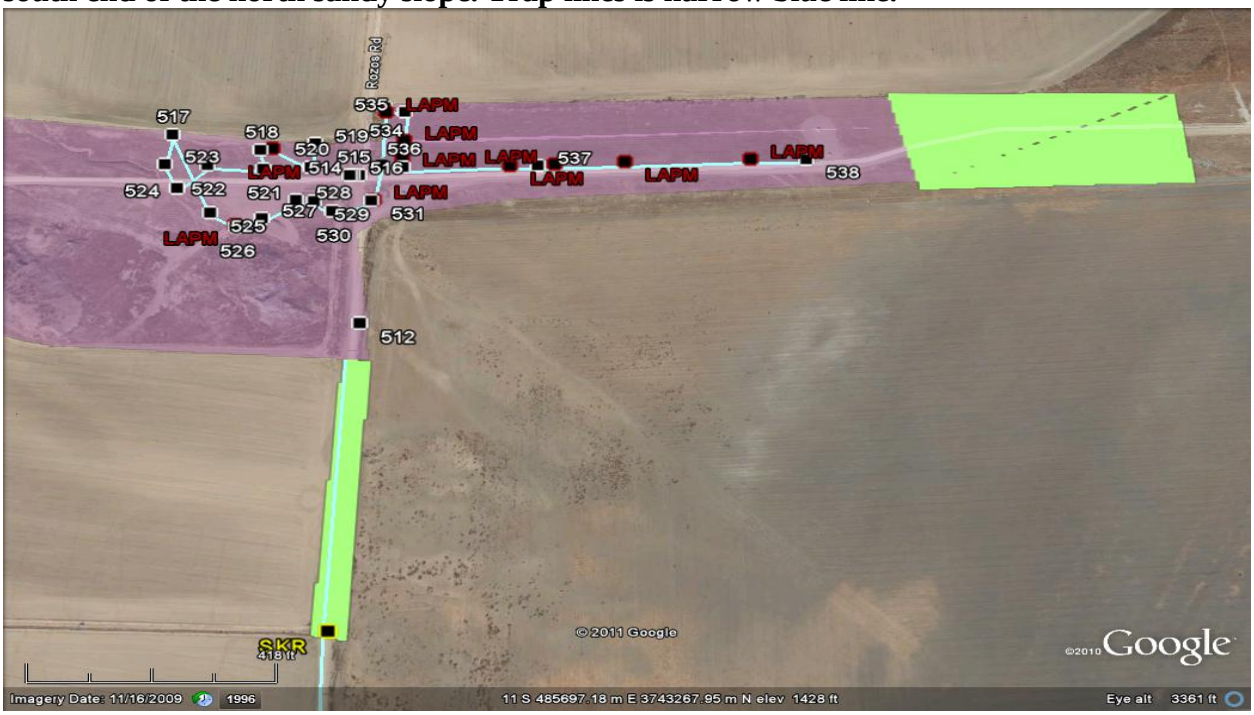
Summary

Habitats with sandy/loamy soils that are presently occupied by SKR and/or LAPM in the Southern Section of the project area are shown in Figure 5. These locations are vulnerable to disturbance from vehicles and other heavy substrate disturbances. Since the distribution of LAPM and SKR can be expected to change over time, the results of the trapping survey reported here will only be valid for a particular period of time. The time limit for such surveys is typically one year from the date of the report. However, this time period may be variable, depending on the circumstances.

Figure 5a. Overview of occupied SKR and LAPM habitat in the South Section of the project area, immediately southward of Ramona Expressway.

Figure 5b. Occupied LAPM habitat (yellow) at north end of north sandy slope. Trap line is narrow blue line.

Figure 5c. Habitat occupied LAPM and SKR (violet-pink), and by SKR only (green), at the south end of the north sandy slope. Trap lines is narrow blue line.



Please contact me if you have any questions regarding this report or the associated field effort.

Sincerely,

Stephen J. Montgomery
USFWS Permit TE745541-10

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LITERATURE CITED

Dudek and Associates, Inc. (Dudek). 2003. Western Riverside County Multiple Species Habitat Conservation Plan (Prepared for the Riverside County Integrated Project). Encinitas, CA.

McKernan, R.L. 1997. The status and known distribution of the San Bernardino kangaroo rat (*Dipodomys merriami parvus*): field surveys conducted between 1987 and 1996. Prepared for the U.S. Fish and Wildlife Service, Carlsbad, CA.

Montgomery, S.J. 2010. Results of trapping surveys for San Bernardino kangaroo rats (*Dipodomys merriami parvus*) and Los Angeles pocket mice (*Perognathus longimembris brevinasus*) at the Horseshow Grand Fee to Trust Project Site in Riverside County, California. Prepared for Entrix Corporation and the Bureau of Indian Affairs.

Montgomery, S.J. 2009. San Bernardino kangaroo rat percent area occupied (PAO) survey of the Santa Ana River Wooly Star Preserve Area, May 2009. Prepared for U.S. Army Corps of Engineers, Los Angeles, CA.

Montgomery, S.J. 2003. Presence/absence trapping survey of Stephens' kangaroo rats at an approximately ½-acre site adjacent to the headquarters at Lake Perris State Recreation Area, Riverside County, California. Prepared for Geary Hund, Resource Ecologist, Lake Perris State Recreation Area, Perris, CA.

Montgomery, S.J. 2002. Results of a field assessment for the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR) and the California Department of Fish and Game (CDFG) Species of Special Concern (CSC) Los Angeles pocket mouse (*Perognathus*

longimembris brevinasus)(LAPM) for the Caltrans Highway 79/Gilman Springs Road San Jacinto River Bridge Painting Project. Prepared for Chambers Group, Redlands, CA.

Montgomery, S.J. 1994. Trapping and habitat assessment survey for Stephens' kangaroo rats, San Bernardino kangaroo rats and Los Angeles pocket mice, along State Highway 79 between Beaumont and the area of Gilman Springs Road, Riverside County, California. Prepared for Dames and Moore, Santa Ana, CA.

Montgomery, S.J. 1991. Unpublished results of a preliminary trapping survey for Stephens' kangaroo rats on the Guejito Ranch property east of Escondido, San Diego County, California. Prepared for Pacific Southwest Biological Services. National City, CA.

Montgomery, S.J. 1990. Trapping and habitat mapping survey for Stephens' kangaroo rats on the 235-acre Norco Hills Specific Plan, Tentative Tract 25779. Prepared for Windward Development Co. Newport Beach, CA.

Montgomery, S.J., J. Sawasaki, and D. Mitchell. 1996/97. Survey report and addendum for Stephens' kangaroo rat on Marine Corps Base, Camp Pendleton, California. Prepared by Tetra Tech, Inc. San Bernardino, CA.

O'Farrell, M.J. 1990. Stephens' kangaroo rat: natural history, distribution, and current status. Pp 78-84, In P.J. Brant and J. Remington (eds.), Memoirs of the Natural History Foundation of Orange County; Vol. 3, Publ. By Nat. Hist. Found. of Orange County.

O'Farrell, M.J. and C. Uptain. 1989. Assessment of population and habitat status of the Stephens' kangaroo rat (*Dipodomys stephensi*). Calif. Dept. of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section report (July 1989).

O'Farrell, M.J. 1987. Distribution and aspects of the natural history of Stephens' kangaroo rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego County, California. The Wasmann Journ. 45:34-48.

O'Farrell, M.J., S.M. Juarez, and C.E. Uptain. 1986. A new addition to the known range of Stephens' kangaroo rat (*Dipodomys stephensi*) in San Diego County. Calif. Fish and Game 72:187-189.

Ogden (Ogden Environmental and Energy Services). 1998. Stephens' kangaroo rat study for the Ramona Airport Expansion Project, Ramona, California. Prepared for KEA Environmental and County of San Diego Dept. Public Works. San Diego, CA.

Price, M.V. and P.R. Endo. 1989. Estimating the distribution and abundance of a cryptic species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and implications for management. Conserv. Biol. 3:293-301.

Price, M.V. and P. Kelly. 1992. Monthly and lifetime movement distances of Stephens' kangaroo rat (Dipodomys stephensi Merriami). Final Report, Submitted to Riverside County Habitat Conservation Agency (15 January 1992).

RCHCA (Riverside County Habitat Conservation Agency). 1995. Habitat Conservation Plan for the Stephens' kangaroo rat in Western Riverside County, California. (Vol. 1)

SJM Biological Consultants. 2003. Base-wide survey for Stephens' kangaroo rats (Dipodomys stephensi) on Fallbrook Naval Weapons Station, Fallbrook California. Prepared for Robert Knight, Conservation Program Manager, Naval Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, CA.

SJM Biological Consultants. 2000. 1999-2000 Stephens' kangaroo rat survey on the Lockheed Potrero Creek Property, Beaumont, California. Prepared for Douglas Wood Associates, Newport Beach, CA.

Standerfer, Stephanie. 2011. Personal communication regarding mitigation requirements for projects exhibiting populations of the Los Angeles pocket mouse. Dudek and Associates biologist.

Thomas, J.R. 1975. Distribution, population densities and home range requirements of the Stephens' kangaroo rat (*Dipodomys stephensi*). Unpubl. M.A. Thesis, Calif. State Polytechnic Univ. Pomona, Calif. 64pp.

Thomas, J.R. 1973. Stephens' kangaroo rat survey 1972-73. Calif. Dept. Fish and Game, Special Wildlife Investigations, Job II-54.6. (Final Report)

USFWS (U.S. Fish and Wildlife Service). 2002. Final Designation of Critical Habitat for the San Bernardino Kangaroo. Federal Register 67 (78):19812-19845.

USFWS (U.S. Fish and Wildlife Service. 1998a. Emergency rule to list the San Bernardino kangaroo rat, San Bernardino and Riverside Counties, as endangered. Fed. Regist. 63:3835-38431.

USFWS (U.S. Fish and Wildlife Service. 1998b. Final rule to list the San Bernardino kangaroo rat as endangered. Fed. Regist. 63:51005-51017.

Vergne, P.J. 2010. Personal communication regarding the results of recent trapping surveys for LAPM and SBKR in the SCE project area. Envira Co. biologist.

Williams, D.F. 1986. Mammalian species of special concern. Calif. Dept. Fish and Game, Wildlife Manag. Div. Administ. Report 86-1 (June 1986).

Table 1. Weather conditions during the October 2010 Lakeview SBKR/SKR/LAPM trapping survey

Date	Time	Cloud Cover (%)	Air Temp (°F)	Wind Speed (mph)
19-Oct	1800	100	65	0-4
20-Oct	630	100	57	0-2
28-Oct	645	0	51	0
29-Oct	700	0	53	0
30-Oct	700	100/light drizzle	50	3

Table 2. Summary of Trapping Data, 2010 Lakeview SBKR/SKR/LAPM trapping survey. 120 traps were set each night.

	Animals Captured*			
Date Traps Checked	**SKR**	**LAPM**	**CHFA**	**PEMA**
20-Oct	4AF, 3AM, 1SAM	1AF	11	21
28-Oct	-	-	4	13
29-Oct	-	-	13	26
30-Oct	-	-	9	16
Total	**8**	**1**	**37**	**76**

* Animals Captured

SKR, Stephens' kangaroo rat (*Dipodomys stephensi*)

LAPM, Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)

CHFA, northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)

PEMA, deer mouse (*Peromyscus maniculatus*)

A = adult, SA = subadult

F = female, M = male

Table 3. Weather conditions during the May 2011 Lakeview SBKR/SKR/LAPM trapping survey

Date	Time	Cloud Cover (%)	Air Temp (°F)	Wind Speed (mph)
5-May	1900	0	68	0-4
6-May	700	0	60	0-2
7-May	645	100	55	0-2

Table 4. Summary of Trapping Data, May 2011 Lakeview SBKR/SKR/LAPM trapping survey. 115 traps were set each night.

Date Traps Checked	Animals Captured*				
	SKR	LAPM	CHFA	PEMA	MICA
6-May	-	1	4	12	1
7-May	1	10	5	13	-
Total	**1**	**11**	**9**	**25**	**1**

* Animals Captured

SKR, Stephens' kangaroo rat (*Dipodomys stephensi*)

LAPM, Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)

CHFA, northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)

PEMA, deer mouse (*Peromyscus maniculatus*)

MICA, California vole (*Microtus californicus*)

APPENDIX A

PHOTOGRAPHS OF THE SOUTH SECTION OF THE PROJECT AREA

South Section - Location of LAPM captures in field edge disturbed annual grassland vegetation, immediately eastward of Ramona Expressway

South Section - Sandy disked fields east of Ramona Expressway, looking eastward and downhill into the lowlands that exhibit heavier/clay soils, and then farther toward the San Jacinto River in the distance. Pozos Avenue is on the right adjacent to the pole line. This field is shown with vegetation (cultivation) in the following photograph

South Section - Sandy now cultivated fields east of Ramona Expressway, looking westward and uphill toward Ramona Expressway. Pozos Avenue is at left adjacent to pole line. This is the same field shown above without vegetation (see previous photograph). LAPM and SKR occur in the grassland in the foreground.

Fields with heavier soils in the lowlands eastward of the western sandy slope, looking eastward along Pozos Avenue. One SKR was captured along the road edge, approximately 5 poles down the dirt road from the camera position.

Typical occupied SKR and LAPM habitat in the North Section

Typical occupied SKR and LAPM habitat in the North Section

Typical occupied SKR and LAPM habitat in the North Section

Department of Fish and Game
Biogeographic Data Branch

The Vegetation Classification and Mapping Program

List of California Terrestrial Natural Communities Recognized by The California Natural Diversity Database

September 2003 Edition

Introduction:

This document supersedes all other lists of terrestrial natural communities developed by the Natural Diversity Database (CNDDB). It is based on the classification put forth in "A Manual of California Vegetation" (Sawyer and Keeler-Wolf 1995 and upcoming new edition). However, it is structured to be compatible with previous CNDDB lists (e.g., Holland 1986). For those familiar with the Holland numerical coding system you will see a general similarity in the upper levels of the hierarchy. You will also see a greater detail at the lower levels of the hierarchy. The numbering system has been modified to incorporate this richer detail. Decimal points have been added to separate major groupings and two additional digits have been added to encompass the finest hierarchal detail.

One of the objectives of the Manual of California Vegetation (MCV) was to apply a uniform hierarchical structure to the State's vegetation types. Quantifiable classification rules were established to define the major floristic groups, called alliances and associations in the National Vegetation Classification (Grossman et al. 1998). In this document, the alliance level is denoted in the center triplet of the coding system and the associations in the right hand pair of numbers to the left of the final decimal. The numbers of the alliance in the center triplet attempt to denote relationships in floristic similarity. For example, the Chamise-Eastwood Manzanita alliance (37.106.00) is more closely related to the Chamise-Cupleaf Ceanothus alliance (37.105.00) than it is to the Chaparral Whitethorn alliance (37.205.00). However, due the rigidity of the numerical system newly added alliances are not necessarily numerically adjacent to their closest relatives.

EXAMPLE OF CODE:

```
Denotes general physiognomic and physical location (e.g. riparian and bottomland habitat)
|    ____Denotes type of general habitat (riparian forest and woodland)
|    |           ___Denotes floristic vegetation alliance (Sycamore alliance)
|    |      _____|_____       _____Denotes association (California Sycamore/Soft Chess)
|    |      |    |    |       |   |
6 1. 3 1 1 .0 2
```

In portions of this list numbered place-holders have been added. These are not formal units of classification, but simply serve to further clarity relationships between some of the more complex vegetation types. For example, several vegetation alliances are characterized by having Chamise (*Adenostoma fasciculatum*) as a major component. Thus the code 37.100.00 chaparral with Chamise was erected to show that such alliances as 37.105.00 Chamise-Cupleaf Ceanothus, 37.106.00 Chamise-Eastwood Manzanita, etc- are included in this cluster of chaparral types characterized by high cover of chamise. Other examples in this vein are vegetation with pines dominant (87.000.00), vegetation with fir dominant (88.000.00), and vegetation dominated by tree oaks (71.000.00). Because the classification for California is incomplete, the detail in the finest resolution of the hierarchy, the associations, is not uniform. Associations are defined quantitatively through a classification procedure using numerical comparisons between related vegetation sampling plots. These comparisons have been made only for a

portion of all vegetation stands in California. For example the U.S. Forest Service has been active in defining associations. Thus, one will notice the rich detail of the classification in various forest alliances such as the Douglas-fir, Red fir, White fir, and Jeffrey pine.

Since the previous edition of this document large areas of the State including the Mojave Desert, Yosemite National Park, Point Reyes National Seashore, and other National Park lands have been widely sampled through vegetation mapping and classification projects. Identification of these alliances and associations will be possible in the second edition of The Manual of California Vegetation expected to be published in 2003. Details about the definitions of more long-established alliances (called series in the first edition), their species composition, distribution, and ecological requirements may be sought in the MCV. (*Available from The California Native Plant Society*)

The literature citations following the association name refer to the original authors who defined the particular association. These are analogous to the author's names following a plant species in a botanical flora. All the citations mentioned in this document prior to 1996 are listed as entered in the literature citations in The Manual of California Vegetation or if newly defined, will be cited in the second edition of the MCV.

The primary purpose of the CNDDB classification is to assist in the location and determinations of significance and rarity of various vegetation types. Thus, ranking of natural communities by their rarity and threat is an important facet of the classification. In this document, as in previous CNDDB community lists, asterisks (*) denote communities that are either known or believed to be of high priority for inventory in CNDDB. If an alliance is starred, this means that all of the associations within it will also be considered of high inventory priority.

A special issue arises as a result of the conversion of the classification. Because CNDDB has accumulated many location records for certain rare community types now considered differently in the classification, it is very important that this critical conservation information is not lost as a result of taxonomic change. Thus, in this document one will notice instances where a community is listed either at the alliance or association level with an accompanying bracketed number. This number is the Holland code, which was used for it in the older classification. (**e.g.** 52.100.00 Fresh-Brackish Water Marsh {52200}). Because, in some cases, we are unsure of how this community type relates to the new hierarchy (it has not been quantitatively defined), it is placed into the hierarchy in its most likely position. However, no information will be lost and it will continue to be maintained in CNDDB until all occurrences of the community can be properly placed into the quantitative hierarchy. This fact points to the need for assistance from field investigators to revisit these sites and provide information on the species cover so we can convert to the new classification.

As more information comes in on the relationships between associations in this classification it becomes clear where some of these should be placed in the classification. For example the concept of the montane or Sierra mixed conifer forest has been vastly altered as a result of cumulative analysis of data of many plots of montane coniferous forest throughout California. Thus, in this list you will note that many of the mixed conifer associations in the previous edition of this document have been moved to White fir-Douglas-fir, Douglas-fir – Canyon Live Oak, Douglas-fir – Incense-cedar Forest, White-fir –Sugar Pine, Ponderosa Pine- Incense Cedar, and other newly defined alliances that better describe the variation in the montane coniferous forests of the state. Vegetation classification is an active field in California and such relationships will continue to be refined for some time. Currently we define approximately 400 alliances and 1300 associations.

We ***relish*** information on communities, whether it is a new record or re-assessment of existing information. Please contact us at CNDDB (916) 324-6857, and we can help you determine the most useful way to collect information on communities.

20.000.00 DUNES

21.000.00 Coastal Dunes

21.010.00 Active Coastal Dunes {21100}

21.020.00 Coastal Foredunes {21200}

21.030.00 Central Foredunes {21220}

21.040.00 Southern Foredunes {21230}

*21.100.00 Sand-verbena-Beach Bursage [*Abronia villosa-Ambrosia chamissonis*] {21210}
- *21.100.01 Beach Morning Glory - Dune Sagebrush [*Calystegia soldanella- Artemisia pycnocephala*] (Bluestone 1981)
- *21.100.02 Seashore Bluegrass - Dune Sagebrush [*Poa douglasii- Artemisia pycnocephala*] (Duebendorfer 1989)
- *21.100.03 Beach Bursage-Seaside Woolly-sunflower-Yellow Bush Lupine [*Ambrosia chamissonis-Eriophyllum staechadifolium-Lupinus arboreus*] (Holton & Johnson 1979)
- *21.100.04 Seaside Woolly-sunflower - Yellow Bush Lupine [*Eriophyllum staechadifolium-Lupinus arboreus*] (Holton & Johnson 1979)
- *21.100.05 Active North Coastal Dunes (Johnson 1963)
- *21.100.06 Seashore Bluegrass - Beach Pea [*Poa douglasii-Lathyrus littoralis*] (Parker 1974 & Johnson 1977)
- *21.100.07 Strand (Williams & Potter 1972)
- *21.100.08 Northern Dune Scrub {21310}
- *21.100.09 Central Dune Scrub {21320}
- *21.100.10 Southern Dune Scrub {21330}

*21.110.00 Beach Bursage [*Ambrosia chamissonis*] (Keeler-Wolf, *et al*. 2001)
- *21.110.01 Dune Sagebrush - sandmat [*Artemisia pycnocephala- Cardionema ramosissimum*](Keeler-Wolf, *et al*. 2001)

21.200.00 Non-native Iceplant
- 21.200.01 Iceplant - Fig-marigold [*Mesembryanthemum* spp.- *Carpobrotus* spp.] (Keeler-Wolf, *et al*. 2001)

22.000.00 Cismontane and Desert Interior Dunes

*22.010.00 Active Desert Dunes and Sand Fields {22000}

*22.100.00 Desert Sand-verbena [*Abronia villosa*]

*22.200.00 Antioch Dunes Unique Stands {23100}

22.300.00 Stabilized and Partially Stabilized Desert Dunes {22200}

22.400.00 Stabilized and Partially Stabilized Desert Sand Fields {22300}

*22.500.00 San Joaquin Valley Dunes (residual dunes of Holland)

30.000.00 SCRUB AND CHAPARRAL

31.000.00 Coastal Bluff Scrub {31000}

*31.100.00 Northern Coastal Bluff Scrub {31100}

*31.200.00 Southern Coastal Bluff Scrub {31200}

32.000.00 Coastal Scrub {32000}

32.005.00 Riversidian Sage Scrub {32700}
- 32.005.01 Upland Riversidian Sage Scrub {32710}
- *32.005.02 Riversidian Alluvial Fan Sage Scrub {32720}
- 32.005.03 Riversidian Desert Scrub

32.010.00 California Sagebrush Scrub [*Artemisia californica*]
- 32.010.01 California Sagebrush [*Artemisia californica*] (Kirkpatrick & Hutchinson 1977, Gordon & White 1994)
- 32.010.02 California Sagebrush - Deer Weed [*Artemisia californica-Lotus scoparius*] (DeSimone & Burk 1992)
- 32.010.03 California Sagebrush - Bush Penstemon [*Artemisia californica-Keckiella cordifolia*] (Gordon & White 1994)
- 32.010.04 California Sagebrush - Purple Sage [*Artemisia californica-Salvia leucophylla*] (Gordon & White 1994)

32.020.00 Black Sage Scrub [*Saliva mellifera*]
- 32.020.01 Black Sage - Laurel Sumac [*Salvia mellifera-Malosma laurina*] (Kirkpatrick & Hutchinson 1977)
- 32.020.02 Black Sage - California Buckwheat [*Saliva mellifera-Eriogonum fasciculatum*] (Kirkpatrick & Hutchinson 1977)
- 32.020.03 Black Sage [*Salvia mellifera*] (Malanson 1984)
- 32.020.04 Black Sage - California Encelia [*Salvia mellifera-Encelia californica*] (Malanson 1984)
- *32.020.05 Black Sage - Coast Prickly-pear [*Saliva mellifera-Opuntia littoralis* and hybrids] (Mooney 1977)

*32.030.00 White Sage Scrub [*Salvia apiana*]

32.040.00 California Buckwheat Scrub [*Eriogonum fasciculatum*]
- 32.040.01 California Buckwheat - California Figwort - Phacelia [*Eriogonum fasciculatum-Scrophularia californica-Phacelia ramosissima*] (Kirkpatrick & Hutchinson 1977)
- 32.040.02 California Buckwheat [*Eriogonum fasciculatum*] (Gordon & White 1994)
- *32.040.03 California Buckwheat - Big Sagebrush [*Eriogonum fasciculatum-Artemisia tridentata*] (Gordon & White 1994)
- *32.040.04 California Buckwheat Alluvial Fan [*Eriogonum fasciculatum*] (Gordon & White 1994)
- 32.040.05 California Buckwheat-White Bursage [*Eriogonum fasciculatum-Ambrosia dumosa*] (Keeler-Wolf *et al* 1998)
- 32.040.06 California Buckwheat - Bladder Sage [*Eriogonum fasciculatum-Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)

*32.041.00 Wright's Buckwheat Dwarf Scrub [*Eriogonum wrightii*] (Keeler-Wolf *et al* 1998)

*32.050.00 California Encelia Scrub [*Encelia californica*]
- 32.050.01 California Encelia - California Sagebrush [*Encelia californica-Artemisia californica*] (Kirkpatrick & Hutchinson 1977)
- *32.050.02 California Encelia [*Encelia californica*] (Malanson 1984)

32.060.00 Coyote Brush Scrub and Dwarf Scrub [*Baccharis pilularis*] {32110}

*32.060.01 Coyote Brush/Seaside Woolly-sunflower [*Baccharis pilularis/Eriophyllum staechadifolium*] (Baxter 1992)

*32.060.02 Coyote Brush / Tufted Hairgrass [*Baccharis pilularis/Deschampsia caespitosa*] (Elliott & Wehausen 1974)

*32.060.03 Coyote Brush / Creeping Ryegrass [*Baccharis pilularis/Leymus triticoides*] (Fiedler & Leidy 1987)

*32.060.04 Coyote Brush / Sword Fern [*Baccharis pilularis/Polystichum munitum*] (Grams *et al.* 1977)

32.060.05 Coyote Brush - California Sagebrush [*Baccharis pilularis-Artemisia californica*] (Heady *et al*. 1977)

32.060.06 Coyote Brush – Dune Lupine -Yellow Bush Lupine [*Baccharis pilularis-Lupinus chamissonis – Lupinus arboreus*] (Parker 1974 in Barbour & Johnson 1977 modified by Keeler-Wolf *et al.* 2001)

32.060.07 Coyote Brush / European Beachgrass [*Baccharis pilularis/Ammophila arenaria*] (Parker 1974 in Barbour & Johnson 1977)

32.060.08 Coyote Brush / California Figwort [*Baccharis pilularis/Scrophularia californica*] (Parker 1974 in Barbour & Johnson 1977)

32.060.09 Coyote Brush / Annual Grasses [*Baccharis pilularis-Bromus* spp.] (Keeler-Wolf, *et al*. 2001)

*32.060.10 Coyote Brush / Purple Needlegrass [*Baccharis pilularis /Nassella pulchra*] (Keeler-Wolf, *et a.l* 2001)

*32.060.11 Coyote Brush / California Oatgrass [*Baccharis pilularis /Danthonia californica*] (Keeler-Wolf, *et a.l* 2001)

*32.060.12 Coyote Brush / Ocean Spray [*Baccharis pilularis / Holodiscus discolor*] (Keeler-Wolf *et al.* 2001)

*32.060.13 Coyote Brush / Slough Sedge – Common Rush [*Baccharis pilularis /Carex obnupta - Juncus patens*] (Keeler-Wolf *et al.* 2001)

32.060.14 Coyote Brush – Blueblossom [*Baccharis pilularis – Ceanothus thyrsiflorus*] (Keeler-Wolf *et al*. 2001)

32.060.15 Coyote Brush – California Blackberry/ Weedy herb [*Baccharis pilularis -Rubus ursinus*/weedy herb] (Keeler-Wolf *et al.* 2001)

32.060.16 Coyote Brush – Coffeeberry [*Baccharis pilularis -Rhamnus californicus*] (Keeler-Wolf *et al.* 2001)

32.060.17 Coyote Brush – Poison Oak [*Baccharis pilularis -Toxicodendron diversilobum*] (Keeler-Wolf *et al.* 2001)

32.060.18 Coyote Brush – California Sagebrush – Poison Oak/ Coyotemint [*Baccharis pilularis - Artemisia californica-Toxicodendron/Monardella villosa*] (Keeler-Wolf et al. 2001)

*32.070.00 Scalebroom Scrub [*Lepidospartum squamatum*] (Keeler-Wolf *et al*. 1998)

*32.070.01 California Buckwheat - Scalebroom [*Eriogonum fasciculatum-Lepidospartum squamatum*] (Gordon & White 1994)

*32.070.02 Scalebroom - Hairy Yerba Santa - Chaparral Yucca [*Lepidospartum squamatum-Eriodictyon crassifolium-Yucca whipplei*] (Kirkpatrick & Hutchinson 1977)

*32.070.03 Scalebroom / mixed ephermeral herbs [*Lepidospartum*/mixed ephemeral Mojave Desert], (Barbour & Wirka 1997)

32.080.00 Yellow Bush Lupine Scrub [*Lupinus arboreus*]

32.080.01 Yellow Bush Lupine - Ripgut Brome [*Lupinus arboreus-Bromus diandrus*] (Duebendorfer 1989)

32.080.02 Yellow Bush Lupine [*Lupinus arboreus*] (Holton & Johnson 1979)

*32.080.03 Yellow Bush Lupine-Heather Goldenbush [*Lupinus arboreus-Ericameria ericoides*] (Holton & Johnson 1979)

32.080.04 Yellow Bush Lupine - Vernal Grass [*Lupinus arboreus-Anthoxanthum odoratum*] (Hektner & Foin 1977)

32.080.05 Yellow Bush Lupine - California Figwort [*Lupinus arboreus-Scrophularia californica*] (Parker 1974)

32.081.00 Silver Bush Lupine Scrub [*Lupinus albifrons*] (Keeler-Wolf and Moore 2001)
32.081.01 Silver Bush Lupine [*Lupinus albifrons*] (Keeler-Wolf and Moore 2001)

32.090.00 Purple Sage Scrub [*Salvia leucophylla*]
32.090.01 Purple Sage - California Sagebrush [*Salvia leucophylla-Artemisia californica*] (Kirkpatrick & Hutchinson 1977)
32.090.02 Purple Sage - Laurel Sumac [*Salvia leucophylla-Malosma laurina*] (Kirkpatrick & Hutchinson 1977)

*32.100.00 California Buckwheat - White Sage Scrub [*Eriogonium fasciculatum-Salvia apiana*] (Gordon & White 1994)
*32.100.01 California Buckwheat - White Sage [*Eriogonum fasciculatum-Salvia apiana*] (Gordon & White 1994)

32.110.00 California Sagebrush - California Buckwheat Scrub [*Artemisia californica-Eriogonum fasciculatum*]
32.110.01 California Sagebrush - California Buckwheat - Sugar Bush [*Artemisia californica-Eriogonum fasciculatum-Rhus ovata*] (Gordon & White 1994)
32.110.02 California Sagebrush - California Buckwheat - White Sage [*Artemisia californica-Eriogonum fasciculatum-Salvia apiana*] (Gordon & White 1994)

32.120.00 California Sagebrush - Black Sage Scrub [*Artemisia californica- Salvia mellifera*]
32.120.01 California Sagebrush - Black Sage [*Artemisia californica-Salvia mellifera*] (DeSimone & Burk 1992)
32.120.02 Black Sage - California Sagebrush [*Salvia mellifera-Artemisia californica*] (DeSimone & Burk 1992)

*32.130.00 Salal - Black Huckleberry Scrub and Dwarf Scrub [*Gaultheria shallon-Vaccinium ovatum*] {32120}

32.140.00 Mixed Sage Scrub [*Salvia* spp.]

*32.150.00 Coast Prickly Pear Succulent Scrub [*Opuntia littoralis*]

*32.160.00 Dune Lupine - Goldenbush Scrub [*Lupinus chamissonis-Isocoma menziesii*] {21330}
*32.160.01 Heather Goldenbush [*Ericameria ericoides*] (Bluestone 1981)
*32.160.02 Dune Lupine [*Lupinus chamissonis*] (Holton & Johnson 1979)
*32.160.03 Dune Lupine - Heather Goldenbush [*Lupinus chamissonis-Ericameria ericoides*] (Holton & Johnson 1979)

*32.170.00 Maritime Succulent Scrub {32400}

32.180.00 Broom Scrub [includes stands of *Cytisus* spp., *Spartium* spp.,*Genista* spp.]

32.185.00 Gorse Scrub [*Ulex europea*] (Keeler-Wolf, *et al*. 2001)

32.190.00 Venturan Coastal Sage Scrub {32300}

32.200.00 Diegan Coastal Sage Scrub {32500}

32.300.00 Coastal Sage Chaparral Scrub {37G00}

33.000.00 Sonoran and Mojavean Desert Scrub

33.010.00 Creosote Bush Scrub [*Larrea tridentata*] {33100}
33.010.01 Creosote Bush with disturbance [*Larrea tridentata*] (Minnich *et al*. 1993)

*33.010.02 Sonoran Dune Scrub (Spolsky 1979)
33.010.03 High Diversity Creosote Scrub (Spolsky 1979)
33.010.04 moved to within 33.027.00
*33.010.05 Saltbush - Creosote Bush [*Larrea tridentata-Atriplex polycarpa*] (Spolsky 1979)
33.010.06 Creosote Bush Wash Scrub [*Larrea tridentata*] (Keeler-Wolf *et al*. 1998)
*33.010.07 Creosote Bush-White Ratteny-Big Galleta [*Larrea tridentata-Krameria grayi-Pleuraphis rigida*] (Keeler-Wolf *et al*. 1998)
33.010.08 Creosote Bush - Cheesebush [*Larrea tridentata-Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)
33.010.09 Creosote Bush / Desert Trumpet [*Larrea tridentata/Eriogonum inflatum*] (Keeler-Wolf and Thomas 2000)
33.010.10 Creosote Bush - Nevada Ephedra [*Larrea tridentata-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
*33.010.11 Creosote Bush - Mojave Yucca - Desert Tea [*Larrea tridentata-Yucca schidigera-Ephedra californica*] (Keeler-Wolf and Thomas 2000)
33.010.12 Creosote Bush - Allscale [*Larrea tridentata-Atriplex polycarpa*] (Keeler-Wolf and Thomas 2000)
*33.010.13 Creosote Bush - Big Galleta [*Larrea tridentata-Pleuraphis rigida*] (Keeler-Wolf and Thomas 2000)
*33.010.14 Creosote Bush - Big Galleta - Anderson's Wolfberry [*Larrea tridentata-Pleuraphis rigida-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)
33.010.15 Creosote Bush - Cheesebush - Woolly Brickellia [*Larrea tridentata-Hymenoclea salsola-Brickellia incana*] (Keeler-Wolf and Thomas 2000)
33.010.16 Creosote Bush - Desert-holly [*Larrea tridentata-Atriplex hymenelytra*] (Keeler-Wolf and Thomas 2000)
33.010.17 Creosote Bush - Shadscale [*Larrea tridentata-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)
*33.010.18 Creosote Bush - Shockley's Goldenhead [*Larrea tridentata-Acamptopappus shockleyi*] (Keeler-Wolf and Thomas 2000)

33.020.00 Blackbush High Desert Scrub [*Coleogyne ramosissima*] {34300}
*33.020.01 Sonoran Blackbush [*Coleogyne ramosissima*] (Spolsky 1979)
33.020.02 Blackbush - Shadscale [*Coleogyne ramosissima-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)
33.020.03 Blackbush - Nevada Ephedra [*Coleogyne ramosissima-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
33.020.04 Blackbush - Nevada Ephedra - California Buckwheat [*Coleogyne ramosissima-Ephedra nevadensis-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
33.020.05 Blackbush - California Buckwheat [*Coleogyne ramosissima-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
33.020.06 Blackbush - Creosote Bush - California Buckwheat [*Coleogyne ramosissima-Larrea tridentata-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
33.020.07 Blackbush - Creosote Bush - White Busage [*Coleogyne ramosissima-Larrea tridentata-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
33.020.08 Blackbush - Anderson's Wolfberry [*Coleogyne ramosissima-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)
33.020.09 Blackbush - Bladder Sage [*Coleogyne ramosissima-Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)

33.025.00 Virgin River Encelia Scrub [*Encelia virginensis* var. *actonii*] (Keeler-Wolf and Thomas 2000)
33.025.01 Virgin River Encelia [*Encelia virginensis* var. *actonii*] (Keeler-Wolf and Thomas 2000)
33.025.02 Virgin River Encelia - Blue Sage [*Encelia virginensis* var. *actonii-Salvia dorrii*] (Keeler-Wolf and Thomas 2000)

33.027.00 Creosote Bush - Brittlebush Scrub [*Larrea tridentata-Encelia farinosa*] (Keeler-Wolf and Thomas 2000) Includes former 33.010.04 Creosote Bush - Brittlebush [*Larrea tridenata-Encelia farinosa*] (Spolsky 1979)

33.027.01 Creosote Bush - Brittlebush / Arizona Honeysweet [*Larrea tridentata-Encelia farinosa/Tidestromia oblongifolia*] (Keeler-Wolf and Thomas 2000)
33.027.02 Creosote Bush - Brittlebush - Sweetbush [*Larrea tridentata-Encelia farinosa-Bebbia juncea*] (Keeler-Wolf and Thomas 2000)
33.027.03 Creosote Bush - Brittlebush - White Bursage [*Larrea tridentata-Encelia farinosa-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
33.027.04 Creosote Bush - Brittlebush - Ocotillo [*Larrea tridentata-Encelia farinosa-Fouquieria splendens*] (Keeler-Wolf 2001)

33.030.00 Brittlebush Drought Deciduous Scrub [*Encelia farinosa*]
33.030.01 Brittlebush-succulent scrub [*Encelia farinosa*-succulent]
*33.030.02 Brittlebush-Desert Fir [*Encelia farinosa-Peucephyllum schottii*] (Keeler-Wolf *et al*. 1998)
*33.030.03 Brittlebush-California Buckwheat-Agave [*Encelia farinosa-Eriogonum fasciculatum-Agave deserti*] (Keeler-Wolf *et al*. 1998)

*33.031.00 Acton Encelia [*Encelia actoni*]

33.032.00 Desert Sunflower Drought Deciduous Scrub [*Viguiera parishii*] (Keeler-Wolf *et al.* 1998)
*33.032.01 Desert Sunflower-Agave [*Viguiera parishii-Agave deserti*] (Keeler-Wolf *et al.* 1998)
33.032.02 Desert Sunflower-California Buckwheat [*Viguiera parishii-Eriogonum fasciculatum*] (Keeler-Wolf *et al*. 1998)

*33.033.00 Net-veined Viguiera Scrub [*Viguiera reticulata*] (Keeler-Wolf and Thomas 2000)
*33.033.01 Net-veined Viguiera [*Viguiera reticulata*] (Keeler-Wolf and Thomas 2000)

33.040.00 Catclaw Acacia Thorn Scrub [*Acacia greggii*]
33.040.01 Catclaw Acacia-wash association [*Acacia greggii*] (Keeler-Wolf *et al.* 1998)
33.040.02 Catclaw Acacia Savanna [*Acacia greggii-Bromus madritensis*] (Keeler-Wolf *et al*. 1998)
33.040.03 Catclaw Acacia / Desert Lavender [*Acacia greggii-Hyptis emoryi*] (Keeler-Wolf and Thomas 2000)
33.040.04 Catclaw Acacia / Cheesebush [*Acacia greggii/Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)
33.040.05 Catclaw Acacia - Cheesebush - Virgin River Encelia [*Acacia greggii-Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)
33.040.06 Catclaw Acacia - Desert Sunflower [*Acacia greggii-Viguiera parishii*] (Keeler-Wolf and Thomas 2000)
33.040.07 Catclaw Acacia - Desert Almond [*Acacia greggii-Prunus fasciculatum*] (Keeler-Wolf and Thomas 2000)
*33.040.08 Catclaw Acacia - Woolly Bursage [*Acacia greggii-Ambrosia eriocentra*] (Keeler-Wolf and Thomas 2000)
33.040.09 Catclaw Acacia - Blue Sage [*Acacia greggii-Salvia dorrii*] (Keeler-Wolf and Thomas 2000)
33.040.10 Catclaw Acacia - Sweetbush [*Acacia greggii-Bebbia juncea*] (Keeler-Wolf 2001)
*33.040.11 Catclaw Acacia/Naked buckwheat [*Acacia greggii/Eriogonum nudum* var. *pauciflorum*] (Wirka and Barbour 1997)

*33.050.00 Teddy-bear Cholla Succulent Scrub [*Opuntia bigelovii*]

33.060.00 White Bursage Dwarf Scrub [*Ambrosia dumosa*]
*33.060.01 White Bursage -Rayless Goldenhead [*Ambrosia dumosa -Acamptopappus sphaerocephalus*] association (Keeler-Wolf *et al.* 1998)
*33.060.02 White Bursage [*Ambrosia dumosa*], terrace association (Keeler-Wolf *et al*. 1998)
33.060.03 White Bursage - Desert-holly [*Ambrosia dumosa-Atriplex hymenolytra*] (Keeler-Wolf and Thomas 2000)

*33.060.04 White Bursage - Big Galleta [*Ambrosia dumosa-Pleuraphis rigida*] (Keeler-Wolf 2001)
33.060.05 White Bursage - California Buckwheat [*Ambrosia dumosa-Eriogonum fasciculatum*] (Keeler-Wolf 2001)

*33.061.00 moved to 33.140.41

*33.062.00 Wand Holdback Unique Stands [*Caesalpinia virgata*]

33.070.00 Mojave Yucca Scrub [*Yucca schidigera*]
33.070.01 Mojave Yucca [*Yucca schidigera*] (Keeler-Wolf and Thomas 2000)

33.070.02 Mojave Yucca - Blackbush [*Yucca schidigera-Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)
33.070.02 Mojave Yucca - Nevada Ephedra [*Yucca schidigera-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
33.070.03 Mojave Yucca - White Bursage [*Yucca schidigera-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
33.070.05 Mojave Yucca - Creosote Bush - White Bursage [*Yucca schidigera-Larrea tridentata-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
33.070.06 Mojave Yucca - Creosote Bush - Nevada Ephedra [*Yucca schidigera-Larrea tridentata-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
33.070.07 Mojave Yucca - California Buckwheat [*Yucca schidigera-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
*33.070.08 Mojave Yucca - Buckhorn Cholla [*Yucca schidigera-Opuntia acanthocarpa*] (Keeler-Wolf and Thomas 2000)
33.070.09 Mojave Yucca - Desert Sunflower [*Yucca schidigera-Viguiera parishii*] (Keeler-Wolf and Thomas 2000)
*33.070.10 Mojave Yucca - Creosote Bush - (Jojoba) [*Yucca schidigera-Larrea tridentata-(Simmondsia chinensis)*] (Keeler-Wolf and Thomas 2000)

*33.075.00 Desert Agave succulent-leaved scrub [*Agave deserti*]
*33.075.01 Desert Agave wash terrace [*Agave deserti*] (Keeler-Wolf *et al*. 1998)
*33.075.02 Desert Agave-Mojave Yucca [*Agave deserti-Yucca schidigera*] (Keeler-Wolf *et al*. 1998)

*33.080.00 Nolina [*Nolina* spp.]
*33.080.01 Parry's Nolina [*Nolina parryi*] (Keeler-Wolf and Thomas 2000)

*33.090.00 Ocotillo open-tall scrub [*Fouquieria splendens*]

*33.100.00 All-thorn Tall Scrub Unique Stands [*Koeberlinia spinosa*] {75300}

*33.110.00 Crucifixion-thorn Tall ScrubUnique Stands [*Castela emoryi*] {75200}

*33.120.00 Elephant Tree Unique Stands [*Bursera microphylla*] {75100}

33.130.00 Brittlebush - White Bursage Dwarf Scrub [*Encelia farinosa-Ambrosia dumosa*]

33.140.00 Creosote Bush - White Bursage Scrub [*Larrea tridentata-Ambrosia dumosa*]
33.140.01 Rocky sides of hills and mountains (McHargue 1973)
33.140.02 Rocky bajadas (McHargue 1973)
33.140.03 Gravelly bajadas (McHargue 1973)
33.140.04 Sonoran Creosote Bush Scrub [*Larrea tridentata*] (Spolsky 1979){33100}
33.140.05 Uniform Creosote Scrub [*Larrea tridentata*] (Spolsky 1979)
33.140.06 Mojave Creosote Bush Scrub [*Larrea tridentata*] {34100}

*33.140.07	Creosote bush-White bursage-Indigo Bush [*Larrea tridentata-Ambrosia dumosa-Psorothamnus schottii*] (Keeler-Wolf *et al*. 1998)
*33.140.08	Creosote bush-White bursage-California croton [*Larrea tridentata-Ambrosia dumosa-Croton californica*]
33.140.09	Creosote Bush-White Bursage-Desert-holly [*Larrea tridentata-Ambrosia dumosa-/Atriplex hymenelytra*] (Keeler-Wolf *et al*. 1998)
*33.140.10	Creosote Bush-White Bursage-Galium-Lyrocarpa [*Larrea tridentata-Ambrosia dumosa-Galium angustifolium-Lyrocarpa coulteri*] (Keeler-Wolf *et al*. 1998)
33.140.11	Creosote Bush - White Bursage - Mojave Yucca [*Larrea tridentata-Ambrosia dumosa-Yucca schidigera*] (Keeler-Wolf and Thomas 2000)
33.140.12	Creosote Bush - White Bursage - Desert Sunflower [*Larrea tridentata-Ambrosia dumosa-Viguiera parishii*] (Keeler-Wolf and Thomas 2000)
33.140.13	Creosote Bush - White Bursage - Spiny Senna [*Larrea tridentata-Ambrosia dumosa-Senna armata*] (Keeler-Wolf and Thomas 2000)
33.140.14	Creosote Bush - White Bursage - Bladder Sage [*Larrea tridentata-Ambrosia dumosa-Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)
33.140.15	Creosote Bush - White Bursage - Mojave indigo-bush [*Larrea tridentata-Ambrosia dumosa-Psorothamnus arborescens*] (Keeler-Wolf and Thomas 2000)
33.140.16	Creosote Bush - White Bursage - Fremont's indigo-bush [*Larrea tridentata-Ambrosia dumosa-Psorothamnus fremontii*] (Keeler-Wolf and Thomas 2000)
*33.140.17	Creosote Bush - White Bursage - Big Galleta [*Larrea tridentata-Ambrosia dumosa-Pleuraphis rigida*] (Keeler-Wolf and Thomas 2000)
33.140.18	Creosote Bush - White Bursage - Pencil Cactus [*Larrea tridentata-Ambrosia dumosa-Opuntia ramosissima*] (Keeler-Wolf and Thomas 2000)
33.140.19	Creosote Bush - White Bursage - Anderson's Wolfberry [*Larrea tridentata-Ambrosia dumosa-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)
33.140.20	Creosote Bush - White Bursage - Nevada Ephedra [*Larrea tridentata-Ambrosia dumosa-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
33.140.21	Creosote Bush - White Bursage - Desert Peppergrass [*Larrea tridentata-Ambrosia dumosa-Lepidium fremontii*] (Keeler-Wolf and Thomas 2000)
33.140.22	Creosote Bush - White Bursage - White Rhatany [*Larrea tridentata-Ambrosia dumosa-Krameria grayi*] (Keeler-Wolf and Thomas 2000)
33.140.23	Creosote Bush - White Bursage Pima Rhatany [*Larrea tridentata-Ambrosia dumosa-Krameria erecta*] (Keeler-Wolf and Thomas 2000)
*33.140.24	Creosote Bush - White Bursage - Thurber's Sandpaper Plant [*Larrea tridentata-Ambrosia dumosa-Petalonyx thurberi*] (Keeler-Wolf and Thomas 2000)
33.140.25	Creosote Bush - White Bursage - Matchweed spp. [*Larrea tridentata-Ambrosia dumosa-Gutierrezia* spp.] (Keeler-Wolf and Thomas 2000)
33.140.26	Creosote Bush - White Bursage - Hop-sage [*Larrea tridentata-Ambrosia dumosa-Grayia spinosa*] (Keeler-Wolf and Thomas 2000)
33.140.27	Creosote Bush - White Bursage - Desert Trumpet [*Larrea tridentata-Ambrosia dumosa-Eriogonum inflatum*] (Keeler-Wolf and Thomas 2000)
33.140.28	Creosote Bush - White Bursage - California Buckwheat [*Larrea tridentata-Ambrosia dumosa-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
*33.140.29	Creosote Bush - White Bursage - Death Valley Ephedra [*Larrea tridentata-Ambrosia dumosa-Ephedra funerea*] (Keeler-Wolf and Thomas 2000)
*33.140.30	Creosote Bush - White Bursage - Desert Tea [*Larrea tridentata-Ambrosia dumosa-Ephedra californica*] (Keeler-Wolf and Thomas 2000)
*33.140.31	Creosote Bush - White Bursage - Virgin River Encelia [*Larrea tridentata-Ambrosia dumosa-Encelia virginensis*] (Keeler-Wolf and Thomas 2000)
33.140.32	Creosote Bush - White Bursage - Brittlebush [*Larrea tridentata-Ambrosia dumosa-Encelia farinosa*] (Keeler-Wolf and Thomas 2000)
*33.140.33	Creosote Bush - White Bursage - Barrel Cactus [*Larrea tridentata-Ambrosia dumosa-Echinocactus polycephalus*] (Keeler-Wolf and Thomas 2000)
*33.140.34	Creosote Bush - White Bursage - Downy Dalea [*Larrea tridentata-Ambrosia dumosa-Dalea mollissima*] (Keeler-Wolf and Thomas 2000)

*33.140.35 Creosote Bush - White Bursage - Cryptogrammic crust [*Larrea tridentata-Ambrosia dumosa*-Cryptogrammic crust] (Keeler-Wolf and Thomas 2000)

33.140.36 Creosote Bush - White Bursage - Sweetbush [*Larrea tridentata-Ambrosia dumosa-Bebbia juncea*] (Keeler-Wolf and Thomas 2000)

33.140.37 Creosote Bush - White Bursage - Fourwing Saltbush [*Larrea tridentata-Ambrosia dumosa- Atriplex canescens*] (Keeler-Wolf and Thomas 2000)

33.140.38 Creosote Bush - White Bursage -Allscale [*Larrea tridentata-Ambrosia dumosa-Atriplex polycarpa*] (Keeler-Wolf and Thomas 2000)

33.140.39 Creosote Bush - White Bursage - Shadscale [*Larrea tridentata-Ambrosia dumosa-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)

33.140.40 Creosote Bush - White Bursage - Fremont's Chaff-bush [*Larrea tridentata-Ambrosia dumosa-Amphipappus fremontii*] (Keeler-Wolf and Thomas 2000)

33.140.41 Creosote Bush - White Bursage -Fagonia [*Larrea tridentata-Ambrosia dumosa-Fagonia laevis*] (Keeler-Wolf *et al.* 1998*)*

*33.150.00 Foothill Palo Verde - Saguaro Tall Scrub [*Cercidum microphyllum-Carnegia gigantea*] {75400}

33.160.00 Bladderpod - California Ephedra - Narrowleaf Goldenbush Scrub [*Isomeris arborea-Ephedra californica-Ericameria linearifolia*] {23300}

*33.160.01 Monvero Dunes Association

*33.170.00 Joshua Tree Tall Scrub and Open Woodland [*Yucca brevifolia*]

*33.170.01 Joshua Tree Woodland [*Yucca brevifolia*] {73000}

*33.170.02 Joshua Tree / Blackbush [*Yucca brevifolia-Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)

*33.170.03 Joshua Tree - California Juniper / Blackbush [*Yucca brevifolia-Juniperus californica/Coleogyne ramosissima*] (Keeler-Wolf 2001)

*33.170.04 Joshua Tree / Big Sagebrush - Shadscale [*Yucca brevifolia/Artemisia tridentata-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)

*33.170.05 Joshua Tree / Creosote Bush - Nevada Ephedra [*Yucca brevifolia/Larrea tridentata-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)

*33.170.06 Joshua Tree / Buckhorn Cholla [*Yucca brevifolia/Opuntia acanthocarpa*] (Keeler-Wolf and Thomas 2000)

*33.170.07 Joshua Tree / Galleta spp. [*Yucca brevifolia/Pleuraphis* sp.] (Keeler-Wolf and Thomas 2000)

*33.170.08 Joshua Tree / Anderson's Wolfberry [*Yucca brevifolia/Lycium andersonii*] (Keeler-Wolf and Thomas 2000)

*33.170.09 Joshua Tree / Bladder Sage [*Yucca brevifolia/Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)

*33.170.10 Joshua Tree / Mojave Yucca - Creosote Bush [*Yucca brevifolia/Yucca schidigera-Larrea tridentata*] (Keeler-Wolf and Thomas 2000)

*33.170.11 Joshua Tree / Creosote Bush - White Bursage - California Buckwheat [*Yucca brevifolia/Larrea tridentata-Ambrosia dumosa-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)

33.180.00 Hop-sage Scrub [*Grayia spinosa*]

33.180.01 Hop-sage [*Grayia spinosa*] (Keeler-Wolf and Thomas 2000)

33.180.02 Hop-sage - Shadscale [*Grayia spinosa-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)

33.180.03 Hop-sage - Creosote Bush [*Grayia spinosa-Larrea tridentata*] (Keeler-Wolf and Thomas 2000)

33.180.04 Hop-sage - Anderson's Wolfberry [*Grayia spinosa-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)

*33.180.05 Hop-sage - Round-leaved Buckwheat [*Grayia spinosa-Eriogonum ovalifolium*] (Keeler-Wolf and Thomas 2000)

33.190.00 Desert Lavender Wash Scrub [*Hyptis emoryi*] (Keeler-Wolf *et al*. 1998)

33.200.00 Cheesebush Scrub [*Hymenoclea salsola*]
- 33.200.01 Cheesebush-wash association [*Hymenoclea salsola*] (Keeler-Wolf *et al.* 1998)
- 33.200.02 Cheesebush-California Buckwheat [*Hymenoclea salsola-Eriogonum fasciculatum*] (Keeler-Wolf *et al*. 1998)
- 33.200.03 Cheesebush - Blackstem Rabbitbrush [*Hymenoclea salsola-Chrysothamnus paniculatus*] (Keeler-Wolf and Thomas 2000)
- 33.200.04 Cheesebush - Shadscale [*Hymenoclea salsola-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)
- 33.200.05 Cheesebush - Sweetbush [*Hymenoclea salsola-Bebbia juncea*] (Keeler-Wolf and Thomas 2000)
- *33.200.06 Cheesebush -Woolly Bursage [*Hymenoclea salsola-Ambrosia eriocentra*] (Keeler-Wolf and Thomas 2000)
- 33.200.07 Cheesebush - Woolly Brickellia [*Hymenoclea salsola-Brickellia incana*] (Keeler-Wolf and Thomas 2000)
- 33.200.08 Cheesebush - Spiny Senna [*Hymenoclea salsola-Senna armata*] (Keeler-Wolf and Thomas 2000)

33.210.00 Sonoran Mixed Woody and Succulent Scrub {33220}

33.211.00 Mojave Mixed Woody Scrub {34210}

33.212.00 Mojave Mixed Steppe{34220}

33.213.00 Mojave Wash Scrub {34250}

*33.220.00 Desert Apricot [*Prunus fremontii*] (Keeler-Wolf *et al.* 1998){37400}

*33.225.00 Graythorn Unique Stand [*Ziziphus obtusifolia*] (Keeler-Wolf 2001)

*33.230.00 Hackberry Scrub [*Celtis laevigata*] (Keeler-Wolf and Thomas 2000)

*33.240.00 Stanbury's Antelope Brush Scrub [*Purshia mexicana*] (Keeler-Wolf and Thomas 2000)

*33.260.00 Sweetbush Riparian Scrub [*Bebbia juncea*] (Keeler-Wolf and Thomas 2000)

*33.270.00 California Ephedra [*Ephedra californica*] (Keeler-Wolf and Thomas 2000)
- 33.270.01 California Ephedra - Cheesebush [*Ephedra californica-Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)

33.280.00 Nevada Ephedra Scrub [*Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
- 33.280.01 Nevada Ephedra [*Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
- 33.280.02 Nevada Ephedra - Shadscale [*Ephedra nevadensis-Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)
- 33.280.03 Nevada Ephedra - Bladder Sage [*Ephedra nevadensis-Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)
- 33.280.04 Nevada Ephedra [*Ephedra nevadensis- Lyceum andersonii*] (Keeler-Wolf and Thomas 2000)

33.290.00 Spiny Menodora Scrub [*Menodora spinescens*] (Keeler-Wolf and Thomas 2000)

33.300.00 Desert Almond Scrub [*Prunus fasciculata*] (Keeler-Wolf and Thomas 2000)
- 33.300.01 Desert Almond [*Prunus fasciculata*] (Keeler-Wolf and Thomas 2000)

33.300.02 Desert Almond - Bladder Sage [*Prunus fasciculata-Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)
*33.300.03 Desert Almond - Skunkbrush [*Prunus fasciculata-Rhus trilobata*] (Keeler-Wolf and Thomas 2000)
*33.300.04 Desert Almond - Stanbury's Antelope Bush [*Prunus fasciculata-Purshia mexicana*] (Keeler-Wolf and Thomas 2000)
*33.300.05 Desert Almond - Woolly Bursage [*Prunus fasciculata-Ambrosia eriocentra*] (Keeler-Wolf and Thomas 2000)
*33.300.06 Desert Almond - Net-veined Viguiera - (Utah Mortonia) [*Prunus fasciculata-Viguiera reticulata-(Mortonia utahensis)*] (Keeler-Wolf and Thomas 2000)

33.310.00 Bladder Sage Scrub [*Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)
33.310.01 Bladder Sage [*Salazaria mexicana*] (Keeler-Wolf and Thomas 2000)

*33.320.00 Blue Sage Dwarf Scrubland [*Salvia dorrii*] (Keeler-Wolf and Thomas 2000)
*33.320.01 Blue Sage [*Salvia dorrii*] (Keeler-Wolf and Thomas 2000)

*33.330.00 Arizona Honeysweet Scrub [*Tidestromia oblongifolia*] (Keeler-Wolf and Thomas 2000)

*33.340.00 Chuparosa Scrub [*Justicia californica*] (Keeler-Wolf 2001)

*33.350.00 Chuckawallabush [*Tetracoccus hallii*] unique stands (Keeler-Wolf 2001)

33.360.00 Anderson's Wolfberry [*Lycium andersonii*] (Keeler-Wolf 2001)
33.360.01 Anderson's Wolfberry - Jojoba - Big Galleta [*Lycium andersonii-Simmondsia chinensis-Pleuraphis rigida*] (Keeler-Wolf 2001)

35.000.00 Great Basin Scrub

35.100.00 Sagebrush Scrub [*Artemisia* spp.] {35200}

35.101.00 Subalpine Sagebrush Scrub [*Artemisia* spp.] {35220}

35.102.00 Sagebrush Steppe [*Artemisia* spp.] {35300}

35.110.00 Big Sagebrush Scrub [*Artemisia tridentata*] {35210}
35.110.01 Big Sagebrush - Rubber Rabbitbrush [*Artemisia tridentata-Chrysothamnus nauseosus*] (Ferren & Davis 1991)
*35.110.02 Big Sagebrush [*Artemisia tridentata*] (Gordon & White 1994)
35.110.03 Desert Slope Sagebrush (Spolsky 1979)
35.110.04 Big Sagebrush - Desert Snowberry [*Artemisia tridentata-Symphoricarpos longiflorus*] (Taylor 1980)
35.110.05 Big Sagebrush - Blackbush [*Artemisia tridentata-Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)
35.110.06 Big Sagebrush - Virgin River Encelia [*Artemisia tridentata-Encelia virginensis*] (Keeler-Wolf and Thomas 2000)
35.110.07 Big Sagebrush - Antelope Bitterbrush [*Artemisia tridentata-Purshia tridentata*] (Keeler-Wolf and Thomas 2000)
35.110.08 Big Sagebrush - Green Ephedra [*Artemisia tridentata-Ephedra viridis*] (Keeler-Wolf and Thomas 2000)
35.110.09 Big Sagebrush / Mountain Monardella [*Artemisia tridentata/Monardella odoratissima*] (Keeler-Wolf and Moore 2001)
35.110.10 Mountain Big Sagebrush / Shorthair Sedge [*Artemisia tridentata* var. *vaseyana/Carex filifolia*] (Keeler-Wolf and Moore 2001)

35.120.00 Low Sagebrush Dwarf Scrub [*Artemisia arbuscula*]

*35.120.01 Low Sagebrush / Mono Clover [*Artemisia arbuscula/Trifolium monoense*] (Major & Taylor 1977)
35.120.02 Low Sagebrush / Stemless Haplopappus [*Artemisia arbuscula/Stenotus acaulis*] (Major & Taylor 1977)
*35.120.03 Low Sagebrush / Idaho Fescue [*Artemisia arbuscula/Festuca idahoensis*] (Stillman 1980)
35.120.04 Low Sagebrush / Prickly Phlox [*Artemisia arbuscula/Leptodactylon pungens*] (Keeler-Wolf and Moore 2001)
*35.120.05 Low Sagebrush / slender buckwheat [*Artemisia arbuscula-Eriogonum microthecum*] (Keeler-Wolf and Moore 2001)

35.130.00 Black Sagebrush Dwarf Scrub [*Artemisia nova*] {47000}
*35.130.01 Southern Montane Black Sagebrush Pebble Plains [*Artemisia nova*]
*35.130.02 Black Sagebrush - Engelmann's Hedgehog Cactus [*Artemisia nova-Echinocereus engelmanii*] (Keeler-Wolf and Thomas 2000)
*35.130.03 Black Sagebrush - Cheesebush [*Artemisia nova-Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)

*35.140.00 Rothrock Sagebrush Scrub [*Artemisia rothrockii*]
*35.140.01 Rothrock Sagebrush / Heretic Penstemon [*Artemisia rothrockii/Penstemon heterodoxus*] (Benedict 1983)
*35.140.02 Rothrock Sagebrush / Mountain Monardella [*Artemisia rothrockii/Monardella odoratissima*] (Taylor 1984)
*35.140.03 Rothrock Sagebrush (*Artemisia rothrockii*) Holcomb Valley, San Bernardino Mtns (CNPS veg-fest 2000)

*35.150.00 Silver Sagebrush Scrub [*Artemisia cana*] (Keeler-Wolf and Moore 2001)

35.200.00 Antelope Bitterbrush Scrub [*Purshia tridentata*]
35.200.01 Antelope Bitterbrush - Big Sagebrush - Horesebush [*Purshia tridentata-Artemisia tridentata-Tetradymia canescens*] (Keeler-Wolf and Moore 2001)
35.200.02 Antelope Bitterbrush - Big Sagebrush / Indian Ricegrass [*Purshia tridentata-Artemisia tridentata/Achnatherum hymenoides*] (Keeler-Wolf and Moore 2001)
35.200.03 Antelope Bitterbrush - Big Sagebrush - Round-leaf Snowberry [*Purshia tridentata-Artemisia tridentata-Symphoricarpos rotundifolia*] (Keeler-Wolf and Moore 2001)
35.200.04 Antelope Bitterbrush / Nelson's Needlegrass [*Purshia tridentata/Achnatherum nelsonii*] (Keeler-Wolf and Moore 2001)
35.200.05 Antelope Bitterbrush / Sulphur-flower Buckwheat [*Purshia tridentata/Eriogonum umbellatum*] (Keeler-Wolf and Moore 2001)

35.300.00 Rabbitbrush Scrub [*Chrysothamnus* spp.]

35.310.00 Rubber Rabbitbrush Scrub [*Chrysothamnus nauseosus*]

*35.320.00 Parry Rabbitbrush Dwarf Scrub [*Chrysothamnus parryi*] {35410}

35.330.00 Needle-leaved Rabbitbrush [*Chrysothamnus teretifolius*] {39000}

35.340.00 Blackstem Rabbitbrush [*Chrysothamnus paniculatus*] (Keeler-Wolf and Thomas 2000)

36.000.00 Chenopod Scrub {36000}

36.100.00 Iodine Bush Succulent Scrub [*Allenrolfea occidentalis*]

*36.110.00 Great Valley Iodine Bush Scrub [*Allenrolfea occidentalis*]

*36.120.00 Desert Iodine Bush Scrub [*Allenrolfea occidentalis*]

- *36.120.01 Saltgrass - Iodine Bush [*Distichlis spicata- Allenrolfea occidentalis*] (Bradley 1970)
- *36.120.02 Bush Seepweed - Iodine Bush [*Suaeda moquinii-Allenrolfea occidentalis*] (Bradley 1970)
- *36.120.03 Alkali Sacaton - Iodine Bush [*Sporobolus airoides-Allenrolfea occidentalis*] (Odion *et al* 1992)
- *36.120.04 Iodine Bush [*Allenrolfea occidentalis*] (McHargue 1973)

36.200.00 Bush Seepweed Scrub [*Suaeda moquinii*]

- *36.200.01 Great Valley Bush Seepweed Scrub [*Suaeda moquinii*]
- *36.200.02 Desert Bush Seepweed Scrub [*Suaeda moquinii*]
- 36.200.03 Bush Seepweed - Iodine Bush [*Suaeda moquinii-Allenrolfea occidentalis*] (Bradley 1970)
- 36.200.04 Bush Seepweed - Fourwing Saltbush [*Suaeda moquinii-Atriplex canescens*] (Keeler-Wolf and Thomas 2000)

36.300.00 Saltbush Scrub and Dwarf Scrub [*Atriplex* spp.]

36.301.00 Desert Saltbush Scrub [*Atriplex* spp.] {36110}

36.302.00 Valley Saltbush Scrub [*Atriplex* spp.] {36220}

36.303.00 Interior Coast Range Saltbush Scrub [*Atriplex* spp.] {36320}

36.310.00 Fourwing Saltbush Scrub [*Atriplex canescens*]

- 36.310.01 Fourwing Saltbush [*Atriplex canescens*] (Keeler-Wolf 2001)

36.320.00 Shadscale Scrub [*Atriplex confertifolia*] {36140}

- *36.320.01 Greasewood - Shadscale [*Sarcobatus vermiculatus-Atriplex confertifolia*] (Ferren & Davis 1991)
- 36.320.02 Shadscale - Nevada Ephedra [*Atriplex confertifolia-Ephedra nevadensis*] (Ferren & Davis 1991)
- 36.320.03 Shadscale - White Bursage [*Atriplex confertifolia-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
- 36.320.04 Shadscale - Blackbush [*Atriplex confertifolia-Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)
- 36.320.05 Shadscale - Sticky Snakeweed - Catclaw Horsebrush [*Atriplex confertifolia-Guterriezia microchephala-Tetradymia axillaris*] (Keeler-Wolf and Thomas 2000)
- 36.320.06 Shadscale - Fourwing Saltbush [*Atriplex confertifolia-Atriplex canescens*] (Keeler-Wolf and Thomas 2000)
- 36.320.07 Shadscale - Anderson's Wolfberry [*Atriplex confertifolia-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)
- 36.320.08 Shadscale - Winter Fat [*Atriplex confertifolia-Krascheninnikovia lanata*] (Keeler-Wolf and Thomas 2000)
- 36.320.09 Shadscale - Virgin River Encelia - Hop-sage [*Atriplex confertifolia-Encelia virginensis-Grayia spinosa*] (Keeler-Wolf and Thomas 2000)

36.330.00 Desert-holly Scrub [*Atriplex hymenelytra*]

- 36.330.01 Desert-holly [*Atriplex hymenelytra*] (Keeler-Wolf and Thomas 2000)
- 36.330.02 Desert-holly - White Bursage [*Atriplex hymenelytra-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
- 36.330.03 Desert-holly - Creosote Bush - White Bursage [*Atriplex hymenelytra-Larrea tridentata-Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
- 36.330.04 Desert-holly - Arizona Honeysweet [*Atriplex hymenelytra-Tidestromea oblongifolia*] (Keeler-Wolf and Thomas 2000)

36.340.00 Allscale Scrub [*Atriplex polycarpa*] {23200}

*36.341.00 Great Valley Allscale Scrub [*Atriplex polycarpa*] {36220}

*36.342.00 Sierra-Tehachapi Saltbush Scrub [*Atriplex* spp.] {36310}

*36.350.00 Spinescale Scrub [*Atriplex spinifera*]

*36.351.00 Great Valley Spinescale Scrub [*Atriplex spinifera*] {36220}

36.360.00 Mixed Saltbush [*Atriplex* spp.]
- 36.360.01 Mixed Saltbush [*Atriplex* spp.] (McHargue 1973)
- 36.360.02 Allscale - Shadscale [*Atriplex polycarpa-Atriplex confertifolia*] (Yoder *et al*. 1983)

36.370.00 Quailbush Scrub [*Atriplex lentiformis*]
- 36.370.01 Big Saltbush - Allscale Scrub [*Atriplex lentiformis*] (Keeler-Wolf, Vaghti 2000)

*36.400.00 Greasewood Scrub [*Sarcobatus vermiculatus*] {36130}

*36.500.00 Winter Fat dwarf scrub [*Krascheninnikovia lanata*]

36.600.00 Valley Saltbush Scrub [*Atriplex* spp.]

36.700.00 Desert Sink Scrub {36210}

36.800.00 Valley Sink Scrub {36210}

37.000.00 Undifferentiated Chaparral Scrubs {37000}
- 37.000.01 Northern Mixed Chaparral {37110}
- *37.000.02 Gabbroic Northern Mixed Chaparral {37111}
- *37.000.03 Mafic Southern Mixed Chaparral {37122}
- 37.000.04 Semi-Desert Chaparral {37400}
- 37.000.05 Mixed Montane Chaparral {37510}
- *37.000.06 Mixed Serpentine Chaparral {37610}
- 37.000.07 Northern North Slope Chaparral {37E10}
- 37.000.08 Coastal Sage Chaparral Scrub {37G00}
- 37.000.09 Island Chaparral {37700}

37.100.00 Chaparral with Chamise with or without other codominant shrubs {37200}

37.101.00 Chamise Chaparral [*Adenostoma fasciculatum*]
- 37.101.01 Chamise - Bigberry Manzanita [*Adenostoma fasciculatum-Arctostaphylos glauca*] (Gordon & White 1994)
- 37.101.02 Chamise - Black Sage [*Adenostoma fasciculatum-Salvia mellifera*] (Gordon & White 1994)
- 37.101.03 Chamise - California Buckwheat - White Sage [*Adenostoma fasciculatum-Eriogonum fasciculatum-Salvia apiana*] (Gordon & White 1994)
- 37.101.04 Chamise - Chaparral Yucca [*Adenostoma fasciculatum-Yucca whipplei*] (Gordon & White 1994)
- 37.101.05 Chamise - Cupleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus greggii*] (Gordon & White 1994)
- *37.101.06 Chamise - Cupleaf Ceanothus - Mafic Soils [*Adenostoma fasciculatum-Ceanothus greggii*] (Gordon & White 1994)

37.101.07 Chamise - Eastwood Manzanita [*Adenostoma fasciculatum-Arctostaphylos glandulosa*] (Gordon & White 1994)
37.101.08 Chamise - Hoaryleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus crassifolius*] (Gordon & White 1994)
37.101.09 Chamise - Scrub Oak [*Adenostoma fasciculatum-Quercus berberidifolia*] (Gordon & White 1994)
37.101.10 Chamise - Wedgeleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus cuneatus*] (Gordon & White 1994)
37.101.11 Chamise - Woollyleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus tomentosus*] (Gordon & White 1994)
*37.101.12 Chamise / Bush Monkeyflower [*Adenostoma fasciculatum/Mimulus aurantiacus*] (Keeler-Wolf, *et al*. 2001)

37.102.00 Chamise - Black Sage Chaparral [*Adenostoma fasciculatum-Salvia mellifera*]
*37.102.01 Southern Maritime Chaparral {37C30}
37.102.02 Chamise - Black Sage / Herb [*Adenostoma fasciculatum-Salvia mellifera*/Herb] (Hogan & Sawyer 1996)
*37.102.03 Chamise - Black Sage - Mixed Shrub [*Adenostoma fasciculatum-Salvia mellifera*/Mixed Shrub] (Hogan & Sawyer 1996)

37.103.00 Chamise - White Sage Chaparral [*Adenostoma fasciculatum-Salvia apiana*]
37.103.01 Chamise - White Sage [*Adenostoma fasciculatum-Salvia apiana*] (Gordon & White 1994)

37.104.00 Chamise - Bigberry Manzanita Chaparral [*Adenostoma fasciculatum- Arctostaphylos glauca*]
37.104.01 Chamise - Bigberry Manzanita [*Adenostoma fasciculatum-Arctostaphylos glauca*] (Gordon & White 1994)
37.104.02 Chamise - Bigberry Manzanita - Chaparral Whitethorn [*Adenostoma fasciculatum-Arctostaphylos glauca-Ceanothus leucodermis*] (Gordon & White 1994)
37.104.03 Chamise - Bigberry Manzanita - Chaparral-Yucca [*Adenostoma fasciculatum-Arctostaphylos glauca-Yucca whipplei*] (Gordon & White 1994)
37.104.04 Chamise - Bigberry Manzanita - Cupleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glauca-Ceanothus gregii*] (Gordon & White 1994)
37.104.05 Chamise - Bigberry Manzanita - Hoaryleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glauca-Ceanothus crassifolius*] (Gordon & White 1994)
37.104.06 Chamise - Bigberry Manzanita - Scrub Oak [*Adenostoma fasciculatum-Arctostaphylos glauca-Quercus berberidifolia*] (Gordon & White 1994)
37.104.07 Chamise - Bigberry Manzanita - Wedgeleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glauca-Ceanothus cuneatus*] (Gordon & White 1994)

37.105.00 Chamise - Cupleaf Ceanothus Chaparral [*Adenostoma fasciculatum-Ceanothus greggii*]
37.105.01 Chamise - Cupleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus greggii*] (Gordon & White 1994)
*37.105.02 Chamise / Mafic Soils [*Adenostoma fasciculatum*] (Gordon & White 1994)

37.106.00 Chamise - Eastwood Manzanita Chaparral [*Adenostoma fasciculatum- Arctostaphylos glandulosa*]
37.106.01 Chamise - Eastwood Manzanita - Birchleaf Mountain-mahogany [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Cercocarpus betuloides*] (Gordon & White 1994)
37.106.02 Chamise - Eastwood Manzanita - Chaparral Whitethorn [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Ceanothus leucodermis*] (Gordon & White 1994)

37.106.03 Chamise - Eastwood Manzanita - Cupleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Ceanothus greggii*] (Gordon & White 1994)

37.106.04 Chamise - Eastwood Manzanita - Hoaryleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Ceanothus crassifolius*] (Gordon & White 1994)

37.106.05 Chamise - Eastwood Manzanita / Mafic Soils [*Adenostoma fasciculatum-Arctostaphylos glandulosa*] (Gordon & White 1994)

37.106.06 Chamise - Eastwood Manzanita - Birchleaf Mountain-mahogany [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Cercocarpus betuloides*] (Gordon & White 1994)

37.106.07 Chamise - Eastwood Manzanita - Wedgeleaf Ceanothus [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Ceanothus cuneatus*] (Gordon & White 1994)

37.106.08 Chamise - Eastwood Manzanita [*Adenostoma fasciculatum-Arctostaphylos glandulosa*] (Parker 1990)

37.106.09 Chamise - Eastwood Manzanita - Musk Brush / Serpentine Reed Grass [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Ceanothus jepsonii/Calamagrostis ophitidis*] (Keeler-Wolf, *et al*. 2001)

37.106.10 Chamise - Eastwood Manzanita - Interior Live Oak [*Adenostoma fasciculatum-Arctostaphylos glandulosa-Quercus wislizeni*] (Keeler-Wolf, *et al*. 2001)

37.107.00 Chamise - Hoaryleaf Ceanothus Chaparral [*Adenostoma fasciculatum-Ceanothus crassifolius*]

37.107.01 Chamise - Hoaryleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus crassifolius*] (Gordon & White 1994)

37.107.02 Chamise - Hoaryleaf Ceanothus-Black Sage [*Adenostoma fasciculatum-Ceanothus crassifolius-Salvia mellifera*] (Gordon & White 1994)

37.108.00 Chamise - Wedgeleaf Ceanothus Chaparral [*Adenostoma fasciculatum-Ceanothus cuneatus*]

37.108.01 Chamise - Wedgeleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus cuneatus*] (Gordon & White 1994)

*37.109.00 Chamise - Mission-manzanita - Woollyleaf Ceanothus Chaparral [*Adenostoma fasciculatum-Xylococcus bicolor-Ceanothus tomentosus*]

37.109.01 Chamise - Mission-manzanita [*Adenostoma fasciculatum-Xylococcus bicolor*] (Gordon & White 1994)

37.109.02 Chamise - Mission-manzanita-Woollyleaf Ceanothus [*Adenostoma fasciculatum-Xylococcus bicolor-Ceanothus tomentosus*] (Gordon & White 1994)

*37.109.03 Chamise - Mission-manzanita - Woollyleaf Ceanothus (mafic soils) [*Adenostoma fasciculatum-Xylococcus bicolor-Ceanothus tomentosus*] (Gordon & White 1994)

*37.109.04 Chamise - Woollyleaf Ceanothus [*Adenostoma fasciculatum-Ceanothus tomentosus*] (Gordon & White 1994)

37.200.00 Chaparral with *Ceanothus* spp. as principal indicator

37.201.00 Bigpod Ceanothus Chaparral [*Ceanothus megacarpus*] {37840}

37.201.01 Bigpod Ceanothus [*Ceanothus megacarpus*] (Borchert *et al*. 1993b)

37.201.02 Bigpod Ceanothus - Chamise / Black Sage [*Ceanothus megacarpus-Adenostoma fasciculatum/Salvia mellifera*] (Borchert *et al*. 1993b)

37.202.00 Bigpod Ceanothus - Birchleaf Mountain-mahogany Chaparral [*Ceanothus megacarpus-Cercocarpus betuloides*] (Borchert, *et al*. 2000)

37.203.00 Bigpod Ceanothus - Hollyleaf Redberry Chaparral [*Ceanothus megacarpus-Rhamnus ilicifolia*] (Borchert, *et al*. 2000)

37.204.00 Blue Blossom Chaparral [*Ceanothus thyrsiflorus*] {37820}
- 37.204.01 Blue Blossom Ceanothus - Coyote Brush - Poison Oak [*Ceanothus thyrsiflorus-Baccharis pilularis-Toxicodendron diversilobum*] (Keeler-Wolf, *et al*. 2001)

37.205.00 Chaparral Whitethorn Chaparral [*Ceanothus leucodermis*] {37532}
- 37.205.01 Chaparral Whitethorn [*Ceanothus leucodermis*] (Gordon & White 1994)

37.206.00 Deerbrush Montane Chaparral [*Ceanothus integerrimus*] {37531}
- 37.206.01 Deerbrush [*Ceanothus integerrimus*] (Gordon & White 1994)
- 37.206.02 Deerbrush - Canyon Live Oak - Blue Wildrye [*Ceanothus integerrimus-Quercus chrysolepis-Elymus glaucus*] (Stuart *et al*. 1993)
- 37.206.03 Tanoak - Madrone - Deerbrush [*Lithocarpus densiflora-Arbutus menziesii-Ceanothus integerrimus*] (Stuart *et al*. 1993)
- 37.206.04 Deerbrush - Whiteleaf Manzanita [*Ceanothus integerrimus-Arctostaphylos viscida*] (Keeler-Wolf and Moore 2001)

37.207.00 Hairyleaf Ceanothus Chaparral [*Ceanothus oliganthus*]
- 37.207.01 Hairyleaf Ceanothus [*Ceanothus oliganthus*] (Gordon & White 1994)

37.208.00 Hoaryleaf Ceanothus Chaparral [*Ceanothus crassifolius*] {37830}
- 37.208.01 Hoaryleaf Ceanothus [*Ceanothus crassifolius*] (Gordon & White 1994)

37.209.00 Mountain Whitethorn Montane Chaparral [*Ceanothus cordulatus*]
- 37.209.01 Mountain Whitethorn [*Ceanothus cordulatus*] (Keeler-Wolf and Moore 2001)

37.210.00 Tobacco Brush Montane Chaparral [*Ceanothus velutinus*] {37533}
- 37.210.01 Tobacco Brush [*Ceanothus velutinus*] (Keeler-Wolf and Moore 2001)
- 37.210.02 Tobacco Brush - Bitter Cherry [*Ceanothus velutinus-Prunus emarginata*] (Keeler-Wolf and Moore 2001)

37.211.00 Wedgeleaf Ceanothus Chaparral [*Ceanothus cuneatus*] {37810}
- 37.211.01 Wedgeleaf Ceanothus [*Ceanothus cuneatus*] Stuart *et al*. 1992)
- 37.211.02 Wedgeleaf Ceanothus - Incense-cedar [*Ceanothus cuneatus-Calocedrus decurrens*] (Stuart *et al*. 1992)
- 37.211.03 Wedgeleaf Ceanothus / Squirreltail [*Ceanothus cuneatus/Elymus elymoides*] (Taylor & Teare 1979b)
- 37.211.04 Wedgeleaf Ceanothus / Annual Grass [*Ceanothus cuneatus*/*Bromus* spp.-*Vulpia* spp.] (Keeler-Wolf and Moore 2001)

37.212.00 Cupleaf Ceanothus - Fremontia - Oak Chaparral [*Ceanothus greggii-Fremontodendron californicum-Quercus* sp.] {37J00}
- 37.212.01 Cupleaf Ceanothus [*Ceanothus greggii*] (Gordon & White 1994)
- 37.212.02 Birchleaf Mountain-mahogany - Chamise [*Cercocarpus betuloides-Adenostoma fasciculatum*] (Gordon & White 1994)
- 37.212.03 Birchleaf Mountain-mahogany - Flannelbush [*Cercocarpus betuloides-Fremontodendron californicum*] (Gordon & White 1994)
- *37.212.04 entry moved to 37.418.00

37.213.00 Bigpod Ceanothus - Hollyleaf Cherry Chaparral [*Ceanothus megacarpus-Prunus ilicifolia*] (Borchert, *et al*. 2000)

37.214.00 Greenbark Ceanothus Scrub [*Ceanothus spinosus*] (Borchert, *et al*. 2000)

*37.215.00 Siskiyou Mat dwarf scrub [*Ceanothus pumulus*] (Jimerson et al. 1995)
- *37.215.01 Siskiyou mat / Idaho Fescue [*Ceanothus pumilus/Festuca idahoensis*] (Jimerson et al. 1995)

37.300.00 Chaparral with Manzanita [*Arctostaphylos* spp.] as principal indicator {37B00}

37.301.00 Bigberry Manzanita Chaparral [*Arctostaphylos glauca*]
37.301.01 Bigberry Manzanita [*Arctostaphylos glauca*] (Gordon & White 1994)

37.302.00 Eastwood Manzanita Chaparral [*Arctostaphylos glandulosa*]
37.302.01 Eastwood Manzanita [*Arctostaphylos glandulosa*] (Gordon & White 1994)
37.302.02 Adams Manzanita [*Arctostaphylos glandulosa ssp. adamsii*]
37.302.03 Eastwood Manzanita-Mountain Mahogany [*Arctostaphylos glandulosa-Cercocarpus betuloides*]
37.302.04 Eastwood Manzanita - Interior Live Oak [*Arctostaphylos glandulosa-Quercus wislizeni*] (Keeler-Wolf, *et al*. 2001)

37.303.00 Greenleaf Manzanita Chaparral [*Arctostaphylos patula*]
37.303.01 Greenleaf Manzanita [*Arctostaphylos patula*] (Keeler-Wolf and Moore 2001)

*37.304.00 Ione Manzanita Chaparral [*Arctostaphylos myrtifolia*]

37.305.00 Whiteleaf Manzanita Chaparral [*Arctostaphylos viscida*]
37.305.01 Whiteleaf Manzanita [*Arctostaphylos viscida*] (Keeler-Wolf and Moore 2001)

*37.306.00 Sensitive Manzanita Scrub [*Arctostaphylos nummularia*] (Keeler-Wolf, *et al*. 2001)
*37.306.01 Sensitive Manzanita – Black Huckleberry- Giant Chinquapin (*A. nummularia-Vaccinium ovatum-Chrysolepis chrysophylla)*(Keeler-Wolf et al. 2001)

*37.307.00 Mount Tamalpais Manzanita [*Arctostaphylos hookeri* ssp. *montana*] Unique Stands (Keeler-Wolf, *et al*. 2001)

*37.308.00 Woollyleaf Manzanita Chaparral [*Arctostaphylos tomentosa* spp. *tomentosa*]
*37.308.01 Northern Maritime Chaparral {37C10}
*37.308.02 Central Maritime Chaparral {37C20}

*37.309.00 Ione Chaparral {37D00} (may include other associations and alliances compared to 37.304.00)

37.310.00 Pink-bracted Manzanita [*Arctostaphylos pringlei* ssp. *drupacea*] (Keeler-Wolf *et al*. 1998)

37.310.01 Pink-Bracted Manzanita -Point-leaf Manzanita [*Arctostaphylos pringlei ssp. drupacea- Arctostaphylos pungens*] (Keeler-Wolf *et al*. 1998)

37.400.00 Chaparral with Oak [*Quercus* spp.] as principal indicator

37.401.00 Interior Live Oak Chaparral [*Quercus wislizeni*] {37A00}

37.402.00 Interior Live Oak - Canyon Live Oak Chaparral [*Quercus wislizeni-Quercus chrysolepis*]
37.402.01 Interior Live Oak - Canyon Live Oak [*Quercus wislizeni-Quercus chrysolepis*] (Gordon & White 1994)

37.403.00 Interior Live Oak - Chaparral Whitethorn Chaparral [*Quercus wislizeni-Ceanothus leucodermis*]
37.403.01 Shrub Interior Live Oak - Chaparral Whitethorn [*Quercus wislizeni-Ceanothus leucodermis*] (Gordon & White 1994)
37.403.02 Shrub Interior Live Oak - Chaparral Whitethorn - Eastwood Manzanita [*Quercus wislizeni-Ceanothus leucodermis-Arctostaphylos glandulosa*] (Gordon & White 1994)

37.404.00 Interior Live Oak - Scrub Oak Chaparral [*Quercus wislizeni-Quercus berberidifolia*]

37.405.00 Leather Oak Chaparral [*Quercus durata*] {37620}

*37.405.01 Leather Oak - Eastwood Manzanita [*Quercus durata-Arctostaphylos glandulosa*] (Keeler-Wolf, *et al*. 2001)

37.406.00 Mixed Scrub Oak Chaparral

37.406.01 Scrub Oak - Bigberry Manzanita [*Quercus berberidifolia-Arctostaphylos glauca*] (Gordon & White 1994)

37.406.02 Scrub Oak - Deerbrush [*Quercus berberidifolia-Ceanothus integerrimus*] (Gordon & White 1994)

*37.406.03 Scrub Oak - Hairyleaf Ceanothus [*Quercus berberidifolia-Ceanothus oliganthus*] (Gordon & White 1994)

*37.406.04 Scrub Oak - Toyon [*Quercus berberidifolia-Heteromeles arbutifolia*] (Gordon & White 1994)

37.406.05 Scrub Oak - Wedgeleaf Ceanothus [*Quercus berberidifolia-Ceanothus cuneatus*] (Gordon & White 1994)

37.406.06 Scrub Oak - Woollyleaf Ceanothus [*Quercus berberidifolia-Ceanothus tomentosus*] (Gordon & White 1994)

37.407.00 Scrub Oak Chaparral [*Quercus berberidifolia*] {37900}

37.407.01 Scrub Oak / California Buckeye [*Quercus berberidifolia/Aesculus californica*] (Newton 1987)

37.407.02 Scrub Oak [*Quercus berberidifolia*] (Gordon & White 1994)

37.407.03 Scrub Oak - (Chamise - Eastwood Manzanita) [*Quercus berberidifolia-(Adenostoma fasciculatum-Arctostaphylos glandulosa)*] (Gordon & White 1994)

37.407.04 Scrub Oak - (Toyon) [*Quercus berberidifolia- (Heteromeles arbutifolia)*] (Gordon & White 1994)

37.407.05 Scrub Oak - (Chaparral Whitethorn) [*Quercus berberidifolia-(Ceanothus leucodermis)*] (Gordon & White 1994)

37.407.06 Scrub Oak - (Birchleaf Mountain-mahogany) [*Quercus berberidifolia-(Cercocarpus betuloides)*] (Gordon & White 1994)

37.408.00 Scrub Oak - Birchleaf Mountain-mahogany Chaparral [*Quercus berberidifolia-Cercocarpus betuloides*]

37.408.01 Scrub Oak - Birchleaf Mountain-mahogany [*Quercus berberidifolia-Cercocarpus betuloides*] (Gordon & White 1994)

37.408.02 Scrub Oak - Birchleaf Mountain-mahogany - Cupleaf Ceanothus [*Quercus berberidifolia-Cercocarpus betuloides-Ceanothus greggii*] (Gordon & White 1994)

*37.408.03 Foothill Ash - Birchleaf Mountain-mahogany - Scrub Oak [*Fraxinus dipetala-Cercocarpus betuloides-Quercus berberidifolia*] (Gordon & White 1994)

*37.408.04 Scrub Oak - Birchleaf Mountain-mahogany - Palmer Ceanothus [*Quercus berberidifolia-Cercocarpus betuloides-Ceanothus palmeri*] (Gordon & White 1994)

37.409.00 Scrub Oak - Chamise Chaparral [*Quercus berberidifolia-Adenostoma fasciculatum*]

37.409.01 Scrub Oak - Chamise - Hoaryleaf Ceanothus [*Quercus berberidifolia-Adenostoma fasciculatum-Ceanothus crassifolius*] (Gordon & White 1994)

37.409.02 Scrub Oak - Chamise - Cupleaf Ceanothus [*Quercus berberidifolia-Adenostoma fasciculatum-Ceanothus greggii*] (Gordon & White 1994)

37.410.00 Scrub Oak - Chaparral Whitethorn Chaparral [*Quercus berberidifolia-Ceanothus leucodermis*]

37.410.01 Scrub Oak - Chaparral Whitethorn [*Quercus berberidifolia-Ceanothus leucodermis*] (Gordon & White 1994)

37.411.00 Brewer Oak Chaparral [*Quercus garryana* var. *breweri*] {37541}

*37.411.01 Oregon White Oak - Brewer Oak / California Fescue [*Quercus garryana* var. *garryana-Quercus garryana* var. *breweri/Festuca californica*] (Jimerson 1993)
*37.411.02 White Fir / Huckleberry Oak [*Abies concolor/Quercus vaccinifolia*] (Sawyer 1981b)

*37.412.00 Sadler Oak Montane Scrub [*Quercus sadleriana*]

37.413.00 Canyon Live Oak Chaparral [*Quercus chrysolepis*]
37.413.01 Canyon Live Oak Shrub [*Quercus chrysolepis*] (Gordon & White 1994)
37.413.02 Canyon Live Oak - (Deerbrush - Chaparral Whitethorn) Shrub [*Quercus chrysolepis-(Ceanothus integerrimus-Ceanothus leucodermis)*] (Gordon & White 1994)
*37.413.03 Canyon Live Oak - Silk Tassle Bush [*Quercus chrysolepis-Garrya flavescens*] (Keeler-Wolf and Thomas 2000)
37.413.04 Canyon Live Oak - Holly-leaf Redberry [*Quercus chrysolepis-Rhamnus illicifolia*] (Gordon & White 1994)

37.414.00 Huckleberry Oak Chaparral [*Quercus vaccinifolia*] {37542}
37.414.01 Huckleberry Oak [*Quercus vaccinifolia*] (Keeler-Wolf and Moore 2001)
37.414.02 Huckleberry Oak - Bush Chinquapin [*Quercus vaccinifolia-Chrysolepis sempervirens*] (Keeler-Wolf and Moore 2001)
37.414.03 Huckleberry Oak - Greenleaf Manzanita [*Quercus vaccinifolia-Arctostaphylos patula*] (Keeler-Wolf and Moore 2001)

37.415.00 Muller Oak [*Quercus cornelius-mulleri*]
37.415.01 Muller Oak - Sugarbush [*Quercus cornelius-mulleri-Rhus ovata*] (Keeler-Wolf *et al.* 1998)
37.415.02 Muller Oak - Brittlebush-Narrowleaf Goldenbush [*Quercus cornelius-mulleri-Eriogonum fasciculatum-Ericameria linearifolia*] (Keeler-Wolf *et al.* 1998)
37.415.03 Muller Oak - Mountain Mahogany [*Quercus cornelius-mulleri-Cercocarpus betuloides*] (Keeler-Wolf *et al.* 1998)

37.416.00 Island Scrub Oak Chaparral [*Quercus pacifica*] (Landis, 1997)

37.417.00 Giant Chinquapin Scrub [*Chrysolepis chrysophylla*] (Keeler-Wolf, *et al*. 2001)
37.417.01 Giant Chinquapin / Black Huckleberry [*Chrysolepis chrysophylla /Vaccinium ovatum*] (Keeler-Wolf, *et al*. 2001)

37.418.00 Tucker Oak Scrub [*Quercus john-tuckeri*] (Borchert, 2000)

37.500.00 Chaparral with Red Shank [*Adenostoma sparsifolium*] as principal indicator

*37.501.00 Red Shank Chaparral [*Adenostoma sparsifolium*]
*37.501.01 Red Shank [*Adenostoma sparsifolium*] (Gordon & White 1994)

37.502.00 Red Shank - Birchleaf Mountain-mahogany Chaparral [*Adenostoma sparsifolium-Cercocarpus betuloides*]
*37.502.01 Red Shank - Birchleaf Mountain-mahogany [*Adenostoma sparsifolium-Cercocarpus betuloides*] (Gordon & White 1994)

*37.503.00 Red Shank - Chamise Chaparral [*Adenostoma sparsifolium-Adenostoma fasciculatum*]
*37.503.01 Red Shank - Chamise - Birchleaf Mountain-mahogany [*Adenostoma sparsifolium-Adenostoma fasciculatum-Cercocarpus betuloides*] (Gordon & White 1994)

*37.503.02 Red Shank - Chamise - Cupleaf Ceanothus [*Adenostoma sparsifolium-Adenostoma fasciculatum-Ceanothus greggii*] (Gordon & White 1994)
*37.503.03 Red Shank - Chamise - Pointleaf Manzanita [*Adenostoma sparsifolium-Adenostoma fasciculatum-Arctostaphylos pungens*] (Gordon & White 1994)

*37.504.00 Red Shank Chaparral {37300}

37.600.00 Birchleaf Mountain-mahogany - California buckwheat Chaparral [*Cercocarpus betuloides-Eriogonum fasciculatum*]
37.600.01 Birchleaf Mountain-mahogany - California Buckwheat [*Cercocarpus betuloides-Eriogonum fasciculatum*] (Gordon & White 1994)

37.610.00 Birchleaf Mountain-mahogany Woodland [*Cercocarpus betuloides* var. *betuloides*] (Keeler-Wolf and Moore 2001)
37.610.01 Birchleaf Mountain-mahogany [*Cercocarpus betuloides* var. *betuloides*] (Keeler-Wolf and Moore 2001)

37.700.00 Bush Chinquapin Montane Chaparral [*Chrysolepis sempervirens*] {37540}
37.700.01 Bush Chinquapin [*Chrysolepis sempervirens*] (Keeler-Wolf and Moore 2001)

37.800.00 Sumac Scrub [*Rhus* sp., *Malosma laurina*]

*37.801.00 Sugarbush Scrub [*Rhus ovata*] (Keeler-Wolf et al. 1998)

*37.802.00 Skunkbush [*Rhus trilobata*] (Keeler-Wolf et al., 1998)

37.900.00 Bitter Cherry Scrub [*Prunus emarginata*] (Keeler-Wolf and Moore 2001)
37.900.01 Bitter Cherry [*Prunus emarginata*] (Keeler-Wolf and Moore 2001)

37.910.00 Holly-leaf Cherry [*Prunus illicifolia*] (Borchert, *et al*. 2000)
37.910.01 Holly-leaf Cherry - Sanicle [*Prunus illicifolia-Sanicula crassicaulis*] (Keeler-Wolf, *et al*. 2001)

37.915.00 Toyon – Hollyleaf Cherry Scrub [*Heteromeles arbutifolia-Prunus ilicifolia*] (Borchert, *et al*. 2000)

37.920.00 Coffeeberry Scrub [*Rhamnus californica*] (Keeler-Wolf, *et al*. 2001)
37.920.01 Coffeeberry - Coyote Brush / California Figwort [*Rhamnus californica-Baccharis pilularis/Scrophularia californica*] (Keeler-Wolf, *et al*. 2001)

37.930.00 California Wax Myrtle Scrub [*Myrica californica*] (Keeler-Wolf, *et al*. 2001)
37.930.01 California Wax Myrtle [*Myrica californica*] (Keeler-Wolf, *et al*. 2001)

37.940.00 Poison Oak Scrub [*Toxicodendron diversalobum*] (Keeler-Wolf, *et al*. 2001)
37.940.01 Poison Oak - Coyote Brush - Thimbleberry [*Toxicodendron diversilobum-Baccharis pilularis-Rubus parviflorus*] (Keeler-Wolf, *et al*. 2001)

37.950.00 Hazel Scrub [*Corylus cornuta*] (Keeler-Wolf, *et al*. 2001)
37.950.01 Hazel / Western Sword Fern [*Corylus cornuta/Polystichum munitum*] (Keeler-Wolf, *et al*. 2001)

38.000.00 Subalpine Upland Shrub

38.100.00 Sierra Subalpine Upland Shrub
38.100.01 Shrub Cinquefoil Dwarf Scrub [*Potentilla fruticosa*] (Burke 1982)
38.100.02 Compact Phlox - Stemless Haplopappus - Alpine Ipomopsis dwarf scrub [*Phlox pulvinata-Stenotus acaulis-Ipomopsis congesta*] (Major & Taylor 1977)

38.100.03 Granite-gilia / King Ricegrass Dwarf Scrub [*Leptodactylon pungens/Ptilagrostis kingii*] (Major & Taylor 1977)
38.100.04 entry moved to 38.120.02
38.100.05 Podistera - Pygmy Fleabane [*Podistera-Eriogonum pygmaeus*] (Major & Taylor 1977)
38.100.06 Wax Currant / Purple Reedgrass [*Ribes cereum/Calamagrostis purpurascens*] (Major & Taylor 1977)
*38.100.07 Red Elderberry - Congdon Sedge [*Sambucus racemosa-Carex congdonii*] (Taylor 1984)
38.100.08 entry moved to 41.211.01
38.100.09 entry moved to 38.100.01

*38.110.00 Shrubby Cinquefoil [*Potentilla fruticosa*] (Keeler-Wolf and Moore 2001)
38.110.01 Shrub Cinquefoil - One-seeded Oatgrass [*Potentilla fruticosa-Danthonia unispicata*] (Taylor 1984)
38.110.02 Shrub Cinquefoil - One-seeded Oatgrass [*Potentilla fruticosa-Danthonia intermedia*] (Keeler-Wolf and Moore 2001)

38.120.00 Alpine Goldenbush - Nuttall Sandwort [*Ericameria discoidea-Minuartia nuttallii*] (Keeler-Wolf and Moore 2001)
38.120.01 Nuttal Sandwort [*Minuartia nuttallii*] (Taylor 1984)
38.120.02 Granite-gilia / Alpine Goldenbush [*Leptodactylon pungens/Ericameria discoidea*] (Major & Taylor 1977)
38.120.03 Alpine Goldenbush - Timberline Phacelia [*Ericameria discoidea-Phacelia frigida*] (Taylor 1984)

39.000.00 *Holodiscus* Scrub and Dwarf Scrub with *Holodiscus* spp.

39.100.00 *Holodiscus* Scrub and Dwarf Scrub
39.100.01 Ocean Spray / Suksdorf Monkeyflower [*Holodiscus discolor var. microphyllus/Mimulus suksdorfii*] (Burke 1982)
39.100.02 Western Needlegrass - Nude Buckwheat [*Stipa occidentalis-Eriogonum nudum*] (Burke 1982)
39.100.03 Ocean Spray / Greenleaf Manzanita [*Holodiscus discolor/Arctostaphylos patula*] (Sawyer & Thornburgh 1997)
39.100.04 Ocean Spray / Wedgeleaf Keckiella [*Holodiscus discolor/Keckiella corymbosa*] (Taylor & Teare 1979a)
39.100.05 Ocean Spray / Sierra Stonecrop - Parsley Fern [*Holodiscus discolor/Sedum obtusatum-Cryptogramma acrostichoides*] (Keeler-Wolf and Moore 2001)

40.000.00 GRASS & HERB DOMINATED COMMUNITIES

41.000.00 Native Grassland

*41.010.00 Alkali Sacaton Bunchgrass Grassland [*Sporobolus airoides*] {42120}
*41.010.01 Alkali Sacaton Grassland [*Sporobolus airoides*] (Keeler-Wolf and Thomas 2000)

*41.020.00 Ashy Ryegrass Bunchgrass Grassland [*Leymus cinereus*]

*41.030.00 Big Galleta Bunchgrass Grassland [*Pleuraphis rigida*]
*41.030.01 Big Galleta [*Pleuraphis rigida*] (Keeler-Wolf and Thomas 2000)
*41.030.02 Big Galleta - Rayless Goldenhead [*Pleuraphis rigida-Acamptopappus sphaerocephalus*] (Keeler-Wolf and Thomas 2000)
*41.030.03 Big Galleta - Cooper's Goldenbush [*Pleuraphis rigida-Ericameria cooperi*] (Keeler-Wolf and Thomas 2000)

*41.030.04 Big Galleta - Downy Dalea [*Pleuraphis rigida-Dalea molissima*] (Keeler-Wolf and Thomas 2000)

*41.040.00 Bluebunch Wheatgrass Bunchgrass Grassland [*Pseudoroegneria spicata spp. spicata*]

*41.050.00 California Oatgrass Bunchgrass Grassland [*Danthonia californica*]
- *41.050.01 California Oatgrass - Tall-oatgrass [*Danthonia californica-Arrhenatherum elatius*] (Grenier 1989)
- *41.050.02 Squirreltail - California Oatgrass [*Elymus elymoides-Danthonia californica*] (Stuart *et al*. 1992)
- *41.050.03 California Oatgrass - Pull-up Muhly [*Danthonia californica-Muhlenbergia filiformis*] (Helms & Ratliff 1987)
- 41.050.04 California Oatgrass - Silver European Hairgrass [*Danthonia californica-Aira caryophyllea*] (Keeler-Wolf, *et al*. 2001)

*41.051.00 Intermediate Oatgrass Grassland [*Danthonia intermedia*] (Keeler-Wolf and Moore 2001)

41.060.00 Grasslands with Common Reed [*Phragmites australis*]

41.061.00 Alkali Common Reed [*Phragmites australis*]

*41.070.00 Cordgrass Saline/Alkaline Grassland [*Spartina* spp.]
- *41.070.01 California Cordgrass [*Spartina foliosa*] (Atwater *et al*. 1979)
- *41.070.02 Dense-flowered Cordgrass [*Spartina densiflora*] (Eicher 1987)
- *41.070.03 Alkali Cordgrass - Alkali Sacaton [*Spartina gracilis-Sporobolus airoides*] (Oidon *et al*. 1992)

*41.080.00 Creeping Ryegrass Grassland [*Leymus triticoides*] {42140}

*41.090.00 Desert Needlegrass Grassland [*Achnatherum speciosum*]

*41.110.00 Foothill Needlegrass [*Nassella lepida*]

*41.120.00 Indian Ricegrass [*Achnatherum hymenoides*]

*41.130.00 Needle-and-thread [*Hesperostipa comata*]

*41.140.00 Nodding Needlegrass [*Nassella cernua*]

*41.150.00 Purple Needlegrass [*Nassella pulchra*]
- *41.150.01 Italian Ryegrass - Purple Needlegrass [*Lolium mutiflorum-Nassella pulchra*] (Fiedler & Leidy 1987)
- *41.150.02 Wild Oats - Purple Needlegrass [*Avena fatua-Nassella pulchra*] (Parker 1990)
- *41.150.03 Purple Needlegrass / Purple Sanicle [*Nassella pulchra/Sanicula bipinnatafida*] (Stuart *et al*. 1993)

*41.160.00 Lemmon's Needlegrass [*Achnatherum lemmonii*]

*41.170.00 Valley Needlegrass Grassland [*Achnatherum* spp.] {42110}

*41.180.00 One-sided Bluegrass [*Poa secunda*] {42150}

*41.181.00 One-sided Bluegrass Pebble Plains

*41.190.00 Pacific Reedgrass [*Calamagrostis nutkaensis*]

*41.190.01 Pacific Reedgrass - Coyote Brush [*Calamagrostis nutkaensis-Baccharis pilularis*] (Keeler-Wolf, *et al*. 2001)

*41.190.02 Pacific Reedgrass - Slough Sedge - Rush [*Calamagrostis nutkaensis-Carex obnupta*. - *Juncus* spp.] (Keeler-Wolf, *et al*. 2001)

41.200.00 Saltgrass [*Distichlis spicata*]

*41.200.01 Saltgrass - Iodine Bush [*Distichlis spicata-Allenrolfea occidentalis*] (Bradley 1970)

*41.200.02 Saltgrass - Cooper Rush [*Distichlis spicata-Juncus cooperi*] (Bradley 1970)

*41.200.03 Greasewood - Saltgrass [*Sarcobatus vermiculatus-Distichlis spicata*] (Ferren & Davis 1991)

*41.200.04 Saltgrass - Alkali Rabbitbrush [*Distichlis spicata-Chrysothamnus albidus*] (Odion *et al*. 1992)

41.200.05 Baltic Rush - Saltgrass [*Juncus balticus-Distichlis spicata*] (Odion *et al*. 1992)

*41.200.06 Jaumea - Saltgrass [*Jaumea carnosa-Distichlis spicata*] (Peinado *et al*. 1994)

*41.200.07 Saltgrass - Alkali Heath - Jaumea [*Distichlis spicata-Frankenia salina-Jaumea carnosa*] (Keeler-Wolf, *et al*. 2001)

*41.200.08 Alkali Saltgrass

41.210.00 Shorthair Reedgrass [*Calamagrostis breweri*]

41.210.01 Shorthair Reedgrass - Alpine Aster [*Calamagrostis breweri-Aster alpigenus*] (Benedict 1983)

41.210.02 Shorthair Reedgrass - Spike Trisetum [*Calamagrostis breweri-Trisetum spicatum*] (Benedict 1983)

41.210.03 Shorthair Reedgrass - Bilberry [*Calamagrostis breweri-Vaccinium caespitosum*] (Major & Taylor 1977)

41.210.04 Drummond Rush - Shorthair Reedgrass [*Juncus drummondii-Calamagrostis breweri*] (Taylor 1984)

41.210.05 Shorthair Reedgrass - Mountain Laurel [*Calamagrostis breweri-Kalmia polifolia*] (Taylor 1984)

41.211.00 Purple Reedgrass [*Calamagrostis purpurascens*] (Keeler-Wolf and Moore 2001)

41.211.01 Purple reedgrass - Granite-gilia [*Calamagrostis purpurascens-Leptodactylon pungens*] (Taylor 1984)

41.211.02 Purple reedgrass- Parry rabbitbrush- Granite-gilia [*Calamagrostis purpurascens-Chrysothamnus parryi* ssp. *Monocephalus-Leptodactylon pungens*] (Taylor 1984)

41.220.00 Tufted Hairgrass [*Deschampsia caespitosa*]

41.220.01 Tufted hairgrass - Nebraska Sedge [*Deschampsia caespitosa-Carex nebrascensis*] (Allen-Diaz 1991)

*41.220.02 Tufted Hairgrass - Brewer Bitter-cress [*Deschampsia caespitosa-Cardamine breweri*] (Benedict 1983)

41.220.03 Tufted Hairfrass - Sierra Ragwort [*Deschampsia caespitosa-Senecio scorzonella*] (Benedict 1983)

41.220.04 Tufted Hairgrass - Sierra Ragwort - Yarrow [*Deschampsia caespitosa-Senecio scorzonella-Achillea millefolium*] (Benedict 1983)

*41.220.05 Vernal Grass - Tufted Hairgrass [*Anthoxanthum odoratum-Deschampsia caespitosa*] (Heady *et al*. 1977)

41.220.06 Mt. Dana Sedge - Tufted Hairgrass [*Carex subnigricans-Deschampisia caespitosa*] (Major & Taylor 1977)

41.220.07 Tufted Hairgrass - Northern Goldenrod [*Deschampsia caespitosa-Solidago multiradiata*] (Taylor 1984)

*41.220.08 Tufted Hairgrass [*Deschampsia caespitosa*] (Keeler-Wolf and Moore 2001)
41.220.09 Tufted Hairgrass - California Oatgrass [*Deschampsia caespitosa-Danthonia californica*] (Keeler-Wolf, *et al*. 2001)
*41.220.10 Tufted Hairgrass - Longstalk Clover [*Deschampsia caespitosa-Trifolium longipes*] (Ratliff 1982, 1985)

41.222.00 Tall Mannagrass [*Glyceria elata*] (Keeler-Wolf and Moore 2001)
41.222.01 Tall Mannagrass [*Glyceria elata*] (Keeler-Wolf and Moore 2001)
41.222.02 Tall Mannagrass - Small-fruited Bulrush [*Glyceria elata-Scirpus microphyllus*] (Halpern 1986)
41.222.03 Tall Mannagrass - Stream Deervetch [*Glyceria elata-Lotus longifolius*] (Halpern 1986)

41.224.00 Canadian Reedgrass [*Calamagrostis canadensis*] (Keeler-Wolf and Moore 2001)
41.224.01 Canadian Reedgrass [*Calamagrostis canadensis*] (Keeler-Wolf and Moore 2001)

41.224.00 Sierra Ricegrass [*Ptilogrostis kingii*] (Keeler-Wolf and Moore 2001)
41.224.01 Sierra Ricegrass [*Ptilogrostis kingii*] (Keeler-Wolf and Moore 2001)

41.230.00 Squirreltail [*Elymus elymoides*]

41.240.00 Green Fescue [*Festuca viridula*]

*41.250.00 Idaho Fescue [*Festuca idahoensis*]

*41.255.00 Red Fescue [*Festuca rubra*] (Keeler-Wolf, *et al*. 2001)

*41.260.00 Native Dunegrass [*Leymus mollis*] {21210}
*41.260.01 Native dunegrass - Hottentot-fig [*Leymus mollis-Carpobrotus edulis*] (Bluestone 1981)
*41.260.02 Native Dunegrass - European Beachgrass [*Leymus mollis-Ammophila arenaria*] (LaBanca 1993)
*41.260.03 Native Dunegrass - Sea Rocket [*Leymus mollis-Cakile sp*.] (Parker 1974)

*41.270.00 Coastal Terrace Prairie{41100}

*41.280.00 Serpentine Bunchgrass {42130}

*41.290.00 Wildflower Field {42300}

*41.300.00 Great Basin Grassland {43000}

41.340.00 MOVED TO 42.051.00

*41.600.00 Eureka Valley Dunegrass [*Swallenia alexandrae*] (Keeler-Wolf and Thomas 2000) Unique stands

*41.610.00 Little Galleta Grassland [*Pleuraphis jamesii*] (Keeler-Wolf and Thomas 2000)
*41.610.01 Little Galleta - California Buckwheat [*Pleuraphis jamesii-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
*41.610.02 Little Galleta - Anderson's Wolfberry [*Pleuraphis jamesii-Lycium andersonii*] (Keeler-Wolf and Thomas 2000)
*41.610.03 Little Galleta - Nevada Ephedra [*Pleuraphis jamesii-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)

*41.640.00 Blue Wildrye Grassland [*Elymus glaucus*] (Keeler-Wolf and Moore 2001)

*41.640.01 Blue Wildrye [*Elymus glaucus*] (Keeler-Wolf and Moore 2001)

*41.640.02 Blue Wildrye - Woolly Sedge [*Elymus glaucus-Carex lanuginosa*] (Keeler-Wolf and Moore 2001)

*41.640.03 Blue Wildrye - Feta Sedge [*Elymus glaucus-Carex feta*] (Keeler-Wolf and Moore 2001)

*41.640.04 Blue Wildrye - Cow-parsnip [*Elymus glaucus-Heracleum lanatum*] (Halpern 1986)

42.000.00 Non-native Grassland

42.010.00 European Beachgrass [*Ammophila arenaria*]

42.010.01 European Beachgrass - Australian Fireweed [*Ammophila arenaria-Erechtites minima*] (Parker 1974)

42.010.02 Beachgrass [*Ammophila* sp.] (Duebendorfer 1989)

42.010.03 European Beachgrass - sandmat [*Ammophila arenaria-Cardionema ramosissimum*] (Keeler-Wolf, *et al*. 2001)

42.020.00 Cheatgrass [*Bromus tectorum*]

42.020.01 Cheatgrass [*Bromus tectorum*] (Stuart *et al*. 1993)

42.020.02 Cheatgrass - Ripgut [*Bromus tectorum-Bromus diandrus*] (White 1994a)

42.025.00 Red Brome [*Bromus madritensis* ssp. *rubens*]

42.026.00 Annual Brome [*Bromus (diandrus, hordeaceus)*] (Keeler-Wolf and Moore 2001)

42.026.01 Ripgut Brome - Soft Chess - Annual Clover - Wild Carrot [*Bromus diandrus-Bromus hordeaceus-Trifolium* spp.-*Daucus* spp.] (Keeler-Wolf and Moore 2001)

42.026.02 Soft Chess - Rattail Fescue [*Bromus hordeaceus-Vulpia hirsuta*] (Kopecko & Lathrop 1975)

42.026.03 Slender Oat - Soft Brome [*Avena barbata-Bromus hordeaceus*](Kopecko & Lathrop 1975)

42.026.04 Soft Chess – Silver hairgrass – Fileree [*Bromus hordaceus – Aira carryophyllea – Erodium* spp.] (Jimerson et al. 2001)

42.026.05 Soft Chess – Meadowfoam – Clover [*Bromus hordaceus – Limnanthes douglasii – Trifolium* sp.] (Jimerson et al. 2001)

42.026.06 Soft Chess - Silver hairgrass – Blue Dicks [*Bromus hordaceus – Aira carryophyllea-Dichelostemma capitatum* ssp. *capatatum]* (Jimerson et al. 2001)

42.026.07 Soft Chess – Medusahead – Fileree [*Bromus hordaceus- Taeniantherum caput-medusae-Erodium botrys*] (Jimerson et al 2001)

42.026.08 Soft Chess – Cheatgrass [*Bromus hordaceus-Bromus tectorum*] (Jimerson et al. 2001)

42.026.09 Soft Chess – Fileree [*Bromus hordaceus-Erodium botrys*] (Jimerson et al 2001)

42.026.10 Soft Chess – Blue Dicks – Gumplant [*Bromus hordaceus – Dichelostemma multiflorum – Grindelia camporum]* (Jimerson et al. 2001)

42.030.00 Crested Wheatgrass [*Agropyron desertorum*]

42.040.00 California Annual Grassland {42200}

42.040.01 European Hairgrass [*Aira caryophyllea*] (Schlising & Sanders 1982)

42.040.02 Soft Brome - Storkbill [*Bromus hordeaceus-Erodium botrys*] (Schlising & Sanders 1982)

42.040.03 Brachypodium [*Brachypodium distachyon*] (Keeler-Wolf, *et al*. 2001)

42.041.00 Dogtail Grass [Cynosurus cristatus] (Jimerson et al. 2001)

- 42.041.01 Dogtail – Hareleaf//rocky [*Cynosurus cristatus-Lagophylla glandulosa//rocky*] (Jimerson 1993, Jimerson et al. 2001)
- 42.041.02 Dogtail - Soft Chess - Dandelion [*Cynosurus cristatus-Bromus hordeaceus-Taraxacum officinale*] (Jimerson 1993, Jimerson et al 2001)
- 42.041.03 Dogtail - Soft Chess – Cheatgrass [*Cynosurus cristatus-Bromus hordeaceus-Bromus tectorum*] (Jimerson et al. 2001)
- 42.041.04 Dogtail - Soft Chess – Medusahead [*Cynosurus cristatus-Bromus hordeaceus-Taeniantherum caput-medusae*] (Jimerson et al. 2001)
- 42.041.05 Dogtail - Soft Chess – Wild oat [*Cynosurus cristatus-Bromus hordeaceus-Avena fatua*] (Jimerson et al. 2001)
- 42.041.06 Dogtail – Tarplant [*Cynosurus cristatus-Hemizonia congesta-Madia* spp.] (Jimerson et al 2001)

42.050.00 Introduced Perennial Grassland

- 42.050.01 Hairy Oatgrass - Vernal Grass [*Danthonia pilosa-Anthoxanthum odoratum*] (Hektner & Foin 1977)
- 42.050.02 Foothill Sedge - Tall-oatgrass [*Carex tumulicola-Arrhenatherum elatius*] (Grenier 1989)
- 42.050.03 Vernal Grass - Tufted Hairgrass [*Anthoxanthum odoratum-Deschampsia caespitosa*] (Heady *et al*. 1977b)
- 42.050.04 moved to 42.041.01
- 42.050.05 moved to 42.041.02
- 42.050.06 Tall-oatgrass - Dogtail – Blue dicks [*Arrhenatherum elatius- Cynosurus cristatus- Dichelostemma capitatum* ssp. *capitatum*] (Jimerson 1993, re-named; Jimerson et al. 2001)
- 42.050.07 Creeping Bent - Tall-oatgrass [*Agrostis stolonifera-Arrhenatherum elatius*] (Saenz & Sawyer 1986)

42.051.00 Harding Grass [Phalaris aquatica] (Keeler-Wolf and Vaghti 2000, Jimerson et al 2001)

- 42.051.01 Harding Grass – Soft Chess – Yellow star thistle [*Phaleris aquatica – Bromus hordaceus – Centaurea solstitialis*] (Jimerson et al. 2001)

42.060.00 Kentucky Bluegrass [*Poa pratensis*]

- 42.060.01 Kentucky Bluegrass - Sedge [*Poa pratensis-Carex* spp.] (Allen-Diaz 1991)
- 42.060.02 Kentucky Bluegrass - Silver Cinquefoil [*Poa pratensis-Potentilla gracilis*] (Allen-Diaz 1991)
- 42.060.03 Narrow Sedge - Kentucky Bluegrass [*Carex angustata-Poa pratensis*] (Allen-Diaz 1991)
- 42.060.04 Kentucky Bluegrass - Spreading Rush - Hairy Woodrush [*Poa pratensis-Juncus patens-Luzula comosa*] Stuart *et al*. 1993)
- 42.060.05 Kentucky Bluegrass [*Poa pratensis*] (Keeler-Wolf and Moore 2001)

42.070.00 Pampas Grass [*Cortaderia* spp.] (Keeler-Wolf & Vaghti, 2000)

42.080.00 Giant Reed [*Arundo donax*]

42.090.00 *Schismus* spp.

- 42.090.01 Schismus Playa assocation (Keeler-Wolf et al., 1998)

42.100.00 Tall Wheatgrass [*Elytrigia pontica*] (Keeler-Wolf, Vaghti 2000)

41.310.00 Knotweed-Echinochloa Riparian Grassland [*Polygonum* spp. - *Echinochloa* spp.] (Keeler-Wolf, Vaghti 2000)

- 41.310.01 Echinocloa-Polygonum-Xanthium Riparian Grassland [*Echinochloa* spp. - *Polygonum* spp.- *Xanthium* spp.] (Keeler-Wolf, Vaghti 2000)

41.320.00 Rough Bentgrass Riparian Grassland [*Agrostis scabra*] (Keeler-Wolf, Vaghti 2000)
41.321.00 Italian Ryegrass [*Lolium multiflorum*] (Keeler-Wolf and Vaghti 2000)

44.000.00 Vernal Pools

44.100.00 Northern Vernal Pools

*44.110.00 Northern Hardpan Vernal Pools {44110}
*44.110.01 Fremont Goldfields [*Lasthenia fremontii*] (Schlising & Sanders 1982)

44.120.00 Northern Claypan Vernal Pools {44120}
*44.120.01 Coyote-thistle - Alkali Heath Pools [*Eryngium castrense-Frankenia salina*] (Taylor *et al*. 1990)
*44.120.02 Fremont Goldfields - Saltgrass Pools [*Lasthenia fremontii-Distichlis spicata*] (Taylor *et al*. 1990)

44.130.00 Northern Volcanic Vernal Pools

44.131.00 Northern Basalt Flow Vernal Pools {44131}

*44.132.00 Northern Volcanic Mudflow Vernal Pools {44132}
*44.132.01 California Goldfields - Two-crowned Downingia Pools [*Lasthenia californica-Downingia bicornuta*] (Taylor *et al*. 1990)
*44.132.02 Whiteflower Navarretia - Dwarf Blennosperma Pools [*Navarretia leucocephala-Blennosperma nana*] (Taylor *et al*. 1990)

*44.133.00 Northern Volcanic Ashflow Vernal Pools {44133}

44.300.00 Southern Vernal Pools {44300}

*44.310.00 Santa Rosa Plateau Vernal Pools {44310}
*44.310.01 Dry Marsh Bed Zone (Kepecko & Lathrop 1975)

*44.320.00 San Diego Mesa Vernal Pools {44321}

*44.330.00 San Jacinto Valley Vernal Pools

45.000.00 Meadows and Seeps not dominated by grasses

45.100.00 California Annual Herb-land (Keeler-Wolf and Moore 2001)
45.100.01 Deervetch - Annual Clover - Lessengia [*Lotus* spp.- *Trifolium* spp.- *Lessengia* spp.] (Keeler-Wolf and Moore 2001)

45.110.00 Sedge [*Carex* spp.]
45.110.01 Longbeak Sedge - Shortbeak Sedge [*Carex rostrata-Carex simulata*] (Burke 1987)
45.110.02 Shortbeak Sedge - Inflated Sedge [*Carex simulata-Carex vesicaria*] (Burke 1987)
*45.110.03 Primrose Monkeyflower - Shore Sedge [*Mimulus primuloides-Carex limosa*] (Beguin & Major 1975)
*45.110.04 Skyline Bluegrass - Beaked Sedge [*Poa cusickii-Carex utriculata*] (Beguin & Major 1975)
45.110.05 Many-nerved Sedge - Yarrow [*Carex heteroneura-Achillea lanulosa*] (Benedict 1983)
45.110.06 Slough Sedge - Salt Rush [*Carex obnupta-Juncus lesueurii*] (Duebendorfer 1989)

*45.110.07	Serrate Sedge - Leafly Sedge [*Carex subfusca-Carex ampilifolia*] (Fiedler & Leidy 1987)
45.110.08	Alpine Pussytoes - Vernacular Sedge [*Antennaria alpina-Carex vernacula*] (Major & Taylor 1977)
*45.110.09	entry moved to 45.150.02
45.110.10	entry moved to 45.145.01
*45.110.11	Mount Dana Sedge - Little Elephant's Head [*Carex subnigricans-Pedicularis attollens*] (Major & Taylor 1977)
45.110.12	entry moved to 45.164.01
45.110.13	Diego Bentgrass - Ribbed Sedge [*Agrostis diegoensis-Carex multicostata*] (Stillman 1980)
45.110.14	entry moved to 45.164.02
45.110.15	entry moved to 45.150.01
45.110.16	entry moved to 45.145.02
45.110.17	Luzulaleaf Sedge - Water-plantain Buttercup [*Carex luzulifolia-Ranunculus alismifolius*] (Taylor 1984)
45.110.18	Mount Dana Sedge - Alpine Shootingstar [*Carex subnigricans-Dodecatheon alpinum*] (Taylor 1984)
45.110.19	Mount Dana Sedge - Alpine Pussytoes [*Carex subnigricans-Antennaria alpina*] (Taylor 1984)
45.110.20	entry moved to 45.155.01
*45.110.21	entry moved to 45.160.01
45.110.22	Vernacular Sedge - Alpine Pussytoes [*Carex vernacula-Antennaria alpina*] (Taylor 1984)
45.110.23	Western Yellow Cress - Dewey Sedge [*Rorippa curvisiliqua-Carex deweyana*] (Taylor 1984)
45.110.24	White-tipped Sedge - Junegrass [*Carex albonigra-Koeleria cristata*] (Taylor 1984)
45.110.25	Slough Sedge - Spreading Rush Tidal [*Carex obnupta-Juncus patens*] (Keeler-Wolf, *et al*. 2001)

45.120.00 Rocky Mountain Sedge [*Carex scopulorum*]

45.120.01	Rocky Mountain Sedge [*Carex scopulorum*] (Major & Taylor 1977)
45.120.02	Rocky Mountain Sedge - Elephant's Head [*Carex scopulorum-Pedicularis groenlandica*] (Taylor 1984)
*45.120.03	Rocky Mountain Sedge - Cotton-grass [*Carex scopulorum-Eriophorum criniger*] (Taylor 1984)
45.120.04	Rocky Mountain Sedge - Few-flowered Spikerush [*Carex scopulorum-Eleocharis pauciflora*] (Keeler-Wolf and Moore 2001)

45.130.00 Nebraska Sedge [*Carex nebrascensis*]

45.130.01	Nebraska Sedge [*Carex nebrascensis*] (Beguin & Major 1975)
45.130.02	Nebraska Sedge - Sierra Ricegrass [*Carex nebrascensis-Ptilagrostis kingii*] (Halpern 1986)

45.140.00 Shorthair Sedge [*Carex filifolia*]

45.140.01	Shorthair Sedge - Spike Trisetum [*Carex filifolia-Trisetum spicatum*] (Benedict 1983)
45.140.02	Shorthair Sedge - Sierra Ricegrass [*Carex filifolia-Ptilagrostis kingii*] (Benedict 1983)
45.140.03	Pussypaws - Shorthair Sedge [*Calyptridium umbellatum-Carex filifolia*] (Burke 1982)
45.140.04	Nude Buckwheat - Shorthair Sedge [*Eriogonum nudum-Carex filifolia*] (Burke 1982)
45.140.05	Talus fleabane - Shorthair Sedge [*Erigeron algidus-Carex filifolia*] (Burke 1982)
45.140.06	Shorthair Sedge [*Carex filifolia*] (Major & Taylor 1977)

45.140.07 Shorthair Sedge - Saxifrage [*Carex filifolia-Saxifraga aprica*] (Taylor 1984)
45.140.08 Shorthair Sedge - Heretic Penstemon [*Carex filifolia-Penstemon heterodoxus*] (Keeler-Wolf and Moore 2001)

45.145.00 Heller Sedge [*Carex helleri*] (Keeler-Wolf and Moore 2001)
45.145.01 Heller Sedge - Parry Rush [*Carex helleri-Juncus parryi*] (Major & Taylor 1977)
45.145.02 Heller Sedge - Club-moss Ivesia [*Carex helleri-Ivesia lycopodioides*] (Taylor 1984)

45.150.00 Brewer Sedge [*Carex breweri*] (Keeler-Wolf and Moore 2001)
45.150.01 Brewer Sedge [*Carex breweri*] (Taylor 1984)
*45.150.02 Brewer Sedge - Wheeler Bluegrass [*Carex breweri-Poa wheeleri*] (Major & Taylor 1977)

45.155.00 Showy Sedge [*Carex spectabilis*] (Keeler-Wolf and Moore 2001)
45.155.01 Showy Sedge - Sibbaldia [*Carex spectabilis-Sibbaldia procumbens*] (Taylor 1984)

45.160.00 Congdon Sedge - Streambank Arnica [*Carex congdonii-Arnica amplexicaulis*] (Keeler-Wolf and Moore 2001)
*45.160.01 Streambank Arnica - Congdon Sedge [*Arnica amplexicaulis-Carex congdonii*] (Taylor 1984)

45.162.00 Jones' Sedge [*Carex jonesii*] (Keeler-Wolf and Moore 2001)

45.164.00 Blackish Sedge [*Carex nigricans*] (Keeler-Wolf and Moore 2001)
45.164.01 Bilberry - Blackish Sedge [*Vaccinium caespitosum-Carex nigricans*] (Major & Taylor 1977)
45.164.02 Blackish Sedge - Mountain-laurel [*Carex nigricans-Kalmia polifolia*] (Taylor 1984)

45.166.00 Woolly Sedge [*Carex lanuginosa*] (Keeler-Wolf and Moore 2001)

45.168.00 Water Sedge [*Carex aquatilis*] (Keeler-Wolf and Moore 2001)

45.170.00 Inflated Sedge [*Carex vesicaria*] (Keeler-Wolf and Moore 2001)
45.170.01 Inflated Sedge [*Carex vesicaria*] (Keeler-Wolf and Moore 2001)

45.200.00 Spikerushes [*Eleocharis* spp.]

45.210.00 Spikerush [*Eleocharis* spp.]
45.210.01 Nevada Rush - Spikerush [*Juncus nevadensis-Eleocharis* spp.] (Beguin & Major 1975)
45.210.02 Few-flowered Spikerush [*Eleocharis pauciflora*] (Benedict 1983)
*45.210.03 Few-flowered Spikerush - Primrose Monkeyflower [*Eleocharis* pauciflora- *Mimulus primuloides*] (Benedict 1983)
45.210.04 Mountain Spikerush - Cowbane [*Eleocharis montevidensis-Oxypolis occidentalis*] (Halpern 1986)
45.210.05 Mountain Spikerush - Moss [*Eleocharis montevidensis*-Moss] (Halpern 1986)
*45.210.06 Pale Spikerush - Water-starwort [*Eleocharis macrostachya-Callitriche hermaphroditica*] (Kepecko & Lathrop 1975)
*45.210.07 Spikerush - Water Pygmy [*Eleocharis* spp.-*Crassula aquatica*] (Kepecko & Lathrop 1975)

45.210.08 Littlebeak Spikerush - Common Three-square [*Eleocharis rostellata-Scirpus americanus*] (Odion *et al*. 1992)
*45.210.09 Littlebeak Spikerush - Alkali Muhly [*Eleocharis rostellata-Muhlenbergia asperifolia*] (Odion *et al*. 1992)

45.300.00 Meadow and Seep Habitats {45000}

45.310.00 Montane Meadow
45.310.01 entry moved to 41.640.04
45.310.02 Bluejoint Reedgrass - Small-fruited Bulrush [*Calamagrostis canadensis-Scirpus microphyllus*] (Halpern 1986)
45.310.03 Rough Bentgrass [*Agrostis scabra*] (Halpern 1986)
45.310.04 entry moved to 41.222.02
45.310.05 entry moved to 41.222.03
45.310.06 Bracken Fern- Pale Hedge-nettle [*Pteridium aquilinum-Stachys rigida*] (Palmer 1979)
45.310.07 Gentian - Alpine Aster [*Gentiana newberryi-Aster alpigenus*] (Ratliff 1982, 1985)
45.310.09 Carpet Clover [*Trifolium monathum*] (Ratliff 1982, 1985)
45.310.10 Angelica - Indian Paintbrush [*Angelica tomentosa-Castilleja miniata*] (Stillman 1980)
45.310.11 Diego Bentgrass - Ribbed Sedge [*Agrostis diegoensis-Carex multicostata*] (Stillman 1980)
45.310.12 Wet Montane Meadow {45110}
45.310.13 Dry Montane Meadow {45120}

45.312.00 Bigleaf Lupine alliance [*Lupinus latifolius*] (Keeler-Wolf and Moore 2001)
45.312.01 Bigleaf Lupine [*Lupinus latifolius*] (Keeler-Wolf and Moore 2001)

45.320.00 Subalpine Meadow
45.320.01 Skyline Bluegrass - Smooth-beaked Sedge [*Poa cusickii* spp.*epilis-Carex integra*] (Beguin & Major 1975)
45.320.02 Heretic Penstemon - Yarrow [*Penstemon heterodoxus-Achillea lanulosa*] (Benedict 1983)
45.320.03 Many-nerved Sedge - Yarrow [*Carex multicostata-Achillea lanulosa*] (Benedict 1983)
45.320.04 Tawny Buckwheat - Woolly Mountain-parsley [*Eriogonum incanum-Oreonana vestita*] (Benedict 1983)
45.320.05 Davis Knotweed - Tawny Buckwheat [*Polygonum davisiae-Eriogonum incanum*] (Major & Taylor 1977)
45.320.06 Pussypaws - Heretic Penstemon [*Calyptridium umbellatum-Penstemon heterodoxus*] (Major & Taylor 1977)
45.320.07 Jeffrey Shooting Star - Mertens Rush [*Dodecatheon jeffreyi-Juncus mertensianus*] (Palmer 1979)
45.320.08 Wet Subalpine or alpine meadow

45.400.00 Mountain Heather - Bilberry [*Phyllodoce* spp.-*Vaccinium caespitosum*]
45.400.01 Sierra Primrose [*Primula suffrutescens*] (Burke 1982)
45.400.02 Bilberry - Blackish Sedge [*Vaccinium caespitosum-Carex nigricans*] (Major & Taylor 1977)
45.400.03 Drummond Cinquefoil - Brewer Cinquefoil [*Potentilla drummondii-Potentilla breweri*] (Major & Taylor 1977)

45.405.00 Sierra Bilberry Scrub [*Vaccinium (caespitosum, scoparium)*] (Keeler-Wolf and Moore 2001)

45.410.00 Western Blueberry Scrub [*Vaccinium uliginosum*] (Keeler-Wolf and Moore 2001)

45.410.01 Western Blueberry [*Vaccinium uliginosum*] (Keeler-Wolf and Moore 2001)

45.415.00 Mountain Pride Penstemon [*Penstemon newberryi*] (Keeler-Wolf and Moore 2001)

45.415.01 Mountain Pride Penstemon - Mountain Jewelflower [*Penstemon newberryi-Streptanthus tortuosus*] (Taylor 1984)

45.415.02 Mountain Spiraea / Mountain Pride Penstemon - Mountain Jewelflower [*Spiraea densiflora/Penstemon newberryi-Streptanthus tortuosus*] (Keeler-Wolf and Moore 2001)

45.420.00 Canada Goldenrod [*Solidago canadensis*] (Keeler-Wolf and Moore 2001)

45.420.00 Canada Goldenrod - Yarrow [*Solidago canadensis-Achillea millefolium*] (Keeler-Wolf and Moore 2001)

45.421.00 Alpine Aster [*Aster alpigenus* spp. *andersonii*] (Keeler-Wolf and Moore 2001)

45.422.00 Cordilleran Arnica [*Arnica mollis*] (Keeler-Wolf and Moore 2001)

45.423.00 White Corn-lily [*Veratrum californicum*] (Keeler-Wolf and Moore 2001)

45.423.01 White Corn-lily - Arrowhead Butterweed [*Veratrum californicum-Senecio trangularis*] (Taylor 1984)

45.500.00 Alkali Meadow {45310}

45.550.00 Cocklebur Riparian Grassland [*Xanthium strumarium*] (Keeler-Wolf, Vaghti 2000)

45.555.00 Fennel [*Foeniculum vulgare*] (Keeler-Wolf, Vaghti 2000)

45.560.00 Rush Riparian Grassland [*Juncus* spp.] (Keeler-Wolf, *et al*. 2001)

45.561.00 Common Rush Riparian Grassland [*Juncus effusus* var. *brunneus*] (Keeler-Wolf, *et al*. 2001)

45.562.00 Baltic Rush Riparian Grassland [*Juncus balticus*] (Keeler-Wolf, Vaghti 2000)

45.562.01 Baltic Rush - Poison Hemlock [*Juncus balticus-Conium maculatum*] (Keeler-Wolf, Vaghti 2000)

45.562.02 Baltic Rush - (Mexican Rush) [*Juncus balticus-(Juncus mexicana)*] (Keeler-Wolf and Moore 2001)

*45.563.00 Cooper Rush Riparian Grassland [*Juncus cooperi*] (Keeler-Wolf and Thomas 2000)

45.564.00 Spreading Rush [*Juncus patens*] (Keeler-Wolf, *et al*. 2001)

45.565.00 Mexican Rush Riparian Grassland [*Juncus mexicanus*] (Keeler-Wolf and Thomas 2000)

45.566.00 Parry Rush [*Juncus parryi*] (Keeler-Wolf and Moore 2001)

45.566.01 Parry Rush - Vagus Buckwheat [*Juncus parryi-Eriogonum incanum*] (Taylor 1984)

*45.567.00 Sierra Rush [*Juncus nevadensis*] (Keeler-Wolf and Moore 2001)

45.600.00 Alkali Seep {45320}

45.700.00 Freshwater Seep {45400}

*46.000.00 Alkali Playa Community {46000}

50.000.00 BOG AND MARSH {50000}

51.000.00 Bog and Fen {51000}

*51.100.00 Fen Habitat {51110}{51200}

*51.200.00 Darlingtonia Seep [*Darlingtonia californica*] {51120}
52.200.01 California pitcher plant-California cone flower [*Darlingtonia californica-Rudbeckia californica*] (re-named from Jimerson et al. 1995)

52.000.00 Marsh

52.100.00 Fresh - Brackish Water Marsh {52200}
52.100.01 Coastal and Valley Freshwater Marsh {52410}
52.100.02 Coastal Brackish Marsh {52200}
52.100.03 Montane Freshwater Marsh {52430}
52.100.04 Vernal Marsh {52500}

*52.101.00 Bulrush [*Scirpus* spp.]
*52.101.01 California Bulrush Wetland [*Scirpus californicus*] (Atwater *et al*. 1979)
*52.101.02 moved to 52.111.04
*52.101.03 moved to 52.111.05
*52.101.04 Moved to 52.112.00
52.101.05 moved to 52.112.01
52.101.06 California Bulrush / Tule [*Scirpus californicus/S. acutus*] (Keeler-Wolf, Vaghti 2000)
52.101.07 Small-fruited Bulrush [*Scirpus microcarpus*] (Keeler-Wolf, *et al*. 2001)

52.102.00 Bulrush - Cattail Wetland [*Scirpus* spp.-*Typha* spp.]
52.102.01 Bulrush - Cattail [*Scirpus* spp.-*Typha* spp.] (Atwater *et al*. 1979)
52.102.02 Common Tule - Southern Cattail [*Scirpus acutus* - *Typha domingensis*] (Odion *et al*. 1992)
*52.102.03 moved to 52.112.02
*52.102.04 Brackish Bulrush – Cattail [*Scirpus* spp. - *Typha* spp.] {52200}

52.103.00 Cattail Wetland [*Typha* spp.]
*52.103.01 Brackish Cattail [*Typha* spp.]
52.103.02 Broad-leafed Cattail [*Typha latifolia*] (Keeler-Wolf, *et al*. 2001)

52.104.00 Bur-reed Wetland [*Sparganium* spp.]
52.104.01 Narrowleaf Bur-reed [*Sparganium angustifolium*] (Keeler-Wolf and Moore 2001)

52.105.00 Duckweed Wetland [*Lemma* spp.]

52.106.00 Mosquito Fern Wetland [*Azolla filiculoides*]

*52.107.00 Pondweeds with floating leaves Wetland [*Potamogeton* spp.]

*52.108.00 Pondweeds with submerged leaves Wetland [*Potamogeton* spp.]

*52.109.00 Quillwort Wetland [*Isoetes* spp.]
52.109.01 Western Spikerush [*Isoetes occidentalis*] (Keeler-Wolf and Moore 2001)

*52.110.00 Yellow Pond-lily Wetland [*Nuphar luteum*]

52.111.00 Common Three-square [*Scirpus americanus*] (Keeler-Wolf and Thomas 2000)
- *52.111.01 Common Three-square - Cooper Rush - Yerba Mansa [*Scirpus americanus-Juncus cooperi-Anemopsis californica*] (Keeler-Wolf and Thomas 2000)
- *52.111.02 Common Three-square/ Silverleaf Cinqufoil [*Scirpus americanus/Potentilla anserina*] (Keeler-Wolf, Vaghti 2001)
- 52.111.03 Common Three-square/Perennial Pepperweed [*Scirpus americanus/Lepidium latifolium*] (Keeler-Wolf, Vaghti 2001)
- 52.111.04 Common Three-square [*Scripus americanus*] (Bradley 1970)
- *52.111.05 Common Three-square - Littlebeak Spikerush [*Scripus americanus-Eleocharis rostellata*] (Odion *et al*. 1992)

*52.112.00 Alkali Bulrush [*Scirpus maritimus*] (Keeler-Wolf, Vaghti 2000)
- *52.112.01 Alkali Bulrush / Pickleweed [*Scirpus maritimus/Salicornia* spp.] (Keeler-Wolf, Vaghti 2000)
- *52.112.02 Alkali Bulrush – Cattail [*Scirpus maritima. - Typha* spp.] (Keeler-Wolf, Vaghti 2000)

52.120.00 Beaked Sedge Wetland [*Carex utriculata*]
- 52.120.01 Beaked Sedge [*Carex utriculata*] (Taylor 1984, Halpern 1986, Potter 2000)

52.200.00 Salt - Alkali Marsh

*52.201.00 Pickleweed Wetland [*Salicornia* spp.]
- *52.201.01 Common Pickleweed [*Salicornia virginica*] (Atwater *et al*. 1979)
- *52.201.02 Common Pickleweed - Gumplant [*Salicornia virginica-Grindelia stricta*] (Atwater *et al*. 1979)
- *52.201.03 Common Pickleweed - Saltgrass [*Salicornia virginica-Distichlis spicata*] (Atwater *et al*. 1979)
- *52.201.04 Common Pickleweed - Jaumea - Saltgrass [*Salicornia virginica-Jaumea carnosa*] (Eicher 1987)
- *52.201.05 Bigelow Pickleweed [*Salicornia bigelovii*] (Peinado *et al*. 1994)
- 52.201.06 Northern Coastal Salt Marsh {52110}
- *52.201.07 South Coastal Pickleweed Salt Marsh
- *52.201.08 Alkali Pickleweed
- 52.201.09 Southern Coastal Salt Marsh {52120}
- 52.201.10 Common Pickleweed - Bigelow Pickleweed / Western Sea Purslane [*Salicornia virginica - Salicornia bigelovii / Sesuvium verrucosum*] (Keeler-Wolf, Vaghti 2000)
- 52.201.11 Common Pickleweed - Bigelow Pickleweed / Saltbush [*Salicornia virginica - Salicornia bigelovii* / *Atriplex* spp.] (Keeler-Wolf, Vaghti 2000)
- 52.201.12 Common Pickleweed - Bigelow Pickleweed / Saltgrass [*Salicornia virginica - Salicornia bigelovii / Distichlis spicata*] (Keeler-Wolf, Vaghti 2000)
- 52.201.13 Common Pickleweed - Bigelow Pickleweed / Beardgrass [*Salicornia virginica - Salicornia bigelovii / Polypogon* spp.] (Keeler-Wolf, Vaghti 2000)
- 52.201.14 Common Pickleweed - Saltgrass - Jaumea [*Salicornia virginica-Distichlis spicata-Jaumea carnosa*] (Keeler-Wolf, *et al*. 2001)

*52.202.00 Ditch-grass Wetland [*Ruppia* spp.]

52.203.00 Cismontane Alkali Marsh {52310}

52.204.00 Transmontane Alkali Marsh {52320}

52.205.00 Perennial Pepperweed [*Lepidium latifolium*] (Keeler-Wolf, Vaghti 2000)

52.205.01 Pepperweed - Saltgrass [*Lepidium latifolium - Distichlis* spp.] (Keeler-Wolf, Vaghti 2000)

52.206.00 Gumplant [*Grindelia stricta stricta*] (Keeler-Wolf, Vaghti 2000)

52.208.00 Birdfoot Trefoil [*Lotus corniculatus*] (Keeler-Wolf, Vaghti 2000)

52.209.00 Brass Buttons [*Cotula coronopifolia*] (Keeler-Wolf, Vaghti 2000)

52.210.00 Western Sea Purslane [*Sesuvium verrucosum*] (Keeler-Wolf, Vaghti 2000)

52.211.00 Spearscale [*Atriplex triangularis*] (Keeler-Wolf, Vaghti 2000)

52.500.00 Alkali Heath Dwarf Scrub [*Frankenia salina*] (Keeler-Wolf, Vaghti 2000)

60.000.00 RIPARIAN AND BOTTOMLAND HABITAT

61.000.00 Riparian Forest and Woodland

61.100.00 Cottonwood and Aspen Woodlands and Forests [*Populus* spp.]

61.111.00 Aspen Upland and Riparian Forests and Woodlands

*61.111.01 Riparian Aspen Forest (Talley 1977)

*61.111.02 Aspen [*Populus tremuloides*] (Potter 1994)

*61.111.03 Aspen / White Corn-lily [*Populus tremuloides/Vertrum californicum*] (Riegel *et al*. 1990, Potter 1994)

*61.111.04 Aspen / Upland [*Populus tremuloides*]

*61.111.05 Aspen / Leafy Aster [*Populus tremuloides/Aster foliaceus*] (Riegel *et al*. 1990)

61.111.06 Aspen / Big Sagebrush [*Populus tremuloides/Artemisia tridentata*] (Keeler-Wolf and Moore 2001)

61.111.07 Aspen / Big Sagebrush / Mountain Monardella - Kelloggia [*Populus tremuloides/Artemisia tridentata/Monardella odoratissima-Kelloggia galioides*] (Keeler-Wolf and Moore 2001)

61.111.08 Aspen / Mountain Monardella [*Populus tremuloides/Monardella odoratissima*] (Potter 1994)

61.111.09 Aspen / Jeffrey Pine [*Populus tremuloides/Pinus jeffreyi*] (Keeler-Wolf and Moore 2001)

61.111.10 Aspen / Woods Rose [*Populus tremuloides/Rosa woodsii*] (Keeler-Wolf and Moore 2001)

61.111.11 Aspen - Lodgepole Pine / Big Sagebrush / Kentucky blue-grass [*Populus tremuloides-Pinus contorta/Artemisia tridentata/Poa pratensis*] (Keeler-Wolf and Moore 2001)

*61.120.00 Black Cottonwood Riparian Forests and Woodlands [*Populus balsamifera*] {61110}

*61.120.01 North Coast Black Cottonwood [*Populus balsamifera*]

*61.120.02 Montane Black Cottonwood [*Populus balsamifera*] {61530}

61.120.03 Black Cottonwood - Jeffrey Pine [*Populus balsamifera-Pinus jeffreyi*] (Keeler-Wolf and Moore 2001)

*61.130.00 Fremont Cottonwood Riparian Forests and Woodlands [*Populus fremontii*]

- *61.130.01 Great Valley Cottonwood Riparian [Populus spp.] {61410}
- *61.130.02 Southern Cottonwood - Willow Riparian [*Populus* spp.-*Salix* spp.] {61330}
- *61.130.03 Modoc - Great Basin Cottonwood - Willow Riparian [*Populus* spp.-*Salix* spp.]
- *61.130.04 Mojave Riparian {61700}
- *61.130.05 Sonoran Cottonwood - Willow Riparian [*Populus* spp.-*Salix* spp.] {61810}
- 61.130.06 Fremont Cottonwood [*Populus fremontii*] Sacramento River association (Vaghti 2003)
- 61.130.07 Fremont Cottonwood /Box-elder [*Populus fremontii/Acer negundo]* (Vaghti 2003)
- 61.130.08 Fremont Cottonwood/Box-elder/Hymalian Blackberry [Populus fremontii/Acer negundo/Rubus discolor] (Vaghti 2003)
- 61.130.09 Fremont Cottonwood/Douglas' Mugwort [Populus fremontii/Artemisia douglasiana] (Vaghti 2003)
- 61.130.10 Fremont Cottonwood/Common bedstraw [Populus fremontii/Gallium aparine] (Vaghti 2003)
- 61.130.11 Fremont Cottonwood/California Blackberry [Populus fremontii/Rubus ursinus] (Vaghti 2003)
- 61.130.12 Fremont Cottonwood-Gooddings Black Willow [Populus fremontii-Salix gooddingii] (Vaghti 2003)
- 61.130.13 Fremont Cottonwood/California Wild Grape [Populus fremontii/Vitis californica] (Vaghti 2003)

61.200.00 Willow Riparian Forests and Woodlands [*Salix* spp.]

*61.201.00 Arroyo Willow Riparian Forests and Woodlands [*Salix lasiolepis*]

- *61.201.01 Central Coast Arroyo Willow Riparian [*Salix lasiolepis*] {61230}
- *61.201.02 Southern Arroyo Willow Riparian [*Salix lasiolepis*]
- 61.201.03 Arroyo Willow / Blackberry Riparian [*Salix lasiolepis/Rubus* spp.] (Keeler-Wolf, *et al*. 2001)
- 61.201.04 Arroyo Willow - Shining Willow [*Salix lasiolepis-Salix lucida*] (Keeler-Wolf, *et al*. 2001)

*61.202.00 Black Willow Riparian Forests and Woodlands [*Salix gooddingii*]

*61.203.00 Hooker Willow Riparian Forests [*Salix hookeriana*]

*61.204.00 Pacific Willow Riparian Forests [*Salix lucida* ssp. *lasiandra*]

- 61.204.01 Shining Willow/Dwarf Nettle-Stinging Nettle [Salix lucida/Urtica urens-U. dioica] (Vaghti 2003)

*61.205.00 Red Willow Riparian Forests [*Salix laevigata*]

- 61.205.01 Red Willow [*Salix laevigata*] (Keeler-Wolf and Moore 2001)
- 61.205.02 Red Willow / Arroyo Willow [*Salix laevigata / Salix lasiolepis*] (Keeler-Wolf, Vaghti 2000)

*61.206.00 Sitka Willow Riparian Forests [*Salix sitchensis*]

*61.207.00 Mixed Willow Riparian Forests and Woodlands [*Salix* spp.]

*61.208.00 Southern Willow Scrub [*Salix* spp.]

61.209.00 Narrow-leaf Willow Riparian Scrub [*Salix exigua*] (Keeler-Wolf, Vaghti 2000)

- 61.209.01 Narrow-leaf Willow [*Salix exigua*] Sacramento River Stands (Vaghti 2003)

61.209.02 Narrow-leaf Willow /Giant Reed [*Salix exigua-Arundo donax*] (Vaghti 2003)
61.209.03 Narrow-leaf Willow –Dusky Willow [Salix exigua-Salix melanopsis] (Vaghti 2003)

61.210.00 Yellow Willow Riparian Scrub [*Salix lutea*] (Keeler-Wolf & Moore 2001)

61.211.00 Gooding Willow Woodland [*Salix goodingii*] (Keeler-Wolf 2001)
61.211.01 Gooding Willow [*Salix goodingii*] (Keeler-Wolf 2001)

61.300.00 Sycamore [*Platanus* spp.]

*61.310.00 California Sycamore [*Platanus racemosa*]

*61.311.00 Central California Sycamore Alluvial Woodland [*Platanus* spp.] {62100}
*61.311.01 California Sycamore / Slender Wildoats [*Platanus racemosa/Avena barbata*] (Keeler-Wolf *et al*. 1994)
*61.311.02 California Sycamore / Soft Chess [*Platanus racemosa/Bromus hordeaceus*] (Keeler-Wolf *et al*. 1994)

*61.312.00 Southern Sycamore - Alder Riparian Woodland [*Platanus* spp.-*Alnus* spp.] {62400}
61.312.01 California Sycamore - Coast Live Oak [*Platanus racemosa-Quercus agrifolia*] (Keeler-Wolf *et al*. 1994)
*61.312.02 California Sycamore [*Platanus racemosa*] (Campbell 1980)

*61.313.00 Foothill Sycamore Riparian Woodland [*Platanus* spp.]
*61.313.01 California Sycamore / Mulefat [*Platanus racemosa/Baccharis salicifolia*] (Keeler-Wolf *et al*. 1994)

*61.314.00 Central Coast Cottonwood - Sycamore Riparian Woodland [*Populus* spp.-*Platanus* spp.] {61210}

61.400.00 Alder Riparian Forest [*Alnus* spp.]

61.410.00 Red Alder [*Alnus rubra*]
*61.410.01 Douglas-fir - Red Alder / Vine Maple /Candyflower [*Pseudotsuga menziesii/Alnus rubra/Acer circinatum/Claytonia sibirica*] (Jimerson 1993)
*61.410.02 Red Alder / Salal [*Alnus rubra/Gaultheria shallon*] (Stuart *et al*. 1986)
*61.410.03 Red Alder Riparian Forest [*Alnus rubra*] {61130}
*61.410.04 Red Alder Forest [*Alnus rubra]*{81A00}
*61.410.05 Red Alder / Arroyo Willow [*Alnus rubra/Salix lasiolepis*] (Keeler-Wolf, *et al*. 2001)
*61.410.06 Red Alder / Salmonberry - Blue Elderberry [*Alnus rubra/Rubus spectabilis-Sambucus racemosa*] (Keeler-Wolf, *et al*. 2001)

61.420.00 White Alder Forest and Woodland [*Alnus rhombifolia*] {61510}
*61.420.01 White Alder / California Polypody [*Alnus rhombifolia/Polypodium californicum*] (Borchert *et al*. 1988)
61.420.02 White Alder / Spikenard [*Alnus rhombifolia/Aruncus dioicus*] (Jimerson 1993)
61.420.03 White Alder - Bigleaf Maple [*Alnus rhombifolia/Acer macrophyllum*] (Stuart *et al*. 1992)
61.420.04 Douglas-fir - White Alder / Himalaya Berry [*Pseudotsuga menziesii-Alnus rhombifolia/Rubus discolor*] (Stuart *et al*. 1992)

61.420.05 White Alder / Indian Rhubarb [*Alnus rhombifolia/Darmera peltata*] (Taylor 1975a, b)
61.420.06 White Alder / Miner Dogwood [*Alnus rhombifolia/Cornus sessilis*] (Taylor & Teare 1979a)
61.420.07 White Alder / Red Osier [*Alnus rhombifolia/Cornus sericea*] (Taylor & Teare 1979a)
61.420.08 White Alder / Fragrant Bedstraw [*Alnus rhombifolia/Galium trifolium*] (Taylor & Teare 1979b)
61.420.09 White Alder / Mulefat [*Alnus rhombifolia/Baccharis salicifolia*] (White 1994a)
61.420.10 White Alder [*Alnus rhombifolia*] (Potter 2000)

61.500.00 Desert Wash Riparian Woodland

*61.510.00 Mesquite Woodland [*Prosopis* spp.]
*61.510.01 Mesquite Dune Scrub [*Prosopis* spp.] (Spolsky 1979)
*61.510.02 Acacia - Mesquite thickets [*Acacia* spp.-*Prosopis* spp.] (Spolsky 1979)
*61.510.03 Mesquite Dry Lake [*Prosopis* spp.] (Spolsky 1979)
*61.510.04 Great Valley Mesquite Scrub [*Prosopis* spp.] {63420}
*61.510.05 Mesquite Bosque [*Prosopis* spp.] {61820}
61.510.06 Mesquite Alkaline [*Prosopis* spp.], spring type (Keeler-Wolf *et al.* 1998)
61.510.07 Mesquite - Willow [*Prosopis* spp.-*Salix* spp.] (Keeler-Wolf *et al*. 1998)
61.510.08 Upper Desert Mesquite [*Prosopis* spp.], spring association (Keeler-Wolf *et al*. 1998)

*61.512.00 Honey Mesquite Scrub [*Prosopis glandulosa*] (Keeler-Wolf and Thomas 2000)
*61.512.01 Honey Mesquite [*Prosopis glandulosa*] (Keeler-Wolf and Thomas 2000)

*61.513.00 Tornillo Scrub [*Prosopis pubescens*] (Keeler-Wolf and Thomas 2000)

*61.520.00 Fan Palm Woodland [*Washingtonia filifera*]
*61.520.01 Desert Fan Palm [*Washingtonia filifera*] {62300}
*61.520.02 Fan Palm - Sycamore [*Washingtonia filifera-Platanus* spp.] (Spolsky 1979)

*61.530.00 Blue Palo Verde - Ironwood - Smoke Tree Woodland [*Cercidium floridum-Olneya tesota-Psorothamnus spinosus*]
*61.530.01 Mixed Wash Woodland (Spolsky 1979)

61.540.00 Blue Palo Verde Woodland [*Cercidium floridium*]
*61.540.01 Blue Palo Verde Wash Woodland [*Cercidium floridium*] (Spolsky 1979)
*61.540.02 Blue Palo Verde / Desert Lavender [*Cercicium floridum/Hyptis emoryi*] (Keeler-Wolf 2001)

61.550.00 Desert-willow Woodland [*Chilopsis linearis*]
*61.550.01 Desert-willow Woodland [*Chilopsis linearis*] (Spolsky 1979)
61.550.02 Desert-willow / Cheesebush [*Chilopsis linearis*/*Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)
*61.550.03 Desert-willow - Desert Almond - Cheesebush [*Chilopsis linearis-Prunus fasciculata-Hymenoclea salsola*] (Keeler-Wolf and Thomas 2000)
61.550.04 Desert-willow - Desert Almond [*Chilopsis linearis-Prunus fasciculata*] (Keeler-Wolf and Thomas 2000)
*61.550.05 Desert-willow - Blue Sage [*Chilopsis linearis-Salvia dorrii*] (Keeler-Wolf and Thomas 2000)
61.550.06 Desert-willow - Desert Sunflower [*Chilopsis linearis-Viguiera parishii*] (Keeler-Wolf and Thomas 2000)

61.550.07 Desert-willow - Blackstem Rabbitbrush [*Chilopsis linearis-Chrysothamnus paniculatus*] (Keeler-Wolf and Thomas 2000)

61.560.00 Ironwood Woodland [*Olneya tesota*]
*61.560.01 Ironwood Woodland [*Olneya tesota*] (Spolsky 1979)
61.560.02 Ironwood / Desert Lavender [*Olneya tesota, Hyptis emoryi*] (Keeler-Wolf 2001)

61.570.00 Smoke Tree Woodland and Scrub [*Psorothamnus spinosus*]
*61.570.01 Smoketree Wash Woodland [*Psorothamnus spinosus*] (Spolsky 1979)
61.570.02 Smoketree - Cheesebush - Sweetbush [*Psorothamnus spinosus-Hymenoclea salsola-Bebbia juncea*] (Keeler-Wolf and Thomas 2000)
*61.570.03 Smoketree / California Ephedra [*Psorothamnus spinosus/Ephedra californica*] (Keeler-Wolf and Thomas 2000)
61.570.04 Smoketree - Desert Lavender - Catclaw Acacia [*Psorothamnus spinosus-Hyptis emoryi-Acacia greggii*] (Keeler-Wolf and Thomas 2000)

*61.580.00 Desert Olive Scrub [*Forestiera pubescens*] (Keeler-Wolf and Thomas 2000)

*61.580.01 Desert Olive [*Forestiera pubescens*] (Keeler-Wolf and Thomas 2000)

*61.800.00 Walnut [*Juglans* spp.]

*61.810.00 Hind's Walnut Unique Stands [*Juglans californica* var. *hindsii*] {71120}
*61.810.01 Hinds Walnut/Mexican Elderberry [*Juglans hindsii/Sambucus mexicana*] (Vaghti 2003)

61.900.00 Mixed Riparian Forest and Woodland

*61.910.00 Great Valley Mixed Riparian Forest {61420}

*61.920.00 Southern Mixed Riparian Forest {61340}

*61.930.00 Southern Riparian Forest {61300}

*61.940.00 Mojave Riparian Forest {61700}

61.950.00 Desert Dry Wash Woodland {62200}

*61.960.00 Oregon Ash Riparian Forest [*Fraxinus latifolia*] (Keeler-Wolf, Vaghti 2000)
61.960.01 Oregon Ash [*Fraxinus latifolia*] (Potter 2000)

63.000.00 Low to High Elevation Riparian Scrub {63000}

63.100.00 Scrub Willow [*Salix* spp.]

*63.110.00 Narrowleaf Willow [*Salix exigua*] {63410}
63.110.01 Narrowleaf Willow - Desert Baccharis [*Salix exigua-Baccharis sergilloides*] (Keeler-Wolf and Thomas 2000)

63.111.00 Tealeaf Willow Riparian Scrub [*Salix planifolia*] (Keeler-Wolf and Moore 2001)
63.111.01 Tealeaf Willow [*Salix planifolia*] (Keeler-Wolf and Moore 2001)

63.112.00 Sierra Willow Riparian Scrub [*Salix eastwoodiae*] (Keeler-Wolf and Moore 2001)
63.112.01 Sierra Willow [*Salix eastwoodiae*] (Keeler-Wolf and Moore 2001)

63.113.00 Lemmon’s Willow Riparian Scrub [*Salix lemmonii*] (Keeler-Wolf and Moore

2001)

63.113.01 Lemmon's Willow [*Salix lemmonii*] (Keeler-Wolf and Moore 2001)

63.114.00 Dusky Willow Riparian Scrub [*Salix melanopsis*] (Keeler-Wolf and Moore 2001)

63.114.01 Dusky Willow [*Salix melanopsis*] (Keeler-Wolf and Moore 2001)

63.115.00 Grayleaf Sierra Willow Riparian Scrub [*Salix orestera*] (Taylor 1984)

63.115.01 Grayleaf Sierra Willow / Shorthair Reedgrass [*Salix orestera/Calamagrostis breweri*] (Taylor 1984)

63.115.02 Grayleaf Sierra Willow / Arrowhead Butterweed [*Salix orestera/Senecio triangularis*] (Taylor and Major & Taylor 1977)

63.116.00 Arctic Willow Dwarf Scrub [*Salix arctica*] (Keeler-Wolf and Moore 2001)

*63.116.01 Arctic Willow [*Salix arctica*] (Taylor 1984) {moved from 91.120.22}

63.116.02 Arctic Willow / Shorthair Reedgrass - Sierra Bilberry - Pussytoes [*Salix arctica/Calamagrostis breweri-Vaccinium caespitosum-Antennaria media*] (Keeler-Wolf and Moore 2001)

*63.117.00 Snow Willow Dwarf Scrub [*Salix reticulata*] (Keeler-Wolf and Moore 2001)

63.120.00 Sandbar Willow [*Salix sessifolia*]

*63.130.00 Southern Willow [*Salix* spp.] {63320}

*63.140.00 Great Valley Willow [*Salix* spp.]

*63.150.00 Montane Wetland Shrub Habitat

*63.160.00 Subalpine Wetland Shrub Habitat

63.160.01 Sierra Ragwort - Showy Sedge [*Senecio scorzonella-Carex spectabilis*] (Burke 1982)

*63.160.02 Sierra Willow / Arrowhead Butterweed [*Salix eastwoodiae/Senecio triangularis*] (Major & Taylor 1977)

*63.160.03 Grayleaf Willow - Meadow Onion [*Salix orestera-Allium validum*] (Taylor 1984)

*63.160.04 Grayleaf Willow - Shorthair [*Salix orestera-Carex filifolia*] (Taylor 1984)

*63.160.05 Mountain Spiraea [*Spiraea densiflora*] (Taylor 1984)

*63.160.06 Tealeaf Willow - Showy Sedge [*Salix planifolia-Carex spectabilis*] (Taylor 1984)

63.200.00 Alder Scrubs [*Alnus* spp.]

*63.210.00 Mountain Alder Scrub [*Alnus incana*] {63500}

*63.220.00 Sitka Alder Scrub [*Alnus viridis*]

*63.300.00 Buttonbush Scrub [*Cephalanthus occidentalis*] {63430}

63.400.00 Elderberry Scrub and Savanna [*Sambucus* spp.]

63.410.00 Mexican Elderberry [*Sambucus mexicana*]

*63.410.01 Elderberry Savanna [*Sambucus mexicana*] {63440}

63.510.00 Mulefat Scrub [*Baccharis salicifolia*] {63310}

63.520.00 Emory Baccharis Scrub [*Baccharis emoryi*]

*63.530.00 Broom Baccharis Scrub [*Baccharis sergiloides*]
- *63.530.01 Broom Baccharis - Desert Almond [*Baccharis sergiloides-Prunus fasciculata*] (Keeler-Wolf and Thomas 2000)
- *63.530.02 Broom Baccharis - Desert Almond - Skunkbrush [*Baccharis sergiloides-Prunus fasciculata-Rhus trilobata*] (Keeler-Wolf and Thomas 2000)
- *63.530.03 Broom Baccharis / Deergrass [*Baccharis sergiloides/Muhlenbergia rigens*] (Keeler-Wolf and Thomas 2000)

63.600.00 Birch Scrub [*Betula* spp.]

*63.610.00 Water Birch Scrub [*Betula occidentalis*] {63510}

63.700.00 Arrow Weed Scrubs [*Pluchea* spp.] {63820}

63.710.00 Arrow Weed Scrub [*Pluchea sericea*]

63.800.00 Vegetation dominated by Tamarisk [*Tamarix* spp.] {63810}

63.810.00 Tamarisk Scrubs and Woodlands [*Tamarix* spp.]
- 63.810.01 Athel Tamarisk [*Tamarix aphylla*] type
- 63.810.02 Shrub Tamarisk [*Tamarix* spp.] type

*63.900.00 Southern Riparian Scrub {63300}

63.901.00 North Coast Riparian Scrub {63100}

63.902.00 Central Coast Riparian Scrub {63200}

63.903.00 Montane Riparian Scrub {63500}

63.904.00 Modoc-Great Basin Riparian Scrub {63600}

63.905.00 Mojave Desert Wash Scrub {63700}

63.906.00 Himalayan Blackberry Scrub [*Rubus discolor*] (Keeler-Wolf, Vaghti 2000)

63.907.00 California Rose Riparian Scrub [*Rosa californica*] (Keeler-Wolf, Vaghti 2000)
- 63.907.01 Rose / Baccharis Scrub [*Rosa* spp. / *Baccharis* spp.] (Keeler-Wolf, Vaghti 2000)

63.908.00 Salmonberry Scrub [*Rubus spectabilis*] (Keeler-Wolf, *et al*. 2001)

70.000.00 BROAD LEAFED UPLAND TREE DOMINATED

71.000.00 Oak Woodlands and Forests

71.010.00 Black Oak Forests and Woodland [*Quercus kelloggii*]
- 71.010.01 Black Oak - Canyon Live Oak / Poison-oak [*Quercus kelloggii-Quercus chrysolepis/Toxicodendron diversilobum*] (Allen *et al*. 1991)
- *71.010.02 Black Oak - Coast Live Oak - Pine / Ocean Spray [*Quercus kelloggii-Quercus chrysolepis/Holodiscus discolor*] (Allen *et al.* 1991)
- 71.010.03 Black Oak / Deerbush [*Quercus kelloggii/Ceanothus integerrimus*] (Allen *et al*. 1991)

71.010.04 Black Oak / Deerbush - Poison-oak / Bracken [*Quercus kelloggii/Ceanothus integerrimus-Toxicodendron diversilobum/Pteridium aquilinum*] (Allen *et al*. 1991)

71.010.05 Black Oak / Grass [*Quercus kelloggii/Trieleia* spp.] (Allen *et al*. 1991)

71.010.06 Black Oak / Greenleaf Manzanita [*Quercus kelloggii/Arctostaphylos patula*] (Allen *et al*. 1991)

*71.010.07 Black Oak - Madrone - Coast Live Oak [*Quercus kelloggii-Arbutus menziesii-Quercus chrysolepis*] (Allen *et al*. 1991)

71.010.08 Black Oak / Poison-oak [*Quercus kelloggii/Toxicodendron diversilobum*] (Allen *et al*. 1991)

71.010.09 Black Oak / Poison-oak / Grass [*Quercus kelloggii/Toxicodendron diversilobum/Trieleia* spp.] (Allen *et al*. 1991)

71.010.10 Black Oak / Poison-oak - Styrax / Grass Nut [*Quercus kelloggii/Toxicodendron diversilobum-Styrax officinalis/Trieleia laxa*] (Allen *et al*. 1991)

*71.010.11 Black Oak - Valley Oak [*Quercus kelloggii-Quercus lobata*] (Allen *et al*. 1991)

71.010.12 Canyon Live Oak - Black Oak [*Quercus chrysolepis-Quercus kelloggii*] (Allen *et al*. 1991)

71.010.13 Mixed Oak - Coast Live Oak / Poison-oak [*Quercus* spp.-*Quercus agrifolia/Toxicodendron diversilobum*] (Allen *et al*. 1991)

71.010.14 Coulter Pine - Black Oak [*Pinus coulteri-Quercus kelloggii*] (Keeler-Wolf 1986b, 1990b)

71.010.15 Black Oak [*Quercus kelloggii*] (Keeler-Wolf 1987f)

71.010.16 Black Oak - Douglas-fir - Bigleaf Maple [*Quercus kelloggii-Pseudotsuga menziesii-Acer macrophyllum*] (Jimerson 1993)

*71.010.17 Black Oak - Douglas-fir [*Quercus kelloggii-Pseudotsuga menziesii*] (Wainwright & Barbour 1984)

71.010.18 Black Oak Woodland [*Quercus kelloggii*] {71120}

71.010.19 Black Oak Forest [*Quercus kelloggii*] {81340}

71.010.20 Black Oak / Mewuk Manzanita / Mountain Misery [*Quercus kelloggii/Arctostaphylos mewukka/Chamaebatia foliosa*] (Keeler-Wolf and Moore 2001)

71.010.21 Black Oak - Incense Cedar [*Quercus kelloggii-Calocedrus decurrens*] (Keeler-Wolf and Moore 2001)

71.020.00 Blue Oak Woodland [*Quercus douglasii*] {71140}

71.020.01 Blue Oak - Coast Live Oak / Grass [*Quercus douglasii-Quercus agrifolia/*Grass] (Allen *et al*. 1991)

71.020.02 Blue Oak - Foothill Pine / Grass [*Quercus douglasii-Pinus sabinana/*Grass] (Allen *et al*. 1991)

71.020.03 Blue Oak - Foothill Pine / Wedgeleaf Ceanothus - Birchleaf Mountain-mahogany [*Quercus douglasii-Pinus sabinana/Ceanothus cuneatus-Cercocarpus betuloides*] (Allen *et a*l. 1991)

71.020.04 Blue Oak - Foothill Pine / Whiteleaf Manzanita / Grass [*Quercus douglasii-Pinus sabinana/Arctostaphylos viscida/*Grass] (Allen *et al*. 1991)

71.020.05 Blue Oak / Grass [*Quercus douglasii/*Grass] (Allen *et al*. 1991) (Includes Blue Oak / Bajada Lupine - Tree Clover,[*Quercus douglasii/Lupinus concinnus-Trifolium ciliolatum*], Blue Oak / Blue Larkspur-California Phacelia, [*Quercus douglasii/Delphinium parryi- Phacelia californica*], Blue Oak / Blue-eyed Mary-Rigiopappus, [*Quercus douglasii/Collinsia sparsiflora-Rigiopappus leptocladus*], Blue Oak / Chile Lotus - Purple Needlegrass, [*Quercus douglasii/Lotus wrangelianus-Stipa pulchra*], Blue Oak / Common Fiddleneck - Rusty Popcorn Flower, [*Quercus douglasii/Amsinckia intermedia-Plagiobothrys nothofulvus*], Blue Oak / Foxtail - Johnny-jump-up, [*Quercus douglasii/Hordeum leporinum-Viola*

pedunculata], Blue Oak / Phloxleaf Bedstraw - Bajada Lupine, [*Quercus douglasii/Galium andrewsii-Lupinus concinnus*], Blue Oak / Wand Buckwheat /Chile Lotus - California Plantain, [*Quercus douglasii/Eriogonum elongatum/Lotus wrangelianus-Plantago erecta*], Blue Oak / Wart Spurge - Goldenback Fern, [*Quercus douglasii/Euphorbia spathulata-Pentagramma triangularis*], Blue Oak / Whitestem Filaree - Foxtail,[*Quercus douglasii/Erodium moschatum-Hordeum leporinum*], of Borchert *et al*. 1993a, *Quercus douglasii* (and Blue Oak/Lemmon Needlegrass of Newton 1987) [*Quercus douglasii/Stipa lemmonii*]

71.020.06 Blue Oak - Interior Live Oak / Grass [*Quercus douglasii-Quercus wislizeni/*Grass] (Allen *et al*. 1991) (Includes Blue Oak - Interior Live Oak / Mission Star [*Quercus douglasii-Quercus wislizeni/Lithophragma cymbalaria*] of Borchert *et al*. 1993a)

71.020.07 Blue Oak - Interior Live Oak / Wedgeleaf Ceanothus /Grass [*Quercus douglasii-Quercus wislizeni/Ceanothus cuneatus*] (Allen *et al*. 1991)

71.020.08 Blue Oak - Linearleaf Goldenbush [*Quercus douglasii-Ericameria linearifolia*] (Allen *et al*. 1991)

71.020.09 Blue Oak - Understory Oak / Grass [*Quercus douglasii-Quercus* spp./Grass] (Allen *et al*. 1991)

*71.020.10 Blue Oak - Valley Oak - Coast Live Oak / Grass [*Quercus douglasii-Quercus lobata-Quercus agrifolia/*Grass] (Allen *et al*. 1991)

71.020.11 Blue Oak - Valley Oak / Grass [*Quercus douglasii-Quercus lobata/*Grass] (Allen *et al*. 1991)

71.020.12 Blue Oak / Wedgeleaf Ceanothus / Grass [*Quercus douglasii/Ceanothus cuneatus/*Grass] (Allen *et al*. 1991)

71.020.13 Interior Live Oak - Blue Oak - Foothill Pine / Grass [*Quercus wislizeni-Quercus douglasii-Pinus sabiniana/*Grass] (Allen *et al*. 1991)

*71.020.14 Blue Oak / Birchleaf Mountain-mahogany / Bowlesia [*Quercus douglasii/Cercocarpus betuloides/Bowlesia incana*] (Borchert *et al*. 1993a)

71.020.15 Blue Oak / Hillside Gooseberry / Ripgut Brome [*Quercus douglasii/Ribes californica/Bromus diandrus*] (Borchert *et al*. 1993a)

71.020.16 Blue Oak / Non-native Bromegrass - Wild Carrot [*Quercus douglasii/Bromus* sp.- *Daucus pusillus*] (Keeler-Wolf and Moore 2001)

71.020.17 Blue Oak - Interior Live Oak / Non-native Bromegrass - Wild Carrot [*Quercus douglasii-Quercus wislizeni/Bromus* sp.- *Daucus pusillus*] (Keeler-Wolf and Moore 2001)

*71.030.00 Oregon White Oak Woodland [*Quercus garryana* var. *garryana*]

*71.030.01 Oregon White Oak - Black Oak / Tall-oatgrass [*Quercus garryana* var. *garryana-Quercus kelloggii/Arrhenatherum elatius*] (Jimerson 1993)

*71.030.02 Oregon White Oak - Brewer Oak / California Fescue [*Quercus garryana* var. *garryana-Quercus garryana* var. *breweri/Festuca californica*] (Jimerson 1993)

*71.030.03 Oregon White Oak - Douglas-fir / California Fescue [*Quercus garryana* var. *garryana-Pseudotsuga menziesii/Festuca californica*] (Jimerson 1993)

*71.030.04 Oregon White Oak / Poison-oak [*Quercus garryana* var. *garryana/Toxicodendron diversilobum*] (Leitner & Leitner 1988)

*71.030.05 Oregon White Oak / Common Snowberry [*Quercus garryana* var. *garryana/Symphoricarpos albus*] (1987)

*71.030.06 Oregon White Oak / Dogtail [*Quercus garryana* var. *garryana/Cynosurus cristatus*] (Sugihara *et al*. 1987)

*71.030.07 Oregon White Oak / Klamath Gooseberry [*Quercus garryana* var. *garryana/Ribes roezlii*] (Sugihara *et al*. 1987)

*71.030.08 Oregon White Oak / Mock-orange [*Quercus garryana* var. *garryana/Philadelphus lewisii*] (Sugihara *et al*. 1987)
*71.030.09 Oregon White Oak / Poison Larkspur [Quercus garryana var. *garryana/Delphinium trollifolium*] (Sugihara *et al*. 1987)
*71.030.10 Oregon White Oak / Orchid Grass [*Quercus garryana* var. *garryana/Dactylis glomerata*] (Sugihara *et al*. 1987)
*71.030.11 Oregon White Oak / California Brome [*Quercus garryana* var. *garryana/Bromus californica*] (Taylor and Teare 1979a)
71.030.12 Oregon Oak Woodland [*Quercus garryana* var. *garryana*] {71110}

*71.040.00 Valley Oak Forests and Woodlands [*Quercus lobata*] {61430}
*71.040.01 Black Oak - Valley Oak / Grass [*Quercus kelloggii-Quercus lobata/*Grass] (Allen *et al*. 1991a)
*71.040.02 Blue Oak - Valley Oak / Grass [*Quercus douglasii-Quercus lobata/*Grass] (Allen *et al*. 1991a)
*71.040.03 Coast Live Oak - Valley Oak / Poison-oak [*Quercus agrifolia-Quercus lobata/Toxicodendron diversilobum*] (Allen *et al*. 1991a)
*71.040.04 Mixed Oak - Valley Oak / Poison-oak - California Coffeeberry [*Quercus* spp.- *Quercus lobata/Toxicodendron diversilobum-Rhamnus californica*] (Allen *et al*. 1991a)
*71.040.05 Valley Oak / Grass [*Quercus lobata/*Grass] (Allen *et al*. 1991a)
*71.040.06 Valley Oak - Coast Live Oak / Grass [*Quercus lobata-Quercus agrifolia/*Grass] (Allen *et al*. 1991a)
*71.040.07 Great Valley Valley Oak Riparian [*Quercus lobata*] {61430} (Vaghti 2003 as Q lobata/Aristolochia californica)
*71.040.08 Valley Oak Woodland [*Quercus lobata*] {71130}

71.050.00 Canyon Live Oak Forest and Woodland [*Quercus chrysolepis*]
71.050.01 Canyon Live Oak - Madrone - Tanoak [*Quercus chrysolepis-Arbutus menziesii-Lithocarpus densiflora*] (Campbell 1980)
*71.050.02 Sugar Pine - Canyon Live Oak [*Pinus lambertiana-Quercus chrysolepis*] (Griffin 1976a)
*71.050.03 Canyon Live Oak - Deerbrush [*Quercus chrysolepis-Ceanothus integerrimus*] (Gordon & White 1994)
71.050.04 Canyon Live Oak Woodland [*Quercus chrysolepis*] (Meier 1979)
71.050.05 Canyon Live Oak - Douglas-fir [*Quercus chrysolepis-Pseudotsuga menziesii*] (Mize 1973)
*71.050.06 Canyon Live Oak / Lemmon Catchfly [*Quercus chrysolepis/Silene lemmonii*] (NDDB)
*71.050.07 Canyon Live Oak- Oregon White Oak / Goldenback Fern [*Quercus chrysolepis-Quercus garryana* var. *garryana/Pentagramma triangularis*] (Sawyer & Stillman 1977)
71.050.08 Canyon Live Oak / Narrowleaf Sword Fern [*Quercus chrysolepis/Polystichum imbricans*] (Sawyer & Stillman 1977)
71.050.09 Canyon Live Oak / Mewuk Manzanita [*Quercus chrysolepis/Arctostaphylos mewukka*] (Taylor & Randal 1977a)
71.050.10 Moved to Douglas-fir – Canyon Live oak alliance
71.050.11 Canyon Live Oak [*Quercus chrysolepis*] Ravine forest (Holland 1986) {61350}
71.050.12 Canyon Live Oak Forest [*Quercus chrysolepis*] {81320}
71.050.13 Canyon Live Oak - California Bay [*Quercus chrysolepis-Umbellularia californica*] (Keeler-Wolf and Moore 2001)
71.050.14 Canyon Live Oak / Whiteleaf Manzanita [*Quercus chrysolepis-Arctostaphylos viscida*] (Keeler-Wolf and Moore 2001)
71.050.15 Canyon Live Oak / Greenleaf Manzanita [*Quercus chrysolepis/Arctostaphylos patula*] (Keeler-Wolf and Moore 2001)

71.050.16 Canyon Live Oak - Foothill Pine [*Quercus chrysolepis/Pinus sabiniana*] (Keeler-Wolf and Moore 2001)
71.050.17 Canyon Live Oak / Wood Fern [*Quercus chrysolepis/Dryopteris arguta*] (Keeler-Wolf and Moore 2001)
71.050.18 Canyon Live Oak - Ponderosa Pine [*Quercus chrysolepis/Pinus ponderosa*] (Keeler-Wolf and Moore 2001)
71.050.19 Canyon Live Oak - Incense Cedar [*Quercus chrysolepis/Calocedrus decurrens*] (Keeler-Wolf and Moore 2001)

71.060.00 Coast Live Oak Forest and Woodland [*Quercus agrifolia*]
71.060.01 Blue Oak - Coast Live Oak / Grass [*Quercus douglasii-Quercus agrifolia/*Grass] (Allen *et al*. 1991)
71.060.02 Coast Live Oak [*Quercus agrifolia*] (Allen *et al*. 1991)
71.060.03 Coast Live Oak - Bigleaf Maple / California Coffeeberry -Ocean Spray [*Quercus agrifolia-Acer macrophyllum/Rhamnus californica-Holodiscus discolor*] (Allen *et al*. 1991)
71.060.04 Coast Live Oak / Blackberry / Bracken [*Quercus agrifolia/Rubus* spp*./Pteridium aquilinum*] (Allen *et al*. 1991)
71.060.05 Coast Live Oak - California Bay / Toyon - Scrub Oak [*Quercus agrifolia-Umbellularia californica/Heteromeles arbutifolia-Quercus berberidifolia*] (Allen *et al*. 1991)
71.060.06 Coast Live Oak / California Coffeeberry - Toyon [*Quercus agrifolia/Rhamnus californica-Heteromeles arbutifolia*] (Allen *et al*. 1991)
71.060.07 Coast Live Oak / Chamise - Black Sage [*Quercus agrifolia/Adenostoma fasciculatum-Salvia mellifera*] (Allen *et al*. 1991)
71.060.08 Coast Live Oak / California Sagebrush / Grass [*Quercus agrifolia/Artemisia californica/*Grass] (Allen *et al*. 1991)
71.060.09 Coast Live Oak / Grass [*Quercus agrifolia/*Grass] (Allen *et al*. 1991)
71.060.10 Coast Live Oak - Madrone / Hazel - Blackberry [*Quercus agrifolia-Arbutus menziesii/Corylus cornuta-Rubus* spp.] (Allen *et al*. 1991)
71.060.11 Coast Live Oak / Ocean Spray - Common Snowberry [*Quercus agrifolia/Holodiscus discolor-Symphoricarpos albus*] (Allen *et al*. 1991)
71.060.12 Coast Live Oak / Poison-oak / Grass [*Quercus agrifolia / Toxicodendron diversilobum/*Grass] (Allen *et al*. 1991)
71.060.13 Coast Live Oak / Poison-oak [*Quercus agrifolia/Toxicodendron diversilobum*] (Allen *et al*. 1991)
71.060.14 Coast Live Oak / Toyon / Grass [*Quercus agrifolia/Heteromeles arbutifolia/*Grass] (Allen *et al*. 1991)
71.060.15 Coast Live Oak / Toyon - Poison-oak [*Quercus agrifolia/Heteromeles arbutifolia-Toxicodendron diversilobum*] (Allen *et al*. 1991)
71.060.16 Coast Live Oak / Hairyleaf Ceanothus [*Quercus agrifolia/Ceanothus oliganthus*] (Gordon & White 1994)
71.060.17 Coast Live Oak /Common Snowberry [*Quercus agrifolia/Symphoricarpos albus*] (Keeler-Wolf 1994)
*71.060.18 Coast Live Oak - Black Oak [*Quercus agrifolia-Quercus kelloggii*] (Wainwright & Barbour 1984)
71.060.19 Coast Live Oak Woodland [*Quercus agrifolia*] {71160}
*71.060.20 Southern Coast Live Oak Riparian Forest [*Quercus agrifolia*] {61310}
71.060.21 Central Coast Live Oak Forest [*Quercus agrifolia*] {61220}
71.060.22 Coast Live Oak/Wright's Buckwheat [*Quercus agrifolia/Eriogonum wrightii*]
71.060.23 Coast Live Oak-Coulter Pine [*Quercus agrifolia-Pinus coulteri*]
71.060.24 Coast Live Oak - (Madrone) - California Bay [*Quercus agrifolia-(Arbutus menziesii)-Umbellularia californica*] (Keeler-Wolf, *et al*. 2001)

71.060.25 Coast Live Oak / Poison Oak - (Hazel) [*Quercus agrifolia/Toxicodendron diversilobum-(Corylus cornuta)*] (Keeler-Wolf, *et al*. 2001)

*71.070.00 Engelmann Oak Woodland [*Quercus engelmannii*]
- *71.070.01 Open Engelmann Oak Woodland [*Quercus engelmannii*] {71181}

71.080.00 Interior Live Oak Woodland [*Quercus wislizeni*]
- 71.080.01 Interior Live Oak - Blue Oak - Foothill Pine [*Quercus wislizeni-Quercus douglasii-Pinus sabiniana*] (Allen *et al*. 1991)
- 71.080.02 Interior Live Oak - Foothill Pine / Common Manzanita [*Quercus wislizeni-Pinus sabiniana/Arctostaphylos manzanita*] (Allen *et al*. 1991)
- 71.080.03 Interior Live Oak - Madrone / Poison-oak [*Quercus wislizeni-Arbutus menziesii/Toxicodendron diversilobum*] (Allen *et al*. 1991)
- 71.080.04 Interior Live Oak / Whiteleaf Manzanita [*Quercus wislizeni/Arctostaphylos viscida*] (Allen *et al*. 1991)
- 71.080.05 Interior Live Oak / Yerba Santa / Grass [*Quercus wislizeni/Eriodictyon californicum/*Grass] (Allen *et al*. 1991)
- 71.080.06 Interior Live Oak Woodland [*Quercus wislizeni*] {71150}
- 71.080.07 Interior Live Oak Forest [*Quercus wislizeni*] {81330}

*71.090.00 Island Oak Woodland [*Quercus tomentella*] {71190}

71.095.00 Shrub Live Oak Scrub [*Quercus turbinella*]
- 71.095.01 Shrub Live Oak - Singleleaf Pinyon [*Quercus turbinella-Pinus monophylla*] (Keeler-Wolf and Thomas 2000)
- 71.095.02 Shrub Live Oak - Desert Baccharis [*Quercus turbinella-Baccharis sergiloides*] (Keeler-Wolf and Thomas 2000)

71.100.00 Mixed Oak Woodland and Forest [*Quercus* spp.]
- 71.100.01 Black Oak - Valley Oak / Grass [*Quercus kelloggii-Quercus lobata/*Grass] (Allen *et al*. 1991)
- 71.100.02 Black Oak - Valley Oak - Coast Live Oak / Grass [*Quercus kelloggii-Quercus lobata-Quercus agrifolia/*Grass] (Allen *et al*. 1991)
- 71.100.03 Interior Live Oak / Toyon [*Quercus wislizeni/Heteromeles arbutifolia*] (Allen *et al*. 1991)
- 71.100.04 Mixed Oak - Black Oak / Grass [*Quercus* spp.-*Quercus kelloggii*/Grass] (Allen *et al*. 1991)
- 71.100.05 Mixed Oak - California Buckeye / Grass [*Quercus* spp.-*Aesculus californica/*Grass] (Allen *et al*. 1991)
- 71.100.06 Mixed Oak - Coast Live Oak / Poison-oak [*Quercus* spp.-*Quercus agrifolia/Toxicodendron diversilobum*] (Allen *et al*. 1991)
- 71.100.07 Mixed Oak - Foothill Pine / Grass [*Quercus* spp.-*Pinus sabiniana/*Grass] (Allen *et al*. 1991)
- 71.100.08 Mixed Oak / Grass [*Quercus* spp./Grass] (Allen *et al*. 1991)
- 71.100.09 Mixed Oak - Interior Live Oak - Foothill Pine [*Quercus* spp.-*Quercus wislizeni-Pinus sabinana*] (Allen *et al*. 1991)
- 71.100.10 Mixed Oak / Poison-oak - Coyote Brush [*Quercus* spp.*/Toxicodendron diversilobum-Baccharis pilularis*] (Allen *et al*. 1991)
- 71.100.11 Mixed Oak - Valley Oak / Poison-oak - California Coffeeberry [*Quercus* spp.-*Quercus lobata/Toxicodendron diversilobum-Rhamnus californica*] (Allen *et al*. 1991)
- 71.100.12 Oregon White Oak - Black Oak / Firecracker Flower [*Quercus garryana* var. *garryana-Quercus kelloggii/Dichelostemma ida-maia*] (Jimerson 1993)
- 71.100.13 Oregon White Oak - Black Oak / Tall-oatgrass [*Quercus garryana* var. *garryana-Quercus kelloggii/Arrhenatherum elatius*] (Jimerson 1993)

72.000.00 Upland Walnut Woodlands and Forests [*Juglans* spp.]

- 72.100.00 California Walnut Woodland and Forests [*Juglans californica* var. *californica*]
  - *72.100.01 California Walnut Woodland [*Juglans californica* var. *californica*] {71210}
  - *72.100.02 California Walnut Forest [*Juglans californica* var. *californica*] {81600}

73.000.00 Tanoak Forest and Woodland

- 73.100.00 Tanoak Forest and Woodland [*Lithocarpus densiflora*] {81400}
  - 73.100.01 Sugar Pine - Tanoak / Poison-oak [*Pinus lambertina-Lithocarpus densiflora/Toxicodendron diversilobum*] (Griffin 1976)
  - 73.100.02 Tanoak / California Coffeeberry [*Lithocarpus densiflora/Rhamnus californica*] (Sawyer 1981a)

73.200.00 Pacific Madrone [*Arbutus menziesii*] (Keeler-Wolf, *et al*. 2001)

*74.000.00 California Bay Forests and Woodlands [*Umbellularia californica*]

- 74.100.00 California Bay Forest and Woodland [*Umbellularia californica*] {81200}
  - 74.100.01 California Bay [*Umbellularia californica*] (Campbell 1980)
  - 74.100.02 Tanoak - California Bay [*Lithocarpus densiflora-Umbellularia californica*] (Fiedler & Leidy 1987)
  - 74.100.03 California Bay - Madrone [*Umbellularia californica-Arbutus menzesii*] (Parker 1990)
  - 74.100.04 California Bay - Blue Elderberry / Western Sword Fern [*Umbellularia californica-Sambucus racemosa/Polystichum munitum*] (Keeler-Wolf, *et al*. 2001)
  - 74.100.05 California Bay - Coast Live Oak / Poison Oak - Hazelnut [*Umbellularia californica-Quercus agrifolia/Toxicodendron diversilobum-Corylus cornuta*] (Keeler-Wolf, *et al*. 2001)

75.000.00 California Buckeye Woodland [*Aesculus californica*]

- *75.100.00 California Buckeye Woodland [*Aesculus californica*]

76.000.00 *Cercocarpus*-Mountain Mahogany Woodlands and Scrubs [*Cercocarpus* spp.]

- 76.100.00 Birchleaf Mountain-Mahogany Scrub [*Cercocarpus betuloides*]
  - 76.100.01 Klamath Birchleaf Mountain-mahogany [*Cercocarpus* spp.] (Taylor 1979a)
  - 76.100.02 Peninsular Range Birchleaf Mountain-mahogany [*Cercocarpus* spp.] (Gordon & White 1994)
  - 76.100.03 Birchleaf Mountain Mahogany with Scrub
  - 76.100.04 Birchleaf Mountain-mahogany-Bigberry Manzanita
- 76.200.00 Curlleaf Mountain-Mahogany Woodland and Scrub [*Cercocarpus ledifolius*]
  - 76.200.01 Curlleaf Mountain-Mahogany - Big Sagebrush [*Cersocarpus ledifolius-Artemisia tridentata*] (Keeler-Wolf and Thomas 2000)
  - 76.200.02 Curlleaf Mountain-Mahogany / Roundleaf Snowberry [*Cersocarpus ledifolius/Symphoricarpos rotundifolia*] (Keeler-Wolf and Thomas 2000)
- *76.300.00 Littleleaf Mountain-Mahogany Scrub [*Cercocarpus intricatus*] (Keeler-Wolf and Thomas 2000)

*77.000.00 Catalina Ironwood Woodland Unique Stands [*Lyonothamnus floribundus*] {81700}

*78.000.00 Hollyleaf Cherry Woodland and Scrub Unique Stands [*Prunus ilicifolia*]

*78.100.00 Island Hollyleaf Cherry [*Prunus ilicifolia ssp. lyonii*] {81810}

*78.200.00 ~~Mainland Hollyleaf Cherry [*Prunus ilicifolia ssp. ilicifolia*]~~ {81820} entry obsolete; moved to 37.910.00

79.000.00 Eucalyptus Naturalized Forest [*Eucalyptus* spp.]

80.000.00 CONIFEROUS UPLAND FOREST AND WOODLAND

81.000.00 Cypress Scrubs, Woodlands and Forests [*Cupressus* spp.]

*81.100.00 Port Orford-cedar Forest [*Chamaecyparis lawsoniana*] {82500}

*81.100.01 Port Orford-cedar / Western Azalea [*Chamaecyparis lawsoniana/Rhododendron occidentale*] (Jimerson 1994)

*81.100.02 Port Orford-cedar - Douglas-fir / Huckleberry Oak [*Chamaecyparis lawsoniana-Pseudotsuga menziesii/Quercus vaccinifolia*] (Jimerson 1994)

*81.100.03 Port Orford-cedar - Shasta Fir / Sadler Oak - Thinleaf Huckleberry [*Chamaecyparis lawsoniana-Abies magnifica* var. *shastensis/Quercus sadleriana-Vaccinium membranaceum*] (Jimerson 1994)

*81.100.04 Port Orford-cedar / Rhododendron - Salal [*Chamaecyparis lawsoniana/Rhododendron macrophyllum-Gaultheria shallon*] (Jimerson 1994)

*81.100.05 Port Orford-cedar / Salal [*Chamaecyparis lawsoniana/Gaultheria shallon*] (Jimerson 1994)

*81.100.06 Port Orford-cedar - White Fir / Azalea [*Chamaecyparis lawsoniana-Abies concolor/Rhododendron* spp.] (Jimerson 1994)

*81.100.07 Port Orford-cedar - White Fir / Sadler Oak [*Chamaecyparis lawsoniana-Abies concolor/Quercus sadleriana*] (Jimerson 1994)

*81.100.08 Port Orford-cedar - White Fir / Herb [*Chamaecyparis lawsoniana-Abies concolor/*Herb] (Jimerson 1994)

*81.100.09 Port Orford-cedar - White Fir / Huckleberry Oak [*Chamaecyparis lawsoniana-Abies concolor/Quercus vaccinifolia*] (Jimerson 1994)

*81.100.10 Port Orford-cedar - Western White Pine / Huckleberry Oak [*Chamaecyparis lawsoniana-Pinus monticola/Quercus vaccinfolia*] (Jimerson 1994)

*81.100.11 Moved to Douglas-fir – Tanoak Alliance

*81.100.12 Moved to Douglas-fir – Tanoak Alliance

*81.100.13 Moved to Douglas-fir – Tanoak Alliance

*81.100.14 Moved to Douglas-fir – Tanoak Alliance

*81.100.15 Tanoak - Port Orford-cedar / Spikenard [*Lithocarpus densiflora-Chamaecyparis lawsoniana/Aruncus diocus*] (Jimerson 1994)

*81.100.16 Moved to Douglas-fir – Tanoak Alliance)

*81.100.17 Port Orford-cedar -Pine / Rhododendron [*Pinus* spp./*Rhododendron* spp.] (Simpson 1980)

*81.100.18 Port Orford-cedar -Douglas-fir / Spicebush [*Chamaeparis lawsoniana-Pseudotsuga menziesii/Calycanthus occidentalis*] (Jimerson et al. 1999)

*81.100.19 Port Orford-cedar - Mixed conifer/Western Azalea – dwarf tanbark oak [*Chamaeparis lawsoniana-Abies concolor-Calocedrus decurrens/Rhododendron occidentalis-Lithocarpus densiflorus* var. *echinoides*] (Jimerson et al. 1999)

*81.100.20 Port Orford-cedar - White fir /Sitka alder [*Chamaeparis lawsoniana-Abies concolor/Alnus sinuata]* (Jimerson et al. 1999)

*81.100.21 Port Orford-cedar - White fir /Vine maple [*Chamaeparis lawsoniana-Abies concolor/Acer circinatum*] (Jimerson et al. 1999)

*81.100.22 Port Orford-cedar - Brewer spruce/Sadler oak-Huckleberry oak [*Chamaeparis lawsoniana-Picea breweriana/Quercus sadleriana-Quercus vaccinifolia]* (Jimerson et al. 1999)

*81.100.23 Port Orford-cedar – Shasta Red Fir/Sitka Alder-Sadler Oak [*Chamaeparis lawsoniana-Abies magnifica ssp. Shastensis/Alnus sinuata-Quercus sadleriana]* (Jimerson et al. 1999)

*81.100.24 Port Orford-cedar – Shasta Red Fir/Sitka Alder/California Pitcher Plant [*Chamaeparis lawsoniana-Abies magnifica ssp. shastensis/Alnus sinuata/Darlingtonia californica]* (Jimerson et al. 1999)

*81.100.25 Port Orford-cedar -Douglas-fir /California Hazelnut [*Chamaeparis lawsoniana-Pseudotsuga menziesii/Corylus cornuta* var. *californica]* (Jimerson et al. 1999)

*81.100.26 Port Orford-cedar -Douglas-fir – Red Alder/Vine Maple [*Chamaeparis lawsoniana-Pseudotsuga menziesii-Alnus rubra/Berberis nervosa]* (Jimerson et al. 1999)

*81.100.27 Port Orford-cedar - Western White Pine / Western Azalea –Dwarf Tanbark oak – Labrador Tea [*Chamaeparis lawsoniana-Pinus monticola/Rhododendron occidentalis – Lithocarpus densiflorus* var. *echinoides*] (Jimerson et al. 1999)

*81.100.28 Port Orford-cedar - Western White Pine /Labrador Tea / California Pitcher Plant//coastal [*Chamaeparis lawsoniana-Pinus monticola/Ledum glandulosum/Darlingtonia californica*] (Jimerson et al. 1999)

*81.100.29 Port Orford-cedar - Mixed Conifer /Huckleberry Oak-Western Azalea [*Chamaeparis lawsoniana-Pseudotsuga menziesii –(Abies concolor-Pinus lambertiana)/Quercus vaccinifolia –Rhododendron occidentalis]* (Jimerson et al. 1999)

*81.100.30 Port Orford-cedar - White Fir / Western Azalea-Huckleberry Oak [*Chamaeparis lawsoniana – Abies concolor/Rhododendron occidentalis – Quercus vaccinifolia]* (Jimerson et al. 1999)

*81.100.31 Port Orford-cedar - White Fir / Sierra Laurel-Bush Chinquapin [*Chamaeparis lawsoniana – Abies concolor/Leucothoe davisiae-Chrysolepis sempervirens]* (Jimerson et al. 1999)

*81.100.32 Port Orford-cedar - White Fir / Bush Chinquapin-Western Azalea [*Chamaeparis lawsoniana – Abies concolor/ Chrysolepis sempervirens-Rhododendron occidentalis]* (Jimerson et al. 1999)

*81.100.33 Port Orford-cedar - Western White Pine / Labrador Tea/California Pitcher Plant //interior [*Chamaeparis lawsoniana-Pinus monticola/Ledum glandulosum/Darlingtonia californica//*interior*]* (Jimerson et al. 1999)

*81.100.34 Port Orford-cedar - Western White Pine /Sitka Alder [*Chamaeparis lawsoniana-Pinus monticola/Alnus sinuata]* (Jimerson et al. 1999)

*81.100.35 Port Orford-cedar - Western White Pine /Thinleaf Huckleberry [*Chamaeparis lawsoniana-Pinus monticola/Vaccinium membranaceum]*(Jimerson et al. 1999)

*81.100.36 Port Orford-cedar - Western White Pine //Wet Herb Complex [*Chamaeparis lawsoniana-Pinus monticola/Veratrum californicum-Lilium sp.*] (Jimerson et al. 1999)

*81.100.37 Port Orford-cedar - Western White Pine //Dry Herb Complex [*Chamaeparis lawsoniana-Pinus monticola// dry herb]* (Jimerson et al. 1999)

*81.100.38 Port Orford-cedar - Mountain Hemlock /Bush Chinquapin [*Chamaeparis lawsoniana-Tsuga mertensiana/Chrysolepis sempervirens]*(Jimerson et al. 1999)

*81.100.39 Port Orford-cedar - Mountain Hemlock /Labrador Tea [*Chamaeparis lawsoniana-Tsuga mertensiana/Ledum glandulosum]* (Jimerson et al. 1999)

*81.100.40 Port Orford-cedar - Mountain Hemlock /Sierra Laurel [*Chamaeparis lawsoniana-Tsuga mertensiana/Leucothoe davisiae]* (Jimerson et al 1999)

*81.200.00 Alaska Yellow-cedar Unique Stands [*Chamaecyparis nootkatensis*]

*81.300.00 McNab Cypress Woodland [*Cupressus macnabiana*]

*81.400.00 Pygmy Cypress Dwarf Woodland [*Cupressus goveniana* ssp. *goveniana*] {83161}

*81.400.01 Pygmy Cypress / Lichen [*Cupressus goveniana* ssp. *goveniana*/*Cladonia bellidiflora*] (Westman & Whittaker 1975)

*81.400.02 Pygmy Cypress / Lichen [Cupressus goveniana ssp. *goveniana*/*Cladina impexa*] (Westman & Whittaker 1975)

*81.400.03 Pygmy Cypress / *Ramalina tharusta* [*Cupressus goveniana* ssp. *goveniana*] (Westman & Whittaker 1975)

*81.400.04 Pygmy Cypress / *Usnea subfloridana* [*Cupressus goveniana* ssp. *goveniana*] (Westman & Whittaker 1975)

*81.500.00 Sargent Cypress Woodland [*Cupressus sargentii*]

81.600.00 Unique Stands of Cypress [*Cupressus* spp.]

*81.600.10 Baker Cypress Stands [*Cupressus bakeri*]

*81.600.20 Cuyamaca Cypress Stands [*Cupressus stephensonii*]

*81.600.30 Gowen Cypress Stands [*Cupressus goveniana* ssp. *goveniana*] {83162}

*81.600.40 Monterey Cypress Stands [*Cupressus macrocarpa*] {83150}

*81.600.50 Piute Cypress Stands [*Cupressus nevadensis*] {83230}

*81.600.60 Santa Cruz Cypress Stands [*Cupressus abramsiana*] {83220}

*81.600.70 Tecate Cypress Stands [*Cupressus forbesii*]

82.000.00 Coastal and Montane Douglas-fir Forests and Woodlands [*Pseudotsuga* spp.]

82.000.01 Mixed evergreen forest {82400}

*82.100.00 Bigcone Douglas-fir Forest [*Pseudotsuga macrocarpa*] {84150}

82.200.00 Douglas-fir Forest [*Pseudotsuga menziesii*]

*82.200.01 Douglas-fir - Bigleaf Maple / Hazel [*Pseudotsuga menziesii-Acer macrophyllum/Corylus cornuta*] (Fites 1993)

*82.200.02 Douglas-fir - Bigleaf Maple / Trail Plant [*Pseudotsuga menziesii-Acer macrophyllum/Adenocaulon bicolor*] (Fites 1993)

*82.200.03 Douglas-fir - Pacific Dogwood / Hazel [*Pseudotsuga menziesii-Cornus nuttallii/Corylus cornuta*] (Fites 1993)

*82.200.04 Douglas-fir / Hazel / Trail Plant [*Pseudotsuga menziesii/Corylus cornuta/Adenocaulon bicolor*] (Fites 1993)

*82.200.05 Douglas-fir - California Bay / Poison-oak [*Pseudotsuga menziesii-Umbellularia californica/Toxicodondron diversilobum*] (Jimerson 1993)

*82.200.06 Moved to Douglas-fir – Canyon live oak Alliance

*82.200.07 Moved to Douglas-fir - Canyon Live Oak Alliance

*82.200.08 Moved to Douglas-fir - Canyon Live Oak Alliance

*82.200.09	Douglas-fir - Chinquapin / Bear-grass [*Pseudotsuga menziesii-Chrysolepis chrysophylla/Xerophyllum tenax*] (Jimerson 1993)
*82.200.10	Douglas-fir - Chinquapin / Rhododendron - Little Oregon- grape [*Pseudotsuga menziesii-Chrysolepis chrysophylla/Rhododendron* spp.-*Berberis nervosa*] (Jimerson 1993)
*82.200.11	Douglas-fir - Chinquapin / Rhododendron - Sadler Oak /Bear-grass [*Pseudotsuga menziesii-Chrysolepis chrysophylla/Rhododendron* spp.-*Quercus sadleriana/Xerophyllum tenax*] (Jimerson 1993)
*82.200.12	Douglas-fir - Chinquapin - Tanoak [*Pseudotsuga menziesii-Chrysolepis chrysophylla-Lithocarpus densiflora*] (Jimerson 1993)
*82.200.13	Douglas-fir - Chinquapin - Tanoak / Little Oregon-grape [*Pseudotsuga menziesii-Chrysolepis chrysophyllum-Lithocarpus densiflora/Berberis nervosa*] (Jimerson 1993)
*82.200.14	Douglas-fir / Hazel [*Pseudotsuga menziesii/Corylus cornuta*] (Jimerson 1993)
*82.200.15	Douglas-fir / Huckleberry Oak [*Pseudotsuga meziesii/Quercus vaccinifolia*] (Jimerson 1993, Sawyer *et al.* 1978a)
*82.200.16	Douglas-fir / Huckleberry Oak - Bush Tanoak [*Pseudotsuga menziesii/Quercus vaccinifolia-Lithocarpus densiflora* var.*echinoides*] (Jimerson 1993)
*82.200.17	Douglas-fir - Incense-Cedar / California Fescue [*Pseudotsuga menziesii-Calocedrus decurrens/Festuca californica*] (Jimerson 1993)
*82.200.18	Douglas-fir / Yerba de Selva [*Pseudotsuga menziesii/Whipplea modesta*] (Jimerson 1993)
*82.200.19	Douglas-fir - Oregon White Oak / Grass [*Pseudotsuga menziesii-Quercus garryana* var. *garryana*/Grass] (Jimerson 1993)
*82.200.20	Douglas-fir / Vine Maple - Little Oregon-grape [*Pseudotsuga menziesii/Acer circinatum-Berberis nervosa*] (Jimerson 1993)
82.200.21	Douglas-fir - Bigleaf Maple / Sword Fern [*Pseudotsuga menziesii-Acer macrophyllum/Polystichum munitum*] (Jimerson 1993)
*82.200.22	moved to Port Orford-Cedar Alliance
*82.200.23	moved to Port Orford-Cedar alliance
*82.200.24	moved to Port Orford-Cedar alliance
*82.200.25	Moved to Red Fir Alliance
*82.200.26	Moved to White Fir Alliance
*82.200.27	moved to White Fir Alliance
*82.200.28	White Fir - Douglas-fir - Bigleaf Maple [*Abies concolor-Pseudotsuga menziesii-Acer macrophyllum*] (Jimerson 1993)
*82.200.29	White Fir - Douglas-fir - Black Oak [*Abies concolor-Pseudotsuga menziesii-Quercus kelloggii*] (Jimerson 1993)
*82.200.30	White Fir - Douglas-fir - Canyon Live Oak / White-veined Shinleaf [*Abies concolor-Pseudotsuga menziesii-Quercus chrysolepis/Pyrola picta*] (Jimerson 1993)
*82.200.31	White Fir - Douglas-fir - Canyon Live Oak [*Abies concolor-Pseudotsuga menziesii-Quercus chrysolepis*] (Jimerson 1993)
*82.200.32	White Fir - Douglas-fir - Canyon Live Oak / White-flower Hawkweed-Grass [*Abies concolor-Pseudotsuga menziesii-Quercus chrysolepis/Hieracium albiflorum*-Grass] (Jimerson 1993)
*82.200.33	White Fir - Douglas-fir - Canyon Live Oak / Little Oregon-grape [*Abies concolor-Pseudotsuga menziesii-Quercus chrysolepis/Berberis nervosa*] (Jimerson 1993)
*82.200.34	White Fir - Douglas-fir - Chinquapin / Little Oregon-grape / Vanilla Leaf [*Abies concolor-Pseudotsuga menziesii-Chrysolepis chrysophylla/Berberis nervosa/Achlys triphylla*] (Jimerson 1993)
82.200.35	Moved to White Fir alliance

82.200.36	White Fir - Douglas-fir / Sadler Oak - Huckleberry Oak [*Abies concolor-Pseudotsuga menziesii/Quercus sadleriana-Quercus vaccinifolia*] (Jimerson 1993)
82.200.37	White Fir - Douglas-fir / Sadler Oak - Pinemat Manzanita [*Abies concolor-Pseudotsuga menziesii/Quercus sadleriana-Arctostaphylos nevadensis*] (Jimerson 1993)
*82.200.38	White Fir - Douglas-fir / Grass [*Abies concolor-Pseudostuga menziesii/*Grass] (Jimerson 1993)
*82.200.39	White Fir - Douglas-fir / Hazel [*Abies concolor-Pseudotsuga menziesii/Corylus cornuta*] (Jimerson 1993)
82.200.40	White Fir - Douglas-fir / Huckleberry Oak [*Abies concolor-Pseudotsuga menziesii/Quercus vaccinifolia*] (Jimerson 1993)
*82.200.41	White Fir - Douglas-fir / Yerba de Selva [*Abies concolor-Pseudotsuga menziesii/Whipplea modesta*] (Jimerson 1993)
*82.200.42	White Fir - Douglas-fir / Rhododendron - Sadler Oak [*Abies concolor-Pseudotsuga menziesii/Rhododendron* spp.-*Quercus sadleriana*] (Jimerson 1993)
*82.200.43	White Fir - Douglas-fir - Tanoak / Little Oregon-grape [*Abies concolor-Pseudotsuga menziesii-Lithocarpus densiflora/Berberis nervosa*] (Jimerson 1993)
*82.200.44	White Fir - Douglas-fir / Thimbleberry [*Abies concolor-Pseudotsuga menziesii/Rubus parviflorus*] (Jimerson 1993)
*82.200.45	White Fir - Douglas-fir / Vine Maple [*Abies concolor-Pseudotsuga menziesii/Acer circinatum*] (Jimerson 1993)
*82.200.46	White Fir - Douglas-fir / Wild Rose / Twinflower [*Abies concolor-Pseudotsuga menziesii/Rosa gymnocarpa/Linnaea borealis*] (Jimerson 1993)
*82.200.47	Moved to White Fir alliance
*82.200.48	moved to Jeffrey Pine-fir alliance
*82.200.49	Douglas-fir / Vanilla Leaf [*Pseudotsuga menziesii/Achlys triphylla*] (Keeler-Wolf 1985a, 1987a, 1989b)
*82.200.50	Douglas-fir / Madrone [*Pseudotsuga menziesii/Arbutus menziesii*] (Laidlaw-Holmes 1981)
*82.200.51	Douglas-fir / Rattlesnake Plantain [*Pseudotsuga menziesii/Goodyera oblongifolia*] (Sawyer 1981a)
82.200.52	Douglas-fir / Huckleberry Oak [*Pseudotsuga menziesii/Quercus vaccinifolia*] (Sawyer *et al*. 1978)
82.200.53	Douglas-fir / Greenleaf Manzanita [*Pseudotsuga menziesii/Arctostaphylos patula*] (Sawyer & Stillman 1977)
*82.200.54	Douglas-fir / Prince's-pine [*Pseudotsuga menziesii/Chimaphlia umbellata*] (Sawyer & Stillman 1977)
*82.200.55	Douglas-fir / Twinflower [*Pseudotsuga menziesii/Linnaea borealis*] (Sawyer & Stillman 1977)
*82.200.56	Douglas-fir / Hazel [*Pseudotsuga menziesii/Corylus cornuta*] (Simpson 1980)
*82.200.57	Douglas-fir / Inside-out Flower [*Pseudotsuga menziesii/Vancouveria planipetala*] (Simpson 1980)
*82.200.58	Douglas-fir / Rhododendron [*Pseudotsuga menziesii/Rhododendron* spp.] (Simpson 1980)
*82.200.59	Douglas-fir / Salal [*Pseudotsuga menziesii/Gaultheria shallon*] (Simpson 1980)
*82.200.60	Black Oak - Douglas-fir [*Quercus kelloggii-Pseudotsuga menziesii*] (Stuart *et al*. 1992)
*82.200.61	Douglas-fir [*Pseudotsuga menziesii*] (Stuart *et al*. 1992)
*82.200.62	Douglas-fir - Jeffrey Pine - Incense-cedar [*Pseudotsuga menziesii-Pinus jeffreyi-Calocedrus decurrens*] (Stuart *et al*. 1992)

82.200.63 Douglas-fir - White Alder / Himalaya Berry [*Pseudotsuga menziesii-Abies concolor/Rubus discolor*] (Stuart *et al*. 1992)

*82.200.64 Douglas-fir / Little Oregon-grape [*Pseudotsuga menziesii/Berberis nervosa*] (Taylor 1975a, b)

*82.200.65 Douglas-fir / Pacific Dogwood [*Pseudotsuga menziesii/Cornus nuttallii*] (Taylor & Teare 1979a)

*82.200.66 Douglas-fir - California Bay [*Pseudotsuga menziesii-Umbellularia californica*] (Wainwright & Barbour 1984)

*82.200.67 Coastal Douglas-fir-Western Hemlock Forest [*Pseudotsuga menziesii-Tsuga heterophylla*] {82410}

82.200.68 Upland Douglas-fir forest [*Pseudotsuga menziesii*] {82420}

82.200.69 Douglas-fir - California Bay / Sword Fern [*Pseudotsuga menziesii-Umbellularia californica/Polystichum munitum*] (Keeler-Wolf, *et al*. 2001)

82.200.70 Douglas-fir - California Bay / California Coffeeberry [*Pseudotsuga menziesii-Umbellularia californica/Rhamnus californicus*] (Keeler-Wolf, *et al*. 2001)

82.200.71 Douglas-fir / Coast Live Oak [*Pseudotsuga menziesii/Quercus agrifolia*] (Keeler-Wolf, *et al*. 2001)

82.200.72 Douglas-fir / Coyote Brush [*Pseudotsuga menziesii/Baccharis pilularis*] (Keeler-Wolf, *et al*. 2001)

82.200.73 Douglas-fir - White Fir - Incense-cedar [*Pseudotsuga menziesii-Abies concolor-Calocedrus decurrens*] (Keeler-Wolf and Moore 2001)

*82.200.74 *Pseudotsuga menziesii/Quercus vaccinifolia - Rhododendron macrophyllum* association (Jimerson 1993)

*82.200.75 *Pseudotsuga menziesii/Rhododendron macrophyllum* association, (Simson 1980)

*82.300.00 Douglas-fir - Canyon Live Oak Forest [*Pseudotsuga menziesii-Quercus chrysolepis*]

*82.300.01 Douglas-fir - Canyon Live Oak / Sword Fern [Mixed Conifer-*Quercus chrysolepis/Polystichum munitum*] (Fites 1993)

*82.300.02 Douglas-fir - Canyon Live Oak - Madrone / Poison-oak [*Pseudotsuga menziesii-Quercus chrysolepis-Arbutus menziesii/Toxicodendron diversilobum*] (Jimerson 1993)

*82.300.03 Douglas-fir - Canyon Live Oak [*Pseudotsuga menziesii-Quercus chrysolepis*] (Taylor & Teare 1979a)

*82.300.04 Douglas-fir - Canyon Live Oak / Rockpile [*Pseudotsuga menziesii-Quercus chrysolepis*/Rockpile] (Jimerson 1993)

*82.300.05 Douglas-fir - Canyon Live Oak - Tanoak [*Pseudotsuga menziesii-Quercus chrysolepis-Lithocarpus densiflora*] (Jimerson 1993)

*82.400.00 Douglas-fir - Ponderosa Pine Forest [*Pseudotsuga menziesii-Pinus ponderosa*]

*82.400.01 Black Oak - Douglas-fir - Bigleaf Maple [*Quercus kelloggii-Pseudotsuga menziesii-Acer macrophyllum*] (Jimerson 1993)

*82.400.02 Douglas-fir - Ponderosa Pine - Incense-cedar [*Pseudotsuga menziesii-Pinus ponderosa-Calocedrus decurrens*] (Stuart *et al*. 1992)

*82.400.03 Douglas-fir - Ponderosa Pine - Jeffrey Pine / One-sided Bluegrass [*Pseudotsuga menziesii-Pinus ponderosa-Pinus jeffreyi/Poa secunda*] (Smith 1994)

*82.400.04 Douglas-fir - Ponderosa Pine [*Pseudotsuga menziesii-Pinus ponderosa*] (Taylor & Teare 1979b)

82.400.05 Douglas-fir -Ponderosa pine -Incense-cedar [*Pseudotsuga menziesii-Pinus ponderosa-Calocedrus decurrens*] (Keeler-Wolf & Moore 2001)

82.500.00 Douglas-fir - Tanoak Forest [*Pseudotsuga menziesii-Lithocarpus densiflora*]

*82.500.01	Douglas-fir - Tanoak / Prince's Pine [*Pseudotsuga menziesii-Lithocarpus densiflora/Chimaphila umbellata*] (Keeler-Wolf 1985a, 1987b, 1989b)
*82.500.02	Douglas-fir - Tanoak - Bigleaf Maple / Sword Fern [*Pseudotsuga menziesii-Lithocarpus densiflora-Acer macrophyllum/Polystichum munitum*] (Jimerson 1993)
*82.500.03	Douglas-fir - Tanoak - Black Oak / Wild Rose [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus kelloggii/Rosa gymnocarpa*] (Jimerson 1993)
82.500.04	Douglas-fir - Tanoak - California Bay / Poison-oak [*Pseudotsuga menziesii-Lithocarpus densiflora-umbellularia californica/Toxicodendron diversilobum*] (Jimerson 1993)
82.500.05	Douglas-fir - Tanoak - Canyon Live Oak - Black Oak /Poison-oak [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis-Quercus kelloggii/Toxicodendron diversilobum*] (Jimerson 1993)
82.500.06	Douglas-fir - Tanoak - Canyon Live Oak / Little Oregon-grape - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis-Berberis nervosa-Gaultheria shallon*] (Jimerson 1993)
*82.500.07	Douglas-fir - Tanoak - Canyon Live Oak / Little Oregon-grape [*Pseudotsuga menziesii-Lithocarpus densiflora/Berberis nervosa*] (Jimerson 1993)
*82.500.08	Douglas-fir - Tanoak - Canyon Live Oak / Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis/Vaccinium ovatum*] (Jimerson 1993)
*82.500.09	Douglas-fir - Tanoak - Canyon Live Oak / Black Huckleberry - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis/Vaccinium ovatum-Gaultheria shallon*] (Jimerson 1993)
82.500.10	Douglas-fir - Tanoak - Canyon Live Oak / Poison-oak [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis/Toxicodendron diversilobum*] (Jimerson 1993)
82.500.11	Douglas-fir - Tanoak - Canyon Live Oak / Rockpile [*Pseudotsuga menziesii-Lithocarpus densiflora-Quercus chrysolepis/*Rockpile] (Jimerson 1993)
82.500.12	Douglas-fir - Tanoak - Chinquapin / Bracken [*Pseudotsuga menziesii-Lithocarpus densiflora-Chrysolepis chrysophylla/Pteridium aquilinum*] (Jimerson 1993)
*82.500.13	Douglas-fir - Tanoak - Chinquapin / Little Oregon-grape [*Pseudotsuga menziesii-Lithocarpus densiflora-Chrysolepis chrysophylla/Berberis nervosa*] (Jimerson 1993)
*82.500.14	Douglas-fir - Tanoak - Chinquapin / Rhododendron / Beargrass [*Pseudotsuga menziesii-Lithocarpus densiflora-Chrysolepis chrysophylla/Rhododendron* spp.*/Xerophyllum tenax*] (Jimerson 1993)
*82.500.15	Douglas-fir - Tanoak - Chinquapin / Rhododendron - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora-Chrysolepis chrysophylla/Rhododendron* spp.*-Gaultheria shallon*] (Jimerson 1993)
*82.500.16	Douglas fir - Tanoak - Chinquapin / Salal [*Pseudotsuga menziesii-Lithocarpus densiflora-Chrysolepis chrysophylla/Gaultheria shallon*] (Jimerson 1993)
*82.500.17	Douglas-fir - Tanoak / Little Oregon-grape [*Pseudotsuga menziesii-Lithocarpus densiflora/Berberis nervosa*] (Thornburgh 1987, Jimerson 1993)
*82.500.18	Douglas-fir - Tanoak / Little Oregon-grape - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora/Berberis nervosa-Gaultheria shallon*] (Jimerson 1993)
*82.500.19	Douglas-fir - Tanoak / Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora/Vaccinium ovatum*] (Jimerson 1993)

*82.500.20	Douglas-fir - Tanoak / Black Huckleberry - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora/Vaccinium ovatum-Gaultheria shallon*] (Jimerson 1993)
*82.500.21	Douglas-fir - Tanoak / Hazel [*Pseudotsuga menziesii-Lithocarpus densiflora/Corylus cornuta*] (Jimerson 1993)
*82.500.22	Douglas-fir - Tanoak - Incense-cedar / California Fescue [*Pseudotsuga menziesii-Lithocarpus densiflora-Calocedrus decurrens/Festuca californica*] (Jimerson 1993)
*82.500.23	Douglas-fir - Tanoak / Poison-oak - Hairy Honeysuckle [*Pseudotsuga menziesii-Lithocarpus densiflora/Toxicodendron diversilobum-Lonicera hispidula*] (Jimerson 1993)
*82.500.24	Douglas-fir - Tanoak - Port Orford-cedar - California Bay /Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana-Umbellularia californica/Vaccinium ovatum*] (Jimerson 1993)
*82.500.25	Douglas-fir - Tanoak - Port Orford-cedar / Little Oregon-grape / Twinflower [*Pseudotsuga menziesii-Lithcarpus densiflora-Chamaecyparis lawsoniana/Berberis nervosa/Linnaea borealis*] (Jimerson 1993)
*82.500.26	Douglas-fir - Tanoak - Port Orford-cedar / Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana/Vaccinium ovatum*] (Jimerson 1993)
*82.500.27	Douglas-fir - Tanoak - Port Orford-cedar / Black Huckleberry - Western Azalea [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana/Vaccinium ovatum-Rhododendron occidentalis*] (Jimerson 1993)
*82.500.28	Douglas-fir - Tanoak - Port Orford-cedar / Red Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana/Vaccinium parvifolium*] (Jimerson 1993)
*82.500.29	Douglas-fir - Tanoak - Port Orford-cedar / Salal [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana/Gaultheria shallon*] (Jimerson 1993)
*82.500.30	Douglas-fir - Tanoak - Port Orford-cedar / Vine Maple [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana/Acer circinatum*] (Jimerson 1993)
*82.500.31	Douglas-fir - Tanoak - Port Orford-cedar - White Alder /Riparian [*Pseudotsuga menziesii-Lithocarpus densiflora-Chamaecyparis lawsoniana-Alnus rhombifolia/*Riparian] (Jimerson 1993)
*82.500.32	Douglas-fir - Tanoak / Rhododendron - Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora/Rhododendron* spp.-*Vaccinium ovatum*] (Jimerson 1993)
*82.500.33	Douglas-fir - Tanoak / Rhododendron - Huckleberry Oak [*Pseudotsuga menziesii-Lithocarpus densiflora/Rhododendron* spp.-*Quercus vaccinifolia*] (Jimerson 1993)
*82.500.34	Douglas-fir - Tanoak / Rhododendron - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora/Rhododenron* spp.-*Gaultheria shallon*] (Jimerson 1993)
*82.500.35	Douglas-fir - Tanoak / Salal [*Pseudotsuga menziesii-Lithocarpus densiflora/Gaultheria shallon*] (Jimerson 1993)
*82.500.36	Douglas-fir - Tanoak / Vine Maple [*Pseudotsuga menziesii-Lithocarpus densiflora/Acer circinatum*] (Jimerson 1993)
*82.500.37	Douglas-fir - Tanoak / Vine Maple - Salal [*Pseudotsuga menziesii-Lithocarpus densiflora/Acer circinatum-Gaultheria shallon*] (Jimerson 1993)
*82.500.38	Douglas-fir - Tanoak / Pacific Yew [*Pseudotsuga menziesii-Lithocarpus densiflora/Taxus brevifolia*] (Mize 1973)

*82.500.39 Douglas-fir - Tanoak - Sugar Pine [*Pseudotsuga menziesii-Lithocarpus densiflora-Pinus lambertiana*] (1973)

*82.500.40 Douglas-fir - Tanoak / Vanilla Leaf [*Pseudotsuga menziesii-Lithocarpus densiflora/Achlys triphylla*] (Mize 1973)

*82.500.41 Douglas-fir - Tanoak / Black Huckleberry [*Pseudotsuga menziesii-Lithocarpus densiflora/Vaccinium ovatum*] (Simpson 1980)

*82.500.42 Douglas-fir - Tanoak / Poison-oak [*Pseudotsuga menziesii-Lithocarpus densiflora/Toxicodendron diversilobum*] (Thornburgh 1987)

*82.500.43 Douglas-fir – Tanoak/Mountain Dogwood [*Pseudotsuga menziesii* – Mixed conifer -*Lithocarpus densiflora/Cornus nuttallii*] (Fites 1993)

*82.500.44 Douglas-fir – Tanoak/Iris [*Pseudotsuga menziesii* –Mixed conifer - *Lithocarpus densiflora/Iris* spp.] (Fites 1993)

*82.500.45 Douglas-fir – Tanoak/ Hazel [*Pseudotsuga menziesii* –Mixed Conifer – *Lithocarpus densiflora/Corulus cornuta*] (Fites 1993)

82.500.46 *Pseudotsuga menziesii - Lithocarpus densiflorus/Quercus vaccinifolia-Holodiscus discolor* association (Jimerson 1993)

*82.600.00 Douglas-fir – Incense-cedar Forest [*Pseudotsuga menziesii – Calocedrus decurrens*]

*82.600.01 Douglas-fir – Incense-cedar – California Bay/Poison Oak [*Pseudotsuga menziesii- Calocedrus decurrens - Umbellularia californica/ Toxicodendron diversiloba* association] (Jimerson 1993)

*82.600.02 Douglas-fir – Incense-cedar /California Fescue [*Pseudotsuga menziesii - Calocedrus decurrens/Festuca californica*] (Jimerson 1993)

*82.600.03 Moved to 87.020.29.

*82.600.04 *Pseudotsuga menziesii - Calocedrus decurrens/Quercus vaccinifolia* association (Jimerson 1993)

*82.600.05 Duplicated 82.200.16 so removed.

*82.600.06 Moved to 82.200.74.

*82.600.07 Duplicated 82.200.15 so removed, but added reference name there.

*82.600.08 Duplicated 82.200.51 so removed.

*82.600.09 Moved to 82.200.75.

*82.600.10 Duplicated 82.200.59 so removed.

*82.600.11 *Calocedrus decurrens - Pseudotsuga menziesii* association (Stuart *et al.* 1992):

83.000.00 Coastal and Montane Spruce Forests [*Picea* spp.]

*83.100.00 Engelmann Spruce Forest [*Picea engelmannii*]

*83.200.00 Sitka Spruce Forest [*Picea sitchensis*]

*83.200.01 Sitka Spruce / False Lily-of-the valley [*Picea sitchensis-Maianthemum dilatatum*] (Imper & Sawyer 1987)

*83.200.02 Sitka Spruce / Salmonberry [*Picea sitchensis/Rubus spectabilis*] (Imper & Sawyer 1987)

*83.200.03 Sitka Spruce / Sword Fern [*Picea sitchensis/Polystichum munitum*] (Imper & Sawyer 1987)

*83.200.04 Sitka Spruce - Western Hemlock [*Picea sitchensis/Tsuga heterphylla*] (Westman & Whittaker 1975)
*83.200.05 Sitka Spruce Forest {82110}

*83.300.00 Brewer Spruce Forest [*Picea breweriana*]

84.000.00 Coastal and Montane Hemlock Forests [*Tsuga* spp.]
84.100.00 Mountain Hemlock Forest [*Tsuga mertensiana*]
84.100.01 Mountain Hemlock / Cascade Heather [*Tsuga mertensiana /Phyllodoce empetriformis*] (Imper 1988a)
84.100.02 Mountain Hemlock / Parry Rush [*Tsuga mertensiana/Juncus parryi*] (Imper 1988a)
84.100.03 Mountain Hemlock / Sadler Oak [*Tsuga mertensiana/Quercus sadleriana*] (Jimerson 1993)
84.100.04 Mountain Hemlock [*Tsuga mertensiana*] (Potter 1994)
84.100.05 entry moved to 84.100.10
84.100.06 Mountain Hemlock / Dwarf Bilberry [*Tsuga mertensiana/Vaccinium caespitosum*] (Sawyer & Thornburgh 1977)
84.100.07 Mountain Hemlock / Huckleberry Oak [*Tsuga mertensiana/Quercus vaccinifolia*] (Sawyer & Thornburgh 1977)
84.100.08 Mountain Hemlock / White-veined Shinleaf [*Tsuga mertensiana/Pyrola picta*] (Sawyer & Thornburgh 1977)
84.100.09 Mountain Hemlock / Heartleaf Arnica [*Tsuga mertensiana/Arnica cordifolia*] (Taylor 1984)
84.100.10 Moutain Hemlock-Western White Pine / Broad-seeded Rock Cress [*Tsuga mertensiana- Pinus monticola/Arabis platysperma*] (*Sensu.* Potter 1994 *Tsuga mertensiana /*Steep) (Keeler-Wolf and Moore 2001)

84.100.11 Mountain Hemlock - Lodgepole Pine -Western White Pine [*Tsuga mertensiana-Pinus contorta* var. *murrayana-Pinus monticola*] (Parker 1988)
84.100.12 Mountain Hemlock - Lodgepole Pine / Mountain Heather [*Tsuga mertensiana-Pinus contorta* var. *murrayana/Phyllodoce brewerii*] (Keeler-Wolf and Moore 2001)
84.100.13 Mountain Hemlock - Lodgepole Pine / Ross Sedge [*Tsuga mertensiana-Pinus contorta* var. *murrayana/Carex rossii*] (Keeler-Wolf and Moore 2001)

*84.200.00 Western Hemlock Forest [*Tsuga heterophylla*] {82200}

85.000.00 Incense-cedar Forests [*Calocedrus* spp.]

*85.100.00 Incense-cedar Forest [*Calocedrus decurrens*]
*85.100.01 Incense-cedar / Twayblane [*Calocedrus decurrens/Listera convallarioides*] (Muldavin 1982)
*85.100.02 Incense-cedar - Douglas-fir [*Calocedrus decurrens-Pseudotsuga menziesii*] (Stuart *et al.* 1992)
85.100.03 Incense-cedar - White Alder [*Calocedrus decurrens-Alnus rhombifolia*] (Keeler-Wolf and Moore 2001)

86.000.00 Coastal and Montane Redwood Forests [*Sequoia sempervirens*] {82300}

*86.100.00 Redwood Forest [*Sequoia sempervirens*]
*86.100.01 Redwood - Bigleaf Maple / California Polypody / Gamboa [*Sequoia sempervirens-Acer macrophylla/Polypodium californicum/*Gamboa] (Borchert *et al.* 1988)

*86.100.02 Redwood / Bracken - Chain Fern / Streamsides [*Sequoia sempervirens/Pteridium aquilinum-Woodwardia fimbriata/*Streamsides] (Borchert *et al*. 1988)

*86.100.03 Redwood / Bracken - Trillium / Gamboa - Sur [*Sequoia sempervirens/Pteridium aquilinum-Trillium ovatum/*Gamboa-Sur] (Borchert *et al*. 1988)

*86.100.04 Redwood / Gamboa - Sur [*Sequoia sempervirens/*Gamboa-Sur] (Borchert *et al*. 1988)

*86.100.05 Redwood / Man Root - Common Vetch / Gamboa - Sur [*Sequoia sempervirens/Marah fabaceus-Vicia angustifolia*/Gamboa-Sur] (Borchert *et al*. 1988)

*86.100.06 Redwood - Tanoak / Round-fruited Sedge - Douglas Iris /Gamboa [*Sequoia sempervirens-Lithocarpus densiflora/Carex globosa-Iris douglasiana*] (Borchert *et al*. 1988)

*86.100.07 Redwood / Deer Fern [*Sequoia sempervirens/Blechnum spicant*] (Lenihan 1990)

*86.100.08 Redwood / Little Oregon-grape [*Sequoia sempervirens/Berberis nervosa*] (Lenihan 1990)

*86.100.09 Redwood / Madrone [*Sequoia sempervirens/Arbutus menziesii*] (Lenihan 1990)

*86.100.10 Redwood - Douglas-fir / Madrone [*Sequoia sempervirens-Pseudotsuga menziesii/Arbutus menziesii*] (Matthews 1986a, 1986b)

*86.100.11 Redwood - Douglas-fir / Salal [*Sequoia sempervirens-Pseudotsuga menziesii/Gaultheria shallon*] (Matthews 1986a, 1986b)

*86.100.12 Redwood - Douglas-fir / Black Huckleberry [*Sequoia sempervirens-Pseudotsuga menziesii/Vaccinium ovatum*] (Matthews 1986a, 1986b)

*86.100.13 Redwood / Redwood Oxalis [*Sequoia sempervirens/Oxalis oregana*] (Matthews 1986a, 1986b)

*86.100.14 North Coast Alluvial Redwood Forest {61120}

86.100.15 Upland Redwood Forest {82320}

86.100.16 Redwood - Tanoak / Black Huckleberry [*Sequoia sempervirens-Lithocarpus densiflora/Vaccinium ovatum*] (Keeler-Wolf, *et al*. 2001)

86.100.17 Redwood - Douglas-fir / California Bay [*Sequoia sempervirens-Pseudotsuga menziesii/Umbellularia californica*] (Keeler-Wolf, *et al.* 2001)

*86.200.00 Giant Sequoia Forest [*Sequoiadendron giganteum*] {84250}

86.200.01 Giant Sequoia - Sugar Pine / Pacific Dogwood [*Sequoiadendron giganteum-Pinus lambertiana/Cornus nuttalii*] (Keeler-Wolf and Moore 2001)

87.000.00 Pine Forests and Woodlands [*Pinus* spp.]

87.010.00 Ponderosa Pine Forest and Woodland [*Pinus ponderosa*]

*87.010.01 Ponderosa Pine / Antelope Bitterbrush / Bolander Bedstraw [*Pinus ponderosa/Purshia tridentata* var. *tridentata*] (Fites 1993)

*87.010.02 Ponderosa Pine / Mountain Misery [*Pinus ponderosa/Chamaebatia foliolosa*] (Taylor & Randall 1977, Fites 1993)

*87.010.03 Ponderosa Pine / Greenleaf Manzanita - Mountain Misery [*Pinus ponderosa/Arctostaphylos patula-Chamaebatia foliolosa*] (Fites 1993)

*87.010.04 Ponderosa Pine / Big Sagebrush [*Pinus ponderosa/Artemisia tridentata*] (Keeler-Wolf 1984c)

*87.010.05 Ponderosa Pine / Antelope Bitterbrush [*Pinus ponderosa/Purshia tridentata* var. *tridentata*] (Keeler-Wolf 1984c, Vora 1988)

*87.010.06 Ponderosa Pine / California Brome [*Pinus ponderosa/Bromus carinatus*] (Keeler-Wolf 1984c)

*87.010.07	Ponderosa Pine / Shrubby Bedstraw [*Pinus ponderosa/Galium angustifolium*] (Keeler-Wolf 1986e, 1988e)
*87.010.08	Ponderosa Pine/ Mahala Carpet [*Pinus ponderosa/Ceanothus prostratus*] (Sawyer & Thornburgh 1977)
*87.010.09	Ponderosa Pine / Wedgeleaf Ceanothus [*Pinus ponderosa/Ceanothus cuneatus*] (Simpson 1980)
*87.010.10	Ponderosa Pine / Antelope Bitterbrush / Arrowleaf Balsam Root [*Pinus ponderosa/Purshia tridentata* var. *tridentata/Balsamorhiza sagittata*] (Smith 1994)
*87.010.11	Ponderosa Pine / Antelope Bitterbrush - Choke Cherry /Orcutt Brome [*Pinus ponderosa/Purshia tridentata* var. *tridentata*] (Smith 1994)
*87.010.12	Ponderosa Pine / Antelope Bitterbrush / Columbia Needlegrass / Pumice [*Pinus ponderosa/Purshia tridentata* var. *tridentata/Stipa nelsonii/*Pumice] (Smith 1994)
*87.010.13	Ponderosa Pine / Antelope Bitterbrush - Greenleaf Manzanita / Columbia Needlegrass [*Pinus ponderosa/Purshia tridentata* var. *tridentata-Arctostaphylos patula/Stipa nelsonii*] (Smith 1994)
*87.010.14	Ponderosa Pine / Antelope Bitterbrush - Tobacco Brush [*Pinus ponderosa/Purshia tridentata* var. *tridentata-Ceanothus velutinus*] (Smith 1994)
*87.010.15	Ponderosa Pine / Antelope Bitterbrush / Tower Butterweed/ Granite [*Pinus ponderosa/Purshia tridentata* var. *tridentata/Senecio integerrimus/*Granite] (Smith 1994)
*87.010.16	Ponderosa Pine / Antelope Bitterbrush - Wax Currant /Orcutt Brome [*Pinus ponderosa/Purshia tridentata* var.*tridentata-Ribes cereum/Bromus orcuttii*] (Smith 1994)
*87.010.17	Ponderosa Pine - Black Oak / Curlleaf Mountain-mahogany [*Pinus ponderosa/quercus kelloggii/Cercocarpus ledifolius*] (Smith 1994)
*87.010.18	Ponderosa Pine / Columbia Needlegrass [*Pinus ponderosa/Stipa nelsonii*] (Smith 1994)
*87.010.19	Ponderosa Pine / Curlleaf Mountain-mahogany - Antelope Bitterbrush / Idaho Fescue [*Pinus ponderosa/Cercocarpus ledifolius-Purshia tridentata* var. *tridenata/Festuca idahoensis*] (Smith 1994)
*87.010.20	Ponderosa Pine / Curlleaf Mountain-mahogany / Blue Wheatgrass [*Pinus ponderosa/Cercocarpus ledifolius/Pseudoroegneria spicata*] (Smith 1994)
*87.010.21	Ponderosa Pine - Douglas-fir / Antelope Bitterbrush /Mule's Ears [*Pinus ponderosa-Pseudotsuga menziesii/Purshia tridentata* var. *tridentata/Wyethia mollis*] (Smith 1994)
*87.010.22	Ponderosa Pine - Interior Live Oak [*Pinus ponderosa-Quercus wislizeni*] (Smith 1994)
*87.010.23	Ponderosa Pine - Lodgepole Pine / Service Berry [*Pinus ponderosa-Pinus contorta* ssp. *murrayana/Amelanchier alnifolia*] (Smith 1994)
*87.010.24	Ponderosa Pine / Mountain Big Sagebrush / Idaho Fescue [*Pinus ponderosa/Artemisia tridentata* var. *vaseyana*/*Festuca idahoensis*] (Smith 1994)
*87.010.25	Ponderosa Pine / Mountain Big Sagebrush - Antelope Bitterbrush [*Pinus ponderosa/Artemisia tridentata* var. *vaseyana-Purshia tridentata* var. *tridentata*] (Smith 1994)
*87.010.26	Ponderosa Pine / Service Berry - Choke Cherry [*Pinus ponderosa/Amelanchier alnifolia-Prunus virginiana*] (Smith 1994)
*87.010.27	Ponderosa Pine / Service Berry - Creeping Oregon-grape /Heartleaf Arnica [*Pinus ponderosa/Amelanchier alnifolia-Berberis repens/Arnica cordifolia*] (Smith 1994)
*87.010.28	Ponderosa Pine / Tobacco Bush / Columbia Needlegrass [*Pinus ponderosa/Ceanothus velutinus/Stipa nelsonii*] (Smith 1994)

*87.010.29 Ponderosa Pine / Desert Snowberry [*Pinus ponderosa/Symphoricarpos longiflorus*] (Vora 1988)
*87.010.30 Ponderosa Pine - Canyon Live Oak [*Pinus ponderosa-Quercus chrysolepis*] (Waddell 1982)
*87.010.31 Maritime Coast Range Ponderosa Pine Forest {84132}
*87.010.32 Ponderosa Dune Forest {84221}
*87.010.33 Westside Ponderosa Pine Forest {84210}
*87.010.34 Eastside Ponderosa Pine Forest {84220}
87.010.35 Upland Coast Range Ponderosa Pine Forest {84131}
87.010.36 Ponderosa Pine / Whiteleaf Manzanita / Ripgut Brome [*Pinus ponderosa/Arctostaphylos viscida/Bromus diandrus*] (Keeler-Wolf and Moore 2001)

87.015.00 Ponderosa Pine - Incense Cedar Forest [*Pinus ponderosa-Calocedrus decurrens*] (Keeler-Wolf and Moore 2001)

87.015.02 Ponderosa Pine - Incense Cedar - Black Oak [*Pinus ponderosa-Calocedrus decurrens-Quercus kelloggii*] (Keeler-Wolf and Moore 2001)

87.015.03 Ponderosa Pine - Incense Cedar / Mountain Misery [*Pinus ponderosa-Calocedrus decurrens/Chamaebatia foliosa*] (Keeler-Wolf and Moore 2001)
87.015.04 Ponderosa Pine - Incense Cedar-Canyon Oak / Mountain Misery [*Pinus ponderosa-Calocedrus decurrens-Quercus chrysolepis/Chamaebatia foliosa*] (Fites 1993, re-named Keeler-Wolf and Moore 2001)
87.015.05 Ponderosa Pine –Incense-cedar /Huckleberry Oak [*Pinus ponderosa* Mixed Conifer */Quercus vaccinifolia*] (Fites 1993)
87.015.06 Ponderosa Pine - Incense Cedar - Canyon Live Oak / Bolander Bedstraw [Mixed Conifer-*Quercus chrysolepis/Galium bolanderi*] (Fites 1993)
87.015.07 Ponderosa pine- Incense Cedar/Bearclover/Bolander Bedstraw [Ponderosa pine-mixed conifer/*Chamaebatia foliosa/Galium bolanderi*] (Fites 1993)

87.020.00 Jeffrey Pine Forest and Woodland [*Pinus jeffreyi*]
87.020.01 Jeffrey Pine / Sadler Oak / Bear-grass [*Pinus jeffreyi/Quercus sadleriana/Xerophyllum tenax*] (Jimerson 1993)
*87.020.02 Jeffrey Pine - Douglas-fir / Huckleberry Oak / California Fescue [*Pinus jeffreyi-Pseudotsuga menziesii/Quercus vaccinifolia/Festuca californica*] (Jimerson 1993)
*87.020.03 Jeffrey Pine / Idaho Fescue [*Pinus jeffreyi/Festuca idahoensis*] (Duebendorfer 1987, Jimerson 1993)
87.020.04 Jeffrey Pine - Incense-cedar / Buckbrush [*Pinus jeffreyi-Calocedrus decurrens/Ceanothus cuneatus*] (Jimerson 1993)
87.020.05 Jeffrey Pine - Incense-cedar / Huckleberry Oak / Bear-grass [*Pinus jeffreyi-Calocedrus decurrens/Quercus vaccinifolia/Xerophyllum tenax*] (Jimerson 1993)
*87.020.06 moved to Jeffrey Pine-Fir alliance
87.020.07 Jeffrey Pine [*Pinus jeffreyi*] (Potter 1994)
87.020.08 Jeffrey Pine / Huckleberry Oak [*Pinus jeffreyi/Quercus vaccinifolia*] (Potter 1994)
87.020.09 Jeffrey Pine / Greenleaf Manzanita [*Pinus jeffreyi/Arctostaphylos patula*] (Potter 1994)
87.020.10 Jeffrey Pine / Mountain Whitethorn [*Pinus jeffreyi/Ceanothus cordulatus*] (Potter 1994)
87.020.11 Jeffrey Pine / Tailed Lupine [*Pinus jeffreyi/Lupinus caudatus*] (Riegel *et al*. 1990)

*87.020.12 Jeffrey Pine / Antelope Bitterbrush/ Mule's Ears [*Pinus jeffreyi/Purshia tridentata* var. *tridentata/Wyethia mollis*] (Smith 1994)

*87.020.13 Jeffrey Pine / Antelope Bitterbrush - Curlleaf Mountain-mahogany / Western Needlegrass [*Pinus jeffreyi/Purshia tridentata* var. *tridentata/Cercocarpus ledifolius/Stipa occidentalis*] (Smith 1994)

*87.020.14 Jeffrey Pine / Antelope Bitterbrush - Desert Snowberry / Wheeler Bluegrass [*Pinus jeffreyi/Purshia tridentata* var. *tridentata-Symphoricarpos longiflorus/Poa wheeleri*] (Smith 1994)

*87.020.15 Jeffrey Pine - Black Oak / One-sided Bluegrass [*Pinus jeffreyi-Quercus kelloggii/Poa secunda*] (Smith 1994)

*87.020.16 Jeffrey Pine - Black Oak / Basket Bush [*Pinus jeffreyi-Quercus kelloggii/Rhus trilobata*] (Smith 1994)

*87.020.17 Jeffrey Pine / Curlleaf Mountain-mahogany [*Pinus jeffreyi/Cercocarpus ledifolius*] (Smith 1994)

*87.020.18 Jeffrey Pine / Desert Snowberry / Wheeler Bluegrass [*Pinus jeffreyi/Symphoricarpos longiflorus/Poa wheeleri*] (Smith 1994)

*87.020.19 Jeffrey Pine / Mountain Big Sagebrush / Idaho Fescue [*Pinus jeffreyi/Artemisia tridentata* var.*vaseyana/Festuca idahoensis*] (Smith 1994)

*87.020.20 Jeffrey Pine / Bush Chinquapin [*Pinus jeffreyi/Chrysolepis sempervirens*] (Talley 1978)

*87.020.21 Jeffrey Pine / Antelope Bitterbrush [*Pinus jeffreyi/Purshia tridentata* var. *tridentata*] (Taylor 1980)

*87.020.22 Jeffrey Pine / Serpentine-Haplopappus [*Pinus jeffreyi/Ericameria ophitidis*] (Taylor & Teare 1979)

*87.020.23 Jeffrey Pine / Tufted Reedgrass [*Pinus jeffreyi/Calamagrostis koelerioides*] (Taylor & Teare 1979b)

87.020.24 Jeffrey Pine / Pinemat Manzanita [*Pinus jeffreyi/Arctostaphylos nevadensis*] (Waddell 1982)

87.020.25 Northern Ultramafic Jeffrey Pine Forest {84121}

87.020.26 Jeffrey Pine - Singleleaf Pinyon [*Pinus jeffreyi-Pinus monophylla*] (Keeler-Wolf and Moore 2001)

87.020.27 Jeffrey Pine/Huckleberry Oak-Pinemat Manzanita/Idaho Fescue [*Pinus jeffreyi/Quercus vaccinifolia-Arctostaphylos nevadensis/Festuca idahoensis*] (Jimerson et al. 1995)

87.020.28 Jeffrey Pine-Incense-cedar/Siskiyou mat [*Pinus jeffreyi-Calocedrus decurrens/Ceanothus pumila*] (Jimerson et al. 1995)

*87.020.29 *Pseudotsuga menziesii - Pinus jeffreyi/Festuca californica* association (Jimerson et al. 1995)

*87.020.30 Jeffrey Pine-Port Orford-cedar/Huckleberry Oak [*Pinus jeffreyi-Chamaecyparis lawsoniana/ Quercus vaccinifolia*] (Jimerson et al. 1999)

*87.030.00 Parry Pinyon Woodland [*Pinus quadrifolia*]

87.040.00 Singleleaf Pinyon Woodland [*Pinus monophylla*] {72122}

87.040.01 Mojavean Pinyon Woodland {72210}

87.040.02 Singleleaf Pinyon / Big Sagebrush [*Pinus monophylla/Artemisia tridentata*] (Keeler-Wolf and Thomas 2000)

87.040.03 Singleleaf Pinyon / Green Ephedra [*Pinus monophylla/Ephedra viridis*] (Keeler-Wolf and Thomas 2000)

87.040.04 Singleleaf Pinyon / Waxberry - Desert Gooseberry [*Pinus monophylla /Symphoricarpos rotundifolia-Ribes velutinum*] (Keeler-Wolf and Thomas 2000)

87.040.05 Singleleaf Pinyon / Silk Tassle Bush [*Pinus monophylla/Garrya flavescens*] (Keeler-Wolf and Thomas 2000)

87.040.06 Singleleaf Pinyon / Utah Juniper / Big Sagebrush - Blackbush [*Pinus monophylla/Juniperus osteosperma/Artemisia tridentata-Coleogyne ramosissisima*] (Keeler-Wolf and Thomas 2000)

87.040.07 Singleleaf Pinyon / Utah Juniper / Black Sagebrush [*Pinus monophylla/Juniperus osteosperma/Artemisia nova*] (Keeler-Wolf and Thomas 2000)

87.040.08 Singleleaf Pinyon / Muller Oak [*Pinus monophylla/Quercus cornelius-mulleri*] (Keeler-Wolf 2000)

87.040.09 Singleleaf Pinyon / Muller Oak / California Fiddleleaf [*Pinus monophylla/Quercus cornelius-mulleri/Nama californica*] (Keeler-Wolf and Thomas 2000)

87.040.10 Singleleaf Pinyon / Desert Almond [*Pinus monophylla/Prunus fasciculata*] (Keeler-Wolf and Thomas 2000)

87.040.11 Singleleaf Pinyon / Desert Gooseberry [*Pinus monophylla/Ribes velutinum*] (Keeler-Wolf and Thomas 2000)

87.040.12 Singleleaf Pinyon / Curl-leaf Mountain Mahogany / Big Sagebrush - Antelope Bitterbrush [*Pinus monophylla/Cercocarpus ledifolius/Artemisia tridentata-Purshia tridentata*] (Keeler-Wolf and Thomas 2000)

87.040.13 Singleleaf Pinyon / Utah Juniper / Antelope Brush [*Pinus monophylla/Juniperus osteosperma/Purshia mexicana*] (Keeler-Wolf and Thomas 2000)

*87.050.00 Twoleaf Pinyon Unique Stands [*Pinus edulis*]

*87.060.00 Beach Pine Forest [*Pinus contorta* ssp. *contorta*]

*87.060.01 Beach Pine Forest {83110}

*87.070.00 Bishop Pine Forests [*Pinus muricata*] {83120}

87.070.01 Bishop Pine - Pacific Madrone / Black Huckleberry [*Pinus muricata-Arbutus menziesii/Vaccinium ovatum*] (Keeler-Wolf, *et al*. 2001)

*87.071.00 Northern Bishop Pine Forest [*Pinus* spp.] {83121}

*87.071.01 Bishop Pine / Bear-grass [*Pinus muricata/Xerophyllum tenax*] (Westman & Whittaker 1975)

*87.071.02 Bishop Pine - Bolander Pine / Labrador-tea [*Pinus muricata-Pinus contorta* ssp. *bolanderi*] (Westman and Whittaker 1975)

*87.071.03 Bishop Pine - Bolander Pine / Rayless Arnica [*Pinus muricata-Pinus contorta* ssp. *bolanderi/Arnica discoidea*] (Westman & Whittaker 1975)

*87.071.04 Bishop Pine - Douglas-fir [*Pinus muricata-Pseudotsuga menziesii*] (Westman & Whittaker 1975)

*87.072.00 Southern Bishop Pine Forest [*Pinus* spp.] {83122}

87.080.00 Lodgepole Pine Forest and Woodland [*Pinus contorta* ssp. *murrayana*] {86100}

87.080.01 Lodgepole Pine [*Pinus contorta* ssp. *murrayana*] (Potter 1994)

87.080.02 Lodgepole Pine / Big Sagebrush [*Pinus contorta* ssp. *murrayana/Artemisia tridentata*] (Potter 1994)

87.080.03 Lodgepole Pine / Gray Lovage [*Pinus contorta* ssp. *murrayana/Ligusticum grayi*] (Potter 1994)

87.080.04 Lodgepole Pine / Open [*Pinus contorta* ssp. *murrayana/*Open] (Potter 1994)

87.080.05 Lodgepole Pine / Pussypaws [*Pinus contorta* ssp. *murrayana/Calyptridium monosperma*] (Taylor 1980)

87.080.06 Lodgepole Pine / Ross Sedge [*Pinus contorta* ssp. *murrayana/Carex rossii*] (Taylor 1984)

87.080.07 Lodgepole Pine / Fendler Meadow-rue [*Pinus contorta* ssp. *murrayana/Thalictrum fendleri*] (Taylor 1984)
87.080.08 Lodgepole Pine / Labrador-Tea [*Pinus contorta* ssp. *murrayana/Ledum glandulosum*] (Taylor 1984)
87.080.09 Lodgepole Pine / Western Blueberry [*Pinus contorta* ssp. *murrayana/Vaccinium uliginosum*] (Keeler-Wolf and Moore 2001)
87.080.10 Lodgepole Pine / Shorthair Sedge [*Pinus contorta* ssp. *murrayana/Carex filifolia*] (Keeler-Wolf and Moore 2001)
87.080.11 Lodgepole Pine - Whitebark Pine / Ross Sedge [*Pinus contorta* ssp. *murrayana-Pinus albicaulis/Carex rossii*] (Keeler-Wolf and Moore 2001)
87.080.12 Lodgepole Pine / Mountain Pride Penstemon [*Pinus contorta* ssp. *murrayana/Penstemon newberryi*] (Keeler-Wolf and Moore 2001)

87.090.00 Coulter Pine Woodland [*Pinus coulteri*] {84140}

87.092.00 Coulter Pine / Eastwood Manzanita Woodland [*Pinus coulteri/Arctostaphylos glandulosa*] (Borchert, *et al.* 2000)

87.100.00 Knobcone Pine Forest and Woodland [*Pinus attenuata*] {83210}
87.100.01 Knobcone Pine / Hairy Manzanita [*Pinus attenuata/Arctostaphylos columbiana*] (Imper 1991a)
87.100.02 Knobcone Pine / Greenleaf Manzanita [*Pinus attenuata/Arctostaphylos patula*] (Imper 1991b)
87.100.03 Knobcone Pine / Huckleberry Oak [*Pinus attenuata/Quercus vaccinifolia*] (Taylor & Teare 1979a)
87.100.04 Knobcone Pine / Chamise [*Pinus attenuata/Adenostoma fasciculata*] (Keeler-Wolf and Moore 2001)
87.100.05 Knobcone Pine / Whiteleaf Manzanita [*Pinus attenuata/Arctostaphylos viscida*] (Keeler-Wolf and Moore 2001)

*87.110.00 Monterey Pine Forest[*Pinus radiata*] {83130}

*87.120.00 Washoe Pine Woodland [*Pinus washoensis*] {85220}
*87.120.01 Washoe Pine / Tailed Lupine [*Pinus washoensis/Lupinus caudatus*] (Riegel *et al.* 1990)*
*87.120.02 Washoe Pine / Desert Snowberry / Sticky Starwort [*Pinus washoensis/Symphoricarpos longiflorus/Pseudostellaria jamesiana*] (Smith 1994)
*87.120.03 Washoe Pine / Pinemat Manzanita [*Pinus washoensis/Arctostaphylos nevadensis*] (Smith 1994)

87.130.00 Foothill Pine Woodland [*Pinus sabiniana*] {71300}
87.130.01 Serpentine Digger Pine Chaparral Woodland {71321}
87.130.02 Non-Serpentine Digger Pine Chaparral Woodland {71322}
87.130.03 Digger Pine-Oak Woodland {71410}
87.130.04 Foothill Pine - Interior Live Oak / Wedgeleaf Ceanothus [*Pinus sabiniana-Quercus wislizeni/Ceanothus cuneatus*] (Keeler-Wolf and Moore 2001)
87.130.05 Foothill Pine - Interior Live Oak / Whiteleaf Manzanita [*Pinus sabiniana- Quercus wislizeni/Arctostaphylos viscida*] (Keeler-Wolf and Moore 2001)

*87.140.00 Bristlecone Pine Woodland [*Pinus longaeva*] {86400}
*87.140.01 Bristlecone Pine [*Pinus longaeva*] (Taylor 1979)

*87.140.02 Bristlecone Pine / Littleleaf Mountain-mahogany [*Pinus longaeva/Cercocarpus intricatus*] (Taylor 1979)

87.150.00 Foxtail Pine Woodland [*Pinus balfouriana*] {86300}
- 87.150.01 Sierra Foxtail Pine Forest [*Pinus* spp.] (Ball 1976)
- 87.150.02 Foxtail Pine Forest / Drummond Windflower [*Pinus balfouriana/Anemone drummondii*] (Whipple & Cope 1979)

87.160.00 Limber Pine Forest and Woodland [*Pinus flexilis*] {86700}
- *87.160.01 Limber Pine / Curlleaf Mountain-mahogany [*Pinus flexilis/Cercocarpus ledifolius*] (Taylor 1979)

87.170.00 Western White Pine Woodland [*Pinus monticola*]
- *87.170.01 Western White Pine / Bush Tanoak [*Pinus monticola/Lithocarpus densiflora* var. *echinoides*] (Duebendorfer 1987)
- *87.170.02 Western White Pine / Ocean Spray [*Pinus monticola/Holodiscus discolor*] (Sawyer & Thornburgh 1977)
- *87.170.03 Pine / Bear-grass [*Pinus* spp./*Xerophyllum tenax*] (Simpson 1980)
- *87.170.04 Western White Pine / Angelica [*Pinus monticola/Angelica arguta*] (Whipple & Cope 1979)
- *87.170.05 Ultramafic White Pine Forest {84160}
- 87.170.06 Western White Pine / Western Needlegrass [*Pinus monticola/ Achnatherum occidentalis*] (Keeler-Wolf and Moore 2001)
- 87.170.07 Western White Pine - Lodgepole Pine [*Pinus monticola-Pinus contorta* var. *murrayana*] (Keeler-Wolf and Moore 2001)
- *87.170.08 Western White Pine –Del Norte Lodgepole Pine/Dwarf Tanbark-Pacific Rhododendron [Pinus monticola-Pinus contorta ssp contorta/Lithocarpus densiflorus ssp. echinoides] (Jimerson et al 1995)
- *87.170.09 Western White Pine-Sugar Pine/Huckleberry Oak-Dwarf Tanbark [Pinus monticola-Pinus lambertiana/Quercus vaccinifolia-Lithocarpus densiflorus ssp. echinoides] (Jimerson et al. 1995)
- *87.170.10 Western White Pine - Douglas-fir/Huckleberry Oak-Dwarf Tanbark [Pinus monticola-Pseudotsuga menziesii/Quercus vaccinifolia-Lithocarpus densiflorus ssp. echinoides] (Jimerson et al. 1995)

87.180.00 Whitebark Pine Woodland [*Pinus albicaulis*] {86600}
- 87.180.01 Whitebark Pine / California Needlegrass [*Pinus albicaulis/Stipa californica*] (Riegel *et al*. 1990)
- 87.180.02 Whitebark Pine / Slender Penstemon [*Pinus albicaulis/Penstemon gracilentus*] (Reigel *et al*. 1990)
- 87.180.03 Whitebark Pine / Woody Sandwort [*Pinus albicaulis/Arenaria pumicola*] (Reigel *et al*. 1990)
- 87.180.04 Whitebark Pine / Ocean Spray [*Pinus albicaulis/Holodiscus discolor*] (Sawyer & Thornburgh 1977)
- 87.180.05 Whitebark Pine / Wheeler Bluegrass [*Pinus albicaulis/Poa wheeleri*] (Taylor 1984)
- 87.180.06 Whitebark Pine / Davidson Penstemon [*Pinus albicaulis/Penstemon davidsonii*] (Taylor 1984)
- 87.180.07 Whitebark Pine - Mountain Hemlock [*Pinus albicaulis/Tsuga mertensiana*] (Keeler-Wolf and Moore 2001)
- 87.180.08 Whitebark Pine / Shorthair Sedge [*Pinus albicaulis/Carex filifolia*] (Keeler-Wolf and Moore 2001)

87.180.09 Whitebark Pine / Ross Sedge [*Pinus albicaulis/Carex rossii*] (Keeler-Wolf and Moore 2001)

*87.190.00 Torrey Pine Unique Stands [*Pinus torreyana*] {83140}

87.200.00 Jeffrey Pine - Ponderosa Pine Forest and Woodland [*Pinus jeffreyi-Pinus ponderosa*]

*87.200.01 Jeffrey Pine - Ponderosa Pine / Arrowleaf Balsam Root [*Pinus jeffreyi-Pinus ponderosa/Balsamorhiza sagittata*] (Smith 1994)

*87.200.02 Jeffrey Pine - Ponderosa Pine / Antelope Bitterbrush /Idaho Fescue [*Pinus jeffreyi-Pinus ponderosa/Purshia tridentata* var. *tridentata/Festuca idahoensis*] (Smith 1994)

*87.200.03 Jeffrey Pine - Ponderosa Pine / Antelope Bitterbrush /Idaho Fescue / Granite [*Pinus jeffreyi-Pinus ponderosa/Purshia tridentata* var. *tridentata/Festuca idahoensis/*Granite] (Smith 1994)

*87.200.04 Jeffrey Pine - Ponderosa Pine / Modoc Coffeeberry / One-sided Bluegrass [*Pinus jeffreyi-Pinus ponderosa/Rhamnus rubra/Poa secunda*] (Smith 1994)

*87.200.05 Jeffrey Pine - Ponderosa Pine / Huckleberry Oak [*Pinus jeffreyi-Pinus ponderosa/Quercus vaccinifolia*] (Smith 1994)

*87.200.06 Jeffrey Pine - Ponderosa Pine / Columbia Needlegrass / Oregon Ash [*Pinus jeffreyi-Pinus ponderosa/Stipa nelsonii/Fraxinus latifolia*] (Smith 1994)

*87.200.07 Jeffrey Pine - Ponderosa Pine / Creeping Snowberry /Mule's Ears [*Pinus jeffreyi-Pinus ponderosa/Symphoricarpos mollis/Wyethia mollis*] (Smith 1994)

87.205.00 Jeffrey Pine-White Fir Forest {85210}

87.205.01 Jeffrey Pine - Red Fir [*Pinus jeffreyi-Abies magnifica*] (Potter 1994)

87.205.02 Jeffrey Pine - White Fir / Big sagebrush/squirreltail[*Pinus jeffreyi-Abies concolor/Artemisia tridentata/Elymus elymoides*] (Keeler-Wolf and Moore 2001)

87.205.03 Jeffrey Pine - White Fir - Red Fir [*Pinus jeffreyi-Abies magnifica*] (Potter 1994)

87.205.04 White Fir - Jeffrey Pine / California Fescue [Abies concolor-Pinus jeffreyi/Festuca californica] (Jimmerson 1993)

87.205.05 Jeffrey Pine-White fir/Sadler oak [Pinus jeffreyi-Abies concolor/Quercus sadleriana] (Jimerson 1993)

87.205.06 Jeffrey Pine - White Fir / Del Norte Iris [*Pinus jeffreyi-Abies concolor/Iris innominata*] (Jimerson 1993)

87.206.00 Sugar Pine Forest and Woodland

87.206.01 Sugar Pine/Chinquapin/Huckleberry Oak-Sadler Oak [*Pinus lambertiana/Chrysolepis chrysophylla/Quercus vaccinifolia-Quercuys sadleriana*] (Jimerson et al. 1995)

87.206.02 Sugar Pine-Lodgepole Pine/Huckleberry oak-Dwarf Tanbark Oak [*Pinus lambertiana-Pinus contorta/Quercus vaccinifolia-Lithocarpus densiflora* var *echinoides*] (Jimerson et al. 1995)

87.206.03 Sugar Pine-Lodgepole Pine/Huckleberry oak-Pacific Rhododendron [*Pinus lambertiana-Pinus contorta/Quercus vaccinifolia-Rhododensron macrophyllum*] (Jimerson et al. 1995)

87.206.04 Sugar pine-Western White Pine/Huckleberry oak-Dwarf Silktassel [*Pinus lambertiana-Pinus monticola/Quercus vaccinifolia-Garrya buxifolia*] (Jimerson et al. 1995)

87.210.00 Coulter Pine - Canyon Live Oak Woodland [*Pinus coulteri-Quercus chrysolepis*]

87.220.00 Mixed Subalpine Forest [*Pinus* spp.]

87.220.01 Whitebark Pine Mountain Hemlock Forest {86210}

87.221.00 Southern California Subalpine Forest {86500}

*87.230.00 San Benito Unique Stands

88.000.00 Forest and Woodland dominated by Fir [*Abies* spp.]

*88.100.00 Grand Fir Forest [*Abies grandis*]

*88.100.01 Grand Fir Forest {82120}

88.200.00 Red Fir Forest [*Abies magnifica* var. *magnifica*] {85310}

88.200.01 Shasta Fir / Sadler Oak [*Abies magnifica* var. *shastensis/Quercus sadleriana*] (Imper 1988a)

*88.200.02 Shasta Fir / Thinleaf Huckleberry [*Abies magnifica* var. *shastensis/Vaccinium membranaceum*] (Imper 1988a)

88.200.03 Shasta Fir / Vanilla Leaf [*Abies magnifica* var.*shastensis/Achlys triphylla*] (Imper 1988a)

88.200.04 Shasta Fir / Pinemat Manzanita [*Abies magnifica* var. *shastensis/Arctostaphylos nevadensis*] (Imper 1988b)

88.200.05 Shasta Fir / Prince's-pine [*Abies magnifica* var. *shastensis/Chimaphila umbellata*] (Sawyer & Thornburgh 1977, Imper 1988b)

88.200.06 Shasta Fir / Slender Penstemon [*Abies magnifica* var. *shastensis/Penstemon gracilentus*] (Imper 1988b)

*88.200.07 Port Orford-cedar - Red Fir / Sadler Oak - Thinleaf Huckleberry [*Chamaecyparis lawsoniana-Abies magnifica* var.*magnifica/Quercus sadleriana-Vaccinium membranaceum*] (Jimerson 1993)

88.200.08 Red Fir / Sadler Oak [*Abies magnifica* var.*magnifica/Quercus sadleriana*] (Jimerson 1993)

88.200.09 Red Fir / Sadler Oak - Pinemat Manzanita [*Abies magnifica* var. *magnifica/Quercus sadleriana-Arctostaphylos nevadensis*] (Jimerson 1993)

*88.200.10 Red Fir - Incense-cedar [*Abies magnifica* var.*magnifica-Calocedrus decurrens*] (Jimerson 1993)

88.200.11 Red Fir / One-sided Shinleaf [*Abies magnifica* var. *magnifica/Orthilia secunda*] (Jimerson 1993)

*88.200.12 Red Fir / Rhododendron [*Abies magnifica* var. *magnifica /Rhododendron* spp.] (Jimerson 1993)

88.200.13 Red Fir / White-veined Shinleaf [*Abies magnifica* var. *magnifica /Pyrola picta*] (Jimerson 1993)

*88.200.14 Red Fir - Brewer Spruce / Sadler Oak -Thinleaf Huckleberry [*Abies magnifica* var. *magnifica-Picea breweriana/Quercus sadleriana-Vaccinium membranaceum*] (Jimerson 1993)

88.200.15 Red Fir -Mountain Hemlock / One-sided Shinleaf [*Abies magnifica* var. *magnifica-Tsuga mertensiana/Orthilia secunda*] (Jimerson 1993)

88.200.16 entry moved to 88.520.02

88.200.17 entry moved to 88.520.03

88.200.18 entry moved to 88.520.04

88.200.19 entry moved to 88.520.05

88.200.20 entry moved to 88.520.06

88.200.21 entry moved to 88.520.07

88.200.22 entry moved to 88.520.08

88.200.23 Red Fir [*Abies magnifica* var. *magnifica*] (Potter 1994)

88.200.24 Red Fir / Lodgepole Pine / Whiteflower Hawkweed [*Abies magnifica* var. *magnifica/Pinus contorta* ssp. *murrayana/Hieracium albiflorum*] (Potter 1994)
88.200.25 Red Fir / Lodgepole Pine [*Abies magnifica* var. *magnifica/Pinus contorta* ssp. *murrayana*] (Potter 1994)
88.200.26 Red Fir / Mule's Ears [*Abies magnifica* var. *magnifica/Wyethia mollis*] (Potter 1994)
88.200.27 Red Fir / Pinemat Manzanita [*Abies magnifica* var. *magnifica/Arctostaphylos nevadensis*] (Potter 1994)
88.200.28 Red Fir / Western White Pine / Pinemat Manzanita [*Abies magnifica* var. *magnifica/Pinus monticola/Arctostaphylos nevadensis*] (Potter 1994)
88.200.29 Red Fir - Western White Pine - Lodgepole Pine [*Abies magnifica* var. *magnifica-Pinus monticola-Pinus contorta* ssp. *murrayana*] (Potter 1994)
88.200.30 Red Fir - Western White Pine [*Abies magnifica* var. *magnifica-Pinus monticola*] (Potter 1994)
88.200.31 Red Fir / Western White Pine / Bush Chinquapin [*Abies magnifica* var. *magnifica/Pinus monticola/Chrysolepis sempervirens*] (Potter 1994)
88.200.32 entry moved to 88.520.01
88.200.33 entry moved to 88.520.09
88.200.34 entry moved to 88.510.02
88.200.35 Shasta Fir / Black-laurel [*Abies magnifica* var. *shastensis/Leucothoe davisiae*] (Sawyer & Thornburgh 1977)
88.200.36 Shasta Fir / Huckleberry Oak [*Abies magnifica* var. *shastensis /Quercus vaccinifolia*] (Sawyer & Thornburgh 1977)
88.200.37 Shasta Fir / Twinflower [*Abies magnifica* var. *shastensis/Linnaea borealis*] (Sawyer & Thornburgh 1977)
88.200.38 Shasta Fir / White-veined Shinleaf [*Abies magnifica* var. *shastensis/Pyrola picta*] (Sawyer & Thornburgh 1977)
88.200.39 Shasta Fir / Pinemat Manzanita [*Abies magnifica* var. *shastensis/Arctostaphylos nevadensis*] (Simpson 1980)
88.200.40 Shasta Fir / Sadler Oak [*Abies magnifica* var. *shastensis/Quercus sadleriana*] (Simpson 1980)
88.200.41 Red Fir / Silver Bush Lupine [*Abies magnifica* var. *magnifica/Lupinus albifrons*] (Waddell 1982)
88.200.42 Red Fir / White-veined Shinleaf [*Abies magnifica* var. *magnifica/Pyrola picta*] (Waddell 1982)

*88.300.00 Santa Lucia Fir Woodland [*Abies bracteata*] {84120}
88.300.01 Santa Lucia Fir / Santa Lucia Bedstraw [*Abies bracteata/Galium clementis*] (NDDB)
88.300.02 Santa Lucia Fir / Sword Fern [*Abies bracteata/Polystichum munitum*]

*88.400.00 Subalpine Fir Forest [*Abies lasiocarpa*]

88.500.00 White Fir Forest [*Abies concolor*] {85320}
88.500.01 White Fir / Bush Chinquapin [*Abies concolor/Chrysolepis sempervirens*] (Fites 1993)
88.500.02 White Fir / Creeping Snowberry / Kelloggia [*Abies concolor/Symphoricarpos mollis/Kelloggia galioides*] (Fites 1993)
88.500.03 White Fir - Pacific Dogwood / Bush Chinquapin [*Abies concolor-Cornus nuttallii/Chrysolepis sempervirens*] (Fites 1993)
88.500.04 White Fir - Pacific Dogwood / Hazel [*Abies concolor-Cornus nuttallii/Corylus cornuta*] (Fites 1993)
88.500.05 White Fir - Pacific Dogwood / Trail Plant [*Abies concolor-Cornus nuttallii*] (Fites 1993)
88.500.06 White Fir / Ross Sedge [*Abies concolor/Carex rossii*] (Fites 1993)
88.500.07 entry moved to 88.510.03

88.500.08	White Fir / Trail Plant [*Abies concolor/Adenocaulon bicolor*] (Fites 1993)
*88.500.09	White Fir / Vine Maple - Bush Chinquapin [*Abies concolor/Acer circinatum-Chrysolepis sempervirens*] (Fites 1993)
88.500.10	White Fir / Pinemat Manzanita [*Abies concolor/Arctostaphylos nevadensis*] (Imper 1988a)
88.500.11	White Fir / Prince's-pine [*Abies concolor/Chimaphila umbellata*] (Sawyer & Thornburgh 1977b, Imper 1988a)
88.500.12	White Fir / Vanilla Leaf [*Abies concolor/Achlys triphylla*] (Imper 1988a)
*88.500.13	moved to Port Orford Cedar Alliance
88.500.14	entry moved to 88.520.11
88.500.15	entry moved to 88.520.12
88.500.16	entry moved to 88.520.13
88.500.17	White Fir / Heartleaf Arnica [*Abies concolor/Arnica ordifolia*] (Jimerson 1993)
88.500.18	White Fir / Creeping Snowberry [*Abies concolor/Symphoricarpos mollis*] (Jimerson 1993)
88.500.19	White Fir - Douglas-fir / Bear-grass [*Abies concolor-Pseudotsuga menziesii/Xerophyllum tenax*] (Jimerson 1993)
88.500.20	White Fir - Douglas-fir / Bigleaf Maple [*Abies concolor-Pseduotsuga menziesii/Acer macrophyllum*] (Jimerson 1993)
88.500.21	White Fir - Douglas-fir / Heartleaf Arnica [*Abies concolor-Pseudotsuga menziesii/Arnica cordifolia*] (Jimerson 1993)
88.500.22	Moved to Douglas-fir alliance
88.500.23	White Fir - Douglas-fir / Sadler Oak [*Abies concolor-Pseudotsuga menziesii/Quercus sadleriana*] (Jimerson 1993)
88.500.24	Moved to Douglas-fir alliance
88.500.25	White Fir - Douglas-fir / Mountain Maple [*Abies concolor-Pseudotsuga menziesii/Acer glabrum*] (Jimerson 1993)
*88.500.26	moved to Douglas-fir alliance
88.500.27	White Fir - Douglas-fir / Vanilla Leaf [*Abies concolor-Pseudotsuga menziesii/Achlys triphylla*] (Jimerson 1993)
88.500.28	White Fir - Douglas-fir / Wild rose - Creeping Snowberry [*Abies concolor-Pseudotsuga menziesii/Rosa gymnocarpa-Symphoricarpos mollis*] (Jimerson 1993)
88.500.29	White Fir - Incense-cedar - Black Oak [*Abies concolor-Calocedrus decurrens-Quercus kelloggii*] (Jimerson 1993)
88.500.30	White Fir - Incense-cedar / Creeping Snowberry [*Abies concolor-Calocedrus decurrens/Symphoricarpos mollis*] (Jimerson 1993)
88.500.31	White Fir - Incense-cedar / White-veined Shinleaf [*Abies concolor-Calocedrus decurrens/Pyrola picta*] (Jimerson 1993)
88.500.32	White Fir / Little Prince's-pine - White-veined Shinleaf [*Abies concolor/Chimaphila menziesii-Pyrola picta*] (Jimerson 1993)
88.500.33	White Fir / Serviceberry [*Abies concolor/Amelanchier alnifolia*] (Jimerson 1993)
88.500.34	White Fir / Wild Rose [*Abies concolor/Rosa gymnocarpa*] (Jimerson 1993)
88.500.35	White Fir / Wild Rose - Creeping Snowberry [*Abies concolor/Rosa gymnocarpa-Symphoricarpos mollis*] (Jimerson 1993)
88.500.36	White Fir - Brewer Spruce / Sadler Oak - Thinleaf Huckleberry [*Abies concolor-Picea breweriana/Quercus sadleriana-Vaccinium membranaceum*] (Jimerson 1993)
*88.500.37	White Fir - Chinquapin [*Abies concolor-Chryoslepis chrysophylla*] (Jimerson 1993)
*88.500.38	White Fir - Chinquapin - Sugar Pine / Prince’s-pine [*Abies concolor-Chrysolepis chrysophylla-Pinus lambertiana/chimaphila umbellata*] (Jimerson 1993)

88.500.39 White Fir - Douglas-fir / Alaska Oniongrass [*Abies concolor-Pseudotsuga menziesii/Melica subulata*] (Jimerson 1993)
88.500.40 Moved to Douglas-fir alliance
88.500.41 Moved to Douglas-fir alliance
88.500.42 Moved to Douglas-fir alliance
88.500.43 Moved to Douglas-fir alliance
88.500.44 Moved to Douglas-fir alliance
88.500.45 White Fir - Douglas-fir / Wild Rose - Twinflower - Creeping Snowberry [*Abies concolor-Pseudotsuga menziesii/Rosa gymnocarpa-Linnaea borealis-Symphoricarpos mollis*] (Jimerson 1993)
88.500.46 White Fir - Douglas-fir / Wild Rose - Twinflower [*Abies concolor-Pseudotsuga menziesii/Rosa gymnocarpa-Linnaea borealis*] (Jimerson 1993)
88.500.47 entry moved to 88.520.14
88.500.48 entry moved to 88.520.15
88.500.49 entry moved to 88.520.16
88.500.50 White Fir / Huckleberry Oak [*Abies concolor/Quercus vaccinifolia*] (Laidlaw-Holmes 1981)
88.500.51 White Fir / Bracken [*Abies concolor/Pteridium aquilinum*] (Sawyer 1981b)
88.500.52 White Fir / Sadler Oak [*Abies concolor/Quercus sadleriana*] (Sawyer 1981b)
88.500.53 White Fir / American Vetch [*Abies concolor/Vicia americana*] (Sawyer & Thornburgh 1977)
88.500.54 White Fir / Little Oregon-grape [*Abies concolor/Berberis nervosa*] (Sawyer & Thornburg 1977)
88.500.55 White Fir / Prince's-pine [*Abies concolor/Chimaphila umbellata*] (Sawyer & Thornburgh 1977)
88.500.56 White Fir / Mahala Carpet [*Abies concolor/Ceanothus prostratus*] (Sawyer & Thornburgh 1977)
88.500.57 White Fir / Trillium [*Abies concolor/Trillium ovatum*] (Sawyer & Thornburgh 1977)
88.500.58 White Fir / Bitter Cherry [*Abies concolor/Prunus emarginata*] (Taylor & Randall 1977)
88.500.59 White Fir / Rattlesnake-plantain [*Abies concolor/Goodyera oblongifolia*] (Taylor & Randall 1977)
88.500.60 White Fir / Mountain Maple [*Abies concolor/Acer glabrum*] (Taylor & Teare 1979b)
88.500.61 White Fir / Sticky Starwort [*Abies concolor/Pseudostellaria jamesiana*] (Waddell 1982)
88.500.62 White Fir / White-veined Shinleaf [*Abies concolor/Pyrola picta*] (Waddell 1982)
*88.500.63 Desert Mountain White Fir Forest
88.500.64 Sierran White Fir Forest {84240}
88.500.65 Southern California White Fir Forest {85320}
88.500.66 White Fir / Mountain Whitehorn [*Abies concolor/Ceanothus cordulatus*] (Keeler-Wolf and Moore 2001)

88.510.00 White Fir - Sugar Pine Forest [*Abies concolor-Pinus lambertiana*] (Keeler-Wolf and Moore 2001)
88.510.01 White Fir - Sugar Pine [*Abies concolor-Pinus lambertiana*] (Keeler-Wolf and Moore 2001)
88.510.02 White Fir - Sugar Pine - Red Fir [*Abies concolor-Pinus lambertiana-Abies magnifica* var. *magnifica*] (Potter 1994)
88.510.03 White Fir - Sugar pine / False solomon's seal - Hooker fairybells [*Abies concolor-Pinus lambertiana/Smilacina racemosa-Disporum hookeri*] (Fites 1993)

88.510.04 White Fir - Sugar Pine - Jeffrey Pine [*Abies concolor-Pinus lambertiana-Pinus jeffreyi*] (Keeler-Wolf and Moore 2001)

88.510.05 White Fir - Sugar Pine - Incense Cedar / Pacific Dogwood / California Hazel [*Abies concolor-Pinus lambertiana-Calocedrus decurrens/Cornus nuttallii/ Corylus cornuta* var. *californica*] (Keeler-Wolf and Moore 2001)

88.510.06 White Fir - Sugar Pine - Incense Cedar / Trail Plant [*Abies concolor-Pinus lambertiana-Calocedrus decurrens/Adenocaulon bicolor*] (*Sensu.* Fites 1993 *Abies concolor*-Mixed Conifer/*Adenocaulon bicolor*) (Keeler-Wolf and Moore 2001)

88.510.07 White Fir - Sugar Pine - Incense Cedar / Bush Chinquapin / Multi-stemmed Sedge [*Abies concolor-Pinus lambertiana-Calocedrus decurrens/Chrysolepis sempervirens/Carex multicaulis*] (*Sensu.* Fites 1993 *Abies concolor*-Mixed Conifer/*Chrysolepis sempervirens*) (Keeler-Wolf and Moore 2001)

88.510.08 White Fir - Sugar Pine - Incense Cedar / Creeping Snowberry / Kelloggia [*Abies concolor-Pinus lambertiana-Calocedrus decurrens/Symphoricarpos mollis/Kelloggia galioides*] (*Sensu.* Fites 1993 *Abies concolor*-Mixed Conifer/*Symphoricarpos mollis/Kelloggia galioides*) (Keeler-Wolf and Moore 2001)

88.520.00 Red Fir - White Fir Forest [*Abies magnifica* var. *magnifica-Abies concolor*] (Parker 1984, Parker 1982)

88.520.01 Red Fir - White Fir [*Abies magnifica* var. *magnifica-Abies concolor*] (Potter 1994)

88.520.02 Red Fir - White Fir / Bracken [*Abies magnifica* var. *magnifica-Abies concolor/Pteridium aquilinum*] (Jimerson 1993)

88.520.03 Red Fir - White Fir / Heartleaf Arnica [*Abies magnifica* var. *magnifica-Abies concolor/Arnica cordifolia*] (Jimerson 1993)

88.520.04 Red Fir - White Fir / Creeping Snowberry / White-veined Shinleaf [*Abies magnifica* var. *magnifica-Abies concolor/Symphoricarpos mollis/Pyrola picta*] (Jimerson 1993)

88.520.05 Red Fir - White Fir / Creeping Snowberry - Wild Rose [*Abies magnifica* var. *magnifica-Abies concolor/Syphoricarpos mollis-Rosa gymnocarpa*] (Jimerson 1993)

88.520.06 Red Fir - White Fir / Sadler Oak [*Abies magnifica* var. *magnifica-Abies concolor/Quercus sadleriana*] (Jimerson 1993)

88.520.07 Red Fir - White Fir / Pinemat Manzanita [*Abies magnifica* var. *magnifica-Abies concolor/Arctostaphylos nevadensis*] (Jimerson 1993)

88.520.08 Red Fir - White Fir / Vanilla Leaf [*Abies magnifica* var. *magnifica-Abies concolor/Achlys triphylla*] (Jimerson 1993)

88.520.09 Red Fir - White Fir - Jeffrey Pine [*Abies magnifica* var. *magnifica-Abies concolor-Pinus jeffreyi*] (Potter 1994)

88.520.10 Red Fir - White Fir - Sugar Pine [*Abies magnifica* var. *magnifica-Abies concolor/Pinus lambertiana*] (Potter 1994)

88.520.11 Shasta Fir - White Fir / Mountain Maple [*Abies magnifica* var. *shastensis-Abies concolor/Acer glabrum*] (Jimerson 1993)

88.520.12 Shasta Fir - White Fir / Pinemat Manzanita [*Abies magnifica* var. *shastensis-Abies concolor/Arctostaphylos nevadensis*] (Jimerson 1993)

88.520.13 Shasta Fir - White Fir / Trail Penstemon - Mountain Monardella [*Abies magnifica* var. *shastensis-Abies concolor/Penstemon anguineus-Monardella odoratissima*] (Jimerson 1993)

88.520.14 White Fir - Shasta Fir / Sadler Oak [*Abies concolor-Abies magnifica* var. *shastensis/Quercus sadleriana*] (Jimerson 1993)

88.520.15 White Fir - Shasta Fir / White-veined Shinleaf [*Abies concolor-Abies magnifica* var. *shastensis/Pyrola picta*] (Jimerson 1993)

88.520.16 White Fir - Shasta Fir / Threeleaf Anemone [*Abies concolor-Abies magnifica* var. *shastensis/Anemone deltoidea*] (Jimerson 1993)

88.600.00 Mixed Conifer Forest {84230}

*88.600.01 Mixed Conifer / Bolander Bedstraw - Milkwort [Mixed Conifer/*Galium bolanderi-Polygala cornuta*] (Fites 1993)

88.600.02 Mixed Conifer / Huckleberry Oak [Mixed Conifer/*Quercus vaccinifolia*] (Fites 1993)

88.600.03 Mixed Conifer / Rosy Everlasting - Naked-stemmed Buckwheat [Mixed Conifer/*Antennaria rosea-Eriogonum latifolium*] (Fites 1993)

88.600.04 Mixed Conifer / Service Berry [Mixed Conifer/*Amelanchier alnifolia*] (Fites 1993)

88.600.05 moved to Ponderosa pine- Incense cedar alliance

*88.600.06 Mixed Conifer / Starflower [Mixed Conifer/*Trientalis latifolia*] (Fites 1993)

88.600.07 Mixed Conifer - Canyon Live Oak / Hazel [Mixed Conifer-*Quercus chrysolepis/Corylus cornuta*] (Fites 1993)??

88.600.08 moved to Ponderosa pine – Incense-cedar alliance

88.600.09 moved to Ponderosa pine – Incense-cedar alliance

88.600.10 Moved to Douglas-fir – Canyon live oak Alliance

*88.600.11 Mixed Conifer – Tanoak / Mountain Dogwood [Mixed Conifer-*Quercus chrysolepis/Cornus nuttallii*] (Fites 1993)

*88.600.12 Moved to White fir - Sugar Pine Alliance

88.600.13 Mixed Conifer / Little Oregon-grape [Mixed Conifer/*Berberis nervosa*] (Sawyer & Thornburgh 1977)

88.600.14 Mixed Conifer / Mahala Carpet [Mixed Conifer/*Ceanothus prostratus*] (Sawyer & Thornburgh 1977)

88.600.15 Southern Ultramafic Mixed Coniferous Forest {84182}

88.600.16 Coast Range Mixed Coniferous Forest {84110}

88.600.17 Ultramafic Mixed Coniferous Forest {84180}

88.600.18 Sierran Mixed Coniferous Forest {84230}

*88.700.00 Klamath Enriched Conifer Unique Stands {85400}{85410}{85420}

*88.800.00 Pacific Silver Fir Unique Stands [*Abies amabilis*]

89.000.00 Juniper Woodlands [*Juniperus* spp.]

89.100.00 California Juniper Woodland and Scrub [*Juniperus californica*]

*89.100.01 Juniper - Oak Cismontane Woodland {71430}

*89.100.02 Cismontane Juniper Woodland & Scrub {72400}

89.100.03 California Juniper - Desert Agave [*Juniperus californica-Agave deserti*] (Keeler-Wolf *et al*, 1998)

89.100.04 California Juniper / Blackbush [*Juniperus californica/Coleogyne ramosissima*] (Keeler-Wolf *et al*, 1998)

89.100.05 California Juniper - Muller Oak / Blackbush [*Juniperus californica-Quercus cornelius-mulleri/Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)

89.100.06 California Juniper / Blackbush - Mojave Yucca [*Juniperus californica/Coleogyne ramosissima-Yucca schidigera*] (Keeler-Wolf and Thomas 2000)

89.100.07 California Juniper / Desert Needlegrass [*Juniperus californica/Achnatherum speciosum*] (Keeler-Wolf and Thomas 2000)

89.100.08 California Juniper - Mojave Yucca / Big Galleta [*Juniperus californica-Yucca schidigera/Pleuraphis rigida*] (Keeler-Wolf 2001)

89.100.09 California Juniper / Desert Needlegrass [*Juniperus californica/Achnatherum speciosum*] (Keeler-Wolf 2001)
89.100.10 California Juniper / California Buckwheat [*Juniperus californica/Eriogonum fasciculatum*] (Keeler-Wolf 2001)
89.100.11 California Juniper / Parry's Nolina [*Juniperus californica/Nolina parryi*] (Keeler-Wolf 2001)

*89.200.00 Mountain Juniper Woodland [*Juniperus occidentalis* ssp. *australis*]
89.200.01 Mountain Juniper [*Juniperus occidentalis* ssp. *australis*] (Potter 1994)
89.200.02 Mountain Juniper / Big Sagebrush [*Juniperus occidentalis* ssp. *australis*/*Artemisia tridentata*] (Potter 1994)
89.200.03 Mountain Juniper / Curl-leaf Mountain Mahogany / Big Sagebrush [*Juniperus occidentalis* ssp. *australis/Cercocarpus ledifolius/Artemisia tridentata*] (Keeler-Wolf and Moore 2001)
89.200.04 Mountain Juniper / Ocean Spray [*Juniperus occidentalis* ssp. *australis/Holodiscus discolor*] (Keeler-Wolf and Moore 2001)

89.300.00 Utah Juniper Woodland {72123}
89.300.01 Utah Juniper [*Juniperus osteosperma*] (Keeler-Wolf and Thomas 2000)
89.300.02 Utah Juniper / Big Sagebrush - Green Ephedra [*Juniperus osteosperma/Artemisia tridentata-Ephedra viridis*] (Keeler-Wolf and Thomas 2000)
89.300.03 Utah Juniper / Big Sagebrush - Desert Bitterbrush - Nevada Ephedra [*Juniperus osteosperma/Artemisia tridentata-Purshia glandulosa-Ephedra nevadensis*] (Keeler-Wolf and Thomas 2000)
89.300.04 Utah Juniper / California Buckwheat [*Juniperus osteosperma-Eriogonum fasciculatum*] (Keeler-Wolf and Thomas 2000)
89.300.05 Utah Juniper / Sticky Snakeweed [*Juniperus osteosperma/Gutierrezia microcephala*] (Keeler-Wolf and Thomas 2000)
89.300.06 Utah Juniper / Shadscale [*Juniperus osteosperma/Atriplex confertifolia*] (Keeler-Wolf and Thomas 2000)
89.300.07 Utah Juniper / White Bursage [*Juniperus osteosperma/Ambrosia dumosa*] (Keeler-Wolf and Thomas 2000)
89.300.08 Utah Juniper / Blackbush [*Juniperus osteosperma/Coleogyne ramosissima*] (Keeler-Wolf and Thomas 2000)
89.300.09 Utah Juniper / Blackbush / Galleta [*Juniperus osteosperma/Coleogyne ramosissima/Pleuraphis jamesii*] (Keeler-Wolf and Thomas 2000)
89.300.10 Utah Juniper / Spanish Bayonet [*Juniperus osteosperma*/*Yucca baccata*] (Keeler-Wolf and Thomas 2000)
89.300.11 Utah Juniper / Nevada Ephedra / Desert Needlegrass [*Juniperus osteosperma/Ephedra nevadensis/Achnantherium speciosum*] (Keeler-Wolf and Thomas 2000)

89.400.00 Western Juniper Woodland [*Juniperus occidentalis ssp. occidentalis*]
89.400.01 Northern Juniper Woodland {72110}

89.500.00 Singleleaf Pinyon - Utah Juniper Woodland [*Pinus monophylla-Juniperus* spp.] {72121}

89.600.00 Great Basin Woodlands {72100}

89.700.00 Mojave Juniper Woodland and Scrub {72220}

89.800.00 Peninsular Juniper Woodland and Scrub {72320}

90.000.00 ALPINE HABITATS

91.000.00 Boulder and Rock Field

91.100.00 Alpine Fell-field (= Alpine Habitat from book)

91.110.00 Klamath-Cascade Fell-field {91110}

91.120.00 Sierra Nevada Fell-field {91120}

*91.120.01 Sierra Primrose [*Primula suffrutenscens*] (Burke 1982)
91.120.02 Alpine Pussypaws - Heretic Penstemon [*Antennaria alpina-Penstemon heterodoxus*] (Major & Taylor 1977)
91.120.03 Alpine Pyrrocoma [*Haplopappus aparigoides*] (Major & Taylor 1977)
91.120.04 Dense Draba - Sweetwater Mountain Milkvetch [*Draba densiflora-Astragalus kentrophyta* var. *danaus*] (Major & Taylor 1977, Taylor 1984)
91.120.05 Hairy Draba - Inyo Rock-cress [*Draba oligosperma-Arabis inyoensis*] (Major & Taylor 1977)
91.120.06 Muir Ivesia [*Ivesia muirii*] (Major & Taylor 1977)
*91.120.07 Netted Willow [*Salix nivalis*] (Major & Taylor 1977)
91.120.08 Podistera - King Sandwort [*Podistera nevadensis-Arenaria kingii*] (Major & Taylor 1977)
91.120.09 Podistera - Pygmy Daisy [*Podistera nevadensis-Erigeron pygmaeus*] (Major & Taylor 1977)
*91.120.10 Sibbaldia - Merten Rush [*Sibbaldia procumbens-Juncus mertensianus*] (Major & Taylor 1977)
91.120.11 Silky Raillardella - Tawny Buckwheat [*Raillardella argentea-Eriogonum incanum*] (Major & Taylor 1977)
91.120.12 Stemless Haplopappus - Old Man's Whiskers [*Stenotus acaulis-Geum canescens*] (Major & Taylor 1977)
91.120.13 Watson Spikemoss - Round-leaved Buckwheat [*Selaginella watsonii-Eriogonum ovalifolium*] (Major & Taylor 1977)
91.120.14 Western Needlegrass - Nude Buckwheat [*Stipa occidentalis-Eriogonum nudum*] (Major & Taylor 1977)
*91.120.15 Alpine Alumroot - Fragile Fern [*Heuchera rubescens-Cystopteris fragilis*] (Taylor 1984)
91.120.16 entry moved to 38.120.03
*91.120.17 entry moved to 91.125.01
91.120.18 Alpine Sedum - Watson Spikemoss [*Sedum roseum-Selaginella watsonii*] (Taylor 1984)
91.120.19 Alpine Smartweed [*Polygonum minimum*] (Taylor 1984)
*91.120.20 Alpine Timothy - One-spike Oatgrass [*Phleum alpinum-Danthonia unispicata*] (Taylor 1984)
91.120.21 Baltic Rush [*Juncus balticus*] (Taylor 1984)
*91.120.22 entry moved to 61.216.00
91.120.23 Cordilleran Arnica - Davidson Arabis [*Arnica mollis-Arabis davidsonii*] (Taylor 1984)
91.120.24 Coville Phlox - Vagus Buckwheat [*Phlox pulvinata-Eriogonum incanum*] (Taylor 1984)
91.120.25 King Ricegrass - Sierra Ragwort [*Ptilagrostis kingii-Senecio scorzonella*] (Taylor 1984)
91.120.26 entry moved to 91.122.01
91.120.27 Merten Rush [*Juncus mertensianus*] (Taylor 1984)
*91.120.28 Moss Saxifrage [*Saxifraga bryophora*] (Taylor 1984)
91.120.29 Mountain Sedum - Mountain Muhly [*Sedum obtusatum-Muhlenbergia montana*] (Taylor 1984)
91.120.30 entry moved to 91.124.01
91.120.31 Nevada Claytonia [*Claytonia nevadensis*] (Taylor 1984)
91.120.32 Tiling Monkeyflower - One-sided Bluegrass [*Mimulus tilingii-Poa secunda*] (Taylor 1984)

91.120.33 entry moved to 38.120.01
91.120.34 entry moved to 41.560.01
91.120.35 Podistera - Pygmy Daisy [*Podistera nevadensis-Erigeron pygmaeus*] (Taylor 1984)
91.120.36 Showy Fescue - Davidson Penstemon [*Festuca minutiflora-Penstemon davidsonii*] (Taylor 1984)
91.120.37 Vagus Buckwheat - Silky Raillardella [*Eriogonum incanum-Raillardella argentea*] (Taylor 1984)
91.120.38 entry moved to 91.128.01

91.121.00 Alpine Hulsea [*Hulsea algida*] (Keeler-Wolf and Moore 2001)

91.122.00 Alpine Sorrel [*Oxyria digyna*] (Taylor 1984)
91.122.01 Lemmon Draba - Alpine Sorrel [*Draba lemmonii-Oxyria digyna*] (Taylor 1984)

91.123.00 Coville Phlox - Squirreltail [*Phlox covillei-Elymus elymoides*] (Taylor 1984)
91.123.01 Coville Phlox - Squirreltail - Alpine Podistera [*Phlox covillei-Elymus elymoides-Podistera nevadensis*] (Taylor 1984)
91.123.02 Coville Phlox - Squirreltail - Alpine Podistera - Pygmy Daisy [*Phlox covillei-Elymus elymoides-Podistera nevadensis-Erigeron pygmaeus*] (Taylor 1984)

91.124.00 Nested Saxifrage - Suksdorf Monkeyflower [*Saxifraga nidifica-Mimulus rubellus*] (Taylor 1984)
91.124.01 Nested Saxifrage - Suksdorf Monkeyflower [*Saxifraga nidifica-Mimulus suksdorfii*] (Taylor 1984)

91.125.00 Alpine Saxifrage [*Saxifraga tolmiei*] (Keeler-Wolf and Moore 2001)
*91.125.01 Alpine Saxifrage - Woodrush [*Saxifraga tolmiei-Luzula divaricata*] (Taylor 1984)

*91.130.00 Southern California Fell-field {91130}

91.140.00 White Mountains Fell-field {91140}
91.140.01 Mason's Sky Pilot - Vagus Fleabane [*Polemonium chartaceum-Erigeron vagus*] (Major & Taylor 1977)
91.140.02 Coville Phlox - Inyo Buckwheat [*Phlox pulvinata-Eriognoum gracilipes*] (Major & Taylor 1977)

91.150.00 Sweetwater Mountains Fell-field
91.150.01 Compact Phlox - Gordon Ivesia [*Phlox pulvinata-Ivesia muirii*] (Major & Taylor 1977)
91.150.02 Compact Phlox - Alpine Phoenicaulis [*Phlox pulvinata-Anelsonia eurycarpa*] (Major & Taylor 1977)
91.150.03 Compact Phlox - Small Haplopappus - Alpine Ipomopsis [*Phlox pulvinata-Ericameria suffrutenscens-Ipomopsis congesta*] (Major & Taylor 1977)
91.150.04 Compact Phlox - Sweetwater Lupine [*Phlox pulvinata-Lupinus montigenus*] (Major & Taylor 1977)

91.160.00 Subalpine Upland Shrub Habitat {<u>includes</u> 94000}

91.200.00 Alpine and Talus Scree Slope{91200}

91.210.00 Wet Alpine Talus and Scree Slope{91210}

	91.220.00	Dry Alpine Talus and Scree Slope{91220}
	91.300.00	Alpine Snowbank Margin {91300}
92.000.00	Alpine Snow and Ice Habitat	
	92.100.00	Alpine Snowfield {93100}
	92.200.00	Alpine Glacier {93200}
99.000.00	Non-Vegetated Desert	
	99.900.01	Sandy to Cobbly wash bottom
	99.900.02	Gypsum
	99.900.03	Mud hills
	99.900.04	Low Elevation Rock Outcrop
	99.900.05	Upper Elevation Rock Outcrop
	99.900.07	Playa

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities

State of California
CALIFORNIA NATURAL RESOURCES AGENCY
Department of Fish and Game
November 24, 2009[1]

INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to the survey and assessment of special status native plants and natural communities so that reliable information is produced and the potential of locating a special status plant species or natural community is maximized. They may also help those who prepare and review environmental documents determine when a botanical survey is needed, how field surveys may be conducted, what information to include in a survey report, and what qualifications to consider for surveyors. The protocols may help avoid delays caused when inadequate biological information is provided during the environmental review process; assist lead, trustee and responsible reviewing agencies to make an informed decision regarding the direct, indirect, and cumulative effects of a proposed development, activity, or action on special status native plants and natural communities; meet California Environmental Quality Act (CEQA)[2] requirements for adequate disclosure of potential impacts; and conserve public trust resources.

DEPARTMENT OF FISH AND GAME TRUSTEE AND RESPONSIBLE AGENCY MISSION

The mission of the Department of Fish and Game (DFG) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish and Game Code §1802). DFG, as trustee agency under CEQA §15386, provides expertise in reviewing and commenting on environmental documents and makes protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) provides additional protections for such species, including take prohibitions (Fish and Game Code §2050 *et seq.*). As a responsible agency, DFG has the authority to issue permits for the take of species listed under CESA if the take is incidental to an otherwise lawful activity; DFG has determined that the impacts of the take have been minimized and fully mitigated; and, the take would not jeopardize the continued existence of the species (Fish and Game Code §2081). Surveys are one of the preliminary steps to detect a listed or special status plant species or natural community that may be impacted significantly by a project.

DEFINITIONS

Botanical surveys provide information used to determine the potential environmental effects of proposed projects on all special status plants and natural communities as required by law (i.e., CEQA, CESA, and Federal Endangered Species Act (ESA)). Some key terms in this document appear in **bold font** for assistance in use of the document.

For the purposes of this document, **special status plants** include all plant species that meet one or more of the following criteria[3]:

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1 This document replaces the DFG document entitled "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities."

2 http://ceres.ca.gov/ceqa/

3 Adapted from the East Alameda County Conservation Strategy available at http://www.fws.gov/sacramento/EACCS/Documents/080228_Species_Evaluation_EACCS.pdf

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).

- Listed[4] or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 *et seq.*). A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).

- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 *et seq.*). A plant is **rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).

- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:

  - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);

  - Species that may warrant consideration on the basis of local significance or recent biological information[5];

  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List* (California Department of Fish and Game 2008)[6].

- Considered a **locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's *List of California Terrestrial Natural Communities*[7] indicates which natural communities are of special status given the current state of the California classification.

Most types of wetlands and riparian communities are considered special status natural communities due to their limited distribution in California. These natural communities often contain special status plants such as those described above. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[8] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[9].

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4 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

5 In general, CNPS List 3 plants (plants about which more information is needed) and List 4 plants (plants of limited distribution) may not warrant consideration under CEQA §15380. These plants may be included on special status plant lists such as those developed by counties where they would be addressed under CEQA §15380. List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List.* [Refer to the current online published list available at: http://www.dfg.ca.gov/biogeodata.] Data on Lists 3 and 4 plants should be submitted to CNDDB. Such data aids in determining or revising priority ranking.

6 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

7 http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf. The rare natural communities are asterisked on this list.

8 http://www.wetlands.com/regs/tlpge02e.htm

9 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

BOTANICAL SURVEYS

Conduct botanical surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.

SURVEY OBJECTIVES

Conduct field surveys in a manner which maximizes the likelihood of locating special status plant species or special status natural communities that may be present. Surveys should be **floristic in nature**, meaning that every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status species or are restricted to lists of likely potential species are not considered floristic in nature and are not adequate to identify all plant taxa on site to the level necessary to determine rarity and listing status. Include a list of plants and natural communities detected on the site for each botanical survey conducted. More than one field visit may be necessary to adequately capture the floristic diversity of a site. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the species and communities on the site is also useful to assess the significance of a particular population.

SURVEY PREPARATION

Before field surveys are conducted, compile relevant botanical information in the general project area to provide a regional context for the investigators. Consult the CNDDB[10] and BIOS[11] for known occurrences of special status plants and natural communities in the project area prior to field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties of the site and surrounding ecoregion[12], unless a larger assessment area is appropriate. Then, develop a list of special status plants with the potential to occur within these vegetation types. This list can serve as a tool for the investigators and facilitate the use of reference sites; however, special status plants on site might not be limited to those on the list. Field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on this list. Include in the survey report the list of potential special status species and natural communities, and the list of references used to compile the background botanical information for the site.

SURVEY EXTENT

Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts.

FIELD SURVEY METHOD

Conduct surveys using **systematic field techniques** in all habitats of the site to ensure thorough coverage of potential impact areas. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct surveys by walking over the entire site to ensure thorough coverage, noting all plant taxa

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10 Available at http://www.dfg.ca.gov/biogeodata/cnddb

11 http://www.bios.dfg.ca.gov/

12 Ecological Subregions of California, available at http://www.fs.fed.us/r5/projects/ecoregions/toc.htm

observed. The level of effort should be sufficient to provide comprehensive reporting. For example, one person-hour per eight acres per survey date is needed for a comprehensive field survey in grassland with medium diversity and moderate terrain[13], with additional time allocated for species identification.

TIMING AND NUMBER OF VISITS

Conduct surveys in the field at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present[14]. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted.

REFERENCE SITES

When special status plants are known to occur in the type(s) of habitat present in the project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

USE OF EXISTING SURVEYS

For some sites, floristic inventories or special status plant surveys may already exist. Additional surveys may be necessary for the following reasons:

- Surveys are not current[15]; or
- Surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems); or
- Surveys are not comprehensive in nature; or fire history, land use, physical conditions of the site, or climatic conditions have changed since the last survey was conducted[16]; or
- Surveys were conducted in natural systems where special status plants may not be observed if an annual above ground phase is not visible (e.g. flowers from a bulb); or
- Changes in vegetation or species distribution may have occurred since the last survey was conducted, due to habitat alteration, fluctuations in species abundance and/or seed bank dynamics.

NEGATIVE SURVEYS

Adverse conditions may prevent investigators from determining the presence of, or accurately identifying, some species in potential habitat of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any given year. Discuss such conditions in the report.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that this plant occurrence no longer exists at this location, particularly if adverse conditions are present. For example, surveys over a number of years may be necessary if the species is an annual plant having a persistent, long-lived seed bank and is known not to germinate every year. Visits to the site in more

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13 Adapted from U.S. Fish and Wildlife Service kit fox survey guidelines available at www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

14 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

15 Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

16 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/botanicalinventories.pdf

than one year increase the likelihood of detection of a special status plant especially if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may ensure that the timing of the survey was appropriate.

REPORTING AND DATA COLLECTION

Adequate information about special status plants and natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants or natural communities[17] and will guide the development of minimization and mitigation measures. The next section describes necessary information to assess impacts. For comprehensive, systematic surveys where no special status species or natural communities were found, reporting and data collection responsibilities for investigators remain as described below, excluding specific occurrence information.

SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS

Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

- A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;
- The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and
- Digital images of the target species and representative habitats to support information and descriptions.

FIELD SURVEY FORMS

When a special status plant or natural community is located, complete and submit to the CNDDB a California Native Species (or Community) Field Survey Form[19] or equivalent written report, accompanied by a copy of the relevant portion of a 7.5 minute topographic map with the occurrence mapped. Present locations documented by use of GPS coordinates in map and digital form. Data submitted in digital form must include the datum[20] in which it was collected. If a potentially undescribed special status natural community is found on the site, document it with a Rapid Assessment or Relevé form[21] and submit it with the CNDDB form.

VOUCHER COLLECTION

Voucher specimens provide verifiable documentation of species presence and identification as well as a public record of conditions. This information is vital to all conservation efforts. Collection of voucher specimens should

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17 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata. For Timber Harvest Plans (THPs) please refer to the "Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations", available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

18 NAD83, NAD27 or WGS84

19 http://www.dfg.ca.gov/biogeodata

20 NAD83, NAD27 or WGS84

21 http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp

be conducted in a manner that is consistent with conservation ethics, and is in accordance with applicable state and federal permit requirements (e.g. incidental take permit, scientific collection permit). Voucher collections of special status species (or suspected special status species) should be made only when such actions would not jeopardize the continued existence of the population or species.

Deposit voucher specimens with an indexed regional herbarium[22] no later than 60 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant permittee names and permit numbers on specimen labels. A collecting permit is required prior to the collection of State-listed plant species[23].

BOTANICAL SURVEY REPORTS

Include reports of botanical field surveys containing the following information with project environmental documents:

- **Project and site description**
  - A description of the proposed project;
  - A detailed map of the project location and study area that identifies topographic and landscape features and includes a north arrow and bar scale; and,
  - A written description of the biological setting, including vegetation[24] and structure of the vegetation; geological and hydrological characteristics; and land use or management history.
- **Detailed description of survey methodology and results**
  - Dates of field surveys (indicating which areas were surveyed on which dates), name of field investigator(s), and total person-hours spent on field surveys;
  - A discussion of how the timing of the surveys affects the comprehensiveness of the survey;
  - A list of potential special status species or natural communities;
  - A description of the area surveyed relative to the project area;
  - References cited, persons contacted, and herbaria visited;
  - Description of reference site(s), if visited, and phenological development of special status plant(s);
  - A list of all taxa occurring on the project site. Identify plants to the taxonomic level necessary to determine whether or not they are a special status species;
  - Any use of existing surveys and a discussion of applicability to this project;
  - A discussion of the potential for a false negative survey;
  - Provide detailed data and maps for all special plants detected. Information specified above under the headings “Special Status Plant or Natural Community Observations,” and “Field Survey Forms,” should be provided for locations of each special status plant detected;
  - Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms should be sent to the CNDDB and included in the environmental document as an Appendix. It is not necessary to submit entire environmental documents to the CNDDB; and,
  - The location of voucher specimens, if collected.

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22 For a complete list of indexed herbaria, see: Holmgren, P., N. Holmgren and L. Barnett. 1990. Index Herbariorum, Part 1: Herbaria of the World. New York Botanic Garden, Bronx, New York. 693 pp. Or: http://www.nybg.org/bsci/ih/ih.html

23 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

24 A vegetation map that uses the National Vegetation Classification System (http://biology.usgs.gov/npsveg/nvcs.html), for example *A Manual of California Vegetation*, and highlights any special status natural communities. If another vegetation classification system is used, the report should reference the system, provide the reason for its use, and provide a crosswalk to the National Vegetation Classification System.

- **Assessment of potential impacts**
  - A discussion of the significance of special status plant populations in the project area considering nearby populations and total species distribution;
  - A discussion of the significance of special status natural communities in the project area considering nearby occurrences and natural community distribution;
  - A discussion of direct, indirect, and cumulative impacts to the plants and natural communities;
  - A discussion of threats, including those from invasive species, to the plants and natural communities;
  - A discussion of the degree of impact, if any, of the proposed project on unoccupied, potential habitat of the species;
  - A discussion of the immediacy of potential impacts; and,
  - Recommended measures to avoid, minimize, or mitigate impacts.

QUALIFICATIONS

Botanical consultants should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with the plants of the area, including special status species;
- Familiarity with natural communities of the area, including special status natural communities;
- Experience conducting floristic field surveys or experience with floristic surveys conducted under the direction of an experienced surveyor;
- Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- Experience with analyzing impacts of development on native plant species and natural communities.

SUGGESTED REFERENCES

Barbour, M., T. Keeler-Wolf, and A. A. Schoenherr (eds.). 2007. Terrestrial vegetation of California (3rd Edition). University of California Press.

Bonham, C.D. 1988. Measurements for terrestrial vegetation. John Wiley and Sons, Inc., New York, NY.

California Native Plant Society. Most recent version. Inventory of rare and endangered plants (online edition). California Native Plant Society, Sacramento, CA. Online URL http://www.cnps.org/inventory.

California Natural Diversity Database. Most recent version. Special vascular plants, bryophytes and lichens list. Updated quarterly. Available at www.dfg.ca.gov.

Elzinga, C.L., D.W. Salzer, and J. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1. U.S. Dept. of the Interior, Bureau of Land Management, Denver, Colorado.

Leppig, G. and J.W. White. 2006. Conservation of peripheral plant populations in California. Madroño 53:264-274.

Mueller-Dombois, D. and H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons, Inc., New York, NY.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed plants on the Santa Rosa Plain. Sacramento, CA.

U.S. Fish and Wildlife Service. 1996. Guidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants. Sacramento, CA.

Van der Maarel, E. 2005. Vegetation Ecology. Blackwell Science Ltd., Malden, MA.

Forest and Woodlands Alliances and Stands		Global & State Rank
*88.800.00	***Abies amabilis* (Pacific silver fir forest) Alliance**	G5 S1
*88.800.01	*Abies amabilis*	
*88.300.00	***Abies bracteata* (Santa Lucia fir groves) Alliance**	G3 S3
*88.300.01	*Abies bracteata / Galium clementis*	
*88.300.02	*Abies bracteata / Polystichum munitum*	
88.500.00	***Abies concolor* (White fir forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
88.500.40	*Abies concolor - Calocedrus decurrens - Pinus jeffreyi*	
88.510.10	*Abies concolor - Calocedrus decurrens - Pseudotsuga macrocarpa - Pinus coulteri*	
88.500.29	*Abies concolor - Calocedrus decurrens - Quercus kelloggii*	
88.500.31	*Abies concolor - Calocedrus decurrens / Pyrola picta*	
88.500.30	*Abies concolor - Calocedrus decurrens / Symphoricarpos mollis*	
*88.500.37	*Abies concolor - Chrysolepis chrysophylla*	
88.500.35	*Abies concolor / (Rosa gymnocarpa) - Symphoricarpos mollis*	
88.500.60	*Abies concolor / Acer glabrum*	
88.500.12	*Abies concolor / Achlys triphylla*	
88.500.33	*Abies concolor / Amelanchier alnifolia*	
88.500.10	*Abies concolor / Arctostaphylos nevadensis*	
88.500.17	*Abies concolor / Arnica cordifolia*	
88.500.32	*Abies concolor / Chimaphila menziesii - Pyrola picta*	
88.500.11	*Abies concolor / Chimaphila umbellata*	
88.500.59	*Abies concolor / Goodyera oblongifolia*	
88.500.54	*Abies concolor / Mahonia nervosa*	
88.500.58	*Abies concolor / Prunus emarginata*	
88.500.61	*Abies concolor / Pseudostellaria jamesiana*	
88.500.57	*Abies concolor / Trillium ovatum*	
88.500.53	*Abies concolor / Vicia americana*	
88.510.00	***Abies concolor - Pinus lambertiana* (White fir - sugar pine forest) Alliance**	G4 S4
88.510.01	*Abies concolor - Pinus lambertiana*	
88.510.09	*Abies concolor - Pinus lambertiana - Calocedrus decurrens - Quercus chrysolepis*	
88.510.06	*Abies concolor - Pinus lambertiana - Calocedrus decurrens / Adenocaulon bicolor*	
88.510.07	*Abies concolor - Pinus lambertiana - Calocedrus decurrens / Chrysolepis sempervirens*	
88.510.05	*Abies concolor - Pinus lambertiana - Calocedrus decurrens / Cornus nuttallii / Corylus cornuta*	
88.510.08	*Abies concolor - Pinus lambertiana - Calocedrus decurrens / Symphoricarpos mollis / Kelloggia galioides*	
88.510.04	*Abies concolor - Pinus lambertiana - Pinus jeffreyi*	
88.510.17	*Abies concolor - Pinus lambertiana - Pinus ponderosa / Lithocarpus densiflorus var. echinoides*	
88.510.14	*Abies concolor - Pinus lambertiana - Pseudotsuga menziesii / Carex rossii*	
88.510.13	*Abies concolor - Pinus lambertiana / Ceanothus cordulatus*	
88.510.03	*Abies concolor - Pinus lambertiana / Maianthemum racemosa - Prosartes hookeri*	
88.510.16	*Abies concolor - Pinus ponderosa / Lithocarpus densiflorus var. echinoides*	
88.510.15	*Pinus ponderosa - Pinus lambertiana / Lithocarpus densiflorus var. echinoides*	
88.530.00	***Abies concolor - Pseudotsuga menziesii* (White fir - Douglas fir forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
88.530.34	*Abies concolor - Pseudotsuga menziesii - (mixed conifer) / Acer circinatum - Chrysolepis sempervirens*	
*88.530.06	*Abies concolor - Pseudotsuga menziesii - (Quercus chrysolepis)*	
88.530.30	*Abies concolor - Pseudotsuga menziesii - Calocedrus decurrens*	
88.530.35	*Abies concolor - Pseudotsuga menziesii / Amelanchier utahensis*	
88.530.14	*Abies concolor - Pseudotsuga menziesii / Arnica cordifolia*	
88.530.36	*Abies concolor - Pseudotsuga menziesii / Cornus nuttallii*	
88.530.37	*Abies concolor - Pseudotsuga menziesii / Cornus nuttallii / Corylus cornuta*	

*88.530.15	*Abies concolor - Pseudotsuga menziesii / Corylus cornuta*	
88.530.32	*Abies concolor - Pseudotsuga menziesii / Corylus cornuta / Adenocaulon bicolor*	
88.530.16	*Abies concolor - Pseudotsuga menziesii / Melica subulata*	
88.530.29	*Abies concolor - Pseudotsuga menziesii / Pteridium aquilinum*	
88.530.17	*Abies concolor - Pseudotsuga menziesii / Quercus sadleriana*	
88.530.18	*Abies concolor - Pseudotsuga menziesii / Quercus sadleriana - Arctostaphylos nevadensis*	
88.530.19	*Abies concolor - Pseudotsuga menziesii / Quercus sadleriana - Quercus vacciniifolia*	
88.530.38	*Abies concolor - Pseudotsuga menziesii / Quercus sadleriana - Rhododendron macrophyllum*	
88.530.20	*Abies concolor - Pseudotsuga menziesii / Quercus vacciniifolia*	
*88.530.21	*Abies concolor - Pseudotsuga menziesii / Rhododendron macrophyllum - Quercus*	
88.530.23	*Abies concolor - Pseudotsuga menziesii / Rosa gymnocarpa - Linnaea borealis - Symphoricarpos mollis*	
88.530.24	*Abies concolor - Pseudotsuga menziesii / Rosa gymnocarpa - Symphoricarpos mollis*	
*88.530.25	*Abies concolor - Pseudotsuga menziesii / Rosa gymnocarpa / Linnaea borealis*	
88.530.31	*Abies concolor - Pseudotsuga menziesii / Rubus ameniacus*	
*88.530.26	*Abies concolor - Pseudotsuga menziesii / Rubus parviflorus*	
88.530.33	*Abies concolor - Pseudotsuga menziesii / Trientalis latifolia*	
88.530.28	*Abies concolor - Pseudotsuga menziesii / Xerophyllum tenax*	
*88.100.00	***Abies grandis* (Grand fir forest) Alliance**	G4 S2
*88.400.00	***Abies lasiocarpa* (Subalpine fir forest) Alliance**	G5 S2
*88.400.01	*Abies lasiocarpa*	
88.200.00	***Abies magnifica* (Red fir forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
88.200.23	*Abies magnifica*	
88.200.30	*Abies magnifica - Pinus monticola*	
88.200.15	*Abies magnifica - Tsuga mertensiana / Orthilia secunda*	
88.200.14	*Abies magnifica - Picea breweriana / Quercus sadleriana - Vaccinium membranaceum*	
88.200.16	*Abies magnifica - Pinus contorta / Sphenosciadium capitellatum*	
88.200.24	*Abies magnifica - Pinus contorta ssp. murrayana / Hieracium albiflorum*	
88.200.29	*Abies magnifica - Pinus monticola - Pinus contorta ssp. murrayana*	
88.200.43	*Abies magnifica - Pinus monticola / Quercus vacciniifolia*	
*88.200.10	*Abies magnifica - (Calocedrus decurrens)*	
88.200.03	*Abies magnifica / Achlys triphylla*	
88.200.27	*Abies magnifica / Arctostaphylos nevadensis*	
88.200.05	*Abies magnifica / Chimaphila umbellata*	
88.200.35	*Abies magnifica / Leucothoe davisiae*	
88.200.37	*Abies magnifica / Linnaea borealis*	
88.200.41	*Abies magnifica / Lupinus albifrons*	
88.200.11	*Abies magnifica / Orthilia secunda*	
88.200.06	*Abies magnifica / Penstemon gracilentus*	
88.200.25	*Abies magnifica / Pinus contorta ssp. murrayana*	
88.200.28	*Abies magnifica / Pinus monticola / Arctostaphylos nevadensis*	
88.200.31	*Abies magnifica / Pinus monticola / Chrysolepis sempervirens*	
88.200.13	*Abies magnifica / Pyrola picta*	
88.200.01	*Abies magnifica / Quercus sadleriana*	
88.200.09	*Abies magnifica / Quercus sadleriana - Arctostaphylos nevadensis*	
88.200.36	*Abies magnifica / Quercus vacciniifolia*	
*88.200.12	*Abies magnifica / Rhododendron macrophyllum*	
*88.200.02	*Abies magnifica / Vaccinium membranaceum*	
88.200.26	*Abies magnifica / Wyethia mollis*	
88.520.00	***Abies magnifica - Abies concolor* (Red fir - white fir forest) Alliance**	G5 S4
88.520.01	*Abies magnifica - Abies concolor*	
88.520.09	*Abies magnifica - Abies concolor - Pinus jeffreyi*	
88.520.11	*Abies magnifica - Abies concolor / Acer glabrum*	
88.520.08	*Abies magnifica - Abies concolor / Achlys triphylla*	
88.520.16	*Abies magnifica - Abies concolor / Anemone deltoidea*	

88.520.07 *Abies magnifica - Abies concolor / Arctostaphylos nevadensis*
88.520.12 *Abies magnifica - Abies concolor / Arctostaphylos nevadensis*
88.520.03 *Abies magnifica - Abies concolor / Arnica cordifolia*
88.520.13 *Abies magnifica - Abies concolor / Penstemon anguineus - Monardella odoratissima*
88.520.10 *Abies magnifica - Abies concolor / Pinus lambertiana*
88.520.02 *Abies magnifica - Abies concolor / Pteridium aquilinum*
88.520.15 *Abies magnifica - Abies concolor / Pyrola picta*
88.520.06 *Abies magnifica - Abies concolor / Quercus sadleriana*
88.520.14 *Abies magnifica - Abies concolor / Quercus sadleriana*
88.520.05 *Abies magnifica - Abies concolor / Symphoricarpos mollis - Rosa gymnocarpa*
88.520.04 *Abies magnifica - Abies concolor / Symphoricarpos mollis / Pyrola picta*

*61.450.00 ***Acer macrophyllum* (Bigleaf maple forest) Alliance** G4 S3
*61.450.01 *Acer macrophyllum*
*61.450.02 *Acer macrophyllum - Pseudotsuga menziesii / Adenocaulon bicolor*
*61.450.04 *Acer macrophyllum - Pseudotsuga menziesii / Corylus cornuta*
*61.450.03 *Acer macrophyllum - Pseudotsuga menziesii / Dryopteris arguta*
*61.450.05 *Acer macrophyllum - Pseudotsuga menziesii / Philadelphus lewisii*
*61.450.06 *Acer macrophyllum - Pseudotsuga menziesii / Polystichum munitum*

*61.440.00 ***Acer negundo* (Box-elder forest) Alliance** G5 S2
*61.440.01 *Acer negundo - Salix gooddingii*

*75.100.00 ***Aesculus californica* (California buckeye groves) Alliance** G3 S3
*75.100.03 *Aesculus californica*
*75.100.02 *Aesculus californica - Umbellularia californica / Diplacus aurantiacus*
*75.100.06 *Aesculus californica - Umbellularia californica / Holodiscus discolor*
*75.100.04 *Aesculus californica / Datisca glomerata*
*75.100.05 *Aesculus californica / Lupinus albifrons*
*75.100.01 *Aesculus californica / Toxicodendron diversilobum / moss*

61.420.00 ***Alnus rhombifolia* (White alder groves) Alliance** G4 S4 (some associations are of high priority for inventory)
61.420.10 *Alnus rhombifolia*
61.420.03 *Alnus rhombifolia - Acer macrophyllum*
*61.420.11 *Alnus rhombifolia - Platanus racemosa*
61.420.12 *Alnus rhombifolia - Platanus racemosa - Quercus chrysolepis*
*61.420.15 *Alnus rhombifolia - Platanus racemosa - Salix laevigata*
61.420.29 *Alnus rhombifolia - Pseudotsuga menziesii*
61.420.31 *Alnus rhombifolia - Pseudotsuga menziesii - Calocedrus decurrens*
61.420.30 *Alnus rhombifolia - Pseudotsuga menziesii / Darmera peltata*
61.420.04 *Alnus rhombifolia - Pseudotsuga menziesii / Rubus armeniacus*
61.420.22 *Alnus rhombifolia - Quercus chrysolepis*
*61.420.13 *Alnus rhombifolia - Salix laevigata*
61.420.02 *Alnus rhombifolia / Aruncus dioicus*
61.420.09 *Alnus rhombifolia / Baccharis salicifolia*
61.420.24 *Alnus rhombifolia / Carex nudata*
61.420.23 *Alnus rhombifolia / Carex spp*
*61.420.07 *Alnus rhombifolia / Cornus sericea*
61.420.06 *Alnus rhombifolia / Cornus sessilis*
*61.420.05 *Alnus rhombifolia / Darmera peltata*
61.420.08 *Alnus rhombifolia / Galium trifolium*
61.420.26 *Alnus rhombifolia / Galium trifolium - Stachys ajugoides*
61.420.21 *Alnus rhombifolia / Leucothoe davisiae*
*61.420.01 *Alnus rhombifolia / Polypodium californicum*
61.420.27 *Alnus rhombifolia / Pteridium aquilinum*
*61.420.17 *Alnus rhombifolia / Rhododendron occidentale*
*61.420.18 *Alnus rhombifolia / Salix exigua - (Rosa californica)*

61.410.00	***Alnus rubra* (Red alder forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
*61.410.01	*Alnus rubra - Pseudotsuga menziesii / Acer circinatum / Claytonia sibirica*	
*61.410.02	*Alnus rubra / Gaultheria shallon*	
61.410.07	*Alnus rubra / Rubus spectabilis*	
*61.410.06	*Alnus rubra / Rubus spectabilis - Sambucus racemosa*	
*61.410.05	*Alnus rubra / Salix lasiolepis*	
*73.200.00	***Arbutus menziesii* (Madrone forest) Alliance**	G4 S3
*73.200.03	*Arbutus menziesii - Quercus agrifolia*	
*73.200.01	*Arbutus menziesii - Umbellularia californica - (Lithocarpus densiflorus)*	
*73.200.02	*Arbutus menziesii - Umbellularia californica - Quercus kelloggii*	
*33.120.00	***Bursera microphylla* (Elephant tree stands) Special Stands**	G4 S1
*81.606.00	***Callitropsis abramsiana* (Santa Cruz cypress groves) Special Stands**	G1 S1
*81.601.00	***Callitropsis bakeri* (Baker cypress stands) Alliance**	G2 S2
*81.601.01	*Callitropsis bakeri / Arctostaphylos patula*	
*81.607.00	***Callitropsis forbesii* (Tecate cypress stands) Alliance**	G2 S2
*81.603.00	***Callitropsis goveniana* (Monterey pygmy cypress stands) Special Stands**	G1 S1
*81.300.00	***Callitropsis macnabiana* (McNab cypress woodland) Alliance**	G3 S3
*81.300.02	*Callitropsis macnabiana / Arctostaphylos viscida*	
*81.604.00	***Callitropsis macrocarpa* (Monterey cypress stands) Special Stands**	G1 S1
*81.605.00	***Callitropsis nevadensis* (Piute cypress woodland) Alliance**	G2 S2
*81.605.01	*Callitropsis nevadensis*	
*81.200.00	***Callitropsis nootkatensis* (Alaska yellow-cedar stands) Alliance**	G4 S1
*81.400.00	***Callitropsis pigmaea* (Mendocino pygmy cypress woodland) Alliance**	G2 S2
*81.400.01	*Callitropsis pigmaea / Cladonia bellidiflora*	
*81.400.03	*Callitropsis pigmaea / Ramalina tharusta*	
*81.400.04	*Callitropsis pigmaea / Usnea subfloridana*	
*81.400.02	*Callitropsis pimaea / Cladina impexa*	
*81.500.00	***Callitropsis sargentii* (Sargent cypress woodland) Alliance**	G3 S3
*81.500.01	*Callitropsis sargentii*	
*81.500.03	*Callitropsis sargentii / Arctostaphylos montana*	
*81.500.02	*Callitropsis sargentii / riparian*	
*81.610.00	***Callitropsis stephensonii* (Cuyamaca cypress stands) Special Stands**	G1 S1
*85.100.00	***Calocedrus decurrens* (Incense cedar forest) Alliance**	G4 S3
*85.100.05	*Calocedrus decurrens - Abies concolor / Senecio triangularis*	
*85.100.03	*Calocedrus decurrens - Alnus rhombifolia*	
*85.100.04	*Calocedrus decurrens - Quercus chrysolepis - Quercus kelloggii*	
*85.100.01	*Calocedrus decurrens / Listera convallarioides*	
*81.100.00	***Chamaecyparis lawsoniana* (Port Orford cedar forest) Alliance**	G3 S3
*81.100.31	*Chamaecyparis lawsoniana - Abies concolor / Acer circinatum*	
*81.100.30	*Chamaecyparis lawsoniana - Abies concolor / Alnus viridis*	
*81.100.14	*Chamaecyparis lawsoniana - Abies concolor / Chrysolepis sempervirens (-Rhododendron occidentale - Leucothoe davisiae)*	
*81.100.08	*Chamaecyparis lawsoniana - Abies concolor / herb*	
*81.100.07	*Chamaecyparis lawsoniana - Abies concolor / Quercus sadleriana*	
*81.100.09	*Chamaecyparis lawsoniana - Abies concolor / Quercus vacciniifolia*	

*81.100.06 *Chamaecyparis lawsoniana - Abies concolor / Rhododendron occidentale*
*81.100.32 *Chamaecyparis lawsoniana - Abies x shastensis - Picea breweri / Quercus sadleriana - Quercus vacciniifolia*
*81.100.33 *Chamaecyparis lawsoniana - Abies x shastensis / Alnus viridis - Quercus sadleriana*
*81.100.34 *Chamaecyparis lawsoniana - Abies x shastensis / Alnus viridis / Darlingtonia californica*
*81.100.03 *Chamaecyparis lawsoniana - Abies x shastensis / Quercus sadleriana - Vaccinium membranaceum*
*81.100.39 *Chamaecyparis lawsoniana - Calocedrus decurrens - Alnus rhombifolia*
*81.100.40 *Chamaecyparis lawsoniana - Calocedrus decurrens / Quercus vacciniifolia*
*81.100.16 *Chamaecyparis lawsoniana - Pinus monticola / Alnus viridis*
*81.100.19 *Chamaecyparis lawsoniana - Pinus monticola / dry herb complex*
*81.100.10 *Chamaecyparis lawsoniana - Pinus monticola / Quercus vacciniifolia*
*81.100.15 *Chamaecyparis lawsoniana - Pinus monticola / Rhododendron neoglandulosum / Darlingtonia californica*
*81.100.38 *Chamaecyparis lawsoniana - Pinus monticola / Rhododendron neoglandulosum / Darlingtonia californica*
*81.100.37 *Chamaecyparis lawsoniana - Pinus monticola / Rhododendron occidentale - Lithocarpus densiflorus var. echinoides - Rhododendron neoglandulosum*
*81.100.17 *Chamaecyparis lawsoniana - Pinus monticola / Vaccinium membranaceum*
*81.100.18 *Chamaecyparis lawsoniana - Pinus monticola / wet herb complex*
*81.100.25 *Chamaecyparis lawsoniana - Pseudotsuga menziesii - Lithocarpus densiflorus / Quercus vacciniifolia*
*81.100.26 *Chamaecyparis lawsoniana - Pseudotsuga menziesii - Lithocarpus densiflorus / Rhododendron macrophyllum*
*81.100.22 *Chamaecyparis lawsoniana - Pseudotsuga menziesii / Calycanthus occidentalis*
*81.100.35 *Chamaecyparis lawsoniana - Pseudotsuga menziesii / Corylus cornuta*
*81.100.02 *Chamaecyparis lawsoniana - Pseudotsuga menziesii / Quercus vacciniifolia*
*81.100.20 *Chamaecyparis lawsoniana - Tsuga heterophylla / Chrysolepis sempervirens*
*81.100.24 *Chamaecyparis lawsoniana - Tsuga heterophylla / Leucothoe davisiae*
*81.100.21 *Chamaecyparis lawsoniana - Tsuga heterophylla / Rhododendron neoglandulosum*
*81.100.05 *Chamaecyparis lawsoniana / Gaultheria shallon*
*81.100.12 *Chamaecyparis lawsoniana / Quercus vacciniifolia - Rhododendron occidentale*
*81.100.04 *Chamaecyparis lawsoniana / Rhododendron macrophyllum - Gaultheria shallon*
*81.100.01 *Chamaecyparis lawsoniana / Rhododendron occidentale*
*81.100.11 *Chamaecyparis lawsoniana / Rhododendron occidentale - Lithocarpus densiflorus var. echinoides*

*61.550.00 ***Chilopsis linearis* (Desert willow woodland) Alliance** G4 S3
*61.550.01 *Chilopsis linearis*
*61.550.02 *Chilopsis linearis / Ambrosia salsola*
*61.550.08 *Chilopsis linearis / Atriplex polycarpa*
*61.550.07 *Chilopsis linearis / Ericameria paniculata*
*61.550.04 *Chilopsis linearis / Prunus fasciculata*
*61.550.03 *Chilopsis linearis / Prunus fasciculata - Ambrosia salsola*
*61.550.05 *Chilopsis linearis / Salvia dorrii*
*61.550.06 *Chilopsis linearis / Viguiera parishii*

79.100.00 ***Eucalyptus (globulus, camaldulensis)* (Eucalyptus groves) Semi-natural Stands**

*61.960.00 ***Fraxinus latifolia* (Oregon ash groves) Alliance** G4 S3
*61.960.04 *Fraxinus latifolia*
*61.960.02 *Fraxinus latifolia - Alnus rhombifolia*
*61.960.03 *Fraxinus latifolia / Cornus sericea*
*61.960.01 *Fraxinus latifolia / Toxicodendron diversilobum*

*72.100.00 ***Juglans californica* (California walnut groves) Alliance** G3 S3
*72.100.08 *Juglans californica - Quercus agrifolia*
*72.100.03 *Juglans californica / annual herbaceous*
*72.100.04 *Juglans californica / Artemisia californica / Leymus condensatus*
*72.100.05 *Juglans californica / Ceanothus spinosus*
*72.100.06 *Juglans californica / Heteromeles arbutifolia*
*72.100.07 *Juglans californica / Malosma laurina*

*61.810.00	***Juglans hindsii and Hybrids*** **(Hinds's walnut and related stands) Special Stands**	G1 S1
89.100.00	***Juniperus californica*** **(California juniper woodland) Alliance**	G4 S4 (some associations are of high priority for inventory)
89.100.08	*Juniperus californica - (Yucca schidigera) / Pleuraphis rigida*	
*89.100.01	*Juniperus californica - Adenostoma fasciculatum - Eriogonum fasciculatum*	
*89.100.04	*Juniperus californica - Coleogyne ramosissima*	
89.100.06	*Juniperus californica - Coleogyne ramosissima - Yucca schidigera*	
*89.100.02	*Juniperus californica - Ericameria linearifolia / annual - perennial - herb*	
89.100.12	*Juniperus californica - Eriogonum fasciculatum - Artemisia californica*	
*89.100.14	*Juniperus californica - Fraxinus dipetala - Ericameria linearifolia*	
89.100.05	*Juniperus californica - Quercus cornelius - mulleri / Coleogyne ramosissima*	
89.100.18	*Juniperus californica - Yucca schidigera*	
89.100.03	*Juniperus californica / Agave deserti*	
*89.100.15	*Juniperus californica / annual herbaceous*	
89.100.17	*Juniperus californica / Hesperostipa comata*	
89.100.11	*Juniperus californica / Nolina parryi*	
89.100.16	*Juniperus californica / Prunus ilicifolia / moss*	
89.200.00	***Juniperus grandis*** **(Mountain juniper woodland) Alliance**	G4 S4 (some associations are of high priority for inventory)
89.200.01	*Juniperus grandis*	
*89.200.03	*Juniperus grandis - Cercocarpus ledifolius / Artemisia tridentata*	
89.200.05	*Juniperus grandis / Arctostaphylos nevadensis*	
*89.200.02	*Juniperus grandis / Artemisia tridentata*	
89.200.04	*Juniperus grandis / Holodiscus discolor*	
89.400.00	***Juniperus occidentalis*** **(Western juniper woodland) Alliance**	G5 S4
89.400.02	*Juniperus occidentalis*	
89.400.03	*Juniperus occidentalis - Pinus jeffreyi / (Purshia tridentata) - (Prunus virginiana*	
89.400.04	*Juniperus occidentalis / Artemisia arbuscula*	
*89.300.00	***Juniperus osteosperma*** **(Utah juniper woodland) Alliance**	G5 S3
*89.300.01	*Juniperus osteosperma*	
*89.300.07	*Juniperus osteosperma / Ambrosia dumosa*	
*89.300.02	*Juniperus osteosperma / Artemisia tridentata - Ephedra viridis*	
*89.300.03	*Juniperus osteosperma / Artemisia tridentata - Purshia glandulosa - Ephedra nevadensis*	
*89.300.06	*Juniperus osteosperma / Atriplex confertifolia - (Tetradymia axillaris)*	
*89.300.08	*Juniperus osteosperma / Coleogyne ramosissima / (Achnatherum speciosum)*	
*89.300.09	*Juniperus osteosperma / Coleogyne ramosissima / Pleuraphis jamesii*	
*89.300.11	*Juniperus osteosperma / Ephedra nevadensis / Achnatherium speciosum*	
*89.300.04	*Juniperus osteosperma / Eriogonum fasciculatum*	
*89.300.05	*Juniperus osteosperma / Gutierrezia microcephala*	
*89.300.10	*Juniperus osteosperma / Yucca baccata*	
*73.100.00	***Lithocarpus densiflorus*** **(Tanoak forest) Alliance**	G4 S3
*73.100.10	*Lithocarpus densiflorus - Acer circinatum*	
*73.100.11	*Lithocarpus densiflorus - Acer macrophyllum*	
*73.100.03	*Lithocarpus densiflorus - Arbutus menziesii*	
*73.100.12	*Lithocarpus densiflorus - Calocedrus decurrens / Festuca californica*	
*73.100.13	*Lithocarpus densiflorus - Chamaecyparis lawsoniana*	
*73.100.14	*Lithocarpus densiflorus - Chrysolepis chrysophylla*	
*73.100.15	*Lithocarpus densiflorus - Cornus nuttallii*	
*73.100.16	*Lithocarpus densiflorus - Cornus nuttallii / Toxicodendron diversilobum*	
*73.100.01	*Lithocarpus densiflorus - Pinus lambertiana / Toxicodendron diversilobum*	
*73.100.17	*Lithocarpus densiflorus - Quercus chrysolepis*	
*73.100.18	*Lithocarpus densiflorus - Quercus kelloggii*	
*73.100.19	*Lithocarpus densiflorus - Umbellularia californica*	
*73.100.04	*Lithocarpus densiflorus / Corylus cornuta*	
*73.100.02	*Lithocarpus densiflorus / Frangula californica*	

*73.100.05 *Lithocarpus densiflorus / Gaultheria shallon*
*73.100.06 *Lithocarpus densiflorus / Mahonia nervosa*
*73.100.07 *Lithocarpus densiflorus / Quercus vacciniifolia - Rhododendron macrophyllum*
*73.100.08 *Lithocarpus densiflorus / Toxicodendron diversilobum - Lonicera hispidula var. vacillens*
*73.100.09 *Lithocarpus densiflorus / Vaccinium ovatum*

*77.000.00 ***Lyonothamnus floribundus* (Catalina ironwood groves) Special Stands** G2 S2

*61.545.00 ***Parkinsonia florida - Olneya tesota* (Blue palo verde - Ironwood woodland) Alliance** G4 S3
*61.545.05 *Parkinsonia florida*
*61.545.06 *Parkinsonia florida - Acacia greggii - Encelia frutescens Parkinsonia florida*
*61.545.10 *Parkinsonia florida - Olneya tesota*
*61.545.12 *Parkinsonia florida - Olneya tesota / Cylindropuntia munzii*
*61.545.11 *Parkinsonia florida - Olneya tesota / Hyptis emoryi*
*61.545.07 *Parkinsonia florida / Chilopsis linearis*
*61.545.08 *Parkinsonia florida / Hyptis emoryi*
*61.545.09 *Parkinsonia florida / Larrea tridentata - Peucephyllum schottii*
*61.545.01 *Olneya tesota*
*61.545.02 *Olneya tesota - Psorothamnus schottii*
*61.545.04 *Olneya tesota / Hyptis emoryi*
*61.545.03 *Olneya tesota / Larrea tridentata - Encelia farinosa*

*83.300.00 ***Picea breweriana* (Brewer spruce forest) Alliance** G3 S2
*83.300.03 *Picea breweriana - Abies concolor / Chimaphila umbellata - Pyrola picta*

*83.100.00 ***Picea engelmannii* (Engelmann spruce forest) Alliance** G5 S2

*83.200.00 ***Picea sitchensis* (Sitka spruce forest) Alliance** G5 S2
*83.200.04 *Picea sitchensis - Tsuga heterophylla*
*83.200.01 *Picea sitchensis / Maianthemum dilatatum*
*83.200.03 *Picea sitchensis / Polystichum munitum*
*83.200.02 *Picea sitchensis / Rubus spectabilis*

87.180.00 ***Pinus albicaulis* (Whitebark pine forest) Alliance** G5 S4
87.180.07 *Pinus albicaulis - Tsuga mertensiana*
87.180.01 *Pinus albicaulis / Achnatherum californica*
87.180.03 *Pinus albicaulis / Arenaria aculeata*
87.180.08 *Pinus albicaulis / Carex filifolia*
87.180.09 *Pinus albicaulis / Carex rossii*
87.180.04 *Pinus albicaulis / Holodiscus discolor*
87.180.06 *Pinus albicaulis / Penstemon davidsonii*
87.180.02 *Pinus albicaulis / Penstemon gracilentus*
87.180.05 *Pinus albicaulis / Poa wheeleri*

87.100.00 ***Pinus attenuata* (Knobcone pine forest) Alliance** G4 S4
87.100.08 *Pinus attenuata - mixed oak / Arctostaphylos viscida*
87.100.04 *Pinus attenuata / Adenostoma fasciculatum*
87.100.01 *Pinus attenuata / Arctostaphylos columbiana*
87.100.06 *Pinus attenuata / Arctostaphylos glandulosa*
87.100.02 *Pinus attenuata / Arctostaphylos patula*
87.100.05 *Pinus attenuata / Arctostaphylos viscida*
87.100.07 *Pinus attenuata / Ceanothus lemmonii*
87.100.03 *Pinus attenuata / Quercus vacciniifolia*

*87.150.00 ***Pinus balfouriana* (Foxtail pine woodland) Alliance** G3 S3
*87.150.01 *Pinus balfouriana*
*87.150.04 *Pinus balfouriana - Abies magnifica*
*87.150.05 *Pinus balfouriana - Pinus albicaulis*
*87.150.07 *Pinus balfouriana - Pinus flexilis*
*87.150.06 *Pinus balfouriana - Pinus monticola*
*87.150.02 *Pinus balfouriana / Anemone drummondii*

*87.150.03	*Pinus balfouriana / Chrysolepis sempervirens*	
87.080.00	***Pinus contorta ssp. murrayana* (Lodgepole pine forest) Alliance**	G4 S4
87.080.01	*Pinus contorta ssp. murrayana*	
87.080.17	*Pinus contorta ssp. murrayana - Pinus albicaulis / Carex filifolia*	
87.080.11	*Pinus contorta ssp. murrayana - Pinus albicaulis / Carex rossii*	
87.080.02	*Pinus contorta ssp. murrayana / Artemisia tridentata*	
87.080.10	*Pinus contorta ssp. murrayana / Carex filifolia*	
87.080.06	*Pinus contorta ssp. murrayana / Carex rossii*	
87.080.13	*Pinus contorta ssp. murrayana / Carex spp.*	
87.080.05	*Pinus contorta ssp. murrayana / Cistanthe umbellata*	
87.080.03	*Pinus contorta ssp. murrayana / Ligusticum grayi*	
87.080.12	*Pinus contorta ssp. murrayana / Penstemon newberryi*	
87.080.08	*Pinus contorta ssp. murrayana / Rhododendron neoglandulosum*	
87.080.14	*Pinus contorta ssp. murrayana / Rhododendron neoglandulosum - Phyllodoce breweri*	
87.080.07	*Pinus contorta ssp. murrayana / Thalictrum fendleri*	
87.080.15	*Pinus contorta ssp. murrayana / Vaccinium caespitosum*	
87.080.09	*Pinus contorta ssp. murrayana / Vaccinium uliginosum*	
87.080.16	*Pinus contorta ssp. murrayana / Vaccinium uliginosum - Rhododendron neoglandulosum*	
*87.060.00	***Pinus contorta var. contorta* (Beach pine forest) Alliance**	G5 S3
*87.060.01	*Pinus contorta var. contorta*	
*87.060.02	*Pinus contorta ssp. contorta - Picea sitchensis*	
87.090.00	***Pinus coulteri* (Coulter pine woodland) Alliance**	G4 S4 (some associations are of high priority for inventory)
*87.090.01	*Pinus coulteri - Calocedrus decurrens - Pinus jeffreyi / Quercus durata*	
*87.092.03	*Pinus coulteri - Calocedrus decurrens / Frangula californica spp. tomentella / Aquilegia eximia*	
*87.090.02	*Pinus coulteri - Calocedrus decurrens / Quercus durata - Arctostaphylos glauca*	
*87.090.03	*Pinus coulteri - Pinus sabiniana / Quercus durata - Arctostaphylos pungens*	
87.090.04	*Pinus coulteri - Quercus chrysolepis*	
*87.090.06	*Pinus coulteri - Quercus chrysolepis / Arctostaphylos pringlei*	
87.092.08	*Pinus coulteri - Quercus kelloggii*	
87.092.05	*Pinus coulteri - Quercus wislizeni*	
87.092.07	*Pinus coulteri / Arctostaphylos glandulosa*	
87.092.01	*Pinus coulteri / Arctostaphylos glandulosa - Quercus wislizeni*	
87.092.02	*Pinus coulteri / Arctostaphylos glauca*	
*87.092.04	*Pinus coulteri / Quercus durata*	
*87.050.00	***Pinus edulis* (Two-needle pinyon stands) Special Stands**	G4 S2?
*87.160.00	***Pinus flexilis* (Limber pine woodland) Alliance**	G5 S3
*87.160.02	*Pinus flexilis - Pinus contorta / Chrysolepis sempervirens*	
*87.160.03	*Pinus flexilis - Pinus contorta ssp. murryana*	
*87.160.01	*Pinus flexilis / Cercocarpus ledifolius*	
87.020.00	***Pinus jeffreyi* (Jeffrey pine forest) Alliance**	G4 S4 (some associations are of high priority for inventory)
87.205.03	*Pinus jeffreyi - Abies concolor - Abies magnifica*	
87.020.30	*Pinus jeffreyi - Abies concolor / Chrysolepis sempervirens*	
87.205.06	*Pinus jeffreyi - Abies concolor / Iris innominata*	
87.205.05	*Pinus jeffreyi - Abies concolor / Quercus sadleriana*	
87.205.07	*Pinus jeffreyi - Abies concolor / Symphoricarpos rotundifolius / Elymus elymoides*	
87.020.39	*Pinus jeffreyi - Abies magnifica*	
87.020.04	*Pinus jeffreyi - Calocedrus decurrens / Ceanothus cuneatus*	
87.020.28	*Pinus jeffreyi - Calocedrus decurrens / Ceanothus pumila*	
87.020.37	*Pinus jeffreyi - Calocedrus decurrens / Quercus vacciniifolia*	
87.020.05	*Pinus jeffreyi - Calocedrus decurrens / Quercus vacciniifolia / Xerophyllum tenax*	
87.020.26	*Pinus jeffreyi - Pinus monophylla*	
87.200.08	*Pinus jeffreyi - Pinus ponderosa - Quercus kelloggii / Poa wheeleri / granite*	

87.200.09 *Pinus jeffreyi - Pinus ponderosa / Amelanchier alnifolia - Mahonia repens*
*87.200.03 *Pinus jeffreyi - Pinus ponderosa / Purshia tridentata var. tridentata / Festuca idahoensis / Granite*
*87.200.07 *Pinus jeffreyi - Pinus ponderosa / Symphoricarpos mollis / Wyethia mollis*
*87.020.02 *Pinus jeffreyi - Pseudotsuga menziesii / Quercus vacciniifolia / Festuca californica*
87.020.38 *Pinus jeffreyi - Quercus chrysolepis / Arctostaphylos viscida*
87.020.25 *Pinus jeffreyi - Quercus kelloggii*
*87.020.15 *Pinus jeffreyi - Quercus kelloggii / Poa secunda*
*87.020.16 *Pinus jeffreyi - Quercus kelloggii / Rhus trilobata*
87.020.24 *Pinus jeffreyi / Arctostaphylos nevadensis*
87.020.09 *Pinus jeffreyi / Arctostaphylos patula*
87.020.35 *Pinus jeffreyi / Arctostaphylos patula - Ceanothus velutinus*
87.020.32 *Pinus jeffreyi / Artemisia tridentata / Penstemon centranthifolius*
*87.020.19 *Pinus jeffreyi / Artemisia tridentata var. vaseyana / Festuca idahoensis*
*87.020.23 *Pinus jeffreyi / Calamagrostis koelerioides*
87.020.10 *Pinus jeffreyi / Ceanothus cordulatus*
87.020.36 *Pinus jeffreyi / Ceanothus cordulatus - Artemisia tridentata*
*87.020.17 *Pinus jeffreyi / Cercocarpus ledifolius*
*87.020.20 *Pinus jeffreyi / Chrysolepis sempervirens*
*87.020.22 *Pinus jeffreyi / Ericameria ophitidis*
*87.020.03 *Pinus jeffreyi / Festuca idahoensis*
87.020.11 *Pinus jeffreyi / Lupinus caudatus*
*87.020.21 *Pinus jeffreyi / Purshia tridentata var. tridentata*
*87.020.14 *Pinus jeffreyi / Purshia tridentata var. tridentata - Symphoricarpos longiflorus / Poa wheeleri*
*87.020.13 *Pinus jeffreyi / Purshia tridentata var. tridentata / Cercocarpus ledifolius / Achnatherum occidentalis*
*87.020.12 *Pinus jeffreyi / Purshia tridentata var. tridentata / Wyethia mollis*
87.020.33 *Pinus jeffreyi / Quercus palmeri*
87.020.01 *Pinus jeffreyi / Quercus sadleriana / Xerophyllum tenax*
87.020.08 *Pinus jeffreyi / Quercus vacciniifolia*
87.020.27 *Pinus jeffreyi / Quercus vacciniifolia - Arctostaphylos nevadensis / Festuca idahoensis*
87.020.34 *Pinus jeffreyi / Quercus wislizeni*
*87.020.18 *Pinus jeffreyi / Symphoricarpos longiflorus / Poa wheeleri*

*87.206.00 ***Pinus lambertiana* (Sugar pine forest) Alliance** G4 S3
*87.206.01 *Pinus lambertiana - Chrysolepis chrysophylla / Quercus vacciniifolia - Quercus sadleriana*
*87.206.02 *Pinus lambertiana - Pinus contorta ssp contorta / Quercus vacciniifolia - Lithocarpus densiflorus var. echinoides*
*87.206.03 *Pinus lambertiana - Pinus contorta ssp. contorta / Lithocarpus densiflorus var. echinoides - Rhododendron macrophyllum*
*87.206.04 *Pinus lambertiana - Pinus monticola / Quercus vacciniifolia - Garrya buxifolia*

*87.140.00 ***Pinus longaeva* (Bristlecone pine woodland) Alliance** G4 S2
*87.140.01 *Pinus longaeva*
*87.140.02 *Pinus longaeva / Cercocarpus intricatus*

87.040.00 ***Pinus monophylla* (Singleleaf pinyon woodlands) Alliance** G5 S4
87.040.14 *Pinus monophylla - Juniperus californica / Achnatherum speciosum*
87.040.18 *Pinus monophylla - Juniperus californica / Quercus cornelius-mulleri*
87.040.16 *Pinus monophylla - Juniperus osteosperma / Artemisia tridentata*
87.040.17 *Pinus monophylla - Juniperus osteosperma / Cercocarpus intricatus*
87.040.02 *Pinus monophylla / Artemisia tridentata*
87.040.15 *Pinus monophylla / Artemisia tridentata / Elymus elymoides*
87.040.12 *Pinus monophylla / Cercocarpus ledifolius / Artemisia tridentata - Purshia tridentata*
87.040.03 *Pinus monophylla / Ephedra viridis*
87.040.05 *Pinus monophylla / Garrya flavescens*
87.040.06 *Pinus monophylla / Juniperus californica / Artemisia tridentata - Coleogyne ramosissima*
87.040.07 *Pinus monophylla / Juniperus osteosperma / Artemisia nova*
87.040.13 *Pinus monophylla / Juniperus osteosperma / Purshia mexicana*
87.040.10 *Pinus monophylla / Prunus fasciculata - Rhus trilobata*
87.040.09 *Pinus monophylla / Quercus cornelius - mulleri / Nama californica*
87.040.11 *Pinus monophylla / Ribes velutinum*

87.040.04	*Pinus monophylla / Symphoricarpos rotundifolia - Ribes velutinum*	
87.170.00	***Pinus monticola* (Western white pine forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
*87.170.01	*Pinus monticola - Pinus contorta ssp. contorta / Lithocarpus densiflorus var. echinoides*	
87.170.07	*Pinus monticola - Pinus contorta var. ssp. Murrayana*	
87.170.08	*Pinus monticola - Pseudotsuga menziesii / Quercus vacciniifolia - Lithocarpus densiflorus var. echinoides*	
87.170.06	*Pinus monticola / Achnatherum occidentalis*	
*87.170.04	*Pinus monticola / Angelica arguta*	
*87.170.02	*Pinus monticola / Holodiscus discolor*	
*87.170.03	*Pinus monticola / Xerophyllum tenax*	
*87.070.00	***Pinus muricata* (Bishop pine forest) Alliance**	G3 S3
*87.070.01	*Pinus muricata - (Arbutus menziesii) / Vaccinium ovatum*	
*87.070.10	*Pinus muricata - Callitropsis pigmaea*	
*87.070.02	*Pinus muricata - Pinus contorta ssp. bolanderi*	
*87.070.03	*Pinus muricata - Pinus contorta ssp. bolanderi / Arnica discoidea*	
*87.070.04	*Pinus muricata - Pseudotsuga menziesii*	
*87.070.07	*Pinus muricata / Arctostaphylos glandulosa*	
*87.070.09	*Pinus muricata / Xerophyllum tenax*	
87.010.00	***Pinus ponderosa* (Ponderosa pine forest) Alliance**	G5 S4 (some associations are of high priority for inventory)
87.010.45	*Pinus ponderosa - Abies concolor / Lithocarpus densiflorus var. echinoides*	
87.010.37	*Pinus ponderosa - Alnus rhombifolia*	
87.010.44	*Pinus ponderosa - Alnus rhombifolia*	
87.010.46	*Pinus ponderosa - Lithocarpus densiflorus*	
*87.010.23	*Pinus ponderosa - Pinus contorta ssp. murrayana / Amelanchier alnifolia*	
87.010.54	*Pinus ponderosa - Pinus jeffreyi / Achnatherum occidentalis*	
*87.010.25	*Pinus ponderosa - Pinus jeffreyi / Artemisia tridentata var. vaseyana - Purshia tridentata var. tridentata*	
87.010.55	*Pinus ponderosa - Pinus jeffreyi / Balsamorhiza sagittata*	
87.010.49	*Pinus ponderosa - Pinus jeffreyi / Cercocarpus ledifolius / Pseudoroegneria spicata*	
87.010.51	*Pinus ponderosa - Pinus jeffreyi / Frangula rubra / Poa secunda*	
87.010.50	*Pinus ponderosa - Pinus jeffreyi / Purshia tridentata var. tridentata / Senecio integerrimus / granite*	
87.010.53	*Pinus ponderosa - Pinus jeffreyi / Quercus vacciniifolia*	
87.010.52	*Pinus ponderosa - Pinus jeffreyi / Quercus vacciniifolia / Wyethia mollis*	
87.010.48	*Pinus ponderosa - Pinus lambertiana - Quercus chrysolepis / Lithocarpus densiflorus var. echinoides*	
87.010.47	*Pinus ponderosa - Pinus lambertiana / Arctostaphylos patula - Lithocarpus densiflorus var. echinoides*	
*87.010.18	*Pinus ponderosa / Achnatherum nelsonii*	
*87.010.27	*Pinus ponderosa / Amelanchier alnifolia - Mahonia repens / Arnica cordifolia*	
87.010.42	*Pinus ponderosa / Amelanchier alnifolia - Mahonia repens / Arnica cordifolia*	
*87.010.26	*Pinus ponderosa / Amelanchier alnifolia - Prunus virginiana*	
*87.010.03	*Pinus ponderosa / Arctostaphylos patula - Chamaebatia foliolosa*	
87.010.39	*Pinus ponderosa / Arctostaphylos viscida*	
*87.010.04	*Pinus ponderosa / Artemisia tridentata*	
*87.010.24	*Pinus ponderosa / Artemisia tridentata var. vaseyana / Festuca idahoensis*	
*87.010.06	*Pinus ponderosa / Bromus carinatus*	
*87.010.09	*Pinus ponderosa / Ceanothus cuneatus*	
*87.010.08	*Pinus ponderosa / Ceanothus prostratus*	
*87.010.28	*Pinus ponderosa / Ceanothus velutinus / Achnatherum nelsonii*	
*87.010.19	*Pinus ponderosa / Cercocarpus ledifolius - Purshia tridentata var. tridentata / Festuca idahoensis*	
*87.010.20	*Pinus ponderosa / Cercocarpus ledifolius / Pseudoroegneria spicata*	
*87.010.02	*Pinus ponderosa / Chamaebatia foliolosa*	
*87.010.07	*Pinus ponderosa / Galium angustifolium*	
87.010.43	*Pinus ponderosa / Lithocarpus densiflorus var. echinoides*	
*87.010.05	*Pinus ponderosa / Purshia tridentata var. tridentata*	

*87.010.13	*Pinus ponderosa / Purshia tridentata var. tridentata - Arctostaphylos patula / Achnatherum nelsonii*	
*87.010.14	*Pinus ponderosa / Purshia tridentata var. tridentata - Ceanothus velutinus*	
87.010.41	*Pinus ponderosa / Purshia tridentata var. tridentata - Prunus virginiana / Bromus orcuttianus*	
*87.010.16	*Pinus ponderosa / Purshia tridentata var. tridentata - Ribes cereum / Bromus orcuttianus*	
*87.010.12	*Pinus ponderosa / Purshia tridentata var. tridentata / Achnatherum nelsonii / pumice*	
*87.010.10	*Pinus ponderosa / Purshia tridentata var. tridentata / Balsamorhiza sagittata*	
87.010.40	*Pinus ponderosa / Purshia tridentata var. tridentata / Galium bolanderi*	
*87.010.15	*Pinus ponderosa / Purshia tridentata var. tridentata / Senecio integerrimus / granite*	
*87.010.29	*Pinus ponderosa / Symphoricarpos longiflorus*	
87.010.38	*Pinus ponderosa stream terrace*	
87.015.00	***Pinus ponderosa - Calocedrus decurrens* (Mixed conifer forest) Alliance**	G4 S4
87.015.02	*Pinus ponderosa - Calocedrus decurrens - Quercus kelloggii*	
87.015.04	*Pinus ponderosa - Calocedrus decurrens (mixed conifer) - Quercus chrysolepis / Chamaebatia foliosa*	
87.015.08	*Pinus ponderosa - Calocedrus decurrens (mixed conifer) / Arctostaphylos sp. - Chamaebatia foliolosa*	
87.015.01	*Pinus ponderosa - Calocedrus decurrens (mixed conifer) / Galium bolanderi - Polygala cornuta*	
87.015.10	*Pinus ponderosa - Calocedrus decurrens / Ceanothus prostratus*	
87.015.11	*Pinus ponderosa - Calocedrus decurrens / Chamaebatia foliolosa / Galium bolanderi*	
87.015.03	*Pinus ponderosa - Calocedrus decurrens / Chamaebatia foliosa*	
87.015.09	*Pinus ponderosa - Calocedrus decurrens / Mahonia nervosa*	
87.015.14	*Pinus ponderosa - Calocedrus decurrens / Purshia tridentata / Achnatherum occidentalis*	
87.015.13	*Pinus ponderosa - Calocedrus decurrens / Purshia tridentata var. tridentata / (Balsamorhiza sagittata - Achnatherum occidentalis)*	
87.015.12	*Pinus ponderosa - Calocedrus decurrens / Quercus chrysolepis var. nana - Quercus vacciniifolia*	
87.015.05	*Pinus ponderosa - Calocedrus decurrens / Quercus vaccinifolia (serpentine)*	
82.400.00	***Pinus ponderosa - Pseudotsuga menziesii* (Ponderosa pine - Douglas fir forest) Alliance**	G4 S4 (some associations are of high priority for inventory)
82.400.08	*Pinus ponderosa - Pseudotsuga menziesii - Lithocarpus densiflorus / Chamaebatia foliolosa*	
82.400.09	*Pinus ponderosa - Pseudotsuga menziesii - Quercus chrysolepis / Galium bolanderi*	
82.400.07	*Pinus ponderosa - Pseudotsuga menziesii / Antennaria rosea - Eriogonum nudum*	
82.400.06	*Pinus ponderosa - Pseudotsuga menziesii / Purshia tridentata var. tridentata / Wyethia*	
*82.400.04	*Pseudotsuga menziesii - Pinus ponderosa*	
*82.400.02	*Pseudotsuga menziesii - Pinus ponderosa - Calocedrus decurrens*	
*82.400.03	*Pseudotsuga menziesii - Pinus ponderosa - Pinus jeffreyi / Poa secunda*	
*87.030.00	***Pinus quadrifolia* (Parry pinyon woodland) Alliance**	G3 S2
*87.030.01	*Pinus quadrifolia / Quercus cornelius - mulleri*	
*87.110.00	***Pinus radiata* (Monterey pine forest) Alliance**	G1 S1
*87.110.03	*Pinus radiata - Pinus muricata / Arctostaphylos tomentosa - Arctostaphylos hookeri*	
*87.110.04	*Pinus radiata - Quercus agrifolia / Toxicodendron diversilobum*	
*87.110.01	*Pinus radiata / Arctostaphylos tomentosa - Vaccinium ovatum*	
*87.110.02	*Pinus radiata / Toxicodendron diversilobum*	
87.130.00	***Pinus sabiniana* (Ghost pine woodland) Alliance**	G4 S4 (some associations are of high priority for inventory)
87.130.02	*Pinus sabiniana - Juniperus californica / grass*	
87.130.12	*Pinus sabiniana - Quercus chrysolepis / Arctostaphylos viscida*	
87.130.11	*Pinus sabiniana - Quercus wislizeni / Adenostoma fasciculatum*	
87.130.04	*Pinus sabiniana - Quercus wislizeni / Ceanothus cuneatus*	
87.130.07	*Pinus sabiniana / Adenostoma fasciculatum*	
87.130.08	*Pinus sabiniana / Arctostaphylos viscida*	
87.130.06	*Pinus sabiniana / Artemisia californica - Ceanothus ferrisiae - Heteromeles arbutifolia*	
87.130.09	*Pinus sabiniana / Ceanothus cuneatus - Heteromeles arbutifolia*	
87.130.10	*Pinus sabiniana / Ceanothus cuneatus - Rhamnus illicifolia*	
*87.130.03	*Pinus sabiniana / Ceanothus cuneatus / Plantago erecta*	

87.130.13 *Pinus sabiniana / Frangula californica ssp. tomentella*

*87.190.00 ***Pinus torreyana* (Torrey pine stands) Special Stands** G1 S1
*87.190.01 *Pinus torreyana / Artemisia californica - Rhus integrifolia*

*87.120.00 ***Pinus washoensis* (Washoe pine woodland) Alliance** G2 S2
*87.120.03 *Pinus washoensis / Arctostaphylos nevadensis*
*87.120.01 *Pinus washoensis / Lupinus caudatus*
*87.120.02 *Pinus washoensis / Symphoricarpos longiflorus / Pseudostellaria jamesiana*

*61.310.00 ***Platanus racemosa* (California sycamore woodlands) Alliance** G3 S3
*61.314.01 *Platanus racemosa - Populus fremontii*
*61.314.03 *Platanus racemosa - Populus fremontii / Salix lasiolepis*
*61.314.02 *Platanus racemosa - Populus fremontii / Salix lasiolepis - Salix exigua / Scirpus americanus*
*61.312.01 *Platanus racemosa - Quercus agrifolia*
*61.312.06 *Platanus racemosa - Quercus agrifolia - Populus fremontii - Salix laevigata*
*61.312.03 *Platanus racemosa - Quercus agrifolia - Salix lasiolepis*
*61.312.04 *Platanus racemosa - Quercus agrifolia / Baccharis salicifolia / Artemisia douglasiana*
*61.312.07 *Platanus racemosa - Salix laevigata*
*61.312.05 *Platanus racemosa - Salix laevigata / Salix lasiolepis - Baccharis salicifolia*
*61.313.03 *Platanus racemosa / Adenostoma fasciculatum*
*61.311.03 *Platanus racemosa / annual grass*
*61.311.01 *Platanus racemosa / Avena barbata*
*61.313.01 *Platanus racemosa / Baccharis salicifolia*
*61.311.02 *Platanus racemosa / Bromus hordeaceus*
*61.313.02 *Platanus racemosa / Toxicodendron diversilobum*

*61.130.00 ***Populus fremontii* (Fremont cottonwood forest) Alliance** G4 S3
*61.130.06 *Populus fremontii*
*61.130.18 *Populus fremontii - Juglans californica*
*61.130.19 *Populus fremontii - Prosopis pubescens*
*61.130.20 *Populus fremontii - Quercus agrifolia*
*61.130.24 *Populus fremontii - Salix (laevigata, lasiolepis, lucida ssp. lasiandra)*
*61.130.14 *Populus fremontii - Salix gooddingii / Baccharis salicifolia*
*61.130.15 *Populus fremontii - Salix laevigata*
*61.130.22 *Populus fremontii - Salix laevigata / Salix lasiolepis - Baccharis salicifolia*
*61.130.21 *Populus fremontii - Salix laevigata / Salix lasiolepis / Vitis girdiana*
*61.130.23 *Populus fremontii - Salix lasiolepis*
*61.130.25 *Populus fremontii - Salix lucida ssp. lasiandra*
*61.130.26 *Populus fremontii - Sambucus nigra*
*61.130.07 *Populus fremontii / Acer negundo*
*61.130.08 *Populus fremontii / Acer negundo / Rubus armeniacus*
*61.130.09 *Populus fremontii / Artemisia douglasiana*
*61.130.16 *Populus fremontii / Baccharis salicifolia*
*61.130.10 *Populus fremontii / Galium aparine*
*61.130.11 *Populus fremontii / Rubus ursinus*
*61.130.17 *Populus fremontii / Salix exigua*
*61.130.13 *Populus fremontii / Vitis californica*

*61.111.00 ***Populus tremuloides* (Aspen groves) Alliance** G5 S3
*61.111.02 *Populus tremuloides*
*61.111.11 *Populus tremuloides - Pinus contorta / Artemisia tridentata / Poa pratensis*
*61.111.06 *Populus tremuloides / Artemisia tridentata*
*61.111.07 *Populus tremuloides / Artemisia tridentata / Monardella odoratissima - Kelloggia galioides*
*61.111.19 *Populus tremuloides / Bromus carinatus*
*61.111.18 *Populus tremuloides / dry graminoid*
*61.111.17 *Populus tremuloides / mesic forb*
*61.111.08 *Populus tremuloides / Monardella odoratissima*
*61.111.09 *Populus tremuloides / Pinus jeffreyi*
*61.111.20 *Populus tremuloides / Poa pratensis*
*61.111.14 *Populus tremuloides / Prunus*

*61.111.10 *Populus tremuloides / Rosa woodsii*
*61.111.15 *Populus tremuloides / Symphoricarpos albus*
*61.111.16 *Populus tremuloides / Symphoricarpos rotundifolius*
*61.111.05 *Populus tremuloides / Symphyotricum foliaceum*
*61.111.04 *Populus tremuloides / upland*
*61.111.03 *Populus tremuloides / Veratrum californicum*

*61.120.00 ***Populus trichocarpa* (Black cottonwood forest) Alliance** G5 S3
*61.120.01 *Populus trichocarpa*
*61.120.03 *Populus trichocarpa - Pinus jeffreyi*
*61.120.08 *Populus trichocarpa - Quercus agrifolia*
*61.120.09 *Populus trichocarpa - Salix laevigata*
*61.120.10 *Populus trichocarpa - Salix lasiolepis*
*61.120.11 *Populus trichocarpa - Salix lucida*
*61.120.04 *Populus trichocarpa / Artemisia tridentata ssp. vaseyana*
*61.120.07 *Populus trichocarpa / Rhododendron occidentalis*
*61.120.05 *Populus trichocarpa / Symphoricarpos rotundifolius*
*61.120.06 *Populus / Salix*

*61.512.00 ***Prosopis glandulosa* (Mesquite bosque, mesquite thicket) Alliance** G5 S3
*61.512.01 *Prosopis glandulosa*
*61.512.09 *Prosopis glandulosa - Salix exigua - Salix lasiolepis*
*61.512.02 *Prosopis glandulosa - Sambucus nigra*
*61.512.04 *Prosopis glandulosa / Atriplex canescens*
*61.512.03 *Prosopis glandulosa / Atriplex spp. (alkaline)*
*61.512.05 *Prosopis glandulosa / Bebbia juncea - Petalonyx thurberi (wash)*
*61.512.06 *Prosopis glandulosa / Pluchea sericea - Atriplex canescens (alkaline spring)*
*61.512.07 *Prosopis glandulosa / Rhus ovata (upper desert spring)*
*61.512.08 *Prosopis glandulosa / Suaeda moquinii*

*61.513.00 ***Prosopis pubescens* (Screwbean mesquite bosques) Alliance** G3 S2
*61.513.01 *Prosopis / Atriplex spp. (alkaline)*
*61.513.03 *Prosopis / Bebbia juncea - Petalonyx thurberi (wash)*
*61.513.02 *Prosopis / Pluchea sericea - Atriplex canescens (alkaline spring)*

*82.100.00 ***Pseudotsuga macrocarpa* (Bigcone Douglas fir forest) Alliance** G3 S3
*82.100.01 *Pseudotsuga macrocarpa - Quercus agrifolia*
*82.100.02 *Pseudotsuga macrocarpa - Quercus chrysolepis*

82.200.00 ***Pseudotsuga menziesii* (Douglas fir forest) Alliance** G5 S4 (some associations are of high priority for inventory)
82.200.77 *Pseudotsuga menziesii*
*82.200.12 *Pseudotsuga menziesii - Chrysolepis chrysophylla - Lithocarpus densiflorus*
*82.200.13 *Pseudotsuga menziesii - Chrysolepis chrysophylla - Lithocarpus densiflorus / Mahonia nervosa*
82.200.79 *Pseudotsuga menziesii - Chrysolepis chrysophylla / Rhododendron macrophyllum - Gaultheria shallon*
*82.200.10 *Pseudotsuga menziesii - Chrysolepis chrysophylla / Rhododendron macrophyllum - Mahonia nervosa*
*82.200.11 *Pseudotsuga menziesii - Chrysolepis chrysophylla / Rhododendron macrophyllum - Quercus sadleriana - Xerophyllum tenax*
*82.200.09 *Pseudotsuga menziesii - Chrysolepis chrysophylla / Xerophyllum tenax*
82.200.71 *Pseudotsuga menziesii - Quercus agrifolia*
*82.300.03 *Pseudotsuga menziesii - Quercus chrysolepis*
82.300.07 *Pseudotsuga menziesii - Quercus chrysolepis - Acer macrophyllum / Toxicodendron diversilobum*
*82.300.02 *Pseudotsuga menziesii - Quercus chrysolepis - Arbutus menziesii / Toxicodendron diversilobum*
*82.300.05 *Pseudotsuga menziesii - Quercus chrysolepis - Lithocarpus densiflorus*
*82.300.01 *Pseudotsuga menziesii - Quercus chrysolepis - mixed conifer / Polystichum munitum*
82.300.06 *Pseudotsuga menziesii - Quercus chrysolepis / Arctostaphylos manzanita*
*82.200.19 *Pseudotsuga menziesii - Quercus garryana var. garryana / grass*

*82.200.60 *Pseudotsuga menziesii - Quercus kelloggii*
82.200.80 *Pseudotsuga menziesii - Quercus kelloggii*
*82.200.66 *Pseudotsuga menziesii - Umbellularia californica*
82.200.70 *Pseudotsuga menziesii - Umbellularia californica / Frangula californica*
82.200.81 *Pseudotsuga menziesii - Umbellularia californica / Holodiscus discolor*
82.200.69 *Pseudotsuga menziesii - Umbellularia californica / Polystichum munitum*
*82.200.05 *Pseudotsuga menziesii - Umbellularia californica / Toxicodendron diversilobum*
*82.200.20 *Pseudotsuga menziesii / Acer circinatum - Mahonia nervosa*
*82.200.49 *Pseudotsuga menziesii / Achlys triphylla*
*82.200.50 *Pseudotsuga menziesii / Arbutus menziesii*
82.200.53 *Pseudotsuga menziesii / Arctostaphylos patula*
82.200.72 *Pseudotsuga menziesii / Baccharis pilularis*
*82.200.54 *Pseudotsuga menziesii / Chimaphila umbellata*
*82.200.56 *Pseudotsuga menziesii / Corylus cornuta*
*82.200.04 *Pseudotsuga menziesii / Corylus cornuta / Adenocaulon bicolor*
*82.200.59 *Pseudotsuga menziesii / Gaultheria shallon*
*82.200.55 *Pseudotsuga menziesii / Linnaea borealis*
82.200.78 *Pseudotsuga menziesii / Lithocarpus densiflorus var. echinoides / Iris douglasii*
*82.200.64 *Pseudotsuga menziesii / Mahonia nervosa*
*82.200.15 *Pseudotsuga menziesii / Quercus vacciniifolia*
*82.200.16 *Pseudotsuga menziesii / Quercus vacciniifolia - Lithocarpus densiflorus var. echinoides*
*82.200.74 *Pseudotsuga menziesii / Quercus vacciniifolia - Rhododendron macrophyllum*
*82.200.58 *Pseudotsuga menziesii / Rhododendron spp.*
*82.200.57 *Pseudotsuga menziesii / Vancouveria planipetala*

*82.600.00 ***Pseudotsuga menziesii - Calocedrus decurrens* (Douglas fir - Incense cedar forest) Alliance** G3 S3
*82.600.15 *Pseudotsuga menziesii - Calocedrus decurrens - (Pinus jeffreyi) / Nassella pulchra*
*82.600.14 *Pseudotsuga menziesii - Calocedrus decurrens - (Quercus kellogii) / Nassella pulchra*
*82.600.12 *Pseudotsuga menziesii - Calocedrus decurrens - Pinus jeffreyi*
*82.600.13 *Pseudotsuga menziesii - Calocedrus decurrens - Pinus jeffreyi / Festuca californica*
*82.600.01 *Pseudotsuga menziesii - Calocedrus decurrens - Umbellularia californica / Toxicodendron diversilobum*
*82.600.02 *Pseudotsuga menziesii - Calocedrus decurrens / Festuca californica*
*82.600.04 *Pseudotsuga menziesii - Calocedrus decurrens / Quercus vacciniifolia*

82.500.00 ***Pseudotsuga menziesii - Lithocarpus densiflorus* (Douglas fir - tanoak forest) Alliance** G4 S4
82.500.48 *Pseudotsuga menziesii - Lithocarpus densiflorus*
82.500.02 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Acer macrophyllum) / Polystichum munitum*
82.500.50 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Acer macrophyllum) / Polystichum munitum*
82.500.22 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Calocedrus decurrens) / Festuca californica*
82.500.31 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana - Alnus rubra) / riparian*
82.500.24 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana - Umbellularia californica) / Vaccinium ovatum*
82.500.25 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Mahonia nervosa / Linnaea borealis*
82.500.30 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Acer circinatum*
82.500.29 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Gaultheria shallon*
82.500.26 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Vaccinium ovatum*
82.500.27 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Vaccinium ovatum - Rhododendron occidentalis*
82.500.28 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chamaecyparis lawsoniana) / Vaccinium parvifolium*
82.500.16 *Pseudotsuga menziesii - Lithocarpus densiflorus - (Chrysolepis chrysophylla) / Gaultheria shallon*

82.500.12	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Chrysolepis chrysophylla) / Pteridium aquilinum*	
82.500.15	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Chrysolepis chrysophylla) / Rhododendron macrophyllum - Gaultheria shallon*	
82.500.39	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Pinus lambertiana)*	
82.500.13	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis) / Mahonia nervosa*	
82.500.06	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis) / Mahonia nervosa - Gaultheria shallon*	
82.500.11	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis) / rockpile*	
82.500.10	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis) / Toxicodendron diversilobum*	
82.500.08	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis) / Vaccinium ovatum*	
82.500.05	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus chrysolepis, Quercus kelloggii) / Toxicodendron diversilobum*	
82.500.03	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Quercus kelloggii) / Rosa gymnocarpa*	
82.500.04	*Pseudotsuga menziesii - Lithocarpus densiflorus - (Umbellularia californica) / Toxicodendron diversilobum*	
82.500.44	*Pseudotsuga menziesii - Lithocarpus densiflorus / Iris*	
82.500.51	*Pseudotsuga menziesii - Lithocarpus densiflorus - Thuja plicata / Vaccinium ovatum - Gaultheria shallon*	
82.500.36	*Pseudotsuga menziesii - Lithocarpus densiflorus / Acer circinatum*	
82.500.40	*Pseudotsuga menziesii - Lithocarpus densiflorus / Achlys triphylla*	
82.500.01	*Pseudotsuga menziesii - Lithocarpus densiflorus / Chimaphila umbellata*	
82.500.43	*Pseudotsuga menziesii - Lithocarpus densiflorus / Cornus nuttallii*	
82.500.21	*Pseudotsuga menziesii - Lithocarpus densiflorus / Corylus cornuta*	
82.500.35	*Pseudotsuga menziesii - Lithocarpus densiflorus / Gaultheria shallon*	
82.500.07	*Pseudotsuga menziesii - Lithocarpus densiflorus / Mahonia nervosa*	
82.500.46	*Pseudotsuga menziesii - Lithocarpus densiflorus / Quercus vacciniifolia - Holodiscus*	
82.500.49	*Pseudotsuga menziesii - Lithocarpus densiflorus / Rhododendron macrophyllum*	
82.500.38	*Pseudotsuga menziesii - Lithocarpus densiflorus / Taxus brevifolia*	
82.500.23	*Pseudotsuga menziesii - Lithocarpus densiflorus / Toxicodendron diversilobum - (Lonicera hispidula)*	
82.500.19	*Pseudotsuga menziesii - Lithocarpus densiflorus / Vaccinium ovatum*	
82.500.20	*Pseudotsuga menziesii - Lithocarpus densiflorus / Vaccinium ovatum - (Gaultheria shallon)*	
82.500.47	*Pseudotsuga menziesii - Lithocarpus densiflorus / Whipplea modesta*	
*61.570.00	***Psorothamnus spinosus* (Smoke tree woodland) Alliance**	G4 S3
*61.570.01	*Psorothamnus spinosus*	
*61.570.06	*Psorothamnus spinosus - Acacia greggii - Chrysothamnus sp*	
*61.570.02	*Psorothamnus spinosus / Ambrosia salsola - Bebbia juncea*	
*61.570.03	*Psorothamnus spinosus / Ephedra californica - Ambrosia salsola*	
*61.570.04	*Psorothamnus spinosus / Hyptis emoryi - Acacia greggii*	
71.100.00	***Quercus (agrifolia, douglasii, garryana, kelloggii, lobata, wislizeni)* (Mixed oak forest) Alliance**	G4 S4
71.100.05	*Mixed oak - Aesculus californica / grass*	
71.100.07	*Mixed oak - Pinus sabiniana / grass*	
71.100.06	*Mixed oak - Quercus agrifolia / Toxicodendron diversilobum*	
71.100.04	*Mixed oak - Quercus kelloggii / grass*	
71.100.10	*Mixed oak / Baccharis pilularis - Toxicodendron diversilobum*	
71.100.08	*Mixed oak / grass*	
71.100.14	*Quercus douglasii - Quercus lobata - Quercus agrifolia / Toxicodendron diversilobum*	
71.060.00	***Quercus agrifolia* (Coast live oak woodland) Alliance**	G5 S4 (some associations are of high priority for inventory)
71.060.02	*Quercus agrifolia*	
71.060.03	*Quercus agrifolia - Acer macrophyllum / Frangula californica - Holodiscus discolor*	
71.060.52	*Quercus agrifolia - Aesculus californica*	
71.060.40	*Quercus agrifolia - Arbutus menziesii*	
71.060.41	*Quercus agrifolia - Arbutus menziesii - Toxicodendron diversilobum*	
71.060.26	*Quercus agrifolia - Arbutus menziesii - Umbellularia californica*	

71.060.10 *Quercus agrifolia - Arbutus menziesii / Corylus cornuta - Rubus spp.*
71.060.27 *Quercus agrifolia - Juglans californica*
71.060.23 *Quercus agrifolia - Pinus coulteri*
71.060.43 *Quercus agrifolia - Platanus racemosa - Salix laevigata*
71.060.42 *Quercus agrifolia - Platanus racemosa / Toxicodendron diversilobum*
71.060.01 *Quercus agrifolia - Quercus douglasii*
71.060.45 *Quercus agrifolia - Quercus engelmannii / Eriogonum fasciculatum*
*71.060.18 *Quercus agrifolia - Quercus kelloggii*
71.060.47 *Quercus agrifolia - Salix lasiolepis*
71.060.48 *Quercus agrifolia - Umbellularia californica*
71.060.51 *Quercus agrifolia - Umbellularia californica / Arctostaphylos glauca - Toxicodendron diversilobum*
71.060.49 *Quercus agrifolia - Umbellularia californica / Ceanothus oliganthus*
71.060.05 *Quercus agrifolia - Umbellularia californica / Heteromeles arbutifolia - Quercus berberidifolia*
71.060.50 *Quercus agrifolia - Umbellularia californica / Toxicodendron diversilobum*
71.060.07 *Quercus agrifolia / Adenostoma fasciculatum (- Salvia mellifera)*
71.060.08 *Quercus agrifolia / Artemisia californica*
71.060.16 *Quercus agrifolia / Ceanothus oliganthus*
71.060.34 *Quercus agrifolia / Ceanothus spinosus*
71.060.29 *Quercus agrifolia / chaparral*
71.060.28 *Quercus agrifolia / coastal sage scrub*
71.060.35 *Quercus agrifolia / Equisetum hymale*
71.060.22 *Quercus agrifolia / Eriogonum wrightii*
71.060.06 *Quercus agrifolia / Frangula californica - Heteromeles arbutifolia*
71.060.36 *Quercus agrifolia / Frangula californica ssp. tomentella / Stachys pycnantha*
71.060.09 *Quercus agrifolia / grass*
71.060.14 *Quercus agrifolia / Heteromeles arbutifolia*
71.060.15 *Quercus agrifolia / Heteromeles arbutifolia - Toxicodendron diversilobum*
71.060.11 *Quercus agrifolia / Holodiscus discolor - Symphoricarpos albus*
71.060.37 *Quercus agrifolia / Quercus berberidifolia*
71.060.04 *Quercus agrifolia / Rubus spp. / Pteridium aquilinum*
71.060.38 *Quercus agrifolia / Salvia leucophylla - Artemisia californica*
71.060.17 *Quercus agrifolia / Symphoricarpos albus*
71.060.13 *Quercus agrifolia / Toxicodendron diversilobum*
71.060.25 *Quercus agrifolia / Toxicodendron diversilobum - (Corylus cornuta)*
71.060.12 *Quercus agrifolia / Toxicodendron diversilobum / grass*
71.060.39 *Quercus agrifolia / Toxicodendron diversilobum riparian*

71.050.00 ***Quercus chrysolepis* (Canyon live oak forest) Alliance** G5 S5 (some associations are of high priority for inventory)

71.050.31 *Pinus ponderosa - Quercus chrysolepis / Arctostaphylos viscida*
71.050.04 *Quercus chrysolepis*
71.050.01 *Quercus chrysolepis - Arbutus menziesii - Lithocarpus densiflorus var. densiflorus*
71.050.19 *Quercus chrysolepis - Calocedrus decurrens*
*71.050.03 *Quercus chrysolepis - Ceanothus integerrimus*
71.050.32 *Quercus chrysolepis - Pinus jeffreyi*
*71.050.02 *Quercus chrysolepis - Pinus lambertiana*
*71.050.18 *Quercus chrysolepis - Pinus ponderosa*
71.050.16 *Quercus chrysolepis - Pinus sabiniana*
*71.050.07 *Quercus chrysolepis - Quercus garryana var. garryana / Pentagramma triangularis*
*71.050.27 *Quercus chrysolepis - Quercus kelloggii - Acer macrophyllum*
71.050.26 *Quercus chrysolepis - Quercus kelloggii / (Toxicodendron diversilobum)*
*71.050.28 *Quercus chrysolepis - Quercus lobata / Vitis californica*
71.050.29 *Quercus chrysolepis - Quercus wislizeni*
71.050.13 *Quercus chrysolepis - Umbellularia californica*
*71.050.30 *Quercus chrysolepis - Umbellularia californica / Vitis californica*
71.050.09 *Quercus chrysolepis / Arctostaphylos mewukka*
71.050.15 *Quercus chrysolepis / Arctostaphylos patula*
71.050.14 *Quercus chrysolepis / Arctostaphylos viscida*
71.050.17 *Quercus chrysolepis / Dryopteris arguta*
71.050.25 *Quercus chrysolepis / Lithocarpus densiflorus var. echinoides*

71.050.08	*Quercus chrysolepis / Polystichum imbricans*	
71.050.33	*Querecus chrysolepis / Rhamnus ilicifolia*	
71.050.21	*Quercus chrysolepis / Toxicodendron diversilobum*	
71.020.00	***Quercus douglasii* (Blue oak woodland) Alliance**	G4 S4 (some associations are of high priority for inventory)
71.020.44	*Quercus douglasii - Aesculus californica / Asclepias fascicularis*	
71.020.24	*Quercus douglasii - Aesculus californicus / grass*	
71.020.02	*Quercus douglasii - Pinus sabiniana*	
71.020.04	*Quercus douglasii - Pinus sabiniana / Arctostaphylos viscida*	
71.020.03	*Quercus douglasii - Pinus sabiniana / Ceanothus cuneatus - Cercocapus montanus*	
71.020.25	*Quercus douglasii - Pinus sabiniana / Cercocarpus montanus*	
71.020.01	*Quercus douglasii - Quercus agrifolia*	
*71.020.11	*Quercus douglasii - Quercus lobata*	
71.020.06	*Quercus douglasii - Quercus wislizeni*	
71.020.18	*Quercus douglasii - Quercus wislizeni - Pinus sabiniana*	
71.020.17	*Quercus douglasii - Quercus wislizeni / Bromus spp. - Daucus pusillus*	
71.020.07	*Quercus douglasii - Quercus wislizeni / Ceanothus cuneatus*	
71.020.46	*Quercus douglasii - Quercus wislizeni / Lithophragma cymbalaria*	
71.020.42	*Quercus douglasii / Juniperus californica - Cercocarpus montanus*	
71.020.43	*Quercus douglasii / Achnatherum lemmonii*	
71.020.27	*Quercus douglasii / Amsinckia intermedia - Plagiobothrys nothofulvus*	
71.020.22	*Quercus douglasii / Arctostaphylos manzanita / herbaceous*	
71.020.28	*Quercus douglasii / Brachypodium distachyon*	
71.020.30	*Quercus douglasii / Bromus hordeaceus - Lolium multiflorum*	
71.020.29	*Quercus douglasii / Bromus hordeaceus - Madia gracilis*	
71.020.31	*Quercus douglasii / Bromus hordeaceus - Triteleia laxa*	
71.020.16	*Quercus douglasii / Bromus spp. - Daucus pusillus*	
71.020.12	*Quercus douglasii / Ceanothus cuneatus*	
*71.020.14	*Quercus douglasii / Cercocarpus montanus / Bowlesia incana - Lithophragma affine*	
71.020.32	*Quercus douglasii / Collinsia sparsiflora - Rigiopappus leptocladus*	
71.020.33	*Quercus douglasii / Delphinium parryi - Phacelia imbricata*	
71.020.08	*Quercus douglasii / Ericameria linearifolia*	
71.020.19	*Quercus douglasii / Ericameria linearifolia - Juniperus californica*	
71.020.34	*Quercus douglasii / Eriogonum elongatum / Lotus subpinnatus - Plantago erecta*	
71.020.20	*Quercus douglasii / Eriogonum fasciculatum / herbaceous*	
71.020.35	*Quercus douglasii / Erodium moschatum - Hordeum leporinum*	
71.020.36	*Quercus douglasii / Euphorbia spathulata - Pentagramma triangularis*	
71.020.37	*Quercus douglasii / Galium andrewsii - Lupinus concinnus*	
71.020.05	*Quercus douglasii / grass*	
71.020.38	*Quercus douglasii / Hordeum leporinum - Viola pedunculata*	
71.020.26	*Quercus douglasii / Juniperus californica*	
*71.020.23	*Quercus douglasii / Juniperus californica - Ceanothus cuneatus*	
71.020.41	*Quercus douglasii / Juniperus californica - Quercus john-tuckeri*	
71.020.40	*Quercus douglasii / Lotus subpinnatus - Nassella pulchra*	
71.020.39	*Quercus douglasii / Lupinus concinnus - Trifolium ciliolatum*	
71.020.15	*Quercus douglasii / Ribes californica / Bromus diandrus*	
*71.020.21	*Quercus douglasii / Selaginella hansenii - Navarretia pubescens*	
71.020.45	*Quercus douglasii / Toxicodendron diversilobum / grass*	
71.020.09	*Quercus douglasii / understory oak*	
*71.070.00	***Quercus engelmannii* (Engelmann oak woodland) Alliance**	G3 S3
*71.070.02	*Quercus engelmannii - Quercus agrifolia / Artemisia californica*	
*71.070.03	*Quercus engelmannii - Quercus agrifolia / chaparral (Adenostoma fasciculatum - Quercus berberidifolia - Rhamnus ilicifolia)*	
*71.070.04	*Quercus engelmannii - Quercus agrifolia / Toxicodendron diversilobum / annual grass*	
*71.070.05	*Quercus engelmannii / Adenostoma fasciculatum - Arctostaphylos glauca*	
*71.070.06	*Quercus engelmannii / annual grass - herb*	
*71.070.07	*Quercus engelmannii / Quercus berberidifolia*	
*71.070.08	*Quercus engelmannii / Salvia apiana / grass - herb*	
*71.070.09	*Quercus engelmannii / Toxicodendron diversilobum / grass*	

*71.030.00	***Quercus garryana* (Oregon white oak woodland) Alliance**	G4 S3
*71.030.03	*Quercus garryana - Pseudotsuga menziesii / Festuca californica*	
*71.030.01	*Quercus garryana - Quercus kelloggii / Arrhenatherum elatius*	
*71.030.15	*Quercus garryana - Quercus kelloggii / Dichelostemma ida-maia*	
*71.030.14	*Quercus garryana - Quercus kelloggii / Toxicodendron diversilobum*	
*71.030.02	*Quercus garryana var. garryana - Quercus garryana var. breweri / Festuca californica*	
*71.030.11	*Quercus garryana / Bromus carinatus*	
*71.030.06	*Quercus garryana / Cynosurus cristatus*	
*71.030.10	*Quercus garryana / Dactylis glomerata*	
*71.030.09	*Quercus garryana / Delphinium trolliifolium*	
*71.030.13	*Quercus garryana / Melica subulata*	
*71.030.08	*Quercus garryana / Philadelphus lewisii*	
*71.030.07	*Quercus garryana / Ribes roezlii*	
*71.030.05	*Quercus garryana / Symphoricarpos albus*	
*71.030.04	*Quercus garryana / Toxicodendron diversilobum*	
71.010.00	***Quercus kelloggii* (California black oak forest) Alliance**	G4 S4 (some associations are of high priority for inventory)
71.010.18	*Quercus kelloggii*	
71.010.22	*Quercus kelloggii - Arbutus menziesii - Quercus agrifolia*	
71.010.21	*Quercus kelloggii - Calocedrus decurrens*	
71.010.32	*Quercus kelloggii - Pinus coulteri*	
71.010.33	*Quercus kelloggii - Pinus coulteri / Arctostaphylos glandulosa*	
71.010.34	*Quercus kelloggii - Pinus coulteri / Arctostaphylos pringlei*	
71.010.26	*Quercus kelloggii - Pinus ponderosa*	
71.010.27	*Quercus kelloggii - Pinus ponderosa / Arctostaphylos viscida*	
71.010.28	*Quercus kelloggii - Pinus ponderosa / Ceanothus integerrimus*	
71.010.35	*Quercus kelloggii - Pinus sabiniana / Styrax officinalis - Toxicodendron diversilobum*	
*71.010.17	*Quercus kelloggii - Pseudotsuga menziesii*	
71.010.16	*Quercus kelloggii - Pseudotsuga menziesii - Acer macrophyllum*	
*71.010.29	*Quercus kelloggii - Pseudotsuga menziesii - Umbellularia californica*	
*71.010.02	*Quercus kelloggii - Quercus agrifolia - pine / Holodiscus discolor*	
71.010.12	*Quercus kelloggii - Quercus chrysolepis*	
71.010.01	*Quercus kelloggii - Quercus chrysolepis / Toxicodendron diversilobum*	
71.010.23	*Quercus kelloggii - Quercus chrysolepis / Toxicodendron diversilobum*	
*71.010.11	*Quercus kelloggii - Quercus lobata / grass*	
71.010.30	*Quercus kelloggii / annual grass - herb*	
71.010.20	*Quercus kelloggii / Arctostaphylos mewukka / Chamaebatia foliosa*	
71.010.06	*Quercus kelloggii / Arctostaphylos patula*	
71.010.24	*Quercus kelloggii / Arctostaphylos viscida*	
71.010.03	*Quercus kelloggii / Ceanothus integerrimus*	
71.010.04	*Quercus kelloggii / Ceanothus integerrimus - Toxicodendron diversilobum / Pteridium*	
71.010.31	*Quercus kelloggii / Heteromeles arbutifolia - Toxicodendron diversilobum*	
71.010.08	*Quercus kelloggii / Toxicodendron diversilobum*	
*71.010.10	*Quercus kelloggii / Toxicodendron diversilobum - Styrax officinalis / Triteleia laxa*	
71.010.25	*Quercus kelloggii / Toxicodendron diversilobum / grass*	
71.010.05	*Quercus kelloggii/ Triteleia spp.*	
*71.040.00	***Quercus lobata* (Valley oak woodland) Alliance**	G3 S3 (some associations are of high priority for inventory)
*71.040.15	*Quercus lobata - Acer negundo*	
*71.040.11	*Quercus lobata - Alnus rhombifolia*	
*71.040.16	*Quercus lobata - Fraxinus latifolia / Vitis californica*	
*71.040.06	*Quercus lobata - Quercus agrifolia / grass*	
*71.040.17	*Quercus lobata - Quercus agrifolia / Toxicodendron diversilobum*	
*71.040.18	*Quercus lobata - Quercus douglasii*	
*71.040.19	*Quercus lobata - Quercus kelloggii*	
*71.040.12	*Quercus lobata - Quercus wislizeni*	
*71.040.20	*Quercus lobata - Salix lasiolepis*	
*71.040.14	*Quercus lobata (Sacramento River)*	

*71.040.05 *Quercus lobata / grass*
*71.040.13 *Quercus lobata / herbaceous semi-riparian*
*71.040.09 *Quercus lobata / Rhus trilobata*
*71.040.10 *Quercus lobata / Rubus armeniacus*

*71.085.00 ***Quercus parvula var. shrevei* (Shreve oak forests) Provisional Alliance** G2 S2

*71.090.00 ***Quercus tomentella* (Island oak groves) Special Stands** G3 S3

71.080.00 ***Quercus wislizeni* (Interior live oak woodland) Alliance** G4 S4
71.080.14 *Quercus wislizeni - Aesculus californica*
71.080.37 *Quercus wislizeni - Aesculus californica / Toxicodendron diversilobum*
71.080.03 *Quercus wislizeni - Arbutus menziesii / Toxicodendron diversilobum*
*71.080.15 *Quercus wislizeni - Pinus ponderosa*
71.080.42 *Quercus wislizeni - Pinus sabiniana / annual grass - herb*
*71.080.02 *Quercus wislizeni - Pinus sabiniana / Arctostaphylos manzanita*
71.080.08 *Quercus wislizeni - Pinus sabiniana / Arctostaphylos viscida*
71.080.39 *Quercus wislizeni - Quercus chrysolepis - Pinus coulteri*
71.080.38 *Quercus wislizeni - Quercus chrysolepis tree*
71.080.43 *Quercus wislizeni - Quercus douglasii - Aesculus californica*
71.080.01 *Quercus wislizeni - Quercus douglasii - Pinus sabiniana / (grass)*
71.080.41 *Quercus wislizeni - Quercus douglasii - Pinus sabiniana / Toxicodendron diversilobum*
71.080.44 *Quercus wislizeni - Quercus douglasii / herbaceous*
71.080.46 *Quercus wislizeni - Quercus douglasii / Toxicodendron diversilobum*
71.080.45 *Quercus wislizeni - Quercus kelloggii*
71.080.47 *Quercus wislizeni - Quercus kelloggii / Heteromeles arbutifolia - Toxicodendron*
*71.080.13 *Quercus wislizeni - Salix laevigata / Frangula californica*
71.080.04 *Quercus wislizeni / Arctostaphylos viscida*
71.080.05 *Quercus wislizeni / Eriodictyon californicum*
71.080.40 *Quercus wislizeni / Heteromeles arbutifolia*
71.080.48 *Quercus wislizeni / Toxicodendron diversilobum*
71.080.16 *Quercus wislizeni / Toxicodendron diversilobum / Centaurea solstitialis*

*61.211.00 ***Salix gooddingii* (Black willow thickets) Alliance** G4 S3
*61.211.01 *Salix gooddingii*
*61.211.04 *Salix gooddingi - Populus fremontii*
*61.211.06 *Salix gooddingii - Quercus lobata / wetland herb*
*61.211.05 *Salix gooddingii - Salix laevigata*
*61.211.08 *Salix gooddingii - Salix lucida - Populus fremontii*
*61.211.02 *Salix gooddingii / Baccharis salicifolia*
*61.211.03 *Salix gooddingii / Lepidium latifolium*
*61.211.07 *Salix gooddingii / Rubus armeniacus*

*61.205.00 ***Salix laevigata* (Red willow thickets) Alliance** G3 S3
*61.205.01 *Salix laevigata*
*61.205.05 *Salix laevigata - Cornus sericea / Scirpus microcarpus*
*61.205.02 *Salix laevigata - Salix lasiolepis*
*61.205.03 *Salix laevigata - Salix lasiolepis / Artemisia douglasiana - Rubus ursinus*
*61.205.07 *Salix laevigata - Salix lasiolepis / Baccharis salicifolia*
*61.205.04 *Salix laevigata / Rosa californica*
*61.205.06 *Salix laevigata / Salix lasiolepis / Artemisia douglasiana*

*61.204.00 ***Salix lucida* (Shining willow groves) Alliance** G4 S3
*61.204.02 *Salix lucida / Poa pratensis*
*61.204.03 *Salix lucida ssp. lasiandra*
*61.204.04 *Salix lucida ssp. lasiandra / Cornus sericea*
*61.204.05 *Salix lucida ssp. lasiandra / Equisetum arvense*
*61.204.06 *Salix lucida ssp. lasiandra / Trifolium longipes*

79.200.00 ***Schinus (molle, terebinthifolius) - Myoporum laetum*** **(Pepper tree or Myoporum groves) Semi-natural Stands**

- 79.200.01 *Myoporum laetum / Arundo donax*
- 79.200.02 *Schinus molle*
- 79.200.03 *Schinus molle / Lepidospartum squamatum*

*86.100.00 ***Sequoia sempervirens*** **(Redwood forest) Alliance** G3 S3

- *86.100.04 *Sequoia sempervirens*
- *86.100.14 *Sequoia sempervirens - Acer macrophyllum - Umbellularia californica*
- *86.100.01 *Sequoia sempervirens - Acer macrophyllum / Polypodium californicum*
- *86.100.29 *Sequoia sempervirens - Alnus rubra / Rubus spectabilis*
- *86.100.15 *Sequoia sempervirens - Arbutus menziesii / Vaccinium ovatum*
- *86.100.18 *Sequoia sempervirens - Chrysolepis chrysophylla / Arctostaphylos glandulosa*
- *86.100.06 *Sequoia sempervirens - Lithocarpus densiflorus / Carex globosa - Iris douglasiana*
- *86.100.16 *Sequoia sempervirens - Lithocarpus densiflorus / Vaccinium ovatum*
- *86.100.23 *Sequoia sempervirens - Pseudotsuga menziesii - Lithocarpus densiflorus - Chamaecyparis lawsoniana / Vaccinium ovatum*
- *86.100.20 *Sequoia sempervirens - Pseudotsuga menziesii - Umbellularia californica*
- *86.100.10 *Sequoia sempervirens - Pseudotsuga menziesii / Arbutus menziesii*
- *86.100.11 *Sequoia sempervirens - Pseudotsuga menziesii / Gaultheria shallon*
- *86.100.26 *Sequoia sempervirens - Pseudotsuga menziesii / Rhododendron macrophyllum*
- *86.100.12 *Sequoia sempervirens - Pseudotsuga menziesii / Vaccinium ovatum*
- *86.100.28 *Sequoia sempervirens - Tsuga heterophylla / Polystichum munitum*
- *86.100.30 *Sequoia sempervirens - Tsuga heterophylla / Rubus spectabilis*
- *86.100.27 *Sequoia sempervirens - Tsuga heterophylla / Vaccinium ovatum*
- *86.100.21 *Sequoia sempervirens - Umbellularia californica*
- *86.100.02 *Sequoia sempervirens / (Pteridium aquilinum) - Woodwardia fimbriata*
- *86.100.09 *Sequoia sempervirens / Arbutus menziesii*
- *86.100.07 *Sequoia sempervirens / Blechnum spicant*
- *86.100.08 *Sequoia sempervirens / Mahonia nervosa*
- *86.100.05 *Sequoia sempervirens / Marah fabaceus - Vicia angustifolia*
- *86.100.13 *Sequoia sempervirens / Oxalis oregana*
- *86.100.25 *Sequoia sempervirens / Polystichum munitum*
- *86.100.24 *Sequoia sempervirens / Pteridium aquilinum*
- *86.100.03 *Sequoia sempervirens / Pteridium aquilinum - Trillium ovatum*

*86.200.00 ***Sequoiadendron giganteum*** **(Giant sequoia forest) Alliance** G3 S3

- *86.200.01 *Sequoiadendron giganteum - Pinus lambertiana / Cornus nuttallii*

*84.200.00 ***Tsuga heterophylla*** **(Western hemlock forest) Alliance** G5 S2

- *84.200.01 *Tsuga heterophylla - Pseudotsuga menziesii - Chamaecyparis lawsoniana*

84.100.00 ***Tsuga mertensiana*** **(Mountain hemlock forest) Alliance** G5 S4

- 84.100.04 *Tsuga mertensiana*
- 84.100.15 *Tsuga mertensiana - Pinus contorta ssp. murrayana*
- 84.100.11 *Tsuga mertensiana - Pinus contorta var. murrayana - Pinus monticola*
- 84.100.10 *Tsuga mertensiana - Pinus monticola*
- 84.100.09 *Tsuga mertensiana / Arnica cordifolia*
- 84.100.02 *Tsuga mertensiana / Juncus parryi*
- 84.100.01 *Tsuga mertensiana / Phyllodoce empetriformis*
- 84.100.08 *Tsuga mertensiana / Pyrola picta*
- 84.100.03 *Tsuga mertensiana / Quercus sadleriana*
- 84.100.07 *Tsuga mertensiana / Quercus vacciniifolia*
- 84.100.14 *Tsuga mertensiana / steep*

*74.100.00 ***Umbellularia californica*** **(California bay forest) Alliance** G4 S3

- *74.100.01 *Umbellularia californica*
- *74.100.10 *Umbellularia californica - Acer macrophyllum*
- *74.100.06 *Umbellularia californica - Aesculus californica / Holodiscus discolor*
- *74.100.16 *Umbellularia californica - Alnus rhombifolia*
- *74.100.03 *Umbellularia californica - Arbutus menziesii*

*74.100.11 *Umbellularia californica - Juglans californica / Ceanothus spinosus*
*74.100.12 *Umbellularia californica - Lithocarpus densiflorus*
*74.100.13 *Umbellularia californica - Platanus racemosa*
*74.100.17 *Umbellularia californica - Pseudotsuga menziesii / Rhododendron occidentale*
*74.100.15 *Umbellularia californica - Quercus agrifolia / (Genista monspessulana)*
*74.100.19 *Umbellularia californica - Quercus agrifolia / Heteromeles arbutifolia - Toxicodendron diversilobum / Melica torreyana*
*74.100.05 *Umbellularia californica - Quercus agrifolia / Toxicodendron diversilobum (Corylus cornuta)*
*74.100.20 *Umbellularia californica - Quercus chrysolepis*
*74.100.18 *Umbellularia californica - Quercus wislizeni*
*74.100.07 *Umbellularia californica / Ceanothus oliganthus*
*74.100.08 *Umbellularia californica / Polystichum munitum*
*74.100.09 *Umbellularia californica / Toxicodendron diversilobum*

*61.520.00 ***Washingtonia filifera* (California fan palm oasis) Alliance** G3 S3
*61.520.04 *Washingtonia filifera - Platanus racemosa / Salix spp*
*61.520.03 *Washingtonia filifera / spring (Atriplex - Baccharis - Pluchea)*

*33.170.00 ***Yucca brevifolia* (Joshua tree woodland) Alliance** G4 S3
*33.170.01 *Yucca brevifolia*
*33.170.20 *Yucca brevifolia / Ephedra nevadensis*
*33.170.18 *Yucca brevifolia / Yucca baccata / Pleuraphis jamesii*
*33.170.04 *Yucca brevifolia / Artemisia tridentata - Atriplex confertifolia*
*33.170.02 *Yucca brevifolia / Coleogyne ramosissima*
*33.170.06 *Yucca brevifolia / Cylindropuntia acanthocarpa*
*33.170.14 *Yucca brevifolia / Gutierrezia microcephala / Pleuraphis rigida*
*33.170.03 *Yucca brevifolia / Juniperus californica / Coleogyne ramosissima*
*33.170.19 *Yucca brevifolia / Juniperus californica / Ephedra nevadensis*
*33.170.10 *Yucca brevifolia / Larrea tridentata - Yucca schidigera*
*33.170.11 *Yucca brevifolia / Larrea tridentata - Ambrosia dumosa - Eriogonum fasciculatum*
*33.170.15 *Yucca brevifolia / Larrea tridentata - Pleuraphis rigida*
*33.170.08 *Yucca brevifolia / Lycium andersonii*
*33.170.07 *Yucca brevifolia / Pleuraphis (rigida, jamesii)*
*33.170.16 *Yucca brevifolia / Pleuraphis rigida*
*33.170.17 *Yucca brevifolia / Pleuraphis rigida - Muhlenbergia porteri*
*33.170.13 *Yucca brevifolia / Prunus fasciculata*
*33.170.09 *Yucca brevifolia / Salazaria mexicana*

Shrubland Alliances and Stands — Global & State Rank

33.040.00 ***Acacia greggii* (Catclaw acacia thorn scrub) Alliance** G5 S4 (some associations are of high priority for inventory)
*33.040.08 *Acacia greggii - Ambrosia eriocentra*
33.040.05 *Acacia greggii - Ambrosia salsola*
33.040.02 *Acacia greggii - annual herbs (Bromus rubens)*
33.040.10 *Acacia greggii - Bebbia juncea*
33.040.12 *Acacia greggii - Encelia virginensis*
33.040.13 *Acacia greggii - Eriogonum fasciculatum*
33.040.03 *Acacia greggii - Hyptis emoryi*
33.040.07 *Acacia greggii - Prunus fasciculata*
33.040.09 *Acacia greggii - Salvia dorrii*
33.040.06 *Acacia greggii - Viguiera parishii*
*33.040.11 *Acacia greggii / Eriogonum nudum var. pauciflorum*
33.040.01 *Acacia greggii wash (Justicia californica)*

*61.430.00 ***Acer glabrum* (Rocky Mountain maple thickets) Provisional Alliance** G5 S3?

37.101.00	***Adenostoma fasciculatum* (Chamise chaparral) Alliance**	G5 S5 (some associations are of high priority for inventory)
37.101.16	*Adenostoma fasciculatum*	
37.101.07	*Adenostoma fasciculatum - (Arctostaphylos glandulosa)*	
*37.101.19	*Adenostoma fasciculatum - (Arctostaphylos manzanita)*	
37.101.26	*Adenostoma fasciculatum - (Arctostaphylos pungens)*	
37.101.27	*Adenostoma fasciculatum - (Arctostaphylos viscida)*	
37.101.08	*Adenostoma fasciculatum - (Ceanothus crassifolius)*	
37.101.10	*Adenostoma fasciculatum - (Ceanothus cuneatus)*	
*37.101.06	*Adenostoma fasciculatum - (Ceanothus greggii / mafic)*	
37.101.11	*Adenostoma fasciculatum - (Ceanothus tomentosus)*	
37.101.32	*Adenostoma fasciculatum - Arctostaphylos glandulosa - Ceanothus jepsonii / Calamagrostis ophitidis*	
37.101.22	*Adenostoma fasciculatum - Arctostaphylos pringlei*	
*37.101.12	*Adenostoma fasciculatum - Diplacus aurantiacus*	
37.101.31	*Adenostoma fasciculatum - Eriodictyon californicum (Lotus scoparius)*	
37.101.14	*Adenostoma fasciculatum - Eriogonum fasciculatum*	
37.103.03	*Adenostoma fasciculatum - Eriogonum fasciculatum - Salvia apiana*	
37.101.04	*Adenostoma fasciculatum - Hesperoyucca whipplei*	
37.101.28	*Adenostoma fasciculatum - Heteromeles arbutifolia / Melica torreyana*	
37.101.21	*Adenostoma fasciculatum - Malosma laurina*	
37.101.33	*Adenostoma fasciculatum - Malosma laurina - Eriodictyon crassifolium*	
37.101.24	*Adenostoma fasciculatum / annual grass - forb*	
37.101.29	*Adenostoma fasciculatum / Castilleja pruinosa*	
37.101.25	*Adenostoma fasciculatum / mixed herb - moss*	
37.101.30	*Adenostoma fasciculatum / Selaginella bigelovii*	
37.101.17	*Adenostoma fasciculatum disturbance*	
*37.101.15	*Adenostoma fasciculatum serpentine*	
*37.103.00	***Adenostoma fasciculatum - Salvia apiana* (Chamise - white sage chaparral) Alliance**	G3 S3
*37.103.01	*Adenostoma fasciculatum - Salvia apiana*	
*37.103.02	*Adenostoma fasciculatum - Salvia apiana - Artemisia californica*	
*37.101.23	*Adenostoma fasciculatum - Salvia leucophylla*	
37.102.00	***Adenostoma fasciculatum - Salvia mellifera* (Chamise - black sage chaparral) Alliance**	G5 S5 (some associations are of high priority for inventory)
37.102.04	*Adenostoma fasciculatum - Salvia mellifera - Artemisia californica*	
37.102.05	*Adenostoma fasciculatum - Salvia mellifera - Ceanothus crassifolius*	
37.102.06	*Adenostoma fasciculatum - Salvia mellifera - Malosma laurina*	
37.102.07	*Adenostoma fasciculatum - Salvia mellifera - Rhus ovata*	
37.102.02	*Adenostoma fasciculatum - Salvia mellifera / (herbaceous)*	
*37.102.03	*Adenostoma fasciculatum - Salvia mellifera / mixed shrub*	
*37.109.00	***Adenostoma fasciculatum - Xylococcus bicolor* (Chamise-mission manzanita chaparral) Alliance**	G4 S3
*37.109.01	*Adenostoma fasciculatum - Xylococcus bicolor*	
*37.109.05	*Adenostoma fasciculatum - Xylococcus bicolor - Ceanothus crassifolius*	
*37.109.14	*Adenostoma fasciculatum - Xylococcus bicolor - Ceanothus crassifolius - Malosma laurina*	
*37.109.02	*Adenostoma fasciculatum - Xylococcus bicolor - Ceanothus tomentosus*	
*37.109.08	*Adenostoma fasciculatum - Xylococcus bicolor - Ceanothus verrucosus*	
*37.109.09	*Adenostoma fasciculatum - Xylococcus bicolor - Cneoridium dumosum*	
*37.109.10	*Adenostoma fasciculatum - Xylococcus bicolor - Eriogonum fasciculatum*	
*37.109.12	*Adenostoma fasciculatum - Xylococcus bicolor - Quercus berberidifolia*	
*37.109.11	*Adenostoma fasciculatum - Xylococcus bicolor - Rhus integrifolia*	
*37.109.13	*Adenostoma fasciculatum - Xylococcus bicolor - Salvia mellifera - Malosma laurina*	
37.501.00	***Adenostoma sparsifolium* (Redshank chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
*37.501.01	*Adenostoma sparsifolium*	
37.503.05	*Adenostoma sparsifolium - Adenostoma fasciculatum - Arctostaphylos glauca*	
*37.503.03	*Adenostoma sparsifolium - Adenostoma fasciculatum - Arctostaphylos pungens*	
37.503.04	*Adenostoma sparsifolium - Adenostoma fasciculatum - Ceanothus crassifolius*	

*37.503.02	*Adenostoma sparsifolium - Adenostoma fasciculatum - Ceanothus greggii*	
*37.503.01	*Adenostoma sparsifolium - Adenostoma fasciculatum - Cercocarpus montanus*	
37.503.06	*Adenostoma sparsifolium - Adenostoma fasciculatum - Opuntia parryi*	
37.501.02	*Adenostoma sparsifolium - Artemisia tridentata*	
37.501.03	*Adenostoma sparsifolium - Ceanothus crassifolius*	
37.501.04	*Adenostoma sparsifolium - Ceanothus cuneatus*	
37.502.01	*Adenostoma sparsifolium - Cercocarpus montanus*	
37.501.06	*Adenostoma sparsifolium - Ericameria linearifolia - Eriogonum fasciculatum - Opuntia basilaris*	
37.501.07	*Adenostoma sparsifolium - Eriogonum fasciculatum - Lotus scoparius*	
*33.075.00	***Agave deserti* (Desert agave scrub) Alliance**	G3 S3
*33.075.01	*Agave deserti - Ambroia salsola (wash and terrace)*	
*33.075.02	*Agave deserti - Yucca schidigera*	
*36.120.00	***Allenrolfea occidentalis* (Iodine bush scrub) Alliance**	G4 S3
*36.120.04	*Allenrolfea occidentalis*	
*36.120.03	*Allenrolfea occidentalis - Sporobolus airoides*	
*36.120.02	*Allenrolfea occidentalis - Suaeda moquinii*	
*63.210.00	***Alnus incana* (Mountain alder thicket) Alliance**	G4 S3
*63.210.01	*Alnus incana*	
*63.210.02	*Alnus incana / Glyceria elata*	
*63.210.03	*Alnus incana / bench*	
*63.220.00	***Alnus viridis* (Sitka alder thickets) Provisional Alliance**	G5 S3?
33.060.00	***Ambrosia dumosa* (White bursage scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
*33.060.02	*Ambrosia dumosa*	
*33.060.01	*Ambrosia dumosa - Acamptopappus sphaerocephalus*	
33.060.03	*Ambrosia dumosa - Atriplex hymenolytra*	
33.060.06	*Ambrosia dumosa - Encelia farinosa*	
33.060.07	*Ambrosia dumosa - Ephedra californica / sandy*	
33.060.09	*Ambrosia dumosa - Olneya tesota - Calliandra eriophylla*	
*33.060.04	*Ambrosia dumosa / Pleuraphis rigida*	
33.200.00	***Ambrosia salsola* (Cheesebush scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
33.200.01	*Ambrosia salsola*	
*33.200.06	*Ambrosia salsola - Ambrosia eriocentra*	
33.200.04	*Ambrosia salsola - Atriplex confertifolia*	
33.200.05	*Ambrosia salsola - Bebbia juncea*	
33.200.07	*Ambrosia salsola - Brickellia incana*	
33.200.02	*Ambrosia salsola - Eriogonum fasciculatum*	
33.200.10	*Ambrosia salsola - Larrea tridentata*	
33.200.09	*Ambrosia salsola - Psorothamnus schottii*	
33.200.08	*Ambrosia salsola - Senna armata*	
33.200.11	*Ambrosia salsola -Petalonyx thurberi*	
*37.308.00	***Arctostaphylos (crustacea, tomentosa)* (Brittle leaf-Woolly leaf manzanita chaparral)**	G2 S2
*37.306.00	***Arctostaphylos (nummularia, sensitiva)* (Glossy leaf manzanita chaparral) Alliance**	G2 S2
*37.322.00	***Arctostaphylos (purissima, rudis)* (Burton Mesa chaparral) Provisional Alliance**	G1 S1
*37.317.00	***Arctostaphylos bakeri* (Stands of Baker manzanita) Special Stands**	G1 S1

*37.311.00 ***Arctostaphylos canescens*** **(Hoary manzanita chaparral) Provisional Alliance** G3? S3?

*37.311.01 *Arctostaphylos canescens - Arctostaphylos glandulosa - Adenostoma fasciculatum*
*37.308.03 *Arctostaphylos crustacea*
*37.308.04 *Arctostaphylos crustacea - Adenostoma fasciculatum - Ceanothus (cuneatus, papillosus)*
*37.308.05 *Arctostaphylos crustacea - Arctostaphylos gabilanensis*

37.302.00 ***Arctostaphylos glandulosa*** **(Eastwood manzanita chaparral) Alliance** G4 S4 (some associations are of high priority for inventory)

37.302.01 *Arctostaphylos glandulosa*
37.106.13 *Arctostaphylos glandulosa - Adenostoma fasciculatum*
37.106.12 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Arctostaphylos glauca*
37.106.04 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Ceanothus crassifolius*
37.106.07 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Ceanothus cuneatus*
37.106.02 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Ceanothus leucodermis*
37.106.01 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Cercocarpus montanus*
37.106.11 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Quercus berberidifolia*
37.106.10 *Arctostaphylos glandulosa - Adenostoma fasciculatum - Quercus wislizeni*
*37.106.05 *Arctostaphylos glandulosa - Adenostoma fasciculatum / mafic soils*
37.106.03 *Arctostaphylos glandulosa - Adenostoma fasciculatum -Ceanothus greggii*
*37.302.07 *Arctostaphylos glandulosa - Arctostaphylos pringlei*
37.302.03 *Arctostaphylos glandulosa - Cercocarpus montanus*
37.302.04 *Arctostaphylos glandulosa - Quercus wislizeni*
*37.302.02 *Arctostaphylos glandulosa ssp. adamsii*

37.301.00 ***Arctostaphylos glauca*** **(Bigberry manzanita chaparral) Alliance** G4 S4 (some associations are of high priority for inventory)

37.301.01 *Arctostaphylos glauca*
37.104.01 *Arctostaphylos glauca - Adenostoma fasciculatum*
37.104.05 *Arctostaphylos glauca - Adenostoma fasciculatum - Ceanothus crassifolius*
37.104.07 *Arctostaphylos glauca - Adenostoma fasciculatum - Ceanothus cuneatus*
37.104.04 *Arctostaphylos glauca - Adenostoma fasciculatum - Ceanothus greggii*
37.104.02 *Arctostaphylos glauca - Adenostoma fasciculatum - Ceanothus leucodermis*
37.104.08 *Arctostaphylos glauca - Adenostoma fasciculatum - Diplacus aurantiacus*
37.104.03 *Arctostaphylos glauca - Adenostoma fasciculatum - Hesperoyucca whipplei*
37.104.06 *Arctostaphylos glauca - Adenostoma fasciculatum - Quercus berberidifolia*
37.104.09 *Arctostaphylos glauca - Adenostoma fasciculatum - Rhus ovata*
37.104.10 *Arctostaphylos glauca - Adenostoma fasciculatum - Salvia mellifera*
37.104.11 *Arctostaphylos glauca - Adenostoma fasciculatum on serpentine*
37.301.03 *Arctostaphylos glauca - Artemisia californica - Salvia mellifera*
37.301.05 *Arctostaphylos glauca - Cercocarpus montanus*
*37.301.04 *Arctostaphylos glauca - Quercus durata / Pinus sabiniana*
*37.301.02 *Arctostaphylos glauca / Melica torreyana*

*37.321.00 ***Arctostaphylos hookeri*** **(Hooker's manzanita chaparral) Provisional Alliance** G2 S2

*37.312.00 ***Arctostaphylos hooveri*** **(Hoover's manzanita chaparral) Alliance** G2 S2
*37.312.01 *Arctostaphylos hooveri*

*37.313.00 ***Arctostaphylos manzanita*** **(Spiny menodora scrub) Provisional Alliance** G3? S3?

*37.307.00 ***Arctostaphylos montana*** **(Mount Tamalpais manzanita chaparral) Alliance** G2 S2
*37.307.01 *Arctostaphylos montana*
*37.307.02 *Arctostaphylos montana - Adenostoma fasciculatum*

*37.314.00 ***Arctostaphylos montereyensis*** **(Monterey manzanita chaparral) Provisional Alliance** G1 S1

*37.315.00 ***Arctostaphylos morroensis*** **(Morro manzanita chaparral) Alliance** G1 S1

*37.304.00 ***Arctostaphylos myrtifolia*** **(Ione manzanita chaparral) Alliance** G1 S1
*37.304.01 *Arctostaphylos myrtifolia*

*37.316.00	***Arctostaphylos pajaroensis* (Pajaro manzanita chaparral) Alliance**	G1 S1
*37.316.01	*Arctostaphylos pajaroensis*	
37.303.00	***Arctostaphylos patula* (Green leaf manzanita chaparral) Alliance**	G5 S4
37.303.01	*Arctostaphylos patula*	
37.303.02	*Arctostaphylos patula - Quercus vacciniifolia*	
*37.310.00	***Arctostaphylos pringlei ssp. drupacea* (Pink-bract manzanita chaparral) Alliance**	G3 S3
*37.310.02	*Arctostaphylos pringlei ssp. drupacea*	
*37.310.01	*Arctostaphylos pringlei ssp. drupacea - Arctostaphylos pungens*	
*37.318.00	***Arctostaphylos pumila* (Sandmat manzanita chaparral) Provisional Alliance**	G1 S1
*37.306.01	*Arctostaphylos sensitiva - Vaccinium ovatum - Chrysolepis chrysophylla var. minor*	
*37.306.02	*Arctostaphylos sensitiva - Arctostaphylos glandulosa*	
*37.320.00	***Arctostaphylos silvicola* (Silverleaf manzanita chaparral) Provisional Alliance**	G1 S1
*37.319.00	***Arctostaphylos stanfordiana* (Stanford manzanita chaparral) Provisional Alliance**	G3 S3?
37.305.00	***Arctostaphylos viscida* (White leaf manzanita chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
37.305.01	*Arctostaphylos viscida*	
37.305.05	*Arctostaphylos viscida - Heteromeles arbutifolia - Toxicodendron diversilobum*	
37.305.07	*Arctostaphylos viscida - Quercus wislizeni*	
*37.305.03	*Arctostaphylos viscida / Salvia sonomensis*	
37.305.06	*Arctostaphylos viscida ssp. pulchella*	
37.305.02	*Arctostaphylos viscida - Adenostoma fasciculatum*	
*37.305.04	*(Arctostaphylos viscida - Adenostoma fasciculatum) / Salvia sonomensis*	
35.120.00	***Artemisia arbuscula ssp. arbuscula* (Little sagebrush scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
35.120.07	*Artemisia arbuscula*	
*35.120.05	*Artemisia arbuscula - Eriogonum microthecum*	
35.120.06	*Artemisia arbuscula / Carex exserta*	
35.120.08	*Artemisia arbuscula / Castilleja applegatei*	
35.120.09	*Artemisia arbuscula / Castilleja schizotrichia*	
35.120.10	*Artemisia arbuscula / Eriogonum nudum - Monardella odoratissima*	
*35.120.03	*Artemisia arbuscula / Festuca idahoensis*	
35.120.04	*Artemisia arbuscula / Leptodactylon pungens*	
35.120.02	*Artemisia arbuscula / Stenotus acaulis - Geum canescens*	
35.120.11	*Artemisia arbuscula / Stenotus acaulis - Linanthus pungens*	
35.120.12	*Artemisia arbuscula / Stenotus acaulis - Tetradymia canescens*	
*35.120.01	*Artemisia arbuscula / Trifolium andersonii ssp. monoense*	
35.121.00	***Artemisia arbuscula ssp. longicaulis* (Lahontan sagebrush scrub) Provisional Alliance**	G5 S4?
32.010.00	***Artemisia californica* (California sagebrush scrub) Alliance**	G5 S5
32.010.01	*Artemisia californica*	
45.455.02	*Artemisia californica - Malosma laurina*	
32.010.15	*Artemisia californica - Baccharis pilularis / Leymus condensatus*	
32.010.08	*Artemisia californica - Ceanothus ferrisiae*	
32.010.11	*Artemisia californica - Diplacus aurantiacus*	
32.010.07	*Artemisia californica - Eriogonum cinereum*	
32.010.03	*Artemisia californica - Keckiella cordifolia*	
32.010.09	*Artemisia californica - Lepidospartum squamatum*	
32.010.02	*Artemisia californica - Lotus scoparius*	
32.010.10	*Artemisia californica - Malosma laurina*	
32.010.04	*Artemisia californica - Salvia leucophylla*	

32.110.00 ***Artemisia californica - Eriogonum fasciculatum*** **(California sagebrush - California buckwheat scrub) Alliance** G4 S4

- 32.110.05 *Artemisia californica - Eriogonum fasciculatum*
- 32.110.07 *Artemisia californica - Eriogonum fasciculatum - Ephedra californica*
- 32.110.06 *Artemisia californica - Eriogonum fasciculatum - Malosma laurina*
- 32.110.01 *Artemisia californica - Eriogonum fasciculatum - Rhus ovata*
- 32.110.02 *Artemisia californica - Eriogonum fasciculatum - Salvia apiana*
- 32.110.03 *Artemisia californica - Eriogonum fasciculatum - Salvia leucophylla*
- 32.110.04 *Artemisia californica - Eriogonum fasciculatum - Salvia mellifera*

32.120.00 ***Artemisia californica - Salvia mellifera*** **(California sagebrush - black sage scrub) Alliance** G4 S4

- 32.120.01 *Artemisia californica - Salvia mellifera*
- 32.120.03 *Artemisia californica - Salvia mellifera - Baccharis sarothroides*
- 32.010.12 *Artemisia californica / Amsinckia menziesii*
- 32.010.13 *Artemisia californica / Eschscholzia californica*
- 32.010.14 *Artemisia californica / Leymus condensatus*

*35.150.00 ***Artemisia cana*** **(Silver sagebrush scrub) Alliance** G5 S3

- *35.150.06 *Artemisia cana - Muhlenbergia richardsonis*
- *35.150.01 *Artemisia cana / cold*
- *35.150.02 *Artemisia cana / dry graminoid*
- *35.150.05 *Artemisia cana / Iris missouriensis - Juncus arcticus var. balticus*
- *35.150.04 *Artemisia cana / Juncus arcticus var. balticus*
- *35.150.07 *Artemisia cana / mesic (Poa secunda - Poa cusickii)*
- *35.150.03 *Artemisia cana / warm*

*35.130.00 ***Artemisia nova*** **(Black sagebrush scrub) Alliance** G4 S3

- *35.130.01 *Artemisia nova*
- *35.130.03 *Artemisia nova - Ambrosia salsola*
- *35.130.02 *Artemisia nova - Echinocereus engelmannii*

*35.140.00 ***Artemisia rothrockii*** **(Rothrock's sagebrush) Alliance** G3 S3

- *35.140.02 *Artemisia rothrockii / Monardella odoratissima*
- *35.140.01 *Artemisia rothrockii / Penstemon heterodoxus*

35.110.00 ***Artemisia tridentata*** **(Big sagebrush) Alliance** G5 S5

- 35.110.02 *Artemisia tridentata*
- 35.110.11 *Artemisia tridentata - Artemisia nova*
- 35.110.12 *Artemisia tridentata - Chrysothamnus viscidiflorus*
- 35.110.05 *Artemisia tridentata - Coleogyne ramosissima*
- 35.110.06 *Artemisia tridentata - Encelia virginensis*
- 35.110.13 *Artemisia tridentata - Ephedra nevadensis*
- 35.110.01 *Artemisia tridentata - Ericameria nauseosa*
- 35.110.14 *Artemisia tridentata - Ericameria teretifolia*
- 35.110.09 *Artemisia tridentata - Eriogonum fasciculatum*
- 35.110.10 *Artemisia tridentata - Eriogonum wrightii*
- 35.110.07 *Artemisia tridentata - Purshia tridentata*
- 35.110.15 *Artemisia tridentata - Purshia tridentata / Hesperostipa comata*
- 35.110.04 *Artemisia tridentata - Symphoricarpos longiflorus*

35.111.00 ***Artemisia tridentata ssp. vaseyana*** **(Mountain big sagebrush) Alliance** G5 S5

- 35.111.02 *Artemisia tridentata ssp. vaseyana*
- 35.111.03 *Artemisia tridentata ssp. vaseyana - Purshia tridentata / Festuca idahoensis*
- 35.111.01 *Artemisia tridentata ssp. vaseyana / Carex exserta*
- 35.111.04 *Artemisia tridentata ssp. vaseyana / Monardella odoratissima*

36.310.00 ***Atriplex canescens*** **(Fourwing saltbush scrub) Alliance** G5 S4

- 36.310.01 *Atriplex canescens*
- 36.310.02 *Atriplex canescens - Krascheninnikovia lanata*

36.320.00 ***Atriplex confertifolia*** **(Shadscale scrub) Alliance** G5 S4

36.320.10 *Atriplex confertifolia*
36.320.09 *Atriplex confertifolia - Grayia spinosa - Encelia virginensis var. actoni*
36.320.03 *Atriplex confertifolia - Ambrosia dumosa*
36.320.06 *Atriplex confertifolia - Atriplex canescens*
36.320.04 *Atriplex confertifolia - Coleogyne ramosissima*
36.320.02 *Atriplex confertifolia - Ephedra nevadensis*
36.320.05 *Atriplex confertifolia - Gutierrezia microcephala - Tetradymia axillaris*
36.320.08 *Atriplex confertifolia - Krascheninnikovia lanata*
36.320.07 *Atriplex confertifolia - Lycium andersonii*
36.320.11 *Atriplex confertifolia / cryptogramic crust*

36.330.00 ***Atriplex hymenelytra*** **(Desert holly scrub) Alliance** G5 S4

36.330.01 *Atriplex hymenelytra*
36.330.02 *Atriplex hymenelytra - Ambrosia dumosa*
36.330.06 *Atriplex hymenelytra - Encelia farinosa*
36.330.03 *Atriplex hymenelytra - Larrea tridentata - Ambrosia dumosa*
36.330.04 *Atriplex hymenelytra - Tidestromea oblongifolia*
36.330.05 *Atriplex hymenelytra / rock*

36.370.00 ***Atriplex lentiformis*** **(Quailbush scrub) Alliance** G4 S4

36.370.01 *Atriplex lentiformis*

36.340.00 ***Atriplex polycarpa*** **(Allscale scrub) Alliance** G5 S4

36.340.04 *Atriplex polycarpa*
36.340.01 *Atriplex polycarpa - Atriplex confertifolia*
36.340.05 *Atriplex polycarpa sparse playa*

*36.350.00 ***Atriplex spinifera*** **(Spinescale scrub) Alliance** G3 S3

*36.350.01 *Atriplex spinifera*
*36.350.03 *Atriplex spinifera - Picrothamnus desertorum*
*36.350.02 *Atriplex spinifera / annual herb*

*63.520.00 ***Baccharis emoryi*** **(Emory's baccharis thickets) Provisional Alliance** G3 S2?

32.060.00 ***Baccharis pilularis*** **(Coyote brush scrub) Alliance** G5 S5 (some associations are of high priority for inventory)

32.060.23 *Baccharis pilularis*
32.060.06 *Baccharis pilularis - Lupinus arboreus*
32.060.05 *Baccharis pilularis - Artemisia californica*
32.060.19 *Baccharis pilularis - Artemisia californica - Heteromeles arbutifolia*
32.060.18 *Baccharis pilularis - Artemisia californica - Toxicodendron / Monardella villosa*
32.060.14 *Baccharis pilularis - Ceanothus thyrsiflorus*
32.060.25 *Baccharis pilularis - Corylus cornuta*
32.060.16 *Baccharis pilularis - Frangula californica - Rubus parviflorus*
*32.060.12 *Baccharis pilularis - Holodiscus discolor*
32.060.29 *Baccharis pilularis - Lotus scoparius*
32.060.26 *Baccharis pilularis - Prunus ilicifolia*
32.060.15 *Baccharis pilularis - Rubus ursinus / weedy herb*
32.060.27 *Baccharis pilularis - Salvia mellifera*
32.060.17 *Baccharis pilularis - Toxicodendron diversilobum*
32.060.07 *Baccharis pilularis / Ammophila arenaria*
32.060.20 *Baccharis pilularis / Annual Grass - Herb*
*32.060.13 *Baccharis pilularis / Carex obnupta - Juncus patens*
*32.060.11 *Baccharis pilularis / Danthonia californica*
*32.060.02 *Baccharis pilularis / Deschampsia caespitosa*
32.060.24 *Baccharis pilularis / Dudleya farinosa*
*32.060.01 *Baccharis pilularis / Eriophyllum staechadifolium*
*32.060.03 *Baccharis pilularis / Leymus triticoides*
*32.060.10 *Baccharis pilularis / Nassella pulchra*
32.060.21 *Baccharis pilularis / Native Grass (Mixed)*

*32.060.04 *Baccharis pilularis / Polystichum munitum*
32.060.08 *Baccharis pilularis / Scrophularia californica*
32.060.28 *Gaultheria shallon - Baccharis pilularis - Ceanothus thyrsiflorus*

63.510.00 ***Baccharis salicifolia* (Mulefat thickets) Alliance** G5 S4
63.510.01 *Baccharis salicifolia*
63.510.05 *Baccharis salicifolia - Arundo donax*
63.510.02 *Baccharis salicifolia - Lepidospartum squamatum - Hazardia squarrosa*
63.510.06 *Baccharis salicifolia - Pluchea sericea*
63.510.03 *Baccharis salicifolia - Sambucus mexicana*
63.510.07 *Baccharis salicifolia - Tamarix ramosissima*
63.510.04 *Baccharis salicifolia / Stachys albens*

*63.530.00 ***Baccharis sergiloides* (Broom baccharis thickets) Alliance** G4 S3
*63.530.01 *Baccharis sergiloides - Prunus fasciculata*
*63.530.02 *Baccharis sergiloides - Prunus fasciculata - Rhus trilobata*
*63.530.03 *Baccharis sergiloides / Muhlenbergia rigens*

*63.620.00 ***Betula glandulosa* (Resin birch thickets) Provisional Alliance** G5 S2?

*63.610.00 ***Betula occidentalis* (Water birch thicket) Alliance** G4 S2
*63.610.01 *Betula occidentalis / Salix spp.*

32.180.00 ***Broom (Cytisus scoparius and Others)* (Broom patches) Semi-natural Stands**
32.180.01 *Genista monspessulana*
*32.180.02 *Spartium junceum*

*91.126.00 ***Cassiope mertensiana* (White mountain heather heath) Provisional Alliance** G5 S3?

*33.110.00 ***Castela emoryi* (Crucifixion thorn stands) Special Stands** G2 S1

37.209.00 ***Ceanothus cordulatus* (Mountain white thorn chaparral) Alliance** G4 S4
37.209.01 *Ceanothus cordulatus*

37.208.00 ***Ceanothus crassifolius* (Hoary leaf ceanothus chaparral) Alliance** G4 S4
37.208.01 *Ceanothus crassifolius*
37.208.02 *Ceanothus crassifolius - Adenostoma fasciculatum*
37.208.04 *Ceanothus crassifolius - Adenostoma fasciculatum - Rhus ovata*
37.208.05 *Ceanothus crassifolius - Adenostoma fasciculatum - Salvia mellifera*
37.208.03 *Ceanothus crassifolius - Adenostoma fasciculatum - Malosma Laurina*
37.208.06 *Ceanothus crassifolius - Adenostoma fasciculatum - Xylococcus bicolor*
37.208.07 *Ceanothus crassifolius - Cercocarpus montanus*
37.208.08 *Ceanothus crassifolius - Malosma laurina*

37.211.00 ***Ceanothus cuneatus* (Wedge leaf ceanothus chaparral, Buck brush chaparral) Alliance** G4 S4

37.211.01 *Ceanothus cuneatus*
37.211.06 *Ceanothus cuneatus - Adenostoma fasciculatum*
37.211.10 *Ceanothus cuneatus - Adenostoma fasciculatum - Salvia mellifera - Malosma laurina*
37.211.08 *Ceanothus cuneatus - Eriodictyon californicum - (Fremontodendron californicum)*
37.211.09 *Ceanothus cuneatus - Frangula californica - Arctostaphylos pungens*
37.211.02 *Ceanothus cuneatus / Calocedrus decurrens*
37.211.03 *Ceanothus cuneatus / Elymus elymoides*
37.211.11 *Ceanothus cuneatus / Eriophyllum lanatum*
*37.211.05 *Ceanothus cuneatus / Plantago erecta*

*37.212.00 ***Ceanothus greggii* (Cup leaf ceanothus chaparral) Alliance** G4 S3
*37.212.01 *Ceanothus greggii*
*37.212.03 *Ceanothus greggii - Adenostoma fasciculatum*

37.206.00	***Ceanothus integerrimus* (Deer brush chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
37.206.01	*Ceanothus integerrimus*	
37.206.04	*Ceanothus integerrimus - Arctostaphylos viscida*	
*37.206.05	*Ceanothus integerrimus - Quercus garryana var. fruticosa*	
37.206.03	*Ceanothus integerrimus / Lithocarpus densiflorus - Arbutus menziesii*	
37.206.02	*Ceanothus integerrimus / Quercus chrysolepis / Elymus glaucus*	
37.205.00	***Ceanothus leucodermis* (Chaparral white thorn chaparral) Alliance**	G4 S4
37.205.01	*Ceanothus leucodermis*	
37.205.02	*Ceanothus leucodermis / Toxicodendron diversilobum*	
37.201.00	***Ceanothus megacarpus* (Big pod ceanothus chaparral) Alliance**	G4 S4
37.201.01	*Ceanothus megacarpus*	
37.201.02	*Ceanothus megacarpus - Adenostoma fasciculatum*	
37.201.04	*Ceanothus megacarpus - Adenostoma sparsifolium*	
37.201.05	*Ceanothus megacarpus - Cercocarpus montanus*	
37.201.06	*Ceanothus megacarpus - Malosma laurina*	
37.201.09	*Ceanothus megacarpus - Prunus ilicifolia*	
37.203.01	*Ceanothus megacarpus - Rhamnus ilicifolia*	
37.201.08	*Ceanothus megacarpus - Salvia mellifera*	
*37.207.00	***Ceanothus oliganthus* (Hairy leaf ceanothus chaparral) Alliance**	G3 S3
*37.207.01	*Ceanothus oliganthus*	
*37.207.02	*Ceanothus oliganthus - Adenostoma fasciculatum*	
*37.207.03	*Ceanothus oliganthus - Adenostoma fasciculatum - Xylococcus bicolor*	
*37.207.04	*Ceanothus oliganthus - Adenostoma sparsifolium*	
*37.207.05	*Ceanothus oliganthus - Arctostaphylos glandulosa*	
*37.207.06	*Ceanothus oliganthus - Eriodictyon crassifolium*	
*37.207.07	*Ceanothus oliganthus - Heteromeles arbutifolia - Rhus ovata*	
*37.207.08	*Ceanothus oliganthus - Quercus berberidifolia*	
*37.215.00	***Ceanothus papillosus* (Wart leaf ceanothus chaparral) Alliance**	G3 S3
*37.215.01	*Ceanothus papillosus - Adenostoma fasciculata*	
37.214.00	***Ceanothus spinosus* (Greenbark ceanothus chaparral) Alliance**	G4 S4
37.214.01	*Ceanothus spinosus*	
37.214.02	*Ceanothus spinosus - Ceanothus megacarpus*	
37.204.00	***Ceanothus thyrsiflorus* (Blue blossom chaparral) Alliance**	G4 S4
37.204.01	*Ceanothus thyrsiflorus - Baccharis pilularis - Toxicodendron diversilobum*	
37.204.02	*Ceanothus thyrsiflorus - Rubus ursinus*	
37.204.03	*Ceanothus thyrsiflorus - Vaccinium ovatum - Rubus parviflorus*	
37.210.00	***Ceanothus velutinus* (Tobacco brush or snow bush chaparral) Alliance**	G5 S4
37.210.01	*Ceanothus velutinus*	
37.210.02	*Ceanothus velutinus - Prunus emarginata - Artemisia tridentata*	
*37.216.00	***Ceanothus verrucosus* (Wart-stemmed ceanothus chaparral) Provisional Alliance**	G2 S2
*63.300.00	***Cephalanthus occidentalis* (Button willow thickets) Alliance**	G5 S2
*63.300.01	*Cephalanthus occidentalis*	
*76.300.00	***Cercocarpus intricatus* (Small leaf mountain mahogany scrub) Provisional Alliance**	G4 S3?
*76.300.01	*Cerocarpus intricatus*	
76.200.00	***Cercocarpus ledifolius* (Curl leaf mountain mahogany scrub) Alliance**	G5 S4
76.200.03	*Cercocarpus ledifolius*	
76.200.01	*Cercocarpus ledifolius - Artemisia tridentata*	
76.200.02	*Cercocarpus ledifolius / Symphoricarpos rotundifolia*	

76.100.00	***Cercocarpus montanus* (Birch leaf mountain mahogany chaparral) Alliance**	G5 S4
76.100.06	*Cercocarpus montanus - Adenostoma fasciculatum*	
76.100.17	*Cercocarpus montanus - Adenostoma fasciculatum - Diplacus aurantiacus*	
76.100.04	*Cercocarpus montanus - Arctostaphylos glauca*	
76.100.16	*Cercocarpus montanus - Ceanothus cuneatus*	
76.100.15	*Cercocarpus montanus - Ceanothus cuneatus - Fraxinus dipetala*	
76.100.09	*Cercocarpus montanus - Ceanothus cuneatus - Quercus john-tuckeri*	
76.100.05	*Cercocarpus montanus - Ceanothus spinosus*	
37.600.01	*Cercocarpus montanus - Eriogonum fasciculatum*	
37.600.02	*Cercocarpus montanus - Eriogonum fasciculatum - Eriogonum wrightii*	
76.100.10	*Cercocarpus montanus - Fremontodendron californicum*	
76.100.11	*Cercocarpus montanus - Juniperus californica*	
76.100.12	*Cercocarpus montanus - Malosma laurina - Artemisia californica*	
76.100.14	*Cercocarpus montanus - Prunus ilicifolia*	
76.100.13	*Cercocarpus montanus - Prunus ilicifolia - Adenostoma sparsifolium*	
76.100.03	*Cercocarpus montanus var. glaber*	
37.610.01	*Cercocarpus montanus var. macrourus*	
37.610.02	*Cercocarpus montanus var. minutiflorus*	
*37.417.00	***Chrysolepis chrysophylla* (Golden chinquapin thickets) Alliance**	G2 S2
*37.417.02	*Chrysolepis chrysophylla - Arctostaphylos glandulosa*	
*37.417.01	*Chrysolepis chrysophylla / Vaccinium ovatum*	
*37.700.00	***Chrysolepis sempervirens* (Bush chinquapin chaparral) Alliance**	G4 S3
*37.700.01	*Chrysolepis sempervirens*	
33.020.00	***Coleogyne ramosissima* (Black brush scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
*33.020.01	*Coleogyne ramosissima*	
33.020.02	*Coleogyne ramosissima - Atriplex confertifolia*	
33.020.10	*Coleogyne ramosissima - Atriplex hymenelytra - Tetradymia axillaris*	
33.020.03	*Coleogyne ramosissima - Ephedra nevadensis*	
33.020.05	*Coleogyne ramosissima - Eriogonum fasciculatum*	
33.020.06	*Coleogyne ramosissima - Eriogonum fasciculatum - Larrea tridentata*	
33.020.11	*Coleogyne ramosissima - Grayia spinosa*	
33.020.12	*Coleogyne ramosissima - Guiterrezia microcephala*	
33.020.07	*Coleogyne ramosissima - Larrea tridentata - Ambrosia dumosa*	
33.020.08	*Coleogyne ramosissima - Lycium andersonii*	
33.020.09	*Coleogyne ramosissima - Salazaria mexicana*	
*43.100.00	***Coreopsis gigantea* (Giant coreopsis scrub) Alliance**	G3 S3?
*43.100.01	*Coreopsis gigantea - Artemisia californica - Eriogonum cinereum*	
*43.100.02	*Coreopsis gigantea - Ericameria ericoides - Encelia californica*	
*80.100.00	***Cornus sericea* (Red osier thickets) Alliance**	G4 S3?
*80.100.02	*Cornus sericea*	
*80.100.03	*Cornus sericea - Salix exigua*	
*80.100.04	*Cornus sericea - Salix lasiolepis*	
*80.100.01	*Cornus sericea / Senecio triangularis*	
*37.950.00	***Corylus cornuta var. californica* (Hazelnut scrub) Alliance**	G3 S2?
*37.950.01	*Corylus cornuta / Polystichum munitum*	
*33.050.00	***Cylindropuntia bigelovii* (Teddy bear cholla patches) Alliance**	G4 S3
*33.050.01	*Cylindropuntia bigelovii*	
*38.110.00	***Dasiphora fruticosa* (Shrubby cinquefoil scrub) Alliance**	G5 S3?
*38.110.01	*Dasiphora fruticosa*	
*38.110.02	*Dasiphora fruticosa / Danthonia intermedia*	
*38.110.04	*Dasiphora fruticosa / Danthonia unispicata*	
*38.110.03	*Dasiphora fruticosa / Potentilla breweri*	

*38.110.05	*Dasiphora fruticosa / Veratrum californicum*	
*43.110.00	***Deinandra clementina - Eriogonum giganteum* (Island buckwheat - Island tar plant scrub) Provisional Alliance**	G3? S3?
37.750.00	***Dendromecon rigida* (Bush poppy scrub) Alliance**	G4 S4
37.750.01	*Dendromecon rigida*	
*32.082.00	***Diplacus aurantiacus* (Bush monkeyflower scrub) Alliance**	G3 S3?
*32.082.01	*Diplacus aurantiacus*	
*32.050.00	***Encelia californica* (California brittle bush scrub) Alliance**	G4 S3
*32.050.02	*Encelia californica*	
*32.050.01	*Encelia californica - Artemisia californica*	
*32.050.03	*Encelia californica - Artemisia californica - Salvia mellifera - Baccharis pilularis*	
*32.050.04	*Encelia californica - Eriogonum cinereum*	
*32.050.05	*Encelia californica - Malosma laurina - Salvia mellifera*	
*32.050.06	*Encelia californica - Rhus integrifolia*	
33.030.00	***Encelia farinosa* (Brittle bush scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
33.030.05	*Encelia farinosa - coastal sage scrub*	
33.030.01	*Encelia farinosa - warm desert*	
33.030.07	*Encelia farinosa - Ambrosia dumosa - Fouquieria splendens*	
33.030.08	*Encelia farinosa - Ambrosia dumosa - Salvia greatae*	
33.030.09	*Encelia farinosa - Ambrosia dumosa - Senna armata*	
33.030.04	*Encelia farinosa - Artemisia californica*	
*33.030.03	*Encelia farinosa - Eriogonum fasciculatum - Agave deserti*	
33.030.06	*Encelia farinosa - Mirabilis californica*	
*33.030.02	*Encelia farinosa - Peucephyllum schottii*	
*33.025.00	***Encelia virginensis* (Virgin River brittle brush scrub) Alliance**	G4 S3
*33.025.01	*Encelia virginensis*	
*33.025.02	*Encelia virginensis - Salvia dorrii*	
*33.270.00	***Ephedra californica* (California joint fir scrub) Alliance**	G3 S3
*33.270.01	*Ephedra californica*	
*33.270.02	*Ephedra californica - Ambrosia salsola*	
*33.270.04	*Ephedra californica - Gutierrezia californica / Eriastrum pluriflorum*	
*33.270.03	*Ephedra californica / annual - perennial herb*	
*33.275.00	***Ephedra funerea* (Death Valley joint fir scrub) Provisional Alliance**	G3? S2?
33.280.00	***Ephedra nevadensis* (Nevada joint fir scrub) Alliance**	G4 S4
33.280.01	*Ephedra nevadensis*	
33.280.02	*Ephedra nevadensis - Atriplex confertifolia*	
33.280.05	*Ephedra nevadensis - Ericameria cooperi*	
33.280.04	*Ephedra nevadensis - Lycium andersonii*	
33.280.03	*Ephedra nevadensis - Salazaria mexicana*	
33.285.00	***Ephedra viridis* (Mormon tea scrub) Alliance**	G4 S4
33.285.01	*Ephedra viridis - Artemisia tridentata*	
*38.125.00	***Ericameria linearifolia* (Narrowleaf goldenbush scrub) Provisional Alliance**	G3 S3?
35.310.00	***Ericameria nauseosa* (Rubber rabbitbrush scrub) Alliance**	G5 S5
35.310.01	*Ericameria nauseosa - Juniperus californica / annual to perennial herb*	
35.310.02	*Ericameria nauseosa / Sporobolus airoides*	
*38.130.00	***Ericameria palmeri* (Palmer's goldenbush scrub) Provisional Alliance**	G3 S3?

*35.340.00	***Ericameria paniculata* (Black-stem rabbitbrush scrub) Alliance**	G4 S3
*35.340.01	*Ericameria paniculata*	
*35.340.03	*Ericameria paniculata - Ambrosia eriocentra*	
*35.340.02	*Ericameria paniculata - Ambrosia salsola*	
*35.320.00	***Ericameria parryi* (Parry's rabbitbrush scrub) Alliance**	G4 S3
*35.320.01	*Ericameria parryi / Gayophytum diffusum*	
35.330.00	***Ericameria teretifolia* (Needleleaf rabbitbrush scrub) Alliance**	G4 S4
35.330.01	*Ericameria teretifolia*	
37.080.00	***Eriodictyon californicum* (California yerba santa scrub) Alliance**	G4 S4
35.080.01	*Eriodictyon californicum / herbaceous*	
*37.090.00	***Eriodictyon crassifolium* (Thick leaf yerba santa scrub) Provisional Alliance**	G3 S3
*32.035.00	***Eriogonum cinereum* (Ashy buckwheat scrub) Alliance**	G3 S3
*32.035.01	*Eriogonum cinereum*	
32.040.00	***Eriogonum fasciculatum* (California buckwheat scrub) Alliance**	G5 S5 (some associations are of high priority for inventory)
32.040.02	*Eriogonum fasciculatum*	
*32.070.01	*Eriogonum fasciculatum - (Lepidospartum squamatum) alluvial fan*	
32.040.05	*Eriogonum fasciculatum - Ambrosia dumosa*	
*32.040.03	*Eriogonum fasciculatum - Artemisia tridentata*	
32.040.08	*Eriogonum fasciculatum - Bebbia juncea*	
32.040.10	*Eriogonum fasciculatum - Cylindropuntia californica*	
32.040.18	*Eriogonum fasciculatum - Encelia farinosa*	
32.040.09	*Eriogonum fasciculatum - Gutierrezia sarothrae*	
32.040.19	*Eriogonum fasciculatum - Lotus scoparius*	
32.040.11	*Eriogonum fasciculatum - Rhus ovata*	
32.040.06	*Eriogonum fasciculatum - Salazaria mexicana*	
32.100.00	***Eriogonum fasciculatum - Salvia apiana* (California buckwheat - white sage scrub) Alliance**	G4 S4 (some associations are of high priority for inventory)
*32.100.01	*Eriogonum fasciculatum - Salvia apiana*	
32.040.17	*Eriogonum fasciculatum - Salvia mellifera*	
32.040.07	*Eriogonum fasciculatum - Salvia mellifera - Malosma laurina*	
32.040.01	*Eriogonum fasciculatum - Scrophularia californica - Phacelia ramosissima*	
32.040.12	*Eriogonum fasciculatum - Simmondsia chinensis - Cylindropuntia californica*	
32.040.16	*Eriogonum fasciculatum var. foliolosum - Hesperoyucca whipplei*	
32.040.13	*Eriogonum fasciculatum var. foliolosum - Juniperus californica*	
32.040.15	*Eriogonum fasciculatum var. polifolium / Eriastrum pluriflorum*	
*32.045.00	***Eriogonum heermannii* (Heermann's buckwheat patches) Provisional Alliance**	G2 S2?
*32.041.00	***Eriogonum wrightii* (Wright's buckwheat patches) Alliance**	G3 S3
*32.041.01	*Eriogonum wrightii - Eriophyllum confertiflorum / Monardella antonina ssp. benitensis*	
*32.041.02	*Eriogonum wrightii - Juniperus californica*	
*32.041.03	*Eriogonum wrightii - Lessingia filaginifolia*	
*61.580.00	***Forestiera pubescens* (Desert olive patches) Alliance**	G3 S2
*61.580.01	*Forestiera pubescens*	
*61.580.02	*Forestiera pubescens - Sambucus nigra*	
37.920.00	***Frangula californica* (California coffee berry scrub) Alliance**	G4 S4 (some associations are of high priority for inventory)
*37.920.04	*Frangula californica spp. tomentella / Hoita macrostachya*	
37.920.02	*Frangula californica ssp. tomentella*	
37.920.03	*Frangula californica ssp. tomentella / Cirsium fontinale var. campylon - Mimulus guttatus*	
*37.920.01	*Frangula californica - Baccharis pilularis / Scrophularia californica*	

*39.040.00	***Garrya elliptica* (Coastal silk tassel scrub) Provisional Alliance**	G3? S3?
*33.180.00	***Grayia spinosa* (Spiny hop sage scrub) Alliance**	G5 S3
*33.180.02	*Grayia spinosa - Atriplex confertifolia*	
*33.180.06	*Grayia spinosa - Ephedra viridis*	
*33.180.03	*Grayia spinosa - Larrea tridentata*	
*33.180.04	*Grayia spinosa - Lycium andersonii*	
*33.180.07	*Grayia spinosa - Picrothamnus desertorum / Achnatherum hymenoides*	
*33.180.05	*Grayia spinosa / Eriogonum ovalifolium*	
*32.042.00	***Gutierrezia californica* (California match weed patches) Provisional Alliance**	G3? S3?
*32.042.01	*Gutierrezia californica / Annual - perennial grass - herb*	
*32.043.00	***Gutierrezia sarothrae* (Broom snake weed scrub) Provisional Alliance**	G3 S3
*32.055.00	***Hazardia squarrosa* (Sawtooth golden bush scrub) Alliance**	G3 S3
*32.055.02	*Hazardia squarrosa - Artemisia californica*	
*32.055.01	*Hazardia squarrosa / Nassella pulchra - Deinandra fasciculata*	
*37.911.00	***Heteromeles arbutifolia* (Toyon chaparral) Alliance**	G5 S3
*37.911.02	*Heteromeles arbutifolia - Artemisia californica*	
*37.911.03	*Heteromeles arbutifolia - Malosma laurina*	
*37.911.04	*Heteromeles arbutifolia - Quercus berberidifolia - Cercocarpus montanus - Fraxinus dipetala*	
*37.911.01	*Heteromeles arbutifolia / serpentine*	
*39.100.00	***Holodiscus discolor* (Ocean spray brush) Alliance**	G4 S3
*39.100.03	*Holodiscus discolor - Arctostaphylos patula*	
*39.100.04	*Holodiscus discolor - Keckiella corymbosa*	
*39.100.06	*Holodiscus discolor - Sambucus racemosa*	
*39.100.02	*Holodiscus discolor / Achnatherum occidentalis - Eriogonum nudum*	
*39.100.01	*Holodiscus discolor / Mimulus suksdorfii*	
*39.100.05	*Holodiscus discolor / Sedum obsusatum ssp. boreale - Cryptogramma acrostichoides*	
*33.190.00	***Hyptis emoryi* (Desert lavender scrub) Alliance**	G4 S3
*33.190.01	*Hyptis emoryi*	
*33.190.02	*Hyptis emoryi - Psorothamnus schottii*	
32.044.00	***Isocoma menziesii* (Menzies's golden bush scrub) Alliance**	G4? S4? (some associations are of high priority for inventory)
32.044.03	*Isocoma menziesii - Lupinus albifrons*	
*32.044.01	*Isocoma menziesii / Astragalus miguelensis - Atriplex californica - Lasthenia californica*	
32.044.02	*Isocoma menziesii / Distichlis spicata - Paraphalis incurva*	
*33.340.00	***Justicia californica* (Chuparosa patches) Provisional Alliance**	G2 S2?
*45.406.00	***Kalmia microphylla* (Alpine laurel heath) Provisional Alliance**	G4 S3?
*32.065.00	***Keckiella antirrhinoides* (Bush penstemon scrub) Alliance**	G3 S3
*32.065.01	*Keckellia antirrhinoides*	
*32.065.02	*Keckellia antirrhinoides - Artemisia californica*	
*32.065.03	*Keckellia antirhinoides - Eriogonum fasciculatum*	
*32.065.04	*Keckiella antirrhinoides - Mixed Chaparral*	
*33.100.00	***Koeberlinia spinosa* (Crown-of-thorns stands) Special Stands**	G2 S1
*36.500.00	***Krascheninnikovia lanata* (Winterfat scrubland) Alliance**	G4 S2
*36.500.01	*Krascheninnikovia lanata*	

33.010.00 ***Larrea tridentata* (Creosote bush scrub) Alliance** G5 S5 (some associations are of high priority for inventory)

33.140.04 *Larrea tridentata*
33.010.08 *Larrea tridentata - Ambrosia salsola*
33.010.17 *Larrea tridentata - Atriplex confertifolia*
33.010.16 *Larrea tridentata - Atriplex hymenelytra*
33.010.12 *Larrea tridentata - Atriplex polycarpa*
33.010.10 *Larrea tridentata - Ephedra nevadensis*
*33.010.07 *Larrea tridentata - Krameria grayi - Pleuraphis rigida*
*33.010.13 *Larrea tridentata - Pleuraphis rigida*
*33.010.14 *Larrea tridentata - Pleuraphis rigida - Lycium andersonii*
33.010.19 *Larrea tridentata / cryptogamic crust*
33.010.09 *Larrea tridentata / Eriogonum inflatum*
33.010.06 *Larrea tridentata / wash*

33.140.00 ***Larrea tridentata - Ambrosia dumosa* (Creosote bush - white burr sage scrub) Alliance** G5 S5 (some associations are of high priority for inventory)

33.140.42 *Larrea tridentata - Ambrosia dumosa*
33.140.09 *Larrea tridentata - Ambrosia dumosa - / Atriplex hymenelytra*
33.140.40 *Larrea tridentata - Ambrosia dumosa - Amphipappus fremontii*
33.140.37 *Larrea tridentata - Ambrosia dumosa - Atriplex canescens*
33.140.39 *Larrea tridentata - Ambrosia dumosa - Atriplex confertifolia*
33.140.45 *Larrea tridentata - Ambrosia dumosa - Atriplex confertifolia - Psorothamnus arborescens*
33.140.38 *Larrea tridentata - Ambrosia dumosa - Atriplex polycarpa*
33.140.36 *Larrea tridentata - Ambrosia dumosa - Bebbia juncea*
33.140.46 *Larrea tridentata - Ambrosia dumosa - Cylindropuntia acanthocarpa*
33.140.18 *Larrea tridentata - Ambrosia dumosa - Cylindropuntia ramosissima*
*33.140.33 *Larrea tridentata - Ambrosia dumosa - Echinocactus polycephalus*
33.140.32 *Larrea tridentata - Ambrosia dumosa - Encelia farinosa*
*33.140.31 *Larrea tridentata - Ambrosia dumosa - Encelia virginensis*
*33.140.30 *Larrea tridentata - Ambrosia dumosa - Ephedra californica*
*33.140.29 *Larrea tridentata - Ambrosia dumosa - Ephedra funerea*
33.140.20 *Larrea tridentata - Ambrosia dumosa - Ephedra nevadensis*
33.140.47 *Larrea tridentata - Ambrosia dumosa - Ephedra viridis*
33.140.48 *Larrea tridentata - Ambrosia dumosa - Ericameria cooperi*
33.140.28 *Larrea tridentata - Ambrosia dumosa - Eriogonum fasciculatum*
33.140.27 *Larrea tridentata - Ambrosia dumosa - Eriogonum inflatum*
33.140.44 *Larrea tridentata - Ambrosia dumosa - Fouquieria splendens*
*33.140.10 *Larrea tridentata - Ambrosia dumosa - Galium angustifolium - Lyrocarpa coulteri*
33.140.26 *Larrea tridentata - Ambrosia dumosa - Grayia spinosa*
33.140.25 *Larrea tridentata - Ambrosia dumosa - Gutierrezia sarothrae*
33.140.23 *Larrea tridentata - Ambrosia dumosa - Krameria erecta*
33.140.22 *Larrea tridentata - Ambrosia dumosa - Krameria grayii*
33.140.21 *Larrea tridentata - Ambrosia dumosa - Lepidium fremontii*
33.140.19 *Larrea tridentata - Ambrosia dumosa - Lycium andersonii*
33.140.49 *Larrea tridentata - Ambrosia dumosa - Olneya tesota*
33.140.43 *Larrea tridentata - Ambrosia dumosa - Opuntia basilaris*
*33.140.24 *Larrea tridentata - Ambrosia dumosa - Petalonyx thurberi*
*33.140.17 *Larrea tridentata - Ambrosia dumosa - Pleuraphis rigida*
33.140.15 *Larrea tridentata - Ambrosia dumosa - Psorothamnus arborescens*
*33.140.08 *Larrea tridentata - Ambrosia dumosa - Psorothamnus emoryi - sandy*
33.140.16 *Larrea tridentata - Ambrosia dumosa - Psorothamnus fremontii*
*33.140.07 *Larrea tridentata - Ambrosia dumosa - Psorothamnus schottii*
33.140.50 *Larrea tridentata - Ambrosia dumosa - Psorothamnus spinosus*
33.140.14 *Larrea tridentata - Ambrosia dumosa - Salazaria mexicana*
33.140.13 *Larrea tridentata - Ambrosia dumosa - Senna armata*
33.140.12 *Larrea tridentata - Ambrosia dumosa - Viguiera parishii*
33.140.11 *Larrea tridentata - Ambrosia dumosa - Yucca schidigera*
*33.140.35 *Larrea tridentata - Ambrosia dumosa / Crytogrammic crust*
*33.140.34 *Larrea tridentata - Ambrosia dumosa / Dalea mollissima*

33.027.00	***Larrea tridentata - Encelia farinosa*** **(Creosote bush - brittle bush scrub) Alliance**	G5 S4
33.027.05	*Larrea tridentata - Encelia farinosa*	
33.027.03	*Larrea tridentata - Encelia farinosa - Ambrosia dumosa*	
33.027.02	*Larrea tridentata - Encelia farinosa - Bebbia juncea*	
33.027.04	*Larrea tridentata - Encelia farinosa - Fouquieria splendens*	
33.027.06	*Larrea tridentata - Encelia farinosa - Peucephyllum schottii*	
33.027.07	*Larrea tridentata - Encelia farinosa - Pleurocoronis pluriseta*	
*32.070.00	***Lepidospartum squamatum*** **(Scale broom scrub) Alliance**	G3 S3
*32.070.09	*Lepidospartum squamatum - Artemisia californica*	
*32.070.04	*Lepidospartum squamatum - Atriplex canescens*	
*32.070.05	*Lepidospartum squamatum - Baccharis salicifolia*	
*32.070.02	*Lepidospartum squamatum - Eriodictyon crassifolium - Hesperoyucca whipplei*	
*32.070.08	*Lepidospartum squamatum - Eriodictyon trichocalyx - Hesperoyucca whipplei*	
*32.070.06	*Lepidospartum squamatum - Eriogonum fasciculatum*	
*32.070.07	*Lepidospartum squamatum / Amsinckia menziesii*	
*32.070.03	*Lepidospartum squamatum / ephemeral annuals*	
*73.110.00	***Lithocarpus densiflorus var. echinoides*** **(Shrub tanoak chaparral) Alliance**	G3 S3
*73.110.01	*Lithocarpus densiflorus var. echinoides / Arctostaphylos nevadensis*	
*73.110.02	*Lithocarpus densiflorus var. echinoides / Pteridium aquilinum*	
52.240.00	***Lotus scoparius*** **(Deer weed scrub) Alliance**	G5 S5
52.240.01	*Lotus scoparius*	
32.081.00	***Lupinus albifrons*** **(Silver bush lupine scrub) Alliance**	G4 S4
32.081.01	*Lupinus albifrons*	
32.081.03	*Lupinus albifrons - Senecio flaccidus var. douglasii*	
32.081.02	*Lupinus albifrons coastal*	
32.080.00	***Lupinus arboreus*** **(Yellow bush lupine scrub) Alliance**	G4 S4 (within native range), some associations are of high priority for inventory
32.080.02	*Lupinus arboreus*	
*32.080.03	*Lupinus arboreus - Ericameria ericoides*	
32.080.04	*Lupinus arboreus / Anthoxanthum odoratum*	
32.080.01	*Lupinus arboreus / Bromus diandrus*	
32.080.05	*Lupinus arboreus / Scrophularia californica*	
*32.160.00	***Lupinus chamissonis - Ericameria ericoides*** **(Silver dune lupine - mock heather scrub) Alliance**	G3 S3
*32.160.01	*Ericameria ericoides*	
*32.160.02	*Lupinus chamissonis*	
*32.160.03	*Lupinus chamissonis - Ericameria ericoides*	
*33.360.00	***Lycium andersonii*** **(Anderson's boxthorn scrub) Alliance**	G4 S3
*33.360.02	*Lycium andersonii*	
*33.360.01	*Lycium andersonii - Simmondsia chinensis - Pleuraphis rigida*	
*33.365.00	***Lycium californicum*** **(California desert-thorn) Provisional Alliance**	G2? S2?
45.450.00	***Malacothamnus fasciculatus*** **(Bush mallow scrub) Alliance**	G4 S4
45.450.01	*Malacothamnus fasciculatus*	
45.450.02	*Malacothamnus fasciculatus - Ceanothus megacarpus*	
45.450.03	*Malacothamnus fasciculatus - Ceanothus spinosus*	
45.450.04	*Malacothamnus fasciculatus - Malosma laurina*	
45.450.05	*Malacothamnus fasciculatus - Salvia leucophylla*	
45.450.06	*Malacothamnus fasciculatus - Salvia mellifera*	

45.455.00	***Malosma laurina* (Laurel sumac scrub) Alliance**	G4 S4
45.455.01	*Malosma laurina*	
45.455.03	*Malosma laurina - Eriogonum cinereum*	
45.455.04	*Malosma laurina - Eriogonum fasciculatum*	
45.455.06	*Malosma laurina - Eriogonum fasciculatum - Salvia apiana*	
45.455.07	*Malosma laurina - Eriogonum fasciculatum - Salvia mellifera*	
45.455.08	*Malosma laurina - Rhus ovata - Ceanothus megacarpus*	
45.455.09	*Malosma laurina - Salvia mellifera*	
45.455.10	*Malosma laurina - Tetracoccus dioicus*	
*33.290.00	***Menodora spinescens* (Spiny menodora scrub) Alliance**	G4 S3
*33.290.01	*Menodora spinescens - Atriplex confertifolia*	
*33.290.02	*Menodora spinescens - Ephedra nevadensis*	
*37.930.00	***Morella californica* (Wax myrtle scrub) Alliance**	G3 S3
*37.930.01	*Morella californica*	
*33.080.00	***Nolina (bigelovii, parryi)* (Nolina scrub) Alliance**	G3 S2
*33.080.02	*Nolina bigelovii*	
*33.080.01	*Nolina parryi*	
*32.150.00	***Opuntia littoralis* (Coast prickly pear scrub) Alliance**	G4 S3
*32.150.01	*Opuntia littoralis - Eriogonum fasciculatum - Malosma laurina*	
*32.150.02	*Opuntia littoralis - mixed coastal sage scrub*	
*33.150.00	***Parkinsonia microphylla* (Foothill palo verde desert scrub) Alliance**	G4 S1
45.402.00	***Phyllodoce breweri* (Mountain heather mats) Alliance**	G4 S4?
45.402.02	*Phyllodoce breweri - Cassiope mertensiana - Juncus parryi*	
45.402.01	*Phyllodoce breweri - Juncus parryi*	
45.405.01	*Phyllodoce breweri - Vaccinium caespitosum*	
*45.404.00	***Phyllodoce empetriformis* (Mountain heather mats) Provisional Alliance**	G5 S2?
*63.710.00	***Pluchea sericea* (Arrow weed thickets) Alliance**	G3 S3
*63.710.01	*Pluchea sericea*	
*63.710.02	*Pluchea sericea - Allenrolfea occidentalis*	
*63.710.03	*Pluchea sericea - Atriplex canescens*	
37.900.00	***Prunus emarginata* (Bitter cherry thickets) Provisional Alliance**	G4 S4
*33.300.00	***Prunus fasciculata* (Desert almond scrub) Alliance**	G4 S3
*33.300.01	*Prunus fasciculata*	
*33.300.06	*Prunus fasciculata - (Viguiera reticulata - Mortonia utahensis) limestone*	
*33.300.05	*Prunus fasciculata - Ambrosia eriocentra*	
*33.300.04	*Prunus fasciculata - Purshia stansburiana*	
*33.300.03	*Prunus fasciculata - Rhus trilobata*	
*33.300.02	*Prunus fasciculata - Salazaria mexicana*	
*33.220.00	***Prunus fremontii* (Desert apricot scrub) Alliance**	G4 S3
*33.220.01	*Prunus fremontii*	
*37.910.00	***Prunus ilicifolia* (Holly leaf cherry chaparral) Alliance**	G3 S3 (some associations are of high priority for inventory)
*37.910.03	*Prunus ilicifolia ssp. ilicifolia*	
*37.910.05	*Prunus ilicifolia ssp. ilicifolia - Ceanothus cuneatus*	
*37.910.06	*Prunus ilicifolia ssp. ilicifolia - Fraxinus dipetala*	
*37.910.02	*Prunus ilicifolia ssp. ilicifolia - Heteromeles arbutifolia*	
*37.910.07	*Prunus ilicifolia ssp. ilicifolia - Toxicodendron diversilobum / grass*	
*37.910.01	*Prunus ilicifolia ssp. Ilicifolia / Sanicula crassicaulis*	
*37.910.04	*Prunus ilicifolia ssp. lyonii*	

*37.905.00	***Prunus virginiana* (Choke cherry thickets) Provisional Alliance**	G4 S2?
*33.240.00	***Purshia stansburiana* (Stansbury cliff rose scrub) Alliance**	G3 S3
*33.240.01	*Purshia stansburiana*	
*35.200.00	***Purshia tridentata* (Bitter brush scrub) Alliance**	G4 S3
*35.200.03	*Purshia tridentata - Artemisia tridentata - Symphoricarpos rotundifolia*	
*35.200.01	*Purshia tridentata - Artemisia tridentata - Tetradymia canescens*	
*35.200.02	*Purshia tridentata - Artemisia tridentata / Achnatherum hymenoides*	
*35.200.04	*Purshia tridentata / Achnatherum nelsonii*	
*35.200.05	*Purshia tridentata / Eriogonum umbellatum*	
37.407.00	***Quercus berberidifolia* (Scrub oak chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
37.407.02	*Quercus berberidifolia*	
37.406.01	*Quercus berberidifolia - Arctostaphylos glauca*	
37.406.05	*Quercus berberidifolia - Ceanothus cuneatus*	
37.406.02	*Quercus berberidifolia - Ceanothus integerrimus*	
37.407.05	*Quercus berberidifolia - Ceanothus leucodermis*	
*37.406.03	*Quercus berberidifolia - Ceanothus oliganthus*	
37.407.07	*Quercus berberidifolia - Ceanothus spinosus*	
37.406.06	*Quercus berberidifolia - Ceanothus tomentosus*	
37.407.06	*Quercus berberidifolia - Cercocarpus montanus*	
37.407.09	*Quercus berberidifolia - Fraxinus dipetela - Heteromeles arbutifolia*	
37.407.04	*Quercus berberidifolia - Heteromeles arbutifolia*	
37.407.08	*Quercus berberidifolia - southern mixed chaparral*	
37.407.01	*Quercus berberidifolia / Aesculus californica*	
37.409.00	***Quercus berberidifolia - Adenostoma fasciculatum* (Scrub oak - chamise chaparral)**	G4 S4
37.409.03	*Quercus berberidifolia - Adenostoma fasciculatum*	
37.407.03	*Quercus berberidifolia - Adenostoma fasciculatum - Arctostaphylos glandulosa*	
37.409.01	*Quercus berberidifolia - Adenostoma fasciculatum - Ceanothus crassifolius*	
37.409.02	*Quercus berberidifolia - Adenostoma fasciculatum - Ceanothus greggii*	
*37.413.00	***Quercus chrysolepis* (Canyon live oak chaparral) Alliance**	G3 S3
*37.413.01	*Quercus chrysolepis*	
37.415.00	***Quercus cornelius-mulleri* (Muller oak chaparral) Alliance**	G4 S4
37.415.04	*Quercus cornelius-mulleri - Adenostoma sparsifolium - Ceanothus greggii*	
37.415.05	*Quercus cornelius-mulleri - Adenostoma sparsifolium - Cercocapus montanus*	
37.415.03	*Quercus cornelius-mulleri - Cercocapus montanus*	
37.415.02	*Quercus cornelius-mulleri - Eriogonum fasciculatum - Ericameria linearifolia*	
37.415.01	*Quercus cornelius-mulleri - Rhus ovata*	
37.415.06	*Quercus cornelius-mulleri -Coleogyne ramosissima*	
37.405.00	***Quercus durata* (Leather oak chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
37.405.02	*Quercus durata*	
37.405.03	*Quercus durata - Adenostoma fasciculatum - Quercus wislizeni*	
*37.405.14	*Quercus durata - Adenostoma fasciculatum / Salvia sonomensis*	
*37.405.01	*Quercus durata - Arctostaphylos glandulosa*	
*37.405.06	*Quercus durata - Arctostaphylos glauca - Artemisia californica / Grass*	
*37.405.07	*Quercus durata - Arctostaphylos glauca - Garrya congdonii / Melica torreyana*	
37.405.04	*Quercus durata - Arctostaphylos glauca / Pinus sabiniana*	
*37.405.08	*Quercus durata - Arctostaphylos pungens / Pinus sabiniana*	
37.405.10	*Quercus durata - Cercocarpus montanus*	
*37.405.12	*Quercus durata - Frangula californica - Arctostaphylos glauca*	
37.405.11	*Quercus durata - Heteromeles arbutifolia - Umbellularia californica*	
*37.405.13	*Quercus durata / Allium falcifolium - Streptanthus batrachopus*	
37.405.09	*Quercus durata / Pinus sabiniana*	

37.411.00	***Quercus garryana* (Brewer oak scrub) *Alliance***	G4 S4
37.411.03	*Quercus garryana shrub*	
37.411.04	*Quercus garryana / Festuca californica*	
37.411.05	*Quercus garryana - Arctostaphylos patula*	
37.411.06	*Quercus garryana - Cercocarpus montanus*	
37.418.00	***Quercus john-tuckeri* (Tucker oak chaparral) Alliance**	G4 S4
37.418.04	*Quercus john-tuckeri*	
37.418.01	*Quercus john-tuckeri - Adenostoma fasciculatum*	
37.418.05	*Quercus john-tuckeri - Juniperus californica - Ericameria linearifolia*	
37.418.02	*Quercus john-tuckeri - Juniperus californica - Fraxinus dipetala*	
37.418.03	*Quercus john-tuckeri - Quercus wislizeni - Garrya flavescens*	
*37.416.00	***Quercus pacifica* (Island scrub oak chaparral) Alliance**	G3 S3
*37.416.01	*Quercus pacifica*	
*37.419.00	***Quercus palmeri* (Palmer oak chaparral) Alliance**	G3 S2?
*37.419.01	*Quercus palmeri - Eriogonum fasciculatum*	
*37.419.02	*Quercus palmeri - Eriogonum wrightii*	
*37.412.00	***Quercus sadleriana* (Sadler oak or deer oak brush fields) Alliance**	G3 S3
*37.412.01	*Quercus sadleriana*	
*71.095.00	***Quercus turbinella* (Sonoran live oak scrub) Alliance**	G4 S1
*71.095.02	*Quercus turbinella - Baccharis sergiloides*	
*71.095.01	*Quercus turbinella / Pinus monophylla*	
37.414.00	***Quercus vacciniifolia* (Huckleberry oak chaparral) Alliance**	G4 S4
37.414.01	*Quercus vacciniifolia*	
37.414.03	*Quercus vacciniifolia - Arctostaphylos patula*	
37.414.02	*Quercus vacciniifolia - Chrysolepis sempervirens*	
37.420.00	***Quercus wislizeni* (Interior live oak chaparral) *Alliance***	G4 S4
37.420.05	*Quercus wislizen - Cercocarpus montanus - Arctostaphylos glandulosa*	
37.420.01	*Quercus wislizeni*	
37.420.02	*Quercus wislizeni - Arctostaphylos glandulosa*	
37.403.01	*Quercus wislizeni - Ceanothus leucodermis*	
37.403.02	*Quercus wislizeni - Ceanothus leucodermis - Arctostaphylos glandulosa*	
37.403.03	*Quercus wislizeni - Ceanothus leucodermis / Pinus coulteri*	
37.420.03	*Quercus wislizeni - Cercocarpus montanus*	
37.420.04	*Quercus wislizeni - Cercocarpus montanus - Adenostoma sparsifolium*	
37.404.01	*Quercus wislizeni - Quercus berberidifolia*	
37.404.02	*Quercus wislizeni - Quercus berberidifolia - Fraxinus dipetala*	
37.402.01	*Quercus wislizeni - Quercus chrysolepis shrub*	
*63.425.00	***Rhododendron neoglandulosum* (Western Labrador-tea thickets) Alliance**	G4 S2?
*63.425.01	*Rhododendron neoglandulosum*	
*63.425.02	*Rhododendron neoglandulosum - Kalmia microphylla / Pinus contorta*	
*63.310.00	***Rhododendron occidentale* (Western azalea patches) Provisional Alliance**	G3 S2?
*37.803.00	***Rhus integrifolia* (Lemonade berry scrub) Alliance**	G3 S3
*37.803.01	*Rhus integrifolia*	
*37.803.02	*Rhus integrifolia - Adenostoma fasciculatum - Artemisia californica*	
*37.803.03	*Rhus integrifolia - Artemisia californica - Eriogonum cinereum*	
*37.803.04	*Rhus integrifolia - Opuntia spp - Eriogonum cinereum*	
*37.803.05	*Rhus integrifolia - Salvia mellifera - Artemisia californica*	

37.801.00	***Rhus ovata* (Sugarbush chaparral) Alliance**	G4 S4 (some associations are of high priority for inventory)
37.801.01	*Rhus ovata*	
37.801.02	*Rhus ovata - Salvia leucophylla - Artemisia californica*	
*37.801.03	*Rhus ovata - Ziziphus parryi*	
*37.802.00	***Rhus trilobata* (Basket bush thickets) Provisional Alliance**	G4 S3?
*37.960.00	***Ribes quercetorum* (Oak gooseberry thickets) Provisional Alliance**	G2 S2?
*63.907.00	***Rosa californica* (California rose briar patches) Alliance**	G3 S3
*63.907.02	*Rosa californica*	
*63.907.01	*Rosa californica - Baccharis pilularis*	
*63.907.03	*Rosa californica / Schoenoplectus spp.*	
*63.320.00	***Rosa woodsii* (Interior rose thickets) Provisional Alliance**	G5 S3
*63.901.00	***Rubus (parviflorus, spectabilis, ursinus)* (Coastal brambles) Alliance**	G4 S3
*63.901.01	*Gaultheria shallon - Rubus spectabiis - Rubus parviflorus*	
*63.901.03	*Rubus parviflorus*	
*63.901.02	*Rubus parviflorus - Rubus spectabilis - Rubus ursinus*	
*63.901.04	*Rubus spectabilis*	
*63.901.05	*Rubus ursinus*	
63.906.00	***Rubus armeniacus* (Himalayan black berry brambles) Semi-natural Stands**	
63.906.01	*Rubus armeniacus*	
63.906.02	*Rubus armeniacus - Rubus ursinus*	
33.310.00	***Salazaria mexicana* (Bladder sage scrub) Alliance**	G4 S4
33.310.01	*Salazaria mexicana*	
33.310.03	*Salazaria mexicana - Ambrosia salsola - Eriogonum fasciculatum*	
33.310.02	*Salazaria mexicana - Viguieria reticulata - Atriplex confertifolia*	
*61.213.00	***Salix bebbiana* (Bebb's willow thickets) Alliance**	G4 S2?
*61.213.01	*Salix bebbiana / mesic forb type*	
*61.215.00	***Salix breweri* (Brewer willow thickets) Alliance**	G2 S2
*61.215.01	*Salix breweri / Muhlenbergia asperifolia*	
*61.112.00	***Salix eastwoodiae* (Sierran willow thickets) Alliance**	G3 S3
*61.112.01	*Salix eastwoodiae*	
*61.112.02	*Salix eastwoodiae / Carex scopulorum*	
*61.112.03	*Salix eastwoodiae / Oreostemma alpigenum*	
*63.160.02	*Salix eastwoodiae / Senecio triangularis*	
61.209.00	***Salix exigua* (Sandbar willow thickets) Alliance**	G5 S4 (some associations are of high priority for inventory)
61.209.01	*Salix exigua*	
61.209.07	*Salix exigua - (Saix lasiolepis) - Rubus discolor*	
61.209.02	*Salix exigua - Arundo donax*	
*61.209.06	*Salix exigua - Brickellia californica*	
61.209.03	*Salix exigua - Salix melanopsis*	
61.209.04	*Salix exigua / Baccharis sergiloides*	
61.209.05	*Salix exigua / Juncus spp.*	
*61.212.00	***Salix geyeriana* (Geyer willow thickets) Alliance**	G4 S2?
*61.212.01	*Salix geyeriana / grass*	
*61.212.02	*Salix geyeriana / mesic graminoid*	

*61.203.00	***Salix hookeriana* (Coastal dune willow thickets) Alliance**	G4 S3
*61.203.01	*Salix hookeriana*	
*61.203.02	*Salix hookeriana / Rubus ursinus*	
*61.118.00	***Salix jepsonii* (Jepson willow thickets) Alliance**	G3 S3
*61.118.01	*Salix jepsonii*	
*61.118.04	*Salix jepsonii - Cornus sericea*	
*61.118.03	*Salix jepsonii - Paxistima myrsinites*	
*61.118.02	*Salix jepsonii / Senecio triangularis*	
61.201.00	***Salix lasiolepis* (Arroyo willow thickets) Alliance**	G4 S4 (some associations are of high priority for inventory)
*61.201.01	*Salix lasiolepis*	
61.201.04	*Salix lasiolepis - Salix lucida*	
61.201.02	*Salix lasiolepis / Artemisia douglasiana*	
61.201.05	*Salix lasiolepis / Baccharis pilularis - Rubus ursinus*	
61.201.06	*Salix lasiolepis / Baccharis salicifolia*	
61.201.07	*Salix lasiolepis / Malosma laurina*	
61.201.08	*Salix lasiolepis / Rosa californica*	
61.201.03	*Salix lasiolepis / Rubus spp.*	
*61.113.00	***Salix lemmonii* (Lemmon's willow thickets) Alliance**	G4 S3
*61.113.01	*Salix lemmonii*	
*61.113.02	*Salix lemmonii / Carex spp.*	
*61.113.04	*Salix lemmonii / mesic forb*	
*61.113.03	*Salix lemmonii / mesic graminoid*	
*61.204.01	*Salix lucida ssp. lasiandra / Urtica urens - Urtica dioica*	
*61.210.00	***Salix lutea* (Yellow willow thickets) Alliance**	G4 S3?
*61.210.01	*Salix lutea / mesic forbs*	
*61.210.02	*Salix lutea / mesic graminoids*	
*61.210.03	*Salix lutea / Poa pratensis*	
*61.210.04	*Salix lutea/ Rosa woodsii*	
*91.127.00	***Salix nivalis* (Snow willow mats) Provisional Alliance**	G4 S1?
61.115.00	***Salix orestera* (Sierra gray willow thickets) Alliance**	G4 S4 (some associations are of high priority for inventory)
*63.160.03	*Salix orestera / Allium validum*	
61.115.01	*Salix orestera / Calamagrostis muiriana*	
61.115.02	*Salix orestera / Senecio triangularis*	
61.115.03	*Salix orestera / tall forb*	
*61.116.00	***Salix petrophila* (Alpine willow turf) Alliance**	G5 S3
*61.116.01	*Salix petrophila*	
*61.116.03	*Salix petrophila - Calamagrostis muiriana*	
*61.116.02	*Salix petrophila - Calamagrostis muriana - Vaccinium caespitosum - Antennaria media*	
*61.119.00	***Salix planifolia* (Tea-leaved willow thickets) Provisional Alliance**	G4 S2?
*61.119.01	*Salix planifolia*	
*61.206.00	***Salix sitchensis* (Sitka willow thickets) Provisional Alliance**	G4 S3?
*32.030.00	***Salvia apiana* (White sage scrub) Alliance**	G4 S3
*32.030.01	*Salvia apiana - Artemisia californica*	
*32.030.02	*Salvia apiana - Encelia farinosa*	
*32.030.03	*Salvia apiana - Hesperoyucca whipplei*	
*33.320.00	***Salvia dorrii* (Desert purple sage scrub) Alliance**	G3 S2
*33.320.01	*Salvia dorrii*	

32.090.00	***Salvia leucophylla* (Purple sage scrub) Alliance**	G4 S4
32.090.03	*Salvia leucophylla*	
32.090.01	*Salvia leucophylla - Artemisia californica*	
32.090.04	*Salvia leucophylla - Artemisia californica - Eriogonum cinereum / Nassella spp.*	
32.090.05	*Salvia leucophylla - Eriogonum cinereum / annual herb*	
32.090.02	*Salvia leucophylla - Malosma laurina*	
32.020.00	***Salvia mellifera* (Black sage scrub) Alliance**	G4 S4 (some associations are of high priority for inventory)
32.020.03	*Salvia mellifera*	
32.020.04	*Salvia mellifera - Encelia californica*	
*32.020.08	*Salvia mellifera - Eriogonum cinereum*	
32.020.06	*Salvia mellifera - Eriogonum fasciculatum / Bromus rubens*	
32.020.07	*Salvia mellifera - Eriogonum fasciculatum var. foliolosum - Eriodictyon tomentosum*	
32.020.09	*Salvia mellifera - Lotus scoparius*	
32.020.01	*Salvia mellifera - Malosma laurina*	
*32.020.05	*Salvia mellifera - Opuntia littoralis*	
32.020.11	*Salvia mellifera - Rhus ovata*	
*63.410.00	***Sambucus nigra* (Blue elderberry stands) Alliance**	G3 S3
*63.410.01	*Sambucus nigra*	
*63.410.03	*Sambucus nigra - Heteromeles arbutifolia*	
*63.410.02	*Sambucus nigra / Leymus condensatus*	
*36.400.00	***Sarcobatus vermiculatus* (Greasewood scrub) Alliance**	G5 S4 (some associations are of high priority for inventory)
36.400.01	*Sarcobatus vermiculatus*	
*36.400.02	*Sarcobatus vermiculatus - Atriplex confertifolia*	
*33.005.00	***Simmondsia chinensis* (Jojoba scrub) Provisional Alliance**	G4 S3?
*33.005.01	*Simmondsia chinensis - Eriogonum fasciculatum - Opuntia parryi*	
*36.200.00	***Suaeda moquinii* (Bush seepweed scrub) Alliance**	G5 S3
*36.200.01	*Suaeda moquinii*	
*36.200.02	*Suaeda moquinii - Allenrolfea occidentalis*	
*36.200.03	*Suaeda moquinii - Atriplex canescens*	
63.810.00	***Tamarix spp.* (Tamarisk thickets) Semi-natural Stands**	
*33.350.00	***Tetracoccus hallii* (Hall's shrubby-spurge patches) Provisional Alliance**	G2 S1
*33.330.00	***Tidestromia oblongifolia* (Arizona honey sweet sparse scrub) Provisional Alliance**	G3 S3
37.940.00	***Toxicodendron diversilobum* (Poison oak scrub) Alliance**	G4 S4
37.940.02	*Toxicodendron diversilobum - Artemisia californica / Leymus condensatus*	
37.940.01	*Toxicodendron diversilobum - Baccharis pilularis - Rubus parviflorus*	
37.940.03	*Toxicodendron diversilobum - Diplacus aurantiacus*	
37.940.04	*Toxicodendron diversilobum - Philadelphus lewisii*	
37.940.05	*Toxicodendron diversilobum / Bromus hordeaceus - Micropus californicus*	
37.940.06	*Toxicodendron diversilobum / Bromus hordeaceus - Vicia villosa - Madia gracilis*	
37.940.08	*Toxicodendron diversilobum / herbaceous*	
37.940.07	*Toxicodendron diversilobum / Pteridium aquilinum*	
*45.405.00	***Vaccinium cespitosum* (Dwarf bilberry meadows and mats) Alliance**	G4? S3?
*45.405.03	*Vaccinium cespitosum - Calamagrostis muiriana*	
*45.405.04	*Vaccinium cespitosum - Carex filifolia*	
*45.405.00	*Vaccinium cespitosum - Carex nigricans*	
*45.405.02	*Vaccinium cespitosum - Kalmia microphylla*	
*45.410.00	***Vaccinium uliginosum* (Bog blue berry wet meadows) Alliance**	G4 S3
*45.410.01	*Vaccinium uliginosum*	

*45.410.03	*Vaccinium uliginosum / Aulacomnium palustre*	
*45.410.04	*Vaccinium uliginosum / Sphagnum teres*	
*45.410.02	*Vaccinium uliginosum ssp. occidentale / Bistorta bistortoides*	
*39.030.00	***Venegasia carpesioides* (Canyon sunflower scrub) Alliance**	G3 S3
*39.030.01	*Venegasia carpesioides*	
33.032.00	***Viguiera parishii* (Parish's goldeneye scrub) Alliance**	G4 S4 (some associations are of high priority for inventory)
33.032.03	*Viguiera parishii*	
*33.032.01	*Viguiera parishii - Agave deserti*	
33.032.04	*Viguiera parishii - Encelia farinosa*	
33.032.02	*Viguiera parishii - Eriogonum fasciculatum*	
*33.032.05	*Viguiera parishii - Salvia dorrii*	
*33.033.00	***Viguiera reticulata* (Net-veined goldeneye scrub) Alliance**	G3 S3?
*33.033.01	*Viguiera reticulata*	
33.070.00	***Yucca schidigera* (Mojave yucca scrub) Alliance**	G4 S4 (some associations are of high priority for inventory)
33.070.01	*Yucca schidigera*	
33.070.03	*Yucca schidigera - Ambrosia dumosa*	
33.070.04	*Yucca schidigera - Coleogyne ramosissima*	
*33.070.08	*Yucca schidigera - Cylindropuntia acanthocarpa*	
33.070.02	*Yucca schidigera - Ephedra nevadensis*	
33.070.07	*Yucca schidigera - Eriogonum fasciculatum*	
*33.070.11	*Yucca schidigera - Larrea tridentata - Agave deserti*	
33.070.05	*Yucca schidigera - Larrea tridentata - Ambrosia dumosa*	
33.070.06	*Yucca schidigera - Larrea tridentata - Ephedra nevadensis*	
*33.070.10	*Yucca schidigera - Larrea tridentata - Simmondsia chinensis*	
33.070.09	*Yucca schidigera - Viguiera parishii*	
33.070.12	*Yucca schidigera / Pleuraphis rigida*	
*33.225.00	***Ziziphus obtusifolia* (Graythorn patches) Special Stands**	G2 S2?

Herbaceous Alliances and Stands		**Global & State Rank**
*21.100.00	***Abronia latifolia - Ambrosia chamissonis* (Dune mat) Alliance**	G3 S3
*21.101.01	*Abronia latifolia - Erigeron glaucus*	
*21.101.02	*Abronia latifolia - Leymus mollis*	
*21.102.02	*Ambrosia chamissonis - Abronia maritima - Cakile maritima*	
*21.102.01	*Ambrosia chamissonis - Abronia umbellata*	
*21.100.03	*Ambrosia chamissonis - Eriophyllum staechadifolium (- Lupinus arboreus)*	
*21.102.03	*Ambrosia chamissonis - Malacothrix incana - Carpobrotus chilensis - Poa douglasii*	
*21.100.01	*Artemisia pycnocephala - Calystegia soldanella*	
*21.110.01	*Artemisia pycnocephala - Cardionema ramosissimum*	
*21.110.03	*Artemisia pycnocephala - Ericameria ericoides*	
*21.110.04	*Artemisia pycnocephala - Poa douglasii*	
21.110.02	*Artemisia pycnocephala - Polygonum paronychia*	
21.125.01	*Cakile maritima - Abronia maritima*	
21.102.04	*Cakile maritima - Ambrosia chamissonis - Carpobrotus edulis*	
*21.100.06	*Poa douglasii - Lathyrus littoralis*	
33.065.00	***Ambrosia psilostachya* (Western ragweed meadows) Provisional Alliance**	G4 S4?
*41.120.00	***Achnatherum hymenoides* (Indian rice grass grassland) Alliance**	G4 S1
*41.120.01	*Achnatherum hymenoides - Leptodactylon pungens*	
*41.120.02	*Achnatherum hymenoides - Sphaeralcea ambigua*	

*41.090.00 ***Achnatherum speciosum*** **(Desert needlegrass grassland) Alliance** G4 S2
*41.090.01 *Achnatherum speciosum*

42.003.00 ***Aegilops triuncialis*** **(Barbed goatgrass patches) Provisional Semi-natural Stands**
42.003.01 *Aegilops triuncialis - Hemizonia congesta*

42.030.00 ***Agropyron cristatum*** **(Crested wheatgrass rangelands) Semi-natural Stands**

45.106.00 ***Agrostis (gigantea, stolonifera) - Festuca arundinacea*** **(Bent grass - tall fescue meadows) Semi-natural Stands**
45.106.01 *Agrostis gigantea*
45.106.02 *Agrostis stolonifera*
45.106.03 *Agrostis stolonifera - Festuca arundinacea*

*42.006.00 ***Alopecurus geniculatus*** **(Water foxtail meadows) Provisional Alliance** G3? S3?

42.010.00 ***Ammophila arenaria*** **(European beach grass swards) Semi-natural Stands**
42.010.02 *Ammophila arenaria*
42.010.03 *Ammophila arenaria - Cardionema ramosissimum*
42.010.01 *Ammophila arenaria - Erechtites minima*
42.010.04 *Ammophila arenaria - Lupinus variicolor*

42.110.00 ***Amsinckia (menziesii, tessellata)*** **(Fiddleneck fields) Alliance** G4 S4
42.110.01 *Amsinckia menziesii - Erodium spp.*
42.110.02 *Amsinckia menziesii - Vulpia bromoides - Plagiobothrys canescens*

*52.214.00 ***Anemopsis californica*** **(Yerba mansa meadows) Alliance** G3 S2?
*52.214.01 *Anemopsis californica - Juncus arcticus var. mexicanus*

*38.140.00 ***Argentina egedii*** **(Pacific silverweed marshes) Alliance** G4 S2
*38.140.01 *Argentina egedii*
*38.140.03 *Argentina egedii - Eleocharis macrostachya*
*38.140.02 *Argentina egedii - Alopecurus aequalis*
*38.140.04 *Argentina egedii - Lotus uliginosus*

*45.425.00 ***Aristida purpurea*** **(Purple three-awn meadows) Provisional Alliance** G4 S3?

35.160.00 ***Artemisia dracunculus*** **(Wild tarragon patches) Alliance** G4 S4
35.160.01 *Artemisia dracunculus*
35.160.02 *Artemisia dracunculus - Pseudognaphalium canescens*

*52.212.00 ***Arthrocnemum subterminale*** **(Parish's glasswort patches) Alliance** G4 S2
*52.212.01 *Arthrocnemum subterminale*
*52.212.03 *Arthrocnemum subterminale - Monanthocloe littoralis*
*52.212.02 *Arthrocnemum subterminale - Sarcocornia pacifica*

42.080.00 ***Arundo donax (Giant reed breaks)*** **Semi-natural Stands**
42.080.01 *Arundo donax*
42.080.02 *Arundo donax - Salix exigua*

52.211.00 ***Atriplex prostrata - Cotula coronopifolia*** **(Fields of fat hen and brass buttons) Semi-natural Stands**
52.211.01 *Atriplex prostrata*
52.211.02 *Atriplex prostrata / annual grasses*
52.211.03 *Atriplex prostrata / Distichlis spicata*
52.211.04 *Atriplex prostrata / Schoenoplectus maritimus*
52.211.05 *Atriplex prostrata / Sesuvium verrucosum*
52.211.06 *Cotula coronopifolia*

44.150.00 ***Avena (barbata, fatua) (Wild oats grasslands)*** **Semi-natural Stands**
44.150.01 *Avena barbata*

44.150.02 *Avena barbata - Avena fatua*
44.150.03 *Avena barbata - Bromus hordeaceus*
44.150.04 *Avena fatua*

52.106.00 ***Azolla (filiculoides, mexicana)*** **(Mosquito fern mats) Provisional Alliance** G4 S4

45.413.00 ***Bistorta bistortoides - Mimulus primuloides*** **(Western bistort - primrose monkey flower meadows) Alliance** G4 S4
45.413.02 *Bistorta bistortoides*

42.011.00 ***Brassica nigra and other mustards*** **(Upland mustards) Semi-natural Stands**
42.011.01 *Brassica nigra*
42.011.02 *Brassica nigra - Bromus diandrus*
42.011.03 *Brassicas tournefortii / Ambrosia dumosa*
42.011.04 *Raphanus sativus*

42.026.00 ***Bromus (diandrus, hordeaceus) - Brachypodium distachyon*** **(Annual brome grasslands) Semi-natural Stands**
42.040.03 *Brachypodium distachyon*
42.026.21 *Bromus diandrus*
42.026.22 *Bromus diandrus - Avena spp.*
42.026.11 *Bromus diandrus - Mixed herbs*
42.026.20 *Bromus hordeaceus - Aira caryophyllea*
42.026.23 *Bromus hordeaceus - Amsinckia menziesii - Hordeum murinum*
42.026.08 *Bromus hordeaceus - Bromus tectorum*
42.026.10 *Bromus hordeaceus - Dichelostemma multiflorum*
42.026.09 *Bromus hordeaceus - Erodium botrys*
42.040.02 *Bromus hordeaceus - Erodium botrys*
42.026.13 *Bromus hordeaceus - Erodium botrys - Plagiobothrys fulvus*
42.026.15 *Bromus hordeaceus - Holocarpha virgata - Lolium perenne*
42.026.14 *Bromus hordeaceus - Holocarpha virgata - Taeniatherum caput - medusa*
42.026.17 *Bromus hordeaceus - Leontodon taraxacoides*
42.026.16 *Bromus hordeaceus - Limnanthes douglasii*
42.026.18 *Bromus hordeaceus - Lupinus nanus - Trifolium spp.*
42.026.07 *Bromus hordeaceus - Taeniatherum caput - medusae*
42.026.02 *Bromus hordeaceus - Vulpia hirsuta*
42.026.19 *Bromus hordeaceus (-Vicia villosa - Lolium multiflorum) - Trifolium hirtum*

42.024.00 ***Bromus rubens - Schismus (arabicus, barbatus)*** **(Red brome or Mediterranean grass grasslands) Semi-natural Stands**
42.024.01 *Bromus rubens*
42.024.02 *Bromus rubens - mixed herbs*
42.024.03 *Schimus playa*

42.020.00 ***Bromus tectorum*** **(Cheatgrass grassland) Semi-natural Stands**
42.020.01 *Bromus tectorum*
42.020.02 *Bromus tectorum - Bromus diandrus*

*52.112.00 ***Bulboschoenus maritimus*** **(Salt marsh bulrush marshes) Alliance** G4 S3
*52.112.03 *Bolboschoenus maritimus*
*52.112.04 *Bolboschoenus maritimus / Sarcocornia pacifica (depressa)*
*52.112.05 *Bolboschoenus maritimus / Sesuvium verrucosum*

21.125.00 ***Cakile (edentula, maritima)*** **(Sea rocket sands) Provisional Semi-natural Stands**

*41.224.00 ***Calamagrostis canadensis*** **(Bluejoint reed grass meadows) Alliance** G5 S3
*41.224.01 *Calamagrostis canadensis*
*41.224.02 *Calamagrostis canadensis - Carex utriculata*
*41.224.03 *Calamagrostis canadensis - Dodecatheon redolens*
*41.224.04 *Calamagrostis canadensis - Scirpus microcarpus*

45.141.00 ***Calamagrostis muiriana*** **(Shorthair reed grass meadows) Alliance** G4 S4
- 45.141.02 *Calamagrostis muiriana - Oreostemma alpigenum*
- 45.141.03 *Calamagrostis muiriana - Ptilagrostis kingii*
- 45.141.04 *Calamagrostis muiriana - Trisetum spicatum*
- 45.141.01 *Calamagrostis muriana - Juncus drummondii*

*41.190.00 ***Calamagrostis nutkaensis*** **(Pacific reed grass meadows) Alliance** G4 S2
- *41.190.03 *Calamagrostis nutkaensis*
- *41.190.01 *Calamagrostis nutkaensis - Baccharis pilularis*
- *41.190.02 *Calamagrostis nutkaensis - Carex obnupta. - Juncus spp.*

41.211.00 ***Calamagrostis purpurascens*** **(Fell-fields with purple reed grass) Alliance** G4? S4?
- 41.211.02 *Calamagrostis purpurascens - Ericameria parryi var. monocephala - Linanthus pungens*
- 41.211.01 *Calamagrostis purpurascens - Linanthus pungens*
- 41.211.03 *Calamagrostis purpurascens / Ribes cereum*

*45.416.00 ***Camassia quamash*** **(Small camas meadows) Alliance** G4? S3?
- *45.416.01 *Camassia quamash / Sphagnum subsecundum*

*45.168.00 ***Carex (aquatilis, lenticularis)*** **(Water sedge and Lakeshore sedge meadows) Alliance** G5 S3
- *45.168.01 *Carex aquatilis*
- *45.168.04 *Carex aquatilis - Carex lenticularis*
- *45.168.02 *Carex lenticularis / Aulacomnium palustre*
- *45.168.03 *Carex lenticularis / Perideridia parishii*

52.121.00 ***Carex (utriculata, vesicaria)*** **(Beaked sedge and blister sedge meadows) Alliance** G5 S4
- 52.120.01 *Carex utriculata*
- 52.121.01 *Carex utriculata - Mimulus primuloides*
- 45.110.22 *Carex vernacula - Antennaria media*
- 45.170.01 *Carex vesicaria*

*45.142.00 ***Carex barbarae*** **(White-root beds) Alliance** G2? S2?
- *45.142.01 *Carex barbarae*

*45.150.00 ***Carex breweri*** **(Brewer sedge mats) Alliance** G4 S3
- *45.150.01 *Carex breweri*
- *45.150.03 *Carex breweri - Cistanthe umbellata*
- *45.150.02 *Carex breweri - Poa wheeleri*

*45.160.00 ***Carex congdonii*** **(Congdon's sedge talus) Provisional Alliance** G2 S2
- *45.160.01 *Arnica amplexicaulis - Carex congdonii*

*45.165.00 ***Carex densa*** **(Dense sedge marshes) Provisional Alliance** G2? S2?
- *45.165.02 *Carex densa - Juncus xiphioides*
- *45.165.03 *Carex densa - Lolium perenne - Juncus spp.*

*45.169.00 ***Carex douglasii*** **(Douglas' sedge meadows) Provisional Alliance** G4? S2?

45.140.00 ***Carex filifolia*** **(Shorthair sedge turf) Alliance** G4 S4
- 45.140.06 *Carex filifolia*
- 45.140.09 *Carex filifolia - Calamagrostis muiriana*
- 45.140.10 *Carex filifolia - Cistanthe monosperma*
- 45.140.05 *Carex filifolia - Erigeron algidus*
- 45.140.11 *Carex filifolia - Erigeron petiolaris*
- 45.140.08 *Carex filifolia - Penstemon heterodoxus*
- 45.140.07 *Carex filifolia - Saxifraga aprica*
- 45.140.01 *Carex filifolia - Trisetum spicatum*

*45.145.00 ***Carex helleri*** **(Heller's sedge fell-fields) Alliance** G4 S2
- *45.145.03 *Carex helleri - Saxifraga tolmiei - Luzula divaricata*
- *45.145.06 *Carex helleri - Arabis platysperma - Penstemon heterodoxus*

*45.145.05	*Carex helleri - Eriogonum incanum - Raillardella argentea*	
*45.145.04	*Carex helleri - Poa suksdorfii*	
*45.115.00	***Carex heteroneura* (Different-nerve sedge patches) Provisional Alliance**	G3? S3?
*45.115.01	*Carex heteroneura - Achillea millefolium*	
*45.175.00	***Carex integra* (Small-fruited sedge meadows) Provisional Alliance**	G4? S2?
*45.162.00	***Carex jonesii* (Jones's sedge turf) Alliance**	G4 S3
*45.162.02	*Carex jonesii*	
*45.162.01	*Carex jonesii - Bistorta bistortoides*	
*45.162.03	*Carex jonesii / Sphagnum subsecundum*	
*45.166.00	***Carex lasiocarpa* (Slender sedge meadows) Provisional Alliance**	G5? S3?
*45.166.01	*Carex lasiocarpa*	
*45.178.00	***Carex limosa* (Shore sedge fens) Alliance**	G4? S2?
*45.178.02	*Carex limosa - Menyanthes trifoliata*	
*45.110.03	*Carex limosa - Mimulus primuloides*	
*45.178.01	*Carex limosa / Drepanocladus sordidus*	
*45.179.00	***Carex luzulina* (Woodland sedge fens) Provisional Alliance**	G3 S2?
*45.181.00	***Carex microptera* (Small-winged sedge meadows) Provisional Alliance**	G4 S2?
45.130.00	***Carex nebrascensis* (Nebraska sedge meadows) Alliance**	G5 S4
45.130.01	*Carex nebrascensis*	
45.130.02	*Carex nebrascensis - Ptilagrostis kingii*	
*45.164.00	***Carex nigricans* (Showy sedge sod) Provisional Alliance**	G4 S3?
*45.182.00	***Carex nudata* (Torrent sedge patches) Alliance**	G3 S3
*45.182.01	*Carex nudata*	
*45.183.00	***Carex obnupta* (Slough sedge swards) Alliance**	G4 S3
*45.183.01	*Carex obnupta*	
*45.183.02	*Carex obnupta - Juncus lescurii*	
*45.183.03	*Carex obnupta - Juncus patens*	
*45.184.00	***Carex pansa* (Sand dune sedge swaths) Provisional Alliance**	G4? S3?
*45.120.00	***Carex scopulorum* (Sierra alpine sedge turf) Alliance**	G4 S3
*45.120.01	*Carex scopulorum*	
*45.120.07	*Carex scopulorum - Allium validum*	
*45.120.04	*Carex scopulorum - Eleocharis quinquefolia*	
*45.120.03	*Carex scopulorum - Eriophorum crinigerum*	
*45.120.08	*Carex scopulorum - Mimulus primuloides*	
*45.120.02	*Carex scopulorum - Pedicularis groenlandica*	
*45.120.06	*Carex scopulorum / Aulacomnium palustre*	
*45.120.05	*Carex scopulorum / Oreostemma alpigenum*	
*45.180.00	***Carex serratodens* (Twotooth sedge seeps) Provisional Alliance**	G3 S3?
*45.190.00	***Carex simulata* (Short-beaked sedge meadows) Alliance**	G4 S3
*45.190.01	*Carex simulata*	
*45.190.04	*Carex simulata - Carex utriculata*	
*45.190.05	*Carex simulata - Carex vesicaria*	
*45.190.02	*Carex simulata / Aulacomnium palustre*	
*45.190.03	*Carex simulata / Philonotis fontana*	

*45.155.00 ***Carex spectabilis*** **(Showy sedge sod) Alliance** G4 S3
*45.155.02 *Carex spectabilis - Senecio triangularis*
*45.155.01 *Carex spectabilis - Sibbaldia procumbens*

*45.185.00 ***Carex straminiformis*** **(Mount Shasta sedge meadows) Provisional Alliance** G3? S3?

*45.186.00 ***Carex subnigricans*** **(Dark alpine sedge turf) Alliance** G4 S3
*45.186.01 *Carex subnigricans - Antennaria media*
*45.186.05 *Carex subnigricans - Deschampsia caespitosa*
*45.186.03 *Carex subnigricans - Dodecatheon alpinum*
*45.186.02 *Carex subnigricans - Oreostemma alpigenum*
*45.186.04 *Carex subnigricans - Pedicularis attollens*

21.200.00 ***Carpobrotus edulis or other Ice Plants*** **(Ice plant mats) Semi-natural Stands**

42.042.00 ***Centaurea (solstitialis, meletensis)*** **(Yellow star-thistle fields) Semi-natural Stands**
42.042.01 *Centaurea melitensis - Brassica nigra*
42.042.02 *Centaurea solstitialis*
42.040.04 *Centaurea spp. - Brachypodium distachyon.*

42.043.00 ***Centaurea (virgata)*** **(Knapweed and purple-flowered star-thistle fields) Provisional Semi-natural Stands**

*44.160.00 ***Centromadia (pungens)*** **(Tar plant fields) Alliance** G2? S2?
*44.160.02 *Centromadia pungens - Downingia bella*
*44.160.01 *Centromadia pungens ssp. laevis*

*42.100.00 ***Cirsium fontinale*** **(Fountain thistle seeps) Alliance** G1 S1
*42.100.01 *Cirsium fontinale var. campylon - Carex serratodens - Hordeum brachyantherum*
*42.100.02 *Cirsium fontinale var. campylon - Hemizonia congesta var. luzulifolia*
*42.100.03 *Cirsium fontinale var. campylon - Mimulus guttatus - Stachys pycnantha*

45.311.00 ***Cistanthe (umbellata) - Gayophytum (diffusum)*** **(Pussypaws - groundsmoke openings) Alliance** G4 S4
45.311.01 *Astragalus bolanderi - (Cistanthe umbellatum)*
45.311.02 *Cistanthe umbellatum - Achnatherum occidentalis*
45.311.03 *Cistanthe - Castilleja arachnoidea*
45.311.04 *Polygonum douglasii - Gayophytum dffusum*

45.556.00 ***Conium maculatum - Foeniculum vulgare*** **(Poison hemlock or fennel patches) Semi-natural Stands**
45.556.01 *Conium maculatum*
45.556.02 *Foeniculum vulgare*

42.070.00 ***Cortaderia (jubata, selloana)*** **(Pampas grass patches) Semi-natural Stands**

46.100.00 ***Cressa truxillensis - Distichlis spicata*** **(Alkali weed - Salt grass playas and sinks) Alliance** G4 S4

46.100.02 *Chamaesyce hooveri - Bolboschoenus maritimus*
46.100.03 *Neostapfia colusana - Malvella leprosa*
46.100.04 *Neostapfia colusana - Polypogon maritimus*
46.100.05 *Orcuttia pilosa*

42.044.00 ***Cynosurus echinatus*** **(Annual dogtail grasslands) Semi-natural Stands**
42.044.07 *Cynosurus echinatus - Arrhenatherum elatius / Dichelostemma capitatum*
42.044.01 *Cynosurus echinatus - Bromus hordeaceus - Avena fatua*
42.044.02 *Cynosurus echinatus - Bromus hordeaceus - Madia elegans*
42.044.04 *Cynosurus echinatus - Bromus hordeaceus - Taeniatherum caput-medusae*
42.044.03 *Cynosurus echinatus - Bromus hordeaceus - Taraxacum officinale*
42.044.05 *Cynosurus echinatus - Lagophylla ramosissima*

*41.050.00	***Danthonia californica* (California oat grass prairie) Provisional Alliance**	G4 S3
*41.050.05	*Danthonia californica*	
*41.050.04	*Danthonia californiaca - Aira caryophyllea*	
*41.050.01	*Danthonia californica - Arrhenatherum elatius*	
*41.050.02	*Danthonia californica - Elymus elymoides*	
*41.050.03	*Danthonia californica - Muhlenbergia filiformis*	
*41.051.00	***Danthonia intermedia* (Wild mountain oat grass meadows) Alliance**	G4? S3?
*41.051.01	*Danthonia intermedia - Antennaria rosea*	
*41.051.02	*Danthonia intermedia - Ptilagrostis kingii*	
*51.200.00	***Darlingtonia californica* (California pitcher plant fens) Alliance**	G4? S3
*51.200.01	*Darlingtonia californica*	
*44.161.00	***Deinandra fasciculata* (Clustered tarweed fields) Alliance**	G3? S3?
*44.161.01	*Deinandra fasciculata - annual grass-herb*	
*44.161.02	*Deinandra fasciculata - Hordeum depressum - Atriplex coronata var. notatior*	
41.220.00	***Deschampsia caespitosa* (Tufted hair grass meadows) Alliance**	G5 S4? (some associations are of high priority for inventory)
*41.220.08	*Deschampsia caespitosa*	
*41.220.05	*Deschampsia caespitosa - Anthoxanthum odoratum*	
41.220.12	*Deschampsia caespitosa - Bistorta bistortoides*	
*41.220.02	*Deschampsia caespitosa - Cardamine breweri*	
41.220.01	*Deschampsia caespitosa - Carex nebrascensis*	
41.220.09	*Deschampsia caespitosa - Danthonia californica*	
*41.220.13	*Deschampsia caespitosa - Horkelia marinensis*	
*41.220.14	*Deschampsia caespitosa - Lilaeopsis masonii*	
41.220.11	*Deschampsia caespitosa - Perideridia parishii*	
41.220.03	*Deschampsia caespitosa - Senecio scorzonella*	
41.220.04	*Deschampsia caespitosa - Senecio scorzonella - Achillea millefolium*	
41.220.07	*Deschampsia caespitosa - Solidago multiradiata*	
*41.220.10	*Deschampsia caespitosa - Trifolium longipes*	
*41.220.15	*Deschampsia caespitosa var. holciformis*	
*22.100.00	***Dicoria canescens - Abronia villosa* (Desert dunes) Alliance**	G3 S2
*22.100.01	*Dicoria canescens*	
41.200.00	***Distichlis spicata* (Salt grass flats) Alliance**	G5 S4 (some associations are of high priority for inventory)
41.200.14	*Distichlis spicata - Agrostis viridis*	
*41.200.11	*Distichlis spicata - Ambrosia chamissonis*	
41.200.15	*Distichlis spicata - Atriplex triangularis*	
41.200.16	*Distichlis spicata - Bromus diandrus*	
41.200.17	*Distichlis spicata - Cotula coronopifolia*	
*41.200.07	*Distichlis spicata - Frankenia salina - Jaumea carnosa*	
41.200.18	*Distichlis spicata - Hordeum murninum*	
*41.200.06	*Distichlis spicata - Jaumea carnosa*	
41.200.05	*Distichlis spicata - Juncus arcticus ssp. balticus (J. arcticus ssp. mexicanus)*	
*41.200.02	*Distichlis spicata - Juncus cooperi*	
41.200.19	*Distichlis spicata - Leymus triticoides / Lupinus (albifrons, arboreus)*	
41.200.10	*Distichlis spicata - Parapholis strigosa*	
*41.200.20	*Distichlis spicata - Sarcocornia pacifica*	
*41.200.01	*Distichlis spicata / Allenrolfea occidentalis*	
41.200.13	*Distichlis spicata / annual grasses*	
*41.200.04	*Distichlis spicata / Chrysothamnus albidus*	
*41.200.03	*Distichlis spicata / Sarcobatus vermiculatus*	
*52.115.00	***Dulichium arundinaceum* (Three-way sedge meadows) Provisional Alliance**	G3? S1
*52.115.01	*Dulichium arundinaceum*	

*45.231.00	***Eleocharis acicularis* (Needle spike rush stands) Alliance**	G4? S3?
*45.231.01	*Eleocharis acicularis - Eryngium castrense*	
*45.231.03	*Navarretia spp. - (Eleocharis acicularis - Eryngium alismaefolium)*	
*45.231.02	*Plagiobothrys mollis - (Eleocharis acicularis - Eryngium mathiasiae)*	
45.230.00	***Eleocharis macrostachya* (Pale spike rush marshes) Alliance**	G4 S4 (some associations are of high priority for inventory)
45.230.01	*Eleocharis macrostachya*	
*45.230.07	*Eleocharis macrostachya - (Pleuropogon californicus)*	
*45.230.02	*Eleocharis macrostachya - Callitriche hermaphroditica*	
*45.230.04	*Eleocharis macrostachya - Eryngium aristulatum ssp. Parishii*	
*45.230.05	*Eleocharis macrostachya - Lasthenia glaberrima*	
*45.230.06	*Eleocharis macrostachya - Marsilea vestita*	
*45.230.03	*Eleocharis macrostachya - Sagittaria montevidensis*	
45.220.00	***Eleocharis quinqueflora* (Few-flowered spike rush marshes) Alliance**	G4 S4 (some associations are of high priority for inventory)
45.220.01	*Eleocharis quinqueflora*	
*45.220.02	*Eleocharis quinqueflora - Mimulus primuloides*	
*45.220.03	*Eleocharis quinqueflora / Aulacomnium palustre*	
*45.220.04	*Eleocharis quinqueflora / Campylium stellatum*	
*45.220.05	*Eleocharis quinqueflora / Drepanocladus aduncus - Drepanocladus sordidus*	
*45.220.06	*Eleocharis quinqueflora / Philonotis fontana*	
*41.640.00	***Elymus glaucus* (Blue wild rye meadows) Alliance**	G3? S3?
*41.640.01	*Elymus glaucus*	
*41.640.03	*Elymus glaucus - Carex feta*	
*41.640.02	*Elymus glaucus - Carex pellita*	
*41.640.04	*Elymus glaucus - Heracleum lanatum*	
41.650.00	***Elymus multisetus* (Big squirreltail patches) Provisional Alliance**	G4 S4?
*38.120.00	***Ericameria discoidea - Hulsea algida* (Fell-fields with California heath-goldenrod and Pacific alpine gold) Alliance**	G3? S3?
*38.120.02	*Ericameria discoidea - Linanthus pungens*	
*38.120.01	*Ericameria discoidea - Minuartia nuttallii*	
*38.120.04	*Hulsea algida*	
*38.120.05	*Hulsea algida - Ericameria discoidea - Phacelia hastata*	
*38.120.06	*Hulsea algida - Muhlenbergia richardsonis - Achnatherum pinetorum*	
*42.004.00	***Eryngium aristulatum* (California button-celery patches) Alliance**	G3 S3?
*42.004.01	*Eryngium aristulatum - Lupinus bicolor*	
43.200.00	***Eschscholzia (californica)* (California poppy fields) Alliance**	G4 S4
43.200.01	*Eschoscholzia californica*	
*91.170.00	***Festuca brachyphylla* (Alpine fescue fell-fields) Alliance**	G4? S3?
*91.170.02	*Festuca brachyphylla - Penstemon davidsonii*	
*91.170.01	*Festuca brachyphylla - Eriogonum ovalifolium*	
*41.250.00	***Festuca idahoensis* (Idaho fescue grassland) Alliance**	G4 S3?
*41.250.03	*Festuca idahoensis - Achillea millefolium*	
*41.250.01	*Festuca idahoensis - Bromus carinatus*	
*41.250.02	*Festuca idahoensis - Festuca rubra*	
*41.255.00	***Festuca rubra* (Red fescue grassland) Alliance**	G4 S3?
*41.255.01	*Festuca rubra*	
*52.500.00	***Frankenia salina* (Alkali heath marsh) Alliance**	G4 S3
*52.500.02	*Frankenia salina*	
*52.500.01	*Frankenia salina - Limonium californicum - Monanthochloe littoralis - Sarcocornia pacifica*	

*52.500.03	*Frankenia salina / Agrostis avenacea*	
*52.500.04	*Frankenia salina / Distichlis spicata*	
*52.500.06	*Suaeda taxifolia / Hordeum murinum*	
*41.222.00	***Glyceria (elata, striata)*** **(Manna grass meadows) Alliance**	G4 S3?
*41.222.01	*Glyceria elata*	
*41.222.03	*Glyceria elata - Lotus longifolius*	
*41.222.02	*Glyceria elata - Scirpus microcarpus*	
*41.222.04	*Glyceria striata*	
*41.223.00	***Glyceria occidentalis*** **(Northwest manna grass marshes) Provisional Alliance**	G3? S3?
*52.206.00	***Grindelia (stricta)*** **(Gum plant patches) Provisional Alliance**	G3? S3?
42.050.00	***Holcus lanatus - Anthoxanthum odoratum*** **(Common velvet grass - sweet vernal grass meadows) Semi-natural Stands**	
42.050.08	*Holcus lanatus*	
42.050.09	*Holcus lanatus - Anthoxanthum odoratum*	
*42.052.00	***Hordeum brachyantherum*** **(Meadow barley patches) Alliance**	G4 S3?
*42.052.01	*Hordeum brachyantherum*	
*42.052.04	*Hordeum brachyantherum - Poa pratensis*	
*42.052.02	*Hordeum brachyantherum - Polypogon monspeliensis*	
*42.052.03	*Hordeum brachyantherum - Senecio triangularis*	
*52.117.00	***Hydrocotyle (ranunculoides, umbellata)*** **(Mats of floating pennywort) Alliance**	G4 S3?
*52.117.01	*Hydrocotyle ranunculoides*	
*52.117.02	*Hydrocotyle ranunculoides - Schoenoplectus pungens*	
45.401.00	***Iris missouriensis*** **(Western blue flag patches) Provisional Alliance**	G5 S4
*52.109.00	***Isoetes (bolanderi, echinospora, howellii, nuttallii, occidentalis)*** **(Quillwort beds) Provisional Alliance**	G3 S3?
*45.568.00	***Juncus (oxymeris, xiphioides)*** **(Iris-leaf rush seeps) Provisional Alliance**	G2? S2?
45.562.00	***Juncus arcticus (var. balticus, mexicanus)*** **(Baltic and Mexican rush marshes) Alliance**	G5 S4
45.562.07	*Juncus arcticus var. balticus*	
91.120.21	*Juncus arcticus var. balticus*	
45.562.05	*Juncus arcticus var. balticus - Argentina egedii*	
45.562.04	*Juncus arcticus var. balticus - Carex praegracilis*	
45.562.01	*Juncus arcticus var. balticus - Conium maculatum*	
45.562.06	*Juncus arcticus var. balticus - Lepidium latifolium*	
45.562.02	*Juncus arcticus var. mexicanus*	
*45.563.00	***Juncus cooperi*** **(Cooper's rush marsh) Alliance**	G3 S3
*45.563.01	*Juncus cooperi*	
45.561.00	***Juncus effusus*** **(Soft rush marshes) Alliance**	G4 S4?
45.561.01	*Juncus effusus*	
*45.569.00	***Juncus lescurii*** **(Salt rush swales) Alliance**	G3 S2?
*45.569.01	*Juncus lescurii*	
*45.569.02	*Juncus (lescurii) - Distichlis spicata*	
*45.567.00	***Juncus nevadensis*** **(Sierra rush marshes) Alliance**	G3? S3?
*45.567.01	*Juncus nevadensis*	
*45.567.02	*Juncus nevadensis - Carex leporinella*	
*45.567.03	*Juncus nevadensis - Eleocharis quinqueflora*	

45.566.00	***Juncus parryi* (Parry's rush outcrops) Alliance**	G4 S4
45.566.01	*Juncus parryi - Eriogonum incanum*	
45.564.00	***Juncus patens* (Western rush marshes) Provisional Alliance**	G4? S4?
*91.115.00	***Kobresia myosuroides* (Pacific bog sedge meadows) Alliance**	G5 S1
*91.115.01	*Kobresia myosuroides - Thalictrum alpinum*	
44.108.00	***Lasthenia californica - Plantago erecta - Vulpia microstachys* (California goldfields - Dwarf plantain - Six-weeks fescue flower fields) Alliance**	G4 S4 (some associations are of high priority for inventory)
44.109.03	*Lasthenia californica*	
*44.109.01	*Lasthenia californica - Atriplex coronata var. notatior*	
*44.109.04	*Lasthenia californica - Lupinus bicolor - Layia platyglossa - Bromus spp.*	
*44.108.01	*Lasthenia californica - Plantago erecta - Hesperevax sparsiflora*	
*52.500.05	*Lasthenia ferrisiae - Lasthenia conjugens*	
44.108.02	*Plantago erecta - Lolium perenne lichen-rocky*	
*44.108.08	*Vulpia microstachys - Elymus elymoides - Achnatherum lemmonii*	
*44.109.05	*Vulpia microstachys - Lasthenia californica - Agrostis elliottiana*	
44.108.05	*Vulpia microstachys - Mimulus guttatus - Pentagramma triangularis*	
*44.108.09	*Vulpia microstachys - Navarretia tagetina*	
44.109.06	*Vulpia microstachys - Parvisedum pumilum - Lasthenia californica*	
*44.108.04	*Vulpia microstachys - Plantago erecta*	
44.108.03	*Vulpia microstachys - Plantago erecta - Calycadenia (truncata, multiglandulosa)*	
*44.108.10	*Vulpia microstachys - Selaginella hansenii*	
*44.108.11	*Vulpia microstachys - Selaginella hansenii - Lupinus nanus*	
*44.108.07	*Vulpia microstachys - Selaginella hansenii - Lupinus spectabilis*	
*44.119.00	***Lasthenia fremontii - Distichlis spicata* (Fremont's goldfields - Saltgrass alkaline vernal pools) Alliance**	G4 S3
*44.119.01	*Downingia bella - Lilaea scilloides*	
*44.119.02	*Downingia cuspidata - Myosurus minimus*	
*44.119.03	*Downingia insignis - Psilocarphus brevissimus*	
*44.119.04	*Downingia pulchella - Cressa truxillensis*	
*44.119.05	*Downingia pulchella - Distichlis spicata*	
*44.119.07	*Lasthenia fremontii - Pleuropogon californicus*	
*44.119.09	*Lasthenia platycarpha - Lepidium latipes*	
*44.119.10	*Limnanthes douglasii ssp. rosea - Pleuropogon californicus*	
*44.119.06	*Hordeum (depressum, murinum spp. leporinum)*	
*44.119.11	*Lasthenia fremontii - Distichlis spicata*	
*42.007.00	***Lasthenia fremontii - Downingia (bicornuta)* (Fremont's goldfields - Downingia vernal pools) Alliance**	G3 S3
*42.007.02	*Downingia (bicornuta, cuspidata)*	
*42.007.01	*Downingia bicornuta*	
*42.007.06	*Eryngium (vaseyi, castrense)*	
*42.007.08	*Lasthenia californica - Downingia bicornuta*	
*42.007.07	*Lasthenia fremontii*	
*42.007.03	*Lasthenia fremontii - Downingia bicornuta*	
*42.007.04	*Lasthenia fremontii - Downingia ornatissima*	
*42.007.05	*Ranunculus bonariensis - Holocarpha virgata*	
*44.140.00	***Lasthenia glaberrima* (Smooth goldfields vernal pool bottoms) Alliance**	G3 S3
*44.119.08	*Lasthenia glaberrima - Atriplex persistens*	
*44.140.01	*Lasthenia glaberrima - Downingia bicornuta*	
*44.140.05	*Lasthenia glaberrima - Downingia insignis*	
*44.140.06	*Lasthenia glaberrima - Lupinus bicolor*	
*44.140.02	*Lasthenia glaberrima - Pleuropogon californicus*	
*44.140.03	*Lasthenia glaberrima - Pogogyne douglasii*	
*44.140.04	*Lasthenia glaberrima - Trifolium variegatum*	

*42.002.00 ***Layia fremontii - Achyrachaena mollis*** **(Fremont's tidy-tips - Blow wives vernal pools) Alliance** G3 S3?

*42.002.01 *Layia fremontii - Achyrachaena mollis*
*42.002.02 *Layia fremontii - Lasthenia californica - Achyrachaena mollis*
*42.002.03 *Layia fremontii - Leontodon taraxacoides - Plagiobothrys greenei*
*42.002.04 *Plagiobothrys austina - Achyrachaena mollis*

52.105.00 ***Lemna (minor) and Relatives*** **(Duckweed blooms) Provisional Alliance** G5 S4?

52.205.00 ***Lepidium latifolium*** **(Perennial pepper weed patches) Semi-natural Stands**

52.205.02 *Lepidium latifolium*
52.205.01 *Lepidium latifolium - Distichlis spicata.*

*41.020.00 ***Leymus cinereus*** **(Ashy ryegrass meadows) Alliance** G4 S2

*41.265.00 ***Leymus condensatus*** **(Giant wild rye grassland) Alliance** G3 S3

*41.265.01 *Leymus condensatus*

*41.260.00 ***Leymus mollis*** **(Sea lyme grass patches) Alliance** G4 S2

*41.260.03 *Leymus mollis - Abronia latifolia - (Cakile sp.)*
*41.260.02 *Leymus mollis - Ammophila arenaria*
*41.260.01 *Leymus mollis - Carpobrotus edulis*

*41.080.00 ***Leymus triticoides*** **(Creeping rye grass turfs) Alliance** G4 S3

*41.080.01 *Leymus triticoides*
*41.080.05 *Leymus triticoides - Anemopsis californica*
*41.080.02 *Leymus triticoides - Bromus spp. - Avena spp.*
*41.080.04 *Leymus triticoides - Carduus pycnocephalus - Geranium dissectum*
*41.080.03 *Leymus triticoides - Lolium perenne*
*41.080.06 *Leymus triticoides - Poa secunda*

41.321.00 ***Lolium perenne*** **(Perennial rye grass fields) Semi-natural Stands**

41.321.01 *Lolium perenne*
41.321.07 *Lolium perenne*
41.321.02 *Lolium perenne - Bromus hordeaceus*
41.321.03 *Lolium perenne - Centaurium muehlenbergii*
41.321.08 *Lolium perenne - Convolvulus arvensis*
41.321.09 *Lolium perenne - Festuca arundinacea*
41.321.04 *Lolium perenne - Hemizonia congesta*
41.321.05 *Lolium perenne - Hordeum marinum - Ranunculus californicus*
41.321.10 *Lolium perenne - Lepidium latifolium*
41.321.06 *Lolium perenne - Leymus triticoides*
41.321.11 *Lolium perenne - Lotus corniculatus*
41.321.12 *Zigadenus fremontii (- Lolium perenne)*

52.230.00 ***Lotus purshianus*** **(Spanish clover fields) Provisional Alliance** G4? S4?

52.118.00 ***Ludwigia (hexapetala, peploides)*** **(Water primrose wetlands) Provisional Semi-natural Stands**

*41.275.00 ***Melica torreyana*** **(Torrey's melic grass patches) Provisional Alliance** G2 S2?

*41.275.01 *Melica torreyana*

*44.111.00 ***Mimulus (guttatus)*** **(Common monkey flower seeps) Alliance** G4? S3?

*44.111.01 *Mimulus guttatus*
*44.111.03 *Mimulus guttatus - (Mimulus spp.)*
*44.111.02 *Mimulus guttatus - Vulpia microstachys*
*44.111.04 *Mimulus lewisii*
*45.413.03 *Mimulus primuloides*

*44.113.00	***Montia fontana - Sidalcea calycosa*** **(Water blinks - Annual checkerbloom vernal pools) Alliance**	G2 S2
*44.113.01	*Montia fontana - Sidalcea calycosa*	
41.276.00	***Muhlenbergia filiformis*** **(Pullup muhly meadows) Provisional Alliance**	G4? S4?
41.277.00	***Muhlenbergia richardsonis*** **(Mat muhly meadows) Provisional Alliance**	G4? S4?
*41.278.00	***Muhlenbergia rigens*** **(Deer grass beds) Alliance**	G3 S2?
*41.278.01	*Muhlenbergia rigens*	
*41.140.00	***Nassella cernua*** **(Nodding needle grass grassland) Provisional Alliance**	G4 S3?
*41.110.00	***Nassella lepida*** **(Foothill needle grass grassland) Provisional Alliance**	G3? S3?
*41.150.00	***Nassella pulchra*** **(Purple needle grass grassland) Alliance**	G4 S3?
*41.150.04	*Nassella pulchra*	
*41.150.02	*Nassella pulchra - Avena fatua*	
*41.150.05	*Nassella pulchra - Avena spp. - Bromus spp.*	
*41.150.10	*Nassella pulchra - Distichlis spicata - Bromus spp.*	
*41.150.06	*Nassella pulchra - Erodium spp. - Avena barbata*	
*41.150.11	*Nassella pulchra - Leontodon taraxicoides*	
*41.150.01	*Nassella pulchra - Lolium perenne (-Trifolium spp.)*	
*41.150.12	*Nassella pulchra - Lolium perenne - Astragalus gambelianus - Lepidium nitidum*	
*41.150.13	*Nassella pulchra - Lolium perenne - Calystegia collina*	
*41.150.09	*Nassella pulchra - Melica californica - annual grass*	
*41.150.03	*Nassella pulchra - Sanicula bipinnatifida*	
*41.150.14	*Nassella pulchra / Baccharis pilularis*	
*41.150.07	*Nassella pulchra / Hazardia squarrosa*	
*52.110.00	***Nuphar lutea*** **(Yellow pond-lily mats) Provisional Alliance**	G5 S3?
*52.119.00	***Oenanthe sarmentosa*** **(Water-parsley marsh) Alliance**	G4 S2?
*52.119.01	*Oenanthe sarmentosa*	
*45.418.00	***Oxypolis occidentalis*** **(Western cowbane meadows) Alliance**	G3 S3
*45.418.02	*Oxypolis occidentalis - Bistorta bistortoides*	
*45.418.03	*Oxypolis occidentalis - Carex amplifolia*	
*45.418.04	*Oxypolis occidentalis - Eleocharis montevidensis*	
*45.418.05	*Oxypolis occidentalis - Senecio triangularis*	
*45.418.06	*Oxypolis occidentalis / Philonotis fontana*	
*91.122.00	***Oxyria digyna*** **(Mountain sorrel patches) Provisional Alliance**	G4 S3?
*42.095.00	***Panicum urvilleanum*** **(Desert panic grass patches) Alliance**	G3 S1
*42.095.01	*Panicum urvilleanum*	
42.085.00	***Pennisetum setaceum*** **(Fountain grass swards) Semi-natural Stands**	
42.085.01	*Pennisetum setaceum - Coreopsis gigantea - Hesperoyucca whipplei - Malosma laurina*	
*45.414.00	***Penstemon heterodoxus*** **(Heretic penstemon patches) Provisional Alliance**	G4? S3?
*91.120.02	*Antennaria alpina - Penstemon heterodoxus*	
45.415.00	***Penstemon newberryi*** **(Mountain pride patches) Alliance**	G4 S4
45.415.03	*Penstemon newberryi - Streptanthus tortuosus - Sedum obtusatum ssp. boreale - Muhlenbergia montana*	
45.415.04	*Penstemon newberryi - Streptanthus tortuosus / Selaginella watsonii*	
45.415.02	*Penstemon newberryi - Streptanthus tortuosus / Spiraea densiflora*	

42.207.00 ***Persicaria lapathifolia - Xanthium strumarium*** **(Smartweed - cocklebur patches) Provisional Alliance** G4 S4

42.051.00 ***Phalaris aquatica*** **(Harding grass swards) Semi-natural Stands**
- 42.051.02 *Phalaris aquatica*
- 42.051.03 *Phalaris aquatica - Avena barbata*
- 42.051.01 *Phalaris aquatica - Bromus hordeaceus - Centaurea solstitialis*

*91.123.00 ***Phlox covillei*** **(Coville's phlox fell-fields) Alliance** G4 S3
- *91.123.03 *Astragalus kentrophyta - Draba oligosperma*
- *91.123.04 *Draba oligosperma - Poa glauca ssp. Rupicola*
- *91.120.36 *Festuca minutiflora - Penstemon davidsonii*
- *91.120.06 *Ivesia muirii*
- *91.123.01 *Phlox covillei - Elymus elymoides - Podistera nevadensis*
- *91.123.02 *Phlox covillei - Elymus elymoides - Podistera nevadensis - Erigeron pygmaeus*
- *91.123.09 *Phlox covillei - Eriogonum gracilipes*
- *91.123.05 *Phlox covillei - Eriogonum incanum*
- *91.123.07 *Phlox (covillei) - Ivesia shockleyi*
- *91.123.08 *Phlox covillei - Linum lewisii*
- *91.120.08 *Podistera nevadensis - Arenaria kingii*
- *91.123.06 *Podistera nevadensis - Erigeron pygmaeus*

*91.150.00 ***Phlox pulvinata*** **(Cushion phlox fell-fields) Alliance** G4 S3
- *91.150.02 *Phlox pulvinata - Anelsonia eurycarpa*
- *91.150.03 *Phlox pulvinata - Ericameria suffruticosa - Ipomopsis congesta*
- *91.150.05 *Phlox pulvinata - Festuca brachyphylla*
- *91.150.06 *Phlox pulvinata - Ivesia gordonii*
- *91.150.04 *Phlox pulvinata - Lupinus argenteus var. montigenus*

41.061.00 ***Phragmites australis*** **(Common reed marshes) Alliance** G5 S4?
- 41.061.01 *Phragmites australis*
- 41.061.02 *Phragmites australis - Scirpus spp.*

43.300.00 ***Plagiobothrys nothofulvus*** **(Popcorn flower fields) Alliance** G4 S4
- 43.300.01 *Plagiobothrys nothofulvus - Daucus pusillus - Bromus hordeaceus*

*41.610.00 ***Pleuraphis jamesii*** **(James' galleta shrub-steppe) Alliance** G3 S2
- *41.610.03 *Pleuraphis jamesii / Ephedra nevadensis*
- *41.610.01 *Pleuraphis jamesii / Eriogonum fasciculatum*
- *41.610.02 *Pleuraphis jamesii / Lycium andersonii*

*41.030.00 ***Pleuraphis rigida*** **(Big galleta shrub-steppe) Alliance** G3 S2
- *41.030.01 *Pleuraphis rigida*
- *41.030.04 *Pleuraphis rigida - Dalea mollissima*
- *41.030.02 *Pleuraphis rigida / Acamptopappus sphaerocephalus*
- *41.030.06 *Pleuraphis rigida / Ambrosia dumosa*
- *41.030.05 *Pleuraphis rigida / Atriplex canescens*
- *41.030.07 *Pleuraphis rigida / Ephedra californica*
- *41.030.03 *Pleuraphis rigida / Ericameria cooperi*
- *41.030.08 *Pleuraphis rigida / Larrea tridentata*

42.060.00 ***Poa pratensis*** **(Kentucky blue grass turf) Semi-natural Stands**
- 42.060.05 *Poa pratensis*
- 42.060.01 *Poa pratensis - Carex (nebrascensis, pellita)*
- 42.060.04 *Poa pratensis - Juncus patens - Luzula comosa*
- 42.060.02 *Poa pratensis - Potentilla gracilis*
- 42.060.07 *Poa pratensis ssp. pratensis*
- 42.060.06 *Poa pratensis ssp.agassizensis*

*41.180.00 ***Poa secunda*** **(Curly blue grass grassland) Alliance** G4 S3?
- *41.180.04 *Poa secunda - Danthonia unispicata*

*41.180.03 *Poa secunda ssp. juncifolia*
*41.180.02 *Poa secunda ssp. secunda*

*41.040.00 ***Pseudoroegneria spicata*** **(Bluebunch wheat grass grassland) Alliance** G4 S2

41.225.00 ***Ptilagrostis kingii*** **(King's needle grass meadows) Alliance** G4 S4
41.225.01 *Ptilagrostis kingii*
41.225.02 *Ptilagrostis kingii - Oreostemma alpigenum*
91.120.25 *Ptilagrostis kingii - Senecio scorzonella*

*52.202.00 ***Ruppia (cirrhosa, maritima)*** **(Ditch-grass or widgeon-grass mats) Alliance** G4? S2
*52.202.02 *Ruppia cirrhosa - algae*

*52.215.00 ***Sarcocornia pacifica (Salicornia depressa)*** **(Pickleweed mats) Alliance** G4 S3
*52.215.12 *Sarcocornia pacific - Lepidium latifolium*
*52.215.04 *Sarcocornia pacifica*
*52.215.22 *Sarcocornia pacifica - Jaumea carnosa - Batis maritima*
*52.215.06 *Sarcocornia pacifica - Atriplex prostrata*
*52.215.07 *Sarcocornia pacifica - Bolboschoenus maritimus*
*52.215.15 *Sarcocornia pacifica - Brassica nigra*
*52.215.16 *Sarcocornia pacifica - Cotula coronopifolia*
*52.215.17 *Sarcocornia pacifica - Crypsis schoenoides*
*52.215.01 *Sarcocornia pacifica - Cuscuta salina - Spartina densiflora*
*52.215.02 *Sarcocornia pacifica - Distichlis spicata*
*52.215.08 *Sarcocornia pacifica - Distichlis spicata*
*52.215.18 *Sarcocornia pacifica - Echinochloa crus-galli - Polygonum - Xanthium strumarium*
*52.215.09 *Sarcocornia pacifica - Frankenia salina*
*52.215.21 *Sarcocornia pacifica - Frankenia salina - Suaeda taxifolia*
*52.215.10 *Sarcocornia pacifica - Grindelia stricta*
*52.215.11 *Sarcocornia pacifica - Jaumea carnosa*
*52.215.03 *Sarcocornia pacifica - Jaumea carnosa - Distichlis spicata*
*52.215.20 *Sarcocornia pacifica - Sesuvium verrucosum*
*52.215.13 *Sarcocornia pacifica - Spartina foliosa*
*52.215.14 *Sarcocornia pacifica / algae*
*52.215.19 *Sarcocornia pacifica/annual grasses (Polypogon, Hordeum, Lolium)*

*91.124.00 ***Saxifraga nidifica*** **(Pink saxifrage patches) Provisional Alliance** G4? S3?
*91.124.03 *Polygonum minimum*
*91.124.02 *Rhodiola integrifolia - Selaginella watsonii*

*91.125.00 ***Saxifraga tolmiei*** **(Patches of Tolmie's alpine saxifrage) Provisional Alliance** G4 S3?

52.122.00 ***Schoenoplectus acutus*** **(Hardstem bulrush marsh) Alliance** G5 S4
52.122.01 *Schoenoplectus acutus*
52.122.02 *Schoenoplectus acutus - Apocynum cannibinum*
52.122.03 *Schoenoplectus acutus - Typha angustifolia*
52.102.02 *Schoenoplectus acutus - Typha domingensis*
52.122.04 *Schoenoplectus acutus - Typha latifolia*
52.122.05 *Schoenoplectus acutus - Typha latifolia - Phragmites australis*
52.122.06 *Schoenoplectus acutus - Xanthium strumarium*

*52.111.00 ***Schoenoplectus americanus*** **(American bulrush marsh) Alliance** G5 S3
*52.111.04 *Schoenoplectus americanus*
*52.111.05 *Schoenoplectus americanus - Eleocharis rostellata*
*52.111.02 *Schoenoplectus americanus / Argentina egedii*
*52.111.03 *Schoenoplectus americanus / Lepidium latifolium*
*52.111.06 *Schoenoplectus americanus / Schoenoplectus californicus - Schoenoplectus acutus*

52.114.00 ***Schoenoplectus californicus*** **(California bulrush marsh) Alliance** G5 S4?
52.114.02 *Schoenoplectus californicus*
52.114.03 *Schoenoplectus californicus - Apocynum cannabinum*

52.114.04	*Schoenoplectus californicus - Eichhornia crassipes*	
52.114.01	*Schoenoplectus californicus - Schoenoplectus acutus*	
52.114.06	*Schoenoplectus californicus - Schoenoplectus acutus / Rosa californica*	
52.114.05	*Schoenoplectus californicus - Typha latifolia*	
*52.113.00	***Scirpus microcarpus* (Small-fruited bulrush marsh) Alliance**	G4 S2
*52.113.01	*Scirpus microcarpus*	
*52.113.02	*Scirpus microcarpus - Oxypolis occidentalis*	
*52.113.03	*Scirpus microcarpus - Scirpus congdonii*	
43.400.00	***Sedum spathulifolium* (Coast Range stonecrop draperies) Provisional Alliance**	G4? S4?
*42.062.00	***Selaginella bigelovii* (Bushy spikemoss mats) Alliance**	G4 S3
*42.062.01	*Selaginella bigelovii / Eriogonum fasciculatum*	
45.419.00	***Senecio triangularis* (Herb-rich meadows) Alliance**	G4 S4
45.419.04	*Senecio triangularis - Athyrium filix-femina*	
45.419.01	*Senecio triangularis - Lupinus latifolius*	
45.419.05	*Senecio triangularis - Lupinus polyphyllus*	
*52.210.00	***Sesuvium verrucosum* (Western sea-purslane marshes) Alliance**	G3? S2
*52.210.01	*Sesuvium verrucosum*	
*52.210.02	*Sesuvium verrucosum - Cotula coronopifolia*	
*52.210.03	*Sesuvium verrucosum - Distichlis spicata*	
*52.210.04	*Sesuvium verrucosum - Lolium perenne*	
45.420.00	***Solidago canadensis* (Canada goldenrod patches) Provisional Alliance**	G4? S4?
*52.010.00	***Sparganium (angustifolium)* (Mats of bur-reed leaves) Alliance**	G4 S3?
*52.010.01	*Sparganium angustifolium*	
*41.070.00	***Spartina (alterniflora, densiflora)* (Smooth or Chilean cordgrass marshes) Semi-natural Stands**	
41.070.02	*Spartina densiflora*	
*52.020.00	***Spartina foliosa* (California cordgrass marsh) Alliance**	G3 S3
*52.020.02	*Spartina foliosa*	
*52.020.01	*Spartina foliosa - Sarcocornia pacifica*	
*52.030.00	***Spartina gracilis* (Alkali cordgrass marsh) Alliance**	GU S1
*52.030.01	*Spartina gracilis - Sporobolus airoides*	
*41.010.00	***Sporobolus airoides* (Alkali sacaton grassland) Alliance**	G4 S2
*41.010.01	*Sporobolus airoides*	
*41.010.03	*Sporobolus airoides / Allenrolfea occidentalis*	
*41.010.02	*Sporobolus airoides / Ericameria nauseosa*	
*52.107.00	***Stuckenia (pectinata) - Potamogeton spp.* (Pondweed mats) Alliance**	G3G5 S3?
*52.107.02	*Potomogeton spp.*	
*52.107.01	*Stuckenia pectinata*	
*41.600.00	***Swallenia alexandrae* (Patches of Eureka Valley dune grass) Special Stands**	G1 S1
*45.171.00	***Torreyochloa pallida* (Floating mats of weak manna grass) Alliance**	G3 S3?
*45.171.01	*Torreyochloa pallida*	
*45.171.02	*Torreyochloa pallida - Isoetes bolanderi*	
*45.135.00	***Triantha occidentalis - Narthecium californicum* (Western false asphodel - California bog asphodel fens) Alliance**	G2? S2?
*45.135.01	*Triantha occidentalis - Rhynchospora alba*	
*45.135.02	*Triantha occidentalis / Sphagnum teres*	

*45.135.03	*Triantha occidentalis - Narthecium californicum*	
*45.426.00	***Trifolium longipes* (Long-stalk clover meadows) Provisional Alliance**	G3? S3?
*42.005.00	***Trifolium variegatum* (White-tip clover swales) Alliance**	G3? S3?
*42.005.02	*Trifolium gracilentum - Hesperevax caulescens*	
*42.005.01	*Trifolium variegatum*	
*42.005.03	*Trifolium variegatum - Lolium perenne - Leontodon taraxacoides*	
*42.005.04	*Trifolium variegatum - Vulpia bromoides (Hypochaeris glabra - Leontodon taraxacoides)*	
*42.005.05	*(Trifolium variegatum - Vulpia bromoides) - Hypochaeris glabra - Leontodon taraxacoides*	
52.050.00	***Typha (angustifolia, domingensis, latifolia)* (Cattail marshes) Alliance**	G5 S5
52.050.01	*Typha angustifolia*	
52.050.02	*Typha angustifolia - Distichlis spicata*	
52.050.05	*Typha angustifolia - Typha latifolia - Typha domingensis*	
52.050.06	*Typha angustifolia - Typha latifolia - Typha domingensis / Distichlis spicata*	
52.050.07	*Typha angustifolia - Typha latifolia - Typha domingensis / Echinocloa crus-galli*	
52.050.08	*Typha angustifolia - Typha latifolia - Typha domingensis / Phragmites australis*	
52.050.09	*Typha angustifolia - Typha latifolia - Typha domingensis / Schoenoplectus americanus*	
52.050.03	*Typha domingensis*	
52.103.02	*Typha latifolia*	
52.050.04	*Typha latifolia - Typha angustifolia*	
45.423.00	***Veratrum californicum* (White corn lily patches) Alliance**	G5 S4
45.423.02	*Veratrum californicum*	
45.423.03	*Veratrum californicum - Bistorta bistortoides*	
45.423.04	*Veratrum californicum - Juncus nevadensis*	
45.423.01	*Veratrum californicum - Senecio triangularis*	

Ambystoma californiense

Element Code: AAAAA01180

California tiger salamander

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G2G3
	State:	Threatened		**State:**	S2S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_VU-Vulnerable			
Habitat:	**General:**	CENTRAL VALLEY DPS FEDERALLY LISTED AS THREATENED. SANTA BARBARA & SONOMA COUNTIES DPS FEDERALLY LISTED AS ENDANGERED.			
	Micro:	NEED UNDERGROUND REFUGES, ESPECIALLY GROUND SQUIRREL BURROWS & VERNAL POOLS OR OTHER SEASONAL WATER SOURCES FOR BREEDING			

Occurrence No.	2	**Map Index:**	37896	**EO Index:**	32903	**Element Last Seen:**	1892-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1892-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-01-13

Quad Summary: Hemet (3311668), Lake Fulmor (3311677), San Jacinto (3311678), Winchester (3311761), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.78387 / -116.95881	**Accuracy:**	5 miles
UTM:	Zone-11 N3738193 E503813	**Elevation (ft):**	1540
PLSS:	T04S, R01W, Sec. 35 (S)	**Acres:**	0.0

Location: SAN JACINTO.

Detailed Location: HISTORIC RECORD, EXACT LOCATION UNKNOWN.

Ecological: GENERAL HABITAT TYPE FOR TIGER SALAMANDER IS FOOTHILL AND VALLEY GRASSLAND.

General: MUSEUM SPECIMEN SU #695.

Owner/Manager: UNKNOWN

Spea hammondii

Element Code: AAABF02020

western spadefoot

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_NT-Near Threatened			
Habitat:	**General:**	OCCURS PRIMARILY IN GRASSLAND HABITATS, BUT CAN BE FOUND IN VALLEY-FOOTHILL HARDWOOD WOODLANDS.			
	Micro:	VERNAL POOLS ARE ESSENTIAL FOR BREEDING AND EGG-LAYING.			

Occurrence No.	5	**Map Index:**	20474	**EO Index:**	9408	**Element Last Seen:**	1991-06-01
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-10-20

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82459 / -117.14745	**Accuracy:**	80 meters
UTM:	Zone-11 N3742716 E486355	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 13 (S)	**Acres:**	0.0

Location: JUST EAST OF THE SAN JACINTO RIVER, APPROXIMATELY 150 FEET NORTH OF THE END OF 11TH STREET, 1 MI NORTH OF NUEVO.

Detailed Location: TOADS INHABIT A SERIES OF SHALLOW, MAN-MADE PONDS.

Ecological: HABITAT SURROUNDING PONDS CONSISTS OF ALKALINE SINK SCRUB, VEGETATED BY SUAEDA TORREYA, SPERGULARIA MARINA, FRANKENIA GRANDIFOLIA, RUMEX CRISPUS, HORDEUM DEPRESSUM, POLYGONUM AVICIULARE, LASTHENIA CALIFORNICA, AMARANTHUS ALBUS, AND OTHERS.

General: APPROXIMATELY 700 "TOADLETS" (JUVENILES) OBSERVED. POTENTIAL FAIRY SHRIMP HABITAT. AREA SURROUNDING THIS SITE RECENTLY ZONED FOR RESIDENTIAL DEVELOPMENT.

Owner/Manager: UNKNOWN

Occurrence No.	33	**Map Index:**	24632	**EO Index:**	20817	**Element Last Seen:**	1993-06-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-11-02

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90468 / -117.29379	**Accuracy:**	4/5 mile
UTM:	Zone-11 N3751625 E472838	**Elevation (ft):**	1580
PLSS:	T03S, R04W, Sec. 15 (S)	**Acres:**	0.0

Location: 0.25 MILE SW OF THE INTERSECTION OF CACTUS ROAD AND PLUMMER ROAD, MARCH AIR FORCE BASE.

Detailed Location: A TOTAL OF 4 INDIVIDUALS WAS CAPTURED DURING A 1-WEEK SURVEY UTILIZING PITFALL TRAPS; NO ANIMALS WERE MARKED, IT IS UNKNOWN IF ANY WERE RECAPTURES.

Ecological: HABITAT CONSISTS OF GRASSLAND, DOMINATED BY BROMUS, BRASSICA, AND SALSOLA.

General: SITE IS PART OF A 1000-ACRE RESERVE ESTABLISHED FOR STEPHENS' K-RAT. USE OF CONTROLLED BURNS TO ENHANCE K-RAT HABITAT MAY HAVE UNKNOWN EFFECTS.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	68	**Map Index:**	32335	**EO Index:**	2679	**Element Last Seen:**	1978-04-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1978-04-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-06-21

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.91970 / -117.28488	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3753289 E473667	**Elevation (ft):**	1510
PLSS:	T03S, R04W, Sec. 10 (S)	**Acres:**	0.0

Location: EDGEMONT; BETWEEN U.S. ROUTE 395 AND ATCHISON TOPEKA AND SANTA FE RAILROAD NORTH OF ALESSANDRO BLVD.

Detailed Location:

Ecological: IN A PUDDLE BETWEEN HIGHWAY AND RAILROAD TRACKS.

General: A FEW TADPOLES OBSERVED; CONSULTED SEVERAL MAPS AND HIGHWAYS 15E, 215 AND 395 SEEM TO CORRESPOND TO THE SAME HIGHWAY.

Owner/Manager: UNKNOWN

Occurrence No.	226	**Map Index:**	48074	**EO Index:**	48074	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-10

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.88659 / -117.13490	**Accurracy:**	80 meters
UTM:	Zone-11 N3749589 E487525	**Elevation (ft):**	1700
PLSS:	T03S, R02W, Sec. 30 (S)	**Acres:**	0.0

Location: 1.4 MILES NORTHEAST OF PERRIS RESERVOIR. 1.3 MILES SOUTHEAST OF MT. RUSSELL. 0.3 MILE WEST OF DAVIS ROAD.

Detailed Location: PIT-FALL TRAP ARRAYS 12 & 13.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: THREE TOADS CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THESE TWO ARRAYS.

Owner/Manager: DFG, DPR

Occurrence No.	227	**Map Index:**	48075	**EO Index:**	48075	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-10

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87623 / -117.12311	**Accurracy:**	80 meters
UTM:	Zone-11 N3748439 E488614	**Elevation (ft):**	1600
PLSS:	T03S, R02W, Sec. 30 (S)	**Acres:**	0.0

Location: 1.75 MILES ENE OF PERRIS RESEROIR. JUST EAST OF DAVIS ROAD.

Detailed Location: PIT-FALL TRAP ARRAY 17.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: THREE TOADS CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THIS ARRAY.

Owner/Manager: DFG, DPR

Occurrence No.	228	**Map Index:**	48077	**EO Index:**	48077	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-10

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84562 / -117.14635	**Accurracy:**	80 meters
UTM:	Zone-11 N3745048 E486460	**Elevation (ft):**	1550
PLSS:	T04S, R03W, Sec. 01 (S)	**Acres:**	0.0

Location: ABOUT 1.1 MILES EAST OF PERRIS RESERVOIR, EAST OF BERNASCONI HILLS. 0.3 MI NORTH OF MARTIN ST.

Detailed Location: PIT-FALL TRAP ARRAY 15.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: ONE TOAD CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THIS ARRAY.

Owner/Manager: DFG, DPR

Occurrence No.	230	**Map Index:**	48080	**EO Index:**	48080	**Element Last Seen:**	2003-03-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-03-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-29

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80844 / -117.25624	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740946 E476283	**Elevation (ft):**	1900
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	167.6

Location: MOTTE RIMROCK RESERVE. 1 MILE SOUTHWEST OF MAYER FARMS AT HIGHWAY 395 (I-15E), NORTH OF PERRIS.

Detailed Location: PIT-FALL TRAP ARRAYS 1, & 3-10. TOADS FOUND IN ALL BUT ONE OF THE ARRAYS.

Ecological: MOTTE RESERVE IS MODERATE SIZED FRAGMENT DOMINATED BY COASTAL SAGE SCRUB WITH PATCHES OF GRASSLAND. SITE IS RELATIVELY FLAT, SURROUNDED BY LOW DENSITY HOUSES. SITE IS PART OF THE STEPHENS K-RAT HCP.

General: 23 TOADS CAPTURED. 22 SAMPLE PERIODS BETWEEN 11 JUL 1995 & 6 OCT 1999 FOR ALL OF THE MOTTE RESERVE ARRAYS. 100'S OF TADPOLES OBSERVED ON 8 MAR 2003 IN AN AREA THAT WAS FORMERLY PART OF MOTTE RIMROCK RESERVE.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	259	**Map Index:**	51783	**EO Index:**	51783	**Element Last Seen:**	2003-05-16
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-05-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-07-16

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.95168 / -117.24643	**Accurracy:**	80 meters
UTM:	Zone-11 N3756826 E477228	**Elevation (ft):**	1680
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: DOWNSTREAM OF THE POORMAN RESERVOIR DAM, MORENO VALLEY

Detailed Location: SITE IS LOCATED WITHIN THE LOWER FLOOD CATCHMENT BASIN (130 ACRES), WHICH IS SURROUNDED BY RESIDENTIAL DEVELOPMENT.

Ecological: HABITAT CONSISTS OF A 4.2-ACRE VERNAL MARSH, VEGETATED BY RUMEX CRISPUS, ELEOCHARIS SPP, CAREX SPP, AND XANTHIUM STRUMARIUM.

General: 20 TADPOLES IN MID-METAMORPHOSIS OBSERVED ON 16 MAY 2003.

Owner/Manager: CITY OF MORENO VALLEY

Occurrence No.	310	**Map Index:**	60449	**EO Index:**	60485	**Element Last Seen:**	2005-03-08
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-03-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-03-09

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.96272 / -117.15989	**Accurracy:**	80 meters
UTM:	Zone-11 N3758034 E485227	**Elevation (ft):**	2050
PLSS:	T02S, R03W, Sec. 26 (S)	**Acres:**	0.0

Location: JUST WEST OF REDLANDS BOULEVARD, 0.4 MILE NORTH OF LOCUST AVENUE, 3.25 MILES WSW OF EL CASCO LAKE

Detailed Location:

Ecological: HABITAT CONSISTS OF SMALL, PUDDLED AREAS ON A DIRT ROAD; SURROUNDED BY RIVERSIDEAN SAGE SCRUB TO THE NW AND ACTIVE AGRICULTURE THE THE SE. DOMINANT PLANTS IN THE CSS ARE ENCELIA FARINOSA, ARTEMISIA CALIFORNICA, AND LESSINGIA FILAGINIFOLIA.

General: 100 LARVAE OBSERVED ON 8 MAR 2005, WITHIN SMALL PUDDLES ON A DIRT ROAD; PUDDLES MAY DRY UP BEFORE THE LARVAE CAN METAMORPHOSE.

Owner/Manager: UNKNOWN

Occurrence No.	393	**Map Index:**	69833	**EO Index:**	70652	**Element Last Seen:**	2005-04-07
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-04-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-31

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.93555 / -117.00702	**Accurracy:**	80 meters
UTM:	Zone-11 N3755010 E499350	**Elevation (ft):**	2525
PLSS:	T03S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: 0.1 MILE NORTH OF HIGHWAY 60 AND 0.8 MILE WEST OF I-10, BEAUMONT.

Detailed Location:

Ecological: HABITAT CONSISTS OF SEVERAL POOLS FORMED AS ROAD RUTS FROM EXTENSIVE ORV ACTIVITY AND IN ONE CATTLE POND; SURROUNDED BY SPARSE ANNUAL GRASSLAND IMPACTED BY ORV USE.

General: 100 LARVAE OBSERVED ON 7 APR 2005.

Owner/Manager: PVT

Rana muscosa **Element Code:** AAABH01330

Sierra Madre yellow-legged frog

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Candidate Endangered		**State:**	S1
	Other:	DFG_SSC-Species of Special Concern, IUCN_EN-Endangered, USFS_S-Sensitive			
Habitat:	**General:**	FEDERAL LISTING REFERS TO POPULATIONS IN THE SAN GABRIEL, SAN JACINTO & SAN BERNARDINO MOUNTAINS ONLY.			
	Micro:	ALWAYS ENCOUNTERED WITHIN A FEW FEET OF WATER. TADPOLES MAY REQUIRE 2 - 4 YRS TO COMPLETE THEIR AQUATIC DEVELOPMENT.			

Occurrence No.	26	**Map Index:**	42447	**EO Index:**	42447	**Element Last Seen:**	1905-04-12
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1905-04-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-04-22

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10478 / -117.10855	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3773779 E489987	**Elevation (ft):**	1800
PLSS:	T01S, R02W, Sec. 08 (S)	**Acres:**	938.0

Location: MOUTH OF THE CANYONS OF THE UPPER SANTA ANA RIVER WASH.

Detailed Location:

Ecological:

General: INFORMATION TAKEN FROM: FOOTHILL YELLOW-LEGGED FROG, THE SEASONAL & ASSOCIATIONAL DISTRIBUTION OF THE FAUNA OF THE UPPER SANTA ANA RIVER WASH, JOURNAL OF ENTOMOLOGY AND ZOOLOGY, 21(1,2) 1-96, 1929.

Owner/Manager: UNKNOWN

Plegadis chihi **Element Code:** ABNGE02020

white-faced ibis

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S1
	Other:	DFG_WL-Watch List, IUCN_LC-Least Concern			
Habitat:	**General:**	SHALLOW FRESH-WATER MARSH.			
	Micro:	DENSE TULE THICKETS FOR NESTING INTERSPERSED WITH AREAS OF SHALLOW WATER FOR FORAGING.			

Occurrence No.	16	**Map Index:** 24635	**EO Index:** 48048	**Element Last Seen:**	1993-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1993-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2002-06-04

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88790 / -117.09815	**Accurracy:**	1 mile
UTM:	Zone-11 N3749731 E490923	**Elevation (ft):**	1425
PLSS:	T03S, R02W (S)	**Acres:**	0.0

Location: SAN JACINTO LAKE & NEAR MYSTIC LAKE.

Detailed Location:

Ecological:

General: SAN JACINTO LAKE: 200 NESTS IN 1911; DRAINED IN 1917 (GRINNELL & MILLER, 1944; WILLETT & JAY, 1911). INDIVIDUALS NESTING SINCE 1993 NEAR MYSTIC LAKE (T. PAULEK, 1997).

Owner/Manager: UNKNOWN

Occurrence No.	29	**Map Index:** 75837	**EO Index:** 76868	**Element Last Seen:**	2006-XX-XX
Occ. Rank:	Excellent		**Presence:** Presumed Extant	**Site Last Seen:**	2006-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2009-07-13

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79745 / -117.02375	**Accurracy:**	80 meters
UTM:	Zone-11 N3739698 E497801	**Elevation (ft):**	1492
PLSS:	T04S, R01W, Sec. 30 (S)	**Acres:**	0.0

Location: 0.4 MILES NORTH OF CANAL AND 0.6 MILES EAST OF N. WARREN RD, MIDWAY BETWEEN LAKEVIEW MOUNTAINS & SAN JACINTO RESERVOIR.

Detailed Location: 40 METERS EAST OF ODEL AVENUE, NORTH OF DEEGAN STREET.

Ecological: RIPARIAN AREA WITH CATTAILS AND WILLOWS IN AN OPEN WETLAND ASSOCIATED WITH A WATER TREATMENT FACILITY.

General: ROOKERY OBSERVED IN THE SPRING OF 2005 & 2006. APPROXIMATELY 50 TO 75 YOUNG.

Owner/Manager: UNKNOWN

Elanus leucurus **Element Code:** ABNKC06010

white-tailed kite

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_FP-Fully Protected, IUCN_LC-Least Concern			
Habitat:	**General:**	ROLLING FOOTHILLS AND VALLEY MARGINS WITH SCATTERED OAKS & RIVER BOTTOMLANDS OR MARSHES NEXT TO DECIDUOUS WOODLAND.			
	Micro:	OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.			

Occurrence No.	61	**Map Index:**	47815	**EO Index:**	47815	**Element Last Seen:**	1983-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-30

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79821 / -117.35220	**Accuracy:**	80 meters
UTM:	Zone-11 N3739838 E467398	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	0.0

Location: 5.5 MILES WEST OF PERRIS AND 1.4 MILES ESE OF GAVILAN PEAK.

Detailed Location:

Ecological: HABITAT CONSISTS OF GRASSLAND, SCRUB AND WOODLAND.

General: NEST LOCATED DURING MONTHS OF JUNE/JULY 1983. PARCELS 1 AND 2 HAVE "HIGH-VALUE RAPTOR NESTING HABITAT"; IT IS RECOMMENDED THAT PARCELS 1-4 REMAIN CONTINOUS.

Owner/Manager: PVT

Occurrence No.	147	**Map Index:**	78435	**EO Index:**	79357	**Element Last Seen:**	2006-06-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-03-25

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.01347 / -117.01810	**Accuracy:**	1/10 mile
UTM:	Zone-11 N3763650 E498328	**Elevation (ft):**	2760
PLSS:	T02S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: ABOUT 0.2 MI SE OF WILDWOOD CYN RD AT HOLMES ST, SOUTH SIDE OF YUCAIPA CRK, YUCAIPA.

Detailed Location: MAPPED TO DESCRIBED HABITAT IN 2005 NAIP AERIAL IN THE VICINITY OF PROVIDED COORDINATE (UTM COORDINATE FROM TOPOZONE FALLS NORTH OF CREEK & ABSENT OF OAK TREES).

Ecological: "STRIP OF OAK WOODLAND SOUTH OF YUCAIPA CREEK BED." OTHER SPECIES OBSERVED WERE COSTA'S HUMMINGBIRD, RUFOUS-CROWNED SPARROW, YELLOW WARBLE (MIGRANT), LAWRENCE'S GOLDFINCH, & OLIVE-SIDED FLYCATCHER (MIGRANT).

General: A PAIR OF ADULTS WAS OBSERVED AT A NEST ON 19 MAY AND 23 JUN, 2006.

Owner/Manager: CITY OF YUCAIPA

Haliaeetus leucocephalus

Element Code: ABNKC10010

bald eagle

Listing Status:	**Federal:**	Delisted	**CNDDB Element Ranks:**	**Global:**	G5
	State:	Endangered		**State:**	S2
	Other:	BLM_S-Sensitive, CDF_S-Sensitive, DFG_FP-Fully Protected, IUCN_LC-Least Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.			
	Micro:	NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTER.			

Occurrence No.	1	**Map Index:**	03288	**EO Index:**	27012	**Element Last Seen:**	1975-03-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1975-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.83889 / -117.39311	**Accurracy:**	1 mile
UTM:	Zone-11 N3744362 E463628	**Elevation (ft):**	1400
PLSS:	T04S, R05W, Sec. 10 (S)	**Acres:**	0.0

Location: NORTH SHORE OF LAKE MATHEWS.

Detailed Location:

Ecological: SITE CONSISTS OF SEVERAL WINDROWS OF GUM TREES (EUCALYPTUS SP). WATERFOWL IMPORTANT IN DIET OF THESE WINTERING RAPTORS.

General: WINTER ROOST SITE.

Owner/Manager: UNKNOWN

Accipiter cooperii

Element Code: ABNKC12040

Cooper's hawk

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	DFG_WL-Watch List, IUCN_LC-Least Concern			
Habitat:	**General:**	WOODLAND, CHIEFLY OF OPEN, INTERRUPTED OR MARGINAL TYPE.			
	Micro:	NEST SITES MAINLY IN RIPARIAN GROWTHS OF DECIDUOUS TREES, AS IN CANYON BOTTOMS ON RIVER FLOOD-PLAINS; ALSO, LIVE OAKS.			

Occurrence No.	44	**Map Index:**	03389	**EO Index:**	479	**Element Last Seen:**	1983-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-04-09

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80500 / -117.34032	**Accurracy:**	1 mile
UTM:	Zone-11 N3740587 E468500	**Elevation (ft):**	2000
PLSS:	T04S, R04W, Sec. 19 (S)	**Acres:**	0.0

Location: GAVILAN HILLS, IN HARFORD SPRINGS COUNTY PARK AND ON IDA LEONA ESTATES EAST OF PARK.

Detailed Location:

Ecological: SUITABLE NESTING AND FORAGING HABITAT IS PRESENT IN THE RIPARIAN WOODLAND, SCRUB OAK WOODLAND, AND JUNIPER WOODLAND.

General: SIGHTINGS MADE IN HARFORD SPRING COUNTY PARK AND ON IDA LEONA ESTATES; NO NEST OBSERVED.

Owner/Manager: PVT, RIV COUNTY

Occurrence No.	72	**Map Index:**	45576	**EO Index:**	45576	**Element Last Seen:**	2001-06-26
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-08-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.95568 / -117.24658	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3757269 E477216	**Elevation (ft):**	1680
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: SE END OF POORMAN RESERVOIR, 0.3 MILE SOUTH OF MANZANITA AVENUE, MORENO VALLEY

Detailed Location:

Ecological: HABITAT CONSISTS OF COTTONWOOD/WILLOW RIPARIAN, SUPPORTED BY LAWN IRRIGATION AND STORMWATER RUN-OFF; SURROUNDED BY DISTURBED ANNUAL GRASSLAND. SITE IS OPERATED AS A FLOOD CONTROL RESERVOIR.

General: 2 ADULTS FIRST OBSERVED NESTING ON 9 MAY 2001; SUBSEQUENTLY OBSERVED ON 30 MAY, 15 JUN, AND 26 JUN 2001. 2 JUVENILES OBSERVED, AS WELL.

Owner/Manager: CITY OF MORENO VALLEY

Occurrence No.	91	**Map Index:**	54557	**EO Index:**	54559	**Element Last Seen:**	1999-07-31
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-07-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01058 / -117.17160	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3763343 E484154	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	33.1

Location: SAN TIMOTEO CANYON, JUST NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: 1.2 KM STRETCH ALONG CREEK.

Ecological: HABITAT CONSISTS OF DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE SALIX LASIOLEPIS, SALIX HINDSIANA, POPULUS FREMONTII AND BACHARIS GLUTINOSA. YELLOW-BILLED CUCKOO OBSERVED IN AREA.

General: 4 OBSERVED DURING SURVEYS WHICH OCCURRED ONCE A WEEK BETWEEN 1 APR AND 31 JUL 1999. NESTING WAS CONFIRMED.

Owner/Manager: UNKNOWN

Occurrence No.	110	**Map Index:**	66241	**EO Index:**	66323	**Element Last Seen:**	2004-07-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-07-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-18

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92671 / -117.00860	**Accurracy:**	80 meters
UTM:	Zone-11 N3754030 E499204	**Elevation (ft):**	790
PLSS:	T03S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: WSW OF BEAUMONT, ABOUT 1.8 MI WEST OF HWY 79 AND 0.45 MI SOUTH OF HWY 60.

Detailed Location:

Ecological: DOMINANT PLANT SPECIES INCLUDE ARROYO WILLOW, COTTONWOOD AND NETTLE. CANOPY HEIGHT IS 11M. SURFACE WATER OR SATURATED SOIL IS PRESENT.

General: NEST SITE WITH 1 ADULT PRESENT OBSERVED BETWEEN 26 MAY & 15 JUL 2004.

Owner/Manager: UNKNOWN

Buteo regalis

Element Code: ABNKC19120

ferruginous hawk

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S3S4
	Other:	DFG_WL-Watch List, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	OPEN GRASSLANDS, SAGEBRUSH FLATS, DESERT SCRUB, LOW FOOTHILLS & FRINGES OF PINYON-JUNIPER HABITATS.			
	Micro:	EATS MOSTLY LAGOMORPHS, GROUND SQUIRRELS, AND MICE. POPULATION TRENDS MAY FOLLOW LAGOMORPH POPULATION CYCLES.			

Occurrence No.	1	**Map Index:**	47739	**EO Index:**	47739	**Element Last Seen:**	1989-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-19

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.76045 / -117.09723	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3735599 E490996	**Elevation (ft):**	2200
PLSS:	T05S, R02W, Sec. 04 (S)	**Acres:**	198.7

Location: 1.0 TO 1.6 MILES NORTH OF HOMELAND; LOCATED BETWEEN JUNIPER FLAT ROAD AND JUNIPER SPRINGS ROAD.

Detailed Location:

Ecological: HABITAT CONSISTS OF UNDISTURBED COASTAL SAGE SCRUB VEGETATED BY ERIOGONUM FASCICULATUM, ARTEMISIA CALIFORNICA, RHUS OVATA, SALVIA APIANA AND SALVIA MELLIFERA.

General: 1 ADULT OBSERVED

Owner/Manager: PVT

Occurrence No.	2	**Map Index:**	47740	**EO Index:**	47740	**Element Last Seen:**	1991-12-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-12-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-19

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81368 / -117.00056	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3741497 E499948	**Elevation (ft):**	1470
PLSS:	T04S, R01W, Sec. 20 (S)	**Acres:**	0.0

Location: APPROXIMATELY 3.1 MILES NW OF SAN JACINTO. 0.4 MILES SOUTH OF JUNCTION OF RAMONA BLVD AND COLORADO RIVER AQUEDUCT.

Detailed Location:

Ecological: HABITAT CONSISTS OF DRY AND IRRIGATED CROPLANDS.

General: 6 NOV AND DEC 13 1991: AT LEAST 1 INDIVIDUAL SEEN ON EACH DAY.

Owner/Manager: UNKNOWN

Occurrence No.	11	**Map Index:**	65991	**EO Index:**	66070	**Element Last Seen:**	2005-12-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-12-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-08-23

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.95064 / -117.16638	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3756695 E484626	**Elevation (ft):**	1936
PLSS:	T02S, R03W, Sec. 35 (S)	**Acres:**	38.0

Location: ABOUT 2.3 MI NNW OF MORENO, 1 MI NW OF INTERSECTION OF REDLANDS BLVD AND HWY 60.

Detailed Location: MAPPED ACCORDING TO ATTACHED MAP IN SOURCE.

Ecological: GENTLY SLOPING ALLUVIAL FAN. RUDERAL HABITAT, BRASSICA NEGRA, BROMUS SPP., SCHISMUS BARBATUS, DATURA METELOIDES, HELIANTHUS ANNUUS, HETEROTHECA GRANDIFLORA, EREMOCARPUS SETIGERUS & ASTRALAGUS SPP.

General: WINTERING SITE. 2 INDIVIDUALS OBSERVED ON 1 DEC 2005.

Owner/Manager: PVT

Coccyzus americanus occidentalis

Element Code: ABNRB02022

western yellow-billed cuckoo

Listing Status:	**Federal:**	Candidate	**CNDDB Element Ranks:**	**Global:**	G5T3Q
	State:	Endangered		**State:**	S1
	Other:	BLM_S-Sensitive, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	RIPARIAN FOREST NESTER, ALONG THE BROAD, LOWER FLOOD-BOTTOMS OF LARGER RIVER SYSTEMS.			
	Micro:	NESTS IN RIPARIAN JUNGLES OF WILLOW, OFTEN MIXED WITH COTTONWOODS, W/ LOWER STORY OF BLACKBERRY, NETTLES, OR WILD GRAPE.			

Occurrence No.	79	**Map Index:**	25607	**EO Index:**	5431	**Element Last Seen:**	1930-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1930-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-06-09

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.07072 / -117.28292	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3770033 E473894	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	1216.7

Location: SANTA ANA RIVER AND WARM CREEK, FROM 3 MILES EAST OF SAN BERNARDINO TO RIVERSIDE COUNTY LINE.

Detailed Location: IN 1930'S SPECIES DESCRIBED AS COMMON AND NESTING IN THIS AREA.

Ecological: ALL NESTS FOUND IN WILLOW TREES, IN WILLOW AND WILLOW-COTTONWOOD THICKETS WITH HEAVY UNDERBRUSH OF NETTLES, WILD GRAPE VINES & CATTAILS.

General: EGG SETS: 6/24/16-NEAR COLTON, 6/30/19-3 MI NE COLTON, 6/6/20-URBITA SWAMP 3 MI NE COLTON, 6/10/20-3 MI SW COLTON, 6/19/22-WARM CR 2 MI E SAN BERNARDINO, 5/29/23-3 MI SW COLTON. ALSO COLLECTED MAY-JULY 1930'S IN THIS AREA BY VARIOUS MUSEUMS

Owner/Manager: UNKNOWN

Occurrence No.	168	**Map Index:**	45571	**EO Index:**	45571	**Element Last Seen:**	2001-06-26
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-08-14

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95734 / -117.25189	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3757454 E476726	**Elevation (ft):**	1690
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: POORMAN RESERVOIR, 0.25 MILE SOUTH OF MANZANITA AVENUE, MORENO VALLEY.

Detailed Location:

Ecological: HABITAT CONSISTS OF COTTONWOOD/ WILLOW RIPARIAN, WHICH IS SUPPORTED BY LAWN IRRIGATION AND STORMWATER RUNOFF; SURROUNDED BY DISTURBED ANNUAL GRASSLAND. SITE IS OPERATED AS A FLOOD CONTROL RESERVOIR.

General: 1 ADULT OBSERVED ON 26 JUN 2001.

Owner/Manager: CITY OF MORENO VALLEY

Athene cunicularia

Element Code: ABNSB10010

burrowing owl

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S2
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern			

Habitat:	**General:**	OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.
	Micro:	SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.

Occurrence No.	65	**Map Index:**	03755	**EO Index:**	25455	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary:	Perris (3311772), Sunnymead (3311782)
County Summary:	Riverside

Lat/Long:	33.86913 / -117.18566	**Accurracy:**	1 mile
UTM:	Zone-11 N3747661 E482828	**Elevation (ft):**	1700
PLSS:	T03S, R03W, Sec. 34 (S)	**Acres:**	0.0

Location:	LAKE PERRIS STATE RECREATION AREA, BETWEEN DAM AND PARKING LOT.
Detailed Location:	
Ecological:	
General:	COLONY OF MANY OWLS OBSERVED IN 1980 BY J. SPEAKS.
Owner/Manager:	DPR-LAKE PERRIS SRA

Occurrence No.	79	**Map Index:**	03967	**EO Index:**	25445	**Element Last Seen:**	1982-07-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-07-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-15

Quad Summary:	Lakeview (3311771)
County Summary:	Riverside

Lat/Long:	33.86612 / -117.12197	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3747318 E488718	**Elevation (ft):**	1425
PLSS:	T03S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location:	SAN JACINTO WILDLIFE AREA, 2 MILES NORTH OF LAKEVIEW.
Detailed Location:	
Ecological:	
General:	ACTIVE BURROW WITH 2 ADULTS AND 5 FLEDGED YOUNG.
Owner/Manager:	DFG-SAN JACINTO WA

Occurrence No.	80	**Map Index:**	04009	**EO Index:**	25438	**Element Last Seen:**	1982-05-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-05-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-03

Quad Summary: Lakeview (3311771)
County Summary: Riverside

Lat/Long:	33.85859 / -117.11156	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3746482 E489680	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA, 1.5 MILES NNE OF LAKEVIEW.
Detailed Location:
Ecological:
General: ACTIVE BURROW WITH 2 BIRDS PRESENT.
Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	81	**Map Index:**	03996	**EO Index:**	25439	**Element Last Seen:**	1982-05-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-05-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-03

Quad Summary: Lakeview (3311771)
County Summary: Riverside

Lat/Long:	33.84567 / -117.11581	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3745050 E489286	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA, 0.5 MILE NORTH OF LAKEVIEW.
Detailed Location:
Ecological:
General: TWO BIRDS PRESENT AT THIS LOCATION ON BOTH 26 AND 28 MAY 1982; NO SEARCH MADE FOR BURROW.
Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	82	**Map Index:**	03974	**EO Index:**	25441	**Element Last Seen:**	1982-07-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-07-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-03

Quad Summary: Lakeview (3311771)
County Summary: Riverside

Lat/Long:	33.87147 / -117.12056	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3747911 E488849	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA, APPROX 2-4 MILES NORTH OF LAKEVIEW.
Detailed Location:
Ecological:
General: TWO ADULTS AND FOUR FLEDGED YOUNG OBSERVED.
Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	83	**Map Index:**	03995	**EO Index:**	25440	**Element Last Seen:**	1982-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-03

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87572 / -117.11513	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3748382 E489352	**Elevation (ft):**	1440
PLSS:	T03S, R02W, Sec. 29 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA, 2.6 MILES NORTH OF LAKEVIEW.

Detailed Location:

Ecological:

General: ACTIVE BURROW WITH 1-2 BIRDS FROM SEPTEMBER THROUGH EARLY OCTOBER OF 1982.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	84	**Map Index:**	03971	**EO Index:**	25436	**Element Last Seen:**	1982-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-03

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87837 / -117.12029	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3748676 E488875	**Elevation (ft):**	1480
PLSS:	T03S, R02W, Sec. 29 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA, 2.8 MILES NORTH OF LAKEVIEW.

Detailed Location:

Ecological:

General: UP TO FOUR BIRDS IN THIS AREA DURING JULY OF 1982.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	99	**Map Index:**	17249	**EO Index:**	12257	**Element Last Seen:**	1989-10-07
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-10-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1990-12-13

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.75952 / -117.16496	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3735505 E484723	**Elevation (ft):**	1475
PLSS:	T05S, R03W, Sec. 02 (S)	**Acres:**	0.0

Location: 0.5 NE OF ROMOLAND, ADJACENT TO MAPES ROAD AND TRADEWIND DRIVE.

Detailed Location: TWO BURROWS AND TWO OWLS LOCATED, BOTH NEAR LOW ROCK OUTCROPS.

Ecological: BURROWS SURROUNDED BY LAND HISTORICALLY PLANTED IN POTATOES; PRESENTLY, VEGETATION CONSISTS OF DISTURBED ANNUALS INCLUDING BRASSICA GENICULATA, AMSINCKIA INTERMEDIA, SALSOLA IBERICA, BROMUS RUBENS, BROMUS DIANDRUS, CHENOPODIUM ALBUS, ETC.

General: IT IS UNKNOWN IF THE OWLS ARE ACTUALLY BREEDING AT THIS HEAVILY-DISTURBED SITE.

Owner/Manager: PVT

Occurrence No.	130	**Map Index:**	20703	**EO Index:**	9507	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-03-16

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81293 / -117.10467	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3741419 E490313	**Elevation (ft):**	1600
PLSS:	T04S, R02W, Sec. 20 (S)	**Acres:**	0.0

Location: 0.6 MI ENE OF THE JUNCTION OF JUNIPER FLAT ROAD AND HANSEN AVENUE, APPROXIMATELY 2 MI SE OF LAKEVIEW.

Detailed Location:

Ecological: HABITAT IS RUDERAL GRASSLAND WITH ONE SMALL PATCH OF COASTAL SAGE SCRUB, IN THE VICINITY OF AGRICULTURAL FIELDS.

General: TWO ADULTS AND TWO ACTIVE BURROWS OBSERVED.

Owner/Manager: UNKNOWN

Occurrence No.	247	**Map Index:**	36172	**EO Index:**	31169	**Element Last Seen:**	1997-05-XX
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-07-21

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77729 / -117.19574	**Accurracy:**	80 meters
UTM:	Zone-11 N3737480 E481876	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: EAST SIDE OF PERRIS VALLEY DRAIN, 0.4 MILE NE OF POINT WHERE I-15E CROSSES THE DRAIN, 1 MILE EAST OF PERRIS.

Detailed Location: ONE OF FOUR BURROW SITES LOCATED WITHIN A 2-MILE STRETCH.

Ecological: HABITAT SURROUNDING THE BURROW SITE CONSISTS OF AGRICULTURE, FALLOW FIELDS, AND THE RUDERAL FLOODPLAIN OF THE SAN JACINTO RIVER.

General: 2 BURROWS BEING USED BY 2 ADULTS AND AT LEAST 1 JUVENILE DURING 19-27 MAY 1997 SURVEY.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	248	**Map Index:**	36173	**EO Index:**	31170	**Element Last Seen:**	1997-05-XX
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-07-21

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78911 / -117.20549	**Accurracy:**	80 meters
UTM:	Zone-11 N3738792 E480976	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 28 (S)	**Acres:**	0.0

Location: WEST SIDE OF PERRIS VALLEY DRAIN, 0.5 MILE ENE OF THE INTERSECTION OF WILSON AVENUE& SAN JACINTO AVENUE, EAST OF PERRIS.

Detailed Location: ONE OF FOUR BURROW SITES LOCATED ALONG A 2-MILE STRETCH OF THE DRAIN.

Ecological: HABITAT SURROUNDING THE BURROW SITES INCLUDES AGRICULTURE, FALLOW FIELDS, AND THE RUDERAL FLOODPLAIN FLOODPLAIN OF THE SAN JACINTO RIVER.

General: TWO ADULTS OBSERVED AT THE BURROW SITE DURING A 19-27 MAY 1997 SURVEY.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	249	**Map Index:**	36174	**EO Index:**	31171	**Element Last Seen:**	2008-06-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-06-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Stable	**Record Last Updated:**	2011-04-11

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80259 / -117.20689	**Accurracy:**	specific area
UTM:	Zone-11 N3740287 E480849	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 21 (S)	**Acres:**	14.0

Location: WEST SIDE OF PERRIS VALLEY DRAIN, 0.3 MILE NE OF THE INTERSECTION OF MURRIETA ROAD AND NUEVO ROAD, NE OF PERRIS.

Detailed Location: 1997 BURROWS ARE THE NORTHMOST OF FOUR BURROW SITES LOCATED ALONG A 2-MILE STRETCH OF THE DRAIN.

Ecological: HABITAT SURROUNDING THE BURROW SITE CONSISTS OF AGRICULTURE, FALLOW FIELDS, AND THE RUDERAL FLOODPLAIN OF THE SAN JACINTO RIVER. NO GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION IN 2007.

General: 2 ADULTS AND AT LEAST 1 YOUNG OBSERVED AT 1 BURROW AND 2 ADULTS AND AT LEAST 4 YOUNG AT THE SECOND BURROW IN MAY 1997. 2 ADULTS AND 2 JUVENILES OBSERVED 19 JUN 2007. 2 ADULTS AND 3 JUVENILES OBSERVED AT 3 BURROW SITES ON 15 JUN 2008.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	273	**Map Index:**	39621	**EO Index:**	34623	**Element Last Seen:**	2007-05-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-05-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-03-01

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07581 / -117.36630	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3770622 E466202	**Elevation (ft):**	1100
PLSS:	T01S, R05W, Sec. 23 (S)	**Acres:**	53.0

Location: ABOUT 0.25 MI SE OF E SAN BERNARDINO AVE AT S RIVERSIDE AVE, RIALTO.

Detailed Location: 1998 OBSERVATION MADE NE OF WOODPINE AVE AT WILDROSE AVE. BLOCK CODE 3770-465 - LOCATION CODES A, B AND D. UNKNOWN DATUM, SO MAPPED APPROXIMATELY TO THE GIVEN COORDINATES.

Ecological: HABITAT CONSISTS OF SANDY SOILS AND OPEN VEGETATION, DOMINATED BY TELEGRAPH WEED, MUSTARD, AND CALIFORNIA CROTON. SITE APPEARS TO HAVE BEEN HISTORICALLY GRADED. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATIONS.

General: 4 BURROWS OBSERVED, ALL WITH SIGNS OF RECENT ACTIVITY WHERE 2 ADULTS & 4 JUVENILES WERE OBSERVED ON 15 AUG 1998. 1 ADULT OBSERVED AT A & B, 1 ADULT & 1 JUVENILE OBSERVED AT D, 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 11 MAY 2007.

Owner/Manager: PVT

Occurrence No.	314	**Map Index:**	40533	**EO Index:**	35540	**Element Last Seen:**	1983-XX-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-01-07

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10196 / -117.21459	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3773482 E480206	**Elevation (ft):**	1170
PLSS:	T01S, R03W, Sec. 08 (S)	**Acres:**	0.0

Location: EAST END OF THE MAIN RUNWAY, NORTON AIR FORCE BASE.

Detailed Location: BURROWS WERE LOCATED EAST OF THE ROAD THAT SKIRTS THE RUNWAY.

Ecological: HABITAT CONSISTS OF AN OPEN, SANDY FIELD.

General: AN UNDETERMINED NUMBER OF OWLS UTILIZED THIS BURROW SITE IN 1983.

Owner/Manager: DOD-USAF

Occurrence No.	439	**Map Index:**	47369	**EO Index:**	47369	**Element Last Seen:**	2007-07-14
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-07-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Stable	**Record Last Updated:**	2011-04-11

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90605 / -117.24800	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3751767 E477072	**Elevation (ft):**	1530
PLSS:	T03S, R04W, Sec. 13 (S)	**Acres:**	160.4

Location: MARCH AIR FORCE BASE, SOUTH OF SUNNYMEAD; BETWEEN CATUS AVE & ESCHSCHOLTZIA AVE, & WEST OF HEACOCK ST.

Detailed Location: 1991: BURROW SITES LOCATED BETWEEN BUILDINGS AND ADJACENT TO RUNWAYS (EXACT LOCATIONS UNKNOWN). OBSERVED AT BLOCK CODE 3750-475 LOCATION CODE "A" AND "B" WITHIN MAPPED FEATURE IN 2007.

Ecological: HABITAT CONSISTS OF OPEN GRASSLAND DOMINATED BY BROMUS, ERODIUM AND EREMOCARPUS SETIGERUS. AREAS ARE REGULARLY MOWED FOR FIRE CONTROL. CALIFORNIA GROUND SQUIRRELS DETECTED IN AREA.

General: 25 OCT 1991: 14 ADULTS OBSERVED AT 6 BURROW LOCATIONS THROUGHOUT THE BASE. 1999: 6 OBS AT BURROWS. 2002: 11 OWLS OBS BY BURROWS. 2003: 14 ADULTS, 20 JUVENILES AND 15 UNK NEAR BURROWS OBS. 14 JUL 2007: 6 ADULTS AND 2 JUVENILES OBS.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	628	**Map Index:**	52149	**EO Index:**	52149	**Element Last Seen:**	2009-09-02
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-09-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.85932 / -117.24185	**Accurracy:**	80 meters
UTM:	Zone-11 N3746584 E477628	**Elevation (ft):**	1475
PLSS:	T03S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: ALONG OLEANDER STORM DRAIN, JUST EAST OF THE HEACOCK STREET (WEBSTER AVENUE) CROSSING, SE OF THE MARCH AFB RUNWAY.

Detailed Location: MAPPED TO 2001 COORDINATES. 2009 LOCATION DESCRIBED AS THE ENTIRE CANAL BETWEEN HEACOCK ST AND PERRIS BLVD.

Ecological: HABITAT CONSISTS OF A BERM SURROUNDING A FALLOW AGRICULTURAL FIELD.

General: OWLS WERE OBSERVED FLYING BETWEEN 8 BURROWS ON 12 JUL 2001; WHITEWASH, FEATHERS, AND PREY PARTS PRESENT. 5 OWLS WERE OBSERVED WITHIN A MAINTAINED EARTHEN TRAPEZOIDAL FLOOD CONTROL CHANNEL ON 2 SEP 2009.

Owner/Manager: PVT

Occurrence No.	838	**Map Index:**	65895	**EO Index:**	65974	**Element Last Seen:**	2002-07-20
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-07-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-08-18

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79838 / -117.33261	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3739851 E469211	**Elevation (ft):**	2190
PLSS:	T04S, R04W, Sec. 30 (S)	**Acres:**	38.4

Location: ~0.7 MILE NORTH OF SANTA ROSA ROAD, 6 MILES WEST OF PERRIS.

Detailed Location: BURROW SITE WAS LOCATED WITHIN A FENCED "YARD" IN NE1/4 OF NE1/4 SEC 30.

Ecological: HABITAT CONSISTS OF SOMEWHAT DISTURBED NON-NATIVE GRASSLAND.

General: 2 ADULTS AND 4 JUVENILES OBSERVED AT THE BURROW ON 20 JUL 2002.

Owner/Manager: PVT

Occurrence No.	882	**Map Index:**	67910	**EO Index:**	68057	**Element Last Seen:**	2006-06-28
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-01-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84182 / -117.31320	**Accurracy:**	specific area
UTM:	Zone-11 N3744661 E471022	**Elevation (ft):**	1660
PLSS:	T04S, R04W, Sec. 09 (S)	**Acres:**	140.0

Location: MEAD VALLEY, NW OF THE INTERSECTION OF ALEXANDER STREET AND CAJALCO ROAD, SE OF RIVERSIDE.

Detailed Location: SITE IS DEVELOPED ON THREE SIDES, WITH A SMALL EASEMENT ON THE EAST.

Ecological: VEGETATION SURROUNDING BURROW IS DOMINATED BY ERIOGONUM SP. AND BRASSICA SP.

General: 14 ADULTS AND 3+ JUVENILES OBSERVED ON 28 JUN 2006.

Owner/Manager: UNKNOWN

Occurrence No.	929	**Map Index:**	69282	**EO Index:**	70066	**Element Last Seen:**	2006-10-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-10-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-05-24

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.87591 / -117.32890	**Accurracy:**	specific area
UTM:	Zone-11 N3748446 E469582	**Elevation (ft):**	1640
PLSS:	T03S, R04W, Sec. 29 (S)	**Acres:**	26.0

Location: ALONG LURIN AVENUE, EAST OF WOOD ROAD, 1.5 MILES ESE OF WOODCREST.

Detailed Location:

Ecological: HABITAT CONSISTS OF NON-NATIVE GRASSLAND IN A HISTORIC AGRICULTURAL AREA. NUMEROUS GROUND SQUIRREL BURROWS FOUND IN THE VICINTIY, WHICH HAS THE POTENTIAL TO SUPPORT MULTIPLE OWL PAIRS.

General: 5 BURROWS AND 2 POTENTIAL BURROWS OBSERVED ON 17 JAN 2006. 1 ADULT OBSERVED AT A BURROW SITE NORTH OF LURIN AVENUE ON 25 OCT 2006.

Owner/Manager: UNKNOWN

Occurrence No.	1069	**Map Index:**	71396	**EO Index:**	72294	**Element Last Seen:**	2006-05-25
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-05-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.85672 / -117.26713	**Accurracy:**	80 meters
UTM:	Zone-11 N3746301 E475289	**Elevation (ft):**	1570
PLSS:	T04S, R04W, Sec. 02 (S)	**Acres:**	0.0

Location: 0.22 MI SE OF THE CORNER OF OLEANDER AVE & DECKER RD, SOUTH OF MARCH AFB.

Detailed Location: THE PROPERTY IS COMPRISED OF NON-NATIVE GRASSLAND, SEVERAL ROCK OUTCROPS, DISCED AREAS AND A LARGE GRAVEL PAD.

Ecological: HABITAT DOMINATED BY DEINANDRA PANICULATA, BRASSICA SP., CROTON SETIGERUS AND TRICHOSTEMA LANCEOLATUM. NO NATIVE VEGETATION COMMUNITIES PRESENT ON-SITE.

General: 3 ADULTS OBSERVED BREEDING ON 25 MAY 2006.

Owner/Manager: PVT

Occurrence No.	1070	**Map Index:**	71397	**EO Index:**	72295	**Element Last Seen:**	2006-06-06
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-05-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.86172 / -117.27200	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3746858 E474839	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 35 (S)	**Acres:**	78.0

Location: NW OF THE CORNER OF OLEANDER AVE & DECKER RD, SOUTH OF MARCH AFB.

Detailed Location:

Ecological: HABITAT COMPOSED OF VERY LOW GROWING GRASSLAND.

General: 8 TERRITORIES (15 ADULTS AND 23 JUVENILES) OBSERVED ON 6 JUN 2006, 6 BURROWS IDENTIFIED AS "NATAL" BURROWS AND 2 IDENTIFIED AS "OCCUPIED" BURROWS.

Owner/Manager: PVT

Occurrence No.	1074	**Map Index:**	71405	**EO Index:**	72303	**Element Last Seen:**	2004-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	2005-04-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-05-30

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.91205 / -117.37367	**Accurracy:**	80 meters
UTM:	Zone-11 N3752468 E465455	**Elevation (ft):**	1500
PLSS:	T03S, R05W, Sec. 14 (S)	**Acres:**	0.0

Location: 0.14 MI BELOW PRENDA DAM, PRENDA.

Detailed Location: OWL HAS OCCUPIED A GROUND SQUIRREL BURROW ON A ROCKY GENTLE SLOPE.

Ecological: HABITAT DOMINATED BY GRASSLAND AND SAGE SCRUB, IMMEDIATELY UPSLOPE OF THE BURROW ENTRANCE ARE TALL MUSTARD PLANTS.

General: PAIR CONFIRMED BREEDING IN THIS LOCATION IN 2004. OWLS NOW EXTRIPATED FROM THIS LOCATION.

Owner/Manager: PVT

*** SENSITIVE ***

Occurrence No.	1079	**Map Index:**	71412	**EO Index:**	72309	**Element Last Seen:**	2006-07-12
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-07-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-05-30

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:		**Accuracy:**	80 meters
UTM:		**Elevation (ft):**	1495
PLSS:		**Acres:**	0.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT WITHIN THE TERRITORY CONSISTS OF AGRICULTURE (DAIRIES, CROPPED FIELDS, TURF GRASS), GRAZED FIELDS, RUDERAL VEGETATION, AND TREATMENT WETLANDS.

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	1096	**Map Index:**	71438	**EO Index:**	72336	**Element Last Seen:**	2005-06-20
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-06-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-06-05

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:		**Accuracy:**	80 meters
UTM:		**Elevation (ft):**	1515
PLSS:		**Acres:**	0.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT WITHIN THIS TERRITORY CONSISTS OF OPEN RUDERAL FIELDS AND AGRICULTURE (CROPPED FIELDS),

General:

Owner/Manager:

Occurrence No.	1283	**Map Index:**	79601	**EO Index:**	80589	**Element Last Seen:**	2009-07-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-07-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-08-19

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90312 / -117.31515	**Accurracy:**	80 meters
UTM:	Zone-11 N3751459 E470863	**Elevation (ft):**	1680
PLSS:	T03S, R04W, Sec. 17 (S)	**Acres:**	0.0

Location: ABOUT 0.7 MI E OF TRAUTWEIN RD AND 0.6 MI N OF ORANGE TERRACE PARKWAY, NW OF MARCH AFB, RIVERSIDE.

Detailed Location: MARCH AFB SKR PRESERVE. MAPPED TO PROVIDED COORDINATES.

Ecological: RIPARIAN AREA SURROUNDED BY NON-NATIVE GRASSLAND INTERMIXED W/ RIVERSIDEAN SAGE SCRUB. SMALL TO MEDIUM SIZED TREES (INCLUDING COTTONWOODS), WILLOWS, AND MULEFAT ALONG RIPARIAN. AREA SURROUNDING PRESERVE IS RESIDENTIAL.

General: A PAIR WAS OBSERVED WITH A CHICK ON 29 JUL 2009. OWLS WERE FIRST SEEN IN THIS AREA ON 2 JAN 2009. OWLS WERE SEEN IN AREA THROUGHOUT SPRING.

Owner/Manager: JPA, CNLM

Occurrence No.	1284	**Map Index:**	79603	**EO Index:**	80590	**Element Last Seen:**	2009-01-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-01-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-08-19

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90651 / -117.31744	**Accurracy:**	80 meters
UTM:	Zone-11 N3751835 E470652	**Elevation (ft):**	1670
PLSS:	T03S, R04W, Sec. 17 (S)	**Acres:**	0.0

Location: ABOUT 0.6 MI E OF TRAUTWEIN RD AND 0.8 MI N OF ORANGE TERRACE PARKWAY, NW OF MARCH AFB, RIVERSIDE.

Detailed Location: MARCH AFB SKR PRESERVE. MAPPED TO PROVIDED COORDINATES.

Ecological: RIPARIAN AREA SURROUNDED BY NON-NATIVE GRASSLAND INTERMIXED W/ RIVERSIDEAN SAGE SCRUB. SMALL TO MEDIUM SIZED TREES (INCLUDING COTTONWOODS), WILLOWS, AND MULEFAT ALONG RIPARIAN. AREA SURROUNDING PRESERVE IS RESIDENTIAL.

General: A PAIR WAS FREQUENTLY SEEN AT BURROW ON UNKNOWN DATES. OWLS WERE FIRST SEEN IN THIS AREA ON 2 JAN 2009. OWLS WERE SEEN IN AREA THROUGHOUT SPRING.

Owner/Manager: JPA, CNLM

Occurrence No.	1763	**Map Index:**	81851	**EO Index:**	82826	**Element Last Seen:**	2007-08-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-08-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79996 / -117.01145	**Accurracy:**	80 meters
UTM:	Zone-11 N3739976 E498940	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 29 (S)	**Acres:**	0.0

Location: 0.4 MI NE SCOTT ST AT CAWSTON AVE, ABOUT 0.5 MI W OF SAN JACINTO RESERVOIR, SAN JACINTO.

Detailed Location: BLOCK CODE 3735-495 - LOCATION CODE A. MAPPED TO PROVIDED COORDINATES.

Ecological: UPLAND ELEVATION SUBREGION.

General: 2 ADULTS OBSERVED AND 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 23 AUG 2007.

Owner/Manager: PVT

Occurrence No.	1764	**Map Index:**	81852	**EO Index:**	82827	**Element Last Seen:**	2006-06-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.75154 / -117.01781	**Accurracy:**	specific area
UTM:	Zone-11 N3734608 E498349	**Elevation (ft):**	1510
PLSS:	T05S, R01W, Sec. 07 (S)	**Acres:**	10.0

Location: JUST NW OF N CAWSTON AVE AT W DEVONSHIRE AVE, HEMET.

Detailed Location: BLOCK CODE 3730-495 - LOCATION CODES U (EAST) AND V (WEST). MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS NATURAL GRASSLAND. UPLAND ELEVATION SUBREGION. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATIONS.

General: 2 ADULTS OBSERVED AT U; 2 ADULTS AND 4 JUVENILES OBSERVED AT V; 1 BREEDING PAIR ESTIMATED TO OCCUR AT EACH LOCATION ON 29 JUN 2006.

Owner/Manager: PVT

Occurrence No.	1765	**Map Index:**	81853	**EO Index:**	82828	**Element Last Seen:**	2007-06-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84779 / -117.12205	**Accurracy:**	80 meters
UTM:	Zone-11 N3745286 E488708	**Elevation (ft):**	1425
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	0.0

Location: WEST SIDE OF DAVIS RD, ABOUT 0.7 MI N OF RESERVOIR AVE, LAKEVIEW.

Detailed Location: BLOCK CODE 3745-485 - LOCATION CODE A. MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS NATURAL GRASSLAND. UPLAND ELEVATION SUBREGION. NO GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 2 ADULTS OBSERVED AND 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 20 JUN 2007.

Owner/Manager: UNKNOWN

Occurrence No.	1766	**Map Index:**	81854	**EO Index:**	82829	**Element Last Seen:**	2006-06-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.87011 / -117.09179	**Accurracy:**	specific area
UTM:	Zone-11 N3747758 E491510	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 33 (S)	**Acres:**	13.0

Location: 1.75 MI SW OF GILMAN SPRINGS RD AT OLIVE AVE, ABOUT 3 MI NE LAKEVIEW, SAN JACINTO WILDLIFE AREA.

Detailed Location: BLOCK CODE 3745-490 - LOCATION CODES A, E, F, G, AND H. MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS ALKALI FLOOD PLAIN BERM. UPLAND ELEVATION SUBREGION. NO GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATIONS.

General: 2 ADULTS & 2 JUVENILES OBSERVED AT A, 2 AD & 3 JUV OBS AT E, 2 AD & 4 JUV OBS AT F, 2 AD & 5 JUV OBS AT G AS WELL AS H; 1 BREEDING PAIR OBSERVED AT EACH LOCATION ON 1 JUN 2006.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	1767	**Map Index:**	81855	**EO Index:**	82831	**Element Last Seen:**	2007-06-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78158 / -117.19965	**Accurracy:**	80 meters
UTM:	Zone-11 N3737956 E481515	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: ALONG PERRIS VALLEY STORM DRAIN, ABOUT 1.7 MI NE OF PERRIS VALLEY AIRPORT.

Detailed Location: BLOCK CODE 3735-480 - LOCATION CODE A. MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS IDLE OR FALLOW FIELD. UPLAND ELEVATION SUBREGION. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 3 ADULTS OBSERVED AND 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 25 JUN 2007.

Owner/Manager: PVT

Occurrence No.	1768	**Map Index:**	81856	**EO Index:**	82832	**Element Last Seen:**	2007-06-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81160 / -117.20565	**Accurracy:**	80 meters
UTM:	Zone-11 N3741286 E480966	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: ALONG PERRIS VALLEY STORM DRAIN, 0.3 MI SSE MURRIETA RD AT ORANGE AVE, PERRIS.

Detailed Location: BLOCK CODE 3740-480 - LOCATION CODE A. MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS STORM DRAIN BANK SURROUNDED BY HOUSING CONSTRUCTION. UPLAND ELEVATION SUBREGION. NO GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 1 ADULT OBSERVED AND 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 19 JUN 2007.

Owner/Manager: PVT

Occurrence No.	1769	**Map Index:**	81857	**EO Index:**	82833	**Element Last Seen:**	2007-06-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82441 / -117.20846	**Accurracy:**	80 meters
UTM:	Zone-11 N3742706 E480708	**Elevation (ft):**	1430
PLSS:	T04S, R03W, Sec. 16 (S)	**Acres:**	0.0

Location: ALONG MURRIETA RD JUST N OF PLACENTIA AVE, PERRIS.

Detailed Location: IN EMPTY DIRT LOT WEST OF PERRIS VALLEY STORM DRAIN. BLOCK CODE 3740-480 - LOCATION CODE C. MAPPED TO PROVIDED COORDINATES.

Ecological: UPLAND ELEVATION SUBREGION. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 1 ADULT AND 3 JUVENILES OBSERVED; 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 19 JUN 2007.

Owner/Manager: UNKNOWN

Occurrence No.	1770	**Map Index:**	81859	**EO Index:**	82834	**Element Last Seen:**	2006-06-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87690 / -117.09191	**Accurracy:**	specific area
UTM:	Zone-11 N3748510 E491499	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 28 (S)	**Acres:**	15.0

Location: ALONG S CONTOUR RD, 1.5 MI SW OF GILMAN SPRINGS RD AT OLIVE AVE, SAN JACINTO WILDLIFE AREA.

Detailed Location: BLOCK CODE 3745-490 - LOCATION CODES B, C AND D. MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT DESCRIBED AS ALKALI FLOOD PLAINS ON BERMS CONTAINING WATER. UPLAND ELEVATION SUBREGION. NO GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATIONS. CHICKS WERE FLYING WELL AND WERE DIFFICULT TO COUNT.

General: 2 ADULTS AND 4 JUVENILES OBSERVED AT B; 2 ADULTS AND 5 JUVENILES OBSERVED AT C; 2 ADULTS AND 5 JUVENILES OBSERVED AT D; 1 BREEDING PAIR ESTIMATED TO OCCUR AT EACH LOCATION ON 1 JUN 2006.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	1784	**Map Index:**	81883	**EO Index:**	82856	**Element Last Seen:**	2006-05-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-05-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10655 / -117.24148	**Accurracy:**	80 meters
UTM:	Zone-11 N3773996 E477727	**Elevation (ft):**	1110
PLSS:	T01S, R03W, Sec. 06 (S)	**Acres:**	0.0

Location: JUST E OF STERLING AVE AT E 3RD ST, N EDGE OF SAN BERNARDINO INTERNATIONAL AIRPORT.

Detailed Location: ALONG CITY CREEK. BLOCK CODE 3770-475 - LOCATION CODE A. MAPPED TO PROVIDED COORDINATES.

Ecological: UPLAND ELEVATION SUBREGION. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 6 ADULTS AND 3 JUVENILES DETECTED ON 26 MAY 2006; THE 3 PAIRS WERE LOCATED WITHIN 1/4 MI OF EACH OTHER AT THIS LOCATION.

Owner/Manager: UNKNOWN

Occurrence No.	1785	**Map Index:**	81885	**EO Index:**	82858	**Element Last Seen:**	2007-05-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-05-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-03-01

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07583 / -117.35361	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3770621 E467373	**Elevation (ft):**	1090
PLSS:	T01S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: SSW SAN BERNARDINO AVE AT N PEPPER AVE, COLTON.

Detailed Location: BLOCK CODE 3770-465 - LOCATION CODE C. DATUM UNKNOWN; MAPPED TO APPROXIMATE LOCATION OF PROVIDED COORDINATE.

Ecological: HABITAT DESCRIBED AS SANDY BRUSHLAND. GROUND SQUIRRELS DETECTED WITHIN 100 M OF BREEDING LOCATION.

General: 1 ADULT OBSERVED AND 1 BREEDING PAIR ESTIMATED TO OCCUR IN AREA ON 11 MAY 2007.

Owner/Manager: UNKNOWN

Asio otus

Element Code: ABNSB13010

long-eared owl

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern			
Habitat:	**General:**	RIPARIAN BOTTOMLANDS GROWN TO TALL WILLOWS & COTTONWOODS; ALSO, BELTS OF LIVE OAK PARALLELING STREAM COURSES.			
	Micro:	REQUIRE ADJACENT OPEN LAND PRODUCTIVE OF MICE AND THE PRESENCE OF OLD NESTS OF CROWS, HAWKS, OR MAGPIES FOR BREEDING.			

Occurrence No.	35	**Map Index:**	03381	**EO Index:**	25544	**Element Last Seen:**	1983-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-11-07

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80463 / -117.34428	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3740548 E468133	**Elevation (ft):**	2015
PLSS:	T04S, R04W, Sec. 19 (S)	**Acres:**	0.0

Location: IDA LEONA ESTATES, 0.5 MI WNW OF GAVILAN MINE, 4 MILES SOUTHEAST OF LAKE MATHEWS.

Detailed Location: PARCEL 6. ROOST AND NEST SITE.

Ecological: HABITAT CONSISTS OF JUNIPER WOODLAND. IDA LEONA ESTATES PROVIDES EXCELLENT NESTING AND FORAGING HABITAT.

General: 1 NEST OBSERVED DURING 1983. THE OWLS ARE SENSITIVE TO DISTURBANCE DUE TO SEMI-COLONIAL NESTING HABITS. THERE ARE FEW POSSIBLE NESTING AREAS FOR RELOCATION IN THE WESTERN COUNTY; THIS IS A CRITICAL SITE FOR THESE OWLS.

Owner/Manager: PVT

Occurrence No.	36	**Map Index:**	03366	**EO Index:**	13007	**Element Last Seen:**	1983-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-11-07

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79936 / -117.34758	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3739965 E467826	**Elevation (ft):**	2030
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	0.0

Location: IDA LEONA ESTATES, 0.7 MI WSW OF GAVILAN MINE, 4 MILES SOUTHEAST OF LAKE MATHEWS.

Detailed Location: PARCEL 3. ROOST AND NEST SITE.

Ecological: HABITAT CONSISTS OF SCRUB OAK WOODLAND. IDA LEONA ESTATES PROVIDES EXCELLENT NESTING AND FORAGING HABITAT.

General: 1 NEST OBSERVED DURING 1983. OWLS ARE SENSITIVE TO DISTURBANCE DUE TO SEMI-COLONIAL NESTING HABITS. THERE ARE FEW POSSIBLE NESTING AREAS FOR RELOCATION IN THE WESTERN COUNTY; THIS IS A CRITICAL SITE FOR THESE OWLS.

Owner/Manager: PVT

Empidonax traillii extimus

Element Code: ABPAE33043

southwestern willow flycatcher

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G5T1T2
	State:	Endangered		**State:**	S1
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern			

Habitat:	**General:**	RIPARIAN WOODLANDS IN SOUTHERN CALIFORNIA.
	Micro:	

Occurrence No.	4	**Map Index:** 37946	**EO Index:**	32953	**Element Last Seen:** 1997-06-30
Occ. Rank:	Excellent		**Presence:**	Presumed Extant	**Site Last Seen:** 1997-06-30
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 1998-01-21

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10353 / -117.01246	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3773635 E498850	**Elevation (ft):**	3400
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: VICINITY OF THURMAN FLATS PICNIC AREA, IN MILL CREEK CANYON, SAN BERNARDINO NATIONAL FOREST

Detailed Location:

Ecological: HABITAT CONSISTS OF RIVERSIDEAN ALLUVIAL FAN SAGE SCRUB, DOMINATED BY A TALL WILLOW AND ALDER OVERSTORY, WITH A DENSE UNDERSTORY OF BLACKBERRY AND OTHER HERBS.

General: 2 PAIRS NESTED SUCCESSFULLY IN 1997; 2 FLEDGLINGS FROM ONE NEST WERE BANDED.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	29	**Map Index:** 54561	**EO Index:**	54561	**Element Last Seen:** 1999-07-17
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:** 1999-07-31
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:** 2004-03-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01174 / -117.17320	**Accurracy:**	specific area
UTM:	Zone-11 N3763471 E484007	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	39.8

Location: SAN TIMOTEO CANYON, 0.4-0.9 MI NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: THE FIRST 2 BIRDS WERE DETECTED (100 METERS APART) IN THE NORTH PORTION OF OCCURRENCE. THESE BIRDS WERE UTILIZING A WILLOW THICKET AND WILLOW/MULEFAT THICKET. THE THIRD BIRD WAS DETECTED IN SOUTH PORTION OF OCCURRENCE.

Ecological: HABITAT CONSISTS OF DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE SALIX LASIOLEPIS, SALIX HINDSIANA, POPULUS FREMONTII AND BACHARIS GLUTINOSA. YELLOW-BILLED CUCKOO OBSERVED IN AREA.

General: 1 OBS 24 MAY, 10 & 12 JUN & 1 & 17 JUL 1999. 2ND BIRD HEARD WHITTING 10 JUN, 100M UPSTREAM OF FIRST OBS. 3RD BIRD FLYCATCHING FROM SALT CEDAR 12 JUN 1999. NESTING NOT CONFIRMED BUT BIRDS OBS AFTER 10 JUN CONSIDERED TO BE ON TERRITORY.

Owner/Manager: UNKNOWN

Occurrence No.	46	**Map Index:**	66229	**EO Index:**	66309	**Element Last Seen:**	2004-07-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-07-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92729 / -117.01615	**Accurracy:**	80 meters
UTM:	Zone-11 N3754094 E498506	**Elevation (ft):**	790
PLSS:	T03S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: ABOUT 2.35 MI WSW OF BEAUMONT, 0.4 MI SOUTH OF HWY 60.

Detailed Location:

Ecological: DOMINANT SPECIES INCLUDE ARROYO WILLOW, COTTONWOOD, NETTLE. CANOPY HEIGHT IS 11M. SURFACE WATER OR SATURATED SOIL IS PRESENT.

General: 1 ADULT OBSERVED BETWEEN 26 MAY AND 15 JUL 2004; POSSIBLY TERRITORIAL.

Owner/Manager: UNKNOWN

Occurrence No.	47	**Map Index:**	66230	**EO Index:**	66311	**Element Last Seen:**	2004-07-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-11-02

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92987 / -117.02351	**Accurracy:**	80 meters
UTM:	Zone-11 N3754381 E497827	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: ABOUT 2.7 MI WEST OF BEAUMONT, 0.2 MI SOUTH OF HWY 60, COOPER'S CREEK.

Detailed Location:

Ecological: DOMINANT SPECIES INCLUDE ARROYO WILLOW, BLACK WILLOW AND MULEFAT.

General: 1 INDIVIDUAL OBSERVED ON 2 SURVEY DAYES BETWEEN MAY AND JUL 2004; POSSIBLY TERRITORIAL.

Owner/Manager: PVT

Eremophila alpestris actia

Element Code: ABPAT02011

California horned lark

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3Q
	State:	None		**State:**	S3
	Other:	DFG_WL-Watch List, IUCN_LC-Least Concern			
Habitat:	**General:**	COASTAL REGIONS, CHIEFLY FROM SONOMA CO. TO SAN DIEGO CO. ALSO MAIN PART OF SAN JOAQUIN VALLEY & EAST TO FOOTHILLS.			
	Micro:	SHORT-GRASS PRAIRIE, "BALD" HILLS, MOUNTAIN MEADOWS, OPEN COASTAL PLAINS, FALLOW GRAIN FIELDS, ALKALI FLATS.			

Occurrence No.	37	**Map Index:**	47733	**EO Index:**	47733	**Element Last Seen:**	1997-05-27
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-05-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-18

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80735 / -117.20437	**Accurracy:**	80 meters
UTM:	Zone-11 N3740814 E481084	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: 2 MILES NE OF PERRIS; SOUTH OF CITRUS AVE BETWEEN MURRIETA RD AND EVANS RD.

Detailed Location:

Ecological: HABITAT CONSISTS OF AGRICULTURAL/RUDERAL LAND AND FALLOW FIELDS. SURROUNDING LAND USED FOR AGRICULTURE AND RESIDENTIAL PURPOSES.

General: 19 & 27 MAY 1997: ONE JUVENILE & FIVE ADULTS OBSERVED.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	48	**Map Index:**	55837	**EO Index:**	55853	**Element Last Seen:**	2003-XX-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-17

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.93061 / -117.01466	**Accurracy:**	specific area
UTM:	Zone-11 N3754462 E498644	**Elevation (ft):**	2430
PLSS:	T03S, R01W, Sec. 08 (S)	**Acres:**	21.0

Location: JUST SOUTH OF HWY 60, 2 MILES WEST OF BEAUMONT.

Detailed Location:

Ecological: HABITAT ON SITE CONSISTS OF DISTURBED NON-NATIVE ANNUAL GRASSLANDS AND BARE AREAS. SURROUNDING AREA IS UNDISTURBED OPEN SPACE.

General: 10 ADULTS (BREEDING) OBSERVED DURING 2003.

Owner/Manager: PVT

Occurrence No.	61	**Map Index:**	38668	**EO Index:**	55893	**Element Last Seen:**	1992-11-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-11-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-17

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.86915 / -117.30816	**Accurracy:**	specific area
UTM:	Zone-11 N3747690 E471498	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 33 (S)	**Acres:**	25.4

Location: MARCH AIR FORCE BASE, 0.25 MILE NNE OF INTERSECTION OF BARTON ST & NANDIN AVE, 0.4 MILE SW OF BARTON ST & MARIPOSA AVE.

Detailed Location: SITE 1 TRANSECT. WINTERING.

Ecological: HABITAT CONSISTS OF DISTURBED GRASSLAND. TOPOGRAPHY IS LEVEL TO GENTLY SLOPING.

General: 70 OBSERVED DURING SURVEYS. SITE VISITED ON 3 DIFFERENT DAYS BETWEEN 21 OCTOBER AND 24 NOVEMBER 1992.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	62	**Map Index:**	38572	**EO Index:**	55895	**Element Last Seen:**	1992-11-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-11-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-01-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.89242 / -117.29071	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3750266 E473119	**Elevation (ft):**	1640
PLSS:	T03S, R04W, Sec. 22 (S)	**Acres:**	26.0

Location: WEST MARCH AIR FORCE BASE, ABOUT 0.5 MILE WEST OF ARNOLD HEIGHTS AND ABOUT 2 MILES SSW OF EDGEMONT.

Detailed Location: SITE 5 TRANSECT. WINTERING.

Ecological: HABITAT CONSISTS OF DISTURBED GRASSLAND. TOPOGRAPHY IS LEVEL TO GENTLY SLOPING.

General: 110 OBSERVED DURING SURVEYS. SITE VISITED ON 3 DIFFERENT DAYS BETWEEN 21 OCTOBER AND 24 NOVEMBER 1992.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	63	**Map Index:**	55922	**EO Index:**	55938	**Element Last Seen:**	2001-10-12
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-10-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-25

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08228 / -117.24081	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3771305 E477782	**Elevation (ft):**	1100
PLSS:	T01S, R03W, Sec. 18 (S)	**Acres:**	0.0

Location: JUST SOUTH OF THE SANTA ANA RIVER & NORTH OF I-10, SE OF SAN BERNARDINO.

Detailed Location: AG FIELD NORTH OF MOUNTAIN VIEW POWERPLANT.

Ecological: HABITAT CONSISTS OF RIPARIAN WOODLAND. CURRENT/SURROUNDING LAND USE: AG LAND, DISTURBED, COMMERICAL AND DEVELOPED LAND. LOGGERHEAD SHRIKE AND COOPER'S HAWK LOCATED IN VICINITY.

General: 50 ADULTS AND 25 JUVENILES OBSERVED FEEDING IN PLOWED AGRICULTURAL FIELD ON 12 OCT 2001.

Owner/Manager: UNKNOWN

Campylorhynchus brunneicapillus sandiegensis

Element Code: ABPBG02095

coastal cactus wren

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3Q
	State:	None		**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	SOUTHERN CALIFORNIA COASTAL SAGE SCRUB.			
	Micro:	WRENS REQUIRE TALL OPUNTIA CACTUS FOR NESTING AND ROOSTING.			

Occurrence No.	168	**Map Index:**	52665	**EO Index:**	53524	**Element Last Seen:**	2001-12-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-12-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-12-18

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86783 / -117.02750	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3747502 E497455	**Elevation (ft):**	1640
PLSS:	T03S, R01W, Sec. 31 (S)	**Acres:**	0.0

Location: NW OF LABORDE CANYON, NE OF GILMAN SPRINGS ROAD, 5.6 MILES NE OF LAKEVIEW.

Detailed Location:

Ecological: HABITAT DOMINATED BY BRITTLEBUSH, INTERIOR FLAT-TOPPED BUCKWHEAT, CALIFORNIA SAGE & VALLEY CHOLLA W/LARGE PATCH OF COASTAL PRICLKLY PEAR CACTUS. BADLAND HILLS AREA BURNED (2000) & MAY NO LONGER HAVE SUITABLE HABITAT;AREA IS RECOVERING

General: 2-3 PAIRS OBSERVED IN PATCH OF COASTAL PRICKLY PEAR CACTUS. OBSERVATION OCCURRED DURING THE SAN JACINTO CHRISTMAS BIRD COUNT CONDUCTED EACH YEAR IN DEC, 1995-2001.

Owner/Manager: UNKNOWN

Polioptila californica californica

Element Code: ABPBJ08081

coastal California gnatcatcher

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G3T2
	State:	None		**State:**	S2
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, DFG_SSC-Species of Special Concern			
Habitat:	**General:**	OBLIGATE, PERMANENT RESIDENT OF COASTAL SAGE SCRUB BELOW 2500 FT IN SOUTHERN CALIFORNIA.			
	Micro:	LOW, COASTAL SAGE SCRUB IN ARID WASHES, ON MESAS & SLOPES. NOT ALL AREAS CLASSIFIED AS COASTAL SAGE SCRUB ARE OCCUPIED.			

Occurrence No.	39	**Map Index:**	03346	**EO Index:**	25109	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81279 / -117.35838	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3741456 E466831	**Elevation (ft):**	1900
PLSS:	T04S, R05W (S)	**Acres:**	0.0

Location: HARFORD SPRINGS, EAST OF GAVILAN PEAK, VICINITY LAKE MATTHEWS.

Detailed Location:

Ecological: HABITAT IS COASTAL SAGE SCRUB, DOMINATED BY ARTEMISIA CALIFORNICA, ERIOGONUM FASCICULATUM, AND SALVIA MELLIFERA.

General: 5-10 PAIRS ESTIMATED.

Owner/Manager: UNKNOWN

Occurrence No.	136	**Map Index:**	03531	**EO Index:**	25023	**Element Last Seen:**	1988-06-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-06-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97946 / -117.25254	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3759907 E476672	**Elevation (ft):**	1900
PLSS:	T02S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: LAWLESS RANCH, 2.3 MI N OF SUNNYMEAD, E OF RIVERSIDE.

Detailed Location:

Ecological: HABITAT IS ECOTONE BETWEEN RIPARIAN SYCAMORE WOODLAND AND COASTAL SAGE SCRUB; MODERATE TO STEEPLY SW SLOPING ASPECT, ADJOINING DISTURBED HABITAT.

General: 4 ADULTS OBSERVED.

Owner/Manager: PVT

Occurrence No.	151	**Map Index:**	17454	**EO Index:**	11913	**Element Last Seen:**	1989-09-19
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-09-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-02-20

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95496 / -117.28852	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3757199 E473341	**Elevation (ft):**	1700
PLSS:	T02S, R04W, Sec. 34 (S)	**Acres:**	0.0

Location: AT THE INTERSECTION OF CLARK STREET AND FRESH SKY RD, MORENO VALLEY.

Detailed Location: ONE PAIR FOUND AT THE BASE OF A STEEP, WEST-FACING SLOPE.

Ecological: HABITAT IS RIVERSIDIAN SAGE SCRUB DOMINATED BY ENCELIA FARINOSA (80%); OTHER SHRUBS PRESENT INCLUDE ARTEMISIA CALIFORNICA, ERIOGONUM FASCICULATUM, AND SALVIA APIANA.

General:

Owner/Manager: PVT

Occurrence No.	152	**Map Index:**	17455	**EO Index:**	11912	**Element Last Seen:**	1989-12-22
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-12-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-02-20

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.98271 / -117.25653	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3760268 E476305	**Elevation (ft):**	2000
PLSS:	T02S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: 0.25 MI EAST OF THE INTERSECTION OF PIGEON PASS RD AND LAWLESS RANCH RD, MORENO VALLEY.

Detailed Location: TWO PAIRS OBSERVED DURING A FIELD SURVEY OF THIS 20 ACRE PARCEL.

Ecological: HABITAT IS SPARSE TO DENSE RIVERSIDIAN SAGE SCRUB DOMINATED BY ENCELIA FARINOSA (70%); OTHER SHRUBS PRESENT INCLUDE ARTEMISIA CALIFORNICA, SALVIA APIANA, SALVIA MELLIFERA, AND ERIOGONUM FASCICULATUM.

General: IT IS LIKELY THAT PORTIONS OF THESE BIRDS' TERRITORIES OCCUR ON ADJOINING PARCELS.

Owner/Manager: PVT

Occurrence No.	153	**Map Index:**	17457	**EO Index:**	11910	**Element Last Seen:**	1989-10-14
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-10-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-02-20

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81926 / -117.36857	**Accurracy:**	80 meters
UTM:	Zone-11 N3742177 E465891	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 14 (S)	**Acres:**	0.0

Location: JUST NORTH OF MULTIVIEW DRIVE, 0.6 MI WEST OF GAVILAN RD, ONE MI NNE OF GAVILAN PEAK.

Detailed Location: ONE PAIR OBSERVED.

Ecological: HABITAT IS APPROXIMATELY 20 ACRES OF UNDISTURBED COASTAL SAGE SCRUB CONTAINING SCRUB OAK, ERIOGONUM FASCICULATUM, SALVIA APIANA, SALVIA MELLIFERA, SAMBUCUS MEXICANA, ENCELIA FARINOSA, ETC.

General:

Owner/Manager: PVT

Occurrence No.	337	**Map Index:**	21727	**EO Index:**	21407	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82089 / -117.34307	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3742349 E468251	**Elevation (ft):**	1850
PLSS:	T04S, R04W (S)	**Acres:**	0.0

Location: ONE MILE NORTHEAST OF HARFORD SPRING, NORTHEAST OF GAVILAN PK. SITE APPROX 0.25 MILE NW OF DIRT ROAD NEAR BIRD BENCHMARK

Detailed Location:

Ecological: RIVERSIDIAN SAGE SCRUB HABITAT; DOMINANTS: SALVIA MELLIFERA, ERIOGONUM FASICULATUM, AND ARTEMISIA CALIFORNICA. STEEP, SOUTH-FACING SLOPE.

General: ONE NESTING PAIR DETECTED DURING 1990 SURVEY. SITE IS PART OF HARFORD SPRINGS MITIGATION STUDY SITE FOR METROPOLITAN WATER DISTRICT.

Owner/Manager: MWD

Occurrence No.	338	**Map Index:**	21728	**EO Index:**	14542	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81398 / -117.34020	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3741582 E468514	**Elevation (ft):**	2200
PLSS:	T04S, R04W (S)	**Acres:**	0.0

Location: ONE MILE EAST OF HARFORD SPRING, EAST OF GAVILAN PEAK.

Detailed Location:

Ecological: RIVERSIDIAN SAGE SCRUB HABITAT; DOMINANTS: SALVIA MELLIFERA, ERIOGONUM FASICULATUM, AND ARTEMISIA CALIFORNICA. SITE IS NORTHWEST-FACING SUMMIT OF 2200 FOOT HILL.

General: ONE PAIR DETECTED DURING 1990 SURVEY. SITE IS PART OF HARFORD SPRINGS MITIGATION STUDY SITE FOR METROPOLITAN WATER DISTRICT.

Owner/Manager: MWD

Occurrence No.	339	**Map Index:**	21729	**EO Index:**	14541	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81563 / -117.26200	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3741744 E475752	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 14 (S)	**Acres:**	0.0

Location: 1.25 MILES WEST MAYER FARMS AT HIGHWAY 395, ABOUT 2 MILES NNE OF JUCTION OF SAN JACINTO AVE & OLD ELSINOR ROAD.

Detailed Location:

Ecological: RIVERSIDIAN SAGE SCRUB HABITAT; PLANT SPECIES NOT GIVEN IN REPORT.

General: ONE INDIVIDUAL DETECTED DURING 1990 SURVEY ALONG UNNAMED STREAM. SITE IS PART OF MOTTE RESERVE MITIGATION SITE FOR METROPOLITAN WATER DISTRICT.

Owner/Manager: MWD

Occurrence No.	340	**Map Index:**	21730	**EO Index:**	8394	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81327 / -117.25480	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3741481 E476418	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: ONE MILE WEST-SOUTHWEST OF MAYER FARMS AT HIGHWAY 395, ABOUT 2 MILES NE OF JUNCTION OF OLD ELSINOR RD & SAN JACINTO AVE.

Detailed Location:

Ecological: RIVERSIDIAN SAGE SCRUB HABITAT; PLANT SPECIES NOT GIVEN. SITE IS ACROSS ROAD FROM UNNAMED SOUTHWEST-FLOWING STREAM, IN STEEP-SLOPED CANYON.

General: ONE INDIVIDUAL DETECTED DURING 1990 SURVEY. SITE IS PART OF MOTTE RESERVE MITIGATION SITE.

Owner/Manager: MWD

Occurrence No.	452	**Map Index:**	24991	**EO Index:**	6361	**Element Last Seen:**	1924-04-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1924-04-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-02-03

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.06394 / -117.34206	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3769298 E468435	**Elevation (ft):**	1100
PLSS:	T01S, R04W, Sec. 19 (S)	**Acres:**	0.0

Location: NW SLOPE OF SLOVER MOUNTAIN, COLTON.

Detailed Location:

Ecological: NEST LOCATED 10 INCHES FROM THE GROUND IN AN ARTEMISIA CALIFORNICA BUSH.

General: HISTORICAL EGG SET COLLECTION. BOTH MALE AND FEMALE WERE OBSERVED NEST-BUILDING THE WEEK BEFORE; FEMALE WAS INCUBATING THE 4 EGGS AT THE TIME OF COLLECTION (HANNA, SET #1734, FROM SAN BERNRDINO COUNTY MUSEUM).

Owner/Manager: UNKNOWN

Occurrence No.	454	**Map Index:**	24993	**EO Index:**	6368	**Element Last Seen:**	1928-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1928-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-31

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01874 / -117.27110	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3764267 E474969	**Elevation (ft):**	1600
PLSS:	T02S, R04W (S)	**Acres:**	2755.2

Location: RECHE CANYON, SE OF COLTON.

Detailed Location: 1923-1928: 4 NESTS 4-7 MILES SE COLTON, 3 OF THE 4 NESTS WERE BUILT IN BLACK SAGE, 3-3.5 FEET FROM THE GROUND. 2002: 0.65 MILES S OF WASHINGTON ST/BARTON RD, WEST SIDE OF RECHE CANYON.

Ecological: 190 OF 210 ACRES ON BLUE MOUNTAIN PROJECT SITE CONSISTS OF RIVERSIDIAN SAGE SCRUB AND NON-SAGE SCRUB HABITAT. HABITAT CONSIDERED TO BE OF GOOD TO MODERATE QUALITY DUE TO STEEP TOPOGRAPHY, DISTURBED HABITAT AND NON-NATIVE GRASSES.

General: 4 HISTORICAL EGG SET COLLECTIONS. IN ALL 4 CASES, BOTH MEMBERS OF PAIR WERE PRESENT & 4 EGGS WERE COLLECTED (HANNA, SETS #1915, 2941, 4650, AND 7605 SAN BERNARDINO COUNTY MUSEUM). 1 FEMALE OBS 14 MAY 2002, BUT NOT OBS ON FOLLOWING SURVEYS.

Owner/Manager: UNKNOWN

Occurrence No.	494	**Map Index:**	28537	**EO Index:**	29846	**Element Last Seen:**	1995-06-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-06-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-11-27

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09540 / -117.17234	**Accurracy:**	1 mile
UTM:	Zone-11 N3772747 E484102	**Elevation (ft):**	1340
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: SANTA ANA WASH AT EAST HIGHLANDS.

Detailed Location:

Ecological: SOBOBA STONY LOAMY SAND SOIL. 2% TO 9% SLOPE. DOMINANT PLANT SPECIES INCLUDE SALVIA APIANA, ERIOGONIUM FASCICULATUM, LOTUS SCOPARIUS, & ERIODICTYON TRICHOCALYX.

General: ONE JUVENILE BIRD OBSERVED 28 JUNE 1995.

Owner/Manager: UNKNOWN

Occurrence No.	525	**Map Index:**	40517	**EO Index:**	35524	**Element Last Seen:**	1997-05-06
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-05-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-01-06

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84833 / -117.34877	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3745394 E467734	**Elevation (ft):**	1630
PLSS:	T04S, R05W, Sec. 01 (S)	**Acres:**	0.0

Location: 1 MILE NNE OF THE INTERSECTION OF HARLEY JOHN ROAD AND CAJALCO ROAD, 6 MILES NW OF PERRIS

Detailed Location: LOCATED AT A WATER TANK SITE.

Ecological: HABITAT CONSISTS OF XERIC RIVERSIDEAN SAGE SCRUB, DOMINATED BY BRITTLEBUSH, CALIFORNIA SAGEBRUSH, AND CALIFORNIA BUCKWHEAT.

General: 5 INDIVIDUALS (2 ADULTS, 3 JUVENILES) OBSERVED BETWEEN 4 APR-6 MAY 1997.

Owner/Manager: MWD

Occurrence No.	526	**Map Index:**	40518	**EO Index:**	35525	**Element Last Seen:**	1997-06-25
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-06-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-01-06

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.89873 / -117.35853	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3750985 E466851	**Elevation (ft):**	1400
PLSS:	T03S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: 2.5 MILES WNW OF THE INTERSECTION OF TRAUTWEIN ROAD AND VAN BUREN ROAD, WOODCREST.

Detailed Location:

Ecological: HABITAT CONSISTS OF RIVERSIDEAN SAGE SCRUB, DOMINATED BY BRITTLEBUSH, COASTAL SAGEBRUSH, CUDWEED ASTER, AND SEVERAL ANNUAL GRASSES, AND ANNUAL GRASSLAND, DOMINATED BY SLENDER OAT, SPANISH BROME, RIPGUT BROME, AND RANCHER'S FIDDLENECK.

General: 2 ADULTS AND 2 JUVENILES OBSERVED ON 21 MAY 1997.

Owner/Manager: PVT

Occurrence No.	536	**Map Index:**	42495	**EO Index:**	42495	**Element Last Seen:**	1999-04-02
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2000-03-06

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86702 / -117.04264	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3747412 E496056	**Elevation (ft):**	1500
PLSS:	T03S, R02W, Sec. 36 (S)	**Acres:**	0.0

Location: 0.2 MILE SE OF JCT OF BRIDGE ST & HIGHWAY 79, ~1 MILE NW OF LABORDE CANYON, ~5 MILES NE OF LAKEVIEW, SAN JACINTO VALLEY.

Detailed Location: MAPPED TO COORDINATES (LAT 33 52 00; LONG 117 02 30) GIVEN, AND ALSO TO COVER ELEVATION GIVEN.

Ecological: RIVERSIDIAN SAGE SCRUB DOMINATED BY ENCELIA FARINOSA, ARTEMISIA CALIFORNICA, ERIOGONUM FASCICULATUM.

General: 2 OBSERVED FORAGING, 1999.

Owner/Manager: UNKNOWN

Occurrence No.	537	**Map Index:**	42500	**EO Index:**	42500	**Element Last Seen:**	1999-06-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Stable	**Record Last Updated:**	2003-10-03

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84179 / -117.36513	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744674 E466218	**Elevation (ft):**	1512
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	77.5

Location: HARLEY JOHN ROAD EXTENDING SW TO EL SOBRANTE RD, 0.4 TO 0.8 MILE NORTH OF CAJALCO ROAD; EAST LAKE MATHEWS.

Detailed Location: 1999 OBSERVATION MAPPED TO COORDINATES (LAT 33 50 44, LONG 117 21 45) AND ELEVATION GIVEN.

Ecological: HABITAT CONSISTS OF RIVERSIDIAN SAGE SCRUB. NE AREA DOMINATED BY ENCELIA FARINOSA, ARTEMISIA CALIFORNICA, ERIOGONUM, FASCICULATUM, SALVIA MELLIFERA. LAND SURROUNDING LAKE MATHEWS IS A COMBINATION OF ECOLOGICAL RESERVE AND BUFFER LANDS.

General: 3 PAIRS OBS IN 1992. 2 PAIRS OBS IN 1993. 2 ADULTS (W/ 1JUV) NESTING IN 1999. EREMOPHILA ALPESTRIS ACTIA, AIMOPHILA RUFICEPS CANESCENS, CAMPYLORHYNCHUS BRUNNEICAPILLUS COUESI, AMPHISPIZA BELLI BELLI, LANIUS LUDVICIANUS OBS VIC LAKE MATHEWS

Owner/Manager: MWD, WESTERN MWD

Occurrence No.	542	**Map Index:**	44060	**EO Index:**	44060	**Element Last Seen:**	2000-04-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-04-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-14

Quad Summary: San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	34.01095 / -117.28303	**Accurracy:**	specific area
UTM:	Zone-11 N3763406 E473866	**Elevation (ft):**	1400
PLSS:	T02S, R04W, Sec. 10 (S)	**Acres:**	57.9

Location: SPRING MOUNTAIN RANCH & AREA TO THEEAST; EAST OF HIGHGROVE, 1 MILE SE OF BLUE MOUNTAIN & 0.8 MILE WEST OF RECHE CANYON.

Detailed Location: ALL 1997 OBSERVATIONS WERE IN THE AREA OF ALMOST SOLID ARTEMESIA CALIFORNICA.

Ecological: RIVERSIDIAN SAGE SCRUB, DISTURBED GRASSLAND, SMALL RIPARIAN AREAS. PLANTS: ENCELIA FARNINOSA, LOTUS SCOPARIUS, SAMBUCUS MEXICANA, ERIOGONUM FASCICULATUM, SALVIA SP. & ARTEMISIA CALIFORNICA. NEARBY ORANGE GROVES HAVE BEEN CLEARED.

General: 1997: 3 PAIRS (1 PAIR WITH INDEPENDENT JUVENILES OBS ON 29 MAY) OBSERVED DURING SIX SURVEYS BETWEEN 23 APR-29 MAY 1997. 1 MALE OBSERVED ON 3 APR 2000. ORANGE GROVES THAT HAD BEEN NEARBY HAVE BEEN CLEARED. ACCIPITER COOPERII OBS IN VIC.

Owner/Manager: PVT

Occurrence No.	712	**Map Index:**	52018	**EO Index:**	52018	**Element Last Seen:**	2002-01-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-01-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-08-05

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.75595 / -117.02635	**Accurracy:**	80 meters
UTM:	Zone-11 N3735097 E497558	**Elevation (ft):**	1633
PLSS:	T05S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: JUST NW OF THE INTERSECTION OF ROSE ROAD AND MYERS ROAD, TRES CERRITOS, APPROXIMATELY 3 MILES WEST OF HEMET

Detailed Location: LOCATION MAPPED USING UTM COORDINATES (NAD 27).

Ecological: HABITAT ON PROJECT SITE CONSISTS OF RSS COMPRISED OF ENCELIA FARINOSA (DOM MOST AREAS), ERIOGONUM FASCICULATUM, ARTEMISIA CALIFORNICA, BEBBIA JUNCEA, BRICKELLIA CALIFORNICA, OPUNTIA PARRYI, SALVIA MELLIFERA, LOTUS SCOPARIUS, SALVIA APIANA.

General: 1 PAIR OBSERVED ON 29 NOV 2001 AND 24 JAN 2002.

Owner/Manager: PVT

Occurrence No.	757	**Map Index:**	52665	**EO Index:**	52665	**Element Last Seen:**	2000-12-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-12-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-25

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86783 / -117.02750	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3747502 E497455	**Elevation (ft):**	1640
PLSS:	T03S, R01W, Sec. 31 (S)	**Acres:**	0.0

Location: NW OF LABORDE CANYON, NE OF GILMAN SPRINGS ROAD, 5.6 MILES NE OF LAKEVIEW.

Detailed Location:

Ecological: HABITAT DOMINATED BY BRITTLEBUSH, INTERIOR FLAT-TOPPED BUCKWHEAT, CALIFORNIA SAGE & VALLEY CHOLLA W/LARGE PATCH OF COASTAL PRICLKLY PEAR CACTUS. BADLAND HILLS AREA BURNED (2000) & MAY NO LONGER HAVE SUITABLE CAGN HABITAT;AREA IS RECOVERING

General: 2 MATED PAIRS OBSERVED 19 DEC 1995. 3 INDIVIDUALS OBSERVED 31 DEC 1996, 30 DEC 1997 AND 22 DEC 1998. NONE OBSERVED DEC 1999. 1 MATED PAIR OBSERVED 19 DEC 2000. NONE OBSERVED DEC 2001. ALL OBSERVATIONS FROM CHRISTMAS BIRD COUNTS.

Owner/Manager: UNKNOWN

Occurrence No.	758	**Map Index:**	52666	**EO Index:**	52666	**Element Last Seen:**	1998-11-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-11-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-26

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80326 / -117.24807	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3740370 E477038	**Elevation (ft):**	1680
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: 0.8 MILE WEST OF INTERSTATE 215 AND 1.4 MILES NW OF PERRIS.

Detailed Location: END OF POOLEY DRIVE, WEST OF THE INTERSECTION WITH WEBSTER STREET

Ecological: HABITAT CONSISTS OF COASTAL SAGE SCRUB.

General: 2 ADULTS OBSERVED FORAGING IN VEGETATION ON 20 NOV 1998.

Owner/Manager: PVT

Occurrence No.	761	**Map Index:**	52674	**EO Index:**	52674	**Element Last Seen:**	1999-06-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-29

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.77288 / -117.25010	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3737002 E476842	**Elevation (ft):**	1600
PLSS:	T04S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: JUST NE OF THE INTERSECTION OF STATE ROUTE 74 AND ELLIS AVE, APPROXIMATELY 1 MILE WSW OF PERRIS.

Detailed Location: NORTH OF SR-74 (WITHIN 50 FT OF PAVEMENT) AND EAST OF ELLIS AVE

Ecological: HABITAT CONSISTS OF RIVERSIDIAN SAGE SCRUB

General: 1 PAIR OBSERVED DURING FOCUSED SURVEYS CONDUCTED IN APR, MAY AND JUN 1999. OBSERVATION OCCURRED WITHIN PROJECY BOUNDARY.

Owner/Manager: UNKNOWN

Occurrence No.	762	**Map Index:**	52677	**EO Index:**	52677	**Element Last Seen:**	2000-04-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-04-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82418 / -117.32248	**Accurracy:**	specific area
UTM:	Zone-11 N3742709 E470157	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 17 (S)	**Acres:**	49.2

Location: 1 MILE SOUTH OF CAJALCO ROAD AND 3.2 MILES NE OF GAVILAN PEAK, 4.5 MILES NW OF PERRIS

Detailed Location:

Ecological: HABITAT CONSISTS OF RIVERSIDIAN SAGE SCRUB DOMINATED BY CALIFORNIA SAGEBRUSH, CALIFORNIA BUCKWHEAT & BLACK SAGE. OPEN AREAS BETWEEN SHRUBS DOMINATED BY NON-NATIVE GRASSLAND SPECIES SUCH AS RIPGUT GRASS, FIDDLENECK, BLACK MUSTARD & OTHERS

General: 1 PAIR OBSERVED ON 1 APR 2000. 2 MOLOTHRUS ATER OBSERVED NW OF GNATCATCHER OBSERVATION. PROJECT SITE IS SURROUNDED BY RURAL RESIDENTIAL, ORCHARDS AND OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	773	**Map Index:**	52790	**EO Index:**	52790	**Element Last Seen:**	1992-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-03

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.83735 / -117.37480	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3744185 E465321	**Elevation (ft):**	1440
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	0.0

Location: APPROXIMATELY 0.5 MILE WEST OF EL SOBRANTE RD, JUST N OF THE COLORADO RIVER AQUEDUCT; EAST LAKE MATHEWS.

Detailed Location:

Ecological: SURVEYS CONDUCTED WITHIN ALL SAGE SCRUB HABITATS W/ SHRUB COVER EXCEEDING 15%. EREMOPHILA ALPESTRIS ACTIA, AIMOPHILA RUFICEPS CANESCENS, CAMPYLORHYNCHUS BRUNNEICAPILLUS COUESI, AMPHISPIZA BELLI BELLI, LANIUS LUDVICIANUS OBS VIC LAKE MATHEWS

General: 1 MALE OBSERVED DURING FOCUSED SURVEYS CONDUCTED IN 1992. LAND SURROUNDING LAKE MATHEWS IS A COMBINATION OF ECOLOGICAL RESERVE AND BUFFER LANDS.

Owner/Manager: MWD

Occurrence No.	800	**Map Index:**	53052	**EO Index:**	53052	**Element Last Seen:**	2002-04-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-24

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.96158 / -117.22227	**Accurracy:**	specific area
UTM:	Zone-11 N3757918 E479464	**Elevation (ft):**	2120
PLSS:	T02S, R03W, Sec. 29 (S)	**Acres:**	29.4

Location: 0.5 - 1 MILE EAST OF THE INTERSECTION OF INDIAN STREET AND MANZANITA AVE, NNE SUNNYMEAD

Detailed Location: 1 PR LIKELY NESTING IN CSS ON PROMINENT HILL IN W PORTION OF POLYGON. 1 UNPAIRED ADULT DETECTED IN E PORTION OF POLYGON. LOCATED WITHIN DESIGNATED CRITICAL HABITAT. CSS IS OF INTERMEDIATE-HIGH POTENTIAL VALUE FOR LONG TERM CONSERVATION.

Ecological: UPLAND RIVERSIDIAN SAGE SCRUB. INCLUDES BRITTLEBUSH DROUGHT DECIDUOUS SCRUB (DOM BY ENCELIA FARINOSA W/BEBBIA JUNCIA, SALVIA MELLIFERA, OTHERS) & CALIFORNIA SAGEBRUSH SCRUB (DOM BY ARTEMISIA CALIFORNICA W/SALVIA APIANA, S.MELLIFERA, OTHERS)

General: GNATCATCHERS OBS OR HEARD DURING ALL 9 SURVEYS CONDUCTED BETWEEN 27 DEC 2001 & 3 APR 2002. AREA WHERE GNATCATCHERS DETECTED PROPOSED TO REMAIN AS OPEN SPACE. RANCH TO N, TRACT HOMES TO S & SW, FORMER FARMLAND TO NW; VACANT AREAS TO N, S, E

Owner/Manager: UNKNOWN

Occurrence No.	801	**Map Index:**	53053	**EO Index:**	53053	**Element Last Seen:**	2002-02-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-02-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-24

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97283 / -117.22705	**Accurracy:**	specific area
UTM:	Zone-11 N3759167 E479025	**Elevation (ft):**	2180
PLSS:	T02S, R03W, Sec. 30 (S)	**Acres:**	15.8

Location: 0.9 MILE NE OF THE INTERSECTION OF MANZANITA AVE AND NECTAR AVE, NORTH SUNNYMEAD

Detailed Location: DETECTIONS OCCURRED WITHIN CALIFORNIA SAGEBRUSH SCRUB AND BRITTLEBUSH DROUGHT DECIDUOUS SCRUB, 0.3 MILE NORTH OF NECTAR AVE.

Ecological: UPLAND RIVERSIDIAN SAGE SCRUB. INC BRITTLEBUSH DROUGHT DECIDUOUS SCRUB (DOM BY ENCELIA FARINOSA W/ SALVIA MELLIFERA, ERIOGONUM FASCICULATUM, OTHERS) & CA SAGEBRUSH SCRUB (DOM BY ARTEMISIA CALIFORNICA W/SALVIA MELLIFERA, BRITTLEBUSH,OTHERS)

General: 1 ADULT OBS 26 DEC 2001. SINGLE CAGN HEARD 6 FEB 2002. AREA USED BY CAGN FOR FORAGING,BUT NOT KNOWN IF BREEDING OCCURS IN AREA. CONSERVATION EASEMENT MAY BE PLACED ON PROPOSED OPEN SPACE (21 ACRES). RESIDENTIAL TO N, S, W; UNDEVELOPED TO E

Owner/Manager: UNKNOWN

Occurrence No.	813	**Map Index:**	53213	**EO Index:**	53213	**Element Last Seen:**	2002-04-09
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-11-19

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.76412 / -117.30166	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3736044 E472064	**Elevation (ft):**	2100
PLSS:	T05S, R04W, Sec. 04 (S)	**Acres:**	657.6

Location: NORTH OF STEELE PEAK AND EAST OF STEELE VALLEY, SOUTHWEST OF ELLIS AVE, 3.3 MILES SW OF PERRIS.

Detailed Location: SECTION 4

Ecological: HABITAT CONSISTS OF RIVERSIDEAN SAGE SCRUB. SLOPES: 20 - 40%. CURRENT/SURROUNDING LAND USE: HOMES, OPEN SPACE.

General: 1 ADULT OBSERVED FORAGING ON 9 APR 2002.

Owner/Manager: UNKNOWN

Occurrence No.	916	**Map Index:** 72099	**EO Index:**	73033		**Element Last Seen:**	2008-08-21
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2008-08-21
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2008-08-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08994 / -117.12974	**Accurracy:**	80 meters
UTM:	Zone-11 N3772136 E488031	**Elevation (ft):**	1620
PLSS:	T01S, R02W, Sec. 18 (S)	**Acres:**	0.0

Location: SOUTH SIDE OF SANTA ANA WASH APPROXIMATELY 0.2 MILES EAST OF OPAL AVE & 0.5 MILES NE OF BENCH MARK 1594, MENTONE.

Detailed Location: MAPPED TO PROVIDED COORDINATES.

Ecological: HABITAT WAS DESCRIBED AS ALLUVIAL FAN SAGE SCRUB WITH SURROUNDING LAND USES AS MINING, FLOOD CONTROL, & OPEN SPACE.

General: 2 ADULTS OBSERVED AND HEARD SINGING ON 21 AUG 2008.

Owner/Manager: UNKNOWN

Occurrence No.	917	**Map Index:** 72100	**EO Index:**	73037		**Element Last Seen:**	2006-09-20
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2006-09-20
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2008-08-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09459 / -117.13522	**Accurracy:**	80 meters
UTM:	Zone-11 N3772652 E487525	**Elevation (ft):**	1583
PLSS:	T01S, R02W, Sec. 07 (S)	**Acres:**	0.0

Location: 0.6 MILES N OF BENCH MARK 1594 & WEST OF CONE CAMP RD, ALONG THE NORTH SIDE OF SANTA ANA WASH, HILAND.

Detailed Location: MAPPED TO USFWS CARLSBAD FIELD OFFICE 80M POLYGON OF SPECIFIC UTM COORDINATE.

Ecological: HABITAT APPEARS TO BE SAGE SCRUB IN 2008 AERIAL IMAGES.

General: 2 BIRDS DETECTED ON 6 JUN 2006, AND 4 BIRDS DETECTED ON 20 SEP 2006 BY A. DAVENPORT.

Owner/Manager: UNKNOWN

Lanius ludovicianus

Element Code: ABPBR01030

loggerhead shrike

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S4
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	BROKEN WOODLANDS, SAVANNAH, PINYON-JUNIPER, JOSHUA TREE, & RIPARIAN WOODLANDS, DESERT OASES, SCRUB & WASHES.			
	Micro:	PREFERS OPEN COUNTRY FOR HUNTING, WITH PERCHES FOR SCANNING, AND FAIRLY DENSE SHRUBS AND BRUSH FOR NESTING.			

Occurrence No.	2	**Map Index:**	47441	**EO Index:**	47441	**Element Last Seen:**	1994-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-19

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90447 / -117.30649	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3751606 E471664	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 16 (S)	**Acres:**	1184.7

Location: MARCH AFB; NW AREA BETWEEN TRAUTWEIN ROAD AND HWY 395.

Detailed Location: NESTS FOUND (1-2 METERS FROM GROUND) IN THE FOLLOWING SHRUB TYPES: SALIX SP., BACCHARIS PILULARIS, JUNIPERUS OCCIDENTALIS AND BACCHARIS SILICIFOLIA.

Ecological: HABITAT CONSISTS OF ANNUAL GRASSLAND WITH WILLOW RIPARIAN AND RIVERSIDIAN SAGE SCRUB.

General: 1994: 7 NESTS LOCATED. IT IS ESTIMATED THAT 10 -15 PAIRS OCCUPY AREA.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	5	**Map Index:**	54557	**EO Index:**	54560	**Element Last Seen:**	1999-07-31
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-07-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01058 / -117.17160	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3763343 E484154	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	33.1

Location: SAN TIMOTEO CANYON, JUST NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: 1.2 KM STRETCH ALONG CREEK.

Ecological: HABITAT CONSISTS OF DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE SALIX LASIOLEPIS, SALIX HINDSIANA, POPULUS FREMONTII AND BACHARIS GLUTINOSA. YELLOW-BILLED CUCKOO OBSERVED IN AREA.

General: 2 OBSERVED DURING SURVEYS WHICH OCCURRED ONCE A WEEK BETWEEN 1 APR AND 31 JUL 1999. NESTING WAS CONFIRMED.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	75788	**EO Index:**	76800	**Element Last Seen:**	2005-XX-XX
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-07-08

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79860 / -117.02216	**Accurracy:**	80 meters
UTM:	Zone-11 N3739825 E497948	**Elevation (ft):**	1492
PLSS:	T04S, R01W, Sec. 30 (S)	**Acres:**	0.0

Location: EAST OF LAKEVIEW MOUNTAINS, 1.2 MILES WEST OF SAN JACINTO RESERVOIR, SAN JACINTO VALLEY.

Detailed Location: LOCATED BETWEEN N WARREN RD AND N SANDERSON AVE IN HEMET/SAN JACINTO.

Ecological: NEST LOCATED IN A BLACK WILLOW NEAR WETLANDS ASSOCIATED WITH A WATER TREATMENT FACILITY; WILLOW RIPARIAN, OPEN WATER HABITAT.

General: 1 ADULT AND 3-4 FLEDGLINGS OBSERVED DURING THE SPRING OF 2005.

Owner/Manager: UNKNOWN

Occurrence No.	52	**Map Index:**	80990	**EO Index:**	81979	**Element Last Seen:**	2003-06-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-06-20

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90944 / -117.00176	**Accurracy:**	80 meters
UTM:	Zone-11 N3752115 E499837	**Elevation (ft):**	2596
PLSS:	T03S, R01W, Sec. 17 (S)	**Acres:**	0.0

Location: 0.3 MI WNW OF MT. DAVIS, 1.8 MI SW OF I-10 & HWY 79 JUNCTION, 2.9 MI NE OF MT. EDEN, BEAUMONT.

Detailed Location: AMONG THE DIRT ROADS TO THE WEST OF MT. DAVIS, ABOUT 0.3 MI S OF RADIO FACILITY. MAPPED TO COORDINATES PROVIDED.

Ecological: UNDEVELOPED LANDS CONSISTING OF GRASSLANDS & MIXED CHAPARRAL. VISIBLE DISTURBANCES: OHV USE.

General: ONE ADULT OBSERVED DISPLAYING TERRITORIAL BEHAVIOR IN BUSHES ON FOUR OCCASIONS BETWEEN APR-JUN 2003.

Owner/Manager: PVT

Vireo bellii pusillus

Element Code: ABPBW01114

least Bell's vireo

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G5T2
	State:	Endangered		**State:**	S2
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, IUCN_NT-Near Threatened			
Habitat:	**General:**	SUMMER RESIDENT OF SOUTHERN CALIFORNIA IN LOW RIPARIAN IN VICINITY OF WATER OR IN DRY RIVER BOTTOMS; BELOW 2000 FT.			
	Micro:	NESTS PLACED ALONG MARGINS OF BUSHES OR ON TWIGS PROJECTING INTO PATHWAYS, USUALLY WILLOW, BACCHARIS, MESQUITE.			

Occurrence No.	11	**Map Index:**	04033	**EO Index:**	25002	**Element Last Seen:**	1978-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1978-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.97306 / -117.10169	**Accurracy:**	1 mile
UTM:	Zone-11 N3759173 E490605	**Elevation (ft):**	2000
PLSS:	T02S, R02W, Sec. 28 (S)	**Acres:**	0.0

Location: SAN TIMOTEO CANYON; ACROSS FROM FISHERMANS RETREAT RESORT.

Detailed Location:

Ecological: CONTIGUOUS RIPARIAN HABITAT EXTENDS FOR APPROXIMATELY 6 MILES, FROM ABOUT 3 MILES WEST OF I-10 TO REDLANDS BLVD.

General: ONE TERRITORIAL MALE OBSERVED DURING SUMMER OF 1978.

Owner/Manager: UNKNOWN

Occurrence No.	262	**Map Index:**	54529	**EO Index:**	54529	**Element Last Seen:**	2004-07-14
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-07-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-06-17

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07033 / -117.28088	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3769990 E474082	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 22 (S)	**Acres:**	128.0

Location: ALONG THE SANTA ANA RIVER, BETWEEN I-215 AND AND THE ATCHISON TOPEKA AND SANTA FE RAILROAD, SAN BERNARDINO

Detailed Location: SITE NAME: SAR 2

Ecological: HABITAT CONSISTS OF SALIX SPP., COTTONWOOD, AND MULEFAT. DOMINANT EXOTIC PLANT IS ARUNDO DONAX AND CASTOR BEAN. CANOPY HEIGHT = 4M. SURFACE WATER OR SATURATED SOIL IS PRESENT AT SITE IN '03&'04. SURROUNDING LAND: GOLF COURSE, INDUSTRIAL.

General: 4 PAIRS AND 2 SINGLES OBSERVED BETWEEN 26 APR AND 27 JUL 2003. 2 REPRODUCTIVE PAIRS (PRODUCING 5 FLEDGLINGS) AND 1 PAIR WITH NO REPRODUCTIVE SUCCESS OBSERVED 12 APR-14 JUL 2004. SITE IS UTILIZED FOR BREEDING.

Owner/Manager: SBD COUNTY

Occurrence No.	263	**Map Index:** 54530	**EO Index:**	54530		**Element Last Seen:**	2004-07-08
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2004-07-08
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2008-06-18

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04214 / -117.35270	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3766885 E467444	**Elevation (ft):**	870
PLSS:	T01S, R05W, Sec. 36 (S)	**Acres:**	42.0

Location: ALONG THE SANTA ANA RIVER WEST OF LA LOMA HILLS, BETWEEN I-215 & RIVERSIDE AVE, SW COLTON.

Detailed Location: SITE NAME: SAR 4.

Ecological: HABITAT CONSISTS OF SALIX SPP. COTTONWOOD, AND MULEFAT. DOMINANT EXOTIC PLANT IS ARUNDO DONAX. CANOPY HEIGHT = 4M. SURFACE WATER OR SATURATED SOIL IS PRESENT AT SITE ('03&'04). SURROUNDING LAND:WATER TREATMENT FACILITY,LAND FILL,VACANT.

General: 3 PAIRS OBSERVED BETWEEN 26 APR AND 27 JUL 2003 - 2 SINGLES OBS JUST SOUTH OF THE 3 PAIRS. 1 SUCCESSFUL PAIR (4 FLEDGED), 2 UNSUCCESSFUL PAIRS OBSERVED 13 APR - 8 JUL 2004 - 2 SINGLES OBS (1 SOUTH OF PAIRS). SITE IS UTILIZED FOR BREEDING.

Owner/Manager: SBD COUNTY

Occurrence No.	268	**Map Index:** 54556	**EO Index:**	54556		**Element Last Seen:**	2001-05-15
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2001-07-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-07-12

Quad Summary: Redlands (3411712)

County Summary: Riverside, San Bernardino

Lat/Long:	34.00630 / -117.16852	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3762867 E484438	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	57.9

Location: SAN TIMOTEO CANYON, JUST NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: FROM COUNTY LINE TO 0.4 MILE NORTH OF COUNTY LINE.

Ecological: DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE POPULUS FREEMONTII, SALIX LASIOLEPIS, SALIX HINDSIANA & BACHARIS GLUTINOSA. WILLOW THICKET = 8M HIGH. YELLOW-BILLED CUCKOO OBS IN AREA. SCATTERED HOMES, RANCHES IN AREA.

General: 1 DETECTED 24 MAY, 2ND WEEK OF JUNE & 8 JUL 1999. VIREO OBSERVED CHASING OTHER SPECIES AWAY FROM PRESUMED TERRITORY ON 24 MAY 1999. ANOTHER VIREO HEARD TO N OF SITE ON 20 JUL 1999. 2 MALES, 1 PAIR DETECTED MAY '01. NESTING NOT CONFIRMED

Owner/Manager: UNKNOWN

Occurrence No.	270	**Map Index:**	54848	**EO Index:**	54848	**Element Last Seen:**	2001-08-07
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-08-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-25

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.86082 / -117.14973	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3746734 E486150	**Elevation (ft):**	1700
PLSS:	T03S, R03W, Sec. 36 (S)	**Acres:**	40.3

Location: EAST SHORE OF PERRIS RESERVOIR, 1.5 MILES NORTH OF BERNASCONI PASS, LAKE PERRIS STATE RECREATIONAL AREA.

Detailed Location: TOWNSHIP 3S RANGE 3S SE 1/4 OF SW 1/4 SECTION 36.

Ecological: HABITAT CONSISTS OF WILLOW RIPARIAN WITH SOME EXOTIC TAMARISK ALONG THE LAKE SHORE. RIVERSIDIAN COASTAL SAGE SCRUB AND ANNUAL GRASSLAND ADJACENT TO THE WILLOW RIPARIAN. AREA IS A STATE RECREATIONAL PARK.

General: 1 PAIR AND 1 ADULT OBSERVED DURING PRESENCE SURVEYS FOR LEAST BELL'S VIREO.

Owner/Manager: DPR-LAKE PERRIS SRA

Occurrence No.	301	**Map Index:**	67534	**EO Index:**	67695	**Element Last Seen:**	2006-06-28
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-01-04

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.96036 / -117.25562	**Accurracy:**	80 meters
UTM:	Zone-11 N3757790 E476382	**Elevation (ft):**	1700
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: NORTHWEST AREA OF POORMAN RESERVOIR, 1 MILE NORTHWEST OF SUNNYMEAD.

Detailed Location: JUST SOUTH OF MANZANITA AVE. LOCATION MAPPED ACCORDING TO UTM COORDINATES.

Ecological: FLAT WILLOW RIPARIAN AREA. VEGETATION DOMINATED BY SALIX GOODDINGII, S. LASIOLEPIS, EUCALYPTUS WITH SALIX EXIGUA. UNDERSTORY: BACCHARIS SALICIFOLIA, FOENICULUM VULGARE, XANTHIUM STRUMARIUM, POLYPOGON MONSPELIENSIS, BRASSICA TOURNEIFORTII.

General: 1 MALE OBSERVED SINGING ON 28 JUNE, 26 JULY, AND 12 AUGUST OF 2006. 1 COOPER'S HAWK PAIR NESTING AND 1 YELLOW-BREATSED CHAT SINGING IN VICINITY. 1 WILLOW FLYCATCHER HEARD SINGING. SURROUNDING LAND USE: RESIDENTIAL, SCHOOL, URBAN.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	302	**Map Index:** 69728	**EO Index:**	70525		**Element Last Seen:**	2007-06-28
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2007-06-28
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2007-08-09

Quad Summary: Riverside West (3311784), San Bernardino South (3411713), Fontana (3411714)

County Summary: Riverside

Lat/Long:	34.00467 / -117.38146	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3762740 E464774	**Elevation (ft):**	790
PLSS:	T02S, R05W, Sec. 11 (S)	**Acres:**	140.0

Location: SANTA ANA RIVER STREAM CHANNEL/FLOODPLAIN, FROM ABOUT 0.6 MI UPSTREAM TO 0.4 MI DOWNSTREAM OF HWY 60 BRIDGE, RIVERSIDE.

Detailed Location:

Ecological: HABITAT CONSISTS OF MATURE, WELL-DEVELOPED SOUTHERN WILLOW SCRUB.

General: TWO PAIRS OBSERVED ON 23 MAY & 3 PAIRS OBSERVED ON 28 JUN AT 5 SITES WITHIN THE MAPPED AREA.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Dendroica petechia brewsteri

Element Code: ABPBX03018

yellow warbler

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3?
	State:	None		**State:**	S2
	Other:	DFG_SSC-Species of Special Concern, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	RIPARIAN PLANT ASSOCIATIONS. PREFERS WILLOWS, COTTONWOODS, ASPENS, SYCAMORES, & ALDERS FOR NESTING & FORAGING.			
	Micro:	ALSO NESTS IN MONTANE SHRUBBERY IN OPEN CONIFER FORESTS.			

Occurrence No.	86	**Map Index:** 54557	**EO Index:**	54557		**Element Last Seen:**	1999-07-31
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1999-07-31
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-03-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01058 / -117.17160	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3763343 E484154	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	33.1

Location: SAN TIMOTEO CANYON, JUST NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: 1.2 KM STRETCH ALONG CREEK.

Ecological: HABITAT CONSISTS OF DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE SALIX LASIOLEPIS, SALIX HINDSIANA, POPULUS FREMONTII AND BACHARIS GLUTINOSA. YELLOW-BILLED CUCKOO OBSERVED IN AREA.

General: 11 OBSERVED DURING SURVEYS WHICH OCCURRED ONCE A WEEK BETWEEN 1 APR AND 31 JUL 1999. NESTING WAS CONFIRMED.

Owner/Manager: UNKNOWN

Icteria virens

Element Code: ABPBX24010

yellow-breasted chat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern			
Habitat:	**General:**	SUMMER RESIDENT; INHABITS RIPARIAN THICKETS OF WILLOW & OTHER BRUSHY TANGLES NEAR WATERCOURSES.			
	Micro:	NESTS IN LOW, DENSE RIPARIAN, CONSISTING OF WILLOW, BLACKBERRY, WILD GRAPE; FORAGES AND NESTS WITHIN 10 FT OF GROUND.			

Occurrence No.	96	**Map Index:**	45571	**EO Index:**	54056	**Element Last Seen:**	2001-05-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-05-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-23

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95734 / -117.25189	**Accuracy:**	1/10 mile
UTM:	Zone-11 N3757454 E476726	**Elevation (ft):**	1690
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: POORMAN RESERVOIR, 0.25 MILE SOUTH OF MANZANITA AVENUE, MORENO VALLEY.

Detailed Location:

Ecological: HABITAT CONSISTS OF COTTONWOOD-WILLOW RIPARIAN. THIS AREA SERVES AS A FLOOD CONTROL RESERVOIR AND IS SUPPORTED BY LAWN IRRIGATION AND STORMWATER RUNOFF. AREA IS SURROUNED ON ALL SIDES BY DEVELOPMENT.

General: 1 OBSERVED UTILIZING AREA FOR BREEDING ON 9 MAY 2001.

Owner/Manager: CITY OF MORENO VALLEY

Occurrence No.	99	**Map Index:**	54557	**EO Index:**	54558	**Element Last Seen:**	1999-07-31
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-07-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01058 / -117.17160	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3763343 E484154	**Elevation (ft):**	1460
PLSS:	T02S, R03W, Sec. 11 (S)	**Acres:**	33.1

Location: SAN TIMOTEO CANYON, JUST NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE, DIRECTLY SOUTH OF REDLANDS.

Detailed Location: 1.2 KM STRETCH ALONG CREEK.

Ecological: HABITAT CONSISTS OF DENSE LINEAR STANDS OF RIPARIAN. DOMINANT SPECIES INCLUDE SALIX LASIOLEPIS, SALIX HINDSIANA, POPULUS FREMONTII AND BACHARIS GLUTINOSA. YELLOW-BILLED CUCKOO OBSERVED IN AREA.

General: 6 OBSERVED DURING SURVEYS WHICH OCCURRED ONCE A WEEK BETWEEN 1 APR AND 31 JUL 1999. NESTING WAS CONFIRMED.

Owner/Manager: UNKNOWN

Aimophila ruficeps canescens

Element Code: ABPBX91091

southern California rufous-crowned sparrow

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T2T4
	State:	None		**State:**	S2S3
	Other:	DFG_WL-Watch List			

Habitat:	**General:**	RESIDENT IN SOUTHERN CALIFORNIA COASTAL SAGE SCRUB AND SPARSE MIXED CHAPARRAL.
	Micro:	FREQUENTS RELATIVELY STEEP, OFTEN ROCKY HILLSIDES WITH GRASS & FORB PATCHES.

Occurrence No.	94	**Map Index:**	52023	**EO Index:**	52023	**Element Last Seen:**	2002-04-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-08-05

Quad Summary:	Lakeview (3311771)
County Summary:	Riverside

Lat/Long:	33.75616 / -117.02644	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3735120 E497550	**Elevation (ft):**	1540
PLSS:	T05S, R01W, Sec. 07 (S)	**Acres:**	324.7

Location:	NORTH OF ROSE ROAD EXTENDING INTO TRES CERRITOS, EAST OF WARREN ROAD & WEST OF CAWSTON AVE, ABOUT 3 MILES WEST OF HEMET
Detailed Location:	LOCATION MAPPED IS PROJECT BOUNDARY
Ecological:	HABITAT ON PROJECT SITE CONSISTS OF RSS (ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, ARTEMISIA CALIFORNICA, BEBBIA JUNCEA, BRICKELLIA CALIFORNICA, OPUNTIA PARRYI, OTHERS) & NON-NATIVE ANNUAL GRASSLAND(RED BROME,BLACK MUSTARD,WILD OATS,OTHERS)
General:	UNKNOWN OBSERVED DURING CALIFORNIA GNATCATCHER SURVEYS CONDUCTED BETWEEN 14 NOV 2001 AND 23 APR 2002.
Owner/Manager:	PVT

Occurrence No.	119	**Map Index:**	52683	**EO Index:**	52684	**Element Last Seen:**	2000-05-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-29

Quad Summary:	Steele Peak (3311773)
County Summary:	Riverside

Lat/Long:	33.82640 / -117.32229	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742955 E470176	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 17 (S)	**Acres:**	74.3

Location:	0.6 TO 1 MILE SOUTH OF CAJALCO ROAD AND 3.4 MILES NW OF GAVILAN HILLS, 4.5 MILES NW OF PERRIS
Detailed Location:	
Ecological:	HABITAT ON PROJECT SITE CONSISTS OF RIVERSIDIAN SAGE SCRUB.
General:	UNKNOWN NUMBER OBSERVED AT 1 TO 2 LOCATIONS DURING CALIFORNIA GNATCATHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. PROJECT SITE IS SURROUNDED BY RURAL RESIDENTIAL, ORCHARDS AND OPEN SPACE.
Owner/Manager:	UNKNOWN

Occurrence No.	123	**Map Index:**	53058	**EO Index:**	53058	**Element Last Seen:**	2002-04-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-24

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.96552 / -117.22332	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3758356 E479368	**Elevation (ft):**	2120
PLSS:	T02S, R03W, Sec. 29 (S)	**Acres:**	212.1

Location: 0.3 TO 1 MILE EAST OF INDIAN STREET AND 1-2 MILES NORTH OF IRONWOOD AVE, NNE SUNNYMEAD

Detailed Location: EAST PORTION OF SECTION 30 AND THE SW 1/4 SECTION 29

Ecological: UPLAND RIVERSIDIAN SAGE SCRUB. BRITTLEBUSH DROUGHT DECIDUOUS SCRUB FOUND ON STEEP SLOPES/HIGHER ELEVATIONS OF RIDGE, WHILE CALIFORNIA SAGEBRUSH SCRUB FOUND ON LOWER ELEVATION RIDGES/VALLEYS AT BASE OF FOOTHILLS.

General: UNKNOWN NUMBER OBSERVED DURING CALIFORNIA GNATCATCHER SURVEYS BETWEEN 17 OCT 2001 AND 3 APR 2002. CONSERVATION EASEMENT MAY BE PLACED ON NORTH 1/3 OF E PORTION OF SECTION 30. MAJORITY OF SW 1/4 SECTION 29 TO REMAIN AS OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	135	**Map Index:**	54744	**EO Index:**	54744	**Element Last Seen:**	2003-04-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-18

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90140 / -117.01596	**Accurracy:**	80 meters
UTM:	Zone-11 N3751224 E498523	**Elevation (ft):**	2166
PLSS:	T03S, R01W, Sec. 20 (S)	**Acres:**	0.0

Location: 2.2 MILES SOUTH OF STATE ROUTE 60 AND 0.7 MI EAST OF LABORDE CANYON, 2.7 MILES SW OF BEAUMONT

Detailed Location: MAPPED ACCORDING TO GPS COORDINATES.

Ecological: HABITAT CONSISTS OF A RECENTLY BURNED AREA COMPRISED OF CHAMISE CHAPARRAL.

General: 1 ADULT DETECTED ON 9 APR 2003.

Owner/Manager: PVT

Occurrence No.	136	**Map Index:**	54745	**EO Index:**	54745	**Element Last Seen:**	2003-04-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-18

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90887 / -117.01281	**Accurracy:**	80 meters
UTM:	Zone-11 N3752052 E498815	**Elevation (ft):**	2261
PLSS:	T03S, R01W, Sec. 17 (S)	**Acres:**	0.0

Location: 1.7 MILES SOUTH OF STATE ROUTE 60 AND 0.9 MI EAST OF LABORDE CANYON, 2.2 MILES SW OF BEAUMONT

Detailed Location: MAPPED ACCORDING TO GPS COORDINATES.

Ecological: HABITAT CONSISTS OF CHAPARRAL DOMINATED BY BLACK SAGE AND CHAMISE WITH AN UNDERSTORY OF NON-NATIVE GRASSES. THE AREA HAS RECENTLY BEEN BURNED. SURROUNDING AREA CONSISTS OF WILDERNESS.

General: 2 BREEDING ADULTS DETECTED ON 8 APR 2003.

Owner/Manager: PVT

Occurrence No.	138	**Map Index:**	54747	**EO Index:**	54747	**Element Last Seen:**	2003-04-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-19

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.03842 / -117.09118	**Accurracy:**	specific area
UTM:	Zone-11 N3766419 E491582	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 33 (S)	**Acres:**	9.0

Location: 0.3 MILES NORTH OF WEST YUCAIPA BLVD, WEST OF YUCAIPA.

Detailed Location: DRAINAGE JUST WEST OF THE YUCAIPA INTERMEDIATE SCHOOL.

Ecological: HABITAT CONSISTS OF NON-NATIVE GRASSLAND WITH SMALL AMOUNT OF RIVERSIDEAN SAGE SCRUB. CHAPARRAL HABITAT, ALONG W/ COAST LIVE OAKS & A STAND OF EUCALYPTUS ALSO LOCATED ON SITE. COOPER'S HAWK, ORANGE-THROATED WHIPTAIL, VERNAL POOLS IN AREA

General: 2 BREEDING ADULTS DETECTED DURING APRIL 2003. NEST/TERRITORIES NOT CONFIRMED FOR ADULTS OBSERVED, BUT INDIVIDUALS PRESUMED TO BE NESTING IN RIVERSIDEAN SAGE SCRUB/CHAPARRAL HABITAT. SURROUNDING LAND: RESIDENTIAL DEVELOPMENT, HIGH SCHOOL.

Owner/Manager: PVT

Occurrence No.	142	**Map Index:** 54754	**EO Index:**	54754		**Element Last Seen:**	2002-07-25
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-07-25
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-03-22

Quad Summary: El Casco (3311781), Yucaipa (3411711)

County Summary: Riverside

Lat/Long:	33.98268 / -117.07161	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3760238 E493385	**Elevation (ft):**	2200
PLSS:	T02S, R02W, Sec. 22 (S)	**Acres:**	3941.5

Location: OAK VALLEY PROPERTY, BETWEEN I-10 AND SAN TIMOTEO CANYON, SOUTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE.

Detailed Location:

Ecological: HABITAT CONSISTS OF A GRASSLAND AND COASTAL SAGE SCRUB ECOTONE. CHAETODIPUS FALLAX FALLAX IN VICINITY.

General: 3 ADULTS CAPTURED BETWEEN 11 MAY AND 25 JUL 2002.

Owner/Manager: PVT

Occurrence No.	154	**Map Index:** 55795	**EO Index:**	55811		**Element Last Seen:**	1998-05-29
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1998-05-29
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-06-10

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79998 / -117.05210	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3739980 E495177	**Elevation (ft):**	2340
PLSS:	T04S, R02W, Sec. 26 (S)	**Acres:**	0.0

Location: 2.2 MILES DIRECTLY EAST THE INTERSECT OF JUNIPER FLAT ROAD & STAGECOACH RD, 3 MI DIRECTLY WEST OF SAN JACINTO RESERVOIR.

Detailed Location: WITHIN PARCEL NO. 162-261.

Ecological: HABITAT CONSISTS PRIMARILY OF CHAMISE CHAPARRAL WITH NON-NATIVE GRASSLANDS AND POCKETS OF RIVERSIDEAN SAGE SCRUB. TOPOGRAPHY CONSISTS OF STEEP HILLS AND ROCKY OUTCROPS. DISTURBANCES INCLUDE ORV ACTIVITY, ILLEGAL DUMPING AND SHOOTING.

General: OBS AT 1 LOCATION IN PARCEL ON 29 MAY 1998 DURING SURVEYS BY USFWS. SITE MAY BE IMPORTANT AS MOVEMENT AREA BETWEEN EASTSIDE RESERVOIR PROJECT, BADLANDS AREA & SAN JACINTO WILDLIFE AREA. ORANGE-THROATED WHIPTAIL OBS IN AREA IN 1989.

Owner/Manager: BLM

Amphispiza belli belli

Element Code: ABPBX97021

Bell's sage sparrow

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T2T4
	State:	None		**State:**	S2?
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, DFG_WL-Watch List, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	NESTS IN CHAPARRAL DOMINATED BY FAIRLY DENSE STANDS OF CHAMISE. FOUND IN COASTAL SAGE SCRUB IN SOUTH OF RANGE.			
	Micro:	NEST LOCATED ON THE GROUND BENEATH A SHRUB OR IN A SHRUB 6-18 INCHES ABOVE GROUND. TERRITORIES ABOUT 50 YDS APART.			

Occurrence No.	33	**Map Index:**	52687	**EO Index:**	52687	**Element Last Seen:**	2000-05-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82453 / -117.32069	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742747 E470323	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 17 (S)	**Acres:**	55.6

Location: 0.25 TO 0.4 MILE SOUTH OF CAJALCO ROAD AND 3.5 MILES NE GAVILAN PEAK, 4.2 MILES NW OF PERRIS

Detailed Location:

Ecological: HABITAT ON PROJECT CONSISTS OF RIVERSIDIAN SAGE SCRUB.

General: UNKNOWN NUMBER OBSERVED AT 1 TO 2 LOCATIONS DURING CALIFORNIA GNATCATHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. PROJECT SITE IS SURROUNDED BY RURAL RESIDENTIAL, ORCHARDS AND OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	35	**Map Index:**	53058	**EO Index:**	53059	**Element Last Seen:**	2002-04-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-10-24

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.96552 / -117.22332	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3758356 E479368	**Elevation (ft):**	2120
PLSS:	T02S, R03W, Sec. 29 (S)	**Acres:**	212.1

Location: 0.3 TO 1 MILE EAST OF INDIAN STREET AND 1-2 MILES NORTH OF IRONWOOD AVE, NNE SUNNYMEAD

Detailed Location: EAST PORTION OF SECTION 30 AND THE SW 1/4 SECTION 29

Ecological: UPLAND RIVERSIDIAN SAGE SCRUB. BRITTLEBUSH DROUGHT DECIDUOUS SCRUB FOUND ON STEEP SLOPES/HIGHER ELEVATIONS OF RIDGE, WHILE CALIFORNIA SAGEBRUSH SCRUB FOUND ON LOWER ELEVATION RIDGES/VALLEYS AT BASE OF FOOTHILLS.

General: UNKNOWN NUMBER OBSERVED DURING CALIFORNIA GNATCATCHER SURVEYS BETWEEN 17 OCT 2001 AND 3 APR 2002. CONSERVATION EASEMENT MAY BE PLACED ON NORTH 1/3 OF E PORTION OF SECTION 30. MAJORITY OF SW 1/4 SECTION 29 TO REMAIN AS OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	50	**Map Index:** 55794	**EO Index:**	55810		**Element Last Seen:**	1998-05-29
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1998-05-29
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-06-10

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79538 / -117.05349	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3739470 E495048	**Elevation (ft):**	2380
PLSS:	T04S, R02W, Sec. 26 (S)	**Acres:**	0.0

Location: 2.2 MILES EAST OF THE INTERSECTION OF JUNIPER FLAT ROAD & STAGECOACH RD, 3 MI WEST OF SAN JACINTO RESERVOIR.

Detailed Location: PARCEL NUMBER 162-261.

Ecological: HABITAT CONSISTS PRIMARILY OF CHAMISE CHAPARRAL WITH NON-NATIVE GRASSLANDS AND POCKETS OF RIVERSIDEAN SAGE SCRUB. TOPOGRAPHY CONSISTS OF STEEP HILLS AND ROCKY OUTCROPS. DISTURBANCES INCLUDE ORV ACTIVITY, ILLEGAL DUMPING AND SHOOTING.

General: OBSERVED AT 1 LOCATION ON 29 MAY 1998 DURING SURVEYS BY USFWS. SITE MAY BE IMPORTANT AS MOVEMENT AREA BETWEEN EASTSIDE RESERVOIR PROJECT, THE BADLANDS AREA & SAN JACINTO WILDLIFE AREA. ORANGE-THROATED WHIPTAIL OBSERVED IN VIC DURING 1989.

Owner/Manager: BLM

Agelaius tricolor

Element Code: ABPBXB0020

tricolored blackbird

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2G3
	State:	None		**State:**	S2
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_EN-Endangered, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.			
	Micro:	REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.			

Occurrence No.	217	**Map Index:** 21605	**EO Index:**	17015		**Element Last Seen:**	1992-06-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1992-06-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1992-07-14

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94351 / -117.32348	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3755939 E470107	**Elevation (ft):**	1100
PLSS:	T02S, R04W, Sec. 05 (S)	**Acres:**	0.0

Location: SYCAMORE CANYON, 1.8 MI EAST OF THE JUNCTION OF ALESSANDRO BLVD AND ARLINGTON AVENUE, SE EDGE OF RIVERSIDE.

Detailed Location:

Ecological: NESTING SUBSTRATE IS THISTLES.

General: 250 ADULTS OBSERVED NESTING.

Owner/Manager: UNKNOWN

Occurrence No.	219	**Map Index:**	21597	**EO Index:**	14212	**Element Last Seen:**	1997-04-26
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-05-21

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88038 / -117.11173	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3748899 E489666	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 29 (S)	**Acres:**	40.8

Location: SAN JACINTO WILDLIFE AREA, APPROXIMATELY 2 MILES NORTH OF LAKEVIEW.

Detailed Location: LOCATIONS GIVEN AS MARSH A, POND 1 AND MARSH B. BIRDS ARE SPREAD AROUND IN SEVERAL DISTINCT COLONIES NEAR THE ENTRANCE TO THE WILDLIFE AREA. SIZE OF COLONY APPROXIMATELY 3-4 ACRES.

Ecological: NESTING SUBSTRATE IS TYPHA AND WILLOWS. SURROUNDING LAND USE IS AGRICULTURE.

General: 1988: NESTING OBS. 25 MAR - 7 JUN 1989: 3,000 PRS, 100'S OF YOUNG OBS. 1992: ABOUT 5000 OBS IN 3 AREAS. 400 OBS NESTING 23 APR 1994. ABOUT 2000 OBS ON 22 APR 1995, GONE BY 22 MAY 1995. 1996: 500 - 25000 OBS IN 3 AREAS. 1997: 350 OBS.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	363	**Map Index:**	47605	**EO Index:**	47605	**Element Last Seen:**	1986-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-05

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.97534 / -117.09892	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3759426 E490862	**Elevation (ft):**	1960
PLSS:	T02S, R02W, Sec. 28 (S)	**Acres:**	0.0

Location: FISHERMAN'S RETREAT MEMBERSHIP TRAILER PARK; 0.5 MILES DIRECTLY EAST OF EL CASCO LAKE ALONG SAN TIMOTEO CANYON ROAD.

Detailed Location: COLONY SIZE ABOUT 0.5 ACRE.

Ecological: HABITAT CONSISTS OF FRESHWATER MARSH WITH BULRUSH AND CATTAILS.

General: 1983-1986: 20 PAIRS HAVE OCCUPIED AREA & SUCCESSFULLY FLEDGED YOUNG.

Owner/Manager: PVT

Occurrence No.	366	**Map Index:**	47619	**EO Index:**	47619	**Element Last Seen:**	1995-05-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-05-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-05-07

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.93454 / -117.14344	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3754908 E486743	**Elevation (ft):**	1800
PLSS:	T03S, R03W, Sec. 01 (S)	**Acres:**	0.0

Location: VICINITY OF THEODORE STREET AND HIGHWAY 60. ABOUT 1.5 MILES NE OF MORENO.

Detailed Location: 3 REPORTS OF TCBB IN THIS AREA FROM 22 APR & 19 & 27 MAY 1995. IT IS UNCLEAR, BUT LIKELY, THAT ALL 3 REPORTS REFER TO THE SAME COLONY.

Ecological: BIRDS NESTING IN WINTER WHEAT FIELD WITH MUCH MUSTARD WEED.

General: POPULATION ESTIMATED TO BE BETWEEN 1,200 & 2000 INDIVIDUALS. NESTING OBSERVED BY CHILDS & PAULEK.

Owner/Manager: UNKNOWN

Occurrence No.	371	**Map Index:**	52321	**EO Index:**	52321	**Element Last Seen:**	2001-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Fluctuating	**Record Last Updated:**	2003-09-04

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79743 / -117.02007	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3739696 E498141	**Elevation (ft):**	1490
PLSS:	T04S, R01W, Sec. 30 (S)	**Acres:**	0.0

Location: HEMET SEWAGE PONDS. ABOUT 1 MILES WEST OF SAN JACINTO RESERVOIR.

Detailed Location:

Ecological: ABOUT A 50 ACRE MAN-MADE BULRISH WETLAND PLANTED IN 1993. SITE BURNED BETWEEN 1997-1999 & BULRUSHES REMOVED. FORAGING HABITAT IS ALFALFA. SITE MANAGED AS A RESEARCH FACILITY (UC RIVERSIDE) IN THE USE OF MARSHES FOR FILTERING WASTE WATER.

General: COLONY OF 35K IN 1994, THE LARGEST COLONY IN SOUTHERN CALIF. 4K IN 1999; 10K IN 2000 BUT UNSUCCESSFUL DUE TO PREDATION BY BLACK-CROWNED NIGHT HERONS & GREAT-TAILED GRACKLES. 30 BIRDS IN 2001.

Owner/Manager: EASTERN MWD

Spinus lawrencei **Element Code:** ABPBY06100

Lawrence's goldfinch

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4
	State:	None		**State:**	S3
	Other:	ABC_WLBCC-Watch List of Birds of Conservation Concern, IUCN_LC-Least Concern, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	NESTS IN OPEN OAK OR OTHER ARID WOODLAND & CHAPARRAL, NEAR WATER. NEARBY HERBACEOUS HABITATS USED FOR FEEDING.			
	Micro:	CLOSELY ASSOCIATED WITH OAKS.			

Occurrence No.	3	**Map Index:** 45571	**EO Index:** 61573	**Element Last Seen:**	2001-05-30
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	2001-05-30
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2005-06-08

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95734 / -117.25189	**Accuracy:**	1/10 mile
UTM:	Zone-11 N3757454 E476726	**Elevation (ft):**	1690
PLSS:	T02S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: POORMAN RESERVOIR, 0.25 MILE SOUTH OF MANZANITA AVENUE, MORENO VALLEY.

Detailed Location: NW1/4 OF NE1/4 SECTION 36. MAPPED ACCORDING TO LOCATION SHOWN ON MAP.

Ecological: HABITAT CONSISTS OF COTTONWOOD-WILLOW RIPARIAN. THIS AREA IS A FLOOD CONTROL RESERVOIR AND IS SUPPORTED BY LAWN IRRIGATION AND STORMWATER RUNOFF. AREA IS SURROUNDED ON ALL SIDES BY DEVELOPMENT. ADJACENT GRASSLAND PERIODICALLY DISCED.

General: 6 ADULTS OBSERVED AND NOTED AS NESTING ON 30 MAY 2001.

Owner/Manager: CITY OF MORENO VALLEY

Gila orcuttii **Element Code:** AFCJB13120

arroyo chub

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2
	Other:	AFS_VU-Vulnerable, DFG_SSC-Species of Special Concern, USFS_S-Sensitive			
Habitat:	**General:**	NATIVE TO STREAMS FROM MALIBU CR TO SAN LUIS REY RIVER BASIN. INTRODUCED INTO STREAMS IN SANTA CLARA, VENTURA, SANTA YNEZ, MOHAVE & SAN DIEGO RIVER BASINS.			
	Micro:	SLOW WATER STREAM SECTIONS WITH MUD OR SAND BOTTOMS. FEEDS HEAVILY ON AQUATIC VEGETATION & ASSOCIATED INVERTEBRATES.			

Occurrence No.	26	**Map Index:** 34090	**EO Index:** 41451	**Element Last Seen:**	1998-08-06
Occ. Rank:	Poor		**Presence:** Presumed Extant	**Site Last Seen:**	1998-08-06
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1999-08-10

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04863 / -117.34550	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3767601 E468112	**Elevation (ft):**	880
PLSS:	T01S, R04W, Sec. 30 (S)	**Acres:**	130.3

Location: SANTA ANA RIVER, 1.2 RIVER MILES UPSTREAM OF RIVERSIDE AVE AND 0.1 MILE DOWNSTREAM OF 8TH ST, ~2 MILES SSW OF COLTON.

Detailed Location:

Ecological: SOUTHERN CALIFORNIA RIVER, SOUTHERN COTTONWOOD WILLOW RIPARIAN FOREST.

General: 1 ADULT & 5 JUVENILES OBSERVED AT SITE 4 & 2 ADULTS OBSERVED AT SITE 3, AUGUST 1998.

Owner/Manager: UNKNOWN

Occurrence No.	41	**Map Index:** 50083	**EO Index:** 50083	**Element Last Seen:**	2000-09-20
Occ. Rank:	Fair		**Presence:** Presumed Extant	**Site Last Seen:**	2000-09-20
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2003-01-31

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.02670 / -117.36215	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3765175 E466566	**Elevation (ft):**	838
PLSS:	T02S, R05W, Sec. 01 (S)	**Acres:**	12.8

Location: SANTA ANNA RIVER ABOVE RIVERSIDE AVE. APPROX. 2.2 MI NORTH OF STATE ROUTE 91 X 60 INTERCHANGE.

Detailed Location:

Ecological: SAND AND GRAVEL SUBSTRATE, LOTS OF ARUNDO, SOME COTTONWOODS. THE RIVER FLOW IS MAINTAINED BY TREATED WASTEWATER, FLOW SIGNIFICANTLY DECREASES DUE TO TEMPORARY STOPPING OF FLOW AT ONE WASTE WATER TREATMENT PLANT.

General: 61 FISH WERE OBSERVED 9/20/2000. SANTA ANA SUCKER ALSO PRESENT.

Owner/Manager: UNKNOWN

Rhinichthys osculus ssp. 3

Element Code: AFCJB3705K

Santa Ana speckled dace

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T1
	State:	None		**State:**	S1
	Other:	AFS_TH-Threatened, DFG_SSC-Species of Special Concern, USFS_S-Sensitive			
Habitat:	**General:**	HEADWATERS OF THE SANTA ANA AND SAN GABRIEL RIVERS. MAY BE EXTIRPATED FROM THE LOS ANGELES RIVER SYSTEM.			
	Micro:	REQUIRES PERMANENT FLOWING STREAMS WITH SUMMER WATER TEMPS OF 17-20 C. USUALLY INHABITS SHALLOW COBBLE AND GRAVEL RIFFLES.			

Occurrence No.	6	**Map Index:**	03870	**EO Index:**	41477	**Element Last Seen:**	1995-08-04
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-08-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-08-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.12036 / -117.13997	**Accuracy:**	specific area
UTM:	Zone-11 N3775510 E487092	**Elevation (ft):**	1600
PLSS:	T01S, R03W, Sec. 37 (S)	**Acres:**	41.2

Location: PLUNGE CREEK, UPSTREAM OF JCT WITH NORTH FORK CANAL, 5 MILES NNE OF REDLANDS, 3 MILES E OF JCT OF BASE LINE RD & HWY 30.

Detailed Location: MAPPED IN SOUTHERN SYCAMORE ALDER RIPARIAN WOODLAND COMMUNITY.

Ecological: AQUATIC VEGETATION MOSTLY MOSS & ALGAE. SUBSTRATE 50% BOULDERS, 30% COBBLES, 10% GRAVEL, 8% SAND, 2% SILT. 80% RUN & 20% POOLS. LIGHT SHADE CANOPY.

General: 388 DACE OBSERVED AUGUST, 1995.

Owner/Manager: USFS-SAN BERNARDINO, PVT

Occurrence No.	9	**Map Index:**	42030	**EO Index:**	42030	**Element Last Seen:**	1999-05-05
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-05-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2000-04-25

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.07690 / -117.09465	**Accuracy:**	specific area
UTM:	Zone-11 N3770686 E491267	**Elevation (ft):**	2080
PLSS:	T01S, R02W, Sec. 21 (S)	**Acres:**	7.4

Location: MILL CREEK, 0.4 MILES SE OF NEWPORT AVE AND GARNET ST, EAST OF REDLANDS.

Detailed Location: AREA IS WITHIN THE ACTIVE FLOOD CONTROL CHANNELS AND GRAVEL MINING ZONES. STREAM APROXIMATIONS: 2-3 METERS WIDE; AVERAGE 20 CM DEEP; 64 DEGREES F; 10 CFS

Ecological: RIPARIAN AREA CONSISTING OF ALDERS (UP TO 15 METERS HIGH, 24 CM DBH) AND WILOWS (UP TO 3 METERS). SUBSTRATE: 10-20% BOULDERS, 60-70% COBBLE, 10% GRAVEL AND SAND, 10% FINES. COBBLES WERE EMBEDDED ~50-60%.

General: 7 ADULTS OBSERVED, 1999; OCCASIONAL FLOODING HAS REMOVED FISH FROM THE AREA IN THE RECENT PAST, HOWEVER THEY HAVE RECOVERED. FISH PRESENT 1970 TO 1993.

Owner/Manager: SBT COUNTY-FLOOD CONTROL DIST

Catostomus santaanae

Element Code: AFCJC02190

Santa Ana sucker

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1
	Other:	AFS_TH-Threatened, DFG_SSC-Species of Special Concern, IUCN_VU-Vulnerable			
Habitat:	**General:**	ENDEMIC TO LOS ANGELES BASIN SOUTH COASTAL STREAMS.			
	Micro:	HABITAT GENERALISTS, BUT PREFER SAND-RUBBLE-BOULDER BOTTOMS, COOL, CLEAR WATER, & ALGAE.			

Occurrence No.	27	**Map Index:** 78873	**EO Index:**	30063		**Element Last Seen:**	2005-10-06
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2005-10-06
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-05-18

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04610 / -117.35058	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3767323 E467641	**Elevation (ft):**	880
PLSS:	T01S, R05W, Sec. 36 (S)	**Acres:**	184.0

Location: SANTA ANA RIVER (SAR), 0.35 NE OF RIVERSIDE AVE UPSTREAM TO S LA CADENA AVE, 1.8 MILES SSW OF COLTON PO, SAN BERNARDINO.

Detailed Location: SITE #3 JUST W OF LA CADENA DRIVE AND S OF COLTON SEWAGE TREATMENT PLANT. SITE #4 0.3 MILES EAST OF COLTON-SAN BERNARDINO SEWAGE TREATMENT PLANT AT RIALTO DRAIN. MAPPED ACCORDING TO MAP PROVIDED AND DETAILED LOCATION GIVEN.

Ecological: SOUTHERN CALIFORNIA RIVER, SOUTHERN COTTONWOOD WILLOW RIPARIAN FOREST.

General: 5 OBS 23 AUG 1996 & 1 ON 6 AUG '98 @ SITE #4. 95 JUV'S @ SITE #3 ON 3 AUG '98. '00: SAR @ RIALTO DRAIN: LARV, JUV'S & ADULTS COMMON. '01:4 ADULTS & 25 YOY IN RIALTO. 100'S OBS FROM RIALTO TO RIVERSIDE '02 & 50 IN '05. 150 LARV IN RIALTO '05

Owner/Manager: UNKNOWN

Occurrence No.	31	**Map Index:** 52810	**EO Index:**	50090		**Element Last Seen:**	2004-08-31
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2004-08-31
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-05-18

Quad Summary: San Bernardino South (3411713), Fontana (3411714)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01870 / -117.37058	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3764291 E465784	**Elevation (ft):**	838
PLSS:	T02S, R05W, Sec. 11 (S)	**Acres:**	118.0

Location: SANTA ANA RIVER, JUST NORTH OF MARKET STREET CROSSING, UPSTREAM TO NORTH OF RIVERSIDE AVENUE, RIVERSIDE.

Detailed Location: BURTON: SITE #9. MAPPED ACCORDING TO MAP AND LOCATION PROVIDED.

Ecological: GRAVEL/SAND SUBSTRATE, DEPTH ABOUT 0.5 M. VEG: ARUNDO, COTTONWOOD/WILLOW SCRUB & ALLUVIAL SAGE SCRUB. SURROUNDING AREA IS URBAN, HORSE LOTS & WASTEWATER TREATMENT PLANTS. FLOW MAINTAINED BY TREATED WASTEWATER. ARROYO CHUB FOUND HERE TOO.

General: APR-JUNE 2000: SUCKERS COMMON. 20 SEP '00: 26 FISH OBS ABOVE RIVERSIDE AVE. MAY-SEP 01: VISUAL, SEINE, ELECTROSHOCK & PIT: LARVE-ADULTS COMMON. 53 ADULTS BETWEEN MAR '02-MAY '03 & 72 JUVS CAPT 31 AUG '04 ALL AROUND RIVERSIDE AVE CROSSING.

Owner/Manager: UNKNOWN

Lasiurus xanthinus

Element Code: AMACC05070

western yellow bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5

	State:	None	**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_H-High Priority		
Habitat:	**General:**	FOUND IN VALLEY FOOTHILL RIPARIAN, DESERT RIPARIAN, DESERT WASH, AND PALM OASIS HABITATS.		
	Micro:	ROOSTS IN TREES, PARTICULARLY PALMS. FORAGES OVER WATER AND AMONG TREES.		

Occurrence No.	18	**Map Index:** 47547	**EO Index:**	58918	**Element Last Seen:**	1987-08-19
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:**	1987-08-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: Winchester (3311761), Romoland (3311762), Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.74770 / -117.11110	**Accuracy:**	1 mile
UTM:	Zone-11 N3734187 E489710	**Elevation (ft):**	1660
PLSS:	T05S, R02W, Sec. 08 (S)	**Acres:**	0.0

Location: HOMELAND.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE VICINTY OF HOMELAND.

Ecological:

General: ONE FEMALE SPECIMEN COLLECTED 19 AUG 1987 BY W. RAINEY AT "HOMELAND." DEPOSITED AT MVZ #182503.

Owner/Manager: UNKNOWN

Occurrence No.	31	**Map Index:** 58903	**EO Index:**	58939	**Element Last Seen:**	1981-08-17
Occ. Rank:	Unknown		**Presence:**	Presumed Extant	**Site Last Seen:**	1981-08-17
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: Sunnymead (3311782), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94213 / -117.23986	**Accuracy:**	1 mile
UTM:	Zone-11 N3755766 E477833	**Elevation (ft):**	1650
PLSS:	T03S, R03W, Sec. 06 (S)	**Acres:**	0.0

Location: SUNNYMEAD, RIVERSIDE COUNTY.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE VICINTY OF SUNNYMEAD.

Ecological:

General: 2 FEMALE & 1 MALE SPECIMENS COLLECTED 19 SEP & 13 OCT 1980 & 17 AUG 1981 BY D. CONSTANTINE AT "SUNNYMEAD." DEPOSITED AT MVZ #181921-181923.

Owner/Manager: UNKNOWN

Occurrence No.	35	**Map Index:**	58907	**EO Index:**	58943	**Element Last Seen:**	1984-08-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1984-08-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.03398 / -117.31368	**Accurracy:**	1 mile
UTM:	Zone-11 N3765968 E471043	**Elevation (ft):**	1050
PLSS:	T01S, R04W, Sec. 32 (S)	**Acres:**	0.0

Location: GRAND TERRACE, SAN BERNARDINO COUNTY.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE VICINTY OF GRAND TERRACE.

Ecological:

General: 1 FEMALE SPECIMEN COLLECTED 24 AUG 1984 BY D. CONSTANTINE AT "GRAND TERRACE." DEPOSITED AT MVZ #181927.

Owner/Manager: UNKNOWN

Occurrence No.	36	**Map Index:**	58908	**EO Index:**	58944	**Element Last Seen:**	1998-09-14
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-09-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: Redlands (3411712), Harrison Mtn. (3411722)

County Summary: San Bernardino

Lat/Long:	34.12971 / -117.20520	**Accurracy:**	1 mile
UTM:	Zone-11 N3776557 E481078	**Elevation (ft):**	1350
PLSS:	T01N, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: HIGHLAND.

Detailed Location: EXACT LOCATION NOT GIVEN. MAPPED IN THE GENERAL VICINTY OF HIGHLAND.

Ecological:

General: 1 MALE & 1 FEMALE SPECIMENS COLLECTED 14 JUN 1984 & 14 SEP 1998 BY D. CONSTANTINE & SAN BERNARDINO HEALTH LABORATORY AT "HIGHLAND." DEPOSITED AT MVZ #181928 & 200035.

Owner/Manager: UNKNOWN

Occurrence No.	38	**Map Index:**	58911	**EO Index:**	58947	**Element Last Seen:**	1998-06-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-06-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.05602 / -117.18288	**Accurracy:**	1 mile
UTM:	Zone-11 N3768382 E483122	**Elevation (ft):**	1400
PLSS:	T01S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: REDLANDS.

Detailed Location: EXACT LOCATION NOT KNOWN. MAPPED IN THE GENERAL VICINTY OF REDLANDS.

Ecological:

General: 9 TOTAL SPECIMENS COLLECTED, ALL AT MVZ. 1 MALE OCT 1978, 1 MALE MAY 1979, 1 FEMALE APR 1984, 1 MALE JUN 1996, 1 MALE JUL 1996, 1 FEMALE AUG 1996, 1 MALE JUN 1997, 1 MALE JUL 1997 & 1 MALE JUN 1998.

Owner/Manager: UNKNOWN

Occurrence No.	39	**Map Index:**	35235	**EO Index:**	58949	**Element Last Seen:**	1992-03-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-03-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	1050
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SAN BERNARDINO.

Detailed Location: EXACT LOCATION NOT KNOWN. MAPPED IN THE GENERAL VICINTY OF SAN BERNARDINO. LOCATION UNCERTAINTY GIVEN AS 9.25 MILES.

Ecological:

General: 12 TOTAL SPECIMENS COLLECTED ALL BUT 1992 SPECIMEN AT MVZ. 1992 SPECIMEN AT LACM. 2 M & 1 F MAY, AUG & SEP 1977, 1 F JAN 1978, 1 F FEB 1980, 1 F DEC 1981, 1 M MAR 1982, 1 M JUL 1984, 1 M & 1 F AUG 1985, 1 M OCT 1987, 1 M APR 1992.

Owner/Manager: UNKNOWN

Occurrence No.	41	**Map Index:**	58915	**EO Index:**	58951	**Element Last Seen:**	1991-10-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-10-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-21

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.03383 / -117.04297	**Accurracy:**	1 mile
UTM:	Zone-11 N3765908 E496032	**Elevation (ft):**	2600
PLSS:	T02S, R02W, Sec. 01 (S)	**Acres:**	0.0

Location: YUCAIPA.

Detailed Location: EXACT LOCATION NOT KNOWN. MAPPED ACCORING TO LAT/LONG COORDINATES PROVIDED BY MANIS. LOCATION UNCERTAINTY GIVEN AS 1.75 MILES.

Ecological:

General: 2 MALE SPECIMENS COLLECTED 9 AUG 1981 (MVZ # 181945) AND 29 OCT 1991 (LACM # 94007) BY D. CONSTANTINE AT "YUCAIPA."

Owner/Manager: UNKNOWN

Occurrence No.	53	**Map Index:** 53796	**EO Index:**	59072		**Element Last Seen:**	1992-08-31
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1992-08-31
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-12-30

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.89740 / -117.20117	**Accurracy:**	1 mile
UTM:	Zone-11 N3750799 E481399	**Elevation (ft):**	1500
PLSS:	T03S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: MORENO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE VICINITY OF MORENO VALLEY AND THE LAT-LONG COORDINATES PROVIDED BY MANIS.

Ecological:

General: 1 FEMALE COLLECTED 22 AUG 1991 (LACM # 94000) & 1 MALE COLLECTED 31AUG 1992 (MVZ #186307).

Owner/Manager: UNKNOWN

Antrozous pallidus

Element Code: AMACC10010

pallid bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive, WBWG_H-High Priority			
Habitat:	**General:**	DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.			
	Micro:	ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.			

Occurrence No.	244	**Map Index:** 58911	**EO Index:**	66710		**Element Last Seen:**	1929-05-19
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1929-05-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2007-04-03

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.05602 / -117.18288	**Accurracy:**	1 mile
UTM:	Zone-11 N3768382 E483122	**Elevation (ft):**	1360
PLSS:	T01S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: REDLANDS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE GENERAL VICINITY OF REDLANDS.

Ecological:

General: 1 FEMALE AND 2 MALES COLLECTED ON 2 MAY 1928, MVZ #77029-77031, 1 MALE AND 1 FEMALE COLLECTED ON 19 MAY 1929, MVZ #77032-77033, BY ROBERT D. MOORE.

Owner/Manager: UNKNOWN

Eumops perotis californicus

Element Code: AMACD02011

western mastiff bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T4
	State:	None		**State:**	S3?
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, WBWG_H-High Priority			
Habitat:	**General:**				

MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC

Micro: ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.

Occurrence No.	10	**Map Index:**	33084	**EO Index:**	3637	**Element Last Seen:**	1992-09-01
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-09-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-03-27

Quad Summary: Redlands (3411712), Harrison Mtn. (3411722)

County Summary: San Bernardino

Lat/Long:	34.12964 / -117.20506	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3776549 E481091	**Elevation (ft):**	1380
PLSS:	T01N, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: HIGHLAND, CHURCH OF THE LIVING GOD. SAN BERNARDINO MOUNTAINS.

Detailed Location:

Ecological:

General: 40-50 OBSERVED AT THIS SITE IN 1969 BY D. CONSTANTINE; IN 1992; ONLY 3 WERE DETECTED ACCOUSTICALLY AND OBSERVED LEAVING THE BUILDING.

Owner/Manager: PVT

Occurrence No.	78	**Map Index:**	21200	**EO Index:**	66410	**Element Last Seen:**	1957-08-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1957-08-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-11-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81375 / -117.17861	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3741519 E483469	**Elevation (ft):**	1570
PLSS:	T04S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: 4 MILES SW OF LAKEVIEW.

Detailed Location: NON-SPECIFIC LOCATION. LAT/LONG COORDINATES GIVEN WERE AT 4 MILES NW OF LAKEVIEW, SO MAPPED ACCORDING TO LOCALITY DESCRIPTION.

Ecological:

General: 2 MALE & 1 FEMALE SPECIMENS COLLECTED ON 14 JUL, 1 MALE SPECIMEN COLLECTED ON 1 AUG 1954, 1 MALE SPECIMEN COLLECTED ON 28 AUG 1957 BY T.A. VAUGHN, KU #73128, 73213, 76578-76580.

Owner/Manager: UNKNOWN

Occurrence No.	80	**Map Index:**	53796	**EO Index:**	66412	**Element Last Seen:**	1990-09-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-09-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-21

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.89740 / -117.20117	**Accurracy:**	1 mile
UTM:	Zone-11 N3750799 E481399	**Elevation (ft):**	
PLSS:	T03S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: MORENO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED IN THE VICINITY OF MORENO VALLEY.

Ecological:

General: 1 FEMALE SPECIMEN COLLECTED BY D.G. CONSTANTINE, ANOTHER FEMALE SPECIMEN COLLECTED BY CA DEPT. OF HEALTH SERVICES ON 6 SEP 1990, LACM #94015 AND 95890, RESPECTIVELY.

Owner/Manager: UNKNOWN

Occurrence No.	83	**Map Index:**	66322	**EO Index:**	66415	**Element Last Seen:**	1933-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1933-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-26

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.06741 / -117.32753	**Accurracy:**	1 mile
UTM:	Zone-11 N3769679 E469776	**Elevation (ft):**	
PLSS:	T01S, R04W, Sec. 20 (S)	**Acres:**	0.0

Location: COLTON.

Detailed Location: BOTH OF LAT/LONG COORDINATES GIVEN IN MANIS ARE INCLUDED HERE. 1 COLL. BY HANNA, MSU MR.1666. 1 MALE (M) COLL. BY HANNA, 1912, MVZ #15697. (CONTINUED IN GENERAL.)

Ecological:

General: 1 M COLL. BY LITTLE, 1 M & 1 FEMALE (F) COLL. BY LAW, 1918, KU #9420, MVZ #149150-149151. 1 F COLL. BY HANNA/BORELL, 1924, MVZ 34284. 2 F COLL. BY LITTLE, 1931,TTU #36085, MVZ #71734. 4 F COLL. BY HANNA/WILSON, 1932 & 1933, MVZ #71728-71731

Owner/Manager: UNKNOWN

Occurrence No.	128	**Map Index:**	66378	**EO Index:**	66475	**Element Last Seen:**	1992-05-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-25

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84913 / -117.18928	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3745444 E482488	**Elevation (ft):**	1570
PLSS:	T04S, R03W, Sec. 03 (S)	**Acres:**	0.0

Location: LAKE PERRIS.

Detailed Location: MAPPED ACCORDING TO LAT/LONG COORDINATES GIVEN.

Ecological:

General: SPECIMEN COLLECTED 13 JUL 1954. MULTIPLE INDIVIDUALS DETECTED MAY 1992.

Owner/Manager: UNKNOWN

Occurrence No.	175	**Map Index:**	66436	**EO Index:**	66535	**Element Last Seen:**	1991-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-26

Quad Summary:	Redlands (3411712)
County Summary:	San Bernardino

Lat/Long:	34.09156 / -117.22723	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3772332 E479038	**Elevation (ft):**	
PLSS:	T01S, R03W, Sec. 18 (S)	**Acres:**	0.0

Location:	SANTA ANA WASH.
Detailed Location:	EXACT LOCATION UNKNOWN. MAPPED ACCORDING TO LAT/LONG COORDINATES GIVEN BY PIERSON AND RAINEY. THIS PUTS THE SITE IN THE WASH, SOUTH OF NORTON AFB.
Ecological:	
General:	SPECIMEN COLLECTED JUL 1991 BY B. MCKERNON.
Owner/Manager:	UNKNOWN

Nyctinomops femorosaccus

Element Code: AMACD04010

pocketed free-tailed bat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S2S3
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, WBWG_M-Medium Priority			
Habitat:	**General:**	VARIETY OF ARID AREAS IN SOUTHERN CALIFORNIA; PINE-JUNIPER WOODLANDS, DESERT SCRUB, PALM OASIS, DESERT WASH, DESERT RIPARIAN, ETC.			
	Micro:	ROCKY AREAS WITH HIGH CLIFFS.			

Occurrence No.	20	**Map Index:**	68463	**EO Index:**	68721	**Element Last Seen:**	1985-02-05
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-03-14

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88574 / -117.28002	**Accurracy:**	1 mile
UTM:	Zone-11 N3749522 E474105	**Elevation (ft):**	1600
PLSS:	T03S, R04W, Sec. 27 (S)	**Acres:**	0.0

Location: MARCH AIR FORCE BASE.

Detailed Location: MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY MANIS, WITH UNCERTAINTY OF 1609.344M (1 MILE).

Ecological:

General: 1 MALE SPECIMEN (MVZ #181962) COLLECTED AT "MARCH AIR FORCE BASE" BY DENNY G. CONSTANTINE ON 5 FEB 1985.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	23	**Map Index:**	68464	**EO Index:**	68724	**Element Last Seen:**	1985-11-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-11-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-03-14

Quad Summary: Redlands (3411712), San Bernardino South (3411713), Fontana (3411714), Harrison Mtn. (3411722), San Bernardino North (3411723), Devore (3411724)

County Summary: San Bernardino

Lat/Long:	34.11843 / -117.29904	**Accurracy:**	5 miles
UTM:	Zone-11 N3775328 E472422	**Elevation (ft):**	1200
PLSS:	T01S, R04W, Sec. 04 (S)	**Acres:**	0.0

Location: SAN BERNARDINO.

Detailed Location: MAPPED ACCORDING TO LAT/LONG COORDINATES PROVIDED BY MANIS, WITH UNCERTAINTY OF 14,858M (9.2 MILES).

Ecological:

General: 1 FEMALE SPECIMEN (MVZ #181965) COLLECTED AT "SAN BERNARDINO" BY DENNY G. CONSTANTINE ON 15 NOV 1985.

Owner/Manager: UNKNOWN

Lepus californicus bennettii

Element Code: AMAEB03051

San Diego black-tailed jackrabbit

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3?
	State:	None		**State:**	S3?
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	INTERMEDIATE CANOPY STAGES OF SHRUB HABITATS & OPEN SHRUB / HERBACEOUS & TREE / HERBACEOUS EDGES.			
	Micro:	COASTAL SAGE SCRUB HABITATS IN SOUTHERN CALIFORNIA.			

Occurrence No.	39	**Map Index:**	53927	**EO Index:**	53927	**Element Last Seen:**	2003-04-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-13

Quad Summary: El Casco (3311781)
County Summary: Riverside

Lat/Long:	33.90309 / -117.01398	**Accurracy:**	80 meters
UTM:	Zone-11 N3751411 E498706	**Elevation (ft):**	2280
PLSS:	T03S, R01W, Sec. 20 (S)	**Acres:**	0.0

Location: 2.7 MILES SW OF BEAUMONT
Detailed Location:
Ecological: HABITAT CONSISTS OF DISTURBED GRASSLAND AND RECENTLY-BURNED CHAPARRAL.
General: 1 ADULT OBSERVED ON 9 APR 2003.
Owner/Manager: PVT

Occurrence No.	49	**Map Index:**	57338	**EO Index:**	57354	**Element Last Seen:**	2004-01-29
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-01-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-12

Quad Summary: El Casco (3311781)
County Summary: Riverside

Lat/Long:	33.92067 / -117.01787	**Accurracy:**	80 meters
UTM:	Zone-11 N3753360 E498347	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: ABOUT 2.5 MILES SOUTHWEST OF BEAUMONT AND 0.9 MILES SOUTH OF CALIFORNIA STATE HIGHWAY 60.
Detailed Location:
Ecological: HABITAT CONSISTS OF UNDEVELOPED CHAMISE CHAPARRAL.
General: ONE ADULT OBSERVED. MAPPED USING UTM COORDINATES GIVEN: ZONE 11 498427E X 3753153N DATUM: NAD 27.
Owner/Manager: PVT

Occurrence No.	64	**Map Index:**	59981	**EO Index:**	60017	**Element Last Seen:**	2004-06-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-02-14

Quad Summary: El Casco (3311781)
County Summary: Riverside

Lat/Long:	33.92783 / -117.02372	**Accurracy:**	80 meters
UTM:	Zone-11 N3754155 E497806	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: 0.3 MILE SOUTH OF HIGHWAY 60, 2.5 MILES WEST OF BEAUMONT
Detailed Location:
Ecological: HABITAT CONSISTS OF CHAPARRAL AND NON-NATIVE GRASSLAND.
General: 1 ADULT OBSERVED ON 23 JUN 2004.
Owner/Manager: PVT

*** SENSITIVE ***

Occurrence No.	67	**Map Index:**	64582	**EO Index:**	64662	**Element Last Seen:**	1995-09-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-05-02

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accuracy:**	nonspecific area
UTM:		**Elevation (ft):**	1060
PLSS:		**Acres:**	66.6

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: AREA MAPPED AS DELHI SOILS. VEGETATION ON SITE IS DOMINATED BY RUDERAL GRASSES AND CALIFORNIA BUCKWHEAT.

General:

Owner/Manager:

Occurrence No.	70	**Map Index:**	65698	**EO Index:**	65777	**Element Last Seen:**	2005-05-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-08-08

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.82611 / -117.03992	**Accuracy:**	80 meters
UTM:	Zone-11 N3742876 E496305	**Elevation (ft):**	1470
PLSS:	T04S, R02W, Sec. 13 (S)	**Acres:**	0.0

Location: SAN JACINTO VALLEY; ON PICO ROAD, 0.4 MILE NW OF JUNCTION WITH GRANT BDY ROAD.

Detailed Location:

Ecological: HABITAT CONSISTS OF A FLAT AREA WITH VERY LITTLE TOPOGRAPHIC RELIEF; VEGETATION INCLUDES NON-NATIVE GRASSLANDS AND RUDERAL HABITAT.

General: 3-5 INDIVIDUALS OBSERVED ON 5-23-2005.

Owner/Manager: CITY OF SAN JACINTO

Occurrence No.	92	**Map Index:**	79660	**EO Index:**	80651	**Element Last Seen:**	2005-05-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-08-19

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.87569 / -117.32864	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3748422 E469606	**Elevation (ft):**	1665
PLSS:	T03S, R04W, Sec. 29 (S)	**Acres:**	14.0

Location: JUST SE OF WOOD RD AT LURIN AVE, 1.7 MILES ESE OF WOODCREST, SE CITY OF RIVERSIDE.

Detailed Location: MAPPED FROM PROVIDED MAP.

Ecological: HABITAT CONSISTED OF ANNUAL GRASSLANDS SURROUNDED BY URBAN AREAS. LOT APPEARS DISKED IN AERIAL IMAGES FROM 2009.

General: 1 ADULT OBSERVED ON 23 MAY 2005.

Owner/Manager: UNKNOWN

Occurrence No.	93	**Map Index:**	79666	**EO Index:**	80654	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-09-07

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98932 / -117.19696	**Accurracy:**	specific area
UTM:	Zone-11 N3760990 E481808	**Elevation (ft):**	2400
PLSS:	T02S, R03W, Sec. 21 (S)	**Acres:**	15.0

Location: ABOUT 3.4 MILES N OF HWY 60 AT NASSON ST, E OF RECHE CYN AND W OF THE BADLANDS, NORTH OF MORENO VALLEY

Detailed Location: AREA WNW JUNCTION OF SMILY BLVD (JORDAN DR) AND JEFFERY DR. MAPPED FROM PROVIDED COORDINATES AND MAP.

Ecological: HABITAT CONSISTS OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Occurrence No.	94	**Map Index:**	79667	**EO Index:**	80657	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-10-28

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97878 / -117.17962	**Accurracy:**	specific area
UTM:	Zone-11 N3759818 E483408	**Elevation (ft):**	2310
PLSS:	T02S, R03W, Sec. 22 (S)	**Acres:**	10.0

Location: AREA 1 MI SE OF SMILY BLVD AT JEFFERY DR, 2.7 MI NNE OF FWY 60 AT NASON ST, NORTH OF MORENO VALLEY.

Detailed Location: MAPPED FROM PROVIDED COORDINATES AND MAP.

Ecological: HABITAT CONSISTED OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Occurrence No.	95	**Map Index:**	79668	**EO Index:**	80658	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-08-19

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97934 / -117.19849	**Accurracy:**	80 meters
UTM:	Zone-11 N3759883 E481664	**Elevation (ft):**	2675
PLSS:	T02S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: ABOUT 2.8 MILES N OF HWY 60 AT NASON ST, E OF RECHE CYN AND W OF THE BADLANDS, NORTH OF MORENO VALLEY.

Detailed Location: 0.7 MI SW OF SMILY BLVD AT JEFFERY DR. MAPPED FROM PROVIDED COORDINATES.

Ecological: HABITAT CONSISTED OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Occurrence No.	96	**Map Index:**	79669	**EO Index:**	80659	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-08-19

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98437 / -117.18524	**Accurracy:**	80 meters
UTM:	Zone-11 N3760439 E482890	**Elevation (ft):**	2440
PLSS:	T02S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: 3.1 MI N OF HWY 60 AT NASON ST, E OF RECHE CYN AND W OF THE BADLANDS, NORTH OF MORENO VALLEY.

Detailed Location: 0.4 MI ESE OF SMILY BLVD AT JEFFERY DR. MAPPED FROM PROVIDED COORDINATES.

Ecological: HABITAT CONSISTED OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Occurrence No.	97	**Map Index:** 79670	**EO Index:**	80660		**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-08-19

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97726 / -117.18406	**Accurracy:**	80 meters
UTM:	Zone-11 N3759649 E482997	**Elevation (ft):**	2530
PLSS:	T02S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: 2.6 MI N OF HWY 60 AT NASON ST, E OF RECHE CYN AND W OF THE BADLANDS, NORTH OF MORENO VALLEY.

Detailed Location: 0.8 MI SE OF SMILY BLVD AT JEFFERY DR. MAPPED FROM PROVIDED COORDINATES.

Ecological: HABITAT CONSISTED OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Occurrence No.	98	**Map Index:** 79671	**EO Index:**	80661		**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-08-19

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98456 / -117.19746	**Accurracy:**	80 meters
UTM:	Zone-11 N3760461 E481760	**Elevation (ft):**	2745
PLSS:	T02S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: 3.2 MI N OF HWY 60 AT NASON ST, E OF RECHE CYN AND W OF THE BADLANDS, NORTH OF MORENO VALLEY.

Detailed Location: 0.4 MI WSW OF SMILY BLVD AT JEFFERY DR. MAPPED FROM PROVIDED MAP.

Ecological: HABITAT CONSISTED OF DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB ON MODERATE TO STEEP ROLLING HILLS.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED ON 1 JUN 2007. DESCRIBED AS NUMEROUS THROUGHOUT THE SITE.

Owner/Manager: PVT

Perognathus longimembris brevinasus

Element Code: AMAFD01041

Los Angeles pocket mouse

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T1T2
	State:	None		**State:**	S1S2
	Other:	DFG_SSC-Species of Special Concern, USFS_S-Sensitive			
Habitat:	**General:**	LOWER ELEVATION GRASSLANDS & COASTAL SAGE COMMUNITIES IN AND AROUND THE LOS ANGELES BASIN.			
	Micro:	OPEN GROUND WITH FINE SANDY SOILS. MAY NOT DIG EXTENSIVE BURROWS, HIDING UNDER WEEDS & DEAD LEAVES INSTEAD.			

Occurrence No.	11	**Map Index:**	15995	**EO Index:**	23960	**Element Last Seen:**	1940-03-21
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1940-03-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-10

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89537 / -117.05503	**Accurracy:**	1 mile
UTM:	Zone-11 N3750556 E494911	**Elevation (ft):**	
PLSS:	T03S, R02W (S)	**Acres:**	0.0

Location: EDEN HOT SPRINGS.

Detailed Location:

Ecological:

General: MVZ #90713 COLLECTED 21 MAR 1940 BY FLOYD DURHAM.

Owner/Manager: UNKNOWN

Occurrence No.	12	**Map Index:**	24993	**EO Index:**	23958	**Element Last Seen:**	1916-10-31
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1916-10-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-10-01

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01874 / -117.27110	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3764267 E474969	**Elevation (ft):**	1300
PLSS:	T02S, R04W (S)	**Acres:**	2755.2

Location: RECHE CANYON. SOUTHEAST OF COLTON, SOUTH OF THE SANTA ANA RIVER.

Detailed Location: COLLECTED FROM THE MOUTH OF THE CANYON AND THE INTERIOR OF THE CANYON.

Ecological:

General: MVZ #2656 COLLECTED BY C.H. RICHARDSON FROM THE MOUTH OF RECHE CANYON ON 27 JUL 1908. MVZ #24496 COLLECTED BY GRINNELL FROM RECHE CANYON ABOUT 4 MILES SOUTHEAST OF COLTON ON 31 OCT 1916.

Owner/Manager: UNKNOWN

Occurrence No.	15	**Map Index:**	03375	**EO Index:**	6367	**Element Last Seen:**	1912-05-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1912-05-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-08-10

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.06214 / -117.34029	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3769098 E468598	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 30 (S)	**Acres:**	0.0

Location: SLOVER MTN NEAR COLTON.

Detailed Location:

Ecological:

General: MVZ #16663 - 16665 COLLECTED 17 MAY 1912 BY G. A. FISHER.

Owner/Manager: UNKNOWN

Occurrence No.	19	**Map Index:**	38572	**EO Index:**	33579	**Element Last Seen:**	1992-10-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-10-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-01-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.89242 / -117.29071	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3750266 E473119	**Elevation (ft):**	1640
PLSS:	T03S, R04W, Sec. 22 (S)	**Acres:**	26.0

Location: WEST MARCH AIR FORCE BASE, ABOUT 0.5 MILE WEST OF ARNOLD HEIGHTS AND ABOUT 2 MILES SSW OF EDGEMONT.

Detailed Location:

Ecological: DISTURBED GRASSLAND, LIMITED SAGE SCRUB, SMALL ROCK OUTCROP.

General: 1 ADULT CAPTURED 15 OCT 1992 ON TRAPLINE #5.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	20	**Map Index:**	20141	**EO Index:**	45407	**Element Last Seen:**	2000-07-21
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-07-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-08-29

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.05794 / -117.35856	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3768638 E466910	**Elevation (ft):**	1000
PLSS:	T01S, R05W, Sec. 25 (S)	**Acres:**	575.6

Location: AREA LOCATED SOUTH OF I-10, NORTH OF AGUA MANSA ROAD, & NORTH & EAST OF SANTA ANA AVENUE, IN WEST COLTON.

Detailed Location:

Ecological: HABITAT IS WHOLLY OR PARTLY CONSOLIDATED DUNES CONTAINING SANDY SOILS OF THE DELHI SERIES. DOMINANT PERENNIALS INCLUDE ERIOGONUM FASCICULATUM, DICOREA CANESCENS, CROTON CALIFORNICA, LESSINGIA GLANDULIFERA. SURROUNDED BY HEAVY INDUSTRIAL.

General: SITE IS PROPOSED AS A MITIGATION BANK FOR SPECIAL STATUS SPECIES. 33 LA POCKET MOUSE CAPTURED ON 21 JUL 2001.

Owner/Manager: PVT

Occurrence No.	27	**Map Index:**	47388	**EO Index:**	47388	**Element Last Seen:**	1994-09-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-09-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-08

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84335 / -117.00275	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744787 E499745	**Elevation (ft):**	1490
PLSS:	T04S, R01W, Sec. 08 (S)	**Acres:**	21.7

Location: 0.9 MILE NW OF GILMAN HOT SPRINGS; APPROXIMATELY 300 FEET EAST OF SANDERSON AVENUE.

Detailed Location: TRAP 1: LOCATED AT EDGE OF SAN JACINTO RIVER WASH. TRAP 2: LOCATED APPROXIMATELY 0.2 MILE NORTH OF TRAP 1.

Ecological: HABITAT (AT TRAP 1) CONSISTS OF SPARSE VEGETATION DOMINATED BY AMBROSIA PSILOSTACHYA, CROTON CALIFORNICUS, NICOTIANA GLAUCA, HETEROTHECA GRANDIFLORA WITH SOME ERIOGONUM FASCICULATUM AND BRASSICA GENICULATA.

General: TRAP 1: 26-28 JUL 1994, 4 ADULTS & 5 SUBADULTS CAPTURED. 15,16 SEP 1994: 18 ADULTS CAPTURED. SUBSTANTIAL POPULATION EXISTS AT SITE. TRAP 12: 2 INDIVIDUALS (LIKELY TO BE TRANSIENTS) CAPTURED. HABITAT UNLIKELY TO SUPPORT POPULATION.

Owner/Manager: RIV COUNTY-HWY COMMISSION

Occurrence No.	28	**Map Index:**	47422	**EO Index:**	47422	**Element Last Seen:**	1999-01-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.93873 / -117.22892	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3755386 E478844	**Elevation (ft):**	1650
PLSS:	T03S, R03W, Sec. 06 (S)	**Acres:**	87.0

Location: NW OF PERRIS RESERVOIR, LOCATED WITHIN TOWN OF SUNNYMEAD.

Detailed Location: MAPPED THE AREA SOUTH OF HWY 60 & NORTH OF URBAN AREA OF SUNNYMEAD.

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND, SAGE SCRUB AND CULTIVATED FIELDS.

General: DEC 1997 - JAN 1999: 1 INDIVIDUAL OBSERVED WITHIN THIS AREA.

Owner/Manager: UNKNOWN

Occurrence No.	29	**Map Index:**	47423	**EO Index:**	47423	**Element Last Seen:**	1999-01-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-14

Quad Summary: Perris (3311772), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.88866 / -117.23461	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3749835 E478305	**Elevation (ft):**	1500
PLSS:	T03S, R03W, Sec. 19 (S)	**Acres:**	1277.4

Location: MORENO VALLEY, NW OF PERRIS RESERVOIR AND SOUTH OF SUNNYMEAD.

Detailed Location:

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND, SAGE SCRUB AND CULTIVATED FIELDS.

General: DEC 1997 - JAN 1999: 1 INDIVIDUAL OBSERVED WITHIN THIS AREA.

Owner/Manager: UNKNOWN

Occurrence No.	30	**Map Index:**	47424	**EO Index:**	47424	**Element Last Seen:**	1991-07-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-07-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-03-14

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.86539 / -117.13445	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3747239 E487564	**Elevation (ft):**	1480
PLSS:	T03S, R02W, Sec. 31 (S)	**Acres:**	64.9

Location: SAN JACINTO WA. 1.4 MILES EAST OF PERRIS RESERVOIR, LOCATED 0.25 MILES NE OF THE BERNASCONI HILLS.

Detailed Location:

Ecological: HABITAT CONSISTS OF DISTURBED GRASSLAND.

General: 9-14 JUL 1990: 21 CAPTURED (APPROX. 6 INDIVIDUALS) DURING 1000 TRAP NIGHTS. 23-28 JUL 1990: 22 CAPTURED (APPROX. 10 INDIVIDUALS) DURING 1210 TRAP NIGHTS. 11-24 JUL 1991: 53 INDIVIDUALS CAPTURED (NOTED AS BEING "NOTICEABLY ABUNDANT")

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	38	**Map Index:**	58068	**EO Index:**	58104	**Element Last Seen:**	2000-10-31
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-10-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-15

Quad Summary: Perris (3311772), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.87791 / -117.14090	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3748628 E486969	**Elevation (ft):**	1600
PLSS:	T03S, R03W, Sec. 25 (S)	**Acres:**	925.9

Location: ON THE EAST END OF LAKE PERRIS WITHIN THE LAKE PERRIS STATE RECREATION AREA.

Detailed Location: T3S R2W: W 1/2 SEC 30, T3S R3W: S 1/2 SEC 25, AND NE 1/4 SEC 36.

Ecological: HABITAT IS NON-NATIVE GRASSLAND AND ACTIVELY MONITORED AND MANAGED FOR DIPODOMYS STEPHENSI.

General: ONE ADULT OBSERVED.

Owner/Manager: DPR-LAKE PERRIS SRA

Occurrence No.	39	**Map Index:**	68227	**EO Index:**	58105	**Element Last Seen:**	2006-02-11
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-02-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-02-23

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09838 / -117.21693	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3773085 E479990	**Elevation (ft):**	1100
PLSS:	T01S, R03W, Sec. 08 (S)	**Acres:**	647.0

Location: LOCATED ON EASTERN END OF NORTON AIR FORCE BASE.

Detailed Location: 2002: SECTION 8. 2006: LOCATED IN THE FAR SOUTHEAST PORTION OF MAPPED AREA ALONG ALABAMA ROAD.

Ecological: RELATIVELY UNDISTURBED ALLUVIAL SCRUB VEGETATION. SOME AREAS OF DEEP SANDY SOIL. DOMINANTS INCLUDE: BRASSICA, BROMUS, CROTON, & ERIASTRUM. THREE OF THE FOUR SITES SURVEYED OF EXCELLENT QUALITY, ONE OF THE FOUR SITES SURVEYED OF POOR QUALITY

General: ONE INDIVIDUAL OBSERVED 12 NOV 2002. 2 ADULTS TRAPPED ON 11 FEB 2006 - TRAPPED MICE RELOCATED JUST OUTSIDE FENCED AREA. MOST SITES WHERE MICE WERE CAPTURED ARE CONSIDERED EXCELLENT QUALITY, ONLY ONE SITE CONSIDERED POOR QUALITY.

Owner/Manager: DOD-NORTON AFB

Occurrence No.	41	**Map Index:**	58094	**EO Index:**	58130	**Element Last Seen:**	1993-05-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-05-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-16

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88391 / -117.28320	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3749321 E473810	**Elevation (ft):**	1600
PLSS:	T03S, R04W, Sec. 27 (S)	**Acres:**	182.0

Location: LOCATED ON MARCH AIR FORCE BASE, ABOUT 0.15 MILES SOUTH OF ARNOLD HEIGHTS.

Detailed Location:

Ecological:

General: 1 FEMALE CAPTURED/RELEASED DURING A 1-10 MAY 1993 SURVEY.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	42	**Map Index:**	58096	**EO Index:**	58132	**Element Last Seen:**	2002-08-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-08-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-16

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.11732 / -117.33197	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3775214 E469385	**Elevation (ft):**	1150
PLSS:	T01S, R04W, Sec. 06 (S)	**Acres:**	0.0

Location: LOCATED IN THE LYTLE CREEK WASH, BETWEEN 5TH STREET ON THE SOUTH AND BASELINE ROAD ON THE NORTH.

Detailed Location:

Ecological: ALLUVIAL FAN SAGE SCRUB WITH VARYING LEVELS OF DISTURBANCE. MUCH OF CENTRAL PORTION OF THE DRAINAGE CONSISTS OF ANNUAL SPECIES. THERE ARE SOME SCATTERED PATCHES OF COTTONWOODS & EUCALYPTUS. ALSO FOUND IN AREA IS DIPODOMYS MERRIAMI PARVUS.

General: 9 INDIVIDUALS TRAPPED FROM 12-16 AUG 2002 WHILE SURVEYING FOR A PROPOSED PIPELINE REPLACEMENT IN LYTLE CREEK WASH.

Owner/Manager: UNKNOWN

Occurrence No.	46	**Map Index:**	58145	**EO Index:**	58181	**Element Last Seen:**	2002-08-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-08-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-18

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.11649 / -117.33612	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3775123 E469001	**Elevation (ft):**	1170
PLSS:	T01S, R04W, Sec. 06 (S)	**Acres:**	180.7

Location: LOCATED IN CITY OF SAN BERNARDINO IN LYTLE CREEK WASH. BETWEEN FOOTHILL BLVD ON THE SOUTH & BASELINE ROAD ON THE NORTH.

Detailed Location:

Ecological: HABITAT IS HIGHLY DISTURBED BY MINING ACTIVITIES AND CONSISTS OF ALLUVIAL FAN SAGE SCRUB. EASTERN BENCHES CONTAIN SENESCENT SAGE SCRUB. SCATTERED PATCHES OF COTTONWOOD AND EUCALYPTUS. ALSO FOUND IN AREA: DIPODOMYS MERRIAMI PARVUS.

General: 26 ADULTS AND 9 JUVENILES TRAPPED BETWEEN 12-16 AUG 2002.

Owner/Manager: UNKNOWN

Dipodomys stephensi

Element Code: AMAFD03100

Stephens' kangaroo rat

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G2
	State:	Threatened		**State:**	S2
	Other:	IUCN_EN-Endangered			
Habitat:	**General:**	PRIMARILY ANNUAL & PERENNIAL GRASSLANDS, BUT ALSO OCCURS IN COASTAL SCRUB & SAGEBRUSH WITH SPARSE CANOPY COVER.			
	Micro:	PREFERS BUCKWHEAT, CHAMISE, BROME GRASS & FILAREE. WILL BURROW INTO FIRM SOIL.			

Occurrence No.	3	**Map Index:**	03895	**EO Index:**	9356	**Element Last Seen:**	2000-10-31
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Stable	**Record Last Updated:**	2010-01-14

Quad Summary: Lakeview (3311771), Perris (3311772), El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.87091 / -117.17247	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3747856 E484048	**Elevation (ft):**	1750
PLSS:	T03S, R03W, Sec. 24 (S)	**Acres:**	6992.9

Location: SURROUNDING LAKE PERRIS; MOST OF THE HABITAT IS LOCATED TO THE NORTHWEST, NORTH & EAST OF LAKE.

Detailed Location: LARGE PORTION OF SITE IS WITHIN LAKE PERRIS SRA & SAN JACINTO WA. W PORTIONS UNDER STUDY FOR HABITAT ENHANCEMENT. THE EXTREME SE PORTION HAS AN OBSERVATION WHICH RECORDS PRESENCE OF 239 INDV'S. 9-13 APR 2003: NO SKR SIGN IN T3S,R3W SEC 33.

Ecological: HABITAT CONSISTS OF PREVIOUSLY-CULTIVATED ANNUAL GRASSLAND SURROUNDED BY RIVERSIDIAN SAGE SCRUB. SOIL:CIENEBA, EXETER, GORGONIO, GREENFIELD, HANFORD, MONSERATE, PACHAPPA, PLACENTIA, RAMONA, VISTA. SLOPE: 0-15%. POST CONSTR SURVEY SHOWS SKR.

General: 10 INDV'S IN 1988, S OF DUCK PONDS. DEC '97-JAN '99: 32 ADULTS & 2 JUV. RELOC PROJECT ON E SIDE: MAR-NOV '98 119 INDV'S, MAY '99: 305 INDV & 7 INDV AUG '99 CAPT & RELOCATED. JUN '99; 1 ADULT. 90 ADULTS 4-9 NOV '99. 28 ADULTS 26-31 OCT 2000.

Owner/Manager: DPR, DFG, PVT

Occurrence No.	4	**Map Index:**	03461	**EO Index:**	9442	**Element Last Seen:**	2004-08-10
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-08-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-18

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88949 / -117.28759	**Accuracy:**	specific area
UTM:	Zone-11 N3749940 E473406	**Elevation (ft):**	1650
PLSS:	T03S, R04W, Sec. 22 (S)	**Acres:**	547.2

Location: NORTH & SOUTH OF VAN BUREN BLVD., 0.5 MILES WEST OF ARNOLD HEIGHTS, MARCH STEPHENS KANGAROO RAT PRESERVE.

Detailed Location: OCCURRENCE EXTENDS FROM JUST N OF GOLF COURSE TO N OF KENNEDY DRIVE, BOUNDED BY RESIDENTIAL HOUSING TO E & W. CAPTURE RATE LOW; BEAUCHAMP (1984) SAID FROM ALL INDICATIONS POP. HAS BEEN EXTIRPATED. 1992: SITES 2A, 2B, 5.

Ecological: VEGETATION COMPRISED OF ERIOGONUM FASCICULATURM & ARTEMISIA CALIFORNICA. SITE 5: DISTURBED GRASSLAND, SMALL ROCK OUTCROP. 2004: WAS WILDLIFE PRESERVE AT TIME OF STUDY, SURROUNDED BY URBANIZATION; WILL BE DEVELOPED AS LIGHT INDUSTRIAL.

General: O'FARRELL ('88) FOUND LOW DENSITY POPULATION SURROUNDING, 380 ACRES. 30 ADULTS/2 JUV'S CAPTURED OCT '92. 17 MALES/9 FEMALES CAPTURED/RELEASED MAY '93. 13 ADULTS & 6 JUV'S CAPTURED MAR-APR 2004. 20 ADULTS CAPTURED 5-10 AUG 2004.

Owner/Manager: CENTER FOR NATURAL LANDS MGMT

Occurrence No.	11	**Map Index:**	03218	**EO Index:**	9283	**Element Last Seen:**	2003-06-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-06

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.82229 / -117.43179	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742536 E460041	**Elevation (ft):**	1400
PLSS:	T04S, R05W, Sec. 17 (S)	**Acres:**	3327.0

Location: DIRECTLY SOUTH OF LAKE MATHEWS.

Detailed Location: THE DISTRIBUTION VARIES OVER ABOUT 4000 ACRES, FROM TRACE ABUNDANCE TO LARGE PATCHES OF MEDIUM AND HIGH DENSITY. BAX SOURCES SHOW LOCATIONS OF PERMANENT TRAPPING GRIDS.

Ecological: HABITAT CONSISTS OF NON-NATIVE GRASSLAND PLATEAUS SURROUNDED BY RIVERSIDIAN SAGE SCRUB. SOILS: ARLINGTON, BUREN, CAJALCO, CIENEBA, FALLBROOK, GORGONIO, HANFORD, HONCUT, LAS POSAS, MONSERATE, TEMESCAL, YOKOHL. SLOPE: 0-20%

General: 1 ADULT 4 NOV 1998. NEG DATA AT GRIDS #9,13 & 15 NOV-DEC '98. 9 CAPTURED ON 9 DEC '98 AT GRIDS 11&12. NEG DATA AT GRID #'S16-19 MAR-APR '99. 4 TRAPPED 21 APR '99 AT GRID 20. 2 SKR SIGNS OBS 18 OCT 2002 AND ON 18-19 JUN '03 (NO TRAPPING).

Owner/Manager: DFG, BLM, RIV COUNTY, MWD

Occurrence No.	13	**Map Index:**	03265	**EO Index:**	9282	**Element Last Seen:**	2001-11-10
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-11-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-07

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.84870 / -117.40187	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745453 E462822	**Elevation (ft):**	1480
PLSS:	T04S, R05W, Sec. 04 (S)	**Acres:**	1486.1

Location: LAKE MATHEWS ECOLOGICAL RESERVE, DIRECTLY NORTHEAST OF LAKE MATTHEWS.

Detailed Location: 1988: PATCHES OF MEDIUM TO HIGH DENSITY WITH LARGE STRETCHES OF TRACE. MAPPED ACCORDING TO MAP & COORDINATES PROVIDED. BAX SOURCES SHOW LOCATIONS OF PERMANENT TRAPPING GRIDS.

Ecological: NON-NATIVE GRASSLAND PLATEAUS SURROUNDED BY RIVERSIDIAN SAGE SCRUB. SOILS: ARLINGTON, BUREN, CAJALCO, CIENEBA, FALLBROOK, GORGIANO, HANFORD, HONCUT, LAS POSAS, MONSERAE, TEMESCAL, YOKOHL. SLOPE: 0-20%.

General: 33 ADULTS CAPTURED DURING OCT 1998 @ GRID #'S 2,4,5,7, & 8. NEGATIVE DATA RECORDED DURING OCT '98 @ GRIDS #1, 3, & 6. 24-28 MAR 2001: 11 NEW CAPTURES & 23 RECAPS @ GRID 5. 6-10 NOV 2001: 9 NEW CAPTURES & 22 RECAPS @ GRID P1.

Owner/Manager: DFG-LAKE MATHEWS ER

Occurrence No.	16	**Map Index:**	03481	**EO Index:**	24007	**Element Last Seen:**	1988-08-15
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-29

Quad Summary: San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	34.01362 / -117.27838	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3763701 E474296	**Elevation (ft):**	1320
PLSS:	T02S, R04W, Sec. 11 (S)	**Acres:**	0.0

Location: RECHE CYN, W OF RD ABOUT 4.7 KM SE OF JCT W/BARTON RD.

Detailed Location: 2 TRAP SITES: E-FACING HILLSIDE AND WASH. NORTH EXTENT OF RATS RANGE. ACTUAL SITE ALONG RD ENTERING RIVERSIDE PARK RESEARCH INST. 6 ACRES-LOW DENSITY. FRINGE OF RESIDENTIAL YARDS, SMALL WASHES, AND BASE OF SLOPES.

Ecological: NON-NATIVE GRASSLAND BORDERED BY ENCELIA SHRUBLAND. SLOPE: 0-10%. SOIL: ARLINGTON, GORGONIO, MONSERATE.

General:

Owner/Manager: UNKNOWN

Occurrence No.	23	**Map Index:**	03326	**EO Index:**	13605	**Element Last Seen:**	1988-08-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-06-21

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84918 / -117.36643	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3745493 E466101	**Elevation (ft):**	1460
PLSS:	T04S, R05W, Sec. 02 (S)	**Acres:**	0.0

Location: 15.3 KM NW PERRIS.

Detailed Location: IN 1988, O'FARRELL FOUND AREA OF OCCUPATION TO BE ONLY 1 ACRE. CITRUS GROVES NEARBY. POPULATION CONCENTRATED NEAR CENTER, ALONG A DIRT ROAD.

Ecological: NON-NATIVE GRASSLAND.

General: IN 1988, O'FARRELL FOUND A LOW ABUNDANCE HERE.

Owner/Manager: UNKNOWN

Occurrence No.	27	**Map Index:**	33878	**EO Index:**	23999	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-12

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.96823 / -117.30066	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3758674 E472224	**Elevation (ft):**	2200
PLSS:	T02S, R04W, Sec. 28 (S)	**Acres:**	321.8

Location: BOX SPRINGS RESERVE; NEAR UC RIVERSIDE CAMPUS.

Detailed Location: TOWNSHIP 2S, RANGE 4W, EAST HALF OF SECTION 28. SITE IS AN IN-HOLDING IN A COUNTY PARK.

Ecological:

General:

Owner/Manager: UCNR-BOX SPRINGS RESERVE

Occurrence No.	30	**Map Index:**	03634	**EO Index:**	23997	**Element Last Seen:**	1923-09-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1923-09-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78085 / -117.22794	**Accurracy:**	1 mile
UTM:	Zone-11 N3737880 E478896	**Elevation (ft):**	1450
PLSS:	T04S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: PERRIS.

Detailed Location:

Ecological:

General: MVZ #33562.

Owner/Manager: UNKNOWN

Occurrence No.	31	**Map Index:**	04212	**EO Index:**	9361	**Element Last Seen:**	1991-08-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-08-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1995-10-27

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90629 / -117.07688	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3751768 E492892	**Elevation (ft):**	1800
PLSS:	T03S, R02W, Sec. 22 (S)	**Acres:**	2875.5

Location: ABOUT 4-5 MILES NORTHEAST OF PERRIS RESERVOIR. ON THE WESTERN SLOPES OF THE MORENO BADLANDS.

Detailed Location: PATCHY BETWEEN LOW AND TRACE DISTRIBUTION. POPULATIONS ARE BEING ISOLATED AND EXTIRPATED BY DEVELOPMENT.

Ecological: NON-NATIVE GRASSLAND; GRAZED GRAIN FIELDS; GOLF COURSE; BORDERS OF RIVERSIDIAN SAGE SCRUB. SOILS: METZ, SAN EMIGDIO.

General: SAMPLE TAKEN IN 1938: MVZ #88407. SOME HABITATS NEAR THE BADLANDS COULD BE PRESERVED AS A BUFFER FOR STUDY AREA TO THE NORTH.

Owner/Manager: PVT

Occurrence No.	45	**Map Index:**	04090	**EO Index:**	9367	**Element Last Seen:**	1980-03-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-11

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.80561 / -117.09418	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3740606 E491283	**Elevation (ft):**	1700
PLSS:	T04S, R02W, Sec. 21 (S)	**Acres:**	0.0

Location: ABOUT 2.0 MI SE LAKEVIEW. SW OF JUNIPER FLAT RD.

Detailed Location: 1 TRAPPED IN 1980 BY PEARSON. O'FARRELL (1988) REPORTS ANIMALS AS BEING EXTIRPATED.

Ecological: ECOTONE OF COASTAL SAGE SCRUB, CHAMISE CHAPARRAL. ALSO NON-NATIVE GRASSLAND.

General:

Owner/Manager: UNKNOWN

Occurrence No.	46	**Map Index:**	04335	**EO Index:**	23992	**Element Last Seen:**	1994-09-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-09-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-17

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84666 / -117.00260	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745154 E499759	**Elevation (ft):**	1700
PLSS:	T04S, R01W, Sec. 05 (S)	**Acres:**	36.9

Location: 1.0 MI NORTHWEST OF GILMAN HOT SPRINGS, EAST OF INTERSECTION GILMAN SPRINGS ROAD AND HIGHWAY 79.

Detailed Location: 3 CAPTURED IN THE WESTERN PORTION OF TRAP LINE 12, 1994. 1 TRAPPED, 1980.

Ecological: COASTAL SAGE SCRUB HABITAT. SPARCE RUDERAL GRASSLAND, WITH GENERALLY LOAMY SOILS AND PATCHES OF SANDY/LOAMY SUBSTRATE.

General:

Owner/Manager: RIV COUNTY-HWY COMMISSION

Occurrence No.	47	**Map Index:**	04319	**EO Index:**	9120	**Element Last Seen:**	1980-03-04
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-09-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-11

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84600 / -117.00929	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3745081 E499140	**Elevation (ft):**	1650
PLSS:	T04S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: SAN JACINTO VALLEY, ABOUT 1.5 MI NW GILMAN HOT SPRINGS.

Detailed Location:

Ecological: AGRICULTURAL FIELD BORDERED BY RIVERSIDIAN SAGE SCRUB. SLOPE 0 TO 25%.

General:

Owner/Manager: PVT

Occurrence No.	48	**Map Index:**	03936	**EO Index:**	23988	**Element Last Seen:**	1980-03-07
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-05-13

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77363 / -117.13058	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3737064 E487909	**Elevation (ft):**	2200
PLSS:	T04S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location: ABOUT 5.0 MI E OF PERRIS.

Detailed Location: 16 TRAPPED IN 1980. REPORTED EXTIRPATED BY DEVELOPMENT IN 1988.

Ecological: TYPICAL COASTAL SAGE SCRUB HABITAT.

General:

Owner/Manager: UNKNOWN

Occurrence No.	52	**Map Index:**	03456	**EO Index:**	9225	**Element Last Seen:**	1990-07-14
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-08-26

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.74182 / -117.31563	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3733575 E470764	**Elevation (ft):**	2100
PLSS:	T05S, R04W, Sec. 08 (S)	**Acres:**	3412.7

Location: NORTH & WEST OF HWY 74, MOSTLY EAST OF ARROYO DEL TORO TO NORTH OF STEELE PEAK & EAST OF STEELE VALLEY

Detailed Location: ABUNDANCE VARIES: APPROX 2000 ACRES TRACE; 125 ACRES LOW; & 40 ACRES MEDIUM. 21 ANIMALS CAPTURED 1990 & 17 CAPTURED IN 1989 IN T05S, R04W, SEC 4

Ecological: TOPOGRAPHY RANGES FROM FLAT VALLEYS TO HILLY RUGGED AREAS & ROCKLAND. NON-NATIVE GRASSLAND BORDERDED BY RIVERSIDIAN SAGE SCRUB. SOIL: ARLINGTON, CAJALCO, CIENEBA, ESCONDIDO, FRIANT, HANFORD, HONCUT, LAS POSAS, LODA, & VISTA. SLOPE: 0-50%

General: SITE IS CURRENTLY PART OF STEELE PEAK SKR STUDY AREA. SHOULD REMAIN AS PART OF THE STUDY AREA.

Owner/Manager: BLM, OTHERS

Occurrence No.	54	**Map Index:**	03466	**EO Index:**	9444	**Element Last Seen:**	1998-03-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2010-02-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.93340 / -117.32099	**Accurracy:**	specific area
UTM:	Zone-11 N3754818 E470334	**Elevation (ft):**	1580
PLSS:	T03S, R04W, Sec. 05 (S)	**Acres:**	2489.0

Location: EXTENDS FROM 2 MI S OF UC RIVERSIDE TO W OF EDGEMONT, NW OF MARCH AFB. BOUNDED BY ALESSANDRO RD TO W & S, I-215 TO E.

Detailed Location: O'FARRELL HAS SURVEYED A LARGE PORTION OF THIS SITE. DENSITES: 1380 ACRES--LOW, 500 ACRES--MEDIUM. OTHER SOURCES INDICATE PATCHES OF HIGH DENSITY. 5 POLYGONS INDICATED AS ONE BREEDING POPULATION ON SOURCE DOCUMENTS.

Ecological: HABITAT IS ANNUAL GRASSLAND/RIVERSIDEAN COASTAL SAGE SCRUB. LEVEL TO GENTLY ROLLING TOPOGRAPHY. 2009 AERIAL PHOTOS SHOW SIGNIFICANT RESIDENTIAL AND LIGHT INDUSTRIAL DEVELOPMENT WITHIN THE EAST & WEST BOUNDARIES OF THE MAPPED FEATURE.

General: AUG-DEC 1988 SPECIES RECORDED IN LOW-HIGH DENSITIES THROUGHOUT SITE. OBS ON 26 JUL '89. 5 INDV'S TRAPPED 29 SEP '89. JAN '90 10 OBS. 24 ON MAR-APR '90. 10 TRAPPED 10-11 JUL '90. SPECIES OBS. 21 NOV '90. DEC '90-MAR '91:34 INDV'S TRAPPED.

Owner/Manager: PVT, DOD-MARCH AFB

Occurrence No.	60	**Map Index:**	03376	**EO Index:**	23981	**Element Last Seen:**	1990-07-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-14

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79994 / -117.34270	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740026 E468278	**Elevation (ft):**	2040
PLSS:	T04S, R04W, Sec. 30 (S)	**Acres:**	392.3

Location: IDA LEONA ESTATES, LIES JUST S & SE OF HARFORD SPRINGS RESERVE, VICINITY OF INTERSECTION OF IDA LEONA RD & PIEDRAS RD

Detailed Location: 1983: PARCELS 1, 2, 3 (SECTION 25) AND 5, 6 (SECTION 19). 1990 CAPTURES WERE MADE IN NON-NATIVE GRASSLAND AND GRASSY OPENINGS WITHIN THE CHAPARRAL.

Ecological: HABITAT CONSISTS OF CHAPARRAL & DISTURBED NON-NATIVE GRASSLAND. 1983 RECOMMENDATION: NO SUBDIVISION OF PARCELS 1, 2, 3 & 4 AT THIS TIME-160 ACRE PLOT TOO OUTSTANDING FOR DEVELOPMENT. NO DEVELOPMENT OF ANY KIND ON CLAY KNOLL @ PARCELS 1 & 3.

General: 1983: PARCELS 1&2 CONTAIN 2 OR MORE SMALL POCKETS OF SKR. PARCEL 3 HAS SUBSTANTIAL POP AT SE EDGE OF CLAY KNOLL. PARCEL 5 & 6 HAVE POP ASSOCIATED W/PROPERTY TO THE EAST. 1 CAPT IN SEC 25 ON JAN '90. 1 CAPT ON 23 JUL '90 IN SE 1/4 OF SEC 19.

Owner/Manager: PVT

Occurrence No.	69	**Map Index:**	03315	**EO Index:**	9296	**Element Last Seen:**	1999-09-02
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-09-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-24

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.92047 / -117.36127	**Accurracy:**	specific area
UTM:	Zone-11 N3753397 E466606	**Elevation (ft):**	1300
PLSS:	T03S, R05W, Sec. 12 (S)	**Acres:**	2341.0

Location: BOUNDED ON THE S BY VAN BUREN BLVD, ON THE E BY ALESSANDRO BLVD, & ON THE N BY ARLINGTON AVE, 2.5 MILES SW OF RIVERSIDE.

Detailed Location: O'FARRELL & UPTAIN SURVEYED MOST OF THIS AREA & LABELLED IT ONE BREEDING POPULATION. DENSITIES: 70 ACRES-HIGH, 1500 ACRES-MEDIUM, 380 ACRES-LOW. 1998: 4 ACRES OF HABITAT OCCUPIED BY SPECIES IN N POLYGON. 1999: SKR PRESENT IN N SEC OF 24.

Ecological: SPARSE RIVERSIDIAN SAGE SCRUB/ANNUAL GRASSLAND, DISTURBED BY HEAVY SHEEP GRAZING. RIPARIAN AREAS ALONG DRAINAGES. IT IS LIKELY THAT PORTIONS OF THIS OCCURRENCE ARE EXTIRPATED DUE TO HABITAT LOSS/FRAGMENTATION APPARENT IN 2008 AERIAL IMAGES.

General: 18 FSF'S FROM 1988-90. '88: SW 1/4 OF SEC 13: DENSEST POP OF SKR SEEN BY AUTHOR IN 3 YRS WORK W/100+ ANIMALS PER ACRE. MOD-HIGH POP IN SEC 11 '89. 100'S TRAPPED APR '89 IN SEC 18. 201 INDV'S TRAPPED THROUGHOUT SITE BETWEEN JAN-OCT 1990.

Owner/Manager: CITY OF RIVERSIDE, PVT

Occurrence No.	70	**Map Index:**	20358	**EO Index:**	9422	**Element Last Seen:**	1991-10-XX
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-10-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-10

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81195 / -117.26332	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3741337 E475629	**Elevation (ft):**	1850
PLSS:	T04S, R04W, Sec. 23 (S)	**Acres:**	1589.7

Location: AREA INCLUDES MAJOR SEC OF MOTTE RIMROCK RESERVE, BOUNDED BY OLD ELSINORE RD ON W, SE CORNER ABOUT 2 MILES NW OF PERRIS.

Detailed Location: THERE ARE ELEVEN FIELD SURVEY FORMS FOR THIS OCCURRENCE WITH SUBSTANTIAL ADDITIONAL INFORMATION. THE N & SW PORTION OF THE SITE IS NOT PART OF THE MOTTE RIMROCK RESERVE.

Ecological: ANNUAL GRASSLANDS AND RIVERSIDIAN SAGE SCRUB. SOIL: CIENEBA, HANFORD, VISTA. SLOPE: 0-15%.

General: FROM TRACE TO HIGH ABUNDANCE THROUGHOUT PROPERTY. 6 TRAPPED 13 AUG 1989. MCC: LIVE TRAPPED FROM AUG '89-FEB '91; 21 AUG '89 21 INDV'S SW SEC 24. FEB '90 49 INDV'S/TWO NIGHTS NW SEC 24. PRICE REPORTED 254 INDIVIDUALS FROM NOV 1990-OCT 1991.

Owner/Manager: UCNR-MOTTE RIMROCK RES, PVT

Occurrence No.	72	**Map Index:**	20249	**EO Index:**	9441	**Element Last Seen:**	1989-09-05
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-09-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-03-12

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.89808 / -117.31856	**Accuracy:**	1/5 mile
UTM:	Zone-11 N3750901 E470546	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 20 (S)	**Acres:**	0.0

Location: 0.5 MI NORTH OF VAN BUREN BLVD, AT THE JUNCTION WITH TRAUTWEIN ROAD, APPROXIMATELY 2 MI SW OF EDGEMONT.

Detailed Location: TRACE DISTRIBUTION

Ecological: FRINGE OF DISTURBED NON-NATIVE GRASSLAND AT THE BASE OF ROCK OUTCROP AND ALONG DIRT ROAD AT EDGE OF TILLED FIELD.

General:

Owner/Manager: UNKNOWN

Occurrence No.	73	**Map Index:**	20551	**EO Index:**	9299	**Element Last Seen:**	1998-03-07
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-03-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-21

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83388 / -117.34117	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3743790 E468431	**Elevation (ft):**	1600
PLSS:	T04S, R04W, Sec. 07 (S)	**Acres:**	330.1

Location: 0.4 MILES WEST OF THE JUNCTION OF CAJALCO ROAD AND WOOD ROAD, 5.5 NW OF PERRIS

Detailed Location: 3 SITES SURVEYED IN AREA. PATCHY HABITAT - SOME AREAS WITH A HIGH DENSITY OF K-RATS.

Ecological: SPARSE ANNNUAL GRASSES AND FORBS, ESP. ERODIUM SPP. ALSO HORDEUM LEPORIUNUM SCHISMUS BARBATUS, BRASSICA GENICULATA. ALSO COASTAL SAGE SCRUB AND WETLAND AREAS.

General: SKR NOTED BUT NOT CAPTURED IN A 40-ACRE PARCEL NORTH OF CAJALCO ROAD, ON 14 MAY 1989. UNKNOWN NUMBER OBSERVED DURING JUN 1989. ~6 ACTIVE SKR BURROWS OBSERVED DURING SURVEYS CONDUCTED ON 7 MAR 1998.

Owner/Manager: PVT-BOLSA NURSERY

Occurrence No.	74	**Map Index:**	20248	**EO Index:**	9443	**Element Last Seen:**	1990-02-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-02-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-03-12

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95829 / -117.32054	**Accurracy:**	specific area
UTM:	Zone-11 N3757577 E470384	**Elevation (ft):**	1350
PLSS:	T02S, R04W, Sec. 32 (S)	**Acres:**	57.0

Location: 0.5 MI SOUTH OF UC RIVERSIDE.

Detailed Location: LOW DENSITY

Ecological: DISTURBED RIVERSIDIAN SAGE SCRUB,DOMINATED BY ENCELIA. SKR FOUND IN AREAS WHERE BOTH SHRUBS AND GROUND COVER OF ANNUAL GRASSES AND FORBS IS SPARSE. SOIL: CIENEBA. SLOPE: 0-20%.

General: SITE SURROUNDS LOCATION OF THE COUNTY SHERRIFF'S TRAINING FACILITY.

Owner/Manager: PVT

Occurrence No.	75	**Map Index:**	20247	**EO Index:**	9439	**Element Last Seen:**	1989-03-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1992-03-12

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97834 / -117.26929	**Accurracy:**	specific area
UTM:	Zone-11 N3759787 E475125	**Elevation (ft):**	1800
PLSS:	T02S, R04W, Sec. 23 (S)	**Acres:**	205.0

Location: 2 MI NW OF I-60 JUNCTION WITH THE ESCONDIDO FWY (HWY 395).

Detailed Location: TRACE DISTRIBUTION ON PATCHES OF THE SITE.

Ecological: HABITAT IS A MIX OF RIVERSIDEAN SAGE SCRUB, NON-NATIVE GRASSLAND, & ABANDONED AGRICULTURAL LAND.

General: A BURN AREA WEST OF HOUSING DEVELOPMENT ON SITE MAY DEVELOP INTO SUITABLE HABITAT.

Owner/Manager: PVT

Occurrence No.	76	**Map Index:**	20552	**EO Index:**	9298	**Element Last Seen:**	1989-08-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-16

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84053 / -117.32229	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3744521 E470181	**Elevation (ft):**	1600
PLSS:	T04S, R04W, Sec. 08 (S)	**Acres:**	0.0

Location: 0.6 MI ENE OF CAJALCO RD JCT WITH WOOD RD, 4 MI NW OF PERRIS

Detailed Location:

Ecological: ANNUAL GRASSLAND IN ROLLING TERRAIN WITH SMALL KNOLLS AND SHALLOW DRAINAGES.

General: 4 ANIMALS RECORDED ON SITE.

Owner/Manager: PVT

Occurrence No.	77	**Map Index:**	20557	**EO Index:**	9301	**Element Last Seen:**	1989-08-12
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-16

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.77907 / -117.32180	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3737706 E470205	**Elevation (ft):**	2100
PLSS:	T04S, R04W, Sec. 32 (S)	**Acres:**	0.0

Location: 3 MI WSW OF PERRIS

Detailed Location:

Ecological: SAGE SCRUB, DISTURBED GRASSLAND; SEVERAL ROCKY AREAS, SOME OUTCROPS; GENERALLY RUGGED BUT LEVEL ALONG WESTERN PERIMETER.

General: 8 ANIMALS RECORDED ON SITE.

Owner/Manager: BLM

Occurrence No.	78	**Map Index:**	20559	**EO Index:**	23974	**Element Last Seen:**	1989-08-11
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-16

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.75472 / -117.28928	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3734997 E473208	**Elevation (ft):**	1700
PLSS:	T05S, R04W, Sec. 10 (S)	**Acres:**	0.0

Location: 0.75 MILES WEST OF JUNCTION OF SHARP RD AND SPRING ST. SOUTHWEST OF PERRIS.

Detailed Location:

Ecological: GENTLY SLOPING TERRAIN WITH SEVERAL SMALL CANYONS. VEGETATION IS PRIMARILY SAGE SCRUB; SPARSE COVER OF NON-NATIVE GRASSES OCCURS IN INTER-SHRUB AND OPEN AREAS. SOILS: LOAMS AND TERRACE ESCARPEMENTS.

General: 2 ANIMALS RECORDED ON SITE.

Owner/Manager: PVT

Occurrence No.	80	**Map Index:**	20556	**EO Index:**	9300	**Element Last Seen:**	1989-07-12
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-07-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-16

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.77571 / -117.34455	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3737341 E468098	**Elevation (ft):**	2200
PLSS:	T04S, R04W, Sec. 31 (S)	**Acres:**	0.0

Location: 1.6 MI SE OF LAKE MATHEWS DR JCT WITH GAVILON RD; 5 MI W OF PERRIS.

Detailed Location:

Ecological: NON-NATIVE GRASSLAND SURROUNDED BY CHAMISE CHAPARRAL AND RIVERSIDIAN SAGE SCRUB. SOIL: PRIMARILY CAJALCO SERIES WITH INTERSPERSED FALLBROOK, GREENFIELD, LAS POSAS AND VISTA SERIES.

General: SKR DISTRIBUTED ALONG DIRT ROADS AND IN OPEN DISTURBED PATCHES. LOW/MEDIUM ABUNDANCE WITH ONE PATCH OF HIGH.

Owner/Manager: UNKNOWN

Occurrence No.	81	**Map Index:**	20560	**EO Index:**	9833	**Element Last Seen:**	1989-03-04
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-03-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-01-30

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81663 / -117.16303	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3741836 E484912	**Elevation (ft):**	1500
PLSS:	T04S, R03W, Sec. 14 (S)	**Acres:**	0.0

Location: ONE MI NORTH OF NUEVO ROAD JUNCTION WITH PICO AVENUE; ONE MI NW OF NUEVO.

Detailed Location:

Ecological: MOSTLY LEVEL TO GENTLY SLOPING TERRAIN WITH A SMALL ROCKY HILLSIDE ALONG SW PART OF SITE. MOST OF SITE SUBJECT TO DISKING. SOME HERBACEOUS COVER AND NON-NATIVE GRASSES; SOME DEGRADED RIPARIAN WOODLAND. SOIL: SANDY LOAMS AND SILTY CLAYS.

General: TWO ADULTS OBSERVED.

Owner/Manager: PVT

Occurrence No.	82	**Map Index:**	20359	**EO Index:**	9421	**Element Last Seen:**	1989-03-30
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-03-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-03-31

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82097 / -117.25522	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3742335 E476381	**Elevation (ft):**	1700
PLSS:	T04S, R04W, Sec. 13 (S)	**Acres:**	0.0

Location: 0.6 MI SOUTH OF RIDER ST. JCT WITH PATTERSON AVE.

Detailed Location: IDENTIFIED BY SKR DIAGNOSTIC SIGNS. NO INFORMATION ON NUMBERS.

Ecological: SPARSE ANNUAL GRASSES AND FORBS, ESP. ERODIUM SPP.

General: SITE ADJACENT TO UC MOTTE RIMROCK RESERVE COULD BECOME PART OF IT.

Owner/Manager: EASTERN MWD

Occurrence No.	87	**Map Index:**	20246	**EO Index:**	9440	**Element Last Seen:**	1988-98-12
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-11-14

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.87485 / -117.30405	**Accurracy:**	specific area
UTM:	Zone-11 N3748321 E471880	**Elevation (ft):**	1680
PLSS:	T03S, R04W, Sec. 28 (S)	**Acres:**	11.0

Location: 1.2 MILES SOUTHEAST OF JUNCTION OF VAN BUREN BLVD AND TRAUTWEIN ROAD.

Detailed Location: LOW ABUNDANCE OVER 2 ACRES

Ecological: MARCH AIR FORCE BASE, SITE CONTAINS OLD CONCRETE BUILDING FOUNDATION. MUCH OF SURROUNDING AREA IS DISKED. SOIL: MONSERATE. NON-NATIVE GRASSLAND.

General:

Owner/Manager: DOD-MARCH AFB

Occurrence No.	88	**Map Index:**	20453	**EO Index:**	9351	**Element Last Seen:**	1990-09-29
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-09-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97226 / -117.23018	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3759104 E478736	**Elevation (ft):**	2000
PLSS:	T02S, R03W, Sec. 30 (S)	**Acres:**	0.0

Location: 0.1 MI NE INDIAN ST. JCT WITH NECTAR AVE.

Detailed Location: 8 INDIVIDUALS REPORTED ON SITE.

Ecological: CHARACTERIZED BY HILLS & DRAINAGES. MESIC & XERIC TYPES OF COASTAL SAGE SCRUB ON HILLSIDES, MESIC ON NORTH-FACING & XERIC ON SOUTH-FACING. MESIC: ARTEMISIA TRIDENTATA, SAVIA MELLLIFERA, ERIUGONUM FASCICULATUM. XERIC: ENCILIA FARINOSA.

General:

Owner/Manager: PVT

Occurrence No.	89	**Map Index:**	20452	**EO Index:**	9352	**Element Last Seen:**	1988-08-14
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97498 / -117.20848	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3759401 E480741	**Elevation (ft):**	2300
PLSS:	T02S, R03W, Sec. 28 (S)	**Acres:**	58.0

Location: 1.5 MI. ENE INDIAN ST JCT. WITH NECTAR AVE.

Detailed Location: ABUNDANCE LOW WITH SMALL PATCHES OF MEDIUM OVER 50 ACRES. DISTRIBUTION CONCENTRATED ON HILLTOPS, RIDGES, SWALES.

Ecological: NON-NATIVE GRASSLAND. AREA SURROUNDED BY CHAMISE CHAPARRAL COVERED SLOPES AND DRAINAGES WITH RIPARIAN. SLOPE: 0-10%. SOIL: CIENEBA, GREENFIELD.

General:

Owner/Manager: UNKNOWN

Occurrence No.	90	**Map Index:**	20454	**EO Index:**	9350	**Element Last Seen:**	1988-08-14
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.95948 / -117.18405	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3757678 E482995	**Elevation (ft):**	2000
PLSS:	T02S, R03W, Sec. 34 (S)	**Acres:**	29.1

Location: 0.2 MI WNW LOCUST AVE. JCT. WITH HENDRICK RD. ABOUT 2.5 MILES ENE OF SUNNYMEAD.

Detailed Location: ABUNDANCE TRACE WITH PATCHES OF LOW, OVER 35 ACRES.

Ecological: NON-NATIVE GRASSSLAND BORDERED BY RIVERSIDIAN SAGE SCRUB. SLOPE: 0-10%, SOIL: GORGONIO, HANFORD, MONSERATE.

General:

Owner/Manager: UNKNOWN

Occurrence No.	91	**Map Index:**	20451	**EO Index:**	9353	**Element Last Seen:**	1988-08-14
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1992-04-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98459 / -117.19754	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3760464 E481754	**Elevation (ft):**	2500
PLSS:	T02S, R03W, Sec. 21 (S)	**Acres:**	343.5

Location: 2 MI NW LOCUST AVE JCT. WITH HENDRICK RD. NE OF SUNNYMEAD.

Detailed Location: LOW ABUNDANCE OVER 360 ACRES. DISTRIBUTION ON RIDGE TOPS AND IN SWALES. POPULATION IN THE SE QUARTER OF SEC 21 HAS BEEN EXTIRPATED BY RURAL HOUSING.

Ecological: NON-NATIVE GRASSLAND SURROUNDED BY CHAMISE CHAPARRAL. SLOPE: 0-40%. SOIL: CIENEBA, GREENFIELD, VISTA.

General:

Owner/Manager: UNKNOWN

Occurrence No.	92	**Map Index:**	20450	**EO Index:**	9354	**Element Last Seen:**	1988-08-14
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.99115 / -117.19544	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3761192 E481949	**Elevation (ft):**	2380
PLSS:	T02S, R03W, Sec. 16 (S)	**Acres:**	7.4

Location: 2.5 MI NNW OF LOCUST AVE JCT. WITH HENDRICK RD.

Detailed Location: MEDIUM ABUNDANCE OVER 1 ACRE.

Ecological: NON-NATIVE GRASSLAND. SLOPE: 0-20%. SOIL: CIENEBA, FALLBROOK, GREENFIELD, VISTA.

General:

Owner/Manager: UNKNOWN

Occurrence No.	93	**Map Index:**	20455	**EO Index:**	9355	**Element Last Seen:**	1989-08-30
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-10-27

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.92796 / -117.17825	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3754182 E483524	**Elevation (ft):**	1870
PLSS:	T03S, R03W, Sec. 10 (S)	**Acres:**	0.0

Location: DIRECTLY NW OF PETIT ST. JCT WITH COTTONWOOD AVE. SOUTH OF HWY 60, SOUTHEAST OF SUNNYMEAD.

Detailed Location: 5 INDIVIDUALS LOCATED ON SITE.

Ecological: STEEP ROCKY SLOPES TO GENTLY SLOPING TERRAIN. ROCKY OUTCROPS OCCUR IN THE WESTERN, EASTERN, AND SOUTHERN SECTIONS OF THE SITE. VEGETATION CONSISTS OF SAGE SCRUB AND DISTURBED GRASSLAND. LOAMY SOILS.

General: SITE IS ISOLATED. POPULATION IS SMALL.

Owner/Manager: PVT

Occurrence No.	95	**Map Index:**	20352	**EO Index:**	9431	**Element Last Seen:**	1984-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-08-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-10-27

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83227 / -117.36688	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3743619 E466052	**Elevation (ft):**	1500
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	0.0

Location: DIRECTLY SOUTH OF CAJALCO RD. JCT. WITH EL SOBRANTE RD.

Detailed Location:

Ecological: AGRICULTURE AND NON-NATIVE GRASSLAND.

General:

Owner/Manager: PVT

Occurrence No.	96	**Map Index:**	20357	**EO Index:**	9425	**Element Last Seen:**	1988-08-19
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-02

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79357 / -117.29154	**Accurracy:**	specific area
UTM:	Zone-11 N3739306 E473011	**Elevation (ft):**	2000
PLSS:	T04S, R04W, Sec. 27 (S)	**Acres:**	491.4

Location: 0.5 MI NNE OF SANTA ROSA RD. JCT. WITH POST RD. ABOUT 2 MI W OF PERRIS.

Detailed Location: TRACE DISTRIBUTION OVER 560 ACRES.

Ecological: NON-NATIVE GRASSLAND. SOIL: CIENEBA, ESCONDIDO, FRIANT, HANFORD, LODO, TEMESCAL, VISTA. SLOPE: 0-30%

General:

Owner/Manager: UNKNOWN

Occurrence No.	97	**Map Index:**	20351	**EO Index:**	9433	**Element Last Seen:**	1998-12-16
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-12-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2009-12-03

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84230 / -117.36675	**Accurracy:**	specific area
UTM:	Zone-11 N3744731 E466068	**Elevation (ft):**	1500
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	106.9

Location: JUST EAST OF LAKE MATTHEWS ECOLOGICAL RESERVE, SOUTH OF MOCKINGBRID CANYON, EL SOBRANTE.

Detailed Location: BOUNDED BY EL SOBRANTE & MOCKINGBIRD CANYON ROADS ON THE WEST, HARLEY JOHN ROAD TO THE EAST, & CAJALCO ROAD TO THE SOUTH.

Ecological: NON-NATIVE GRASSLAND W/SCATTERED RIVERSIDIAN SAGE SCRUB. SCATTERED JUNIPERUS CALIFORNICA IN E & SE. SLOPE: 0-25%. 1988: LOW & MED DENSITY (90 ACRES) THROUGHOUT WITH LARGE PATCHES OF TRACE DENSITY (30 ACRES), OVER AN AREA OF 120 ACRES.

General: 1988 REPORT DOES NOT SPECIFY HOW MANY OBSERVATIONS. 20 INDV'S TRAPPED 16 DEC '98 AT TRAP LINE 14, SOUTH END OF POLY. 2008 AERIAL IMAGERY SHOWS LIGHT RESIDENTIAL DEVELOPMENT IN N POLYGON, WITH RELATIVELY UNDISTURBED HABITAT IN S 1/2 OF POLY.

Owner/Manager: PVT

Occurrence No.	98	**Map Index:**	20350	**EO Index:**	9432	**Element Last Seen:**	1999-06-24
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-08-25

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84885 / -117.34786	**Accurracy:**	specific area
UTM:	Zone-11 N3745451 E467818	**Elevation (ft):**	1600
PLSS:	T04S, R05W, Sec. 01 (S)	**Acres:**	158.0

Location: ABOUT 1.25 MI SW OF JCT OF OLEANDER AVE AND WOOD ROAD.

Detailed Location: MEDIUM DENSITY WITH PATCHES OF LOW DENSITY OVER 180 ACRES. AREA TO SOUTH WOULD BE SUITABLE WITH REMOVAL OF SOME COVER. 1999 LOCATION GIVEN AS T4S R5W SEC 1, "17-ACRE OUTLET TOWER LANDS".

Ecological: NON-NATIVE GRASSLAND, RIVERSIDIAN SAGE SCRUB AND UNVEGETATED SANDY LOAMS. SOIL: ARLINGTON, BUREN, CIENEBA, ESCONDIDO, FALLBROOK, HANFORD, VISTA. SLOPE: 0-30%

General: 24 JUN 1999: 6 ADULTS DETECTED/OBSERVED.

Owner/Manager: UNKNOWN

Occurrence No.	99	**Map Index:**	20349	**EO Index:**	9434	**Element Last Seen:**	1988-08-12
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1996-01-02

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.85534 / -117.37118	**Accurracy:**	specific area
UTM:	Zone-11 N3746178 E465664	**Elevation (ft):**	1400
PLSS:	T04S, R05W, Sec. 02 (S)	**Acres:**	82.0

Location: 0.6 MI N EL SOBRANTE RD. JCT. WITH MOCKINGBIRD CANYON RD.

Detailed Location: LOW DENSITY OVER 80 ACRES.

Ecological: NON-NATIVE GRASSLAND WITH SCATTERED RIVERSIDIAN SAGE SCRUB. SOIL: BUREN CIENEBA, ESCONDIDO, HANFORD, VISTA. SLOPE: 0-15%

General:

Owner/Manager: PVT

Occurrence No.	100	**Map Index:**	20348	**EO Index:**	9436	**Element Last Seen:**	1988-08-19
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-02

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.86692 / -117.36344	**Accurracy:**	specific area
UTM:	Zone-11 N3747460 E466384	**Elevation (ft):**	1600
PLSS:	T03S, R05W, Sec. 36 (S)	**Acres:**	15.5

Location: 1.6 MI NNE OF EL SOBRANTE RD. JCT. WITH MOCKINGBIRD CANYON RD.

Detailed Location: LOW DISTRIBUTION ALONG ROADS AND IN OPEN AREAS OVER 20 ACRES.

Ecological: NON-NATIVE GRASSLAND SURROUNDED BY RIVERSIDIAN SAGE SCRUB ON NORTH AND ORCHARD ON REMAINING SIDES. SOIL: CIENEBA, FALLBROOK. SLOPE: 0-35%

General:

Owner/Manager: UNKNOWN

Occurrence No.	101	**Map Index:**	20355	**EO Index:**	9427	**Element Last Seen:**	1990-07-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-10-27

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78232 / -117.35820	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3738078 E466836	**Elevation (ft):**	2250
PLSS:	T04S, R05W, Sec. 36 (S)	**Acres:**	143.6

Location: 0.5 MI S GAVILAN RD. JCT. WITH MATTEWS DRIVE

Detailed Location: LOW DENSITY FOUND OUTSIDE OF PLOW LINE ON OPEN DISTURBED GROUND, GENERALLY ADJACENT TO BUT NOT WITHIN CHAPARRAL.

Ecological: MIXED, MOSAIC OF DENSE CHAPARRAL AND PLOWED FIELDS.

General:

Owner/Manager: PVT

Occurrence No.	102	**Map Index:**	20356	**EO Index:**	9426	**Element Last Seen:**	1988-08-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-02

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78023 / -117.33660	**Accurracy:**	specific area
UTM:	Zone-11 N3737839 E468835	**Elevation (ft):**	2250
PLSS:	T04S, R04W, Sec. 31 (S)	**Acres:**	53.5

Location: 1.6 MI SE OF GAVILAN RD. JCT. WITH SANTA ROSA ROAD.

Detailed Location: 60 ACRES OF MEDIUM ABUNDANCE AND 20 ACRES OF TRACE.

Ecological: NON-NATIVE GRASSLAND. SOIL: CIENEBA, FALLBROOK, VISTA. SLOPE: 0-5%

General:

Owner/Manager: UNKNOWN

Occurrence No.	116	**Map Index:**	20486	**EO Index:**	9293	**Element Last Seen:**	1990-03-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: Beaumont (3311688), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.93740 / -117.00319	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3755215 E499705	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 05 (S)	**Acres:**	114.5

Location: 0.3 MI SOUTH OF SAN TIMOTEO CANYON RD. JCT. WITH I-10 AND NORTH OF HWY 60.

Detailed Location:

Ecological: HEAVILY GRAZED FIELDS OCCUPIED PRIMARILY BY NON-NATIVE ANNUAL GRASSES AND FORBS WITH OCCASIONAL REINVASIVE ERIOGONUM FASCICULATUM. SHEEP GRAZING SUSTAINS SPARSE VEGETATION.

General: SITE IS ISOLATED BY SR-60 AND I-10 FROM OTHER POPULATIONS.

Owner/Manager: PVT

Occurrence No.	117	**Map Index:**	20485	**EO Index:**	9360	**Element Last Seen:**	1989-12-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-12-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90315 / -117.00615	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3751417 E499431	**Elevation (ft):**	2500
PLSS:	T03S, R01W, Sec. 17 (S)	**Acres:**	117.3

Location: 2.2 MI S OF SAN TIMOTEO CANYON RD JCT. WITH I-10

Detailed Location: LOW ABUNDANCE OVER 110 ACRES.

Ecological: NON-NATIVE GRASSLAND WITH SCATTERED RIVERSIDIAN SAGE SCRUB AT THE SOUTH. SOIL: CIENEBA, RAMONA, SAN TIMOTEO, VISTA. SLOPE: 0-5%.

General:

Owner/Manager: PVT

Occurrence No.	118	**Map Index:**	20487	**EO Index:**	9366	**Element Last Seen:**	1989-08-31
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-04-14

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86164 / -117.00225	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3746815 E499791	**Elevation (ft):**	2000
PLSS:	T03S, R01W, Sec. 32 (S)	**Acres:**	0.0

Location: EAST OF HWY 79. 3 MI N OF SANDERSON AVE. JCT. WITH MEAD RD.

Detailed Location: HIGH QUALITY HABITAT IN EXTREME SE CORNER. LIMITED IN AREA ALONG RIDGELINE. 2 INDIVIDUALS FOUND.

Ecological: STEEP CANYONS AND SLOPES WITH ROUNDED RIDGES; SAGE SCRUB WITH SOME DENSE CAHPARRAL STANDS. BURNED IN SEVERAL AREAS.

General:

Owner/Manager: BLM

Occurrence No.	119	**Map Index:**	20484	**EO Index:**	9362	**Element Last Seen:**	1990-07-26
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-02-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-24

Quad Summary: El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.91616 / -117.11801	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3752866 E489091	**Elevation (ft):**	1560
PLSS:	T03S, R02W, Sec. 17 (S)	**Acres:**	156.8

Location: 1.5 MILES SOUTH OF HIGHWAY 60 AND GILMAN SPRINGS ROAD, ~2 MILES EAST OF MORENO, NORTH OF THE SAN JACINTO WILDLIFE AREA.

Detailed Location: LOW DENSITY. 1991 NE CORNER SEC 18 PIPELINE SURVEY.

Ecological: ABANDONED DAIRY OPERATION. RUDERAL FIELDS. DISTURBED, WEEDY VEGETATION; DOMINATED BY CHEESEWEED, RUSSIAN-THISTLE, RED BROME, RED-STEMMED FILAREE. SOILS ARE SILTY: SAN EMIGDIO FINE SANDY LOAM. SITE IS FLAT.

General: THE AREA IS PART OF SAN JACINTO WILDLIFE AREA SKR STUDY AREA. BEING CONSIDERED FOR DEVELOPMENT UNDER SECTION 10(A) PERMIT AND REMOVAL FROM SKR STUDY AREA. 33 BURROWS OBSERVED AT 4 POINTS IN SAMPLE AREA, 1991. NO K-RATS FOUND 1993

Owner/Manager: PVT

Occurrence No.	120	**Map Index:**	20483	**EO Index:**	19401	**Element Last Seen:**	1990-07-26
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-05-29

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92786 / -117.11783	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3754163 E489109	**Elevation (ft):**	1800
PLSS:	T03S, R02W, Sec. 08 (S)	**Acres:**	20.4

Location: 1 MI NW OF ALESSANDRO BLVD. JCT. WITH GILMAN SPRINGS RD. WESTERN SLOPE OF THE BADLANDS.

Detailed Location: LOW DENSITY.

Ecological: DISTURBED WEEDY VEGETATION; DOMINATED BY CHEESEWEED, RUSSIAN-THISTLE, RED BROME, RED-STEMMED FILAREE. SOIL: SAN EMIDGIO FINE SANDY LOAM.

General: NE OF SAN JACINTO WILDLIFE AREA.

Owner/Manager: PVT

Occurrence No.	121	**Map Index:**	20488	**EO Index:**	9295	**Element Last Seen:**	2004-08-18
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-08-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-09

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90922 / -117.31416	**Accurracy:**	specific area
UTM:	Zone-11 N3752135 E470956	**Elevation (ft):**	1500
PLSS:	T03S, R04W, Sec. 17 (S)	**Acres:**	19.0

Location: JUST SOUTH OF ALESSANDRO BLVD AT BARTON STREET, WEST OF I-215 (ESCONDIDO FWY), NORTH OF GROVE COMMUNITY DR.

Detailed Location: MARCH STEPHENS' KANGAROO RAT PRESERVE, FORMERLY PART OF MARCH AIR RESERVE BASE. AREA LIES ALONG BOTH SIDES OF BARTON STREET, NORTHEAST OF KENNEDY DRIVE.

Ecological: ACTIVE DRY FARMED AGRICULTURAL FIELDS WITH RIPARIAN IN DRAINAGES AND ISOLATED RIVERSIDEAN SAGE SCRUB REMNANTS.

General: 1988: ISOLATED POPULATION FOUND OUTSIDE OF ORIGINAL PROJECT BOUNDARY. 1 TRAPPED 31 MAR 2004. 51 TRAPPED AND RELEASED BETWEEN 5-10 APR 2004. 131 INDIVIDUALS TRAPPED AND RELEASED BETWEEN 13-18 AUG 2004.

Owner/Manager: CENTER FOR NATURAL LANDS MGMT

Occurrence No.	128	**Map Index:**	20970	**EO Index:**	9224	**Element Last Seen:**	1990-08-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-08-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-05-01

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.74924 / -117.26652	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3734384 E475315	**Elevation (ft):**	1600
PLSS:	T05S, R04W, Sec. 11 (S)	**Acres:**	0.0

Location: JUST EAST OF HWY 74 ABOUT 2 MILES NORTH OF RAILROAD CANYON RESERVOIR.

Detailed Location: 8 INDIVIDUALS FOUND.

Ecological: CHAPARRAL AND SAGE SCRUB WITH ANNUAL GRASSLANDS ON RIDGETOPS.

General:

Owner/Manager: PVT

Occurrence No.	141	**Map Index:**	20987	**EO Index:**	9169	**Element Last Seen:**	1989-08-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-05-01

Quad Summary: Romoland (3311762), Lake Elsinore (3311763), Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.74909 / -117.24608	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3734363 E477208	**Elevation (ft):**	1500
PLSS:	T05S, R04W, Sec. 12 (S)	**Acres:**	0.0

Location: 3.5 MILES E OF ROMOLAND.

Detailed Location: 6 INDIVIDUALS FOUND. K-RATS OCCUR THROUGHOUT THE PROPERTY.

Ecological: FLAT TO GENTLY ROLLING HILLS WITH NON-NATIVE GRASSLANDS AND SAGE SCRUB. SOME EUCALYPTUS GROVES. SOILS ARE LOAMY.

General:

Owner/Manager: PVT

Occurrence No.	166	**Map Index:**	21103	**EO Index:**	9118	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-08-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-07-23

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.02218 / -117.27450	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3764649 E474657	**Elevation (ft):**	1400
PLSS:	T02S, R04W, Sec. 02 (S)	**Acres:**	0.0

Location: ALONG RECHE CANYON ROAD, ABOUT 3 MILES SE OF JUNCTION OF I-215 AND I-10, SSW OF LOMA LINDA.

Detailed Location: PREVIOUS LOCATION DESCRIPTION WAS "3 MILES SE OF JUNCTION OF I-15E AND I-10."

Ecological:

General: ORIGINAL SOURCE: GRINNELL (1922).

Owner/Manager: UNKNOWN

Occurrence No.	167	**Map Index:**	21101	**EO Index:**	9117	**Element Last Seen:**	1976-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-09-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-05-18

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01725 / -117.21308	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3764089 E480326	**Elevation (ft):**	1750
PLSS:	T02S, R03W, Sec. 08 (S)	**Acres:**	0.0

Location: HILLS SOUTHWEST OF REDLANDS.

Detailed Location: EXTIRPATED

Ecological:

General:

Owner/Manager: UNKNOWN

Occurrence No.	168	**Map Index:**	21102	**EO Index:**	9116	**Element Last Seen:**	1988-08-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-08-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-05-18

Quad Summary: Redlands (3411712)

County Summary: Riverside

Lat/Long:	34.00953 / -117.24494	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3763239 E477382	**Elevation (ft):**	1700
PLSS:	T02S, R04W, Sec. 12 (S)	**Acres:**	14.1

Location: HILLS SOUTHWEST OF REDLANDS. ABOUT 3.5 MILES SOUTH OF I-10.

Detailed Location: TRACE ABUNDANCE OVER ABOUT 12 ACRES.

Ecological: NON-NATIVE GRASSLAND. SLOPE: 0-20%. SOIL: MONSERATE.

General:

Owner/Manager: UNKNOWN

Occurrence No.	189	**Map Index:**	21200	**EO Index:**	18620	**Element Last Seen:**	1988-09-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-06-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81375 / -117.17861	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3741519 E483469	**Elevation (ft):**	1580
PLSS:	T04S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: 0.3 MILES SE OF ORANGE AVE. JCT. WITH FOOTHILL AVE. ABOUT 3 MILES NE OF PERRIS & ABOUT 2 MILES S OF PERRIS RESERVOIR.

Detailed Location: 20 ACRES OF TRACE DISTRIBUTION IN SMALL DISJUNCT PATCHES.

Ecological: NON-NATIVE GRASSLAND AT BASE OF ROCKY SLOPES COVERED BY RIVERSIDIAN SAGE SCRUB. SLOPE: 0-20%. SOIL: HANFORD, VISTA.

General:

Owner/Manager: UNKNOWN

Occurrence No.	190	**Map Index:**	21201	**EO Index:**	17712	**Element Last Seen:**	1988-09-18
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-06-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76837 / -117.13518	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3736482 E487482	**Elevation (ft):**	1850
PLSS:	T05S, R02W, Sec. 06 (S)	**Acres:**	6.4

Location: 1.3 MILES NE OF MAPES ROAD JCT WITH MENIFEE ROAD; 5 MILES E OF PERRIS.

Detailed Location: ABOUT 10 ACRES OF TRACE ABUNDANCE.

Ecological: NON-NATIVE GRASSLAND AT BASE OF ROCKY STEEP SLOPES COVERED BY RIVERSIDIAN SAGE SCRUB. SLOPE: 0-10%. SOIL: CIENEBA, HANFORD.

General:

Owner/Manager: UNKNOWN

Occurrence No.	191	**Map Index:**	21199	**EO Index:**	18106	**Element Last Seen:**	1988-09-18
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-06-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76279 / -117.14392	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3735864 E486672	**Elevation (ft):**	1610
PLSS:	T05S, R03W, Sec. 01 (S)	**Acres:**	0.0

Location: 0.5 MILES NW OF MAPES ROAD JCT. WITH BRIGGS ROAD; 5 MILES ESE OF PERRIS.

Detailed Location: EXTIRPATED

Ecological: NON-NATVIE GRASSLAND WITH SCATTERED RIVERSIDIAN SAGE SCRUB.

General: REPORTED HERE BY LEPRE IN 1983.

Owner/Manager: UNKNOWN

Occurrence No.	192	**Map Index:**	21198	**EO Index:**	26959	**Element Last Seen:**	1990-07-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-06-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.75368 / -117.23851	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3734870 E477910	**Elevation (ft):**	1440
PLSS:	T05S, R03W, Sec. 07 (S)	**Acres:**	0.0

Location: 0.8 MILES WSW OF MAPES ROAD JCT WITH GOETZ ROAD; 1.5 MILES SOUTH OF PERRIS.

Detailed Location:

Ecological: SITE FORMERLY IN RIVERSIDIAN SAGE SCRUB BUT NOW HEAVILY DISTURBED AND MOST SHRUBS EXTIRPATED. SPARSE COVER OF ANNUAL GRASSES AND FORBS.

General:

Owner/Manager: UNKNOWN

Occurrence No.	193	**Map Index:**	21207	**EO Index:**	14874	**Element Last Seen:**	1991-01-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-01-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-10-27

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83955 / -117.34812	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744420 E467791	**Elevation (ft):**	1700
PLSS:	T04S, R05W, Sec. 12 (S)	**Acres:**	54.7

Location: 0.7 MILES NE OF CAJALCO ROAD JCT. WITH GAVILAN RD.

Detailed Location: APPROXIMATELY 50 INDIVIDUALS. SURROUNDING AREAS REPORT MEDIUM TO LOW DENSITIES.

Ecological: SITE IS FLAT, HEAVILY DISTURBED ABANDONED FIELDS, APPARENTLY SUBJECT TO HEAVY GRAZING. NORTHERN SECTION OF SITE IS HILLY, ROCKY, DISTURBED RIVERSIDEAN SAGE SCRUB.

General: THIS AREA MAY REPRESENT AN EXTENSION OF THE NORTHERN POPULATION AND MAY INDICATE A LARGE AREA OF CONTIGUOUS HABITAT.

Owner/Manager: PVT

Occurrence No.	198	**Map Index:**	38388	**EO Index:**	33395	**Element Last Seen:**	1994-11-30
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-11-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-17

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78671 / -117.34499	**Accurracy:**	80 meters
UTM:	Zone-11 N3738560 E468061	**Elevation (ft):**	2160
PLSS:	T04S, R04W, Sec. 30 (S)	**Acres:**	0.0

Location: HALL PROPERTY,EAST OF PIEDRAS ROAD, 0.35 MILE SOUTH OF SANTA ROSA ROAD AND 3.5 MILES NORTHWEST OF STEELE PEAK.

Detailed Location: NORTHWEST CORNER OF THE PROPERTY, AREA TO THE WEST AND NORTHWEST HAS THE HIGHEST POTENTIAL FOR OTHER SKR.

Ecological: LEVEL TO GENTLY SLOPING LAND WITH A VARIETY OF LOAM SOILS. CHAMISE CHAPARRAL IS DOMINANT VEGETATION TYPE WITH RUDERAL DISTURBED GRASSLAND A SECONDARY TYPE AND WHERE THE SKR WAS FOUND.

General: 1 FEMALE ADULT CAPTURED, 1994.

Owner/Manager: PVT

Occurrence No.	200	**Map Index:**	38668	**EO Index:**	33675	**Element Last Seen:**	1992-10-30
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-10-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-17

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.86915 / -117.30816	**Accurracy:**	specific area
UTM:	Zone-11 N3747690 E471498	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 33 (S)	**Acres:**	25.4

Location: MARCH AFB, 0.25 MILES NNE OF INTERSECTION OF BARTON ST & NANDINA AVE, 0.4 MILE SW OF BARTON ST & MARIPOSA AVE.

Detailed Location: STEPHENS' K-RATS WERE FOUND IN ALL SECTIONS OF THE BASE COVERED BY THE SURVEY. SITE 1; DENSITY AT THIS SITE ESTIMATED AT 6 K-RATS PER HECTARE.

Ecological: EXTENSIVE AREA OF DISTURBED GRASSLAND: BROMUS SP., AVENA SP., ERODIUM CICUTARIUM, CRETHROGYNE FILAGINIFOLIA, HEMIZONIA SP., TRICHOSTEMA LANCEOLATUM, BRASSICA GENICULATA, EREMOCARPUS SETIGERUS. TOPOGRAPHY IS LEVEL TO GENTLY SLOPING.

General: 3 CAPTURED OCT 28-30 1992, 1 MALE & 1 FEMALE ADULT, & 1 JUVENILE FEMALE.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	208	**Map Index:**	55484	**EO Index:**	55484	**Element Last Seen:**	2003-08-06
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-08-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-05-13

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89794 / -117.02770	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3750840 E497438	**Elevation (ft):**	2000
PLSS:	T03S, R01W, Sec. 19 (S)	**Acres:**	0.0

Location: EAST SIDE OF LABORDE CANYON, 3.5 MILES SW OF BEAUMONT

Detailed Location:

Ecological: HABITAT CONSISTS OF NON-NATIVE (ANNUAL) GRASSLAND, DOMINATED BY BROMES. CHAMISE FORMS THE DOMINANT OVERSTORY IN THE SOUTHERN HALF OF THE TRAPLINE. WHIPPLE'S YUCCA IS COMMON ALONG THE NORTHERN HALF OF THE TRAPLINE.

General: IN AUG 2003, 3 ADULTS WERE CAPTURED (POSSIBLY 2 WERE RECAPTURES, AS ALL CAPTURES WERE AT THE SAME TRAP).

Owner/Manager: PVT-LOCKHEED CORP

Occurrence No.	215	**Map Index:**	55804	**EO Index:**	55820	**Element Last Seen:**	1993-08-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-08-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-14

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.86964 / -117.28290	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3747738 E473834	**Elevation (ft):**	1700
PLSS:	T03S, R04W, Sec. 34 (S)	**Acres:**	159.0

Location: RIVERSIDE NATIONAL CEMETERY, MARCH AIR FORCE BASE

Detailed Location:

Ecological:

General: 1 MALE CAPTURED/RELEASED, 10-12 AUG 1993; 2 MALES/1 FEMALE CAPTURED/RELEASED ON 8-10 NOV 1993.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	221	**Map Index:**	55852	**EO Index:**	55868	**Element Last Seen:**	1999-09-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-09-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-21

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.91788 / -117.05807	**Accurracy:**	80 meters
UTM:	Zone-11 N3753052 E494632	**Elevation (ft):**	1835
PLSS:	T03S, R02W, Sec. 11 (S)	**Acres:**	0.0

Location: WEST SIDE OF JACKRABBIT TRAIL, SOUTH OF HIGHWAY 60, IN THE BADLANDS AREA OF RIVERSIDE COUNTY.

Detailed Location: SPARSE SKR DISTRIBUTION WAS FOUND ALONG THE DRAINAGE EDGES, EXTENDING UP SLOPES; DISTRIBUTION WAS RESTRICTED TO GENTLER SLOPES.

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND, RESULTING FROM A MASSIVE REGIONAL FIRE.

General: 22 SEP 1999: PATCHY SKR OCCUPATION OCCURS THROUGHOUT THE AREA, PRIMARILY RESTRICTED TO DRAINAGE BOTTOMS; OCCUPATION IS PRIMARILY THAT OF TRANSIENT INDIVIDUALS RATHER THAN THAT OF PERMANENT RESIDENTS.

Owner/Manager: UNKNOWN

Occurrence No.	222	**Map Index:**	63131	**EO Index:**	63223	**Element Last Seen:**	1992-10-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-10-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-01-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88453 / -117.29880	**Accurracy:**	specific area
UTM:	Zone-11 N3749393 E472368	**Elevation (ft):**	1680
PLSS:	T03S, R04W, Sec. 28 (S)	**Acres:**	22.5

Location: ALONG DRAINAGE SOUTH OF VAN BUREN BLVD, APPROXIMATELY 1 MILE WSW OF ARNOLD HEIGHTS, MARCH AFB.

Detailed Location: STUDY AREA 4.

Ecological: NARROW BAND OF WILLOW RIPARIAN WOODLAND IN NATURAL DRAINAGE SURROUNDED BY DIST GRASSLAND, SCATTERED PATCHES OF SAGE SCRUB. TREE CANOPY BROKEN/SPARSE AT SOME LOCATIONS, SMALL STANDS OF CATTAILS PRESENT. TOPOGRAPHY: LEVEL TO SLIGHTLY SLOPING.

General: 2 ADULT MALES CAPTURED AND RELEASED ON 28-29 OCT 1992.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	230	**Map Index:**	77392	**EO Index:**	78301	**Element Last Seen:**	1998-06-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-11-24

Quad Summary: Winchester (3311761), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.75129 / -117.10774	**Accurracy:**	specific area
UTM:	Zone-11 N3734585 E490020	**Elevation (ft):**	
PLSS:	T05S, R02W, Sec. 08 (S)	**Acres:**	143.0

Location: EAST OF JUPITER FLAT AND WATSON ROAD INTERSECTION, SW SIDE OF LAKEVIEW MOUNTAINS, 0.3 MILES N FROM THE TOWN OF HOMELAND.

Detailed Location: SEA VIEW/WATSON ROADS RUN THROUGH PLOT. MAPPED ACCORDING TO MAP PROVIDED.

Ecological: DISTURBED RIVERSIDEAN SAGE SCRUB AND ANNUAL GRASSLAND DOMINATED BY ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, BRASSICA NIGRA, AVENA BARBATA, BROMUS MADRITENSIS, & AMSINCKIA MENZIESII. SOILS: ROCKY, SANDY LOAMS. SITE BURNED IN 1997.

General: 4 ADULTS RECORDED 23 JUNE 1998.

Owner/Manager: PVT

Occurrence No.	231	**Map Index:**	77430	**EO Index:**	78334	**Element Last Seen:**	2004-08-18
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-08-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-20

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90350 / -117.31295	**Accurracy:**	specific area
UTM:	Zone-11 N3751500 E471066	**Elevation (ft):**	1
PLSS:	T03S, R04W, Sec. 16 (S)	**Acres:**	15.0

Location: SSE OF ALESSANDRO BLVD & BARTON ST, 1.9 MI W OF I-215 (ESCONDIDO FWY) & INTERCHANGE 27A, 1.9 MI NW OF ARNOLD HEIGHTS.

Detailed Location: AREA LIES EAST OF BARTON STREET, AND TO THE NORTH OF KENNEDY DRIVE. MARCH STEPHENS' KANGAROO RAT PRESERVE (FORMERLY PART OF MARCH AFB). MAPPED ACCORDING TO COORDINATES PROVIDED.

Ecological: NON-NATIVE FORBS AND ANNUAL GRASSES INCLUDING ERIODONUM SP., BROMUS MADRITENSIS, B. DIANDRUS, HORDEUM PUSILLUM, VULPIA MYUROS, AND SCHISMUS BARBATUS. WAS A WILDLIFE PRESERVE @ TIME OF SURVEY, SURROUNDED BY URBANIZATION.

General: 22 ADULTS AND 4 JUV'S CAPTURED BETWEEN 24-29 MAR 2004. 29 ADULTS & 1 JUV CAPTURED BETWEEN 5-10 APR 2004. 32 ADULTS CAPTURED 5-10 AUG '04. 14 ADULTS & 1 JUV CAPTURED 13-18 AUG '04.

Owner/Manager: MARCH JPA

Occurrence No.	239	**Map Index:**	77792	**EO Index:**	78694	**Element Last Seen:**	2004-08-18
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-08-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-13

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.91174 / -117.29243	**Accurracy:**	specific area
UTM:	Zone-11 N3752409 E472965	**Elevation (ft):**	1575
PLSS:	T03S, R04W, Sec. 15 (S)	**Acres:**	386.0

Location: SW CORNER OF I-215 (ESCONDIDO FWY) & ALESSANDRO BLVD INTERSECTION. MARCH STEPHENS' KANGAROO RAT PRESERVE.

Detailed Location: POLYGON MAPPED ACCORDING TO MAP PROVIDED. 1992: SITE 6

Ecological: HABITAT IS ANNUAL GRASSLAND/RIVERSIDEAN COASTAL SAGE SCRUB. LEVEL TO GENTLY ROLLING TOPOGRAPHY. 2004: WAS A WILDLIFE PRESERVE AT TIME OF STUDY, SURROUNDED BY URBANIZATION. TO BE DEVELOPED AS LIGHT INDUSTRIAL.

General: 8 SKR'S TRAPPED IN SEC 15 DURING 450 TRAP NIGHTS IN MAR 1983. SPECIES FOUND 15 AUG '88 IN LOW-MED ABUNDANCE. 14 ADULT FEMALES, 10 ADULT MALES, 1 JF & 1 JM CAPT 13-15 OCT '92. 1 ADULT 5-10 APR 2004. 4 ADULTS 13-18 AUG 2004.

Owner/Manager: MARCH JPA

Occurrence No.	240	**Map Index:**	77793	**EO Index:**	78695	**Element Last Seen:**	1988-03-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1988-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2010-01-12

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94427 / -117.30192	**Accurracy:**	specific area
UTM:	Zone-11 N3756017 E472099	**Elevation (ft):**	1528
PLSS:	T03S, R04W, Sec. 04 (S)	**Acres:**	33.0

Location: E OF SYCAMORE CANYON, W OF ESCONDIDO FWY (I-215) & MORENO VALLEY FWY (SR 60) JCT, 0.3 MI W FROM THE TOWN OF BOX SPRINGS.

Detailed Location: BOUNDED BY SYCAMORE CANYON BLVD TO EAST & FAIR ISLE DRIVE ON THE NORTHWEST. FSF GIVES LOCATION AS SW 1/4 OF SEC 33. POLYGON MAPPED ACCORDING TO MAP PROVIDED.

Ecological: 1988: AREA PROPOSED FOR DEVELOPMENT.

General: SPECIES FOUND HERE IN 1988 DURING TRAPPING SURVEY. 2008: AERIAL IMAGERY SHOWS SITE AS COMPLETELY DEVELOPED AS HOUSING AND SPECIES EXTIRPATED FROM SITE.

Owner/Manager: PVT

Occurrence No.	241	**Map Index:**	77794	**EO Index:**	78696	**Element Last Seen:**	1989-07-30
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-07-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-11

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95338 / -117.29720	**Accuracy:**	specific area
UTM:	Zone-11 N3757026 E472538	**Elevation (ft):**	1575
PLSS:	T02S, R04W, Sec. 33 (S)	**Acres:**	73.0

Location: ALONG WEST & EAST SIDE OF MORTON ROAD, 0.3 MILES NORTH FROM THE TOWN OF BOX SPRINGS, 2 MILES SE FROM UC RIVERSIDE.

Detailed Location: MAPPED ACCORDING TO MAP AND QUADS GIVEN.

Ecological: TOPOGRAPHY SLOPING TO LEVEL. DOMINANT VEGETATION INCLUDES SEVERAL NON-NATIVE GRASSES & FALLOW AGRICULTURAL FIELDS. SOILS CONSIST OF SANDY LOAMS. PORTION USED TO BE OLD CHRISTMAS TREE FARM.

General: SPECIES FOUND ON 15 AUG 1988 DURING POPULATION ASSESSMENT. SIGNS OBS 12 JUN 1989 IN NE SECTION. 3 INDIVIDUALS TRAPPED IN NE SECTION ON 30 JUL 1989.

Owner/Manager: UNKNOWN

Occurrence No.	245	**Map Index:**	78175	**EO Index:**	79076	**Element Last Seen:**	1989-01-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1989-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-23

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90581 / -117.32935	**Accuracy:**	specific area
UTM:	Zone-11 N3751762 E469550	**Elevation (ft):**	1556
PLSS:	T03S, R04W, Sec. 17 (S)	**Acres:**	69.0

Location: TRAUTWEIN RD & JOHN F. KENNEDY DR, 1.6 MI SW FROM SYCAMORE CANYON ECOLOGICAL RESERVE, 3 MI W FROM TOWN OF WEST MARCH.

Detailed Location: MAPPED ACCORDING TO MAP PROVIDED.

Ecological: 1988: ACTIVE, DRY FARMED AG FIELDS W/RIPARIAN IN DRAINAGES & ISOLATED RIVERSIDIAN SAGE SCRUB REMNANTS. LOW TO HIGH ABUNDANCE OF SKR. NOT RECOMMENDED FOR PROTECTION AS TOO CLOSE TO URBAN LEVELS OF DEVELOPMENT, NO LINKAGE TO POLYGON TO NW.

General: POLYGON WAS ONCE PART OF OCC #69 LOCATED TO THE NW. PREVIOUS NOTES STATED THIS POLYGON IS IN DANGER OF BEING SEPARATED FROM INTERACTION (BREEDING) W/THE MAIN POPULATION. 2009: AERIAL IMAGERY SHOWS AREA DEVELOPED & SPECIES LIKELY EXTIRPATED.

Owner/Manager: CITY OF RIVERSIDE, PVT

Dipodomys merriami parvus

Element Code: AMAFD03143

San Bernardino kangaroo rat

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G5T1
	State:	None		**State:**	S1
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	ALLUVIAL SCRUB VEGETATION ON SANDY LOAM SUBSTRATES CHARACTERISTIC OF ALLUVIAL FANS AND FLOOD PLAINS.			
	Micro:	NEEDS EARLY TO INTERMEDIATE SERAL STAGES.			

*** SENSITIVE ***

Occurrence No.	1	**Map Index:** 37999	**EO Index:**	33006		**Element Last Seen:**	1993-07-28
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1993-07-28
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1998-01-29

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accuracy:**	1/10 mile
UTM:		**Elevation (ft):**	1030
PLSS:		**Acres:**	0.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT CONSISTS OF DISTURBED ALLUVIAL SCRUB, DOMINATED BY ERIOGONUM FASCICULATUM, LOTUS SCOPARIUS, AND HETEROTHECA SESSIFLORA; SOUTHERN WILLOW SCRUB DOMINATED BY SALIX EXIGUA, BACCHARIS SALICIFOLIA, TAMARIX SP, AND POPULUS FREMONTII.

General:

Owner/Manager:

Occurrence No.	3	**Map Index:** 44875	**EO Index:**	44875		**Element Last Seen:**	2006-10-18
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2006-10-18
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-08-30

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09392 / -117.19159	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3772586 E482326	**Elevation (ft):**	1190
PLSS:	T01S, R03W, Sec. 09 (S)	**Acres:**	1187.0

Location: SANTA ANA WASH, BETWEEN THE SAN BERNARDINO INT'L AIRPORT & CHURCH ST, N TO FIFTH STREET. 3.5 MI NW FROM TOWN OF MENTONE.

Detailed Location: 1993 LOCATION, "THE SANTA ANA RIVER WASH, REDLANDS". 1998 & 2002, FIFTH ST PROJECT. 2002 AROUND ROBERT'S READY MIX. 2005, S OF NORTON AFB. 2000 & 2006, ALABAMA & ORANGE ST PROJECT, 22 ADULTS TRAPPED, 2006 - RELOCATED OUTSIDE FENCED AREA.

Ecological: SOILS MOSTLY SANDY WITH INTERMIXED RIVERWASH. DISTURBED PIONEER ALLUVIAL FAN SAGE SCRUB; ERIOGONUM FASCICULATUM, HEMIZONIA SQUARROSA, NICOTIANNA GLAUCA, OENOTHERA CALIFORNICA, SALIX LASIOLEPIS, BACCHARIS SALICIFOLIA.

General: 2 COLL, BOTH TO SBCM, 1991. 3 COL '93 (MVZ #182964-182966). 8 IN '98. 2 COL, 2000. 22+ COL FOR LACM 7 JUN-18 AUG '02. 117 CAP, 26 TRAPLINES '02. 4 CAP '02. 1 OBS '04. 22 CAP '05. 22 ADULTS '06. 5 CAPT BETWEEN THIS OCC & OCC #10 18 OCT '06.

Owner/Manager: PVT, CITY OF HIGHLAND, SBD FC

Occurrence No.	10	**Map Index:**	45091	**EO Index:**	45091	**Element Last Seen:**	2006-10-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-10-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-01

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09514 / -117.14424	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3772714 E486693	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	2229.0

Location: SANTA ANA WASH, E OF CHURCH STREET EXTENDING TO MORTON CYN, JUST N OF REDLANDS AIRPORT, 1.6 MI N FROM TOWN OF MENTONE.

Detailed Location: JUNE 2000: SOME TRAPLINES CROSSED SEVERAL HABITATS (WASH & SCRUB). OCT 2000: LOCATION GIVEN AS SECTION 8, GREENSPOT. MAR, APR 2001: NOT PRESENT E 1/2 SEC 8. AUG 2001:SPECIES TRAPPED (285 TRAP NIGHTS) EAST, NORTH & WEST OF AIRPORT RUNWAY.

Ecological: HABITAT CONSISTS OF RIVERSIDIAN FAN SAGE SCRUB WITH SANDY SUBSTRATE. MATURE ALLUVIAL FAN SAGE SCRUB LOCATED AROUND AIRPORT. SURROUNDING LAND IS OPEN.

General: 12 CAPTURED JUNE 2000. 6 ADULTS BETWEEN THIS OCCURRENCE & OCC #14, OCT 2000 (NOT IN E 1/2 SEC 8). MAR, APR '01: NOT PRESENT. 9 M, 8 F (6 ADULTS, 8 SUB-ADULTS, 3 JUV) CAPT 14-15 AUG 2001. 5 CAPT BETWEEN THIS OCC & OCC #3 ON 18 OCT 2006.

Owner/Manager: SBVWCD, REDLANDS MUN AIRPORT

Occurrence No.	11	**Map Index:**	47193	**EO Index:**	47193	**Element Last Seen:**	2001-09-16
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-09-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-21

Quad Summary: Redlands (3411712), Harrison Mtn. (3411722)

County Summary: San Bernardino

Lat/Long:	34.12476 / -117.18964	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3776006 E482511	**Elevation (ft):**	1400
PLSS:	T01N, R03W, Sec. 34 (S)	**Acres:**	85.0

Location: ALONG CITY CREEK, EAST OF BOULDER AVENUE AND SOUTH OF THE CONFLUENCE OF CITY CREEK AND NORTH FORK CANAL, HIGHLAND.

Detailed Location: SITE IS LOCATED WITHIN USFWS PROPOSED CRITICAL HABITAT FOR SAN BERNARDINO KANGAROO RAT, ALL UNDEVELOPED, WITH HOUSING TO THE EAST AND WEST AND OPEN SPACE TO THE NORTH AND SOUTH.

Ecological: HABITAT CONSISTS OF MATURE RIVERSIDEAN ALLUVIAL FAN SCRUB, DOMINATED BY ADENOSTOMA FASCICULATUM, LEPIDOSPARTUM SQUAMATUM, ARTEMISIA CALIFORNICA, AND ERIOGONUM FASCICULATUM; SOME DISTURBED ALLUVIAL FAN SCRUB.

General: 1 INDIVIDUAL WAS CAPTURED AT THE BASE LINE ROAD PROJECT SITE IN 1998. 33 INDIVIDUALS CAPTURED/RELEASED IN 2001.

Owner/Manager: PVT

Occurrence No.	14	**Map Index:**	49711	**EO Index:**	49711	**Element Last Seen:**	2000-10-03
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-10-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-12-20

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.07578 / -117.08504	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3770561 E492153	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 22 (S)	**Acres:**	1260.9

Location: MILL CREEK, NORTH OF CRAFTON HILLS AND JUST EAST OF REDLANDS.

Detailed Location: LOCATION GIVEN AS SECTIONS 16 AND 22; CRAFTON HILLS, MILL CREEK AND GARNET STREET.

Ecological: HABITAT CONSISTS OF SANDY SUBSTRATE WITH OPEN ALLUVIAL FAN SCRUB.

General: 6 ADULTS DETECTED BETWEEN THIS OCCURRENCE AND OCCURRENCE 10 DURING OCT 2000.

Owner/Manager: UNKNOWN

Occurrence No.	15	**Map Index:**	71092	**EO Index:**	49716	**Element Last Seen:**	2002-08-16
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-08-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-27

Quad Summary: San Bernardino South (3411713), San Bernardino North (3411723)

County Summary: San Bernardino

Lat/Long:	34.11804 / -117.33502	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3775295 E469104	**Elevation (ft):**	1200
PLSS:	T01S, R04W, Sec. 06 (S)	**Acres:**	186.0

Location: LYTLE CREEK WASH, JUST NORTH & SOUTH OF BASE LINE ROAD, BETWEEN SAN BERNARDINO AND RIALTO.

Detailed Location: AUG 2001 LOCATION IS NORTH OF BASE LINE RD. FEB 2002 LOCATION IS EAST SIDE OF LYTLE CREEK. AUG 2002 LOCATION IS FOURTH STREET ROCK.

Ecological: HABITAT CONSISTS OF RIVERSIDIAN ALLUVIAL FAN SCRUB. LEVEE TO EAST, STEEP CLIFFS ALONG LYTLE CREEK. DIRT ROAD TO THE EAST AND WEST. LITTER FOUND THROUGHOUT SITE. RESIDENTIAL DEVELOPMENT IN AREAS SURROUNDING THE CAPTURE SITE.

General: AT LEAST 15 INDIVIDUALS (7 ADS MALES, 3 ADS FEMALES, 2 SUBADULT & JUV MALES, 3 SUBADULT & JUV FEMALES) IN 20 CAPTURES (880 TRAP NIGHTS), 5-8 AUG 2001. 17+ ADULTS CAPTURED/RELEASED ON 4-5 FEB 2002. 42 ADS & 19 JUV CAPTURED, 12-16 AUG 2002.

Owner/Manager: UNKNOWN

Occurrence No.	16	**Map Index:**	57228	**EO Index:**	49724	**Element Last Seen:**	2004-07-07
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-07-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-24

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08040 / -117.14745	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771080 E486396	**Elevation (ft):**	1540
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	41.1

Location: NORTH OF I-10 AND SOUTH OF SANTA ANA WASH, NE OF REDLANDS.

Detailed Location: 600 FEET SOUTH OF PIONEER AVE, NORTH OF SAN BERNARDINO AVE AND 0.55 MILE EAST OF JUDSON STREET. TRAP LINES 2, 3 - FROM SAN BERNARDINO AVE TO ~375 FEET NORTH OF ROAD. ONLY THE TOWNSHIP/RANGE/SEC GIVEN FOR 2004 OCCURRENCE.

Ecological: HABITAT AT TRAP LINES 2 & 3 CONSISTS OF RUDERAL VEGETATION. ERIOGONUM SCRUB (70% COVER-PRIMARILY ERIOGONUM FASCICULATUM, OLD ALLUVIAL WASH) & HERBACEOUS COVER (95%) LOCATED TO NORTH OF TRAP LINES 2, 3. SOILS ARE LOOSE, SANDY WITH SOME ROCK.

General: 8 INDIVIDUALS (10 CAPTURES) DURING 15, 16 AUG 2001. 18 CAPTURES (NUMBER OF INDIVIDUALS UNKNOWN) AT 4 TRAPLINES, BETWEEN 9-12 JUL 2002. 1 INDIVIDUAL OBS ON 7 JUL 2004.

Owner/Manager: UNKNOWN

Occurrence No.	17	**Map Index:**	50371	**EO Index:**	50371	**Element Last Seen:**	2002-12-07
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-12-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-03-03

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10820 / -117.19184	**Accurracy:**	80 meters
UTM:	Zone-11 N3774169 E482306	**Elevation (ft):**	1250
PLSS:	T01S, R03W, Sec. 04 (S)	**Acres:**	0.0

Location: EAST OF THE INTERSECTION OF HIGHWAY 30 AND EAST 5TH STREET, NORTH OF THE SANTA ANA RIVER WASH, HIGHLAND.

Detailed Location:

Ecological: HABITAT CONSISTS OF AGRICULTURAL DEVELOPMENT SURROUNDING THE CAPTURE SITE.

General: 1 INDIVIDUAL CAPTURED DURING SURVEYS CONDUCTED FROM 2-7 DEC 2002.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	71045	**EO Index:**	71957	**Element Last Seen:**	1998-06-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-20

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10274 / -117.19615	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3773565 E481907	**Elevation (ft):**	1220
PLSS:	T01S, R03W, Sec. 09 (S)	**Acres:**	0.0

Location: ROBERTSON'S READY MIX STORAGE SITE, EAST HIGHLAND.

Detailed Location:

Ecological:

General: 16 INDIVIDUALS WERE TRAPPED DURING A PRESENCE/ABSENCE STUDY.

Owner/Manager: PVT

Occurrence No.	21	**Map Index:**	71053	**EO Index:**	71964	**Element Last Seen:**	1998-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-21

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.11355 / -117.19299	**Accurracy:**	80 meters
UTM:	Zone-11 N3774763 E482200	**Elevation (ft):**	1250
PLSS:	T01S, R03W, Sec. 04 (S)	**Acres:**	0.0

Location: SE EDGE OF TOWN OF HIGHLAND, CITY CREEK FLOODPLAIN, E SIDE OF PERCOLATION BASIN.

Detailed Location:

Ecological:

General: 1 INDIVIDUAL CAPTURED DURING A PRESENCE/ABSENCE TRAPPING STUDY FOR THE SBKR AT THE STORM DRAIN PROJECT SITE.

Owner/Manager: PVT

Occurrence No.	22	**Map Index:**	77930	**EO Index:**	71968	**Element Last Seen:**	2007-07-17
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-07-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08052 / -117.14096	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771093 E486994	**Elevation (ft):**	1550
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	11.0

Location: REDLANDS SPORTS PARK, 0.4 MILES SE OF REDLANDS AIRPORT, ABOUT 0.9 MILES NW FROM THE TOWN OF MENTONE.

Detailed Location: JUST NORTH OF E SAN BERNARDINO AVENUE, WEST OF N. WABASH AVENUE, SOUTH OF SESSUMS DRIVE. MAPPED ACCORDING TO MAP PROVIDED. 2002: TRAPLINES D&E.

Ecological: DISTURBED ALLUVIAL FAN SCRUB. ENCELIA FARINOSA PROBABLY ONCE DOMINANT. HAD BEEN A CITRUS ORCHARD, TREES NOW REMOVED. TO BE DEVELOPED INTO A SPORTS PARK.

General: 12 CAPTURES AT 2 TRAPLINES BETWEEN 9-12 JUL 2002. 16 ADULTS TRAPPED 17 JULY 2007.

Owner/Manager: CITY OF REDLANDS

Occurrence No.	23	**Map Index:**	71057	**EO Index:**	71969	**Element Last Seen:**	1997-04-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-04-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-24

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.08540 / -117.25325	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3771654 E476635	**Elevation (ft):**	1060
PLSS:	T01S, R04W, Sec. 13 (S)	**Acres:**	0.0

Location: IN THE VICINITY OF THE INTERSECTION OF CENTRAL AVE & PALM MEADOWS DR. SAN BERNARDINO.

Detailed Location:

Ecological: HABITAT IS DOMINATED BY A CALIFORNIA BUCKWHEAT (ERIOGONUM FASCICULATUM) OVERSTORY, WITH A SPARSE OPEN UNDERSTORY & A SANDY TO GRAVELY SUBSTRATE.

General: 9 INDIVIDUALS CAPTURED AT 2 TRAPPING GRID SITES IN APRIL 1997.

Owner/Manager: UNKNOWN

Occurrence No.	24	**Map Index:**	71058	**EO Index:**	71970	**Element Last Seen:**	2005-11-16
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-11-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-24

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09248 / -117.23066	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3772434 E478722	**Elevation (ft):**	1050
PLSS:	T01S, R03W, Sec. 07 (S)	**Acres:**	23.0

Location: SANTA ANA RIVER WASH SOUTH OF SAN BERNARDINO INTERNATIONAL AIRPORT.

Detailed Location: SOUTH OF THE SAN BERNARDINO INTERNATIONAL AIRPORT RD.

Ecological: HABITAT IS ALLUVIAL SAGE SCRUB VEGETATION CONSISTING OF E. FASCICULATUM, C. CALIFORNICA, L. SQUAMATUM, O. PARRYI, E. TRICHOCALYX, E. DENSIFOLIUM SANCTORUM, S. DOUGLASII. SOILS HERE ARE SANDY.

General: 8 INDIVIDUALS CAPTURED IN APRIL 1997. 10 ADULTS & 3 JUV/SUB ADULTS CAPTURED BETWEEN 15-16 NOV 2005.

Owner/Manager: UNKNOWN

Occurrence No.	25	**Map Index:**	71059	**EO Index:**	71971	**Element Last Seen:**	2005-11-16
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-11-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-03-24

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09633 / -117.22234	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3772859 E479489	**Elevation (ft):**	1050
PLSS:	T01S, R03W, Sec. 08 (S)	**Acres:**	22.0

Location: NORTH OF SANTA ANA RIVER, SOUTH EAST OF SAN BERNARDINO INTERNATIONAL AIRPORT.

Detailed Location: NORTH OF THE SAN BERNARDINO INTERNATIONAL AIRPORT RD.

Ecological: VARIABLE HABITAT TYPES ARE PRESENT, INCLUDING DISTURBED ANNUAL GRASSLAND WITH A FEW MINOR REMNANTS OF ALLUVIAL SAGE SCRUB, & SCATTERED PATCHES OF PURE ALLUVIAL SAGE SCRUB. SOILS HERE ARE SANDY OR SANDY LOAMY.

General: 2 INDIVIDUALS CAPTURED IN APRIL 1997. 5 ADULTS CAPTURED BETWEEN 15-16 NOV 2005.

Owner/Manager: UNKNOWN

Occurrence No.	34	**Map Index:**	77876	**EO Index:**	78763	**Element Last Seen:**	2007-08-20
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-08-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-03-09

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.07590 / -117.11290	**Accurracy:**	specific area
UTM:	Zone-11 N3770578 E489582	**Elevation (ft):**	1857
PLSS:	T01S, R02W, Sec. 20 (S)	**Acres:**	15.0

Location: REDLANDS PERCOLATION BASINS, SOUTH OF MILL CREEK, 1.9 MILES ESE OF REDLANDS AIRPORT, 1.1 MI ENE FROM TOWN OF MENTONE,

Detailed Location: MENTONE PIPELINE PROJECT. BOUNDED TO THE WEST BY TENNESSEE STREET, ALONG AND TO THE SOUTH OF SAN BERNARDINO AVENUE, NORTH OF MADEIRA AVENUE, & SAPPHIRE AVENUE TO THE EAST. 3 TRAPPING SITES MAPPED ACCORDING TO UTM COORDINATES PROVIDED.

Ecological: ALLUVIAL FAN SCRUB DOMINATED BY ENCELIA FARINOSA. OPEN SPACE, PERCOLATION PONDS, OLD BUILDINGS, ROADS, DUMPING, AND VEGETATION REMOVAL IN AREA. SAN DIEGO POCKET MOUSE ALSO OBSERVED IN THIS AREA.

General: 15 ADULTS AND 1 JUVENILE CAPTURED ON 20 AUG 2007.

Owner/Manager: UNKNOWN-PVT

Occurrence No.	35	**Map Index:**	77881	**EO Index:**	78778	**Element Last Seen:**	2008-10-22
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-10-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-27

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08239 / -117.11015	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771297 E489837	**Elevation (ft):**	1870
PLSS:	T01S, R02W, Sec. 17 (S)	**Acres:**	41.0

Location: MILL CREEK, JUST S OF GREENSPOT (HISTORICAL), 1.6 MILES N OF CRAFTON RESERVOIR, ABOUT 1.5 MI NE FROM TOWN OF MENTONE.

Detailed Location: JUST SOUTH OF FLORIDA AVE AND WEST OF AMETHYST STREET. MAPPED ACCORDING TO 1/4 SECTION PROVIDED (NW 1/4 OF SE 1/4 OF T01S R02W SECTION 17), AS COORDINATES GIVEN PUT LOCATION IN NW 1/4 OF T01S, R02W, SEC 21 WHICH DOESN'T MAP SITE DESCRIPTION

Ecological: OPEN SPACE WITH PERCOLATION PONDS TO THE SOUTH OF SITE. RIVERSIDEAN ALLUVIAL FAN SAGE SCRUB. DOMINANT PLANTS INCLUDE: SCALEBROOM, CA BUCKWHEAT, CA SAGEBRUSH, GOLDEN ASTER, BRITTLEBRUSH, CHAMISE, VARIOUS ANNUAL FORBS, AND NON-NATIVE GRASSES.

General: 32 ADULTS CAPTURED ON 22 OCT 2008 DURING 420 TRAP NIGHTS OF EFFORT.

Owner/Manager: UNKNOWN

Occurrence No.	40	**Map Index:**	24993	**EO Index:**	79021	**Element Last Seen:**	1931-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1931-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-17

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01874 / -117.27110	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3764267 E474969	**Elevation (ft):**	1270
PLSS:	T02S, R04W (S)	**Acres:**	2755.2

Location: RECHE CANYON, 1.4 MILES EAST OF BLUE MOUNTAIN, ABOUT 4 MILES SE OF COLTON.

Detailed Location: EXTENDS SE FROM BARTON ROAD ALONG RECHE CANYON ROAD DOWN TO CONSOLE SPRINGS. 1898 RECORD "HERRON'S RANCH, RECHE CANYON, 4 MI SE COLTON." 1903 RECORDS LOCALITY GIVEN AS "RECHE CANYON." 1917 RECORDS STATE "RECHE CANYON, 3 MI SE OF COLTON."

Ecological:

General: USNM SPECIMEN #'S 31136 & 31137 COLL IN 1891 BY FRANK STEPHENS. UCLA #38 COLL IN 1898 BY F. STEPHENS. USNM #'S 127930-127932 &127975 COLL IN 1903 BY F. STEPHENS. UCLA #'S 1149-1150 COLL IN 1917 BY LM HUEY. SBMNH #'S 6989-6992 COLL IN 1931.

Owner/Manager: UNKNOWN

Occurrence No.	41	**Map Index:**	78134	**EO Index:**	79025	**Element Last Seen:**	1917-04-01
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1917-04-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-03-09

Quad Summary: San Bernardino South (3411713), San Bernardino North (3411723)

County Summary: San Bernardino

Lat/Long:	34.11668 / -117.31755	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3775139 E470714	**Elevation (ft):**	1141
PLSS:	T01S, R04W, Sec. 05 (S)	**Acres:**	0.0

Location: EAST FROM THE SOUTH END OF LYTLE CREEK WASH, ABOUT 3 MILES NORTH OF COLTON, SAN BERNARDINO.

Detailed Location: LIES TO THE NW OF I-215 & US 66 JUNCTION. MAPPED ACCORDING TO COORDINATES PROVIDED.

Ecological: 2009: AERIAL IMAGERY SHOWS AREA MOSTLY DEVELOPED AND SPECIES LIKELY EXTIRPATED. POSSIBLE HABITAT TO THE WEST IN LYTLE WASH.

General: UCLA SPECIMEN #'S 1107-1112 COLLECTED ON 1 APRIL 1917 BY L.M. HUEY.

Owner/Manager: CITY OF SAN BERNARDINO

Occurrence No.	46	**Map Index:**	78148	**EO Index:**	79040	**Element Last Seen:**	1913-11-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1913-11-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-18

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.91920 / -117.15813	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3753209 E485383	**Elevation (ft):**	1619
PLSS:	T03S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: S OF MORENO VALLEY FWY (SR 60) & REDLANDS BLVD, NORTH OF LAKE PERRIS RECREATION AREA, MORENO.

Detailed Location: RECORD LOCALITY GIVEN AS "MORENO." COORDINATES PROVIDED PUT LOCATION BETWEEN BAY AVE & ALESSANDRO BLVD., JUST WEST OF REDLANDS BLVD. MAPPED ACCORDING TO COORDINATES PROVIDED.

Ecological:

General: LACM SPECIMEN #105 COLLECTED ON 8 NOV 1913 BY H.S. SWARTH.

Owner/Manager: UNKNOWN

Chaetodipus fallax fallax

Element Code: AMAFD05031

northwestern San Diego pocket mouse

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3
	State:	None		**State:**	S2S3
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL, GRASSLANDS, SAGEBRUSH, ETC. IN WESTERN SAN DIEGO CO.			
	Micro:	SANDY, HERBACEOUS AREAS, USUALLY IN ASSOCIATION WITH ROCKS OR COARSE GRAVEL.			

Occurrence No.	2	**Map Index:**	38388	**EO Index:**	33458	**Element Last Seen:**	1994-11-30
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-11-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-25

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78671 / -117.34499	**Accurracy:**	80 meters
UTM:	Zone-11 N3738560 E468061	**Elevation (ft):**	2160
PLSS:	T04S, R04W, Sec. 30 (S)	**Acres:**	0.0

Location: HALL PROPERTY,EAST OF PIEDRAS ROAD, 0.35 MILE SOUTH OF SANTA ROSA ROAD AND 3.5 MILES NORTHWEST OF STEELE PEAK.

Detailed Location: NORTHWEST CORNER OF THE PROPERTY.

Ecological: LEVEL TO GENTLY SLOPING LAND WITH A VARIETY OF LOAM SOILS. CHAMISE CHAPARRAL IS DOMINANT VEGETATION TYPE WITH RUDERAL DISTURBED GRASSLAND A SECONDARY TYPE.

General: 1 FEMALE ADULT CAPTURED, 1994.

Owner/Manager: PVT

Occurrence No.	3	**Map Index:**	04335	**EO Index:**	33459	**Element Last Seen:**	1994-09-16
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-09-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-25

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84666 / -117.00260	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745154 E499759	**Elevation (ft):**	1700
PLSS:	T04S, R01W, Sec. 05 (S)	**Acres:**	36.9

Location: 1.0 MI NORTHWEST OF GILMAN HOT SPRINGS, EAST OF INTERSECTION GILMAN SPRINGS ROAD AND HIGHWAY 79.

Detailed Location: CAPTURED AT TRAP SITES 12 AND 13.

Ecological: COASTAL SAGE SCRUB HABITAT. SPARCE RUDERAL GRASSLAND, WITH GENERALLY LOAMY SOILS AND PATCHES OF SANDY/LOAMY SUBSTRATE.

General: 3 CAPTURED JULY 1994 AND 2 CAPTURED SEPT 1994.

Owner/Manager: RIV COUNTY-HWY COMMISSION

Occurrence No.	4	**Map Index:**	38453	**EO Index:**	33460	**Element Last Seen:**	1994-07-28
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-07-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-03-25

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86317 / -117.00879	**Accurracy:**	80 meters
UTM:	Zone-11 N3746984 E499187	**Elevation (ft):**	1980
PLSS:	T03S, R01W, Sec. 32 (S)	**Acres:**	0.0

Location: HIGHWAY 79, 2 AIR MILES NNW OF GILMAN HOT SPRINGS AND 0.3 MILE NE OF WATER TANKS IN LAMB CANYON.

Detailed Location: TRAP SITE #4, UPHILL AND WEST OF HIGHWAY 79

Ecological: COASTAL SAGE SCRUB HABITAT.

General: 1 CAPTURED, 1994, AGE UNDETERMINED.

Owner/Manager: PVT

Occurrence No.	14	**Map Index:**	38525	**EO Index:**	33532	**Element Last Seen:**	1992-06-26
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-04-01

Quad Summary: El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.95419 / -117.13208	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3757084 E487796	**Elevation (ft):**	2100
PLSS:	T02S, R02W, Sec. 31 (S)	**Acres:**	1860.0

Location: THE BADLANDS, NORTH OF HIGHWAY 60 AND EAST OF REDLANDS BLVD, 6.5 MILES EAST OF SUNNYMEAD.

Detailed Location: THE HIGHEST FREQUENCY OF OCCURRENCE OF SDPM IN TRAPLINES WAS IN THE WESTERN AND SOUTHERN AREAS OF THE PROPERTY.

Ecological: SAGE SCRUB IS THE PREDOMINANT VEGETATION COMMUNITY OVER MOST OF THE PROPERTY, OTHERS ARE: SOUTHERN MIXED CHAPARRAL, DISTURBED GRASSLAND, COAST LIVE OAK WOODLAND, CULTIVATED FIELDS, & LIMITED RIPARIAN SCRUB & WOODLAND HABITATS.

General: 61 CAPTURED MAY AND JUNE, 1992, TRAPLINES F, H, I, J, K, L,M, N, O, P, Q, T, V.

Owner/Manager: UNKNOWN

Occurrence No.	16	**Map Index:**	38536	**EO Index:**	33543	**Element Last Seen:**	1995-04-27
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-04-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-04-02

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94255 / -117.35973	**Accurracy:**	specific area
UTM:	Zone-11 N3755844 E466756	**Elevation (ft):**	1200
PLSS:	T03S, R05W, Sec. 01 (S)	**Acres:**	16.1

Location: 0.3 MILE WSW INTERSECTION OF ARLINGTON AVE & ALESSANDRO BLVD, RIVERSIDE.

Detailed Location:

Ecological: MOST OF THE PROPERTY IS EXTREMELY DENSE NON-NATIVE GRASSLAND, RIVERSIDEAN SAGE SCRUB IS THE OTHER DOMINANT PLANT ASSOCIATION. A SMALL RIPARAIN AREA IS ALSO PRESENT. SITE IS SURROUNDED BY RESIDENCES.

General: 10 INDIVIDUALS CAPTURED 4/27/95. OTHER SPECIES CAPTURED PEROMYSCUS MANICULATUS & DIPODOMYS AGILIS; NO D. STEPHENSI CAPTURED.

Owner/Manager: CITY OF RIVERSIDE

Occurrence No.	17	**Map Index:**	38542	**EO Index:**	33549	**Element Last Seen:**	1992-10-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-10-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-01-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.91150 / -117.29539	**Accurracy:**	specific area
UTM:	Zone-11 N3752382 E472693	**Elevation (ft):**	1600
PLSS:	T03S, R04W, Sec. 15 (S)	**Acres:**	23.4

Location: WEST MARCH AIR FORCE BASE, AT INTERSECTION OF PIPELINE AND OLD RAILROAD GRADE, ~1 MILE SW OF EDGEMONT.

Detailed Location:

Ecological: MIXTURE OF HABITAT TYPES, DISTURBED GRASSLAND (DOMINANT), RIPARIAN WOODLAND, WILLOW SCRUB WITH MULEFAT AND TAMARISK AND SPARSE SAGE SCRUB, ROCK OUTCROPS.

General: 23 CAPTURED ON TRAP LINE #6. OTHER SPECIES: DIPODOMYS STEPHENSI, PEROMYSCUS MANICULAUS AND REITHRODONTOMYS MEGALOTIS; ALL TRAPPED AT LOCATION #6.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	22	**Map Index:**	47633	**EO Index:**	47659	**Element Last Seen:**	1999-06-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-12

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.85028 / -117.35357	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745611 E467291	**Elevation (ft):**	1500
PLSS:	T04S, R05W, Sec. 01 (S)	**Acres:**	644.8

Location: WEST OF LAKE MATHEWS; VICINITY OF EASTERN END OF MOCKINGBIRD CANYON.

Detailed Location: NEAR 17 ACRE OUTLET TOWER

Ecological: HABITAT CONSISTS OF MODERATE TO DENSE RIVERSIDIAN SAGE SCRUB TO UNVEGETATED, SANDY LOAM. SURROUNDING LAND IS VACANT, DISKED.

General: ONE ADULT CAPTURED 24 JUN 1999.

Owner/Manager: UNKNOWN

Occurrence No.	24	**Map Index:**	47670	**EO Index:**	47670	**Element Last Seen:**	1999-06-06
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84052 / -117.14831	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744483 E486278	**Elevation (ft):**	1500
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	95.3

Location: ALONG THE RAMONA EXPRESSWAY, EAST OF POZOS AVE TO 0.2 MILES WEST OF THE SAN JACINTO RIVER.

Detailed Location:

Ecological: TOPOGRAPHY CONSISTS OF LEVEL TO GENTLE SLOPES VEGETATED BY GRASSES AND WEEDS. SOILS RANGE FROM LOAMY TO SALINE/ALKALINE.

General: TWO ADULTS OBSERVED.

Owner/Manager: PVT

Occurrence No.	25	**Map Index:**	47422	**EO Index:**	47672	**Element Last Seen:**	1999-01-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-16

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.93873 / -117.22892	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3755386 E478844	**Elevation (ft):**	1650
PLSS:	T03S, R03W, Sec. 06 (S)	**Acres:**	87.0

Location: NW OF PERRIS RESERVOIR, LOCATED WITHIN TOWN OF SUNNYMEAD.

Detailed Location: MAPPED THE AREA SOUTH OF HWY 60 & NORTH OF URBAN AREA OF SUNNYMEAD.

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND AND SAGE SCRUB. LAND SURROUNDING SITE IS CULTIVATED.

General: DEC 1997 - JAN 1999: A TOTAL OF 12 INDIVIDUALS OBSERVED WITHIN THIS AREA AND SECTIONS 19 & 30 TO THE SOUTH.

Owner/Manager: UNKNOWN

Occurrence No.	26	**Map Index:**	33779	**EO Index:**	47674	**Element Last Seen:**	1999-01-XX
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-12-30

Quad Summary: Lakeview (3311771), Perris (3311772), El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.88322 / -117.13013	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3749215 E487966	**Elevation (ft):**	1600
PLSS:	T03S, R02W, Sec. 30 (S)	**Acres:**	1992.0

Location: SAN JACINTO WILDLIFE AREA, 2.4 - 4.4 MILES SOUTH OF STATE ROUTE 60, NE OF PERRIS RESERVOIR.

Detailed Location: SECTIONS 19 & 30

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND AND SAGE SCRUB. SURROUNDING AREA COMPRISED OF CULTIVATED LAND AND ROADS.

General: DEC 1997 - JAN 1999: A TOTAL OF 12 INDIVIDUALS OBSERVED BETWEEN THIS OCCURRENCE AND OCCURRENCE 32 TO THE SOUTH (SECTION 6).

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	27	**Map Index:**	20103	**EO Index:**	47708	**Element Last Seen:**	2000-01-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-05-31

Quad Summary: San Jacinto (3311678), Beaumont (3311688), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86729 / -116.95571	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3747442 E504096	**Elevation (ft):**	2400
PLSS:	T03S, R01W (S)	**Acres:**	12357.1

Location: NORTH EDGE 3 MILES SOUTH OF BEAUMONT AND SOUTH TO GILMAN HOT SPRINGS.

Detailed Location: AREA COVERED INCLUDES THE FOLLOWING TOWNSHIP, RANGE AND SECTION: 4S 1W SECTIONS 9-11 AND 1-5; 3S 1W SECTIONS 33-36 AND 25-28; 3S 1E SECTIONS 30, 31. SOME SURROUNDING LAND IS USED AS HAZARDOUS WASTE REMEDIATION SITE.

Ecological: HABITAT CONSISTS OF CHAPARRAL, SAGE SCRUB, NON-NATIVE ANNUAL GRASS, COAST LIVE OAK WOODLAND, RIPARIAN WOODLAND AND SCRUB.

General: EIGHT ADULTS OBSERVED WITHIN AREA BETWEEN NOV 1999 & JAN 2000.

Owner/Manager: DFG-SAN JACINTO WA, BLM, PVT

Occurrence No.	30	**Map Index:**	49721	**EO Index:**	49722	**Element Last Seen:**	2001-08-14
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-08-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-02-27

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08569 / -117.14017	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771666 E487068	**Elevation (ft):**	1560
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	16.8

Location: REDLANDS MUNICIPAL AIRPORT, NORTH OF I-10, NE OF REDLANDS

Detailed Location: CENTRAL TO EASTERN END OF AIRPORT, TRAP LINES 1, 2.

Ecological: HABITAT CONSISTS OF MATURE ALLUVIAL FAN SAGE SCRUB. SPECIES COMPRISED OF ENCELIA FARINOSA, ERIODICTYON TRICHOCALYX, ARTEMISIA CALIFORNICA, LEPIDOSPARTUM SQUAMATUM, ERIOGONUM FASCICULATUM. ENCELIA BECOMES DOMINANT TO THE WEST.

General: 37 CAPTURED (210 TRAP NIGHTS) ON 14 AUG 2001.

Owner/Manager: REDLANDS MUN AIRPORT

Occurrence No.	31	**Map Index:**	57228	**EO Index:**	49725	**Element Last Seen:**	2002-07-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-07-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-01

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08040 / -117.14745	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771080 E486396	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	41.1

Location: NORTH OF I-10 AND SOUTH OF SANTA ANA WASH, NE OF REDLANDS.

Detailed Location: 600 FEET SOUTH OF PIONEER AVE, NORTH OF SAN BERNARDINO AVE & 0.55 MILE EAST OF JUDSON STREET. TRAP LINES 1 & 3 - FROM SAN BERNARDINO AVE TO ~625 FEET NORTH OF ROAD.

Ecological: HABITAT CONSISTS OF ERIOGONUM SCRUB (70% COVER-PRIMARILY ERIOGONUM FASCICULATUM, OLD ALLUVIAL WASH) & HERBACEOUS COVER (95%) AT TRAP LINE 1 & RUDERAL AT TRAP LINE 3. SOILS ARE LOOSE, SANDY WITH SOME ROCK.

General: 103 CAPTURES (NUMBER OF INDIVIDUALS UNKNOWN) BETWEEN 14-16 AUG 2001. 4 CAPTURES (NUMBER OF INDIVIDUALS UNKNOWN) BETWEEN 9-12 JUL 2002.

Owner/Manager: UNKNOWN

Occurrence No.	32	**Map Index:** 49747	**EO Index:**	49747		**Element Last Seen:**	1999-01-XX
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	1999-01-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2002-12-30

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.85232 / -117.13004	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745789 E487970	**Elevation (ft):**	1500
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	682.1

Location: SAN JACINTO WILDLIFE AREA, 5.4 TO 6.4 MILES SOUTH OF STATE ROUTE 60, EAST OF PERRIS RESERVOIR.

Detailed Location: SECTION 6

Ecological: HABITAT CONSISTS OF DISTURBED ANNUAL GRASSLAND AND SAGE SCRUB. SURROUNDING AREA COMPRISED OF CULTIVATED LAND AND ROADS.

General: DEC 1997 - JAN 1999: A TOTAL OF 12 INDIVIDUALS OBSERVED BETWEEN THIS OCCURRENCE AND OCCURRENCE 26 TO THE NORTH (SECTIONS 19 & 30).

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	33	**Map Index:** 50047	**EO Index:**	50047		**Element Last Seen:**	2001-08-14
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2001-08-14
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2003-01-30

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08435 / -117.15507	**Accurracy:**	specific area
UTM:	Zone-11 N3771519 E485694	**Elevation (ft):**	1360
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	5.7

Location: REDLANDS MUNICIPAL AIRPORT, NORTH OF I-10, NE OF REDLANDS

Detailed Location: WEST END OF RUNWAY, TRAP LINE 3

Ecological: HABITAT CONSISTS OF ERIOGONUM-DOMINATED SAGE SCRUB

General: 4 CAPTURED (50 TRAP NIGHTS) ON 14 AUG 2001

Owner/Manager: REDLANDS MUN AIRPORT

Occurrence No.	43	**Map Index:** 57557	**EO Index:**	57573		**Element Last Seen:**	2002-01-12
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-01-12
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-10-21

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.83746 / -117.00036	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744134 E499966	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 08 (S)	**Acres:**	108.5

Location: LOCATED JUST W OF GILMAN HOT SPRINGS. BOUNDED ON THE WEST BY SANDERSON AVENUE AND SOUTH BY SAN JACINTO RIVER.

Detailed Location: TWO TRAP LINES ONE IN THE SOUTHERN PORTION AND ONE IN THE NORTHEASTERN PORTION.

Ecological: HABITAT IS A MIX OF GRASSLAND, COASTAL SAGE SCRUB, MULEFAT/ WILLOW SCRUB AND RUDERAL.

General: 46 INDIVIDUALS CAUGHT 25-30 MAR 2001 WHILE SURVEYING ON THE SOUTHERN PORTION. 250 INDIVIDUALS CAUGHT WHILE SURVEYING 7-12 JAN 2002 IN THE NORTHEASTERN PORTION.

Owner/Manager: UNKNOWN

Occurrence No.	52	**Map Index:**	54754	**EO Index:**	57662	**Element Last Seen:**	2002-07-25
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-07-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-25

Quad Summary: El Casco (3311781), Yucaipa (3411711)

County Summary: Riverside

Lat/Long:	33.98268 / -117.07161	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3760238 E493385	**Elevation (ft):**	2200
PLSS:	T02S, R02W, Sec. 22 (S)	**Acres:**	3941.5

Location: OAK VALLEY PROPERTY, BETWEEN I-10 AND SAN TIMOTEO CANYON, SOUTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY LINE.

Detailed Location:

Ecological: HABITAT CONSISTS OF A GRASSLAND AND COASTAL SAGE SCRUB ECOTONE. AIMOPHILA RUFICEPS CANESCENS IN VICINITY.

General: 109 INDIVIDUALS CAPTURED BETWEEN 11 MAY AND 25 JUL 2002.

Owner/Manager: PVT

Occurrence No.	53	**Map Index:**	57662	**EO Index:**	57678	**Element Last Seen:**	2002-06-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-06-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-25

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92348 / -117.04842	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3753673 E495524	**Elevation (ft):**	1900
PLSS:	T03S, R02W, Sec. 12 (S)	**Acres:**	140.0

Location: LOCATED IN THE BADLANDS ABOUT 1 MILE SOUTH OF HIGHWAY 60.

Detailed Location:

Ecological: HABITAT IS NONNATIVE GRASSLAND, COASTAL SAGE SCRUB, CHAPARRAL, DESERT WILLOW AND RUDERAL.

General: 368 INDIVIDUALS CAPTURED WHILE SURVEYING 12-18 JUN 2002.

Owner/Manager: UNKNOWN

Occurrence No.	54	**Map Index:**	57669	**EO Index:**	57685	**Element Last Seen:**	1994-11-15
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-11-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-25

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.93432 / -117.34434	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3754927 E468175	**Elevation (ft):**	1300
PLSS:	T03S, R04W, Sec. 06 (S)	**Acres:**	48.0

Location: LOCATED ON THE EASTERN SIDE OF RIVERSIDE ALONG ALESSANDRO BLVD NEAR CASTLE VIEW SCHOOL.

Detailed Location: 6 TRANSECTS SET ONLY 4 RESULTED IN CAPTURES OF CHAETODIPUS FALLAX FALLAX. 5 OF THE TRANSECTS WERE CLUSTERED IN THE EASTERN PORTION OF THE SITE.

Ecological: HABITAT CONSISTS OF MIXED GRASSLAND AND SAGE SCRUB, RIPARIAN, WASH BOTTOM (ADJACENT TO RECENTLY BURNED AREA)

General: TRAPPING PERIOD: 10-15 NOV 1994. TRANSECT A: 4 INDIVIDUALS, C: 4 INDIVIDUALS, D: 11 INDIVIDUALS, E: 9 INDIVIDUALS.

Owner/Manager: PVT

Occurrence No.	55	**Map Index:**	57673	**EO Index:**	57689	**Element Last Seen:**	1994-07-04
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-07-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-25

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.04066 / -117.11694	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3766670 E489205	**Elevation (ft):**	2100
PLSS:	T01S, R02W, Sec. 32 (S)	**Acres:**	615.1

Location: LOCATED IN YUCAIPA. IN RESEVOIR CANYON, ABUTTING INTERSTATE 10.

Detailed Location: SIX TRANSECTS WERE SET, HOWEVER, 51% OF INDIVIDUALS WERE CAUGHT IN TRANSECT E LOCATED IN THE SW PORTION OF SITE ABOUT 0.3 MILES N OF I-10.

Ecological: STEEPLY SLOPED WITH SOILS RANGING FROM SANDY TO GRAVELLY LOAM. HABITAT CONSISTS OF: BURNED SAGE SCRUB, GRASSLAND WITH SAGE SCRUB, RIVERSIDEAN SAGE SCRUB, HIGHLY DISTURBED GRASSLAND. SITE ADJACENT TO RESIDENTAL DEVELOPMENT & CITRUS OPERATION

General: 20 INDIVIDUALS CAPTURED 12 AUG 1991. 38 INDIVIDUALS CAPTURED FROM 29 JUN - 4 JUL 1994.

Owner/Manager: UNKNOWN

Occurrence No.	56	**Map Index:** 57678	**EO Index:**	57694		**Element Last Seen:**	2000-10-03
Occ. Rank:	Poor		**Presence:**	Presumed Extant		**Site Last Seen:**	2000-10-03
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-10-25

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.07517 / -117.08780	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3770495 E491898	**Elevation (ft):**	2100
PLSS:	T01S, R02W, Sec. 21 (S)	**Acres:**	1892.9

Location: LOCATED ON THE EDGE OF THE CRAFTON HILLS. ABOUT 1.5 MILES EAST OF MENTONE.

Detailed Location:

Ecological: HABITAT CONSISTS OF: FLOOD PLAIN AND TERRACES, LOAMY SAND WITH SOME COBBLES. RIVERSIDIAN ALLUVIAL FAN SCRUB, AND RIPARIAN WOODLAND. HABITAT IN 1999 RATED GOOD, IN 2000 RATED FAIR-POOR.

General: 28 ADULTS OBSERVED ON 15 APR 1999, BURROW SITES OBSERVED AS WELL WHILE SURVEYING SEC 16 & 21. 182 ADULTS OBSERVED ON 3 OCT 2000, BURROW SITES ALSO OBSERVED WHILE SURVEYING SEC 16 & 22.

Owner/Manager: UNKNOWN

Occurrence No.	57	**Map Index:** 58069	**EO Index:**	57698		**Element Last Seen:**	2002-11-12
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-11-12
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-12-01

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10039 / -117.21734	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3773309 E479952	**Elevation (ft):**	1150
PLSS:	T01S, R03W, Sec. 08 (S)	**Acres:**	635.0

Location: EASTERN END OF NORTON AFB.

Detailed Location:

Ecological: RELATIVELY UNDISTURBED ALLUVIAL SCRUB VEGETATION, SOME AREAS OF DEEP SANDY SOIL. MAIN ELEMENTS INCLUDE: BRASSICA, BROMUS, CROTON, ERIASTRUM. HABITAT RATINGS FROM EXCELLENT (3 OF 4 SITES) TO POOR.

General: 75 INDIVIDUALS CAPTURED 12 NOV 2002.

Owner/Manager: DOD-NORTON AFB

Occurrence No.	58	**Map Index:** 57695	**EO Index:**	57711		**Element Last Seen:**	2002-12-07
Occ. Rank:	Poor		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-12-07
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-10-26

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10778 / -117.19994	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3774125 E481558	**Elevation (ft):**	1225
PLSS:	T01S, R03W, Sec. 04 (S)	**Acres:**	66.7

Location: IN HIGHLAND, ABOUT 0.6 MILES SOUTH OF WHERE HIGHWAY 30 CROSSES CITY CREEK. SITE OF PROPOSED 5TH ST. BRIDGE.

Detailed Location: ALL BUT ONE CAPTURE ON THE WESTERN SIDE OF CITY CREEK BED.

Ecological: DISTURBED RIVERSIDEAN ALLUVIAL FAN SAGE SCRUB & RUDERAL

General: 53 INDIVIDUALS OBSERVED 7 JUN-18 AUG 2002, BURROW SITES ALSO OBSERVED. 1 INDIVIDUAL OBSERVED 2-7 DEC 2002, BURROW SITE ALSO OBSERVED.

Owner/Manager: UNKNOWN

Occurrence No.	59	**Map Index:** 57698	**EO Index:**	57714		**Element Last Seen:**	2001-11-10
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2001-11-10
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-10-26

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.03132 / -117.27462	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3765663 E474648	**Elevation (ft):**	1450
PLSS:	T02S, R04W, Sec. 02 (S)	**Acres:**	90.8

Location: LOCATED ON THE EAST SIDE OF RECHE CANYON, ABOUT 0.75 MILES NORTH OF THE SAN BERNARDINO/RIVERSIDE COUNTY BORDERS.

Detailed Location:

Ecological: ANNUAL GRASSLAND, RUDERAL, RIVERSIDIAN COASTAL SAGE SCRUB, WITH VAIRED SOILS AND ASPECTS.

General: 426 INDIVIDUALS CAPTURED 5-10 NOV 2001.

Owner/Manager: UNKNOWN

Occurrence No.	60	**Map Index:** 49716	**EO Index:**	57715		**Element Last Seen:**	2001-08-08
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2001-08-08
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-10-26

Quad Summary: San Bernardino South (3411713), San Bernardino North (3411723)

County Summary: San Bernardino

Lat/Long:	34.12362 / -117.33705	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3775914 E468919	**Elevation (ft):**	1200
PLSS:	T01N, R04W, Sec. 31 (S)	**Acres:**	18.1

Location: LYTLE CREEK WASH, JUST NORTH OF BASE LINE ROAD, BETWEEN SAN BERNARDINO AND RIALTO.

Detailed Location:

Ecological: HABITAT CONSISTS OF DISTURBED RIVERSIDIAN ALLUVIAL FAN SCRUB. LEVEE TO EAST, STEEP CLIFFS ALONG LYTLE CREEK. DIRT ROAD TO THE EAST AND WEST. LITTER FOUND THROUGHOUT SITE.

General: 8 INDIVIDUALS CAUGHT BETWEEN 5-8 AUG 2001. BURROW SITES ALSO OBSERVED.

Owner/Manager: UNKNOWN

Occurrence No.	83	**Map Index:**	57779	**EO Index:**	57795	**Element Last Seen:**	1992-07-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-02

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83696 / -117.36141	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744138 E466560	**Elevation (ft):**	1500
PLSS:	T04S, R05W, Sec. 12 (S)	**Acres:**	470.1

Location: ABOUT 0.7 MILES EAST OF LAKE MATTHEWS & 0.15 MILES NORTH OF THE INTERSECTION BETWEEN EL SOBRANTE ROAD & CAJALCO ROAD.

Detailed Location:

Ecological:

General: 28 MALES & 12 FEMALES TRAPPED ON 30 MAY-1 JUN 1992 IN THE NE 1/4 OF SEC. 11. 21 MALES & 11 FEMALES TRAPPED ON 30 MAY-6 JUN 1992 IN THE NW 1/4 OF SEC. 12. 8 MALES 11 FEMALES TRAPPED ON 2-4 JUN & 29 JUN-2 JUL 1992 IN THE SW 1/4 OF SEC. 12.

Owner/Manager: UNKNOWN

Occurrence No.	91	**Map Index:**	57807	**EO Index:**	57823	**Element Last Seen:**	2002-07-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-07-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-01

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10726 / -117.17538	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3774063 E483824	**Elevation (ft):**	1300
PLSS:	T01S, R03W, Sec. 03 (S)	**Acres:**	31.3

Location: LOCATED IN EAST HIGHLANDS. NORTH SIDE OF SANTA ANA WASH. SITE IS BOUNDED BY 5TH STREET ON NORTH & CHURCH STREET ON EAST.

Detailed Location:

Ecological: HABITAT CONSISTS OF RIVERSIDEAN ALLUVIAL FAN SAGE SCRUB, DISTURBED/RUDERAL ANNUAL GRASSLAND & RIPARIAN. DIPODOMYS MERRIAMI PARVUS & PEROGNATHUS LONGIMEMBRIS BREVIANASUS ALSO KNOWN FROM THIS SITE.

General: 12 INDIVIDUALS CAPTURED OVER FOUR TRANSECTS (600 TRAP NIGHTS) WHILE SURVEYING 15-19 JUL 2002.

Owner/Manager: UNKNOWN

Occurrence No.	92	**Map Index:** 57809	**EO Index:**	57825		**Element Last Seen:**	2002-07-12
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-07-12
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-11-01

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08103 / -117.14109	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771150 E486982	**Elevation (ft):**	1550
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	19.4

Location: LOCATED NEAR THE INTERSECTION OF WABASH AVENUE AND PIONEER AVENUE IN THE CITY OF REDLANDS.

Detailed Location:

Ecological: DIPODOMYS MERRIAMI PARVUS ALSO KNOWN FROM THIS SITE.

General: 2 CAPTURES BETWEEN 9-12 JUL 2002.

Owner/Manager: UNKNOWN

Onychomys torridus ramona

Element Code: AMAFF06022

southern grasshopper mouse

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3?
	State:	None		**State:**	S3?
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	DESERT AREAS, ESPECIALLY SCRUB HABITATS WITH FRIABLE SOILS FOR DIGGING. PREFERS LOW TO MODERATE SHRUB COVER.			
	Micro:	FEEDS ALMOST EXCLUSIVELY ON ARTHROPODS, ESPECIALLY SCORPIONS & ORTHOPTERAN INSECTS.			

Occurrence No.	29	**Map Index:** 58483	**EO Index:**	58519		**Element Last Seen:**	1938-12-27
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1938-12-27
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-12-10

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.91928 / -117.05986	**Accurracy:**	1 mile
UTM:	Zone-11 N3753207 E494466	**Elevation (ft):**	2000
PLSS:	T03S, R02W, Sec. 11 (S)	**Acres:**	0.0

Location: ABOUT 1.5 MILES NORTH OF EDEN HOT SPRINGS.

Detailed Location:

Ecological:

General: ONE MALE SPECIMEN COLLECTED BY F. DURHAM ON 27 DEC 1938 AT "1.5 MI N OF EDEN HOT SPRINGS." DEPOSITED AT MVZ # 88417.

Owner/Manager: UNKNOWN

Occurrence No.	30	**Map Index:**	24632	**EO Index:**	58520	**Element Last Seen:**	1908-09-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1908-09-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-10

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90468 / -117.29379	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3751625 E472838	**Elevation (ft):**	1580
PLSS:	T03S, R04W, Sec. 15 (S)	**Acres:**	0.0

Location: 0.25 MILE SW OF THE INTERSECTION OF CACTUS ROAD AND PLUMMER ROAD, MARCH AIR FORCE BASE.

Detailed Location:

Ecological:

General: 7 TOTAL SPECIMENS (3 FEMALE & 4 MALE) COLLECTED 7-8 SEP 1908 BY H. WILDER AT "7 MI SE RIVERSIDE [SCHELLINGER RANCH]." DEPOSITED AT MVZ # 2464-2469 & 2490.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	33	**Map Index:**	03634	**EO Index:**	58523	**Element Last Seen:**	1923-09-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1923-09-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-10

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78085 / -117.22794	**Accurracy:**	1 mile
UTM:	Zone-11 N3737880 E478896	**Elevation (ft):**	1450
PLSS:	T04S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: PERRIS.

Detailed Location:

Ecological:

General: ONE MALE SPECIMEN COLLECTED 23 SEP 1923 BY F. STEPHENS AT "PERRIS." DEPOSITED AT LACM # 727.

Owner/Manager: UNKNOWN

Occurrence No.	35	**Map Index:**	03468	**EO Index:**	58526	**Element Last Seen:**	1923-08-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1923-08-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-10

Quad Summary: San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.03195 / -117.28449	**Accurracy:**	1 mile
UTM:	Zone-11 N3765735 E473737	**Elevation (ft):**	1180
PLSS:	T02S, R04W, Sec. 03 (S)	**Acres:**	0.0

Location: RECHE CANYON, SOUTH OF SAN BERNADRINO.

Detailed Location:

Ecological:

General: 4 SPECIMENS COLLECTED (2 MALE & 2 FEMALE) 29 OCT-3 NOV 1916 BY J. GRINNELL AT "RECHE CANYON, 4 MI SE COLTON." DEPOSITED AT MVZ # 24526-24529. 1 MALE COLLECTED 18 AUG 1923 BY F. STEPHENS AT "RECHE CANYON." DEPOSITED AT LACM #726.

Owner/Manager: UNKNOWN

Neotoma lepida intermedia

Element Code: AMAFF08041

San Diego desert woodrat

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3?
	State:	None		**State:**	S3?
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	COASTAL SCRUB OF SOUTHERN CALIFORNIA FROM SAN DIEGO COUNTY TO SAN LUIS OBISPO COUNTY.			
	Micro:	MODERATE TO DENSE CANOPIES PREFERRED. THEY ARE PARTICULARLY ABUNDANT IN ROCK OUTCROPS & ROCKY CLIFFS & SLOPES.			

Occurrence No.	43	**Map Index:**	47633	**EO Index:**	47633	**Element Last Seen:**	1999-06-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-11

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.85028 / -117.35357	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3745611 E467291	**Elevation (ft):**	1500
PLSS:	T04S, R05W, Sec. 01 (S)	**Acres:**	644.8

Location: WEST OF LAKE MATHEWS; VICINITY OF EASTERN END OF MOCKINGBIRD CANYON.

Detailed Location: NEAR 17 ACRE OUTLET TOWER

Ecological: HABITAT CONSISTS OF MODERATE TO DENSE RIVERSIDIAN SAGE SCRUB TO UNVEGETATED, SANDY LOAM. SURROUNDING LAND IS VACANT. DIRT ROADS RUN THROUGH THE AREA.

General: ONE ADULT CAPTURED 24 JUN 1999.

Owner/Manager: UNKNOWN

Occurrence No.	46	**Map Index:**	69607	**EO Index:**	49721	**Element Last Seen:**	2007-02-14
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-02-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-07-03

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08579 / -117.14050	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771677 E487037	**Elevation (ft):**	1560
PLSS:	T01S, R03W, Sec. 13 (S)	**Acres:**	23.0

Location: REDLANDS MUNICIPAL AIRPORT, NORTH OF I-10, NE OF REDLANDS.

Detailed Location: 2001 TRAPPING EFFORT LOCATED IN THE CENTRAL TO EASTERN END OF AIRPORT, TRAP LINES 1 & 2.

Ecological: HABITAT CONSISTS OF MATURE ALLUVIAL FAN SAGE SCRUB. SPECIES COMPRISED OF ENCELIA FARINOSA, ERIODICTYON TRICHOCALYX, ARTEMISIA CALIFORNICA, LEPIDOSPARTUM SQUAMATUM, ERIOGONUM FASCICULATUM. ENCELIA FARINOSA BECOMES DOMINANT TO THE WEST.

General: 13 CAPTURED (210 TRAP NIGHTS) ON 14 AUG 2001. 1 ADULT OBSERVED ON A PRICKLY PEAR NEAR A NEST ON 14 FEB 2007.

Owner/Manager: REDLANDS MUN AIRPORT, PVT

Occurrence No.	47	**Map Index:**	33789	**EO Index:**	50407	**Element Last Seen:**	2005-07-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-07-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-03-11

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.83703 / -117.00191	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3744086 E499822	**Elevation (ft):**	1450
PLSS:	T04S, R01W, Sec. 08 (S)	**Acres:**	393.0

Location: NORTH OF THE SAN JACINTO RIVER AND WEST OF GILMAN HOT SPRINGS, 3.5 MILES NNW OF SAN JACINTO

Detailed Location: 2001: SW 1/4 OF THE SW 1/4 OF T4S, R1W SECTION 9. 2002: NW 1/4 OF THE T4S, R1W SW 1/4 OF SECTION 9. 2005: E 1/2 OF T4S, R1W SECTION 8.

Ecological: HABITAT CONSISTS OF GRASSLAND, COASTAL SAGE SCRUB, MULEFAT SCRUB, AND ALLUVIAL FAN SAGE SCRUB. OTHER RARE SPECIES AT THIS SITE INCLUDE PEROGNATHUS LONGIMEMBRIS BREVINASUS AND CHAETODIPUS FALLAX FALLAX.

General: 2001: 4 ADULTS WERE CAPTURED AND RELEASED FROM 25-30 MAR. 2002: 14 ADULTS WERE CAPTURED AND RELEASED FROM 7-12 JAN. 2005: 20 INDIVIDUALS FOUND 10-15 JUL.

Owner/Manager: UNKNOWN

Occurrence No.	54	**Map Index:**	50372	**EO Index:**	50423	**Element Last Seen:**	2002-08-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-08-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-03-05

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10757 / -117.20445	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3774102 E481143	**Elevation (ft):**	1200
PLSS:	T01S, R03W, Sec. 04 (S)	**Acres:**	35.2

Location: WEST OF THE INTERSECTION OF HIGHWAY 30 AND EAST 5TH STREET, NORTH OF THE SANTA ANA RIVER, HIGHLAND

Detailed Location:

Ecological: HABITAT CONSISTS OF DISTURBED RIVERSIDEAN SAGE SCRUB SURROUNDING THE CAPTURE SITE; IMMEDIATE HABITAT TEMPORARILY GONE DURING BRIDGE CONSTRUCTION. OTHER RARE TAXA AT THIS SITE INCLUDE CHAETODIPUS FALLAX FALLAX AND DIPODOMYS MERRIAMI PARVUS.

General: 5 ADULTS AND JUVENILES COLLECTED FROM 7 JUN-18 AUG 2002 AND DEPOSITED AT LACM.

Owner/Manager: UNKNOWN

Occurrence No.	111	**Map Index:** 73883	**EO Index:**	74870		**Element Last Seen:**	2000-10-03
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2000-10-03
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2009-03-11

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08406 / -117.09507	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3771480 E491228	**Elevation (ft):**	
PLSS:	T01S, R02W, Sec. 16 (S)	**Acres:**	2573.0

Location: VICINITY OF SANTA ANA WASH AND PERCOLATION BASINS NORTH AND EAST OF REDLANDS, JUST SOUTH OF SAN BERNARDINO NF.

Detailed Location: T1S R2W SECTIONS 8, 16, 21 & 22.

Ecological: LOAMY & COBBLEY SAND SUBSRATE, OPEN ALLUVIAL FAN SCRUB & RIPARIAN WOODLAND. FLOOD PLAIN & TERRACES. OVERALL SITE QUALITY VARIED FROM GOOD TO FAIR TO POOR.

General: 1999: 15 FOUND IN SECTIONS 16 & 21 ON 15 APR. 2000: 16 FOUND IN SECTIONS 8, 16 & 22 ON 3 OCT.

Owner/Manager: BLM, UNKNOWN

Taxidea taxus

Element Code: AMAJF04010

American badger

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S4
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern			
Habitat:	**General:**	MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.			
	Micro:	NEEDS SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREYS ON BURROWING RODENTS. DIGS BURROWS.			

Occurrence No.	204	**Map Index:** 24993	**EO Index:**	56976		**Element Last Seen:**	1908-07-26
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1908-07-26
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-09-23

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01874 / -117.27110	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3764267 E474969	**Elevation (ft):**	1600
PLSS:	T02S, R04W (S)	**Acres:**	2755.2

Location: RECHE CANYON, NEAR COLTON.

Detailed Location: AREA MAPPED IS RECHE CANYON.

Ecological:

General: MVZ #2705; FEMALE COLLECTED BY C. H. RICHARDSON JR ON 26 JUL 1908.

Owner/Manager: UNKNOWN

Occurrence No.	306	**Map Index:**	35235	**EO Index:**	57566	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-10-21

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	1040
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SAN BERNARDINO.

Detailed Location:

Ecological:

General: 1 COLLECTED, SDSNH.

Owner/Manager: UNKNOWN

Occurrence No.	337	**Map Index:**	59385	**EO Index:**	59421	**Element Last Seen:**	1990-06-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-01-18

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.86661 / -117.12764	**Accurracy:**	80 meters
UTM:	Zone-11 N3747373 E488193	**Elevation (ft):**	1440
PLSS:	T03S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location: ~2 MILES NORTH OF LAKEVIEW, SAN JACINTO WILDLIFE AREA

Detailed Location:

Ecological: HABITAT CONSISTS OF FLOODPLAIN VEGETATION: ANNUAL ATRIPLEX, SUAEDA TORREYANA, AND ANNUAL GRASSES.

General: ON 29 JUN 1990, 1 WAS OBSERVED RUNNING FROM AN IRRIGATION DITCHTO A LEVEE SURROUNDING A 0.25-ACRE DRY RESERVOIR; THE FOLLOWING MORNING, AN ACTIVE BURROW WAS FOUND.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	338	**Map Index:**	59387	**EO Index:**	59423	**Element Last Seen:**	1990-01-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-01-18

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86535 / -117.10506	**Accurracy:**	80 meters
UTM:	Zone-11 N3747232 E490281	**Elevation (ft):**	1400
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	0.0

Location: ~2 MILES NE OF LAKEVIEW, SAN JACINTO WILDLIFE AREA.

Detailed Location:

Ecological: HABITAT CONSISTS OF CHENOPOD SCRUB, DOMINATED BY ATRIPLEX CANESCENS, ENCELIA FARINOSA, AND ARTEMISIA CALIFORNICA.

General: DURING JAN 1990, THE CARCASS OF A JUVENILE (TL = 75MM) WAS FOUND.

Owner/Manager: DFG-SAN JACINTO WA

Emys marmorata

Element Code: ARAAD02030

western pond turtle

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4
	State:	None		**State:**	S3
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_VU-Vulnerable, USFS_S-Sensitive			
Habitat:	**General:**	A THOROUGHLY AQUATIC TURTLE OF PONDS, MARSHES, RIVERS, STREAMS & IRRIGATION DITCHES, USUALLY WITH AQUATIC VEGETATION, BELOW 6000 FT ELEVATION.			
	Micro:	NEED BASKING SITES AND SUITABLE (SANDY BANKS OR GRASSY OPEN FIELDS) UPLAND HABITAT UP TO 0.5 KM FROM WATER FOR EGG-LAYING.			

Occurrence No.	849	**Map Index:**	03634	**EO Index:**	28226	**Element Last Seen:**	1933-XX-XX
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1987-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-11-30

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78085 / -117.22794	**Accuracy:**	1 mile
UTM:	Zone-11 N3737880 E478896	**Elevation (ft):**	1450
PLSS:	T04S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: PERRIS, APPROXIMATELY 15 MI E SANTA MONICA MTNS.

Detailed Location:

Ecological:

General: FEMALE CARAPACE & PLASTRON COLLECTED (AMNH# 69797) AND FULL MALE SKELETON COLLECTED (AMNH# 69798) BY J. H. GEYGER IN 1933. BRATTSTROM (1990) CONSIDERS THIS POP EXTIRPATED.

Owner/Manager: UNKNOWN

Anniella pulchra pulchra

Element Code: ARACC01012

silvery legless lizard

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4T3T4Q
	State:	None		**State:**	S3
	Other:	DFG_SSC-Species of Special Concern, USFS_S-Sensitive			
Habitat:	**General:**	SANDY OR LOOSE LOAMY SOILS UNDER SPARSE VEGETATION.			
	Micro:	SOIL MOISTURE IS ESSENTIAL. THEY PREFER SOILS WITH A HIGH MOISTURE CONTENT.			

Occurrence No.	14	**Map Index:**	44549	**EO Index:**	44549	**Element Last Seen:**	1999-11-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-11-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2000-12-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01714 / -117.14661	**Accurracy:**	80 meters
UTM:	Zone-11 N3764066 E486463	**Elevation (ft):**	2110
PLSS:	T02S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: SOUTH EDGE OF SUNSET DRIVE, 0.5 MILE SOUTH OF REDLANDS COUNTRY CLUB, REDLANDS

Detailed Location:

Ecological: HABITAT CONSISTS OF BUCKWHEAT/CHAMISE SCRUB, BORDERED BY MODERATELY TO HIGHLY-DISTURBED DEVELOPMENT

General: 1 FEMALE FOUND INJURED (MASSIVE INJURY TO ITS POSTERIOR QUARTER) ALONG SUNSET DRIVE IN NOV 1999; LIZARD WAS COLLECTED AND IT DIED THE FOLLOWING DAY.

Owner/Manager: PVT

Occurrence No.	31	**Map Index:**	60866	**EO Index:**	60902	**Element Last Seen:**	2005-02-03
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-02-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-06

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.07625 / -117.15100	**Accurracy:**	80 meters
UTM:	Zone-11 N3770621 E486067	**Elevation (ft):**	1515
PLSS:	T01S, R03W, Sec. 24 (S)	**Acres:**	0.0

Location: <0.1 MILE SOUTH OF SAN BERNARDINO AVENUE AND 0.3 MILE EAST OF JUDSON STREET, WEST OF MENTONE

Detailed Location:

Ecological: DOMINANT PLANT COMMUNITY IS AGRICULTURE (ORANGE GROVES); AREA HAS NOT BEEN ACTIVELY FARMED FOR AWHILE, AND SAGE SCRUB PLANTS HAVE BEGUN TO EMERGE.

General: 1 ADULT AND 1 JUVENILE OBSERVED UNDER A FLAT PIECE OF WOOD, IN SANDY SOIL, ON THE BANK OF A MAN-MADE RESERVOIR.

Owner/Manager: UNKNOWN

Occurrence No.	44	**Map Index:** 69605	**EO Index:**	70378		**Element Last Seen:**	2007-02-14
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	2007-02-14
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2007-07-03

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08716 / -117.13658	**Accurracy:**	80 meters
UTM:	Zone-11 N3771829 E487399	**Elevation (ft):**	1586
PLSS:	T01S, R02W, Sec. 18 (S)	**Acres:**	0.0

Location: EAST SIDE OF OPAL AVENUE, EAST OF REDLANDS MUNICIPAL AIRPORT.

Detailed Location:

Ecological: HABITAT CONSISTS OF OVERGROWN COASTAL SAGE SCRUB, DOMINATED BY ERIODICTYON TRICHOCALYX, ENCELIA FARIMOSA, OPUNTIA SPP, AND ERIOGONUM FASCICULATUM.

General: 1 ADULT DETECTED IN LEAF LITTER NEAR A PRICKLY PEAR ON 14 FEB 2007.

Owner/Manager: PVT

Phrynosoma blainvillii

Element Code: ARACF12100

coast horned lizard

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4G5
	State:	None		**State:**	S3S4
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive			
Habitat:	**General:**	FREQUENTS A WIDE VARIETY OF HABITATS, MOST COMMON IN LOWLANDS ALONG SANDY WASHES WITH SCATTERED LOW BUSHES.			
	Micro:	OPEN AREAS FOR SUNNING, BUSHES FOR COVER, PATCHES OF LOOSE SOIL FOR BURIAL, & ABUNDANT SUPPLY OF ANTS & OTHER INSECTS.			

Occurrence No.	5	**Map Index:** 03401	**EO Index:**	28147		**Element Last Seen:**	197X-XX-XX
Occ. Rank:	None		**Presence:**	Extirpated		**Site Last Seen:**	1992-04-20
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1996-01-11

Quad Summary: Riverside East (3311783), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01362 / -117.32865	**Accurracy:**	1 mile
UTM:	Zone-11 N3763714 E469654	**Elevation (ft):**	1000
PLSS:	T02S, R04W, Sec. 08 (S)	**Acres:**	0.0

Location: HIGHGROVE.

Detailed Location: NO LIZARDS FOUND IN 1992 SURVEY.

Ecological: HABITAT LOST TO COMMERCIAL AND RESIDENTIAL DEVELOPMENT. SOME OF THE ORCHARDS AND GROVES STILL PRESENT BUT CULTIVATION HAS ELIMINATED ANY FORM OF HABITAT FOR CONCEALMENT AND FOOD SOURCE.

General: 1970'S RECORD FROM MCGURTY 1980 REPT TO DFG, PG A-32. 1992 RECORD FROM LESTER G. MILROY III.

Owner/Manager: UNKNOWN

Occurrence No.	8	**Map Index:**	03634	**EO Index:**	28145	**Element Last Seen:**	1930-05-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1930-05-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-03-03

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78085 / -117.22794	**Accurracy:**	1 mile
UTM:	Zone-11 N3737880 E478896	**Elevation (ft):**	1450
PLSS:	T04S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: PERRIS, RIVERSIDE COUNTY.

Detailed Location: SDNHM SPECIMEN #2721STATED LOCALITY AS "PERRIS". MAPPED TO CITY OF PERRIS.

Ecological:

General: SDNHM SPECIMEN# 2721 COLLECTED BY L.M. KLAUBER ON 27 MAY 1930.

Owner/Manager: UNKNOWN

Occurrence No.	45	**Map Index:**	03444	**EO Index:**	12294	**Element Last Seen:**	1989-09-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-09-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-02-15

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97001 / -117.30199	**Accurracy:**	1 mile
UTM:	Zone-11 N3758871 E472102	**Elevation (ft):**	2200
PLSS:	T02S, R04W, Sec. 28 (S)	**Acres:**	0.0

Location: BOX SPRINGS RESERVE NEAR UC RIVERSIDE. ALSO IN MORENO VALLEY, INTERSECTION OF CLARK ST. & FRESH SKY RD.

Detailed Location: AN INHOLDING IN A COUNTY PARK.

Ecological: MORENO VALLEY SITE: SPARSE SYCAMORE RIPARIAN WOODLAND SURROUNDED BY RIVERSIDEAN SAGE SCRUB DOMINATED BY ENCELIA FARINOSA.

General: ONE INDIVIDUAL AND SEVERAL SCATS OBSERVED AT MORENO VALLEY SITE.

Owner/Manager: UCNR-BOX SPRINGS RESERVE

Occurrence No.	119	**Map Index:**	34146	**EO Index:**	481	**Element Last Seen:**	1992-04-18
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Stable	**Record Last Updated:**	1998-10-26

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80473 / -117.34371	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740558 E468186	**Elevation (ft):**	2000
PLSS:	T04S, R04W, Sec. 19 (S)	**Acres:**	807.6

Location: IDA LEONA ESTATES AND HARFORD SPRINGS COUNTY PARK.

Detailed Location: HIGH DENSITY POPULATIONS FOUND IN IDA LEONA ESTATES PARCELS 1-4, AND 7. 5 JUVENILES (41-51 MM SNOUT/VENT LENGTH) FOUND IN HARFORD SPRINGS COUNTY PARK IN 1992.

Ecological: JUNIPER AND ALLUVIAL SCRUB HABITAT. OAK AND CHAPARRAL HABITAT IN EXCELLENT CONDITION. POGONOMYRMEX ANT SPECIES PRESENT.

General: PART OF THE AREA IS A WILDLIFE RESERVE. SURROUNDING AREAS ARE 5-10 ACRE RANCHES.

Owner/Manager: PVT, RIV COUNTY-PARKS & REC

Occurrence No.	216	**Map Index:**	03699	**EO Index:**	28014	**Element Last Seen:**	1967-04-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1967-04-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-01-25

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97665 / -117.20909	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3759586 E480685	**Elevation (ft):**	2400
PLSS:	T02S, R03W, Sec. 20 (S)	**Acres:**	0.0

Location: RECHE CANYON, 7.6 MI S BARTON RD INTERSECTION.

Detailed Location:

Ecological:

General: LACM SPECIMEN #52785.

Owner/Manager: UNKNOWN

Occurrence No.	223	**Map Index:**	03359	**EO Index:**	28010	**Element Last Seen:**	1957-06-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1957-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-18

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.86939 / -117.35900	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3747732 E466796	**Elevation (ft):**	1700
PLSS:	T03S, R05W, Sec. 36 (S)	**Acres:**	0.0

Location: NEAR THREE SISTERS. APPROX 4 MI NE OF LAKE MATHEWS.

Detailed Location: EXACT LOCATION UNKNOWN. LOCATION STATED AS "NEAR THREE SISTERS" AND SO AREA MAPPED IS THREE SISTERS AND THE SURROUNDING AREA.

Ecological:

General: LACM SPECIMEN #101392 COLLECTED 26 JUN 1957 BY R.B. LOOMIS.

Owner/Manager: UNKNOWN

Occurrence No.	227	**Map Index:**	03398	**EO Index:**	28007	**Element Last Seen:**	1966-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1966-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-01-25

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.73972 / -117.33544	**Accurracy:**	1 mile
UTM:	Zone-11 N3733347 E468928	**Elevation (ft):**	1800
PLSS:	T05S, R04W, Sec. 18 (S)	**Acres:**	0.0

Location: ARROYO DEL TORO, 4 MI N OF ELSINORE.

Detailed Location: LOCATION GIVEN AS "2 MI W, 4 MI N ELSINORE, ARROYO DEL TORO". MAPPED IN VICINITY OF ARROYO DEL TORO WHICH IS DUE NORTH OF LAKE ELSINORE.

Ecological:

General: LACM SPECIMENS #101414-101416 COLLECTED 16 APR 1966.

Owner/Manager: UNKNOWN

Occurrence No.	243	**Map Index:**	04203	**EO Index:**	27991	**Element Last Seen:**	1937-06-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1937-06-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-03-17

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89556 / -117.05503	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3750577 E494911	**Elevation (ft):**	1700
PLSS:	T03S, R02W, Sec. 23 (S)	**Acres:**	0.0

Location: EDEN HOT SPRING, 0.5 MI NW OF MOUNT EDEN.

Detailed Location: SDNHM #27299 STATED LOCALITY AS "EDEN HOT SPRING" MAPPED TO EDEN HOT SPRING EXACT LOCATION UNKNOWN.

Ecological:

General: SDNHM SPECIMEN #27299, COLLECTED BY L.M. KLAUBER ON 12 JUN 1937.

Owner/Manager: UNKNOWN

Occurrence No.	248	**Map Index:**	03533	**EO Index:**	27990	**Element Last Seen:**	1935-05-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2011-03-17

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84647 / -117.25558	**Accurracy:**	1 mile
UTM:	Zone-11 N3745162 E476355	**Elevation (ft):**	1500
PLSS:	T04S, R04W, Sec. 01 (S)	**Acres:**	0.0

Location: VAL VERDE, 5 MILES NNW OF PERRIS ALONG I-215.

Detailed Location: SDNHM #23702 STATED LOCALITY AS " VAL VERDE".

Ecological: AREA LOST AS HABITAT FOR WILDLIFE.

General: SDNHM SPECIMEN #23702 COLLECTED BY L.M. KLAUBER ON 23 MAY 1935. NEGATIVE DATA SUBMITTED FROM MILROY ON 12 APRIL 1992.

Owner/Manager: UNKNOWN

Occurrence No.	252	**Map Index:**	03583	**EO Index:**	27982	**Element Last Seen:**	1926-05-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1926-05-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-10

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04750 / -117.23476	**Accurracy:**	1 mile
UTM:	Zone-11 N3767447 E478332	**Elevation (ft):**	1200
PLSS:	T01S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: BRYN MAWR, 2.5 MI WSW OF REDLANDS.

Detailed Location:

Ecological:

General: UCD SPECIMEN #3695.

Owner/Manager: UNKNOWN

Occurrence No.	328	**Map Index:**	20085	**EO Index:**	9898	**Element Last Seen:**	1989-09-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-09-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-12-04

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95568 / -117.28878	**Accurracy:**	80 meters
UTM:	Zone-11 N3757279 E473317	**Elevation (ft):**	1700
PLSS:	T02S, R04W, Sec. 34 (S)	**Acres:**	0.0

Location: CITY OF MORENO VALLEY, AT THE INTERSECTION OF CLARK STREET AND FRESH SKY ROAD.

Detailed Location:

Ecological: HABITAT IS A SPARSE SYCAMORE RIPARIAN WOODLAND SURROUNDED BY RIVERSIDEAN SAGE SCRUB, DOMINATED BY ENCELIA FARINOSA.

General: ONE ADULT LIZARD AND SEVERAL HORNED LIZARD SCATS FOUND IN THE AREA.

Owner/Manager: PVT

Occurrence No.	389	**Map Index:**	21751	**EO Index:**	7851	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-01-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82041 / -117.27564	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742278 E474491	**Elevation (ft):**	1750
PLSS:	T04S, R04W, Sec. 14 (S)	**Acres:**	181.1

Location: TWO MILES WEST OF MAYER FARMS AT HIGHWAY 395, 15 MILES SOUTH OF RIVERSIDE.

Detailed Location: NON-SPECIFIC POLYGON COVERS SW AND NE PARTS OF SEC 14, SMALL WESTERN PORTION OF SEC 13, AND SW CORNER OF SEC 11. POLYGON CONSISTS OF 3 UNATTACHED PORTIONS.

Ecological: HABITAT IS NON-NATIVE GRASSLAND; DOMINANTS: BROMUS RUBENS, LASTHENIA SP., ERODIUM CICUTARIUM, AND SCHISMUS BARBATUS. ELEVATION RANGE: 1700-1800 FEET. MODERATE SLOPE.

General: ONE LIZARD SIGHTED IN 1990. LOCATION SOMEWHERE WITHIN NON-NATIVE GRASSLAND. SITE IS PART OF MOTTE RESERVE MITIGATION SITE.

Owner/Manager: MWD

Occurrence No.	431	**Map Index:**	39955	**EO Index:**	34957	**Element Last Seen:**	1991-07-14
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-07-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-10-19

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10038 / -117.18132	**Accurracy:**	80 meters
UTM:	Zone-11 N3773300 E483275	**Elevation (ft):**	1290
PLSS:	T01S, R03W, Sec. 10 (S)	**Acres:**	0.0

Location: SANTA ANA WASH, 2.6 MILES NORTH OF I-10 ON ORANGE STREET, REDLANDS

Detailed Location: INTERMEDIATE-AGE ALLUVIAL VEGETATION SCRUB HABITAT, SUBSTRATUM IS A SANDY LOAM

Ecological: PERDOMINANT PERENNIAL VEGETATION: ERIODICTYON TRICHOCALYX, ERIOGONUM FASCICULATUM, OPUNTIA PARRYI, AND SCATTERED JUNIPERUS CALIFORNICUS AND YUCCA WHIPPLEI

General: 8 ADULTS, 4 MALE & 4 FEMALE; 1 JUVENILE FEMALE; 1 HATCHLING FEMALE. OTHER INFORMATION: TAIL CONDITION; SNOUT TO TAIL LENGTH; SNOUT TO VENT LENGTH; DATES CAPTURED AND MARKED; WEATHER AND TEMPERATURES.

Owner/Manager: UNKNOWN

Occurrence No.	432	**Map Index:**	39956	**EO Index:**	34958	**Element Last Seen:**	2003-07-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-07-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-02-23

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80946 / -117.25833	**Accurracy:**	specific area
UTM:	Zone-11 N3741059 E476090	**Elevation (ft):**	1960
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	65.8

Location: UNIVERSITY OF CALIFORNIA'S MOTTE RIMROCK RESERVE, 1 MILE WSW OF MAYER FARMS AT HIGHWAY 395. NORTH OF PERRIS.

Detailed Location: 1991: RIVERSIDIAN INTERIOR COASTAL SAGE SCRUB, ON TOP OF A GENTLY SLOPING, NORTHWEST FACING HILL. SUBSTRATUM OF DECOMPOSED GRANITE, CIENEBA ROCKY SANDY LOAM, OCCASIONAL OUTCROPS OF GRANITE BOULDERS. 2003: OBSERVATIONS ON ROADS/TRAILS.

Ecological: DOMINANT PERENNIAL VEGETATION: ERIOGONUM FASCICULATUM, ENCELIA FARINOSA, SALVIA MELLIFERA, S. APIANA, ARTEMISIA CALIFORNICA. 2003: ANTS ABUNDANT.

General: 4 ADULT MALES; 1 JUV MALE; 10 HATCHLINGS (2 FEMALE, 7 MALE 1 UNKNOWN) OTHER INFO: TAIL CONDITION; SNOUT-TAIL & SNOUT-VENT LENGTH; DATES CAPTURED & MARKED; WEATHER & TEMPS. 9-10 JUL 2003: 4 ADULTS OBSERVED.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	433	**Map Index:**	35093	**EO Index:**	34962	**Element Last Seen:**	1991-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-10-20

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09891 / -117.11429	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3773129 E489457	**Elevation (ft):**	1740
PLSS:	T01S, R02W, Sec. 08 (S)	**Acres:**	0.0

Location: 2.8 MILES NNE OF MENTONE, SANTA ANA WASH, WEST AND SOUTH OF GREENSPOT ROAD.

Detailed Location: EXACT LOCATION(S) NOT WELL DESCRIBED.

Ecological: COARSE, SANDY SOIL. SAGE SCRUB WITH ASSOCIATE SPECIES ENCELIA FARINOSA, ERIODICTYON TRICHOCALYX, SALVIA APIANA, HAPLOPAPPUS LINEARIFOLIUS, ERIOGONUM FASICULATUM, AND MIRABILIS CALIFORNIA.

General: 21 INDIVIDUAL WERE OBSERVED WITHIN THE STUDY AREA EITHER ALONG THE MAIN STEM OF SANTA ANA RIVER OR IN ADJACENT ABRADED SANDY HABITATS. SPECIES EXPECTED THROUGHOUT STUDY AREA IN LOOSE SANDY HABITATS.

Owner/Manager: UNKNOWN

Occurrence No.	491	**Map Index:**	52685	**EO Index:**	52685	**Element Last Seen:**	2000-05-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-09-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82326 / -117.32261	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3742606 E470145	**Elevation (ft):**	1860
PLSS:	T04S, R04W, Sec. 17 (S)	**Acres:**	0.0

Location: 0.5 MILE SOUTH OF CAJALCO ROAD AND 3.3 MILES NE OF GAVILAN PEAK, 4.2 MILES NW OF PERRIS

Detailed Location:

Ecological: HABITAT ON PROJECT CONSISTS OF RIVERSIDIAN SAGE SCRUB.

General: UNKNOWN NUMBER OBSERVED AT 1 LOCATION DURING CALIFORNIA GNATCATHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. PROJECT SITE IS SURROUNDED BY RURAL RESIDENTIAL, ORCHARDS AND OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	505	**Map Index:**	53925	**EO Index:**	53925	**Element Last Seen:**	2003-06-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-13

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90257 / -117.01548	**Accurracy:**	specific area
UTM:	Zone-11 N3751353 E498568	**Elevation (ft):**	2200
PLSS:	T03S, R01W, Sec. 20 (S)	**Acres:**	12.5

Location: 2.75 MILES SW OF BEAUMONT

Detailed Location:

Ecological: HABITAT CONSISTS OF CHAPARRAL, DOMINATED BY CHAMISE AND BLACK SAGE.

General: 1 ADULT OBSERVED ON 9 APR 2003; 1 ADULT OBSERVED ON 8 JUN 2003.

Owner/Manager: PVT

Occurrence No.	506	**Map Index:**	53926	**EO Index:**	53926	**Element Last Seen:**	2003-06-17
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-13

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89542 / -117.00391	**Accurracy:**	80 meters
UTM:	Zone-11 N3750561 E499637	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 20 (S)	**Acres:**	0.0

Location: 2.8 MILES SSW OF BEAUMONT

Detailed Location:

Ecological: HABITAT CONSISTS OF A SANDY/ROCKY AREA OF CHAMISE CHAPARRAL.

General: 1 ADULT OBSERVED ON 17 JUN 2003.

Owner/Manager: PVT

Occurrence No.	528	**Map Index:**	59976	**EO Index:**	60012	**Element Last Seen:**	2004-06-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-02-14

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92762 / -117.02465	**Accurracy:**	80 meters
UTM:	Zone-11 N3754131 E497721	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: 0.3 MILE SOUTH OF HIGHWAY 60, 2.5 MILES WEST OF BEAUMONT

Detailed Location:

Ecological: HABITAT CONSISTS OF CHAPARRAL AND NON-NATIVE GRASSLAND WITH ORV USE.

General: 1 ADULT OBSERVED ON 23 JUN 2004.

Owner/Manager: PVT

Occurrence No.	533	**Map Index:**	62597	**EO Index:**	62634	**Element Last Seen:**	2005-09-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-09-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-09-19

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.75861 / -117.29139	**Accurracy:**	80 meters
UTM:	Zone-11 N3735430 E473014	**Elevation (ft):**	1800
PLSS:	T05S, R04W, Sec. 03 (S)	**Acres:**	0.0

Location: WEST END OF OLIVE AVENUE, 0.7 MILE WEST OF SPRING STREET, 3.5 MILES WSW OF PERRIS

Detailed Location:

Ecological: HABITAT CONSISTS PRIMARILY OF RUDERAL VEGETATION (DOVEWEED AND NON-NATIVE GRASSES); GENERAL TOPOGRAPHY WAS A SLOPING HILLSIDE. A NATIVE ANT SOURCE WAS PRESENT ON THE DIRT ROAD WHERE THIS SITE IS CENTERED.

General: 1 ADULT OBSERVED ON 15 SEP 2005.

Owner/Manager: RIV COUNTY

Occurrence No.	541	**Map Index:**	69434	**EO Index:**	70210	**Element Last Seen:**	2006-04-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-04-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-05-30

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80815 / -117.31652	**Accurracy:**	80 meters
UTM:	Zone-11 N3740929 E470704	**Elevation (ft):**	2390
PLSS:	T04S, R04W, Sec. 20 (S)	**Acres:**	0.0

Location: ABOUT 5.3 MILES WNW OF PERRIS, 1.7 MILES NE OF RANCHO DE LAS PIEDRAS.

Detailed Location: MAPPED ACCORDING TO UTM COORDINATES PROVIDED BY SOURCE.

Ecological: RELATIVELY UNDISTURBED SHORT SCRUB AT THE TOP OF A RIDGE.

General: 3 ADULTS OBSERVED ON 24 APR 2006. OBSERVED WHILE CONDUCTING JURISDICTIONAL DELINEATION OF ONSITE DRAINGE.

Owner/Manager: PVT

Occurrence No.	550	**Map Index:**	69446	**EO Index:**	70226	**Element Last Seen:**	2005-04-07
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-04-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-05-31

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.94063 / -117.01419	**Accurracy:**	80 meters
UTM:	Zone-11 N3755573 E498688	**Elevation (ft):**	2300
PLSS:	T03S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: WEST OF BEAUMONT, ABOUT 0.7 MILES WSW OF INTERSECTION OF SAN TIMOTEO CANYON RD AND I-10.

Detailed Location: MAPPED ACCORDING TO UTM COORDINATES PROVIDED BY SOURCE.

Ecological: SPARSE COASTAL SAGE SCRUB WITH GRASSLAND ECOTONE.

General: 2 ADULTS OBSERVED ON 7 APR 2005.

Owner/Manager: PVT

Occurrence No.	735	**Map Index:**	81134	**EO Index:**	82118	**Element Last Seen:**	2008-04-04
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-04-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-02-23

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84128 / -117.31026	**Accurracy:**	80 meters
UTM:	Zone-11 N3744601 E471294	**Elevation (ft):**	1660
PLSS:	T04S, R04W, Sec. 09 (S)	**Acres:**	0.0

Location: MEAD VALLEY, 0.4 MI NW OF CAJALCO RD AND ALEXANDER ST INTERSECTION, 1.3 MI WNW OF MEAD VALLEY PO.

Detailed Location: MAPPED TO PROVIDED COORDINATES.

Ecological: THIS SITE ALSO HAS AT LEAST 10 BURROWING OWLS. GRANITE SPINY LIZARD, GREATER ROADRUNNER WERE ALSO OBSERVED. LEAST BELL'S VIREO LOCATED ON ADJACENT CONSERVATION EASEMENT.

General: ONE ADULT WAS OBSERVED ON 4 APRIL 2008.

Owner/Manager: UNKNOWN

Occurrence No.	741	**Map Index:**	81317	**EO Index:**	82298	**Element Last Seen:**	1991-08-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-08-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-01-12

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90361 / -117.03386	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3751470 E496869	**Elevation (ft):**	2140
PLSS:	T03S, R01W, Sec. 18 (S)	**Acres:**	0.0

Location: LABORDE CANYON, ABOUT 2.0 MI S OF HWY 60 AT JACKRABBIT TRAIL AND NORTHEAST OF EDEN HOT SPRINGS, SW THE TOWN OF BEAUMONT.

Detailed Location: OLD LOCKHEED COORPORATION WEAPON TEST SITE. ELEVATION RANGE IS 2200 TO 2480M.

Ecological: HABITAT CONSISTS OF MIXED CHAPARRAL (CHAMISE, RED BERRY, SHRUB OAK), GRADING INTO RIVERSIDEAN SAGE SCRUB (CALIFORNIA BUCKWHEAT, COASTAL SAGE SCRUB, WHITE SAGE). WEEDY AREA IS DOMINATED BY SHORT PODDED MUSTARD, RED-STEMMED FILAREE.

General: UNKNOWN NUMBERS OF INDIVIDUALS WERE OBSERVED DURING STEPHEN'S KANGAROO RAT SURVEY FROM 30 JUL TO 26 AUG 1991. STEPHEN'S KANGAROO RAT AND ORANGE-THROATED WHIPTAIL WERE OBSERVED DURING SURVEYS.

Owner/Manager: PVT-LOCKHEED CORPORATION

Occurrence No.	767	**Map Index:**	82016	**EO Index:**	82995	**Element Last Seen:**	1929-06-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1929-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-03-14

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80143 / -117.14620	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3740149 E486466	**Elevation (ft):**	1485
PLSS:	T04S, R03W, Sec. 25 (S)	**Acres:**	0.0

Location: NUEVO, RIVERSIDE COUNTY.

Detailed Location: SDNHM SPECIMEN #12009 STATED LOCALITY AS "NUEVO". MAPPED TO TOWN OF NUEVO - EXACT LOCATION IS UNKNOWN.

Ecological:

General: SDNHM SPECIMEN #12009 COLLECTED BY CLYDE SEARL ON 1 JUN 1929.

Owner/Manager: UNKNOWN

Occurrence No.	768	**Map Index:** 47583	**EO Index:**	82997		**Element Last Seen:**	1929-07-08
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1929-07-08
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-03-14

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.91849 / -117.15671	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3753129 E485514	**Elevation (ft):**	1600
PLSS:	T03S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: MORENO, RIVERSIDE COUNTY.

Detailed Location: SDNHM SPECIMEN #12103-4 STATED LOCALITY AS "MORENO". MAPPED TO TOWN OF MORENO. EXACT LOCATION IS UNKNOWN.

Ecological:

General: SDNHM SPECIMEN# 12103-4 COLLECTED BY CLYDE SEARL ON 8 JUL 1929.

Owner/Manager: UNKNOWN

Occurrence No.	769	**Map Index:** 68463	**EO Index:**	83002		**Element Last Seen:**	1936-05-21
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1936-05-21
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-03-16

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88574 / -117.28002	**Accurracy:**	1 mile
UTM:	Zone-11 N3749522 E474105	**Elevation (ft):**	1600
PLSS:	T03S, R04W, Sec. 27 (S)	**Acres:**	0.0

Location: MARCH AIR FORCE BASE, RIVERSIDE COUNTY.

Detailed Location: SDNHM SPECIMENS 14179 AND 25580 STATED LOCALITY AS "MARCH AIR FORCE BASE". EXACT LOCATIONS UNKNOWN.

Ecological:

General: SDNHM SPECIMEN #14179 COLLECTED BY L.H. COOK ON 16 JUN 1930. SDNHM SPECIMEN #25580 COLLECTED BY L.M. KLAUBER ON 21 MAY 1936.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	771	**Map Index:** 58911	**EO Index:**	83030		**Element Last Seen:**	1935-05-23
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1935-05-23
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-03-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.05602 / -117.18288	**Accurracy:**	1 mile
UTM:	Zone-11 N3768382 E483122	**Elevation (ft):**	1400
PLSS:	T01S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: REDLANDS, SAN BERNARDINO COUNTY.

Detailed Location: SDNHM #23705 STATED LOCALITY AS "REDLAND, SAN BERNARDINO COUNTY." EXACT LOCATION IS UNKNOWN.

Ecological:

General: SDNHM SPECIMEN #23705 COLLECTED BY L.M. KLAUBER ON 23 MAY 1935.

Owner/Manager: UNKNOWN

Aspidoscelis hyperythra **Element Code:** ARACJ02060

orangethroat whiptail

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S2
	Other:	DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern			
Habitat:	**General:**	INHABITS LOW-ELEVATION COASTAL SCRUB, CHAPARRAL, AND VALLEY-FOOTHILL HARDWOOD HABITATS.			
	Micro:	PREFERS WASHES & OTHER SANDY AREAS WITH PATCHES OF BRUSH & ROCKS. PERENNIAL PLANTS NECESSARY FOR ITS MAJOR FOOD-TERMITES			

Occurrence No.	6	**Map Index:**	33878	**EO Index:**	27670	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-11

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.96823 / -117.30066	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3758674 E472224	**Elevation (ft):**	2200
PLSS:	T02S, R04W, Sec. 28 (S)	**Acres:**	321.8

Location: BOX SPRING RESERVE (UCNLWRS) NEAR UC RIVERSIDE

Detailed Location: TOWNSHIP 2S, RANGE 4W, EAST HALF OF SECTION 28.

Ecological:

General: AN INHOLDING IN A COUNTY PARK.

Owner/Manager: UCNR-BOX SPRINGS RESERVE

Occurrence No.	43	**Map Index:**	24993	**EO Index:**	27669	**Element Last Seen:**	1966-05-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1966-05-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-06-23

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01874 / -117.27110	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3764267 E474969	**Elevation (ft):**	1500
PLSS:	T02S, R04W (S)	**Acres:**	2755.2

Location: RECHE CANYON, 5 MILES SOUTHEAST OF COLTON.

Detailed Location: 1908: RECHE CANYON NEAR COLTON. 1966: 2 MI NW UP RECHE CANYON. AREA MAPPED IS RECHE CANYON.

Ecological:

General: 7 COLLECTED (MVZ #19-21, 53, 54) BY RICHARDSON JR AND CAMP DURING JULY 1908. LACM SPECIMEN #99905 COLLECTED BY V.A. PARIS ON 13 MAY 1966. ACCORDING TO BRATTSTROM, STILL EXTANT AT OR NEAR THIS SITE IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	47	**Map Index:**	48124	**EO Index:**	64210	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-03-02

Quad Summary: Riverside East (3311783), Riverside West (3311784)

County Summary: Riverside

Lat/Long:	33.97883 / -117.36985	**Accurracy:**	1 mile
UTM:	Zone-11 N3759870 E465836	**Elevation (ft):**	900
PLSS:	T02S, R05W, Sec. 23 (S)	**Acres:**	0.0

Location: RIVERSIDE.

Detailed Location: LOCATION STATED AS RIVERSIDE. LOCATION MAPPED AT THE OLDER PORTION OF RIVERSIDE SINCE IT WAS FROM 1922 OR EARLIER.

Ecological:

General: VAN DENBURGH, 1922. P. 562, MVZUC.

Owner/Manager: UNKNOWN

Occurrence No.	55	**Map Index:**	03634	**EO Index:**	63541	**Element Last Seen:**	1918-03-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1918-03-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-20

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78085 / -117.22794	**Accurracy:**	1 mile
UTM:	Zone-11 N3737880 E478896	**Elevation (ft):**	1450
PLSS:	T04S, R03W, Sec. 31 (S)	**Acres:**	0.0

Location: PERRIS.

Detailed Location: LOCATION GIVEN AS "PERRIS".

Ecological:

General: LA COUNTY MUSEUM# 7757, COLLECTED 26 MAR 1918. ACCORDING TO BRATTSTROM, SPECIES IS STILL PROBABLY AT SITE OR IN IMMEDIATE VICINITY IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	72	**Map Index:**	63452	**EO Index:**	63544	**Element Last Seen:**	1955-04-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1955-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-20

Quad Summary: Riverside East (3311783), San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	33.99580 / -117.28091	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3761726 E474056	**Elevation (ft):**	
PLSS:	T02S, R04W, Sec. 15 (S)	**Acres:**	0.0

Location: PIGEON PASS.

Detailed Location: LOCATION GIVEN AS "RIVERSIDE CO: PIGEON PASS".

Ecological:

General: LA COUNTY MUSEUM# 14749, COLLECTED BY CUNNINGHAM 2 APR 1955. ACCORDING TO BRATTSTROM, STILL AT SITE OR IN IMMEDIATE VICINITY IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	75	**Map Index:**	03359	**EO Index:**	27659	**Element Last Seen:**	1957-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1957-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-18

Quad Summary: Steele Peak (3311773), Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.86939 / -117.35900	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3747732 E466796	**Elevation (ft):**	1700
PLSS:	T03S, R05W, Sec. 36 (S)	**Acres:**	0.0

Location: AREA OF THREE SISTERS PEAKS, SE OF RIVERSIDE.

Detailed Location: EXACT LOCATION UNKNOWN. LOCATION STATED AS "2 MI W, 1 MI S WOODCREST (8 MI S RIVERSIDE) THREE SISTERS PEAKS". LOCATION IS MAPPED TO INCLUDE THREE SISTERS PEAKS AND SURROUNDING AREA.

Ecological:

General: LACM SPECIMEN #99856, COLLECTED 26 APR 1957. ACCORDING TO BRATTSTROM, STILL EXTANT AT SITE OR IN IMMEDIATE VICINITY IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	77	**Map Index:**	03364	**EO Index:**	12281	**Element Last Seen:**	1957-05-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1957-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-18

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84040 / -117.35861	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3744518 E466820	**Elevation (ft):**	1540
PLSS:	T04S, R05W, Sec. 12 (S)	**Acres:**	0.0

Location: NEAR MOCKINGBIRD CANYON, 2 MI S THREE SISTERS, 12 MI S RIVERSIDE.

Detailed Location: LOCATION MAPPED TO INCLUDE AREA 2 MILES SOUTH OF THREE SISTERS.

Ecological:

General: LACM SPECIMENS 99854-5 COLLECTED BY R.B. LOOMIS ON 3 MAY 1957. ACCORDING TO BRATTSTROM, STILL AT SITE OR IN IMMEDIATE VICINITY DURING 1990.

Owner/Manager: UNKNOWN

Occurrence No.	78	**Map Index:**	03303	**EO Index:**	27656	**Element Last Seen:**	1989-06-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-06-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-18

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.85851 / -117.37847	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3746532 E464990	**Elevation (ft):**	1400
PLSS:	T03S, R05W, Sec. 35 (S)	**Acres:**	0.0

Location: MOCKINGBIRD CANYON ROAD, 5.5 MILE SOUTHEAST OF ARLINGTON (ORIGINAL SITE DESCRIPTION, 1959).

Detailed Location: 1930: MOCKINGBIRD CYN. 1952: MOCKINGBIRD CANYON, JUST E OF ARLINGTON. 1989 SURVEY SAMPLED AT WINTERS LANE AND MOCKINGBIRD CANYON ROAD. SITE 1; OBSERVED AT RIPARIAN EDGE. LACM# 99857-60; SBMNH #12: LOCATION STATED AS "LAKE MATHEWS".

Ecological: 2 SITES DESCRIBED AS RIPARIAN. SITE 1: MULEFAT, CHAMISE, ELDERBERRY. SITE 2: CHAMISE, MULEFAT, GRASSES, BUCKWHEAT.

General: LACM# 7758-60, JUL 1930. LACM# 99857-60, 1949/51/52. MVZ# 56475, STEBBINS & BARNES, MAY 1952. SBMNH #12, 1953. LACM# 99852-3, APR 1959. 2 TRANSECTS SAMPLED - 5 LIZARDS SEEN, 1989. STILL EXTANT AT SITE OR IN VICINITY,1990 (BRATTSTROM).

Owner/Manager: UNKNOWN

Occurrence No.	82	**Map Index:**	03350	**EO Index:**	27652	**Element Last Seen:**	1968-06-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1968-06-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-05

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.79126 / -117.36026	**Accurracy:**	1 mile
UTM:	Zone-11 N3739070 E466649	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	0.0

Location: 3 MI S CAJALCO RD ON GAVILAN HILLS RD.

Detailed Location: LOCATION FOR LACM 115682 IS "S OF CAJALCO RD ON GAVILAN HILLS RD". LOCATION FOR LACM #115683-86 IS "3 MI S OF CAJALCO RD ON GAVILAN HILLS RD". AREA MAPPED ALONG GAVILAN HILLS RD 3 MILES SOUTH OF CAJALCO RD.

Ecological:

General: LACM 115682 COLLECTED 11 JUL 1966. LACM SPECIMENS 115683-86 COLLECTED BY M. RUGGLES ON 27 JUN 1968. ACCORDING TO BRATTSTROM, STILL EXTANT AT OR NEAR THIS SITE IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	91	**Map Index:**	03384	**EO Index:**	13111	**Element Last Seen:**	1983-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1983-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-10-22

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81763 / -117.34371	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3741988 E468191	**Elevation (ft):**	2020
PLSS:	T04S, R04W, Sec. 18 (S)	**Acres:**	0.0

Location: IDA LEONA ESTATES, 0.3 MILE WEST OF BIRD PEAK, ~1.4 MILES SE OF INTERSECTION OF GAVILAN AND CAJALCO ROADS, PARCEL 9.

Detailed Location:

Ecological: FOUND MOST COMMONLY NEAR TEMPORARY DRAINAGES OR PERMANENT WATER.

General: INDIVIDUALS SIGHTED, CONSIDERED A LOCAL ENDEMIC. DISTRIBUTION PARALLELS THAT OF STEPHENS KANGAROO RAT.

Owner/Manager: PVT

Occurrence No.	92	**Map Index:**	03386	**EO Index:**	27653	**Element Last Seen:**	1993-04-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-04-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-10-22

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80555 / -117.34041	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740648 E468492	**Elevation (ft):**	2000
PLSS:	T04S, R04W, Sec. 19 (S)	**Acres:**	43.8

Location: IDA LEONA ESTATES, E OF HARFORD SPINGS CO. PARK, 0.4 MI NW OF GAVILAN MINE, 1.3 MI NE OF LAKE MATHEWS DR & GAVILAN RD

Detailed Location:

Ecological: HABITAT CONSISTS OF JUNIPER AND ALLUVIAL SCRUB, SURROUNDED BY OAK AND CHAPARRAL HABITAT.

General: INDIVIDUALS OBSERVED IN 1983. 1 MALE AND 2 FEMALES OBSERVED EXCHANGING COURTSHIP DISPLAYS.

Owner/Manager: PVT

Occurrence No.	125	**Map Index:**	17867	**EO Index:**	9918	**Element Last Seen:**	1989-09-22
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-09-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-12-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80261 / -117.18041	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3740284 E483300	**Elevation (ft):**	1500
PLSS:	T04S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: ABOUT 2.5 MILES SOUTH OF PERRIS RESERVOIR AND 2.5 MILES NORTHEAST OF PERRIS.

Detailed Location:

Ecological: HABITAT IS SPARSE COASTAL SAGE SCRUB, INTERRUPTED BY ROCKY OUTCROPS, ON A SE-FACING SLOPE.

General: ONE ADULT OBSERVED.

Owner/Manager: PVT

Occurrence No.	126	**Map Index:**	17868	**EO Index:**	9917	**Element Last Seen:**	1989-06-11
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-06-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-20

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77985 / -117.13077	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3737754 E487892	**Elevation (ft):**	2000
PLSS:	T04S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location: IN LAKEVIEW MOUNTAINS, ABOUT 3 MILES NORTHEAST OF ROMOLAND.

Detailed Location: 1955: LOCATION GIVEN AS "RIVERSIDE CO: 5 MI E PERRIS".

Ecological: CHAMISE CHAPARRAL - BURNED WITHIN THE LAST YEAR. COMMON PLANTS INCLUDE ADENOSTOMA FASCICULATA, ERIOGONUM FASCICULATUM, RHUS OVATA. SPARSE VEGETATION ON SIDES OF DRY DRAINAGES WITH GRANITE ROCK OUTCROPS.

General: LA COUNTY MUSEUM# 14748, COLLECTED BY CUNNINGHAM ON 2 APR 1955. 2 ADULTS OBSERVED IN SPARSE BURNED CHAPARRAL ON BANKS OF SEASONAL DRAINAGES (NO WATER PRESENT). ACCORDING TO BRATTSTROM, PROBABLY STILL AT SITE OR IN IMMEDIATE VICINITY.

Owner/Manager: PVT

Occurrence No.	128	**Map Index:**	17862	**EO Index:**	9879	**Element Last Seen:**	1991-06-28
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-03-08

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84818 / -117.00538	**Accurracy:**	80 meters
UTM:	Zone-11 N3745323 E499501	**Elevation (ft):**	1600
PLSS:	T04S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: AREA NW THE INTERSECTION OF STATE ROUTE 79 AND GILMAN SPRINGS ROAD, NW OF GILMAN HOT SPRINGS.

Detailed Location: LIZARDS SEEN DURING SEVERAL VISITS TO THIS SITE.

Ecological: MIXED RIVERSIDEAN COASTAL SAGE SCRUB AND RUDERAL PLANT ASSOCIATION; BRITTLE-BRUSH, SHORT-POD MUSTARD, SLENDER WILD OATS, PRICKLY PEARS, RANCHER'S FIDDLENECK.

General: DATES OF SIGHTINGS ARE AS FOLLOWS: 19 APRIL 1991 (ONE OBSERVED), 13 MAY 1991 (ONE OBSERVED), AND 28 JUNE 1991 (TWO OBSERVED).

Owner/Manager: RIV COUNTY, CALTRANS

Occurrence No.	143	**Map Index:**	20058	**EO Index:**	9902	**Element Last Seen:**	1990-06-19
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-06-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1991-12-18

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.02374 / -117.17111	**Accurracy:**	80 meters
UTM:	Zone-11 N3764801 E484202	**Elevation (ft):**	1600
PLSS:	T02S, R03W, Sec. 02 (S)	**Acres:**	0.0

Location: SOUTH OF REDLANDS, BETWEEN SAN TIMOTEO CANYON AND I-10, APPROXIMATELY 0.5 MI EAST OF HILLSIDE CEMETERY.

Detailed Location:

Ecological: HABITAT IS COASTAL SAGE SCRUB AND CHAPARRAL, HEAVILY IMPACTED BY PAST GRAZING AND FREQUENT BURNING. LARGE COMPONENT OF WEEDY ANNUAL GRASSES.

General: TWO ADULTS OBSERVED.

Owner/Manager: PVT

Occurrence No.	144	**Map Index:**	20013	**EO Index:**	1314	**Element Last Seen:**	1991-06-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-12-07

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.05836 / -117.09792	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3768631 E490963	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 28 (S)	**Acres:**	0.0

Location: WESTERN END OF CRAFTON HILLS, NEAR REDLANDS.

Detailed Location:

Ecological: NON-NATIVE ANNUAL GRASS WITH SCATTERED NATIVE SHRUBS SUCH AS ERIOGONUM FASCICULATUM AND SAMBUCUS MEXICANA.

General: ONE OBSERVED.

Owner/Manager: PVT

Occurrence No.	182	**Map Index:**	20929	**EO Index:**	9251	**Element Last Seen:**	1990-06-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-06-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-08

Quad Summary: Winchester (3311761), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.74982 / -117.10575	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3734422 E490205	**Elevation (ft):**	1740
PLSS:	T05S, R02W, Sec. 08 (S)	**Acres:**	0.0

Location: HOMELAND, 0.75 MI NE OF JUNCTION OF JUNIPER FLAT ROAD AND HWY 74.

Detailed Location: CAS LOCATION GIVEN AS 8 MI W OF HEMET.

Ecological: PERENNIALS: MALOSMA LAURINA, ERIOGONUM SP, ARTEMISIA TRIDENTATA, AALVIA LUECOPHYLOA, SALVIA APIANA

General: 1 COLLECTED (CAS# 57780) 16 MAY 1923. 1 OBSERVED BY LEATERMAN AND STRONG, 1990. ALSO, AT SITE OR IN IMMEDIATE VICINITY IN 1990 (BRATTSTROM).

Owner/Manager: UNKNOWN

Occurrence No.	187	**Map Index:**	21100	**EO Index:**	22143	**Element Last Seen:**	1989-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1992-06-23

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.93408 / -117.33090	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3754896 E469418	**Elevation (ft):**	1500
PLSS:	T03S, R04W, Sec. 05 (S)	**Acres:**	0.0

Location: HILLS BETWEEN ESCONDIDO FREEWAY (HWY 60) & ALLESANDRO BLVD, SOUTHEAST OF RIVERSIDE.

Detailed Location:

Ecological:

General: SOURCE CITED AS D. STRONG AND B. LEATHERMAN. OBSERVED 500 METERS OFF CANYON CREST ROAD. SURVEY #9

Owner/Manager: UNKNOWN

Occurrence No.	188	**Map Index:**	21088	**EO Index:**	22134	**Element Last Seen:**	1989-07-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-07-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.96257 / -117.18853	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3758021 E482582	**Elevation (ft):**	2080
PLSS:	T02S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: 0.7 MILES NW OF MORENO BEACH DRIVE (HENDRICK RD) & LOCUST AVENUE, ON RECHE CANYON ROAD, ABOUT 3 MILES ENE OF SUNNYMEAD.

Detailed Location: TWO SURVEYS AT THIS LOCATION; #7 CUT SHORT DUE TO A RAPTOR'S NEST WITH YOUNG PRESENT.

Ecological: SITE #7: RIPARIAN; STRONG SLOPE; BACHARIS SP, CHAMISE, ERIOGONUM FASCICULATUM. SITE #8: CHAPARRAL; GENTAL SLOPE; ADENOSTOMA FASCICULATUM, ERIOGONUM FASCICULATUM.

General: SOURCE CITED AS D. STRONG AND B. LEATHERMAN. SURVEY NUMBERS 7 AND 8; OBSERVED 1 AND 2 LIZARDS RESPECTIVELY.

Owner/Manager: UNKNOWN

Occurrence No.	189	**Map Index:**	21090	**EO Index:**	22145	**Element Last Seen:**	1989-07-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-07-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.94676 / -117.14560	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3756262 E486545	**Elevation (ft):**	1840
PLSS:	T03S, R03W, Sec. 36 (S)	**Acres:**	0.0

Location: 0.3 MILES WEST OF THEODORE ROAD ON IRONWOOD AVENUE, MORENO VALLEY, 5 MILES EAST OF SUNNYMEAD.

Detailed Location:

Ecological: COASTAL SAGE. PERENNIALS: SALVIA MELLIFERA, S. OPIANA, ERIOGONUM FASCICULATUM.

General: 1 LIZARD COLLECTED ON SURVEY #10, 1989.

Owner/Manager: UNKNOWN

Occurrence No.	190	**Map Index:**	21089	**EO Index:**	8978	**Element Last Seen:**	1989-08-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.93076 / -117.17961	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3754493 E483399	**Elevation (ft):**	1840
PLSS:	T03S, R03W, Sec. 10 (S)	**Acres:**	0.0

Location: HILL AREA 0.5 MILES SOUTH OF THE POMONA FREEWAY AT MORENO BEACH DRIVE, 3 MILES ESE OF SUNNYMEAD, MORENO VALLEY.

Detailed Location: LIZARD FOUND 0.4 MILES UP A DIRT ROAD WEST OFF MORENO BEACH DR.

Ecological: COASTAL SAGE. SALVIA OPIANA, ADENOSTOMA FASCICULATUM, ERIOGONUM FASCICULATUM.

General: 2 MALES AND 1 FEMALE OBSERVED ON SURVEYS NUMBERS 13 AND 14.

Owner/Manager: UNKNOWN

Occurrence No.	193	**Map Index:**	21134	**EO Index:**	22135	**Element Last Seen:**	1989-08-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-19

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89949 / -117.06361	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3751013 E494119	**Elevation (ft):**	1800
PLSS:	T03S, R02W, Sec. 23 (S)	**Acres:**	0.0

Location: ABOUT 1 MILE NORTH OF GILMAN SPRINGS ROAD ON JACKRABBIT TRAIL, ABOUT 0.5 MILES NW OF EDEN HOT SPRINGS, IN THE BADLANDS.

Detailed Location: STRONG SLOPE; AVERAGE 75 DEGREES; EAST FACING. 1916 LOCATION STATED AS "NR MYSTIC LAKE, RIVERSIDE?".

Ecological: MIX OF RIPARIAN, GRASSLAND, AND CHAPARRAL. PERENNIALS: SALVIA APIANA, S. MELLIFERA.

General: LA COUNTY MUSEUM# 7750-56, COLLECTED 14 MAY 1916. 1 PREGNANT FEMALE OBSERVED ON SURVEY NUMBER 12, 1989. ACCORDING TO BRATTSTROM, STILL AT OR NEAR VICINITY OF 1916 LOCATION.

Owner/Manager: UNKNOWN

Occurrence No.	194	**Map Index:**	21209	**EO Index:**	9030	**Element Last Seen:**	1989-06-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-06-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78218 / -117.31232	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3738048 E471084	**Elevation (ft):**	1900
PLSS:	T04S, R04W, Sec. 33 (S)	**Acres:**	0.0

Location: ABOUT 1 MILE WEST OF POST ROAD ON SANTA ROSA (ROAD), ABOUT 5 MILES WEST OF PERRIS.

Detailed Location: APPROXIMATELY 150 METERS FROM RIPARIAN THAT PARALLELS ROAD.

Ecological: CHAPARRAL; PERENNIALS IN ORDER OF DOMINANCE: SALVIA MELLIFERA, ADENOSTOMA FASCICULATUM, ERIOGONUM FASCICULATUM. ROCKY, SANDY SOUTH FACING SLOPE.

General: 2 LIZARDS OBSERVED ON SURVEY #4 BY LEATHERMAN AND STRONG.

Owner/Manager: UNKNOWN

Occurrence No.	209	**Map Index:**	21750	**EO Index:**	7852	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-11

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.81980 / -117.26417	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742208 E475552	**Elevation (ft):**	1750
PLSS:	T04S, R04W, Sec. 14 (S)	**Acres:**	680.9

Location: MOTTE RIMROCK RESERVE. AREA 1.9 MILES NW TO 1.2 MILES SW OF MAYER FARMS AT HIGHWAY 395 (I-15E). NORTH OF PERRIS.

Detailed Location: 1990: NS POLYGON INCLUDES EASTERN 2/3 OF SECTION 14, SOUTH-CENTRAL PART OF SECTION 11, WEST-CENTRAL PART OF SEC 13, AND NW CORNER OF SECTION 24. 1995-99: NW TO SE TRENDING AREA - WEST CENTRAL PORTION OF SECTION 24.

Ecological: HABITAT IS RIVERSIDIAN SAGE SCRUB; DOMINANTS: ERIOGONUM FASICULATUM AND ARTEMISIA CALIFORNICA. PATCHES OF GRASSLAND ON SITE. MODERATE SLOPE. ELEVATION RANGE: 1700-1800 FEET.

General: SEVENTEEN WHIPTAILS SIGHTED IN RIVERSIDIAN SAGE SCRUB HABITAT DURING 1990. TOTAL OF 509 LIZARDS TRAPPED (RANGE 27 - 75 LIZARDS/ARRAY). 22 SAMPLE PERIODS BETWEEN 11 JUL 1995 & 6 OCT 1999 FOR THE MOTTE RESERVE ARRAYS.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	217	**Map Index:**	24634	**EO Index:**	6474	**Element Last Seen:**	1993-06-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1994-01-13

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88280 / -117.30924	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3749204 E471402	**Elevation (ft):**	1760
PLSS:	T03S, R04W, Sec. 28 (S)	**Acres:**	0.0

Location: SOUTH OF VAN BUREN BLVD, 2.5 MILES WEST OF I-215, MARCH AIR FORCE BASE.

Detailed Location: 4 ADULTS AND 1 JUVENILE CAPTURED IN PITFALL TRAPS. ANIMALS WERE NOT MARKED BEFORE RELEASE, SO IT IS UNKNOWN IF THERE WERE ANY RECAPTURES.

Ecological: HABITAT CONSISTS OF GRASSLAND, DOMINATED BY BROMUS, BRASSICA, AND SALSOLA.

General: SITE IS LOCATED ON VACANT AIR FORCE BASE PROPERTY, AND MAY LATER BE EITHER ADDED TO THE EXISTING K-RAT RESERVE OR CONVEYED TO A PRIVATE DEVELOPER.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	240	**Map Index:**	33534	**EO Index:**	29665	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-04-11

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95208 / -117.29253	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3756881 E472970	**Elevation (ft):**	1600
PLSS:	T02S, R04W, Sec. 34 (S)	**Acres:**	0.0

Location: 0.5 MILE NORTH OF THE INTERSECTION OF HWY 395 & HWY 60, 1.5 MILE SE OF UC RIVERSIDE.

Detailed Location: 1919: BOX SPRINGS RD., 3 MI OUT FROM RIVERSIDE. 1987: 0.5 MI N JNT HWY 60 AND HWY 395, W BOX SPRINGS MT. 1989: BOX SPRINGS.

Ecological:

General: 1 COLLECTED (MVZ HERP #7919) BY J.E. LAW ON 21 APR 1919. 4 INDIVIDUALS OBSERVED ON 8 NOVEMBER 1987. UNKNOWN NUMBER DETECTED BY MAYHEW DURING 1989. ACCORDING TO BRATTSTROM, STILL AT OR NEAR THIS SITE IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	259	**Map Index:**	03755	**EO Index:**	35134	**Element Last Seen:**	1989-08-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Perris (3311772), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.86913 / -117.18566	**Accurracy:**	1 mile
UTM:	Zone-11 N3747661 E482828	**Elevation (ft):**	1650
PLSS:	T03S, R03W, Sec. 34 (S)	**Acres:**	0.0

Location: 20 METERS WEST OF CAMP NATURE THEATRE, LOT 17, LAKE PERRIS STATE RECREATIONAL AREA.

Detailed Location: SURVEY #15

Ecological: VEGETATION TYPE CLASSIFIED AS GRASSLAND, 80% GRASS COVER. PERENNIALS PRESENT, IN ORDER OF DOMINANCE: SALVIA OPIANA & ADENOSTOMA FASCICULATUM.

General: 1 OBSERVED, 1989.

Owner/Manager: DPR-LAKE PERRIS SRA

Occurrence No.	260	**Map Index:**	40133	**EO Index:**	35135	**Element Last Seen:**	1989-08-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-08-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-11-10

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84148 / -117.17086	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3744593 E484192	**Elevation (ft):**	1600
PLSS:	T04S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: 300 METERS NORTH OF BIG ROCK, BERNASCONI BEACH, LAKE PERRIS STATE RECREATION AREA.

Detailed Location: SURVEY #16. LIZARDS OBSERVED OFF PAVED ROAD FOR CYCLISTS, ETC.

Ecological: DENSE, THICK FOLIAGE, MOSTLY SALVIA OPIANA AND BRASSICA SP; ALSO MARRUBIUM SP.

General: 2 LIZARDS OBSERVED, 1989.

Owner/Manager: DPR-LAKE PERRIS SRA

Occurrence No.	325	**Map Index:** 52683	**EO Index:**	52683		**Element Last Seen:**	2000-05-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2000-05-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2003-09-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.82640 / -117.32229	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3742955 E470176	**Elevation (ft):**	1800
PLSS:	T04S, R04W, Sec. 17 (S)	**Acres:**	74.3

Location: 0.6 TO 1 MILE SOUTH OF CAJALCO ROAD AND 3.4 MILES NE OF GAVILAN PEAK, 4.5 MILES NW OF PERRIS

Detailed Location:

Ecological: HABITAT ON PROJECT SITE CONSISTS OF RIVERSIDIAN SAGE SCRUB.

General: UNKNOWN NUMBER OBSERVED AT 1 TO 2 LOCATIONS DURING CALIFORNIA GNATCATHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. PROJECT SITE IS SURROUNDED BY RURAL RESIDENTIAL, ORCHARDS AND OPEN SPACE.

Owner/Manager: UNKNOWN

Occurrence No.	332	**Map Index:** 54491	**EO Index:**	54491		**Element Last Seen:**	2003-04-XX
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2003-04-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-02-25

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.03636 / -117.08994	**Accurracy:**	80 meters
UTM:	Zone-11 N3766191 E491697	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 33 (S)	**Acres:**	0.0

Location: SW OF YUCAIPA INTERMEDIATE SCHOOL AND 0.2 MILE NORTH OF WEST YUCAIPA BOULEVARD, YUCAIPA

Detailed Location:

Ecological: HABITAT CONSISTS OF NON-NATIVE GRASSLANDS WITH A SMALL AMOUNT OF RIVERSIDEAN SAGE SCRUB; A STAND OF MATURE EUCALYPTUS IS LOCATED IN THE EASTERN PORTION OF THE SITE ALONG WITH STEEP, NARROW FINGERS OF CHAPARRAL HABITAT AND COAST LIVE OAKS.

General: 1 ADULT MALE OBSERVED FORAGING DURING APR 2003.

Owner/Manager: PVT

Occurrence No.	348	**Map Index:**	55888	**EO Index:**	55904	**Element Last Seen:**	1992-11-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-11-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-23

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.87854 / -117.29037	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3748727 E473146	**Elevation (ft):**	1680
PLSS:	T03S, R04W, Sec. 27 (S)	**Acres:**	0.0

Location: WEST MARCH AFB, 0.4 MI S OF VAN BUREN BLVD AND 1.3 MI DIRECTLY E THE END OF KRAMERIA AVE, 1 MILE SW OF ARNOLD HEIGHTS

Detailed Location: SITE 3.

Ecological: HABITAT CONSISTS OF SPARSE SHRUB COVER. TWO SHALLOW PONDS, SEPARATED BY A HIGH DRY AREA, ON SITE. WESTERN POND CONTAINS MATURE TREES FORMING A RELATIVELY CLOSED CANOPY, WHILE EASTERN POND HAS FEWER, YOUNGER TREES W/ MORE OPEN CANOPY.

General: UNKNOWN NUMBER OBSERVED BETWEEN 13 OCT - 24 NOV 1992 DURING BIRD AND SMALL MAMMAL SURVEYS. RESIDENTIAL DEVELOPMENT LOCATED APPROXIMATELY 50 METERS TO THE SOUTH.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	352	**Map Index:**	58348	**EO Index:**	58384	**Element Last Seen:**	2004-10-13
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-10-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-07

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81187 / -117.04611	**Accurracy:**	80 meters
UTM:	Zone-11 N3741298 E495732	**Elevation (ft):**	1735
PLSS:	T04S, R02W, Sec. 24 (S)	**Acres:**	0.0

Location: HILLSIDES 1 MILE SW OF THE JUNCTION OF PICO ROAD AND MEAD ROAD, WEST SIDE OF THE SAN JACINTO VALLEY

Detailed Location:

Ecological: HABITAT CONSISTS OF RIVERSIDEAN SAGE SCRUB WITHIN RUGGED HILLS WITH ROCKY OUTCROPPINGS; NEARBY WAS A SEEP CONTAINING SYCAMORE WOODLAND.

General: 2 ADULTS OBSERVED ON 13 OCT 2004.

Owner/Manager: UNKNOWN

Occurrence No.	354	**Map Index:**	58351	**EO Index:**	58387	**Element Last Seen:**	2004-10-07
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-10-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-12-07

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.80450 / -117.04933	**Accurracy:**	80 meters
UTM:	Zone-11 N3740481 E495433	**Elevation (ft):**	2120
PLSS:	T04S, R02W, Sec. 24 (S)	**Acres:**	0.0

Location: HILLSIDE 1.5 MILES NW OF THE INTERSECTION OF WARREN ROAD AND COTTONWOOD AVENUE, SAN JACINTO VALLEY

Detailed Location:

Ecological: HABITAT CONSISTS OF RUGGED HILLS WITH RIVERSIDEAN SAGE SCRUB, SOUTHERN MIXED CHAPARRAL, AND ROCKY OUTCROPPINGS.

General: 1 ADULT OBSERVED ON 7 OCT 2004, ALONG A DIRT ROAD.

Owner/Manager: UNKNOWN

Occurrence No.	358	**Map Index:**	63085	**EO Index:**	63158	**Element Last Seen:**	1963-08-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1963-08-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-12-01

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95438 / -117.34533	**Accurracy:**	1 mile
UTM:	Zone-11 N3757152 E468091	**Elevation (ft):**	1000
PLSS:	T02S, R04W, Sec. 31 (S)	**Acres:**	0.0

Location: 3 MILES EAST OF RIVERSIDE.

Detailed Location: LOCATION MAPPED ACCORDING TO COORDINATES PROVIDED BY MVZ WITH A MAXIMUM ERROR DISTANCE OF 1 MILE.

Ecological:

General: 1 COLLECTED (MVZ# 76325) BY T. J. PAPENFUSS AND C. J. RALPH ON 13 AUG 1963. ACCORDING TO BRATTSTROM, STILL AT SITE OR IN IMMEDIATE VICINITY IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	360	**Map Index:**	63658	**EO Index:**	63753	**Element Last Seen:**	1991-04-19
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-04-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-01-12

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86374 / -117.00857	**Accurracy:**	80 meters
UTM:	Zone-11 N3747048 E499206	**Elevation (ft):**	1900
PLSS:	T03S, R01W, Sec. 32 (S)	**Acres:**	0.0

Location: ALONG WEST SIDE OF SR 79, APPROXIMATELY 1.25 MILES N OF THE JUNCTION WITH GILMAN SPRINGS ROAD, NW OF GILMAN HOT SPRINGS.

Detailed Location:

Ecological: MIXED RIVERSIDEAN COASTAL SAGE SCRUB AND RUDERAL PLANT ASSOCIATION. COASTAL SAGE, CALIFORNIA ENCELIA, BRITTLE-BUSH, RED BROME, SLENDER WILD OATS, SHORT-POD MUSTARD, AND RED-STEMMED FILAREE.

General: 1 ADULT OBSERVED ON 19 APR 1991.

Owner/Manager: RIV COUNTY, CALTRANS

Aspidoscelis tigris stejnegeri **Element Code:** ARACJ02143

coastal whiptail

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3T4
	State:	None		**State:**	S2S3
	Other:				
Habitat:	**General:**	FOUND IN DESERTS & SEMIARID AREAS WITH SPARSE VEGETATION AND OPEN AREAS. ALSO FOUND IN WOODLAND & RIPARIAN AREAS.			
	Micro:	GROUND MAY BE FIRM SOIL, SANDY, OR ROCKY.			

Occurrence No.	2	**Map Index:**	24633	**EO Index:**	6475	**Element Last Seen:**	1993-06-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-06-23

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.88078 / -117.29251	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3748975 E472949	**Elevation (ft):**	1680
PLSS:	T03S, R04W, Sec. 27 (S)	**Acres:**	130.8

Location: SOUTH SIDE OF VAN BUREN BLVD (EXTENDING 0.5 MILE SOUTH), 1.5 MILES WEST OF I-215, MARCH AIR FORCE BASE.

Detailed Location: OCT-NOV 1992: SITES 2A, 2B, & 3 - UNKNOWN NUMBER OBSERVED. 1993: 4 INDIVIDUALS WERE TRAPPED UTILIZING PITFALL TRAPS. NO ANIMALS MARKED BEFORE RELEASE, SO IT IS UNKNOWN IF ANY WERE RECAPTURES.

Ecological: HABITAT IN NORTH PORTION CONSISTS OF GRASSLAND, DOMINATED BY BROMUS, BRASSICA, AND SALSOLA. SOUTH PORTION: DISTURBED GRASSLAND - PORTIONS OF AREA FORMERLY LANDFILL OR SCRAPED, 2 SHALLOW PONDS ON SITE.

General: THIS SITE IS VACANT LAND WITHIN THE AIR FORCE BASE; IT HAS NOT YET BEEN DECIDED WHETHER IT WILL BE PRESERVED AS AN ADDITION TO THE K-RAT PRESERVE OR CONVEYED TO A PRIVATE DEVELOPER. RESIDENTIAL AREA LOCATED TO THE SOUTH.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	34	**Map Index:**	48080	**EO Index:**	48525	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-08-09

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80844 / -117.25624	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3740946 E476283	**Elevation (ft):**	1900
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	167.6

Location: MOTTE RIMROCK RESERVE. 1 MILE SOUTHWEST OF MAYER FARMS AT HIGHWAY 395 (I-15E). NORTH OF PERRIS.

Detailed Location: PIT-FALL TRAP ARRAYS 1 TO 10; FOUND IN ALL ARRAYS.

Ecological: MOTTE RESERVE IS MODERATE SIZED FRAGMENT DOMINATED BY COASTAL SAGE SCRUB WITH PATCHES OF GRASSLAND. SITE IS RELATIVELY FLAT, SURROUNDED BY LOW DENSITY HOUSES. SITE IS PART OF THE STEPHENS K-RAT HCP.

General: TOTAL OF 347 LIZARDS TRAPPED (RANGE 9 - 69 LIZARDS/ARRAY). 22 SAMPLE PERIODS BETWEEN 11 JUL 1995 & 6 OCT 1999 FOR ALL OF THE MOTTE RESERVE ARRAYS.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	80	**Map Index:**	59974	**EO Index:**	60010	**Element Last Seen:**	2004-06-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-02-14

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92871 / -117.02436	**Accurracy:**	80 meters
UTM:	Zone-11 N3754252 E497747	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: 0.25 MILE SOUTH OF HIGHWAY 60, 2.5 MILES WEST OF BEAUMONT

Detailed Location:

Ecological: HABITAT CONSISTS OF CHAPARRAL AND NON-NATIVE GRASSLAND WITH ORV USE.

General: 1 ADULT OBSERVED ON 23 JUN 2004.

Owner/Manager: PVT

*** SENSITIVE ***

Occurrence No.	83	**Map Index:**	72476	**EO Index:**	64661	**Element Last Seen:**	1995-09-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-08

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	nonspecific area
UTM:		**Elevation (ft):**	1060
PLSS:		**Acres:**	48.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: AREA MAPPED AS DELHI SOILS. VEGETATION ON SITE IS DOMINATED BY RUDERAL GRASSES AND CALIFORNIA BUCKWHEAT. SOME POTENTIAL HABITAT MAY BE PRESENT (2008 AERIAL IMAGE).

General:

Owner/Manager:

Occurrence No.	89	**Map Index:**	75681	**EO Index:**	76706	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-07-06

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98428 / -117.18583	**Accurracy:**	80 meters
UTM:	Zone-11 N3760429 E482835	**Elevation (ft):**	2418
PLSS:	T02S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: NORTHWEST OF THE BADLANDS, 4 MILES NE OF SUNNYMEAD AND 1.4 MILES S OF THE RIVERSIDE/SAN BERNARDINO COUNTY LINE.

Detailed Location: .

Ecological: DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB. MODERATE TO STEEP ROLLING HILLS.

General: 1 OBSERVED AT THIS LOCATION.

Owner/Manager: PVT

Occurrence No.	90	**Map Index:**	75683	**EO Index:**	76707	**Element Last Seen:**	2007-06-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-06-30

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.97558 / -117.17578	**Accurracy:**	80 meters
UTM:	Zone-11 N3759462 E483762	**Elevation (ft):**	2246
PLSS:	T02S, R03W, Sec. 22 (S)	**Acres:**	0.0

Location: NORTHWEST EDGE OF THE BADLANDS, 4 MILES NE OF SUNNYMEAD AND 2 MILES S OF THE RIVERSIDE/SAN BERNARDINO COUNTY LINE.

Detailed Location: 0.65 MILE EAST OF JORDAN DRIVE AND 0.75 MILE NORTH OF WALTHER AVE, WEST OF UNNAMED CREEK.

Ecological: DISTURBED, REGROWN, AND UNDISTURBED SAGE SCRUB. MODERATE TO STEEP ROLLING HILLS.

General: 1 OBSERVED AT THIS LOCATION.

Owner/Manager: PVT

Charina trivirgata **Element Code:** ARADA01020

rosy boa

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4G5
	State:	None		**State:**	S3S4
	Other:	IUCN_LC-Least Concern, USFS_S-Sensitive			
Habitat:	**General:**	DESERT & CHAPARRAL FROM THE COAST TO THE MOJAVE & COLORADO DESERTS. PREFERS MODERATE TO DENSE VEGETATION & ROCKY COVER.			
	Micro:	HABITATS WITH A MIX OF BRUSHY COVER & ROCKY SOIL SUCH AS COASTAL CANYONS & HILLSIDES, DESERT CANYONS, WASHES & MOUNTAINS			

Occurrence No.	42	**Map Index:**	80678	**EO Index:**	81694	**Element Last Seen:**	2007-04-24
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-04-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90745 / -117.30425	**Accuracy:**	80 meters
UTM:	Zone-11 N3751936 E471872	**Elevation (ft):**	1767
PLSS:	T03S, R04W, Sec. 16 (S)	**Acres:**	0.0

Location: ON FORMER MARCH AIR FORCE BASE, 1.2 MI SW OF E ALESSANDRO BLVD & I-215 JUNCTION, 1.75 MILES NW OF ARNOLD HEIGHTS.

Detailed Location: JUST SOUTH OF CACTUS AVE BETWEEN HOUSING DEVELOPMENTS. MAPPED ACCORDING TO UTM COORDINATES PROVIDED.

Ecological: AREA CURRENTLY UTILIZED BY PYROTECHNIC BUSINESS. SURROUNDING LANDS MANAGED BY CNLM AS STEPHENS' KANGAROO RAT HABITAT.

General: 1 ADULT BOA OBSERVED ON 24 APR 2007 NEAR BURNT OUT BUILDING WITHIN PREVIOUS SECURE AREA ON FORMER MARCH AIR FORCE BASE.

Owner/Manager: DOD-MARCH AIR FORCE BASE

Diadophis punctatus modestus

Element Code: ARADB10015

San Bernardino ringneck snake

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T2T3
	State:	None		**State:**	S2?
	Other:	USFS_S-Sensitive			
Habitat:	**General:**	MOST COMMON IN OPEN, RELATIVELY ROCKY AREAS. OFTEN IN SOMEWHAT MOIST MICROHABITATS NEAR INTERMITTENT STREAMS.			
	Micro:	AVOIDS MOVING THROUGH OPEN OR BARREN AREAS BY RESTRICTING MOVEMENTS TO AREAS OF SURFACE LITTER OR HERBACEOUS VEG.			

Occurrence No.	1	**Map Index:** 39705	**EO Index:** 34715	**Element Last Seen:**	1997-04-16
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	1997-04-16
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-09-14

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10295 / -117.00852	**Accuracy:**	1/5 mile
UTM:	Zone-11 N3773571 E499213	**Elevation (ft):**	3460
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: THURMAN FLATS PICNIC AREA, ON THE NORTH SIDE OF MILL CREEK (AND HWY 38), 4 MILES NORTH OF YUCAIPA.

Detailed Location:

Ecological: HABITAT CONSISTS OF SYCAMORE ALDER RIPARIAN FOREST, WITH AN UNDERSTORY OF BLACKBERRY BRAMBLE, ARROYO WILLOWS, AND MULEFAT ALONG STREAM MARGINS. STREAM IS ROCKY/COBBLY, WITH A WIDE FLOODPLAIN AND UPLAND BENCH; CHAPARRAL ALONG CANYON WALLS.

General: 1 ADULT OBSERVED ON 16 APRIL 1997.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	5	**Map Index:** 54959	**EO Index:** 54960	**Element Last Seen:**	2000-05-22
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	2000-05-22
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2004-03-30

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83424 / -117.31888	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3743823 E470494	**Elevation (ft):**	1600
PLSS:	T04S, R04W, Sec. 08 (S)	**Acres:**	959.7

Location: 0.5 MILE N OF CAJALCO RD AND 1 MILE S OF CAJALCO RD, EAST OF WOOD RD AND WEST OF ALEXANDER ST, 6 MILES NE OF PERRIS.

Detailed Location: 1 DETECTION IN NE PORTION & 2 IN SE PORTION OF SITE FOR NORTHERN RED-DIAMOND RATTLESNAKE & SAN BERNARDINO RING-NECKED SNAKE - SYMBOLS ON MAP ARE SAME FOR BOTH SPECIES & SO IT IS NOT CLEAR WHICH SPECIES WAS FOUND AT WHICH LOCATION.

Ecological: SPECIES DETECTED WITHIN RIVERSIDEAN SAGE SCRUB AND NON-NATIVE GRASSLAND ON PROJECT SITE. AREA NORTH OF CAJALCO RD IS RELATIVELY FLAT WITH CITRUS ORCHARDS IN WEST AND GRASSLAND/ROCK OUTCROPS IN REMAINING AREA. NORTH AREA GRAZED BY SHEEP.

General: SPECIES DETECTED ON PROJECT SITE DURING FOCUSED CALIFORNIA GNATCATCHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. SURVEYS CONDUCTED FOR THE BOULDER SPRINGS PROJECT SITE.

Owner/Manager: UNKNOWN

Lampropeltis zonata (parvirubra)

Element Code: ARADB19062

California mountain kingsnake (San Bernardino population)

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4G5
	State:	None		**State:**	S2?
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive			
Habitat:	**General:**	BIGCONE SPRUCE & CHAPARRAL AT LOWER ELEV. BLACK OAK, INCENSE CEDAR, JEFFREY PINE & PONDEROSA PINE AT HIGHER ELEVATIONS.			
	Micro:	WELL-LIT CANYONS WITH ROCKY OUTCROPS OR ROCKY TALUS.			

Occurrence No.	2	**Map Index:** 39705	**EO Index:** 34707	**Element Last Seen:**	1997-04-17
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	1997-04-17
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-09-14

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10295 / -117.00852	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3773571 E499213	**Elevation (ft):**	3460
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: THURMAN FLATS PICNIC AREA, ON THE NORTH SIDE OF MILL CREEK (AND HWY 38), 4 MILES NORTH OF YUCAIPA.

Detailed Location:

Ecological: HABITAT CONSISTS OF SYCAMORE ALDER RIPARIAN FOREST, WITH AN UNDERSTORY OF BLACKBERRY BRAMBLE, ARROYO WILLOWS, AND MULEFAT ALONG STREAM MARGINS. STREAM IS ROCKY/COBBLY, WITH A WIDE FLOODPLAIN AND UPLAND BENCH.

General: 1 ADULT OBSERVED ON 17 APRIL 1997.

Owner/Manager: USFS-SAN BERNARDINO NF

Thamnophis hammondii

Element Code: ARADB36160

two-striped garter snake

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S2
	Other:	BLM_S-Sensitive, DFG_SSC-Species of Special Concern, IUCN_LC-Least Concern, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL CALIFORNIA FROM VICINITY OF SALINAS TO NORTHWEST BAJA CALIFORNIA. FROM SEA TO ABOUT 7,000 FT ELEVATION.			
	Micro:	HIGHLY AQUATIC, FOUND IN OR NEAR PERMANENT FRESH WATER. OFTEN ALONG STREAMS WITH ROCKY BEDS AND RIPARIAN GROWTH.			

Occurrence No.	5	**Map Index:**	23965	**EO Index:**	26499	**Element Last Seen:**	1993-07-31
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1997-01-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-04-10

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.12061 / -117.08642	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3775532 E492030	**Elevation (ft):**	2150
PLSS:	T01S, R02W, Sec. 04 (S)	**Acres:**	0.0

Location: SANTA ANA RIVER, 0.5 MILE DOWNSTREAM FROM THE WARM SPRINGS CANYON JUNCTION, NORTH OF REDLANDS.

Detailed Location:

Ecological: HABITAT WAS MIXED RIPARIAN, DOMINATED BY WILLOW & ALDER STANDS INTERSPERSED WITH OPEN HERBACEOUS COMMUNITIES & ALLUVIAL SCRUB. CONSTRUCTION OF "SEVEN OAKS DAM" HAS DESTROYED MOST RIPARIAN VEGETATION IN THAT PART OF CANYON.

General: ONE 12-INCH SNAKE OBSERVED 7/31/93.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	50	**Map Index:**	39705	**EO Index:**	34708	**Element Last Seen:**	1997-04-16
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-09-14

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10295 / -117.00852	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3773571 E499213	**Elevation (ft):**	3460
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location: THURMAN FLATS PICNIC AREA, ON THE NORTH SIDE OF MILL CREEK (AND HWY 38), 4 MILES NORTH OF YUCAIPA.

Detailed Location:

Ecological: HABITAT CONSISTS OF SYCAMORE ALDER RIPARIAN FOREST, WITH AN UNDERSTORY OF BLACKBERRY BRAMBLE, ARROYO WILLOWS, AND MULEFAT ALONG STREAM MARGINS. STREAM IS ROCKY/COBBLY, WITH A WIDE FLOODPLAIN AND UPLAND BENCH; CHAPARRAL ALONG CANYON WALLS.

General: 1 ADULT OBSERVED ON 16 APRIL 1997.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	92	**Map Index:**	63127	**EO Index:**	63219	**Element Last Seen:**	2005-10-05
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-10-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-11-08

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10811 / -117.09936	**Accurracy:**	80 meters
UTM:	Zone-11 N3774148 E490835	**Elevation (ft):**	1955
PLSS:	T01S, R02W, Sec. 04 (S)	**Acres:**	0.0

Location: SANTA ANA RIVER, ALONG THE ACCESS ROAD TO SEVEN OAKS DAM, JUST UPSTREAM FROM CUTTLE WEIR, NE OF REDLANDS

Detailed Location: THIS SITE WAS DISTURBED DURING CONSTRUCTION OF SEVEN OAKS DAM AND IS RECOVERING. RIVER BED CHANGES WHEN HIGH WATER FLOWS OCCUR.

Ecological: HABITAT CONSISTS OF PERMANENT WATER WITH A PATCH OF RIPARIAN VEGETATION (PRIMARILY WILLOWS) IN THE SANTA ANA RIVER CHANNEL ABOVE CUTTLE WEIR; STEEP CANYON WALLS ON BOTH SIDES OF RIVER. ROAD WAS PAVED; SURROUNDING AREAS SPARSELY VEGETATED.

General: 1 JUVENILE OBSERVED ON 5 OCT 2005.

Owner/Manager: UNKNOWN

Occurrence No.	143	**Map Index:**	80372	**EO Index:**	81358	**Element Last Seen:**	2001-07-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-07-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-10-12

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.11956 / -117.06733	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3775415 E493790	**Elevation (ft):**	2520
PLSS:	T01S, R02W, Sec. 02 (S)	**Acres:**	112.0

Location: CREEK IN WARM SPRINGS CANYON, TRIBUTARY TO SANTA ANA RIVER. 0.7 MI N OF CRAM PEAK.

Detailed Location: MAPPED TO SURVEY REACH LOCATIONSHOWN ON MAP #18, ATTACHED TO REPORT BAC02R0002.

Ecological: USGS MONITORING SITE.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED DURING USGS FIELD SURVEY FOR RANA MUSCOSA ON 27 JUL 2001.

Owner/Manager: USFS-SAN BERNARDINO NF

Crotalus ruber

Element Code: ARADE02090

red-diamond rattlesnake

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S2?
	Other:	DFG_SSC-Species of Special Concern			
Habitat:	**General:**	CHAPARRRAL, WOODLAND, GRASSLAND, & DESERT AREAS FROM COASTAL SAN DIEGO COUNTY TO THE EASTERN SLOPES OF THE MOUNTAINS.			
	Micro:	OCCURS IN ROCKY AREAS & DENSE VEGETATION. NEEDS RODENT BURROWS, CRACKS IN ROCKS OR SURFACE COVER OBJECTS.			

Occurrence No.	21	**Map Index:**	42990	**EO Index:**	42990	**Element Last Seen:**	1988-03-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1988-03-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2000-05-22

Quad Summary: Riverside East (3311783), San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	33.98724 / -117.26744	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3760773 E475298	**Elevation (ft):**	1800
PLSS:	T02S, R04W, Sec. 23 (S)	**Acres:**	663.3

Location: PIGEON PASS ROAD NORTH OF HIGHWAY 60, RIVERSIDE COUNTY.

Detailed Location: SPECIFIC SITE LOCATION NOT GIVEN SO IT WAS MAPPED TO THE ROAD AS DESCRIBED ABOVE.

Ecological:

General: 1 FEMALE COLLECTED (SVL: 109, TL 114, WT 660.9) AND HOUSED AT THE UCLA MUSEUM.

Owner/Manager: UNKNOWN

Occurrence No.	33	**Map Index:**	47523	**EO Index:**	47523	**Element Last Seen:**	1931-04-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1931-04-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-02

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95415 / -117.30958	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3757115 E471395	**Elevation (ft):**	1500
PLSS:	T02S, R04W, Sec. 33 (S)	**Acres:**	0.0

Location: BOX SPRINGS CANYON, JUST SOUTHEAST OF RIVERSIDE.

Detailed Location:

Ecological:

General: SAN DIEGO NATURAL HISTORY MUSEUM #0004385 AND #0004386.

Owner/Manager: UNKNOWN

Occurrence No.	34	**Map Index:**	47524	**EO Index:**	47524	**Element Last Seen:**	1939-06-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1939-06-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-02

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.98332 / -117.28881	**Accurracy:**	1 mile
UTM:	Zone-11 N3760344 E473323	**Elevation (ft):**	2280
PLSS:	T02S, R04W, Sec. 22 (S)	**Acres:**	0.0

Location: BOX SPRINGS GRADE (BOX SPRINGS MOUNTAINS), JUST EAST OF RIVERSIDE.

Detailed Location:

Ecological:

General: SAN DIEGO NATURAL HISTORY MUSEUM # 0031757

Owner/Manager: UNKNOWN

Occurrence No.	40	**Map Index:**	47528	**EO Index:**	47528	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-02

Quad Summary: Steele Peak (3311773)
County Summary: Riverside

Lat/Long:	33.84040 / -117.37108	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3744522 E465667	**Elevation (ft):**	1480
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	0.0

Location: EAST OF LAKE MATHEWS; ALONG EL SOBRANTE ROAD, 0.5 MILE WEST OF JUNCTION WITH CAJALCO ROAD.
Detailed Location:
Ecological:
General: LA COUNTY MUSEUM #0116021
Owner/Manager: UNKNOWN

Occurrence No.	42	**Map Index:**	47529	**EO Index:**	47529	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-02

Quad Summary: Steele Peak (3311773)
County Summary: Riverside

Lat/Long:	33.81896 / -117.35923	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3742140 E466755	**Elevation (ft):**	1840
PLSS:	T04S, R05W, Sec. 13 (S)	**Acres:**	0.0

Location: EAST OF LAKE MATHEWS; ALONG GAVILAN HILLS ROAD ABOUT 1 MILE SOUTH OF CAJALCO ROAD.
Detailed Location:
Ecological:
General: LA COUNTY MUSEUM #0116023. NO DATE GIVEN.
Owner/Manager: UNKNOWN

Occurrence No.	49	**Map Index:**	47571	**EO Index:**	47571	**Element Last Seen:**	1939-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1939-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-04

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774), Riverside West (3311784)
County Summary: Riverside

Lat/Long:	33.86355 / -117.38110	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3747092 E464749	**Elevation (ft):**	1320
PLSS:	T03S, R05W, Sec. 35 (S)	**Acres:**	1092.1

Location: MOCKINGBIRD CANYON, 2.5 MILES NE OF LAKE MATHEWS.
Detailed Location: 2 INDIVIDUALS LOCATED WITHIN CANYON.
Ecological:
General: CAS-SU #0010109 AND #0010110.
Owner/Manager: UNKNOWN

Occurrence No.	53	**Map Index:**	47547	**EO Index:**	47547	**Element Last Seen:**	1923-05-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1923-05-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-02

Quad Summary: Winchester (3311761), Romoland (3311762), Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.74770 / -117.11110	**Accurracy:**	1 mile
UTM:	Zone-11 N3734187 E489710	**Elevation (ft):**	1660
PLSS:	T05S, R02W, Sec. 08 (S)	**Acres:**	0.0

Location: DIRECTIONS GIVEN AS "8 MILES WEST OF HEMET", WHICH PUTS IT IN THE VICINITY OF HOMELAND.

Detailed Location:

Ecological:

General: CAS #0057781. COLLECTED DURING EXPEDITION TO SOUTHERN CALIFORNIA AND LOWER CALIFORNIA.

Owner/Manager: UNKNOWN

Occurrence No.	54	**Map Index:**	47583	**EO Index:**	47583	**Element Last Seen:**	1929-06-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1929-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-04

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.91849 / -117.15671	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3753129 E485514	**Elevation (ft):**	1600
PLSS:	T03S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: MORENO

Detailed Location: NO OTHER LOCATION INFORMATION GIVEN.

Ecological:

General: SAN DIEGO NATURAL HISTORY MUSEUM #0011921

Owner/Manager: UNKNOWN

Occurrence No.	59	**Map Index:**	47557	**EO Index:**	47557	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-03

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.73639 / -117.34114	**Accurracy:**	1 mile
UTM:	Zone-11 N3732980 E468399	**Elevation (ft):**	2000
PLSS:	T05S, R04W, Sec. 18 (S)	**Acres:**	0.0

Location: 4 MILES NORTH OF LAKE ELSINORE.

Detailed Location: COLLECTIONS FROM STOVEPIPE CANYON, ARROYO DEL TORO, AND 3 MILES NORTH OFF HWY 71 ON EL TORO RD.

Ecological:

General: LA COUNTY MUSEUM #0052563, # 0105004 AND # 0105005

Owner/Manager: UNKNOWN

Occurrence No.	60	**Map Index:**	47558	**EO Index:**	47558	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-04-03

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.73676 / -117.29783	**Accurracy:**	1 mile
UTM:	Zone-11 N3733008 E472411	**Elevation (ft):**	1800
PLSS:	T05S, R04W, Sec. 16 (S)	**Acres:**	0.0

Location: 2 MILES WEST AND 4.5 MILES NORTH OF ELSINORE.

Detailed Location: NO OTHER LOCATION INFORMATION GIVEN.

Ecological:

General: LA COUNTY MUSEUM #0105003

Owner/Manager: UNKNOWN

Occurrence No.	64	**Map Index:**	47525	**EO Index:**	47525	**Element Last Seen:**	1947-06-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1947-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-17

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.93871 / -117.29383	**Accurracy:**	1 mile
UTM:	Zone-11 N3755399 E472845	**Elevation (ft):**	1000
PLSS:	T03S, R04W, Sec. 03 (S)	**Acres:**	0.0

Location: BOX SPRINGS (CITRUS EXPERIMENT STATION); SE OF RIVERSIDE.

Detailed Location:

Ecological:

General: 26 JUN 1947: SAN DIEGO NATURAL HISTORY MUSEUM #0038372.

Owner/Manager: UNKNOWN

Occurrence No.	72	**Map Index:**	48124	**EO Index:**	48124	**Element Last Seen:**	1959-09-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1959-09-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-06-17

Quad Summary: Riverside East (3311783), Riverside West (3311784)

County Summary: Riverside

Lat/Long:	33.97883 / -117.36985	**Accurracy:**	1 mile
UTM:	Zone-11 N3759870 E465836	**Elevation (ft):**	900
PLSS:	T02S, R05W, Sec. 23 (S)	**Acres:**	0.0

Location: RIVERSIDE.

Detailed Location: SINCE THE COLLECTION WAS MADE IN 1959, THE LOCATION WAS MAPPED AT THE NORTHERN END (THE OLDER PART) OF RIVERSIDE.

Ecological:

General: CSPUP #0000502.

Owner/Manager: UNKNOWN

Occurrence No.	78	**Map Index:**	51599	**EO Index:**	51599	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-06-19

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.86801 / -117.19197	**Accurracy:**	specific area
UTM:	Zone-11 N3747538 E482244	**Elevation (ft):**	1700
PLSS:	T03S, R03W, Sec. 33 (S)	**Acres:**	15.6

Location: ABOUT 0.45 MI NORTHEAST OF LAKE PERRIS DAM.

Detailed Location: PIT-FALL TRAP ARRAYS 7 & 8.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: 2 SNAKES CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THESE TWO ARRAYS.

Owner/Manager: DFG, DPR

Occurrence No.	79	**Map Index:**	51600	**EO Index:**	51600	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-06-19

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.86385 / -117.20339	**Accurracy:**	80 meters
UTM:	Zone-11 N3747078 E481187	**Elevation (ft):**	1600
PLSS:	T03S, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: 0.27 MI EAST OF KINE AVENUE & 0.38 MI WEST OF LAKE PERRIS DAM.

Detailed Location: PIT-FALL TRAP ARRAY 1.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: 1 SNAKE CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THIS ARRAY.

Owner/Manager: DFG, DPR

Occurrence No.	80	**Map Index:**	48077	**EO Index:**	51601	**Element Last Seen:**	1999-10-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-10-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-06-19

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84562 / -117.14635	**Accurracy:**	80 meters
UTM:	Zone-11 N3745048 E486460	**Elevation (ft):**	1550
PLSS:	T04S, R03W, Sec. 01 (S)	**Acres:**	0.0

Location: ABOUT 1.1 MILES EAST OF PERRIS RESERVOIR, EAST OF BERNASCONI HILLS. 0.3 MI NORTH OF MARTIN ST.

Detailed Location: PIT-FALL TRAP ARRAY 15.

Ecological: OVERALL THE LAKE PERRIS SITE IS A VERY LARGE STUDY AREA DOMINATED BY BRITTLE BUSH, WITH LARGE AREAS OF GRASSLAND & BOULDER FIELDS. MOST ARRAYS ON SOUTH FACING SLOPES, ALTHOUGH SOME ARE FLAT. THIS SITE INCLUDED IN STEPHENS K-RAT HCP.

General: TWO SNAKES CAPTURED. 24 SAMPLE PERIODS BETWEEN 11 JULY 1995 & 6 OCT 1999 FOR ALL OF THE LAKE PERRIS ARRAYS, NOT KNOWN EXACTLY WHICH DATES APPLY TO THIS ARRAY.

Owner/Manager: DFG, DPR

Occurrence No.	89	**Map Index:**	53213	**EO Index:**	54899	**Element Last Seen:**	2002-04-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.76412 / -117.30166	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3736044 E472064	**Elevation (ft):**	2100
PLSS:	T05S, R04W, Sec. 04 (S)	**Acres:**	657.6

Location: NORTH OF STEELE PEAK AND EAST OF STEELE VALLEY, SOUTHWEST OF ELLIS AVE, 3.3 MILES SW OF PERRIS.

Detailed Location: LOCATION GIVEN AS TOWNSHIP 5S RANGE 4W SECTION 4.

Ecological: HABITAT CONSISTS OF COASTAL SAGE SCRUB WITH ROCK OUTCROPPINGS, GRANITIC SOIL. GOLDEN EAGLE, BELL'S SAGE SPARROW AND QUINO CHECKERSPOT ALSO IN VICINITY.

General: 1 ADULT OBSERVED SUNNING ON 9 APR 2002.

Owner/Manager: UNKNOWN

Occurrence No.	95	**Map Index:**	54959	**EO Index:**	54959	**Element Last Seen:**	2000-05-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-03-30

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83424 / -117.31888	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3743823 E470494	**Elevation (ft):**	1600
PLSS:	T04S, R04W, Sec. 08 (S)	**Acres:**	959.7

Location: 0.5 MILE N OF CAJALCO RD AND 1 MILE S OF CAJALCO RD, EAST OF WOOD RD AND WEST OF ALEXANDER ST, 6 MILES NE OF PERRIS.

Detailed Location: 1 DETECTION IN NE PORTION & 2 IN SE PORTION OF SITE FOR NORTHERN RED-DIAMOND RATTLESNAKE & SAN BERNARDINO RING-NECKED SNAKE - SYMBOLS ON MAP ARE SAME FOR BOTH SPECIES & SO IT IS NOT CLEAR WHICH SPECIES WAS FOUND AT WHICH LOCATION.

Ecological: SPECIES DETECTED WITHIN RIVERSIDEAN SAGE SCRUB AND NON-NATIVE GRASSLAND ON PROJECT SITE. AREA NORTH OF CAJALCO RD IS RELATIVELY FLAT WITH CITRUS ORCHARDS IN WEST AND GRASSLAND/ROCK OUTCROPS IN REMAINING AREA. NORTH AREA GRAZED BY SHEEP.

General: SPECIES DETECTED ON PROJECT SITE DURING FOCUSED CALIFORNIA GNATCATCHER SURVEYS CONDUCTED BETWEEN 22 MAR AND 22 MAY 2000. SURVEYS CONDUCTED FOR THE BOULDER SPRINGS PROJECT SITE.

Owner/Manager: UNKNOWN

Occurrence No.	103	**Map Index:**	62996	**EO Index:**	63069	**Element Last Seen:**	2005-07-26
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-07-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-10-31

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.75900 / -117.05601	**Accurracy:**	80 meters
UTM:	Zone-11 N3735436 E494813	**Elevation (ft):**	1600
PLSS:	T05S, R02W, Sec. 02 (S)	**Acres:**	0.0

Location: MOUTH OF REINHARDT CANYON, JUST WEST OF CALIFORNIA AVE AND 1 MILE NORTH OF STATE ROUTE 74, 5 MILES WEST OF HEMET.

Detailed Location: LOCATION MAPPED ACCORDING TO LAT-LONG COORDINATES GIVEN.

Ecological: SUBSTRATE CONSISTS OF SAND AND GRANITE.

General: 7 ADULTS AND 3 JUVENILES OBSERVED ON 26 JUL 2005.

Owner/Manager: PVT

Riversidian Alluvial Fan Sage Scrub

Element Code: CTT32720CA

Riversidian Alluvial Fan Sage Scrub

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1.1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	2	**Map Index:**	03924	**EO Index:**	24585	**Element Last Seen:**	1986-07-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-07-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-13

Quad Summary: Forest Falls (3411618), Yucaipa (3411711), Redlands (3411712), Harrison Mtn. (3411722)

County Summary: San Bernardino

Lat/Long:	34.10419 / -117.10839	**Accurracy:**	specific area
UTM:	Zone-11 N3773713 E490002	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	7259.5

Location: SANTA ANA WASH AND MILL CREEK; NORTH OF REDLANDS AND CRAFTON HILLS.

Detailed Location: ON SOBOBA STONY LOAM SAND AND FLOOD CHANNEL DEPOSITS; REWORKED DURING HIGH WATER. BOUNDARY PER 1985 AERIAL PHOTOS.

Ecological: ERIASTRUM DENSIFOLIUM, ERICAMERIA PINIFOLIA, YUCCA WHIPPLEI, JUNIPERUS CALIFORNICA, OPUNTIA OCCIDENTALIS, O. PARRYI, RHUS INTEGRIFOLIA.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: BLM, SBD VALLEY FCD, OTHERS

Occurrence No.	3	**Map Index:**	03283	**EO Index:**	24427	**Element Last Seen:**	1985-02-12
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-13

Quad Summary: San Bernardino South (3411713), San Bernardino North (3411723), Devore (3411724)

County Summary: San Bernardino

Lat/Long:	34.17532 / -117.39848	**Accurracy:**	specific area
UTM:	Zone-11 N3781667 E463276	**Elevation (ft):**	2000
PLSS:	T01N, R05W (S)	**Acres:**	9218.6

Location: WASHES ON EITHER SIDE OF GLEN HELEN REHABILITATION FACILITY: LYTLE CREEK & CAJON CANYON. SAN BERNARDINO NATIONAL FOREST.

Detailed Location: BOUNDARY PER 1985 AERIAL PHOTOS.

Ecological: LARGE AREA W/ VARIED FAN SCRUB VEG. NEAR STREAM BEDS, ABUNDANT ERIOGONUM FASCIC, ERICAMERIA PINIFOLIA & LEPIDOSPARTUM SQUAMATUM. SITES LESS FREQUENTLY FLOODED: SYCAMORES, MTN MAHOGANY, YUCCA WHIPPLEI. LGE AREAS REWORKED BY ANNUAL FLOODING.

General: MORE SPECIES INFO IN GMF FOR THIS OCCURRENCE. ALSO SEE BIT89R01 IN NC ELF 32720. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: FLOOD CONTROL DIST, PVT, USFS

Occurrence No.	22	**Map Index:**	04268	**EO Index:**	24632	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-13

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.05183 / -117.03051	**Accurracy:**	specific area
UTM:	Zone-11 N3767903 E497184	**Elevation (ft):**	2900
PLSS:	T01S, R01W, Sec. 30 (S)	**Acres:**	50.1

Location: WILSON CREEK, BETWEEN JEFFERSON AND BRYANT STREETS, NORTH OF YUCAIPA.

Detailed Location: MAPPED PER INTERPRETATION OF 1980 AERIAL PHOTOS.

Ecological:

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Southern Riparian Forest

Element Code: CTT61300CA

Southern Riparian Forest

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S4
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	16	**Map Index:**	04110	**EO Index:**	16034	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-23

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.01574 / -117.08171	**Accurracy:**	specific area
UTM:	Zone-11 N3763904 E492455	**Elevation (ft):**	2160
PLSS:	T02S, R02W (S)	**Acres:**	24.5

Location: TRIBUTARY TO YUCAIPA CREEK, BETWEEN WEST AVE AND HWY 10, SW OF YUCAIPA.

Detailed Location: BOUNDARY REPRESENTS EXTENT AS INTERPRETED FROM 1980 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Southern Coast Live Oak Riparian Forest

Element Code: CTT61310CA

Southern Coast Live Oak Riparian Forest

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S4
	Other:				
Habitat:	**General:**				

Micro: ☐

Occurrence No.	137	**Map Index:** 03917	**EO Index:** 13411	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-08-28

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: Riverside, San Bernardino

Lat/Long:	34.00300 / -117.13306	**Accuracy:**	specific area
UTM:	Zone-11 N3762496 E487712	**Elevation (ft):**	1780
PLSS:	T02S, R02W, Sec. 18 (S)	**Acres:**	74.7

Location: LIVE OAK CANYON, FROM ABOUT 1680 TO 1800 FT, SE OF REDLANDS.

Detailed Location: EXTANT, 1978, PER INTERPRETATION OF AERIAL PHOTOS BUT NARROWER CORRIDOR WITH THIN CANOPY SURROUNDED BY RESIDENTIAL DEVELOPMENT.

Ecological: QUERCUS AGRIFOLIA WOODLAND FORMING CLOSED CANOPY ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	143	**Map Index:** 03351	**EO Index:** 15914	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-08-31

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80962 / -117.35774	**Accuracy:**	specific area
UTM:	Zone-11 N3741104 E466889	**Elevation (ft):**	1880
PLSS:	T04S, R05W (S)	**Acres:**	44.6

Location: ALONG GAVILAN ROAD IN VICINITY OF HARFORD SPRING, EAST OF LAKE MATHEWS.

Detailed Location: EXTANT, 1980, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY QUERCUS AGRIFOLIA AND SALIX SPP.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	163	**Map Index:**	04283	**EO Index:**	15901	**Element Last Seen:**	1980-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-08-31

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88488 / -117.01753	**Accurracy:**	specific area
UTM:	Zone-11 N3749392 E498378	**Elevation (ft):**	1820
PLSS:	T03S, R01W, Sec. 30 (S)	**Acres:**	38.0

Location: UNNAMED TRIBUTARY TO LABORDE CANYON, CONFLUENCE ABOUT 1.5 MILES U/S OF SAN JACINTO VALLEY.

Detailed Location: EXTANT, 1980, PER INTERPRETATION OF AERIAL PHOTOS BUT BOUNDARY REDUCED D/S BECAUSE COVER IS VERY THIN.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY QUERCUS AGRIFOLIA.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Southern Cottonwood Willow Riparian Forest

Element Code: CTT61330CA

Southern Cottonwood Willow Riparian Forest

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3.2
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	63	**Map Index:**	04262	**EO Index:**	15788	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.04547 / -117.02857	**Accurracy:**	specific area
UTM:	Zone-11 N3767198 E497362	**Elevation (ft):**	2840
PLSS:	T01S, R01W, Sec. 31 (S)	**Acres:**	91.0

Location: OAK GLEN CREEK, FROM JUNCTION WITH WILSON CREEK U/S ABOUT 1.25 MILES, NE OF YUCAIPA.

Detailed Location: MAPPED FROM INTERPRETATION OF 1978 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	64	**Map Index:**	03377	**EO Index:**	15789	**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04632 / -117.35025	**Accurracy:**	specific area
UTM:	Zone-11 N3767347 E467672	**Elevation (ft):**	860
PLSS:	T01S, R04W (S)	**Acres:**	133.1

Location: SANTA ANA RIVER, STRETCH JUST NORTH OF LA LOMA HILLS, NORTH OF RIVERSIDE.

Detailed Location: EXTANT, 1985, BUT BOUNDARY REDUCED, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS PURE STANDS OF CLOSED CANOPY POPULUS FREMONTII D/S & MIXED STANDS OF CLOSED CANOPY POPULUS FREMONTII & SALIX SPP. OCCURS ON FLOODWAY.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	73	**Map Index:**	03353	**EO Index:**	15779	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.75613 / -117.35675	**Accurracy:**	specific area
UTM:	Zone-11 N3735173 E466960	**Elevation (ft):**	1840
PLSS:	T05S, R05W, Sec. 12 (S)	**Acres:**	177.4

Location: MIDDLE-UPPER PORTIONS OF UNNAMED TRIBUTARY TO WALKER CANYON, JUST WEST OF STOVEPIPE & BULL CANYON ROADS.

Detailed Location: EXTANT, 1980, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY SALIX SPP.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	74	**Map Index:**	03348	**EO Index:**	12477	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.85597 / -117.34768	**Accurracy:**	specific area
UTM:	Zone-11 N3746240 E467838	**Elevation (ft):**	1460
PLSS:	T04S, R05W, Sec. 01 (S)	**Acres:**	167.4

Location: MOCKINGBIRD CANYON BETWEEN MOCKINGBIRD CANYON ROAD & WOOD ROAD ENE OF LAKE MATHEWS.

Detailed Location: EXTANT, 1980, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED SALIX SPP STAND.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	81	**Map Index:**	04304	**EO Index:**	15774	**Element Last Seen:**	1980-04-10
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-05-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86346 / -117.01124	**Accurracy:**	specific area
UTM:	Zone-11 N3747017 E498960	**Elevation (ft):**	1680
PLSS:	T03S, R01W, Sec. 32 (S)	**Acres:**	28.9

Location: LAMB CANYON, FROM ABOUT 1600 TO 1800 FT, TRIBUTARY TO SAN JACINTO RIVER, EAST OF LAKEVIEW.

Detailed Location: MAPPED FROM INTERPRETATION OF 1980 AERIAL PHOTOS. THE FOREST IS CONFINED TO THE BOTTOM OF THE STEEP-WALLED CANYON.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY POPULUS FREMONTII.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: BLM

Occurrence No.	98	**Map Index:**	04180	**EO Index:**	15759	**Element Last Seen:**	1980-02-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-02-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.95492 / -117.06340	**Accurracy:**	specific area
UTM:	Zone-11 N3757159 E494142	**Elevation (ft):**	2170
PLSS:	T02S, R02W (S)	**Acres:**	37.9

Location: SAN TIMENTO CANYON, NEAR HINDA.

Detailed Location: MAPPED FROM INTERPRETATION OF 1980 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	101	**Map Index:**	04443	**EO Index:**	15756	**Element Last Seen:**	1935-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81698 / -116.97105	**Accurracy:**	specific area
UTM:	Zone-11 N3741863 E502679	**Elevation (ft):**	1500
PLSS:	T04S, R01W (S)	**Acres:**	408.4

Location: SAN JACINTO RIVER BED, FROM JUST SOUTH OF GILMAN HOT SPRINGS FOR 2 MILES U/S.

Detailed Location: EXTIRPATED BY AGRICULTURE PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY POPULUS FREMONTII.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	102	**Map Index:**	04411	**EO Index:**	15754	**Element Last Seen:**	1935-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-20

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.82820 / -116.98158	**Accurracy:**	specific area
UTM:	Zone-11 N3743107 E501704	**Elevation (ft):**	1490
PLSS:	T04S, R01W (S)	**Acres:**	415.5

Location: SAN JACINTO RIVER BED, FROM JUST BELOW (WEST OF) GILMAN HOT SPRINGS TO 2 MILES ABOVE (EAST).

Detailed Location: EXTIRPATED BY DEVELOPMENT OF A GOLF COURSE PER INTERPRETATION OF 1980 AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY POPULUS FREMONTII.

General: SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Canyon Live Oak Ravine Forest

Element Code: CTT61350CA

Canyon Live Oak Ravine Forest

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3.3
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	46	**Map Index:** 04196	**EO Index:** 15694	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-08-02

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09267 / -117.05545	**Accurracy:**	specific area
UTM:	Zone-11 N3772432 E494884	**Elevation (ft):**	3400
PLSS:	T01S, R02W, Sec. 11 (S)	**Acres:**	25.0

Location: TRIBUTARY TO MILL CREEK, SW OF MORTON PEAK, SAN BERNARDINO NF.

Detailed Location: EXTANT 1985 PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY (1935) AS CLOSED CANOPY QUERCUS CHRYSOLEPIS.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: USFS-SAN BERNARDINO NF

Southern Sycamore Alder Riparian Woodland

Element Code: CTT62400CA

Southern Sycamore Alder Riparian Woodland

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S4
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	165	**Map Index:**	04316	**EO Index:**	15400	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Forest Falls (3411618), Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10125 / -117.00925	**Accurracy:**	specific area
UTM:	Zone-11 N3773382 E499147	**Elevation (ft):**	3000
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	80.9

Location: MILL CREEK CANYON. FROM 3240 TO 3880 FT, EAST OF REDLANDS.

Detailed Location: MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS.

Ecological: CLOSED CANOPY QUERCUS CHRYSOLEPIS, PLATANUS RACEMOSA & ALNUS RHOMBIFOLIA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	167	**Map Index:**	03701	**EO Index:**	15399	**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.01515 / -117.20624	**Accurracy:**	specific area
UTM:	Zone-11 N3763854 E480957	**Elevation (ft):**	1580
PLSS:	T02S, R03W, Sec. 08 (S)	**Acres:**	28.1

Location: ABOUT 1 MILE SOUTH OF REDLANDS (SIDING), SE OF SAN TIMOTEO CANYON.

Detailed Location: MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS; TWO STANDS ARTIFICIALLY CONNECTED BUT ACTUALLY SEPARATED BY ROAD. DRAINAGE LEADS TO SMALL LEVEE.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	168	**Map Index:**	03870	**EO Index:**	15398	**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary:	Redlands (3411712)
County Summary:	San Bernardino

Lat/Long:	34.12036 / -117.13997	**Accurracy:**	specific area
UTM:	Zone-11 N3775510 E487092	**Elevation (ft):**	1640
PLSS:	T01S, R03W, Sec. 37 (S)	**Acres:**	41.2

Location:	PLUNGE CREEK, IMMEDIATELY U/S FROM JUNCTION W/ NORTH FORK CANAL, EAST OF HARLEM SPRINGS.
Detailed Location:	MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS; SIZE DECREASED BECAUSE COVER DECREASES U/S.
Ecological:	CLOSED CANOPY ALNUS RHOMBIFOLIA & PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.
General:	NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	USFS-SAN BERNARDINO, PVT

Occurrence No.	169	**Map Index:**	03673	**EO Index:**	15397	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-22

Quad Summary:	Sunnymead (3311782)
County Summary:	Riverside

Lat/Long:	33.98360 / -117.21746	**Accurracy:**	specific area
UTM:	Zone-11 N3760359 E479914	**Elevation (ft):**	2200
PLSS:	T02S, R03W, Sec. 20 (S)	**Acres:**	32.4

Location:	RECHE CANYON, FROM CONSOLE SPRINGS TO <1 MILE UPSTREAM, NORTHEAST OF SUNNYMEAD.
Detailed Location:	MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS BUT BOUNDARY DECREASED PER INTERPRETATION OF AERIAL PHOTOS.
Ecological:	CLOSED CANOPY PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.
General:	NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.
Owner/Manager:	PVT

Occurrence No.	170	**Map Index:**	03757	**EO Index:**	15395	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-22

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98710 / -117.17877	**Accurracy:**	specific area
UTM:	Zone-11 N3760740 E483488	**Elevation (ft):**	1920
PLSS:	T02S, R03W, Sec. 15 (S)	**Acres:**	112.9

Location: TWO NORTH-FACING DRAINAGES IN THE BADLANDS, EAST OF CAMP TREE MONT.

Detailed Location: IN 1935 INCLUDED REACH D/S OF CONFLUENCE, NOW CULTIVATED. THE REMAINDER EXTANT, 1935, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: CLOSED CANOPY PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	171	**Map Index:**	03443	**EO Index:**	15396	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.98468 / -117.30189	**Accurracy:**	specific area
UTM:	Zone-11 N3760498 E472116	**Elevation (ft):**	1400
PLSS:	T02S, R04W, Sec. 21 (S)	**Acres:**	35.7

Location: UNNAMED TRIBUTARY TO BELVEDERE HEIGHTS AREA, WEST SIDE OF BOX SPRINGS MTNS.

Detailed Location: MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	172	**Map Index:**	03437	**EO Index:**	15394	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97549 / -117.30541	**Accurracy:**	specific area
UTM:	Zone-11 N3759480 E471787	**Elevation (ft):**	1500
PLSS:	T02S, R04W, Sec. 28 (S)	**Acres:**	44.3

Location: UNNAMED TRIBUTARY TO UC RIVERSIDE FROM BOX SPRINGS RESERVE.

Detailed Location: MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	173	**Map Index:**	03432	**EO Index:**	15393	**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95498 / -117.30422	**Accurracy:**	specific area
UTM:	Zone-11 N3757205 E471890	**Elevation (ft):**	1380
PLSS:	T02S, R04W, Sec. 33 (S)	**Acres:**	73.5

Location: BOX SPRINGS CANYON, FROM ABOUT 1300 TO 1420 FT.

Detailed Location: MAPPED PER INTERPRETATION OF 1985 AERIAL PHOTOS. FRAGMENTED BY HIGHWAY CONSTRUCTION.

Ecological: CLOSED CANOPY PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	174	**Map Index:**	03415	**EO Index:**	12465	**Element Last Seen:**	1980-02-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-02-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.93539 / -117.31673	**Accurracy:**	specific area
UTM:	Zone-11 N3755037 E470728	**Elevation (ft):**	1300
PLSS:	T03S, R04W, Sec. 05 (S)	**Acres:**	145.9

Location: SYCAMORE CANYON, FROM ABOUT 1100 TO 1460 FT.

Detailed Location: EXTANT, 1980, BUT INCREASED BOUNDARY PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: CLOSED CANOPY SALIX SPP & PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	175	**Map Index:**	03373	**EO Index:**	15392	**Element Last Seen:**	1980-02-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-02-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.91507 / -117.34538	**Accurracy:**	specific area
UTM:	Zone-11 N3752792 E468072	**Elevation (ft):**	1420
PLSS:	T03S, R04W, Sec. 18 (S)	**Acres:**	204.5

Location: UNNAMED INTERMITTENT CREEK WEST OF TRAUTWEIN ROAD & ALESSANDRO BLVD JUNCTION.

Detailed Location: EXTANT, 1980, AND BOUNDARY EXTENDED U/S AND D/S PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: CLOSED CANOPY PLATANUS RACEMOSA ACCORDING TO WIESLANDER SURVEY.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	176	**Map Index:**	03379	**EO Index:**	15390	**Element Last Seen:**	1980-02-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-02-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90373 / -117.34347	**Accurracy:**	specific area
UTM:	Zone-11 N3751534 E468245	**Elevation (ft):**	1500
PLSS:	T03S, R04W, Sec. 18 (S)	**Acres:**	52.1

Location: UNNAMED TRIBUTARY TO PRENDA DAM RESERVOIR, FROM ABOUT ROBERTS ROAD TO RIVERSIDE CORPORATE BOUNDARY.

Detailed Location: MAPPED PER INTERPRETATION OF 1980 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	181	**Map Index:**	03413	**EO Index:**	15387	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.77855 / -117.32006	**Accurracy:**	specific area
UTM:	Zone-11 N3737648 E470366	**Elevation (ft):**	1900
PLSS:	T04S, R04W, Sec. 35 (S)	**Acres:**	24.6

Location: UNNAMED TRIBUTARY TO CREEK RUNNING ALONG SANTA ROSA ROAD, NW OF STEELE PEAK/STEELE VALLEY.

Detailed Location: EXTANT, 1985, PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY AS CLOSED CANOPY PLATANUS RACEMOSA.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: BLM

Occurrence No.	182	**Map Index:**	03425	**EO Index:**	12464	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.78593 / -117.31491	**Accurracy:**	specific area
UTM:	Zone-11 N3738465 E470845	**Elevation (ft):**	1980
PLSS:	T04S, R04W, Sec. 33 (S)	**Acres:**	87.3

Location: ALONG SANTA ROSA ROAD & UNNAMED SOUTH-FLOWING TRIBUTARY APPROXIMATELY 1 MILE NORTH OF STEELE VALLEY.

Detailed Location: EXTANT, 1980, PER INTERPRETATION OF AERIAL PHOTOS. MAY EXTEND FURTHER D/S; PHOTOCOVERAGE LIMITED.

Ecological: MAPPED BY WIESLANDER SURVEY AS CLOSED CANOPY QUERCUS AGRIFOLIA AND PLATANUS RACEMOSA.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: BLM, PVT

Occurrence No.	193	**Map Index:**	04040	**EO Index:**	13374	**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-22

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09899 / -117.09626	**Accurracy:**	specific area
UTM:	Zone-11 N3773136 E491120	**Elevation (ft):**	2160
PLSS:	T02S, R02W (S)	**Acres:**	50.3

Location: MORTON CANYON, FROM WASH TO <1 MILE U/S, NE OF REDLANDS.

Detailed Location: EXTANT, 1988, AND EXTENDED BOUNDARY PER INTERPRETATION OF AERIAL PHOTOS.

Ecological: MAPPED BY WIESLANDER SURVEY AS CLOSED CANOPY PLATANUS RACEMOSA.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	232	**Map Index:** 03571	**EO Index:**	15554		**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1998-07-22

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.08504 / -117.23667	**Accurracy:**	specific area
UTM:	Zone-11 N3771610 E478165	**Elevation (ft):**	1100
PLSS:	T01S, R03W (S)	**Acres:**	23.7

Location: ADJACENT TO SOUTH SIDE OF SANTA ANA RIVER, NORTH OF MARIGOLD.

Detailed Location: MAPPED BY INTERPRETATION OF 1985 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD CHECK OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Southern Riparian Scrub

Element Code: CTT63300CA

Southern Riparian Scrub

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3.2
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	41	**Map Index:** 04010	**EO Index:**	15301		**Element Last Seen:**	1985-02-13
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1985-02-13
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1998-07-23

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09237 / -117.10655	**Accurracy:**	specific area
UTM:	Zone-11 N3772403 E490170	**Elevation (ft):**	1840
PLSS:	T01S, R02W, Sec. 08 (S)	**Acres:**	40.8

Location: TRIBUTARY TO SANTA ANA WASH, SOUTH OF MORTON CANYON, NE OF REDLANDS.

Detailed Location:

Ecological: 1985 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	42	**Map Index:**	03497	**EO Index:**	15302	**Element Last Seen:**	1985-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	1998-07-23

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.03459 / -117.26796	**Accurracy:**	specific area
UTM:	Zone-11 N3766023 E475264	**Elevation (ft):**	1360
PLSS:	T01S, R04W, Sec. 35 (S)	**Acres:**	91.1

Location: TRIBUTARY TO RECHE CANYON, SOUTH OF LOMA LINDA.

Detailed Location: 1985 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Occurrence No.	45	**Map Index:**	04230	**EO Index:**	15299	**Element Last Seen:**	1980-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-07-23

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.82733 / -117.04733	**Accurracy:**	specific area
UTM:	Zone-11 N3743012 E495620	**Elevation (ft):**	1450
PLSS:	T04S, R02W, Sec. 13 (S)	**Acres:**	102.7

Location: UNNAMED INTERMITTENT CREEK PARALLEL TO & JUST SW OF PICO ROAD, SAN JACINTO VALLEY.

Detailed Location:

Ecological: 1980 EXTENT MAPPED FROM INTERPRETATION OF AERIAL PHOTOGRAPHS. UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Southern Willow Scrub

Element Code: CTT63320CA

Southern Willow Scrub

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S2.1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	31	**Map Index:** 04042	**EO Index:** 15266	**Element Last Seen:**	1980-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1980-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1998-07-21

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.05256 / -117.10018	**Accurracy:**	specific area
UTM:	Zone-11 N3767988 E490754	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 28 (S)	**Acres:**	36.9

Location: WEST-FACING DRAINAGE OF CRAFTON HILLS, SE OF REDLANDS.

Detailed Location: MAPPED FROM INTERPRETATION OF 1980 AERIAL PHOTOS.

Ecological: UNABLE TO CONVERT TO FLORISTIC CLASSIFICATION, LACKS SPP. INFO.

General: NEEDS FIELD VERIFICATION OF VEGETATION CONDITION, COMPOSITION. SEE WWW.DFG.CA.GOV/BIOGEODATA/VEGCAMP/NATURAL_COMM_BACKGROUND.ASP TO INTERPRET AND ADDRESS THE PRESENCE OF RARE COMMUNITIES.

Owner/Manager: PVT

Rhaphiomidas terminatus abdominalis

Element Code: IIDIP05021

Delhi Sands flower-loving fly

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1T1
	State:	None		**State:**	S1
	Other:				
Habitat:	**General:**	FOUND ONLY IN AREAS OF THE DELHI SANDS FORMATION IN SOUTHWESTERN SAN BERNARDINO & NORTHWESTERN RIVERSIDE COUNTIES.			
	Micro:	REQUIRES FINE, SANDY SOILS, OFTEN WITH WHOLLY OR PARTLY CONSOLIDATED DUNES & SPARSE VEGETATION. OVIPOSITION REQ. SHADE.			

*** SENSITIVE ***

Occurrence No.	1	**Map Index:**	20139	**EO Index:**	9728	**Element Last Seen:**	1998-09-09
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-09-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-09

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	specific area
UTM:		**Elevation (ft):**	1180
PLSS:		**Acres:**	82.1

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT IS WHOLLY OR PARTLY CONSOLIDATED DUNES CONTAINING SANDY SOILS OF THE DELHI SERIES. HABITAT QUALITY IN SOME PARTS OF THIS SITE HAS BEEN REDUCED BY DISKING AND THE SUBSEQUENT INVASION BY TUMBLEWEEDS.

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	2	**Map Index:**	20140	**EO Index:**	9727	**Element Last Seen:**	2003-09-20
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-09-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-11-09

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	nonspecific area
UTM:		**Elevation (ft):**	1100
PLSS:		**Acres:**	31.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT CONSISTS OF WHOLLY OR PARTLY CONSOLIDATED DUNES CONTAINING SANDY SOILS OF THE DELHI SERIES; DOMINANT PLANTS INCLUDE ERIOGONUM FASCICULATUM, HETEROTHECA GRANDIFLORA, AND CROTON CALIFORNICUS. DEVELOPMENT ON 3 SIDES

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	3	**Map Index:**	51553	**EO Index:**	9726	**Element Last Seen:**	1998-09-18
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-09-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-05

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	nonspecific area
UTM:		**Elevation (ft):**	1000
PLSS:		**Acres:**	580.6

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT IS WHOLLY OR PARTLY CONSOLIDATED DUNES CONTAINING SANDY SOILS OF THE DELHI SERIES. DOMINANT PERENNIALS INCLUDE ERIOGONUM FASCICULATUM, DICOREA CANESCENS, CROTON CALIFORNICA, LESSINGIA GLANDULIFERA. SURROUNDED BY HEAVY INDUSTRIAL.

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	4	**Map Index:**	20142	**EO Index:**	9725	**Element Last Seen:**	1998-08-27
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-08-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-05

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	specific area
UTM:		**Elevation (ft):**	1000
PLSS:		**Acres:**	24.8

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: HABITAT IS WHOLLY OR PARTLY CONSOLIDATED DUNES CONTAINING SANDY SOILS OF THE DELHI SERIES.

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	7	**Map Index:**	51663	**EO Index:**	51663	**Element Last Seen:**	1995-09-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-06-27

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	specific area
UTM:		**Elevation (ft):**	1060
PLSS:		**Acres:**	5.5

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: AREA MAPPED AS DELHI SOILS. VEGETATION ON SITE IS DOMINATED BY RUDERAL GRASSES AND CALIFORNIA BUCKWHEAT.

General:

Owner/Manager:

*** SENSITIVE ***

Occurrence No.	13	**Map Index:**	60859	**EO Index:**	60895	**Element Last Seen:**	2001-08-06
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	2001-08-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-05-12

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:		**Accurracy:**	80 meters
UTM:		**Elevation (ft):**	1060
PLSS:		**Acres:**	0.0

Location: *SENSITIVE* LOCATION INFORMATION SUPPRESSED.

Detailed Location: PLEASE CONTACT THE CALIFORNIA NATURAL DIVERSITY DATABASE, CALIFORNIA DEPARTMENT OF FISH AND GAME, FOR MORE INFORMATION: (916) 322-2493

Ecological: 2009 AERIAL PHOTO SHOWS THAT THIS SITE HAS BEEN COMPLETELY DEVELOPED. THERE ARE VACANT PARCELS FROM 0.2 TO 0.4 MI TO THE NW AND NE OF THIS SITE.

General:

Owner/Manager:

Ceratochrysis longimala

Element Code: IIHYM71040

A cuckoo wasp

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	1	**Map Index:** 48124	**EO Index:** 59315	**Element Last Seen:**	1915-03-12
Occ. Rank:	None		**Presence:** Possibly Extirpated	**Site Last Seen:**	1915-03-12
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2006-12-14

Quad Summary: Riverside East (3311783), Riverside West (3311784)

County Summary: Riverside

Lat/Long:	33.97883 / -117.36985	**Accuracy:**	1 mile
UTM:	Zone-11 N3759870 E465836	**Elevation (ft):**	900
PLSS:	T02S, R05W, Sec. 23 (S)	**Acres:**	0.0

Location: RIVERSIDE.

Detailed Location: SINCE THE COLLECTION WAS MADE IN 1915, THE LOCATION WAS MAPPED AT THE NORTHERN END (THE OLDER PART) OF RIVERSIDE.

Ecological: COLLECTED ON ENCELIA FARINOSA.

General: HISTORICAL SPECIMEN (HOLOTYPE MALE). ON PERMANENT LOAN TO CAS.

Owner/Manager: UNKNOWN

Carolella busckana

Element Code: IILEM2X090

Busck's gallmoth

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1G3
	State:	None		**State:**	SH
	Other:				
Habitat:	**General:**				
	Micro:				

Occurrence No.	1	**Map Index:** 60375	**EO Index:** 60411	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	None		**Presence:** Extirpated	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2005-03-07

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04823 / -117.26110	**Accuracy:**	1 mile
UTM:	Zone-11 N3767535 E475901	**Elevation (ft):**	1160
PLSS:	T01S, R04W, Sec. 36 (S)	**Acres:**	0.0

Location: LOMA LINDA.

Detailed Location:

Ecological:

General: HISTORICAL RECORD. PARATYPES #3 AND 4.

Owner/Manager: UNKNOWN

Euphydryas editha quino **Element Code:** IILEPK405L

quino checkerspot butterfly

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G5T1
	State:	None		**State:**	S1
	Other:	XERCES_CI-Critically Imperiled			
Habitat:	**General:**	SUNNY OPENINGS WITHIN CHAPARRAL & COASTAL SAGE SHRUBLANDS IN PARTS OF RIVERSIDE & SAN DIEGO COUNTIES.			
	Micro:	HILLS & MESAS NEAR THE COAST. NEED HIGH DENSITIES OF FOOD PLANTS PLANTAGO ERECTA, P. INSULARIS, ORTHOCARPUS PURPURESCENS			

Occurrence No.	34	**Map Index:**	46609	**EO Index:**	46609	**Element Last Seen:**	1998-01-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-01-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2001-11-28

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80159 / -117.34614	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3740210 E467960	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: 5 MILES WNW OF PERRIS. 0.55 MILES DIRECLTY WEST OF GAVILAN MINE & 1.7 MILES ESE OF GAVILAN PEAK.

Detailed Location:

Ecological:

General: 22 JAN 1998: 2 MATURE LARVAE OBSERVED. 1 LARVA FOUND AT SLIGHTLY DIFFERENT LOCATION ON DIFFERENT DATE - EXACT LOCATION AND DATE NOT GIVEN.

Owner/Manager: UNKNOWN

Texosporium sancti-jacobi **Element Code:** NLTEST7980

woven-spored lichen

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S1.1
	Other:				
Habitat:	**General:**	CHAPARRAL.			
	Micro:	OPEN SITES; IN CALIFORNIA W/ADENOSTOMA FAS., ERIOGONUM, SELAGINELLA. AT PINNACLES, ON SMALL MAMMAL PELLETS. 290-660M.			

Occurrence No.	19	**Map Index:**	56301	**EO Index:**	56317	**Element Last Seen:**	2002-12-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-12-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-08-02

Quad Summary:	Steele Peak (3311773)
County Summary:	Riverside

Lat/Long:	33.80870 / -117.35723	**Accurracy:**	80 meters
UTM:	Zone-11 N3741002 E466936	**Elevation (ft):**	2320
PLSS:	T04S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location:	GAVILAN HILLS, HARTFORD SPRINGS PARK.
Detailed Location:	SE1/4 OF NW1/4 SEC 24.
Ecological:	RARE ON OLD TWIGS IN SOIL DUFF AND ON RABBIT DUNG ON DECOMPOSED GRANITIC SOILS. CHAMISE CHAPARRAL.
General:	ONLY SOURCE OF INFORMATION FOR THIS SITE IS 2002 COLLECTION BY RIEFNER. NEEDS FIELDWORK.
Owner/Manager:	UNKNOWN

Ambrosia pumila **Element Code:** PDAST0C0M0

San Diego ambrosia

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	SANDY LOAM OR CLAY SOIL. IN VALLEYS; PERSISTS WHERE DISTURBANCE HAS BEEN SUPERFICIAL. SOMETIMES ON MARGINS OR NEAR VERNAL POOLS. 20-415M.			

Occurrence No.	54	**Map Index:**	70802	**EO Index:**	71713	**Element Last Seen:**	2005-06-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-06-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-02-11

Quad Summary:	Lake Elsinore (3311763), Steele Peak (3311773)
County Summary:	Riverside

Lat/Long:	33.74939 / -117.30230	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3734410 E472000	**Elevation (ft):**	1900
PLSS:	T05S, R04W, Sec. 09 (S)	**Acres:**	0.0

Location:	0.5 MILE SE OF STEELE PEAK, 4 MILES SW OF PERRIS, AND 6 MILES NNE OF LAKE ELSINORE, NW OF HWY 74.
Detailed Location:	EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS ABOUT 0.5 MILE SSE OF STEELE PEAK IN SECTION 9 TO ENCOMPASS AREAS WITH LOWER ELEVATIONS. LABEL SAYS SPECIMEN WAS COLLECTED IN T6S R4W SECTION 9. ELEVATION IS GIVEN AS 1880-2000 FT.
Ecological:	COASTAL SAGE SCRUB WITH ELEMENTS OF CHAPARRAL, SMALL CANYON WITH RUNNING STREAM. LOCALLY COMMON, PROSTRATE PERENNIAL ON ALKALI FLAT AT BASE OF HILLS.
General:	POPULATION DESCRIBED AS "LOCALLY COMMON". OCCURRENCE BASED ON A 2005 COLLECTION BY SALVATO & CLEMONS. NEEDS FIELDWORK.
Owner/Manager:	UNKNOWN

Helianthus nuttallii ssp. parishii

Element Code: PDAST4N102

Los Angeles sunflower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5TH
	State:	None		**State:**	SH
	Other:	Rare Plant Rank - 1A, USFS_S-Sensitive			
Habitat:	**General:**	MARSHES AND SWAMPS (COASTAL SALT AND FRESHWATER). HISTORICAL FROM SOUTHERN CALIFORNIA.			
	Micro:	5-1675M.			

Occurrence No.	5	**Map Index:** 03430	**EO Index:** 48210	**Element Last Seen:**	1917-10-19
Occ. Rank:	None		**Presence:** Possibly Extirpated	**Site Last Seen:**	1917-10-19
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2002-07-08

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07139 / -117.30560	**Accurracy:**	1 mile
UTM:	Zone-11 N3770113 E471801	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SANTA ANA RIVER, SOUTH OF SAN BERNARDINO.

Detailed Location: EXACT LOCATION UNKNOWN, MAPPED BY CNDDB SOUTH OF SAN BERNARDINO AT THE SANTA ANA RIVER.

Ecological: SWAMP LAND.

General: SITE REPRESENTED BY SIX COLLECTIONS: PARISH (#1025 UC) IN 1885, PARISH (#3826 UC) IN 1895, PARISH (#1931 LAM), PARISH (#5125 RSA & DS) IN 1902, PARISH (#6438 UC) IN 1907, REED (#1961 UC), PARISH (#11632 UC), ET AL. NEEDS FIELDWORK.

Owner/Manager: PVT,SBD COUNTY FLOOD CONT DIST

Centromadia pungens ssp. laevis

Element Code: PDAST4R0R4

smooth tarplant

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4T2
	State:	None		**State:**	S2.1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	VALLEY AND FOOTHILL GRASSLAND, CHENOPOD SCRUB, MEADOWS, PLAYAS, RIPARIAN WOODLAND.			
	Micro:	ALKALI MEADOW, ALKALI SCRUB; ALSO IN DISTURBED PLACES. 0-480M.			

Occurrence No.	2	**Map Index:**	84522	**EO Index:**	19826	**Element Last Seen:**	2005-05-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-22

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07309 / -117.27119	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3770293 E474977	**Elevation (ft):**	1050
PLSS:	T01S, R04W, Sec. 23 (S)	**Acres:**	0.0

Location: SANTA ANA RIVER, EAST OF WATERMAN AVENUE AND JUST SW OF RAILROAD BRIDGE OVER RIVER, SAN BERNARDINO.

Detailed Location: JUST SOUTH OF SANTA ANA RIVER. MAPPED BY CNDDB AS BEST GUESS JUST SW OF RAILROAD BRIDGE OVER SANTA ANA RIVER IN THE SE 1/4 OF THE NW 1/4 OF SECTION 23.

Ecological: RECENTLY DISKED FIELD.

General: APPROXIMATELY 40 PLANTS OBSERVED IN 2005. VAGUE AND HISTORIC COLLECTIONS FROM "SAN BERNARDINO" AND "VICTORIA, ROADSIDE" ARE ALSO ATTRIBUTED TO THIS SITE. NEEDS FIELDWORK TO DETERMINE IF POPULATION IS STILL EXTANT.

Owner/Manager: PVT

Occurrence No.	3	**Map Index:**	28185	**EO Index:**	4016	**Element Last Seen:**	1948-05-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1948-05-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-06

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.05251 / -117.26303	**Accurracy:**	1 mile
UTM:	Zone-11 N3768009 E475724	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: LOMA LINDA.

Detailed Location:

Ecological: GROWING ON HARD ALKALINE SOILS.

General: TWO COLLECTIONS FROM THIS VICINITY; ROOS #3829 IN 1948, AND MUNZ AND JOHNSTON #8902 IN 1924.

Owner/Manager: UNKNOWN

Occurrence No.	4	**Map Index:**	28241	**EO Index:**	3536	**Element Last Seen:**	2009-06-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-09

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.92573 / -117.30797	**Accurracy:**	80 meters
UTM:	Zone-11 N3753964 E471534	**Elevation (ft):**	1460
PLSS:	T03S, R04W, Sec. 09 (S)	**Acres:**	0.0

Location: SYCAMORE CANYON; APPROXIMATELY 1 KM NORTH OF ALESSANDRO BLVD, WEST OF EDGEMONT.

Detailed Location: ALONG TRAIL NEXT TO EDGE OF EAST RIVER BANK. MAPPED BY CNDDB IN THE SE 1/4 OF THE NW 1/4 OF SECTION 9 ACCORDING TO 2009 HERNANDEZ & SPARKS COORDINATES.

Ecological: RIPARIAN AND GRASS. DOMINANT SPECIES INCLUDE BROMUS MADRITENSIS, SALIX GOODDINGII, S. LAEVIGATA, AND DEINANDRA PANICULATA.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 2009. A 1991 REISER COLLECTION FROM "SYCAMORE CANYON PARK WEST OF EUCALYPTUS STREET" IS ALSO ATTRIBUTED TO THIS SITE; UNABLE TO LOCATE EUCALYPTUS STREET.

Owner/Manager: UNKNOWN

Occurrence No.	7	**Map Index:**	28239	**EO Index:**	2587	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-08-15

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.84172 / -117.30995	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3744649 E471323	**Elevation (ft):**	1620
PLSS:	T04S, R04W, Sec. 09 (S)	**Acres:**	0.0

Location: NORTH OF CAJALCO ROAD AND WEST OF ALEXANDER STREET, MEAD VALLEY.

Detailed Location:

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS SITE NAME PROVIDED BY REISER IN "RARE PLANTS OF SAN DIEGO COUNTY."

Owner/Manager: UNKNOWN

Occurrence No.	8	**Map Index:**	28238	**EO Index:**	3563	**Element Last Seen:**	2008-05-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-05-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-19

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80446 / -117.35013	**Accurracy:**	80 meters
UTM:	Zone-11 N3740530 E467592	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: HARFORD SPRINGS COUNTY PARK; 800 METERS EAST OF GAVILAN ROAD, NORTHWEST CORNER OF GAVILAN PLATEAU.

Detailed Location: NEAR DIRT TRAIL. MAPPED BY CNDDB NEAR THE CENTER OF THE SE 1/4 OF SECTION 24 ACCORDING TO 2008 GALVIN COORDINATES.

Ecological: IN WET PLACES ALONG RIPARIAN WOODLAND. RIPARIAN SCRUB SURROUNDED BY NON-NATIVE GRASSLAND. DOMINATED BY ADENOSTOMA FASCICULATUM AND ERIOGONUM FASCICULATUM.

General: TWO 1980 BOYD COLLECTIONS FROM HARFORD SPRINGS COUNTY PARK ARE ATTRIBUTED TO THIS SITE. AREA SEARCHED IN 2003 BUT NO PLANTS WERE FOUND. UNKNOWN NUMBER OF PLANTS OBSERVED IN 2008 AT MAPPED LOCATION.

Owner/Manager: RIV COUNTY

Occurrence No.	9	**Map Index:**	28237	**EO Index:**	2569	**Element Last Seen:**	2003-08-01
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-08-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-19

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83846 / -117.12957	**Accurracy:**	specific area
UTM:	Zone-11 N3744253 E488011	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 07 (S)	**Acres:**	21.0

Location: BOTH SIDES OF THE RAMONA EXPRESSWAY, BETWEEN LAKEVIEW AND SAN JACINTO RIVER, SE OF PERRIS RESERVOIR.

Detailed Location: MAPPED BY CNDDB AS 3 POLYGONS BASED ON 1990 BRAMLET MAPS (W AND E POLYGONS) AND 1999 & 2003 UCR COORDINATES (MIDDLE POLYGON).

Ecological: RUDERAL ROADSIDE SETTING WITH ATRIPLEX ARGENTEA, SALSOLA IBERICA, AVENA FATUA, A. BARBATA, AMBROSIA ACANTHICARPA, BROMUS DIANDRUS, B. RUBENS, SCHISMUS BARBATA, CRESSA TRUXILLENSIS, AND CYNODON DACTYLON.

General: WEST-MOST POLYGON: 2500 PLANTS OBSERVED IN 1990. EAST-MOST POLYGON: 100 PLANTS OBSERVED IN 1990. MIDDLE POLYGON: <100 PLANTS OBSERVED ON ROADSIDE IN 1999, UNKNOWN NUMBER OF PLANTS OBSERVED IN 2003. INCLUDES FORMER OCCURRENCE #10.

Owner/Manager: PVT

Occurrence No.	11	**Map Index:**	28232	**EO Index:**	2510	**Element Last Seen:**	1990-09-05
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-09-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-28

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78993 / -117.20404	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3738882 E481111	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 28 (S)	**Acres:**	24.7

Location: PERRIS VALLEY STORM DRAIN, ABOUT 0.25 MILE NORTH OF SAN JACINTO AVE, NORTHEAST OF PERRIS.

Detailed Location: ON LEVEE EAST OF CHANNEL WITHIN THE CENTER OF THE SW 1/4 OF SECTION 28.

Ecological: IN WEED PATCH BETWEEN DIRT ROAD AND STORM DRAIN WITH SALSOLA IBERICA. PLOWED FIELDS WITH ATRIPLEX ARGENTEA, EREMOCARPUS SETIGERUS, LEPTOCHLOA UNINERVIA, POLYPOGON MONSPELIENSIS, CHENOPODIUM ALBUM, HELIANTHUS ANNUUS, SORGHUM HALEPENSE, ETC.

General: 1 PLANT OBSERVED IN 1990. WHITE SUGGESTS SITE SHOULD SHOULD BE RETAINED AS OPEN SPACE / GREENBELT ALONG THE CHANNEL.

Owner/Manager: PVT

Occurrence No.	12	**Map Index:**	28234	**EO Index:**	2453	**Element Last Seen:**	2008-06-26
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-06-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-22

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77450 / -117.19771	**Accurracy:**	80 meters
UTM:	Zone-11 N3737171 E481693	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: SOUTH OF THE SAN JACINTO RIVER AT CONFLUENCE WITH PERRIS VALLEY STORM DRAIN, ABOUT 1 MILE EAST OF PERRIS.

Detailed Location: SITE IS MAPPED ABOUT 0.25 MILE NORTH OF ELLIS AVE ALONG I-215. A 2008 WHITE & WOOD COLLECTION FROM "I-215 JUST N OF SAN JACINTO RIVER CROSSING" IN SECTION 33 ALSO ATTRIBUTED HERE BUT MAY BE FROM FURTHER NW.

Ecological: RUDERAL HABITAT DOMINATED BY SALSOLA IBERICA AND ATRIPLEX SERENANA. ASSOCIATED WITH HEMIZONIA KELLOGGII, ATRIPLEX ARGENTEA, BROMUS DIANDRUS, HELIANTHUS ANNUUS, BRASSICA GENICULATA, SORGHUM HALIPENSIS, LACTUCA SERRIOLA, CENTAUREA, ET AL.

General: 15 PLANTS IN 1990. 1993 KIRTLAND COLLECTION FROM "ALONG I-215 BETWEEN 4TH ST & 1/4 MI S OF SAN JACINTO RIVER" ATTRIBUTED HERE. ID NEEDS CONFIRMATION; SOME COLLECTIONS FROM AREA ANNOTATED TO SSP. PUNGENS.

Owner/Manager: UNKNOWN

Occurrence No.	13	**Map Index:**	28235	**EO Index:**	2441	**Element Last Seen:**	1990-07-25
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-08-15

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77396 / -117.18321	**Accurracy:**	80 meters
UTM:	Zone-11 N3737108 E483036	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	0.0

Location: ABOUT 0.25 MILE NORTHWEST OF ELLIS ROAD AT SHERMAN ROAD, ABOUT 2.5 MILES EAST OF PERRIS.

Detailed Location:

Ecological: VALLEY SINK SCRUB WITH OPEN SALT PANS. ASSOCIATED WITH SUAEDA TORREYANA, DISTICHLIS SPICATA, BASSIA HYSSOPIFOLIA, BRASSICA GENICULATA, ATRIPLEX ARGENTEA, SALSOLA IBERICA, GEDTUCA MEGALURA, HAPLOPAPPUS VENETUS, AND MARRUBIUM VULGARE.

General: 15 PLANTS OBSERVED IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	14	**Map Index:**	28233	**EO Index:**	2466	**Element Last Seen:**	1990-07-20
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-27

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76652 / -117.21562	**Accurracy:**	specific area
UTM:	Zone-11 N3736289 E480033	**Elevation (ft):**	1420
PLSS:	T05S, R03W, Sec. 05 (S)	**Acres:**	15.0

Location: PERRIS VALLEY AIRPORT, BETWEEN NORTH END OF AIRSTRIP AND CASE ROAD, SOUTH OF PERRIS.

Detailed Location: MAPPED WITHIN THE SE 1/4 OF THE NW 1/4 OF SECTION 5.

Ecological: VALLEY SINK SCRUB WITH ATRIPLEX ARGENTEA, A. SEMIBACCATA, SUAEDA TORREYANA, SALSOLA IBERICA, FRANKENIA GRANDIFOLIA, SIDA LEPROSA, ERODIUM CICUTARIUM, BROMUS DIANDRUS, B. RUBENS, SALICORNIA SUBTERMINALIS, LEPIDIUM DICTYOCARPUM, ET AL.

General: 130 PLANTS OBSERVED IN 1990. THE RARE ATRIPLEX CORONATA VAR. NOTATIOR IS ALSO IN THIS AREA.

Owner/Manager: UNKNOWN

Occurrence No.	15	**Map Index:**	28231	**EO Index:**	3786	**Element Last Seen:**	2006-06-01
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-19

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87252 / -117.11774	**Accurracy:**	specific area
UTM:	Zone-11 N3748028 E489110	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	35.0

Location: DFG SAN JACINTO WILDLIFE AREA, JUST EAST OF DAVIS ROAD NEAR VISITOR CENTER, APPROXIMATELY 2.5 MILES NORTH OF LAKEVIEW.

Detailed Location: MAPPED BY CNDDB AS 3 POLYGONS IN THE SE 1/4 OF THE SW 1/4 OF SECTION 29 AND THE NW 1/4 OF SECTION 32.

Ecological: VALLEY SINK SCRUB WITH ATRIPLEX ARGENTEA, A. ROSEA, SUAEDA TORREYANA, SALSOLA IBERICA, SISYMBRIUM IRIO, FRANKENIA GRANDIFOLIA, SALICORNIA SUBTERMINALIS, HORDEUM LEPORINUM, & MEDICAGO POLYMORPHA. SOIL IS SANDY LOAM & SILTY CLAY, ALKALINE.

General: NE-MOST POLY: 1200 PLANTS IN 1990, UNK # IN 2003, 155 IN 2004. MIDDLE POLY: ~450 IN 2004. SW-MOST POLYGON: 200 IN 1990, PRESENT IN "ENTIRE FIELD" IN 1999, 8000 ESTIMATED IN 2003, 1800 IN 2004, UNKNOWN NUMBER IN 2006. INCLUDES FORMER EO #16.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	17	**Map Index:**	28229	**EO Index:**	3752	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-08-16

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86616 / -117.09513	**Accurracy:**	80 meters
UTM:	Zone-11 N3747320 E491201	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 33 (S)	**Acres:**	0.0

Location: DFG SAN JACINTO WILDLIFE AREA, IN DUCK PONDS 1.5 MILES EAST OF DAVIS ROAD & 0.5 MILE NORTH OF SAN JACINTO RIVER.

Detailed Location: MAPPED NEAR THE NE CORNER OF THE SW 1/4 OF SECTION 33.

Ecological:

General: 3 PLANTS OBSERVED IN 1990. ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1990 MAP BY ERC ENVIRONMENTAL AND ENERGY SERVICES CO.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	18	**Map Index:**	28228	**EO Index:**	3746	**Element Last Seen:**	1990-05-10
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-05-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-06

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84962 / -117.10424	**Accurracy:**	specific area
UTM:	Zone-11 N3745487 E490356	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	9.7

Location: 1 MILE EAST OF DAVIS ROAD & 0.7 MILE NORTH OF THE RAMONA EXPRESSWAY, NORTHEAST OF LAKEVIEW.

Detailed Location: TWO COLONIES MAPPED; NORTHERN ONE IN DRY TIRE TRACKS ON EAST SIDE OF DIRT ROAD 200 METERS NORTH OF MARVIN ROAD, SOUTH OF THE SAN JACINTO RIVER CHANNEL. SECOND COLONY IS ABOUT 300 METERS TO THE SOUTH.

Ecological: GROWING IN DISTURBED FIELD/ALKALI MEADOW WITH CRESSA, BASSIA, DISTICHLIS, AND ATRIPLEX.

General: 548 PLANTS OBSERVED IN 1990 (533 IN ONE STAND; 15 IN THE OTHER). PLANTS ARE SMALL, DISPERSED - NOT A HIGH QUALITY STAND.

Owner/Manager: UNKNOWN

Occurrence No.	19	**Map Index:**	28227	**EO Index:**	3743	**Element Last Seen:**	1990-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-08-16

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85944 / -117.08496	**Accurracy:**	specific area
UTM:	Zone-11 N3746574 E492141	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 03 (S)	**Acres:**	4.4

Location: SOUTH SIDE OF SAN JACINTO RIVER, ABOUT 1.1 MILES NORTHWEST OF BRIDGE STREET CROSSING, NORTHEAST OF LAKEVIEW.

Detailed Location: MAPPED IN THE NW-MOST CORNER OF SECTION 3 ALONG THE RIVER LEVEE.

Ecological:

General: 1100 PLANTS OBSERVED IN 1990. ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1990 MAP BY ERC.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	28226	**EO Index:**	3708	**Element Last Seen:**	1990-04-10
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-27

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85459 / -117.06941	**Accurracy:**	specific area
UTM:	Zone-11 N3746035 E493579	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 03 (S)	**Acres:**	16.5

Location: BOTH SIDES OF BRIDGE STREET ON NORTH SIDE OF SAN JACINTO RIVER, NORTHEAST OF LAKEVIEW.

Detailed Location: TWO COLONIES ALONG THE NORTH LEVEE OF THE RIVER; NORTH COLONY IS ABOUT 50 FEET WEST OF BRIDGE STREET, THE SECOND IS NEAR THE GAGING STATION EAST OF BRIDGE STREET.

Ecological: FALLOW, PLOWED FIELD WITH DENSE, HEAVY SOILS AND LEVEL TOPOGRAPHY.

General: 5000 PLANTS OBERSERVED IN WESTERN COLONY AND 10 IN EASTERN COLONY IN 1990. WESTERN COLONY IS A RELATIVELY PURE, EXTENSIVE STAND. GREATER THAN 1000 PLANTS ESTIMATED IN 1999.

Owner/Manager: UNKNOWN

Occurrence No.	21	**Map Index:**	28225	**EO Index:**	3690	**Element Last Seen:**	1990-04-10
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-08-16

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84986 / -117.04696	**Accurracy:**	80 meters
UTM:	Zone-11 N3745510 E495655	**Elevation (ft):**	1450
PLSS:	T04S, R02W, Sec. 01 (S)	**Acres:**	0.0

Location: 0.15 MILE NORTH OF SAN JACINTO RIVER AND 1.2 MILES EAST OF BRIDGE STREET, SAN JACINTO VALLEY.

Detailed Location: SCATTERED CLUMPS IN UNCULTIVATED BASIN NEXT TO STAGING AREA FOR FARM EQUIPMENT.

Ecological: LARGE INDIVIDUALS INTERSPERSED AMONG DENSE COVER OF PHALARIS, CONYZA, LACTUCA, BRASSICA, AND HELIANTHUS.

General: 140 PLANTS OBSERVED IN 1990.

Owner/Manager: UNKNOWN

Occurrence No.	22	**Map Index:**	28224	**EO Index:**	3664	**Element Last Seen:**	1990-04-10
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-06

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.83283 / -117.03172	**Accurracy:**	specific area
UTM:	Zone-11 N3743621 E497064	**Elevation (ft):**	1450
PLSS:	T04S, R01W, Sec. 07 (S)	**Acres:**	6.9

Location: NORTHEAST EDGE OF DUCK POND/AG DRAINAGE DITCH ABOUT 0.7 MI NORTH OF RAMONA EXPRESSWAY AT WARREN RD, SAN JACINTO VALLEY.

Detailed Location: PLANTS DISTRIBUTED IN SEVERAL PATCHES NEAR THE 'ELBOW' OF A NARROW AGRICULTURAL DRANAGE DITCH (DUCK POND?) ALONG EASTERN AND NORTHERN FOOT OF SMALL HILL.

Ecological: AGRICULTURAL DRAINAGE DITCH WITH MELILOTUS, HELIANTHUS, LACTUCA, AND BASSIA.

General: 1524 PLANTS OBSERVED IN 1990. SITE/OCCURRENCE COULD BE ENHANCED BY CLEARING THE WEEDY SPECIES.

Owner/Manager: UNKNOWN

Occurrence No.	23	**Map Index:**	28223	**EO Index:**	3644	**Element Last Seen:**	1999-07-30
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-07-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-22

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.82083 / -117.02565	**Accurracy:**	specific area
UTM:	Zone-11 N3742291 E497626	**Elevation (ft):**	1460
PLSS:	T04S, R01W, Sec. 18 (S)	**Acres:**	70.0

Location: JUST SOUTH OF THE RAMONA EXPRESSWAY, MOSTLY BETWEEN WARREN ROAD AND SANDERSON AVENUE, SAN JACINTO VALLEY.

Detailed Location: SEVERAL COLONIES MAPPED AS 5 POLYGONS MOSTLY IN THE SOUTH 1/2 OF SECTION 18.

Ecological: ALKALINE SINK SCRUB WITH SUAEDA TORREYANA, BASSIA HYSSOPIFOLIA, SISYMBRIUM IRIO, HORDEUM LEPORINUM, ATRIPLEX ARGENTEA EXPANSA, A. SERENANA, DISTICHLIS SPICATA, LEPIDIUM DICTYOTUM, MATRICARIA MATRICARIOIDES, AND PLANTAGO BIGELOVII.

General: ABOUT 31,000 PLANTS OBSERVED IN 11 COLONIES IN 1990-1991. 1000+ PLANTS ESTIMATED NEAR THE CENTER OF OCCURRENCE IN 1999.

Owner/Manager: PVT

Occurrence No.	24	**Map Index:**	28221	**EO Index:**	3622	**Element Last Seen:**	2009-06-08
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2009-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-04

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81919 / -117.00207	**Accurracy:**	specific area
UTM:	Zone-11 N3742109 E499808	**Elevation (ft):**	1460
PLSS:	T04S, R01W, Sec. 17 (S)	**Acres:**	28.0

Location: ALONG RAMONA BLVD, FROM SANDERSON AVE SE ABOUT 0.6 MILE, SAN JACINTO VALLEY.

Detailed Location: WEST SIDE OF RAMONA BLVD. MAPPED BY CNDDB AS 3 POLYGONS ACCORDING TO A 1991 BRAMLET MAP AND 2009 COORDINATES IN THE SE 1/4 OF SECTION 17 AND THE NE 1/4 OF THE NE 1/4 OF SECTION 20.

Ecological: DISTURBED ALKALINE MEADOW WITH BASSIA HYSSOPIFOLIA, AVENA FATUA, HORDEUM LEPORINUM, BROMUS DIANDRUS, SISYMBRIUM IRIO, ATRIPLEX ARGENTEA EXPANSA, SUAEDA TORREYANA, SPERGULARIA MARINA, DISTICHLIS SPICATA, LEPIDIUM DICTYOTUM, AND HELIANTHUS.

General: NW-MOST POLYGON: 7000 PLANTS OBSERVED IN 1991 (LARGEST # IN DITCH ON S SIDE OF RAMONA BLVD), UNKNOWN NUMBER OF PLANTS IN 1999, "ABUNDANT" IN 2001, 1000 PLANTS ESTIMATED IN 2003. TWO SE-MOST POLYGONS: FEWER THAN 10 PLANTS OBSERVED IN 2009.

Owner/Manager: PVT

Occurrence No.	25	**Map Index:**	28222	**EO Index:**	3630	**Element Last Seen:**	1992-05-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-07-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-10

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81181 / -117.03256	**Accurracy:**	specific area
UTM:	Zone-11 N3741291 E496986	**Elevation (ft):**	1480
PLSS:	T04S, R01W, Sec. 19 (S)	**Acres:**	9.0

Location: JUST EAST OF WARREN ROAD, ABOUT 0.8 MILE SOUTH OF THE RAMONA EXPRESSWAY, SAN JACINTO VALLEY.

Detailed Location: SINGLE COLONY MAPPED FOR THIS OCCURRENCE IN THE SW 1/4 OF THE NW 1/4 OF SECTION 19. PLANTS ALSO OCCUR IN SECTIONS 20, 28 AND 29 ACCORDING TO WHITE. CNDDB ONLY HAS MAP DETAIL FOR COLONY IN SECTION 19. MORE INFO NEEDED FOR OTHER COLONIES.

Ecological: AGRICULTURAL FIELDS, DRAINAGE DITCH, DIRT BERMS AND ROADSIDES.

General: 2000 PLANTS OBSERVED IN 1990. SPECIES ABUNDANT IN THE AREA (SECTIONS 19, 20, 28, 29) IN 1992; PROTECTION OF SITE IS DOUBTFUL ACCORDING TO WHITE. NO PLANTS OBSERVED IN 1999; DRAINAGE DITCH HAS BEEN CLEARED; POSSIBLY IN SURROUNDING FIELDS?

Owner/Manager: PVT

Occurrence No.	26	**Map Index:**	28220	**EO Index:**	3615	**Element Last Seen:**	2001-XX-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-02-02

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.78862 / -117.02980	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3738719 E497240	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 30 (S)	**Acres:**	22.0

Location: VICINITY OF COTTONWOOD LAKE; NEAR THE JUNCTION OF COTTONWOOD AVE AND WARREN RD, SAN JACINTO VALLEY.

Detailed Location: MAPPED BY CNDDB AS 3 POLYGONS. TWO EASTERN POLYGONS ARE SPECIFIC FEATURES BASED ON A 1990 ERC MAP. WESTERN POLYGON JUST NNW OF JCT OF COTTONWOOD AVE & WARREN RD IS NON-SPECIFIC (MAPPED IN VERNAL POOL AREA BUT MAY BE FROM SURROUNDING AREA).

Ecological: WEST MOST POLYGON MAPPED AROUND ALKALI VERNAL POOLS WHICH HAVE BEEN DISTURBED BY CREATION OF DIRT ACCESS ROADS, THICK OVERBURDEN OF MANURE AND AGRICULTURAL ACTIVITIES.

General: 4000 PLANTS OBSERVED IN TWO EASTERN COLONIES IN 1990. 50 PLANTS WERE ESTIMATED ALONG THE ROADSIDE IN THIS AREA IN 1999 (MAP DETAIL NOT PROVIDED). WEST COLONY WAS OBSERVED IN 2001.

Owner/Manager: PVT

Occurrence No.	27	**Map Index:**	28219	**EO Index:**	3581	**Element Last Seen:**	2005-06-10
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-06-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2011-12-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.78623 / -117.01438	**Accuracy:**	specific area
UTM:	Zone-11 N3738454 E498668	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 32 (S)	**Acres:**	45.0

Location: SOUTH SIDE OF COTTONWOOD AVE, FROM SANDERSON AVE TO ABOUT 0.5 MILE WEST OF SANDERSON AVE, SAN JACINTO VALLEY.

Detailed Location: MAPPED BY CNDDB AS 2 POLYGONS IN THE NE 1/4 OF THE NE 1/4 OF SECTION 31 AND THE NORTH 1/2 OF THE NW 1/4 OF SECTION 32.

Ecological: EASTERN POLYGON: MOST OF THE SITE APPEARS TO HAVE BEEN PLANTED IN BARLEY. LIMITED OPEN AREAS ON SITE CONTAIN RUDERAL VEGETATION OR BARE GROUND. THE RUDERAL SPECIES INCLUDE HIRSCHFELDIA INCANA, AMBROSIA PSILOSTACHYA, SALSOLA TRAGUS, ETC.

General: WESTERN COLONY: 95 PLANTS OBSERVED IN 1990, 50 PLANTS ESTIMATED IN 1999. 100+ PLANTS OBSERVED ACROSS SITE IN 2005.

Owner/Manager: PVT

Occurrence No.	28	**Map Index:**	28218	**EO Index:**	3572	**Element Last Seen:**	2010-05-03
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.77079 / -117.03285	**Accurracy:**	specific area
UTM:	Zone-11 N3736743 E496957	**Elevation (ft):**	1510
PLSS:	T05S, R01W, Sec. 06 (S)	**Acres:**	45.0

Location: JUST NORTH OF TRES CERRITOS; NEAR THE JUNCTION OF WARREN ROAD AND ESPLANADE AVENUE, SAN JACINTO VALLEY.

Detailed Location: MAPPED AS TWO POLYGONS IN THE WEST 1/2 OF THE NW 1/4 OF SECTION 6, THE EAST 1/2 OF THE NE 1/4 OF SECTION 1, THE SW 1/4 OF THE SW 1/4 OF SECTION 31 AND THE SE 1/4 OF THE SE 1/4 OF SECTION 36.

Ecological: RUDERAL / DISTURBED VEGETATION ALONG THE DIRT ROADS. CHINO SILT LOAM SOILS, DRAINED, SALINE-ALKALI & TRAVER LOAMY FINE SAND, SALINE-ALKALI, ERODED.

General: 8000 PLANTS IN 1990 & 1999 IN PORTION OF W POLYGON S OF ESPLANADE AVE. UNKNOWN NUMBER OF PLANTS OBSERVED IN PORTION OF W POLY N OF ESPLANADE AVE & E OF WARREN RD IN 2003. HUNDREDS OBSERVED W OF WARREN RD IN 2008. COMMON IN E POLY IN 2010.

Owner/Manager: PVT

Occurrence No.	29	**Map Index:**	28217	**EO Index:**	3566	**Element Last Seen:**	1981-08-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1981-08-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-05-03

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.77211 / -117.05407	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3736890 E494992	**Elevation (ft):**	1800
PLSS:	T05S, R02W, Sec. 02 (S)	**Acres:**	0.0

Location: ALONG REINHARDT CREEK SOUTH OF MAZE STONE COUNTY PARK, BETWEEN HEMET AND HOMELAND NORTH OF HIGHWAY 74.

Detailed Location:

Ecological: LOCALLY COMMON IN DENSE WEEDY GROWTH AT EDGE OF STREAM IN MOIST GRANITIC SOIL.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1981 COLLECTION BY TILFORTH AND WISURA.

Owner/Manager: UNKNOWN

Occurrence No.	34	**Map Index:**	28212	**EO Index:**	3913	**Element Last Seen:**	2005-07-19
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-07-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-21

Quad Summary: Winchester (3311761), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.74072 / -117.04107	**Accurracy:**	specific area
UTM:	Zone-11 N3733409 E496195	**Elevation (ft):**	1500
PLSS:	T05S, R02W, Sec. 13 (S)	**Acres:**	99.0

Location: ALONG SAN DIEGO CANAL FROM JUST SOUTH OF STETSON AVE NORTH TO NEAR ROSE RD, WEST OF WARREN RD, SAN JACINTO VALLEY.

Detailed Location: MAPPED BY CNDDB AS 12 POLYGONS BASED ON 1990, 1995 & 2004 MAPS, 1999 COORDINATES AND 2005 COORDINATES IN SECTIONS 12, 13 AND EXTENDING INTO THE NW 1/4 OF THE NW 1/4 OF SECTION 24.

Ecological: ANNUAL GRASSLAND / ALKALI GRASSLAND. ASSOCIATES INCLUDE LOLIUM PERENNE, PHALARIS MINOR, HORDEUM MURINUM, CRESSA TRUXILLENSIS, SUAEDA MOQUINII, AND LASTHENIA CALIFORNICA.

General: SECTION 12: 4800+ PLANTS IN 1990, 350 PLANTS IN 1993, ~30 IN 1999, OCCASIONAL IN 2003, 1 PLANT IN 2004 IN SMALL PORTION OF SITE, ~10,000 PLANTS IN APRIL 2005. >9000 PLANTS OBS IN 1994 THROUGHOUT EO. ALSO OBSERVED IN JULY 2005 THROUGHOUT EO.

Owner/Manager: PVT

Occurrence No.	62	**Map Index:**	49406	**EO Index:**	49406	**Element Last Seen:**	1999-03-17
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1999-03-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-11-14

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83495 / -117.36540	**Accurracy:**	specific area
UTM:	Zone-11 N3743915 E466190	**Elevation (ft):**	1466
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	1.1

Location: 0.1 AIR MILE NE OF INTERSECTION OF CAJALCO ROAD & EL SOBRANTE ROAD.

Detailed Location: FIELD SURVEY FORM DESCRIBES LOCATION AS 500' EAST OF INTERSECTION & 300' NORTH OF CAJALCO ROAD.

Ecological: MOIST ALKALINE MEADOW/GRASSLAND. ASSOC: HORDEUM MURINUM SSP. LEPORINUM, BROMUS MADRITENSIS, DISTICHLIS SPICATA, FRANKENIA SALINA, HELIANTHUS ANNUS, AMSINCKIA MENZIESII, CALANDRINA CILIATA, HIRSHFELDIA INCANA, ISOCOMA MENZIESII, ET AL.

General: 635 PLANTS OBSERVED IN 1999. STATUS OF CAJALCO CREEK DAM CONSTRUCTION UNKNOWN. HAND REMOVAL OF RIPARIAN VEGETATION BEGAN IN 1999 IN PREPARATION FOR CONSTRUCTION.

Owner/Manager: MWD

Occurrence No.	68	**Map Index:**	49433	**EO Index:**	49433	**Element Last Seen:**	2003-07-31
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-07-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-21

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82957 / -117.14731	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3743269 E486368	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 13 (S)	**Acres:**	0.0

Location: JUST SOUTH OF LAKEVIEW HOT SPRINGS, SOUTHEAST OF LAKE PERRIS.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS TO ENCOMPASS INFO IN A 1991 BRAMLET COLLECTION, MAPS FROM 1991 BRAMLET FIELD SURVEY FORMS FOR NAVARRETIA FOSSALIS WITH CENTROMADIA MENTIONED AS AN ASSOCIATE, AND 1999 & 2003 UCR COORDINATES. NEED MAP DETAIL.

Ecological: DISTURBED ALKALI GRASSLAND WITH HORDEUM GENICULATUM, POLYPOGON MONSPELIENSIS, CIRSIUM VULGARE, RUMEX CRISPUS, MELILOTUS INDICA, ATRIPLEX ARGENTEA, HELIOTROPIUM CURASSAVICUM, AND EPILOBIUM ADENOCAULON.

General: SCARCE IN DRY ALKALI FLATS BUT COMMON IN WET AREAS IN 1989. 1,684 PLANTS OBSERVED IN 1991 JUST SOUTH OF MWD COLORADO AQUEDUCT EASEMENT ROAD (395 M E OF ITS INTERSECTION WITH POZOS AVE). UNKNOWN # OF PLANTS AT N END OF OCC IN 1999 & 2003.

Owner/Manager: UNKNOWN

Occurrence No.	71	**Map Index:**	49518	**EO Index:**	49518	**Element Last Seen:**	2003-05-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-05-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-24

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84582 / -117.12266	**Accurracy:**	specific area
UTM:	Zone-11 N3745067 E488651	**Elevation (ft):**	1425
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	39.0

Location: ALONG SAN JACINTO RIVER, APPROXIMATELY 0.6 AIR MILE NORTH OF LAKEVIEW.

Detailed Location: MAPPED BY CNDDB AS 3 POLYGONS IN THE SE 1/4 SEC 6 & SW 1/4 OF SEC 5. TWO W POLYGONS ARE BASED ON A 1998 METROPOLITAN WATER DISTRICT MAP. E POLYGON IS BASED ON 1999 UCR COORDINATES AND MAY HAVE BEEN THE SAME SITE AS TAYLOR'S 2003 COLLECTION.

Ecological: MARGIN OF AGRICULTURAL FIELD WITH ABUNDANT SISYMBRIUM ALTISSIMUM AND MALVA PARVIFLORA.

General: 11 PLANTS IN NW-MOST POLYGON AND 458 PLANTS IN SW-MOST POLYGON IN 1996. EASTERN POLYGON: 1000+ PLANTS IN 1999. UNKNOWN NUMBER OF PLANTS OBSERVED IN 2003 IN THE SW 1/4 OF THE SW 1/4 OF SECTION 5.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	73	**Map Index:**	53944	**EO Index:**	53944	**Element Last Seen:**	2003-04-25
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-15

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.77635 / -117.02312	**Accurracy:**	specific area
UTM:	Zone-11 N3737359 E497859	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 31 (S)	**Acres:**	0.5

Location: APPROXIMATELY 0.2 AIR MILE NORTH OF ESPLANADE AVENUE, 0.4 AIR MILE WEST OF CAWSTON AVENUE, SAN JACINTO VALLEY.

Detailed Location: ONE SMALL COLONY MAPPED IN THE SW 1/4 OF THE SE 1/4 OF SECTION 31.

Ecological: PLANTS LOCATED ON THE SLOPES OF DRY, ABANDONED RESERVOIR. CHINO SILT LOAM SOILS, DRAINED, SALINE-ALKALI & TRAVER LOAMY FINE SAND, SALINE-ALKALI, ERODED.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 2003.

Owner/Manager: PVT

Occurrence No.	74	**Map Index:**	53945	**EO Index:**	53945	**Element Last Seen:**	1993-06-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-01-15

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78592 / -117.17569	**Accurracy:**	80 meters
UTM:	Zone-11 N3738433 E483734	**Elevation (ft):**	1415
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	0.0

Location: SOUTH OF SAN JACINTO AVENUE, APPROXIMATELY 0.6 AIR MILE EAST OF SAN JACINTO RIVER.

Detailed Location: EXACT LOCATION UNKNOWN, MAPPED IN THE VICINITY OF ATRIPLEX CORONATA V. NOTATIOR OCCURRENCE PROVIDED IN THE NE 1/4 OF THE NE 1/4 OF SECTION 34.

Ecological: PLANTS GROWING ALONG RIVER FLOOD PLAIN IN DISTURBED SEASONALLY FLOODED ALKALI VERNAL PLAINS. ASSOCIATES: ATRIPLEX ROSEA, A. ARGENTA, SUAEDA MOQUINII, HORDEUM INTERCEDENS, H. MURINUM, PLAGIOBOTHRYS LEPTOCLADUS, HEMIZONIA FASCICULATA, ET AL.

General: UNKNOWN NUMBER OF INDIVIDUALS OBSERVED IN 1993. NEEDS FIELDWORK TO CONFIRM LOCATION.

Owner/Manager: PVT

Occurrence No.	84	**Map Index:**	61158	**EO Index:**	61194	**Element Last Seen:**	1995-06-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-29

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86560 / -117.10134	**Accurracy:**	80 meters
UTM:	Zone-11 N3747259 E490625	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 33 (S)	**Acres:**	0.0

Location: SAN JACINTO WILDLIFE AREA. LOVELL UNIT, ALONG ACCESS ROAD.

Detailed Location: 1.83 KM EAST OF DAVIS ROAD AND 762 M NORTH OF THE SAN JACINTO RIVER CHANNEL.

Ecological: ANNUAL GRASSLAND.

General: APPROXIMATELY 2000 PLANTS OBSERVED IN 1995.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	85	**Map Index:**	61159	**EO Index:**	61195	**Element Last Seen:**	2004-04-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-29

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.75706 / -117.02886	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3735220 E497327	**Elevation (ft):**	1520
PLSS:	T05S, R01W, Sec. 07 (S)	**Acres:**	0.0

Location: TRES CERRITOS. 3 AIR MILES WNW OF HEMET. EAST OF THE LAKEVIEW MOUNTAINS.

Detailed Location: MOUTH OF CANYON ON THE SOUTH SIDE. JUST NORTH OF ROSE ROAD.

Ecological: ANNUAL GRASSLAND WITH SMALL VERNAL POOLS ON CLAY-LOAM SOIL. (TRAVERS SERIES).

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2004 COLLECTION BY SANDERS; MENTIONED AS COMMON IN 2004.

Owner/Manager: UNKNOWN

Occurrence No.	86	**Map Index:**	61196	**EO Index:**	61232	**Element Last Seen:**	1995-08-16
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1999-07-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-24

Quad Summary: Winchester (3311761), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.74728 / -117.05855	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3734137 E494576	**Elevation (ft):**	1600
PLSS:	T05S, R02W, Sec. 11 (S)	**Acres:**	324.0

Location: WEST OF HEMET; NORTH OF FLORIDA AVE (HWY 74) & WEST OF CALIFORNIA AVE, SE MARGIN OF LAKEVIEW.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN THE SOUTH 1/2 OF SECTION 11, BASED ON T-R-S PROVIDED BY WHITE.

Ecological: MAJOR HABITATS ARE ARTEMISIA CALIFORNICA / ERIOGONUM FASCICULATUM COASTAL SAGE SCRUB IN GRANITIC BOULDER FIELD FOOTHILLS, & MINOR DRAINAGEWAYS & ROADSIDES WITHIN DRY-FARMED GRAIN FIELD.

General: ABOUT 15 PLANTS OBSERVED IN 1995. NEED MAP DETAIL FOR THIS SITE. NOT OBSERVED IN 1999; MUCH OF THE AREA HAS BEEN DEVELOPED.

Owner/Manager: PVT

Occurrence No.	87	**Map Index:**	61197	**EO Index:**	61233	**Element Last Seen:**	1992-06-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-06-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.97679 / -117.10440	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3759587 E490356	**Elevation (ft):**	1900
PLSS:	T02S, R02W, Sec. 20 (S)	**Acres:**	29.8

Location: SAN TIMOTEO CANYON, 3.2 MILES SOUTHEAST OF REDLANDS BLVD.

Detailed Location:

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1992 COLLECTION BY BALLMER. A 1992 SANDERS COMMUNICATION NOTES THAT THE COLLECTION WAS MADE IN "SAN TIMOTEO CANYON, ACROSS THE ROAD FROM THE OLD SCHOOL HOUSE." INCLUDES FORMER EO #6.

Owner/Manager: UNKNOWN

Occurrence No.	88	**Map Index:**	61198	**EO Index:**	61234	**Element Last Seen:**	1995-09-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-09-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-05-03

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.90533 / -117.29549	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3751698 E472681	**Elevation (ft):**	1500
PLSS:	T03S, R04W, Sec. 15 (S)	**Acres:**	0.0

Location: MARCH AIR FORCE BASE. WEST OF PLUMMER RD & SOUTH OF CACTUS RD, 0.7 MILE WEST OF I-215.

Detailed Location:

Ecological: NEAR BY RARELY WITHIN SEASONAL DRAINAGES. WEEDY GRASSLAND WITH REMNANT COASTAL SAGE SCRUB AND WILLOW RIPARIAN VEGETATION IN PATCHES.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1995 COLLECTION BY WHITE; MENTIONED AS "COMMON IN INFREQUENT PATCHES" IN 1995. NEEDS FIELDWORK.

Owner/Manager: DOD-MARCH AFB

Occurrence No.	98	**Map Index:**	84505	**EO Index:**	85525	**Element Last Seen:**	1993-06-11
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-06-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-14

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.85065 / -117.13263	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745604 E487730	**Elevation (ft):**	1445
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	40.0

Location: NNW OF LAKEVIEW; ~0.75 AIR MILE NORTH OF THE JUNCTION OF SAN JACINTO RIVER AND MARTIN ST, EAST OF BERNASCONI HILLS.

Detailed Location: MAPPED BY CNDDB ACCORDING TO TRS INFORMATION ON COLLECTION LABEL IN THE NE 1/4 OF THE SW 1/4 OF SECTION 6.

Ecological: EDGE OF DRYING FLOOD AREA WITH ECHINODORUS BERTEROI AND AMMANNIA ROBUSTA.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1993 GREENE COLLECTION.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	99	**Map Index:**	84506	**EO Index:**	85527	**Element Last Seen:**	2008-06-20
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-06-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2012-01-24

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80479 / -117.20144	**Accurracy:**	80 meters
UTM:	Zone-11 N3740530 E481354	**Elevation (ft):**	1415
PLSS:	T04S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: PERRIS VALLEY; ALONG E SUNSET RD ABOUT 0.1 MILE WEST OF ITS JUNCTION WITH EVANS RD, NE PERRIS.

Detailed Location: MAPPED BY CNDDB ACCORDING TO 2008 DICUS COORDINATES IN THE EAST 1/2 OF THE SW 1/4 OF SECTION 21.

Ecological: DISTURBED / RUDERAL FIELD ASSOCIATED WITH A MAN-MADE DRAINAGE. RECENT WEED ABATEMENT CONSTITUTES A DISTURBANCE.

General: 1 PLANT OBSERVED IN 2008.

Owner/Manager: PVT

Occurrence No.	100	**Map Index:**	84513	**EO Index:**	85533	**Element Last Seen:**	2008-04-15
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-04-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76896 / -117.19319	**Accurracy:**	specific area
UTM:	Zone-11 N3736557 E482110	**Elevation (ft):**	1414
PLSS:	T05S, R03W, Sec. 04 (S)	**Acres:**	14.0

Location: INTERSTATE 215 APPROXIMATELY 0.5 MILE SE OF THE SAN JACINTO RIVER CROSSING, SE OF PERRIS.

Detailed Location: BOTH SIDES OF FREEWAY IN SCATTERED PATCHES.

Ecological: ALKALI GRASSLANDS IN ROADSIDE DITCH. THE RARE ATRIPLEX CORONATA VAR. NOTATIOR ALSO AT THIS SITE.

General: 200+ PLANTS OBSERVED IN 2008.

Owner/Manager: UNKNOWN

Occurrence No.	101	**Map Index:**	84514	**EO Index:**	85534	**Element Last Seen:**	2001-04-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2001-04-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89658 / -117.08658	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3750693 E491994	**Elevation (ft):**	1440
PLSS:	T03S, R02W, Sec. 21 (S)	**Acres:**	0.0

Location: EAST SIDE OF MYSTIC LAKE ABOUT 50 YARDS WEST OF GILMAN HOT SPRINGS ROAD, NEAR SAN JACINTO.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS AROUND THE ALKALINE AREA ON THE NE END OF MYSTIC LAKE (NOT ON TOPO).

Ecological: ALKALINE PLAYA

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 2001 REISER COLLECTION. NEEDS FIELDWORK.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	102	**Map Index:**	84515	**EO Index:**	85535	**Element Last Seen:**	2010-09-08
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-09-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.95970 / -117.06934	**Accurracy:**	specific area
UTM:	Zone-11 N3757690 E493592	**Elevation (ft):**	2100
PLSS:	T02S, R02W, Sec. 34 (S)	**Acres:**	10.0

Location: SAN TIMOTEO CANYON; 1.3 MILES SE OF SAN TIMOTEO CANYON ROAD AND RAILROAD CROSSING, BEAUMONT BADLANDS.

Detailed Location: MAPPED BY CNDDB ACCORDING TO A 2008 WHITE MAP MOSTLY IN THE NE 1/4 OF THE NE 1/4 OF SECTION 34.

Ecological: AREA OF ALKALI SOIL ADJACENT TO SEEP SURROUNDED BY WILLOWS AND NON-NATIVE GRASSLANDS.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 2007. 1000+ PLANTS OBSERVED IN 2008 BETWEEN OCCURRENCES 102, 103, & 104. "UNCOMMON" IN 2010.

Owner/Manager: PVT

Occurrence No.	103	**Map Index:**	84516	**EO Index:**	85536	**Element Last Seen:**	2008-06-24
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	2008-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.96579 / -117.07499	**Accurracy:**	specific area
UTM:	Zone-11 N3758365 E493071	**Elevation (ft):**	2050
PLSS:	T02S, R02W, Sec. 27 (S)	**Acres:**	2.0

Location: SAN TIMOTEO CANYON; 0.8 MILE SE OF SAN TIMOTEO CANYON ROAD AND RAILROAD CROSSING, BEAUMONT BADLANDS.

Detailed Location: MAPPED BY CNDDB ACCORDING TO A 2008 WHITE MAP IN THE NW 1/4 OF THE SE 1/4 OF SECTION 27.

Ecological: ALKALI GRASSLAND / DISTURBED GRASSLAND.

General: 1000+ PLANTS OBSERVED IN 2008 BETWEEN OCCURRENCES 102, 103, & 104. SITE MAY NOW BE EXTIRPATED.

Owner/Manager: PVT

Occurrence No.	104	**Map Index:**	84517	**EO Index:**	85537	**Element Last Seen:**	2008-06-24
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Decreasing	**Record Last Updated:**	2011-12-15

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.97066 / -117.08201	**Accurracy:**	specific area
UTM:	Zone-11 N3758906 E492423	**Elevation (ft):**	2050
PLSS:	T02S, R02W, Sec. 27 (S)	**Acres:**	5.0

Location: SAN TIMOTEO CANYON; FROM 0.05 TO 0.40 MILE SE OF SAN TIMOTEO CANYON ROAD AND RAILROAD CROSSING, BEAUMONT BADLANDS.

Detailed Location: MAPPED BY CNDDB AS 3 POLYGONS ACCORDING TO A 2008 WHITE MAP IN THE NW 1/4 OF SECTION 27.

Ecological: ALKALI GRASSLAND / DISTURBED GRASSLAND.

General: 1000+ PLANTS OBSERVED IN 2008 BETWEEN OCCURRENCES 102, 103, & 104.

Owner/Manager: PVT

Occurrence No.	105	**Map Index:**	84518	**EO Index:**	85538	**Element Last Seen:**	1992-05-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-15

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.90705 / -117.13114	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3751858 E487875	**Elevation (ft):**	1520
PLSS:	T03S, R02W, Sec. 18 (S)	**Acres:**	76.0

Location: WEST SIDE OF DAVIS ROAD, 1 MILE SOUTH OF ALESSANDRO BLVD, SAN JACINTO VALLEY.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS AROUND DAVIS ROAD CENTERED AT ABOUT 1 MILE SOUTH OF ALESSANDRO ROAD.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1992 SLEIGH & HAIMOV COLLECTION. NEEDS FIELDWORK.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	111	**Map Index:**	84556	**EO Index:**	85573	**Element Last Seen:**	1969-11-06
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1969-11-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-22

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.80270 / -117.40270	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740353 E462725	**Elevation (ft):**	
PLSS:	T04S, R05W, Sec. 21 (S)	**Acres:**	332.0

Location: LAKE MATTHEWS DRIVE, GAVILAN HILLS AREA.

Detailed Location: C.H. MICK PROPERTY. CNDDB UNABLE TO LOCATE "C.H. MICK PROPERTY"; MAPPED AS A BEST GUESS AROUND THE ENTIRE LENGTH OF LAKE MATTHEWS DRIVE.

Ecological: GRAINFIELD.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1969 SIEDSCHLAG COLLECTION. NEEDS FIELDWORK.

Owner/Manager: PVT

Lasthenia glabrata ssp. coulteri

Element Code: PDAST5L0A1

Coulter's goldfields

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T3
	State:	None		**State:**	S2.1
	Other:	Rare Plant Rank - 1B.1, BLM_S-Sensitive			
Habitat:	**General:**	COASTAL SALT MARSHES, PLAYAS, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.			
	Micro:	USUALLY FOUND ON ALKALINE SOILS IN PLAYAS, SINKS, AND GRASSLANDS. 1-1400M.			

Occurrence No.	8	**Map Index:** 23773	**EO Index:** 20411	**Element Last Seen:**	2004-04-22
Occ. Rank:	Excellent		**Presence:** Presumed Extant	**Site Last Seen:**	2004-04-22
Occ. Type:	Natural/Native occurrence		**Trend:** Fluctuating	**Record Last Updated:**	2010-12-06

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89518 / -117.08681	**Accurracy:**	specific area
UTM:	Zone-11 N3750537 E491973	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 21 (S)	**Acres:**	89.0

Location: WEST OF GILMAN SPRINGS ROAD (HIGHWAY 79) AND NORTHWEST OF QUAIL RANCH GOLF COURSE, SAN JACINTO VALLEY.

Detailed Location: ALONG THE NORTHEAST MARGIN OF MYSTIC LAKE. 150-762M WEST OF GILMAN SPRINGS RD. AND 600-1300M SOUTH OF BOLD STYLE AVE. WITHIN THE SE 1/4 NE 1/4 SECTION 21, NE 1/4 SE 1/4 SECTION 21, SW 1/4 NE 1/4 SECTION 21, AND THE NW 1/4 SW 1/4 SECTION 22.

Ecological: ALKALI PLAYA, GROWING IN WET AREAS, DENSE STANDS. ASSOCIATED WITH SUAEDA TORREYANA, SCIRPUS MARITIMUS, POLYPOGON MONSPELIENSIS, BASSIA HYSSOPIFOLIA, JUNCUS BUFONIUS, ATRIPLEX ARGENTEA, ETC. ATRIPLEX CORONATA VAR. NOTATIOR ALSO PRESENT.

General: ~250,000 PLANTS IN 1992, ~20,000 PLANTS IN 2001, 300,000 PLANTS IN 2003, AND ~17,550 PLANTS IN 2004. MUNZ 1922 COLLECTION "NEAR MORENO - SAN JACINTO LAKE" AND REISER 2001 COLLECTION "EAST SIDE OF MYSTIC LAKE" ATTRIBUTED TO THIS SITE.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	9	**Map Index:** 23774	**EO Index:** 7287	**Element Last Seen:**	1992-05-06
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	1992-05-06
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1997-03-31

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88208 / -117.09235	**Accurracy:**	specific area
UTM:	Zone-11 N3749085 E491460	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 28 (S)	**Acres:**	12.9

Location: DUCK PONDS SOUTH OF THE INTERSECTION OF WEST CONTOUR ROAD AND LAKE STREET, SAN JACINTO VALLEY.

Detailed Location: ALONG SOUTH CONTOUR ROAD. MAPPED AS TWO POLYGONS. EAST POLYGON IS 122M S OF THE POND THAT IS ON THE EASTERN BOUNDARY OF THE DUCK CLUB AND W OF MYSTIC LAKE. WEST POLYGON IS 60M NE OF THE MAIN DUCK POND AREA AND 150M SE OF INTERSECTION.

Ecological: GROWING IN ALKALI SINK PLAYA IN ASSOCIATION WITH ATRIPLEX CORONATA VAR. NOTATIOR, PLAGIOBOTHRYS LEPTOCLADUS, PHACELIA CILIATA, RUMEX PERSICARIOIDES, BASSIA HYSSOPIFOLIA, ATRIPLEX ARGENTEA, SPERGULARIA MARINA, AND MATRICARIA SP., ETC.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 1992.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	10	**Map Index:**	23775	**EO Index:**	2514	**Element Last Seen:**	2008-02-19
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-02-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Fluctuating	**Record Last Updated:**	2010-12-07

Quad Summary: Lakeview (3311771), Perris (3311772), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87641 / -117.11729	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3748459 E489152	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 29 (S)	**Acres:**	175.0

Location: NORTH AND WEST OF DUCK PONDS, ON THE EAST AND WEST SIDE OF DAVIS ROAD, SAN JACINTO VALLEY.

Detailed Location: MAPPED AS A SERIES OF POLYS BASED ON A 1993 DICE MAP, UCR SHAPEFILE, COORDINATES FROM SANDERS & MENUZ, AND MULTIPLE COLLECTIONS. POLYS SPAN FROM CENTER OF SEC 31 E INTO SEC 32 AND NE INTO SEC 29. ADDITIONAL POP INFO AVAILABLE AT CNDDB.

Ecological: GROWING ON AN ALKALI PLAYA DEVELOPED ON SILTY CLAY SOIL IN AREA SEASONALLY INUNDATED. ASSOCIATED WITH PLAGIOBOTHRYS LEPTOCLADUS, RUMEX SP., SPERGULARIA SP., SISYMBRIUM IRIO, SUAEDA MOQUINII, HORDEUM DEPRESSUM, LEPIDIUM DICTYOTUM, ETC.

General: EST # PLANTS IN SEC 29: CENTER POLY: 500,000 IN 1992, 501,060 IN 2003, 220,000 IN 2004; S POLY: 48,950 IN 2004. SEC 32: NW POLY: 1000 IN 1992, 100,000 IN '03, & 300 IN '04; S POLY: 1,000 IN '03 & 12 IN '04. SEEN IN 2008. INCL EO #12 & #48.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	13	**Map Index:**	23764	**EO Index:**	2509	**Element Last Seen:**	2004-04-21
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-04-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-20

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84612 / -117.12039	**Accurracy:**	specific area
UTM:	Zone-11 N3745101 E488861	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	42.0

Location: 0.6 MILE NORTH OF RAMONA EXPRESSWAY ALONG BOTH SIDES OF DAVIS ROAD, NORTH OF LAKEVIEW.

Detailed Location: MAPPED AS 3 POLYGONS WITHIN THE SE 1/4 SE 1/4 SECTION 6 AND THE SW 1/4 SW 1/4 SECTION 5 EXTENDING INTO THE SE 1/4 SW 1/4 SECTION 5. MAPPED ACCORDING TO MAP PROVIDED BY DICE, COORDINATES BY BRAMLET AND SHAPEFILE FROM UCR.

Ecological: GROWING IN ALKALI PLAYA AND GRASSLAND COMMUNITIES. MARGIN OF AGRICULTURAL FIELD OF WINTER GRAIN. ASSOCIATED SPECIES INCLUDE PLAGIOBOTHRYS LEPTOCLADUS, HORDEUM INTERCEDENS, SUAEDA MOQUINII, BASSIA HYSSOPIFOLIA, PLANTAGO ELONGATA, ETC.

General: W POLY HAD 250,000 PLANTS AND E POLY HAD 100,000 PLANTS IN 1992 ESTIMATED BY BRAMLET. E POLY HAD ~500,000 PLANTS IN 2003 AND ~200,000 IN 2004. S POLY HAD 21 PLANTS IN 2003. 1996 ROOS COLLECTION "1 MILE N OF LAKEVIEW" ATTRIB TO THIS SITE.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	14	**Map Index:**	23765	**EO Index:**	12375	**Element Last Seen:**	2005-03-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-03-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.82194 / -117.02603	**Accurracy:**	specific area
UTM:	Zone-11 N3742414 E497591	**Elevation (ft):**	1460
PLSS:	T04S, R01W, Sec. 18 (S)	**Acres:**	10.0

Location: SOUTH OF RAMONA EXPRESSWAY AND 0.4 MILE EAST OF WARREN ROAD, SAN JACINTO VALLEY.

Detailed Location: MAPPED AS TWO POLYGONS: N POLYGON FROM ROBERTS COORDINATES AND S POLYGON FROM BRAMLET MAP. SOUTH POLYGON EXTENDS FROM 0-150M NORTH OF MWD AQUEDUCT MAINTENANCE ROAD, 620M EAST OF WARREN ROAD, AND 150-300M SOUTH OF THE RAMONA EXPRESSWAY.

Ecological: GROWING WITHIN ALKALI PLAYA AND ALKALINE SINK SCRUB COMMUNITIES. ASSOCIATES INCLUDE SUAEDA TORREYANA, BASSIA HYSSOPIFOLIA, ATRIPLEX ARGENTEA, DISTICHLIS SPICATA, SPERGULARIA MARINA, HORDEUM MURINUM, LEPIDIUM SP., AND PLANTAGO BIGELOVII.

General: SOUTH POLYGON: UNKNOWN NUMBER OF PLANTS OBSERVED IN 1991, APPROXIMATELY 130,000 PLANTS OBSERVED IN 1992. NORTH POLYGON: 500,000+ PLANTS OBSERVED IN 2005.

Owner/Manager: UNKNOWN

Occurrence No.	15	**Map Index:**	23766	**EO Index:**	7288	**Element Last Seen:**	1992-04-09
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-08-08

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83295 / -117.14079	**Accurracy:**	80 meters
UTM:	Zone-11 N3743643 E486972	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: WEST OF LAKEVIEW, ALONG THE SAN JACINTO RIVER, SOUTHEAST OF LAKEVIEW HOT SPRINGS.

Detailed Location: 100 FT EAST OF THE SAN JACINTO RIVER AND 500 FT NORTH OF THE MWD AQUEDUCT. IN THE SE 1/4 SE 1/4 SECTION 12. THE WEST SIDE OF THE SAN JACINTO RIVER SHOULD ALSO BE SEARCHED AS A 1977 HELMKAMP COLLECTION SAYS IT OCCURS ON THE WEST SIDE ALSO.

Ecological: GROWING IN ALKALINE SINK SCRUB/ALKALI PLAYA. ASSOCIATED SPECIES INCLUDE CRESSA TRUXILLENSIS, SUAEDA TORREYANA, PLAGIOBOTHRYS LEPTOCLADUS, SPERGULARIA MARINA, ETC. NAVARRETIA FOSSALIS AND ATRIPLEX CORONATA VAR. NOTATIOR ALSO PRESENT.

General: OBSERVED IN 1991. APPROXIMATELY 8000 PLANTS OBSERVED IN 1992. HELMKAMP 1977 COLLECTION "W SIDE OF THE SAN JACINTO RIVER 0.5 MI SOUTH OF THE RAMONA EXPRESSWAY" ATTRIBUTED TO THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	16	**Map Index:**	23767	**EO Index:**	17780	**Element Last Seen:**	1992-04-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82410 / -117.14596	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3742663 E486492	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 13 (S)	**Acres:**	0.0

Location: BETWEEN 10TH STREET AND 11TH STREET, EAST SIDE OF THE SAN JACINTO RIVER, SW OF LAKEVIEW.

Detailed Location: TWO COLONIES: (1) 15M TO 100M E OF THE SAN JACINTO RIVER AND W OF EXISTING DIRT ACCESS ROAD, 440M S OF MWD EASEMENT ROAD (NE 1/4 OF NE 1/4 SEC 13); (2) 120M N OF THE END OF 11TH STREET, 45M E OF SAN JACINTO RIVER (SW 1/4 OF NE 1/4 SEC 13).

Ecological: GROWING IN AN ALKALI GRASSLAND.

General: COLLECTIONS BY BRAMLET ARE ONLY SOURCES FOR THIS SITE. POPULATION ESTIMATED AT (1) 800 PLANTS AND (2) 5,000 PLANTS IN 1992. INCLUDES FORMER OCCURRENCE #17.

Owner/Manager: UNKNOWN

Occurrence No.	18	**Map Index:**	23771	**EO Index:**	22306	**Element Last Seen:**	1996-04-20
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-04-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-17

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81513 / -117.15546	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3741669 E485611	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 24 (S)	**Acres:**	81.0

Location: BETWEEN 11TH AND 13TH STREET ON THE EAST AND WEST SIDE OF THE SAN JACINTO RIVER.

Detailed Location: MAPPED AS TWO POLYGONS. N POLY FROM BRAMLET MAP: W SIDE OF POZOS RD, 200FT S OF ROAD FORK, 1300FT NW OF RIVER. S POLY FROM TWO BRAMLET COLLECTIONS: 267M S OF 12TH ST AND 120M E OF RIVER; EAST OF PIPELINE AND 13TH ST INTERSECTION.

Ecological: GROWING IN ALKALINE SINK SCRUB WITHIN A SWALE. ASSOCIATES INCLUDE ATRIPLEX ARGENTEA SSP. EXPANSA, LEPIDIUM DICTYOTUM, SUAEDA TORREYANA, CRESSA TRUXILLENSIS, PLAGIOBOTHRYS LEPTOCLADUS, MATRICARIA MATRICARIOIDES, POLYGONUM AVICULARE, ETC.

General: AREA IS A POTENTIAL RESERVE AREA IN THE RIVERSIDE CO. MSHCP. NORTH POLY: OBSERVED IN 1991. SOUTH POLY: 2 POPS OBSERVED, ONE WITH 10,000 THE OTHER WITH 30,000 PLANTS IN 1992; UNKNOWN NUMBER IN 1996 NEAR 13TH ST. INCL FORMER EO #19 AND #20.

Owner/Manager: UNKNOWN

Occurrence No.	47	**Map Index:**	31522	**EO Index:**	2511	**Element Last Seen:**	2004-05-12
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-05-12
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-06

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86403 / -117.10036	**Accurracy:**	specific area
UTM:	Zone-11 N3747085 E490716	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 33 (S)	**Acres:**	33.0

Location: 2 MILES NORTHEAST OF LAKEVIEW BETWEEN HILLS AND SAN JACINTO RIVER, SAN JACINTO WILDLIFE AREA.

Detailed Location: WITHIN THE OLD DUCK PONDS OF THE LOVELL UNIT. MAPPED AS TWO POLYGONS BASED ON A 1993 DICE MAP AND UCR SHAPEFILE. IN THE SW 1/4 SECTION 33.

Ecological: ALKALI GRASSLAND WITH WILLOWS SOIL. SILTY CLAY AND STRONGLY ALKALINE. ASSOCIATED SPECIES INCLUDE SUAEDA MOQUINII, SISYMBRIUM IRIO, HORDEUM MURINUM SSP. LEPORINUM, BROMUS MADRITENSIS SSP. RUBENS, PLANTAGO ELONGATA, AND FRANKENIA SALINA.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 1995 BY BRAMLET. NE POLYGON HAD ~38,400 PLANTS AND SW POLYGON HAD ~35,000 PLANTS IN 2004.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	49	**Map Index:**	31523	**EO Index:**	2515	**Element Last Seen:**	2004-04-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-04-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-06

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89782 / -117.11218	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3750832 E489627	**Elevation (ft):**	1460
PLSS:	T03S, R02W, Sec. 20 (S)	**Acres:**	65.0

Location: 0.2-0.5 MILE SOUTH OF AIR FORBES AVENUE BETWEEN VIRGINIA STREET AND CASSALERIA AVENUE, SAN JACINTO WILDLIFE AREA.

Detailed Location: MAPPED AS THREE POLYGONS IN THE S 1/2 NW 1/4 AND THE SW 1/4 NE 1/4 SECTION 20. NW POLYGON BASED ON UCR SHAPEFILE, E POLYGON BASED ON COLLECTION WITH TRS BY GREENE AND SW POLYGON BASED ON DICE MAP AND UCR SHAPEFILE COORDINATES.

Ecological: ON THE BERM BETWEEN THE WESTERN PONDS.

General: UNKNOWN NUMBER OF PLANTS OBSERVED "ON THE BERM BETWEEN THE WESTERN PONDS" IN THE SW 1/4 OF THE NE 1/4 OF SECTION 20 IN 1993. 1 PLANT SEEN IN NW POLYGON IN 2004. REMAINING POLYGON BASED ON A 1993 MAP AND 2004 COORDINATES.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	78	**Map Index:**	80897	**EO Index:**	81876	**Element Last Seen:**	1998-03-22
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-03-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-20

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84028 / -117.13462	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3744455 E487544	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 07 (S)	**Acres:**	13.0

Location: ON NORTH SIDE OF RAMONA EXPRESSWAY JUST EAST OF THE SAN JACINTO RIVER, 1.5 MILES WEST OF LAKEVIEW.

Detailed Location: 200-300 FEET EAST OF THE SAN JACINTO RIVER. MAPPED BY CNDDB AS BEST GUESS JUST EAST OF THE JUNCTION OF THE SAN JACINTO RIVER AND THE RAMONA EXPRESSWAY.

Ecological: IN DITCH NEXT TO ROAD SHOULDER.

General: ONLY SOURCES OF INFORMATION FOR THIS SITE ARE TWO CHAN COLLECTIONS FROM 1997 AND 1998.

Owner/Manager: UNKNOWN

Occurrence No.	79	**Map Index:**	80899	**EO Index:**	81878	**Element Last Seen:**	1995-05-05
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-05-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-30

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84078 / -117.14218	**Accurracy:**	80 meters
UTM:	Zone-11 N3744511 E486844	**Elevation (ft):**	1427
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: 90 METERS SOUTHEAST OF RAMONA EXPRESSWAY AND MARTIN ROAD INTERSECTION, 7.5 KM WEST OF LAKEVIEW.

Detailed Location: IN THE SE 1/4 NE 1/4 SECTION 12.

Ecological: ALKALI PLAYA ON WILLOWS SILTY CLAY, STRONGLY SALINE-ALKALINE. ASSOCIATED SPECIES INCLUDE RUMEX MARITIMUS, PLAGIOBOTHRYS LEPTOCLADUS, HORDEUM DEPRESSUM, AND SUAEDA MOQUINII.

General: APPROXIMATELY 5000 PLANTS SEEN IN 1995 BY BRAMLET.

Owner/Manager: UNKNOWN

Occurrence No.	96	**Map Index:**	80992	**EO Index:**	81981	**Element Last Seen:**	2003-04-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-06

Quad Summary: El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.88367 / -117.12546	**Accurracy:**	80 meters
UTM:	Zone-11 N3749265 E488397	**Elevation (ft):**	1450
PLSS:	T03S, R02W, Sec. 30 (S)	**Acres:**	0.0

Location: 0.1 MILE EAST OF DAVIS ROAD AND 0.6 MILE NORTH OF MARTIN STREET, SAN JACINTO VALLEY.

Detailed Location: WEST OF PIPELINE IN THE SE 1/4 NE 1/4 SECTION 30. MAPPED ACCORDING TO GPS POINT IN UCR SHAPEFILE.

Ecological:

General: 14,100 PLANTS ESTIMATED IN 2003.

Owner/Manager: UNKNOWN

Occurrence No.	97	**Map Index:**	80999	**EO Index:**	81988	**Element Last Seen:**	2004-04-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2004-04-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-12-20

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85503 / -117.11583	**Accurracy:**	80 meters
UTM:	Zone-11 N3746088 E489284	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	0.0

Location: APPROXIMATELY 1 MILE NORTH OF RAMONA EXPRESSWAY, 0.3 MILE EAST OF DAVIS ROAD, NORTH OF LAKEVIEW.

Detailed Location: IN THE NW 1/4 SECTION 5 JUST SOUTH OF HILL AND ROAD. MAPPED ACCORDING TO GPS POINT IN UCR SHAPEFILE.

Ecological:

General: 28,500 PLANTS ESTIMATED IN 2004. A 1996 ROOS COLLECTION FROM "1 MILE NORTH OF LAKEVIEW" IS ALSO ATTRIBUTED TO THIS SITE.

Owner/Manager: DFG-SAN JACINTO WA

Trichocoronis wrightii var. wrightii

Element Code: PDAST9F031

Wright's trichocoronis

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T3
	State:	None		**State:**	S1.1
	Other:	Rare Plant Rank - 2.1			
Habitat:	**General:**	MARSHES AND SWAMPS, RIPARIAN FOREST, MEADOWS AND SEEPS, VERNAL POOLS.			
	Micro:	MUD FLATS OF VERNAL LAKES, DRYING RIVER BEDS, ALKALI MEADOWS. 5-435M.			

Occurrence No.	1	**Map Index:**	24638	**EO Index:**	6881	**Element Last Seen:**	1991-06-18
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-12-13

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83056 / -117.15225	**Accurracy:**	80 meters
UTM:	Zone-11 N3743379 E485911	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: 1 KM (0.7 MI) SOUTHWEST OF LAKEVIEW HOT SPRINGS.

Detailed Location: IN A SMALL MARSH AREA 833M WEST OF THE SAN JACINTO RIVER, 433M EAST OF THE INTERSECTION OF POZOS AVE AND THE MWD COLORADO AQUEDUCT EASEMENT.

Ecological: GROWING IN AN ALKALI MEADOW. ASSOCIATES INCLUDE CRYPSIS SCHOENOIDES, CRESSA TRUXILLENSIS, FRANKENIA GRANDIFOLIA, JUNCUS MEXICANUS, ATRIPLEX ARGENTEA, BOISDUVALIA, HORDEUM DEPRESSUM, POLYPOGON MONSPELIENSIS, AND TYPHA DOMINGENSIS.

General: 315 PLANTS OBSERVED IN 1991. SOILS ARE WILLOWS SILTY CLAY AND ARE DEEP AND STRONGLY SALINE-ALKALINE. NAVARRETIA FOSSALIS IS ALSO FOUND AT THIS SITE.

Owner/Manager: PVT

Occurrence No.	2	**Map Index:**	24636	**EO Index:**	6884	**Element Last Seen:**	1993-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-11-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84968 / -117.13394	**Accurracy:**	80 meters
UTM:	Zone-11 N3745497 E487609	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	0.0

Location: 1 KM (0.7 MI) NORTH OF THE RAMONA EXPRESSWAY AT THE SAN JACINTO RIVER, NORTHWEST OF LAKEVIEW.

Detailed Location:

Ecological:

General: MAP DETAIL IS ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	3	**Map Index:**	24637	**EO Index:**	6883	**Element Last Seen:**	1980-05-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-05-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-11-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84101 / -117.14579	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3744537 E486511	**Elevation (ft):**	1400
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: 2.5 KM (1.5 MI) WEST OF LAKEVIEW ALONG THE RAMONA EXPRESSWAY.

Detailed Location: MAPPED NORTH OF LAKEVIEW HOT SPRINGS.

Ecological: GROWING ON THE DRYING BED OF THE SAN JACINTO RIVER.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS 1980 COLLECTION BY SANDERS AND BOYD (#1418, UCR).

Owner/Manager: UNKNOWN

Occurrence No.	4	**Map Index:**	24635	**EO Index:**	6885	**Element Last Seen:**	1937-06-07
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1937-06-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-12-13

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88790 / -117.09815	**Accurracy:**	1 mile
UTM:	Zone-11 N3749731 E490923	**Elevation (ft):**	1420
PLSS:	T03S, R02W (S)	**Acres:**	0.0

Location: SAN JACINTO LAKE (AKA MYSTIC LAKE), NORTH OF LAKEVIEW.

Detailed Location: SAN JACINTO LAKE = VERNAL LAKE IN THE SAN JACINTO VALLEY NORTH OF LAKEVIEW.

Ecological: GROWING IN MUD FLAT OF VERNAL LAKE.

General: AREA KNOWN FROM THREE COLLECTIONS, THE MOST RECENT BEING A 1937 COLLECTION BY ROOS (#2505, UCR). AREA SHOULD BE FIELD CHECKED FOR PRESENCE OF SUITABLE HABITAT.

Owner/Manager: UNKNOWN

Symphyotrichum defoliatum

Element Code: PDASTE80C0

San Bernardino aster

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 1B.2, BLM_S-Sensitive, USFS_S-Sensitive			
Habitat:	**General:**	MEADOWS AND SEEPS, MARSHES AND SWAMPS, COASTAL SCRUB, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST, GRASSLAND.			
	Micro:	VERNALLY MESIC GRASSLAND OR NEAR DITCHES, STREAMS AND SPRINGS; DISTURBED AREAS. 2-2040M.			

Occurrence No.	24	**Map Index:**	60519	**EO Index:**	60555	**Element Last Seen:**	1951-10-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1951-10-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-04-27

Quad Summary: El Casco (3311781), Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98250 / -117.11993	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3760222 E488921	**Elevation (ft):**	2000
PLSS:	T02S, R02W, Sec. 20 (S)	**Acres:**	71.0

Location: EL CASCO, SAN TIMOTEO CANYON.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED AS BEST GUESS ALONG THE PORTION OF SAN TIMOTEO CANYON NEAR EL CASCO; HOWEVER THIS AREA IS SLIGHTLY LOWER IN ELEVATION (~1800 FT) THAN THE ELEVATION ON COLLECTION LABEL (2000 FT).

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1951 ROOS COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	32	**Map Index:**	78675	**EO Index:**	60579	**Element Last Seen:**	1917-11-15
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1917-11-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-04-28

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.11023 / -117.30268	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3774419 E472083	**Elevation (ft):**	
PLSS:	T01S, R04W, Sec. 04 (S)	**Acres:**	0.0

Location: SAN BERNARDINO AT 6TH AND I STREETS.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS AT WHAT IS CURRENTLY THE JUNCTION OF W 6TH ST AND I-215 (CURRENT I-215 LOOKS LIKE IT MAY HAVE HISTORICALLY BEEN "I" STREET).

Ecological: MOIST ADOBE SOIL. DAMP MEADOWS.

General: SITE BASED ON A 1917 PARISH COLLECTION. VAGUE PARISH COLLECTIONS FROM "SAN BERNARDINO" AND "SAN BERNARDINO VALLEY" ARE ALSO ATTIBUTED HERE. HISTORIC MARSHES FORMERLY EXISTED IN WHAT IS NOW DOWNTOWN SAN BERNARDINO. INCL FORMER EO #33.

Owner/Manager: UNKNOWN

Berberis nevinii

Element Code: PDBER060A0

Nevin's barberry

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, CISMONTANE WOODLAND, COASTAL SCRUB, RIPARIAN SCRUB.			

Micro: ON STEEP, N-FACING SLOPES OR IN LOW GRADE SANDY WASHES. 290-1575M.

Occurrence No.	4	**Map Index:**	03726	**EO Index:**	21586	**Element Last Seen:**	2003-05-08
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-05-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-10-21

Quad Summary: Redlands (3411712)

County Summary: Riverside, San Bernardino

Lat/Long:	34.00729 / -117.19848	**Accuracy:**	specific area
UTM:	Zone-11 N3762982 E481671	**Elevation (ft):**	1600
PLSS:	T02S, R03W, Sec. 09 (S)	**Acres:**	37.0

Location: SIDE CANYON OF SAN TIMOTEO CANYON, S OF REDLANDS.

Detailed Location: SITE IS ACCESSIBLE BY POWERLINE ACCESS RD BTWN HORSE RANCH & DAIRY FARM. PLANTS ARE WIDELY SPACED ON THE BANKS OF EPHEMERAL STREAM IN BOTTOM OF CYN FLOODPLAIN. 1 SHRUB SEEN 0.2 MI SSW OF POWERLINE RD IN 2003, GROWING AMIDST A LARGE RHAMNUS.

Ecological: SANDY ALLUVIAL SOIL. ASSOCIATED W/ SAMBUCUS MEXICANA, RHAMNUS CROCEA, CHILOPSIS LINEARIS, PRUNUS ILICIFOLIA, CHRYSOTHAMNUS NAUSEOSUS, LEPIDOSPARTUM SQUAMATUM, LOTUS SCOPARIUS, ARTEMISIA DRACUNCULUS, CEANOTHUS CRASSIFOLIUS, ETC.

General: 5 PLANTS IN 1982, 5 IN 1985, 7 IN 1987 (WITH SOME THAT APPEAR TO BE FENCED), AND AN UNKNOWN # SEEN IN 1988. ONLY 1 INDIVIDUAL SEEN IN 2003. GOOD PLANT DIVERSITY BUT ONLY FAIR QUALITY DUE TO DISTURBANCE FROM GRAZING AND ORVS.

Owner/Manager: PVT

Occurrence No.	5	**Map Index:**	03577	**EO Index:**	21584	**Element Last Seen:**	199X-XX-XX
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	199X-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-05-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.03196 / -117.23733	**Accuracy:**	80 meters
UTM:	Zone-11 N3765725 E478090	**Elevation (ft):**	1500
PLSS:	T02S, R03W, Sec. 06 (S)	**Acres:**	0.0

Location: NEAR MOUTH OF SCOTT CYN, SW OF REDLANDS.

Detailed Location: IN POWERLINE RIGHT-OF-WAY. AN UNDATED ROOS COLLECTION FROM "HILLS AT S END OF MOUNTAIN VIEW AVE" ALSO ATTRIBUTED TO THIS SITE. SITE QUALITY IS FAIR TO POOR DUE TO THERE BEING 1 VERY OLD, NON-REPRODUCING PLANT SURROUNDED BY WEEDS.

Ecological: ON STEEP BANK OF AN EPHEMERAL STREAM IN A NARROW CANYON. ASSOCIATED W/ ERIOGONUM FASICULATUM, RHAMNUS CROCEA, PRUNUS ILICIFOLIA, ARTEMISIA CALIFORNICA, CHRYSOTHAMNUS NAUSEOSUS, OPUNTIA PARRYI, LEPIDOSPARTUM SQUAMATUM, ADENOSTEMA, ETC.

General: ONE PLANT SEEN BY ROOS IN 1952 & NOTED "RARE" IN 1955. ONE PLANT IN 1982, 1985, 1986, & 1987. PLANT ALSO SEEN IN THE 1990'S, BUT EXACT DATE UNK. PLANT WAS BURNED RECENTLY BY A FIRE AT THIS SITE; IMPACT UNKNOWN (A. SANDERS, PERS COMM 1997).

Owner/Manager: CITY OF LOMA LINDA?

Occurrence No.	40	**Map Index:** 36535	**EO Index:**	31532		**Element Last Seen:**	199X-XX-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	199X-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1997-08-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.02449 / -117.21490	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3764892 E480160	**Elevation (ft):**	1500
PLSS:	T02S, R03W, Sec. 05 (S)	**Acres:**	0.0

Location: SOUTH OF REDLANDS; 2.3 AIRMI SW OF MCKINLEY SCHOOL. JUST OFF OF PILGRIM ROAD.

Detailed Location: UNDER THE POWERLINES. NW1/4 OF SW1/4 OF SECTION 5.

Ecological:

General: LARGE, APPARENTLY CLONAL RING. UNKNOWN WHEN PLANTS SEEN AT THIS SITE. NO MAP RECEIVED AT CNDDB; MAPPED BASED ON TRS GIVEN (T02S R03W NW 1/4 OF SW 1/4 OF SECTION 5). 1988 COLLECTION BY SANDERS ATTRIBUTED TO THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	47	**Map Index:** 71260	**EO Index:**	72165		**Element Last Seen:**	1999-01-01
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1999-01-01
Occ. Type:	Transplant Outside of Native Hab./Range		**Trend:**	Unknown		**Record Last Updated:**	2008-05-08

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.95733 / -117.37214	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3757488 E465616	**Elevation (ft):**	1020
PLSS:	T02S, R05W, Sec. 35 (S)	**Acres:**	0.0

Location: GRANITIC KNOLL ABOUT 0.1 MI SW OF VICTORIA HILL (PEAK 1005), W OF THE CORNER OF IVY ST AND VICTORIA AVE, RIVERSIDE.

Detailed Location: SMALL LAND-LOCKED GRANITIC KNOLL WITH COASTAL SAGE SCRUB.

Ecological: ASSOCIATED WITH ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, LESSINGIA FILAGINIFOLIA, DUDLEYA LANCEOLATA & GNAPHALIUM CANESCENS.

General: 1 PLANT SEEN IN 1999. PROVANCE 1999 SPECIMEN LABEL MENTIONS THAT THE "PLANT IS A LARGE SOLITARY SHRUB GROWING FROM CRACKS IN GRANITIC OUTCROP; PRESUMABLY ESCAPED FROM CULTIVATION BUT CERTAINLY NOT INTENTIONALLY PLANTED AT THIS LOCATION".

Owner/Manager: UNKNOWN

Harpagonella palmeri

Element Code: PDBOR0H010

Palmer's grapplinghook

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4
	State:	None		**State:**	S3.2
	Other:	Rare Plant Rank - 4.2			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	CLAY SOILS; OPEN GRASSY AREAS W/IN SHRUBLAND. 15-830M.			

Occurrence No.	7	**Map Index:**	15952	**EO Index:**	25463	**Element Last Seen:**	1986-04-02
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1986-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Increasing	**Record Last Updated:**	2008-02-05

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79938 / -117.35021	**Accurracy:**	specific area
UTM:	Zone-11 N3739967 E467582	**Elevation (ft):**	2040
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	59.7

Location: HARFORD SPRINGS COUNTY PARK, ALONG S BORDER & SMALL HILL TO S OF IDA LEONA RD, GAVILAN PLATEAU.

Detailed Location: POLYGON IS LOCATED IN NE1/4 SEC 25 AND SE1/4 SEC 24.

Ecological: ON HARD BOSANKO CLAY SOIL IN SCRUB OAK WOODLAND WITH FRITILLARIA BIFLORA, ALLIUM FIMBRAIATUM MUNZII, JUNIPERUS CALIFORNICUS.

General: LESS THAN 1000 REPORTED IN 1978; ALSO SEEN IN 1983. GOOD REPRODUCTION FOR SEVERAL YEARS.

Owner/Manager: RIV COUNTY, PVT

Occurrence No.	35	**Map Index:**	20413	**EO Index:**	13194	**Element Last Seen:**	1990-04-24
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1990-04-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-08-12

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79320 / -117.36544	**Accurracy:**	80 meters
UTM:	Zone-11 N3739287 E466170	**Elevation (ft):**	2100
PLSS:	T04S, R05W, Sec. 26 (S)	**Acres:**	0.0

Location: GAVILAN PLATEAU, ABOUT 0.4 MI W OF JCT OF LAKE MATHEWS DR AND GAVILAN RD.

Detailed Location: 0.1 MI E OF ORANGE GROVE FRONTAGE RD.

Ecological: BOSANKU CLAY SOILS IN ANNUAL GRASSLAND. WITH BROMUS RUBENS, APIASTRUM ANGUSTIFOLIUM, PLANTAGO ERECTA, PECTOCARYA PENICILLATA, ERODIUM, ETC.

General: 75 PLANTS SEEN IN 1990. 2008 AERIALS SHOW DEVELOPMENT IN THE AREA; NEEDS FIELD CHECKING.

Owner/Manager: UNKNOWN

Caulanthus simulans

Element Code: PDBRA0M0H0

Payson's jewel-flower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3.2
	Other:	Rare Plant Rank - 4.2, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB.			
	Micro:	FREQUENTLY IN BURNED AREAS, OR IN DISTURBED SITES SUCH AS STREAMBEDS; ALSO ON ROCKY, STEEP SLOPES. 90-2200M.			

Occurrence No.	1	**Map Index:**	04186	**EO Index:**	13241	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.83342 / -117.06479	**Accurracy:**	80 meters
UTM:	Zone-11 N3743688 E494004	**Elevation (ft):**	1940
PLSS:	T04S, R02W, Sec. 11 (S)	**Acres:**	0.0

Location: LAKEVIEW MTNS, MT RUDOLPH, 0.5 AIRMI SSE OF JCT BRIDGE ST & PICO RD (RAMONA EXPRESSWAY).

Detailed Location:

Ecological: IN LAKEVIEW MOUNTAINS, IN CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB ON THIN COBBLY SOIL.

General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.

Owner/Manager: PVT

Occurrence No.	2	**Map Index:**	04128	**EO Index:**	20581	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81646 / -117.08016	**Accurracy:**	specific area
UTM:	Zone-11 N3741809 E492581	**Elevation (ft):**	2400
PLSS:	T04S, R02W, Sec. 15 (S)	**Acres:**	57.0

Location: LAKEVIEW MTNS, FROM TOP OF MT RUDOLPH TO SOUTHWEST FOR ABOUT 1.5 MI.

Detailed Location: MAPPED AS FIVE COLONIES ALONG IMAGINARY SW-TENDING LINE FROM MT. RUDOLPH FOR ABOUT 1.5 MI.

Ecological: ON GRANITE COBBLES AND BOULDERS IN CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB.

General: SEVERAL POPULATIONS. ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED. <50 IN 1981 AT PORTION OF OCCURRENCE; <1000 IN 1982.

Owner/Manager: PVT

Occurrence No.	6	**Map Index:**	04043	**EO Index:**	20580	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.79892 / -117.10324	**Accurracy:**	80 meters
UTM:	Zone-11 N3739865 E490443	**Elevation (ft):**	1940
PLSS:	T04S, R02W, Sec. 28 (S)	**Acres:**	0.0

Location: LAKEVIEW MTNS, APPROX 0.5 AIRMI NW OF BAR V RANCH.

Detailed Location: MAPPED IN NW1/4 OF NW1/4 SEC 28.

Ecological: IN CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB ON THIN COBBLY SOILS.

General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.

Owner/Manager: PVT

Occurrence No.	7	**Map Index:**	03987	**EO Index:**	13240	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Lakeview (3311771)
County Summary: Riverside

Lat/Long:	33.78533 / -117.11973	**Accurracy:**	specific area
UTM:	Zone-11 N3738361 E488914	**Elevation (ft):**	2300
PLSS:	T04S, R02W, Sec. 32 (S)	**Acres:**	19.0

Location: LAKEVIEW MTNS, WNW OF JUNIPER FLAT.
Detailed Location: 2 POPULATIONS: ONE IN NW1/4 OF NW1/4 SEC 32 AND THE OTHER IN NE1/4 OF NE1/4 SEC 31.
Ecological: IN CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB ON THIN COBBLY SOILS.
General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.
Owner/Manager: PVT

Occurrence No.	8	**Map Index:**	03963	**EO Index:**	20579	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Lakeview (3311771)
County Summary: Riverside

Lat/Long:	33.77874 / -117.12466	**Accurracy:**	80 meters
UTM:	Zone-11 N3737631 E488457	**Elevation (ft):**	2400
PLSS:	T04S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location: LAKEVIEW MTNS, WEST OF JUNIPER FLAT.
Detailed Location: MAPPED IN NE1/4 OF SE1/4 SEC 31.
Ecological: CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB ON THIN COBBLY SOIL.
General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.
Owner/Manager: PVT

Occurrence No.	9	**Map Index:**	03935	**EO Index:**	20578	**Element Last Seen:**	1982-04-26
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-21

Quad Summary: Perris (3311772)
County Summary: Riverside

Lat/Long:	33.77631 / -117.13093	**Accurracy:**	80 meters
UTM:	Zone-11 N3737362 E487876	**Elevation (ft):**	2300
PLSS:	T04S, R02W, Sec. 31 (S)	**Acres:**	0.0

Location: LAKEVIEW MTNS, 0.4 MI NE OF JCT GUNTHER RD & BRIGGS RD.
Detailed Location: MAPPED IN NE1/4 OF SW1/4 SEC 31.
Ecological: IN CHAMISE CHAPARRAL AND COASTAL SAGE SCRUB ON THIN COBBLY SOIL.
General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS.
Owner/Manager: PVT

Occurrence No.	17	**Map Index:** 77848	**EO Index:**	478		**Element Last Seen:**	1980-05-02
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1980-05-02
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-02-03

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80963 / -117.25070	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3741077 E476796	**Elevation (ft):**	1700
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: MOTTE RESERVE, ~2.5 MI NW OF PERRIS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN SECTION 24 OF MOTTE RESERVE AT 1700'.

Ecological: ON SEEPY BANK ABOVE A SMALL STREAM IN ROCKY HILLS. IN COASTAL SAGE SCRUB WHICH WAS BURNED IN AUGUST 1979.

General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	43	**Map Index:** 03603	**EO Index:**	20554		**Element Last Seen:**	1972-04-14
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1972-04-14
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2007-11-26

Quad Summary: Sunnymead (3311782), Redlands (3411712)

County Summary: Riverside

Lat/Long:	34.00207 / -117.23412	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3762410 E478379	**Elevation (ft):**	2000
PLSS:	T02S, R03W, Sec. 18 (S)	**Acres:**	78.0

Location: RECHE CYN, 5 MI FROM BARTON RD TURNOFF ON RECHE CYN RD.

Detailed Location: MAPPED ALONG CANYON AT SPECIFIED DISTANCE FROM BARTON RD. NEEDS FIELDWORK.

Ecological: CLEARED LOT.

General: ACCORDING TO ROY BUCK (1992) PLANTS AT THIS SITE ARE PROBABLY C. HETEROPHYLLUS. MORE STUDIES NEEDED.

Owner/Manager: PVT

Lepidium virginicum var. robinsonii

Element Code: PDBRA1M114

Robinson's pepper-grass

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T2?
	State:	None		**State:**	S2.2
	Other:	Rare Plant Rank - 1B.2			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB.			
	Micro:	DRY SOILS, SHRUBLAND. 1-945M.			

Occurrence No.	4	**Map Index:**	35093	**EO Index:**	22090	**Element Last Seen:**	1987-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1987-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-06-04

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09891 / -117.11429	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3773129 E489457	**Elevation (ft):**	1840
PLSS:	T01S, R02W, Sec. 08 (S)	**Acres:**	0.0

Location: 2.8 MI NNE OF MENTONE, NORTH OF SANTA ANA WASH AND SOUTH OF GREENSPOT RD.

Detailed Location: EXACT LOCATION UNKNOWN.

Ecological: COARSE, SANDY SOIL. SAGE SCRUB WITH ASSOCIATE SPECIES ENCELIA FARINOSA, ERIODICTYON TRICHOCALYX, SALVIA APIANA, HAPLOPAPPUS LINEARIFOLIUS, ERIOGONUM FASICULATUM, AND MIRABILIS CALIFORNIA.

General: ORIGINAL LABEL: L. VIRGINICUM VAR. ROBINSONII BUT IN THE UNDET. FILE AT UC.

Owner/Manager: UNKNOWN

Occurrence No.	9	**Map Index:**	35065	**EO Index:**	196	**Element Last Seen:**	1962-05-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1962-05-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-04-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94129 / -117.32668	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3755694 E469810	**Elevation (ft):**	1150
PLSS:	T03S, R04W, Sec. 05 (S)	**Acres:**	0.0

Location: SYCAMORE CANYON, BOX SPRINGS. UPPER SANTA ANA RIVER/SAN BERNARDINO VALLEY REGION.

Detailed Location: EXACT LOCATION UNKNOWN, MAPPED IN THE VICINITY OF CANYON CREST ROAD 1.4 MI SOUTH OF PENNSYLVANIA AVE AS DESCRIBED BY IRWIN COLLECTION.

Ecological: OCCASIONAL IN SANDY SOILS WITH GRASSES & HERBS.

General: 1935 COLLECTION BY TRUE (#66 UC) AT "SYCAMORE CANYON, BOX SPRINGS" ATTRIBUTED TO THIS SITE. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	16	**Map Index:**	13068	**EO Index:**	48299	**Element Last Seen:**	1989-03-30
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1989-03-30
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-04-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.98518 / -117.30265	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3760554 E472046	**Elevation (ft):**	1400
PLSS:	T02S, R04W, Sec. 21 (S)	**Acres:**	0.0

Location: BEYOND CANYON RESERVOIR AT THE END OF BLANE STREET, BOX SPRINGS MOUNTAIN, CITY OF RIVERSIDE.

Detailed Location: EXACT LOCATION UNKNOWN, MAPPED IN THE VICINITY OF BLANE STREET.

Ecological: COASTAL SAGE SCRUB. WIDESPREAD ON HILLSIDE, GENERALLY ON LOW SIDE OF LARGE BUSHES.

General: 1989 COLLECTION BY BUCK & SANDERS (# 1133 JEPS) FROM "2.1 AIR KM ESE OF SUGARLOAF SUMMIT. EAST OF RIVERSIDE, TWO TREES CANYON." ATTRIBUTED TO THIS SITE. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	35235	**EO Index:**	48304	**Element Last Seen:**	1889-03-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1889-03-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-07-17

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SAN BERNARDINO.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN VICINITY OF SAN BERNARDINO.

Ecological: DRY HILLSIDES.

General: TWO COLLECTIONS BY PARISH ATTRIBUTED TO THIS SITE FROM 1884 (JEPS #53787) AND 1889 (JEPS #53786). NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	25	**Map Index:**	51103	**EO Index:**	51103	**Element Last Seen:**	1964-02-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1964-02-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-04-28

Quad Summary: Riverside East (3311783), San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	33.99321 / -117.32842	**Accurracy:**	1 mile
UTM:	Zone-11 N3761451 E469668	**Elevation (ft):**	1450
PLSS:	T02S, R04W, Sec. 17 (S)	**Acres:**	0.0

Location: BOX SPRINGS MOUNTAINS, SMALL HILL EAST OF SUGARLOAF.

Detailed Location: EXACT LOCATION UNKNOWN, COORDINATES PROVIDED & DIRECTIONS ARE INCONSISTENT. MAPPED TO INCORPORATE BOTH.

Ecological: CHAPARRAL-COASTAL SAGE SCRUB. ASSOCIATED WITH MIRABILIS, SALVIA MELLIFERA, FILAREE. DECOMPOSED GRANITE 20% SLOPE & SOUTHEAST EXPOSURE. PLANTS ON NORTH SIDE OF BOULDERS.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1964 COLLECTION BY PLUMB. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	26	**Map Index:**	51104	**EO Index:**	51104	**Element Last Seen:**	1997-03-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-03-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-04-28

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.96424 / -117.32185	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3758237 E470265	**Elevation (ft):**	1400
PLSS:	T02S, R04W, Sec. 29 (S)	**Acres:**	324.7

Location: BOX SPRINGS MOUNTAINS, COYOTE HILL & RIDGE SOUTH & SOUTHEAST OF UCR BOTANIC GARDEN.

Detailed Location: MAPPED FROM T-R-S PROVIDED IN SOUTH HALF OF SECTION 29.

Ecological: COASTAL SAGE SCRUB LARGELY CONVERTED TO ANNUAL GRASSLAND. MUCH OF THE AREA BURNED IN LATE SPRING 1996. NATIVE ANNUALS RECOVERED IN GOOD NUMBERS AND WEEDY GRASSES NOTICABLY DEPRESSED. IN GRAVELLY SOIL NEAR SUMMIT OF COYOTE HILL.

General: FEW INDIVIDUALS SEEN "LOCAL AND SCARCE." ONLY SOURCES OF INFORMATION FOR THIS SITE ARE 1997 COLLECTION BY SANDERS & 2001 COLLECTION BY MONTALVO FROM "COYOTE HILL, BETWEEN WATKINS DR AND HWY60/215." NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	52	**Map Index:**	51204	**EO Index:**	51204	**Element Last Seen:**	1952-02-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1952-02-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2003-05-02

Quad Summary: Sunnymead (3311782), Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside

Lat/Long:	34.00418 / -117.24854	**Accurracy:**	1 mile
UTM:	Zone-11 N3762647 E477048	**Elevation (ft):**	1800
PLSS:	T02S, R04W, Sec. 13 (S)	**Acres:**	0.0

Location: RECHE CANYON.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED AS BEST GUESS WITHIN SOUTHERN PORTION OF RECHE CANYON WITHIN RIVERSIDE COUNTY.

Ecological: ASSOCIATED WITH ADENOSTOMA FASCICULATUM, BRICKELIA DESERTORUM, ETC.

General: DESCRIBED AS COMMON AT THIS SITE. ONLY SOURCE OF INFORMATION IS 1952 COLLECTION BY ROOS. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Nasturtium gambelii

Element Code: PDBRA270V0

Gambel's water cress

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Threatened		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	MARSHES AND SWAMPS.			
	Micro:	FRESHWATER AND BRACKISH MARSHES AT THE MARGINS OF LAKES AND ALONG STREAMS, IN OR JUST ABOVE THE WATER LEVEL. 5-1305M.			

Occurrence No.	4	**Map Index:**	72459	**EO Index:**	29006	**Element Last Seen:**	1935-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1935-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-06

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.08674 / -117.29700	**Accurracy:**	1 mile
UTM:	Zone-11 N3771814 E472600	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 16 (S)	**Acres:**	0.0

Location: SAN BERNARDINO VALLEY (URBITA HOT SPRINGS).

Detailed Location: SITE BASED ON VAGUE PARISH COLLECTIONS (LATE 1880S, EARLY 1900S) FROM "SAN BERNARDINO VALLEY, SWAMPS"; IN 1974 CLARKE MENTIONS THAT THIS SITE WAS PROBABLY AT URBITA HOT SPRINGS. MAPPED BY CNDDB AROUND HISTORICAL URBITA HOT SPRINGS SITE.

Ecological: THIS SWAMP WAS DRAINED BY 1945 AND IT SOON BECAME SAND AND COTTONWOODS, AND THE YELLOW-BILLED CUCKOOS DISAPPEARED.

General: CLARKE MENTIONS THAT HE SAW THIS SITE ~1935. THIS AREA IS NOW COMPLETELY DEVELOPED AND SITE IS LIKELY EXTIRPATED.

Owner/Manager: PVT,SBD COUNTY FLOOD CONT DIST

Streptanthus campestris **Element Code:** PDBRA2G0B0

southern jewel-flower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2.3
	Other:	Rare Plant Rank - 1B.3, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, LOWER MONTANE CONIFEROUS FOREST, PINYON-JUNIPER WOODLAND.			
	Micro:	OPEN, ROCKY AREAS. 600-2790M.			

Occurrence No.	37	**Map Index:**	78803	**EO Index:**	79749	**Element Last Seen:**	1955-05-14
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1955-05-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-05-05

Quad Summary:	Forest Falls (3411618), Yucaipa (3411711)
County Summary:	San Bernardino

Lat/Long:	34.10061 / -117.00404	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3773311 E499626	**Elevation (ft):**	4000
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	0.0

Location:	MILL CREEK PUBLIC CAMP, SAN GORGONIO MOUNTAINS.
Detailed Location:	
Ecological:	CHAPARRAL.
General:	ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1955 COLLECTION BY KEMPERS.
Owner/Manager:	USFS-SAN BERNARDINO NF

Arenaria paludicola

Element Code: PDCAR040L0

marsh sandwort

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	MARSHES AND SWAMPS.			
	Micro:	GROWING UP THROUGH DENSE MATS OF TYPHA, JUNCUS, SCIRPUS, ETC. IN FRESHWATER MARSH. 10-170M.			

Occurrence No.	8	**Map Index:** 40810	**EO Index:** 40810	**Element Last Seen:**	1899-05-01
Occ. Rank:	None		**Presence:** Extirpated	**Site Last Seen:**	1899-05-01
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2007-04-27

Quad Summary: Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713), Fontana (3411714), San Bernardino North (3411723)

County Summary: Riverside, San Bernardino

Lat/Long:	34.05389 / -117.31364	**Accuracy:**	5 miles
UTM:	Zone-11 N3768175 E471054	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 29 (S)	**Acres:**	0.0

Location: VICINITY OF SAN BERNARDINO, SANTA ANA RIVER AT 1000' ELEVATION.

Detailed Location: EXACT LOCATION NOT KNOWN. MAPPED BY CNDDB AS A BEST GUESS. DUE TO THE GENTLE GRADE OF THE RIVER IN THIS VICINITY THE SITE DESCRIPTION FITS A FAIRLY LARGE SECTION OF THE RIVER.

Ecological: IN SWAMPS.

General: SEVEN PARISH COLLECTIONS FROM 1882-1899 ATTRIBUTED TO THIS SITE. MOST HABITAT IN THIS AREA IS DEVELOPED. EXTIRPATED ACCORDING TO ELVIN (2007).

Owner/Manager: UNKNOWN

Atriplex coronata var. notatior

Element Code: PDCHE040C2

San Jacinto Valley crownscale

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G4T1
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	PLAYAS, CHENOPOD SCRUB, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.			
	Micro:	DRY, ALKALINE FLATS IN THE SAN JACINTO RIVER VALLEY. 400-500M.			

Occurrence No.	2	**Map Index:**	03738	**EO Index:**	29412	**Element Last Seen:**	2000-05-05
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-01

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76988 / -117.21223	**Accurracy:**	specific area
UTM:	Zone-11 N3736661 E480348	**Elevation (ft):**	1420
PLSS:	T05S, R03W, Sec. 05 (S)	**Acres:**	40.6

Location: SOUTHEAST OF PERRIS, EAST OF ELLIS AND NORTHEAST OF PERRIS VALLEY AIRPORT.

Detailed Location: THREE COLONIES MAPPED AT CNDDB. ONE ON EITHER SIDE OF CASE ROAD ABOUT 0.5 MILE SE OF ELLIS AND ONE BETWEEN THE NORTH END OF THE RUNWAY AT PERRIS VALLEY AIRPORT AND CASE ROAD.

Ecological: GROWING IN VALLEY SINK SCRUB WITH ATRIPLEX ARGENTEA, SUAEDA TORREYANA, SALICORNIA SUBTERMINALIS, HAPLOPAPPUS PALMERI VAR. PACHYLEPIS, BROMUS DIANDRUS, SALSOLA IBERICA, LEPIDIUM DICTYOCARPUM, ERODIUM, HEMIZONIA LAEVIS, BRODIAEA FILIFOLIA.

General: THE SITE HAS SOME OF THE LAST VALLEY SALTBUSH SCRUB REMAINING OUTSIDE THE SAN JACINTO WILDLIFE AREA (IN THIS AREA). INCLUDES FORMER OCCURRENCE #1. SMALL POP OF BRODIAEA FILIFOLIA NORTH OF CASE RD. PLANTS OBS IN 2000 DURING BRFI SURVEY.

Owner/Manager: PVT

Occurrence No.	3	**Map Index:**	28301	**EO Index:**	29410	**Element Last Seen:**	2000-05-18
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-11-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82567 / -117.14605	**Accurracy:**	specific area
UTM:	Zone-11 N3742836 E486485	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 13 (S)	**Acres:**	213.7

Location: VICINITY OF THE SAN JACINTO RIVER FROM RAMONA EXPRESSWAY SOUTH TO NUEVO.

Detailed Location: MANY COLONIES, ESPECIALLY EAST OF THE EAST LEVEE. MAPPED WITHIN T4S R3W E 1/2 SECTION 12, NE 1/4 SECTION 13, SW 1/4 SECTION 13, SE 1/4 SECTION 14, NE 1/4 SECTION 23, NW 1/4 SECTION 24 & T4S R2W W 1/2 SECTION 7.

Ecological: GROWING IN VALLEY SALTBUSH SCRUB IN ASSOCIATION WITH SUAEDA TORREYANA, SALICORNIA SUBTERMINALIS, ATRIPLEX ARGENTA, CRESSA TRUXILLENSIS, BASSIA HYPOSSIFOLIA, LEPIDIUM DICTYOTUM, ERODIUM CICUTARIUM, LASTHENIA SP., ATRIPLEX SEMIBACCATA, ET AL.

General: SIGNS OF INUNDATION IN THIS AREA. PLANT MAY REQUIRE INUNDATION FOR GERMINATION. SITE SHOULD BE INCLUDED IN PROPOSED MULTI-SPECIES HABITAT CONSERVATION PLAN IN RIVERSIDE COUNTY GENERAL PLAN. INCLUDES FORMER OCCURRENCE #6.

Owner/Manager: PVT

Occurrence No.	5	**Map Index:**	04133	**EO Index:**	7758	**Element Last Seen:**	1995-06-08
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-20

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87156 / -117.10248	**Accurracy:**	specific area
UTM:	Zone-11 N3747919 E490522	**Elevation (ft):**	1420
PLSS:	T03S, R02W, Sec. 33 (S)	**Acres:**	205.1

Location: SAN JACINTO WILDLIFE AREA VICINITY, APPROXIMATELY 4 KM NORTH OF LAKEVIEW.

Detailed Location: SEVERAL COLONIES MAPPED WITHIN THE SOUTH 1/2 OF SECTION 29, NW 1/4 OF SECTION 31, NORTH 1/2 OF SECTION 32, AND WEST 1/2 OF SECTION 33.

Ecological: FOUND AROUND THE DUCK PONDS OR DISTURBED AREAS IN THE VICINITY.

General: APPROXIMATELY 1000 PLANTS SEEN IN 1990. SIGNS OF INUNDATION WERE EVIDENT. SPECIES MAY BENEFIT FROM INUNDATION. 1901 JEPSON COLLECTION FROM "SAN JACINTO LAKE BED" ATTRIBUTED TO SITE.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	7	**Map Index:**	22021	**EO Index:**	8345	**Element Last Seen:**	1990-07-25
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-16

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80313 / -117.16732	**Accurracy:**	specific area
UTM:	Zone-11 N3740340 E484512	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 23 (S)	**Acres:**	23.0

Location: WEST OF NUEVO, ON EITHER SIDE OF SAN JACINTO RIVER LEVEE JUST NORTH OF NUEVO ROAD.

Detailed Location: TWO COLONIES. ONE ABOUT 200 FEET NORTH OF NUEVO ROAD AND 100 FEET WEST OF SAN JACINTO RIVER, SECOND COLONY IS 800 FEET WEST OF PICO AVE ON THE NORTH SIDE OF NUEVO ROAD.

Ecological: GROWING IN VALLEY SINK SCRUB IN ASSOCIATION WITH BASSIA HYSSOPIFOLIA, ATRIPLEX ARGENTA, SISYMBRIUM SP., SIDA LEPROSA, SUAEDA TORREYANA, LEPIDIUM DICTYOTUM, HORDEUM SP., CRESSA TRUXILLENSIS, SALSOLA IBERICA, AND HEMIZONIA FASCICULATA.

General: 4500 PLANTS SEEN IN TWO MAIN AREAS IN 1990. THIS AREA SHOULD BE INCLUDED IN THE PROPOSED RIVERSIDE COUNTY MULTI-SPECIES RESERVE SYSTEM.

Owner/Manager: PVT

Occurrence No.	8	**Map Index:**	22022	**EO Index:**	8344	**Element Last Seen:**	2005-05-24
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-21

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77271 / -117.18792	**Accurracy:**	specific area
UTM:	Zone-11 N3736970 E482599	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	103.6

Location: EAST OF PERRIS, ALONG I-215 AND ELLIS AVENUE.

Detailed Location: MAPPED IN SECTIONS 32, 33, 34 & 4.

Ecological: GROWING IN VALLEY SINK SCRUB ON OPEN SALT PANS. ASSOCIATED WITH ATRIPLEX ARGENTEA, SALSOLA IBERICA, CRESSA TRUXILLENSIS, HORDEUM LEPORINUM, SUAEDA TORREYANA, HAPLOPAPPUS PALMERI, MARRUBIUM VULGARE, BRASSICA GENICULATA, & DISTICHLIS SP.

General: 90 PLANTS SEEN IN 1990, SW PORTION OF POP EXTIRPATED ACCORDING TO BRAMLET. 490 SEEN IN 1997. PORTION OF OCCURRENCE ALONG I-215 MAPPED BASED UPON A COLLECTION BY KIRTLAND, SITE DESCRIBED AS BETWEEN 4TH ST & 1/4 MI SOUTH OF SAN JACINTO RIVER.

Owner/Manager: PVT

Occurrence No.	11	**Map Index:**	28302	**EO Index:**	29411	**Element Last Seen:**	1991-06-19
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-19
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-07-14

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83169 / -117.15193	**Accurracy:**	specific area
UTM:	Zone-11 N3743505 E485941	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	11.8

Location: ABOUT 2 MILES WEST OF LAKEVIEW AND 0.5 MILE SOUTHWEST OF LAKEVIEW HOT SPRINGS ALONG THE COLORADO RIVER AQUEDUCT.

Detailed Location: SITE IS ABOUT 810 METERS WEST OF THE SAN JACINTO RIVER, 500 METERS EAST OF POZOS AVE AT THE MWD AQUEDUCT EASEMENT ROAD, AND 4 METERS NORTH OF THE EASEMENT ROAD ALONG THE AQUEDUCT.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1991 COLLECTION AND 1992 MAP BY BRAMLET.

Owner/Manager: UNKNOWN

Occurrence No.	12	**Map Index:**	23774	**EO Index:**	21768	**Element Last Seen:**	1992-05-06
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-06
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-03-31

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.88208 / -117.09235	**Accurracy:**	specific area
UTM:	Zone-11 N3749085 E491460	**Elevation (ft):**	1420
PLSS:	T03S, R02W, Sec. 28 (S)	**Acres:**	12.9

Location: JUST EAST OF THE SAN JACINTO WILDLIFE AREA, NORTHERN DUCK CLUB PONDS.

Detailed Location: TWO COLONIES: ONE IS 122 M SOUTH OF THE POND THAT IS ON THE EASTERN BOUNDARY OF THE DUCK CLUB AREA; THE SECOND IS 60 M NORTHEAST OF THE MAIN DUCK POND AREA AND 150 M SOUTHEAST OF LAKE STREET AT WEST CONTOUR ROAD.

Ecological: FOUND IN ALKALI SINK PLAYA WITH PLAGIOBOTHRYS LEPTOCLADUS, PHACELIA CILIATA, LASTHENIA GLABRATA COULTERI, RUMEX PERSICARIOIDES, BASSIA HYSSOPIFOLIA, ATRIPLEX ARGENTEA, SPERGULARIA MARINA, MATRICARIA, MONOLEPIS NUTTALLIANA, CRYPSIS, ET AL.

General: ABOUT 20,400 PLANTS OBSERVED IN 1992.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	13	**Map Index:**	28299	**EO Index:**	21766	**Element Last Seen:**	1992-04-29
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-24

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89702 / -117.08816	**Accurracy:**	80 meters
UTM:	Zone-11 N3750741 E491849	**Elevation (ft):**	1425
PLSS:	T03S, R02W, Sec. 21 (S)	**Acres:**	0.0

Location: NORTH OF SAN JACINTO WILDLIFE AREA AND NORTHWEST OF QUAIL RANCH GOLF COURSE, ABOUT 0.3 MILE WEST OF HIGHWAY 79.

Detailed Location: WITHIN SAN JACINTO NUEVO Y POTRERO. SITE IS 823 M WEST OF GILMAN SPRINGS ROAD (HWY 79) AND 460 M SOUTH OF BOLD STYLE ROAD.

Ecological: IN ALKALI PLAYA (SINK SCRUB) WITH CRESSA TRUXILLENSIS, SUAEDA TORREYANA, FRANKENIA GRANDIFOLIA, LASTHENIA GLABRATA SSP COULTERI, BROMUS MOLLIS, HORDEUM LEPORINUM, JUNCUS BUFONIUS, MICROSERIS DOUGLASII, AND ATRIPLEX ARGENTEA.

General: 47 PLANTS OBSERVED IN 1992. REPORTED TO BE AN EXCELLENT EXAMPLE OF ALKALI PLAYA AND ALKALI GRASSLAND COMMUNITIES. BRAMLET SUGGESTS SITE BE INCLUDED WITHIN THE SAN JACINTO WILDLIFE AREA.

Owner/Manager: UNKNOWN

Occurrence No.	14	**Map Index:**	28318	**EO Index:**	9379	**Element Last Seen:**	1996-05-04
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-05-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-01-22

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85240 / -117.12215	**Accurracy:**	specific area
UTM:	Zone-11 N3745797 E488700	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	27.7

Location: BOTH SIDES OF DAVIS ROAD NORTH OF THE SAN JACINTO RIVER, ABOUT 1 MILE NORTH OF LAKEVIEW.

Detailed Location: TWO COLONIES ALONG WEST SIDE OF ROAD AND TWO EAST OF THE ROAD.

Ecological: ALKALI MEADOW ADJACENT TO ANNUAL GRASSLAND. ASSOCIATED WITH PLAGIOBOTHRYS LEPTOCLADUS, SPERGULARIA MARINA, RUMEX MARITIMUS, SUAEDA MOQUINII, HORDEUM INTERCEDENS (?), LASTHENIA CALIFORNICA, MICROSERIS DOUGLASII, BRODIAEA FILIFOLIA, ET AL.

General: MAIN SOURCE OF INFORMATION FOR THIS SITE IS MAP DETAIL PROVIDED BY BRAMLET. 78 PLANTS OBSERVED IN SE-MOST COLONY IN 1996.

Owner/Manager: UNKNOWN

Occurrence No.	15	**Map Index:**	28300	**EO Index:**	21769	**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-09-24

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84731 / -117.11780	**Accurracy:**	specific area
UTM:	Zone-11 N3745232 E489102	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	8.3

Location: ABOUT 0.2 MILE EAST OF DAVIS ROAD & 0.3 MILE SOUTH OF THE SAN JACINTO RIVER, NORTH OF LAKEVIEW.

Detailed Location:

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS MAP DETAIL PROVIDED BY BRAMLET.

Owner/Manager: UNKNOWN

Occurrence No.	18	**Map Index:**	13191	**EO Index:**	49343	**Element Last Seen:**	2000-05-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2006-09-20

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78378 / -117.17927	**Accurracy:**	specific area
UTM:	Zone-11 N3738196 E483402	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	5.8

Location: 3 MILES EAST OF PERRIS, 0.65 AIR MILE WSW OF JUNCTION OF SAN JACINTO RD & SAN JACINTO AVE, NORTHEAST OF I-15.

Detailed Location:

Ecological: IN DISTURBED ALKALI GRASSLAND WITH HORDEUM MURINUM SSP. LEPORINUM, ATRIPLEX ARGENTEA SSP. MOHAVENSIS, HORDEUM INTERCEDENS, MEDICAGO POLYMORPHA, LEPIDIUM DICTYOTUM, HEMIZONIA PUNGENS SSP. LAEVIS, BRODIAEA FILIFOLIA, ET AL.

General: 173 PLANTS OBSERVED IN 1993, 4749 IN 1997. SPECIES OBSERVED DURING 2000 BRODIAEA FILIFOLIA SURVEY. SITE SHOULD BE PROTECTED AS PART OF A SAN JACINTO RIVER CORRIDOR RESERVE.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	60764	**EO Index:**	60800	**Element Last Seen:**	1995-06-08
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-06-08
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-01

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86197 / -117.10773	**Accurracy:**	80 meters
UTM:	Zone-11 N3746857 E490034	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	0.0

Location: 2 AIR MILES NNE OF LAKEVIEW. SAN JACINTO WILDLIFE AREA.

Detailed Location: 1.22 KM EAST OF DAVIS ROAD. 183 METERS SOUTH OF THE EXISTING ACCESS ROAD. 518 METERS NORTH OF THE SAN JACINTO RIVER CHANNEL. MAPPED IN SE1/4 OF SE1/4 SEC 32.

Ecological: ALKALI GRASSLAND.

General: ONLY SOURCE OF INFO FOR THIS OCCURRENCE IS A 1995 COLLECTION BY BRAMLET.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	21	**Map Index:**	60781	**EO Index:**	60817	**Element Last Seen:**	2000-05-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-01

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.79071 / -117.19083	**Accurracy:**	80 meters
UTM:	Zone-11 N3738967 E482333	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: 2 MILES EAST OF PERRIS. ALONG DUNLAP DRIVE.

Detailed Location: 610 METERS WEST OF THE SAN JACINTO RIVER, 457 METERS NORTH OF SAN JACINTO AVE, AND 30 METERS EAST OF DUNLAP DRIVE. MAPPED IN THE SW1/4 OF SW1/4 SEC 27.

Ecological: DISTURBED ALKALI GRASSLAND IN DISKED FIELD. ASSOC INCLUDE: HORDEUM MURINUM LEPORINUM, PLAGIOBOTHRYS LEPTOCLADUS, PHALARIS MINOR, ATRIPLEX ARGENTEA, HORDEUM INTERCEDENS, ETC.

General: ONLY SOURCE OF INFO FOR THIS OCCURRENCE IS A 2000 COLLECTION BY BRAMLET.

Owner/Manager: UNKNOWN

Atriplex pacifica

Element Code: PDCHE041C0

South Coast saltscale

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3G4
	State:	None		**State:**	S2.2
	Other:	Rare Plant Rank - 1B.2			
Habitat:	**General:**	COASTAL SCRUB, COASTAL BLUFF SCRUB, PLAYAS, CHENOPOD SCRUB.			
	Micro:	ALKALI SOILS. 1-500M.			

Occurrence No.	19	**Map Index:**	34627	**EO Index:**	473	**Element Last Seen:**	1991-06-01
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-03-19

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82055 / -117.15003	**Accurracy:**	specific area
UTM:	Zone-11 N3742269 E486115	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 13 (S)	**Acres:**	8.5

Location: EAST SIDE OF THE SAN JACINTO RIVER, 0.2 MI NE OF AQUEDUCT CROSSING.

Detailed Location: 1.9 MI W OF NUEVO, 900 FT S OF THE END OF 11 ST AND 10 FT E OF THE EXISTING DIRT ACCESS ROAD.

Ecological: ALKALINE SINK SCRUB. ASSOCIATES INCLUDE SUAEDA TORREYANA, SALICORNIA SUBTERMINALIS, LASTHENIA CALIFORNICA, ERODIUM CICUTARIUM, AND ATRIPLEX ARGENTEA SSP. EXPANSA.

General: 55 PLANTS SEEN IN 1991. D. TAYLOR BELIEVES THIS MAY BE A SUB-SPECIES OF A. PACIFICA. CITATION FROM REISER "SOUTH OF BERNASCONI HILLS & RAMONA EXPRESSWAY" ATTRIBUTED TO THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	25	**Map Index:**	34728	**EO Index:**	441	**Element Last Seen:**	1996-05-04
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-05-04
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-01-22

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85303 / -117.11998	**Accurracy:**	specific area
UTM:	Zone-11 N3745867 E488901	**Elevation (ft):**	1430
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	11.4

Location: SAN JACINTO WILDLIFE AREA, EAST OF DAVIS ROAD & NORTH OF THE SAN JACINTO RIVER.

Detailed Location: TWO COLONIES: WEST COLONY IS 8M EAST OF ROAD AND 120M NORTH OF LEVEE; EAST COLONY IS 143M EAST OF ROAD AND 120M NORTH OF LEVEE. SITE IS IN OLD RIVERBED AREA BESIDE THE EXISTING CHANNELIZED AREA OF THE SAN JACINTO RIVER.

Ecological: ALKALINE MEADOW WITH ASSOCIATES CRESSA TRUXILLENSIS, BASSIA HYSSOPIFOLIA, PSILOCARPHUS BREVISSIMUS, ATRIPLEX ARGENTEA, JUNCUS BUFONIUS, PLAGIOBOTHRYS LEPTOCLADUS, RUMEX MARITIMUS, FRANKENIA SALINA, PHALARIS MINOR, MONOLEPIS NUTTALLIANA,ETC.

General: 7 PLANTS IN EAST COLONY IN 1996. ACCORDING TO BRAMLET, IDENTIFICATION OF THESE PLANTS IS UNCLEAR, MAY BE A. DAVIDSONII, ANOTHER RARE PLANT.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	26	**Map Index:**	34727	**EO Index:**	442	**Element Last Seen:**	1992-04-03
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-04-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-03-22

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.87187 / -117.12049	**Accurracy:**	80 meters
UTM:	Zone-11 N3747955 E488856	**Elevation (ft):**	1430
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	0.0

Location: SAN JACINTO WA ENTRANCE, 0.1 MI E OF DAVIS ROAD.

Detailed Location: SITE IS 137 METERS SOUTH OF THE EXISTING HEADQUARTERS BUILDING AND 76 METERS SOUTH OF A WATERFOWL POND.

Ecological:

General: 150 PLANTS OBSERVED IN 1992.

Owner/Manager: DFG-SAN JACINTO WA

Atriplex parishii **Element Code:** PDCHE041D0

Parish's brittlescale

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G1G2
	State:	None		**State:**	S1.1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	ALKALI MEADOWS, VERNAL POOLS, CHENOPOD SCRUB, PLAYAS.			
	Micro:	USUALLY ON DRYING ALKALI FLATS WITH FINE SOILS. 4-140M.			

Occurrence No.	2	**Map Index:** 03914	**EO Index:**	29409		**Element Last Seen:**	1974-06-19
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1974-06-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2009-08-28

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83645 / -117.12813	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3744029 E488145	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 07 (S)	**Acres:**	0.0

Location: LAKEVIEW, RIVERSIDE COUNTY.

Detailed Location: 1 KM (1/2 MI) NW OF LAKEVIEW AVE, S OF THE RAMONA EXPRESSWAY (AKA MARTIN ST.).

Ecological: GROWS IN THE FINE ALKALINE SOILS OF DRY LAKE BEDS.

General: BRAMLET BELIEVES THAT HABITAT STILL EXISTS FOR A. PARISHII IN THIS AREA. A 1974 CLARKE & DERBY COLLECTION IS ONLY SOURCE OF LOCATION INFORMATION. SPECIES HAS NOT BEEN COLLECTED SINCE. NEEDS ADDITIONAL FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	21	**Map Index:** 76358	**EO Index:**	77331		**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2009-08-28

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78910 / -117.18458	**Accurracy:**	1 mile
UTM:	Zone-11 N3738788 E482912	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 27 (S)	**Acres:**	0.0

Location: S OF BERNASCONI HILLS, ALONG THE SAN JACINTO RIVER FLOODPLAIN.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS JUST S OF BERNASCONI HILLS, IN THE VICINITY OF THE SAN JACINTO RIVER.

Ecological:

General: ONLY INFORMATION FOR THIS SITE IS A CITATION IN REISER'S "RARE PLANTS OF SAN DIEGO COUNTY." NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Cuscuta obtusiflora var. glandulosa

Element Code: PDCUS01111

Peruvian dodder

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T4T5
	State:	None		**State:**	SH
	Other:	Rare Plant Rank - 2.2			
Habitat:	**General:**	MARSHES AND SWAMPS (FRESHWATER).			
	Micro:	FRESHWATER MARSH. 15-280 M.			

Occurrence No.	1	**Map Index:** 83834	**EO Index:**	84862		**Element Last Seen:**	1890-04-XX
Occ. Rank:	None		**Presence:**	Extirpated		**Site Last Seen:**	1890-04-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-10-11

Quad Summary:	Redlands (3411712), San Bernardino South (3411713)
County Summary:	San Bernardino

Lat/Long:	34.10558 / -117.28052	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3773899 E474126	**Elevation (ft):**	
PLSS:	T01S, R04W, Sec. 10 (S)	**Acres:**	479.0

Location:	WARM CREEK.
Detailed Location:	EXACT LOCATION UNKNOWN, MAPPED BY CNDDB ALONG WARM CREEK.
Ecological:	
General:	MAIN SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1890 COLLECTION BY PARISH. SANDERS STATES THAT WARM CREEK IS NOW THOROUGHLY URBANIZED; THE CREEK IS NOW A BARREN CONCRETE CHANNEL AND THE AREA IS ALL SHOPPING CENTERS, PARKING LOTS, ETC.
Owner/Manager:	UNKNOWN

Astragalus hornii var. hornii

Element Code: PDFAB0F421

Horn's milk-vetch

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4G5T2T3
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, BLM_S-Sensitive			
Habitat:	**General:**	MEADOWS AND SEEPS, PLAYAS.			
	Micro:	LAKE MARGINS, ALKALINE SITES. 60-850M.			

Occurrence No.	1	**Map Index:** 35235	**EO Index:**	70402		**Element Last Seen:**	1898-08-XX
Occ. Rank:	None		**Presence:**	Extirpated		**Site Last Seen:**	1898-08-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2007-07-13

Quad Summary:	San Bernardino South (3411713)
County Summary:	San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location:	VICINITY OF SAN BERNARDINO.
Detailed Location:	EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS A BEST GUESS.
Ecological:	ROADSIDES. DAMP LANDS.
General:	SITE KNOWN FROM SIX PARISH COLLECTIONS TAKEN BETWEEN 1887 AND 1898. 1914 NOTE BY PARISH, CITED IN JEPSON'S FLORA VOLUME II (1936), STATES THAT THIS OCCURRENCE HAS BEEN EXTIRPATED BY CULTIVATION.
Owner/Manager:	UNKNOWN

Astragalus pachypus var. jaegeri

Element Code: PDFAB0F6G1

Jaeger's milk-vetch

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T1
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL, VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND.			
	Micro:	DRY RIDGES AND VALLEYS AND OPEN SANDY SLOPES; OFTEN IN GRASSLAND AND OAK-CHAPARRAL. 365-915M.			

Occurrence No.	17	**Map Index:**	78682	**EO Index:**	79647	**Element Last Seen:**	1922-04-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1922-04-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-04-27

Quad Summary: San Jacinto (3311678), Beaumont (3311688), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.87579 / -116.99174	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3748384 E500763	**Elevation (ft):**	2000
PLSS:	T03S, R01W, Sec. 28 (S)	**Acres:**	333.0

Location: LAMB CANYON PASS (SR-79), SAN JACINTO MOUNTAINS REGION.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS ALONG LAMB CANYON ROAD WHICH IS NOW SR-79 FROM SAN JACINTO VALLEY NORTH THROUGH MOUNTAINS TOWARD BEAUMONT.

Ecological:

General: ONLY SOURCE OF OCCURRENCE IS 1922 COLLECTION BY SPENCER. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Ribes divaricatum var. parishii

Element Code: PDGRO020F3

Parish's gooseberry

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4TH
	State:	None		**State:**	SH
	Other:	Rare Plant Rank - 1A			
Habitat:	**General:**	RIPARIAN WOODLAND.			
	Micro:	SALIX SWALES IN RIPARIAN HABITATS. 65-100M.			

Occurrence No.	5	**Map Index:** 39016	**EO Index:**	34023		**Element Last Seen:**	1917-05-14
Occ. Rank:	None		**Presence:**	Possibly Extirpated		**Site Last Seen:**	1917-05-14
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1998-06-19

Quad Summary: Redlands (3411712), San Bernardino South (3411713), Harrison Mtn. (3411722), San Bernardino North (3411723)

County Summary: San Bernardino

Lat/Long:	34.11539 / -117.23856	**Accurracy:**	5 miles
UTM:	Zone-11 N3774976 E477999	**Elevation (ft):**	1000
PLSS:	T01S, R03W, Sec. 06 (S)	**Acres:**	0.0

Location: WARM CREEK, SAN BERNARDINO VALLEY.

Detailed Location: MAPPED AS A GENERAL OCCURRENCE TO INCLUDE ENTIRE LENGTH OF WARM CREEK.

Ecological: ON BANKS OF CREEK IN DAMP LAND, MEADOWS, OR SWAMPS.

General: SEVERAL COLLECTIONS BY S.B. PARISH AND W.F. PARISH FROM THE LATE 1800'S AND EARLY 1900'S ALONG WARM CREEK AND IN VICINITY OF SAN BERNARDINO VALLEY.

Owner/Manager: UNKNOWN

Nama stenocarpum

Element Code: PDHYD0A0H0

mud nama

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4G5
	State:	None		**State:**	S1S2
	Other:	Rare Plant Rank - 2.2			
Habitat:	**General:**	MARSHES AND SWAMPS.			
	Micro:	LAKE SHORES, RIVER BANKS, INTERMITTENTLY WET AREAS. 5-500M.			

Occurrence No.	11	**Map Index:** 48667	**EO Index:**	48667		**Element Last Seen:**	2010-05-04
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2010-05-04
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-10-07

Quad Summary: Lakeview (3311771), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.87579 / -117.05417	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3748386 E494989	**Elevation (ft):**	1400
PLSS:	T03S, R02W, Sec. 26 (S)	**Acres:**	0.0

Location: MYSTIC (SAN JACINTO) LAKE, NEAR GILMAN HOT SPRINGS RD, 1.8 KM SW OF EDEN PEAK.

Detailed Location: NE SHORE OF LAKE. MAPPED BY CNDDB AROUND THE LAKE SHORE NEAR GILMAN SPRINGS RD IN THE SE 1/4 SE 1/4 OF SECTION 26.

Ecological: MUD ALONG DRYING LAKE SHORE ON ALKALINE SOIL WITH CRYPSIS VIRGINICA, LEPTOCHLOA UNINERVIA, CYPERUS ERYTHRORHIZOS, PETUNIA PARVIFLORA, AND AMMANNIA COCCINEA. PLANTS WERE TALLER AND DENSER AT HIGH WATER LINE NEAR ROAD.

General: APPROXIMATELY 30 INDIVIDUALS OBSERVED IN 1999. ALSO SEEN IN 2005 AND 2010.

Owner/Manager: UNKNOWN

Monardella macrantha ssp. hallii

Element Code: PDLAM180E1

Hall's monardella

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3
	State:	None		**State:**	S3
	Other:	Rare Plant Rank - 1B.3, USFS_S-Sensitive			
Habitat:	**General:**	BROADLEAVED UPLAND FOREST, CHAPARRAL, LOWER MONTANE CONIFEROUS FOREST, CISMONTANE WOODLAND, VALLEY & FOOTHILL GRASSLAND.			
	Micro:	DRY SLOPES AND RIDGES IN OPENINGS WITHIN THE ABOVE COMMUNITIES. 695-2195M.			

Occurrence No.	31	**Map Index:**	04397	**EO Index:**	13652	**Element Last Seen:**	1992-11-05
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-11-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2002-12-12

Quad Summary: Forest Falls (3411618), Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08695 / -116.98578	**Accurracy:**	specific area
UTM:	Zone-11 N3771796 E501311	**Elevation (ft):**	5000
PLSS:	T01S, R01W, Sec. 16 (S)	**Acres:**	136.1

Location: YUCAIPA RIDGE ALONG TRUCK TRAIL AND AQUEDUCT, ABOUT 1 MILE SE OF MOUNTAIN HOME VILLAGE, SAN BERNARDINO MOUNTAINS.

Detailed Location: NUMEROUS COLONIES MAPPED ALONG UNIVERSITY CREEK TRUCK TRAIL & AQUEDUCT; MOSTLY WITHIN THE N 1/2 NE 1/4 SEC 17, NW 1/4 NW 1/4 SEC 16, NE 1/4 SECTION 16, SE 1/4 NE 1/4 SECTION 15, & THE W 1/2 SECTION 15.

Ecological: ON GRANITIC ROCKY SOIL, WITH PINUS COULTERI, PSEUDOTSUGA MACROCARPA, CALOCEDRUS DECURRENS, QUERCUS KELLOGGII AND Q. CHRYSOLEPIS CANOPY; PTERIDIUM AQUILINUM, POLYSTICHUM SCOPULINUM IN UNDERSTORY.

General: LESS THAN 100 PLANTS IN W 1/2 SECTION 15 IN 1981. MANY PLANTS OBSERVED IN 1992. NUMBER OF INDIVIDUALS DIFFICULT TO DETERMINE DUE TO VEGETATIVE PROPAGATION FROM CREEPING ROOTSTOCKS. FORMER EOS 43 & 44 LUMPED HERE.

Owner/Manager: USFS-SAN BERNARDINO NF, PVT

Occurrence No.	32	**Map Index:**	04307	**EO Index:**	17944	**Element Last Seen:**	1992-07-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-06-04

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10084 / -117.01595	**Accurracy:**	specific area
UTM:	Zone-11 N3773337 E498528	**Elevation (ft):**	3550
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	7.3

Location: AQUEDUCT ALONG SOUTH SIDE OF MILL CREEK CANYON, ABOUT 0.7 MILE EAST OF MOUNTAIN HOME VILLAGE, SAN BERNARDINO MOUNTAINS.

Detailed Location: THREE COLONIES MAPPED ALONG AQUEDUCT ACCESS TRAIL WITHIN THE SE 1/4 NE 1/4 SECTION 7 AND THE SW 1/4 NW 1/4 SECTION 8. COLLECTION FROM "MILL CREEK SOUTH OF MILL CREEK PUBLIC CAMP" ALSO ATTRIBUTED TO THIS SITE.

Ecological: IN FILTERED SUN OR PARTIAL SHADE OF SCRUB OAK CHAPARRAL AND BIGCONE SPRUCE-CANYON LIVE OAK FOREST ON STEEP N-FACING SLOPE.

General: MANY PLANTS OBSERVED IN 1992.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	44	**Map Index:**	38879	**EO Index:**	33886	**Element Last Seen:**	1992-07-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-06-04

Quad Summary: Forest Falls (3411618), Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09017 / -116.99954	**Accurracy:**	specific area
UTM:	Zone-11 N3772154 E500042	**Elevation (ft):**	4850
PLSS:	T01S, R01W, Sec. 17 (S)	**Acres:**	10.2

Location: YUCAIPA RIDGE ALONG TRUCK TRAIL AND AQUEDUCT, ABOUT 0.7 MILE SOUTH OF MOUNTAIN HOME VILLAGE, SAN BERNARDINO MOUNTAINS.

Detailed Location: 9 COLONIES MAPPED ALONG ROAD AND AQUEDUCT TRAIL WITHIN THE N 1/2 NE 1/4 SECTION 17 AND THE NW 1/4 NW 1/4 SECTION 16.

Ecological: IN MOSTLY PARTIAL SHADE OR FILTERED SUN OF BIGCONE SPRUCE-CANYON LIVE OAK FOREST, COULTER PINE FOREST, AND SCRUB OAK CHAPARRAL ON RIDGETOP AND STEEP, N-FACING SLOPE.

General: MANY PLANTS OBSERVED IN 1992. INDIVIDUAL PLANTS DIFFICULT TO COUNT DUE TO VEGETATIVE PROPAGATION FROM CREEPING ROOTSTOCK.

Owner/Manager: PVT, USFS-SAN BERNARDINO NF

Occurrence No.	45	**Map Index:**	38880	**EO Index:**	33887	**Element Last Seen:**	1992-07-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-06-04

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08958 / -117.03264	**Accurracy:**	80 meters
UTM:	Zone-11 N3772089 E496989	**Elevation (ft):**	3500
PLSS:	T01S, R01W, Sec. 18 (S)	**Acres:**	0.0

Location: AQUEDUCT ON SOUTH SIDE OF MOUTH OF MILL CREEK CANYON, SAN BERNARDINO MOUNTAINS.

Detailed Location: MAPPED ALONG ACCESS TRAIL FOR LOWER (NORTH) AQUEDUCT ABOUT 0.4 MILE ENE OF POWERHOUSE AND ABOUT 200 METERS FROM CONFLUENCE WITH UPPER (SOUTH) AQUEDUCT. WITHIN THE NW 1/4 NW 1/4 SECTION 18.

Ecological: IN FILTERED SUN OR PARTIAL SHADE OF SCRUB OAK CHAPARRAL AND BIGCONE SPRUCE-CANYON LIVE OAK FOREST.

General: MANY PLANTS OBSERVED IN 1992. INDIVIDUAL PLANTS DIFFICULT TO COUNT DUE TO VEGETATIVE PROPAGATION FROM CREEPING ROOTSTOCK.

Owner/Manager: PVT IN USFS-SAN BERNARDINO NF

Occurrence No.	46	**Map Index:**	38881	**EO Index:**	33888	**Element Last Seen:**	1992-07-23
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-06-04

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.09405 / -117.02841	**Accurracy:**	specific area
UTM:	Zone-11 N3772584 E497379	**Elevation (ft):**	3600
PLSS:	T01S, R01W, Sec. 07 (S)	**Acres:**	9.8

Location: AQUEDUCT ON SOUTH SIDE OF MILL CREEK CANYON, ABOUT 1.5 MI WSW OF MOUNTAIN HOME VILLAGE, SAN BERNARDINO MOUNTAINS.

Detailed Location: MAPPED ALONG ACCESS TRAIL FOR LOWER (NORTH) AQUEDUCT ABOUT 0.7-1.1 MILES NE OF POWERHOUSE WITHIN THE NW 1/4 SE 1/4 SECTION 7 AND THE SE 1/4 SW 1/4 SECTION 7.

Ecological: IN FILTERED SUN OR PARTIAL SHADE OF SCRUB OAK CHAPARRAL AND BIGCONE SPRUCE-CANYON LIVE OAK FOREST.

General: MANY PLANTS OBSERVED IN 1992. INDIVIDUAL PLANTS DIFFICULT TO COUNT DUE TO VEGETATIVE PROPAGATION FROM CREEPING ROOTSTOCK.

Owner/Manager: PVT IN USFS-SAN BERNARDINO NF

Monardella pringlei

Element Code: PDLAM180J0

Pringle's monardella

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	GX
	State:	None		**State:**	SX
	Other:	Rare Plant Rank - 1A			
Habitat:	**General:**	COASTAL SCRUB.			
	Micro:	SANDY HILLS. 300-400M.			

Occurrence No.	2	**Map Index:**	20580	**EO Index:**	9659	**Element Last Seen:**	1941-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1941-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-12-19

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07608 / -117.35507	**Accurracy:**	1 mile
UTM:	Zone-11 N3770648 E467239	**Elevation (ft):**	1000
PLSS:	T01S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: WEST OF COLTON; IN SANDY HILLS BETWEEN COLTON AND RIALTO.

Detailed Location: DISTRIBUTION IS UNCERTAIN, SINCE OLD HERBARIUM LABELS PROVIDE LITTLE SPECIFIC INFORMATION. COULD WELL BE WORTHWHILE SEARCHING OUTSIDE OF THE MAPPED REGION.

Ecological:

General: NEED MORE INFORMATION: DOES THIS PLANT STILL OCCUR AT THIS SITE?

Owner/Manager: CITY OF RIALTO, PVT

Malacothamnus parishii **Element Code:** PDMAL0Q0C0

Parish's bush-mallow

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	GHQ
	State:	None		**State:**	SH
	Other:	Rare Plant Rank - 1A			
Habitat:	**General:**	CHAPARRAL, COASTAL SAGE SCRUB.			
	Micro:	IN A WASH. ONE SITE KNOWN: 485M.			

Occurrence No.	2	**Map Index:** 03752	**EO Index:**	1255		**Element Last Seen:**	1895-XX-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1895-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1992-12-16

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09692 / -117.16897	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3772915 E484413	**Elevation (ft):**	1290
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	3450.3

Location: VICINITY OF SAN BERNARDINO.

Detailed Location: ALSO MAPPED IN SECS 9, 10, 12, 13, 14, 15 AND R2W SECS 7, 8 AND 18.

Ecological:

General: MAPPED AS NON-SPECIFIC POLYGON IN THE SANTA ANA RIVER WASH. THIS IS THE ONLY KNOWN OCCURRENCE FOR THIS TAXON.

Owner/Manager: UNKNOWN

Sidalcea hickmanii ssp. parishii **Element Code:** PDMAL110A3

Parish's checkerbloom

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3T1
	State:	Rare		**State:**	S1.2
	Other:	Rare Plant Rank - 1B.2, BLM_S-Sensitive, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, LOWER MONTANE CONIFEROUS FOREST.			
	Micro:	DISTURBED BURNED OR CLEARED AREAS ON DRY, ROCKY SLOPES, IN FUEL BREAKS & FIRE ROADS ALONG THE MTN SUMMITS. 1000-2135M.			

Occurrence No.	11	**Map Index:**	73503	**EO Index:**	74464	**Element Last Seen:**	1909-06-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1909-06-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-01-28

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08902 / -117.01975	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3772026 E498177	**Elevation (ft):**	4600
PLSS:	T01S, R01W, Sec. 18 (S)	**Acres:**	0.0

Location: PIPELINE TRAIL SAN ANTONIO POWER CO, YUCAIPE MTNS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS WHERE THE 4600 FT ELEVATION LINE CROSSES THE YUCAIPA RIDGE TRUCK TRAIL ON YUCAIPA RIDGE.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1909 REED COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Sidalcea neomexicana **Element Code:** PDMAL110J0

Salt Spring checkerbloom

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4?
	State:	None		**State:**	S2S3
	Other:	Rare Plant Rank - 2.2			
Habitat:	**General:**	ALKALI PLAYAS, BRACKISH MARSHES, CHAPARRAL, COASTAL SCRUB, LOWER MONTANE CONIFEROUS FOREST, MOJAVEAN DESERT SCRUB.			
	Micro:	ALKALI SPRINGS AND MARSHES. 0-1500M.			

Occurrence No.	1	**Map Index:** 35238	**EO Index:**	21172		**Element Last Seen:**	1966-05-19
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1966-05-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1996-06-28

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.78636 / -117.01892	**Accurracy:**	1 mile
UTM:	Zone-11 N3738468 E498248	**Elevation (ft):**	1500
PLSS:	T04S, R01W, Sec. 31 (S)	**Acres:**	0.0

Location: 3 MILES WEST OF SAN JACINTO, SAN JACINTO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN. SITE MAPPED BY CNDDB WEST OF SAN JACINTO ALONG COTTONWOOD AVENUE NEAR WARREN ROAD.

Ecological: SEMI-ALKALINE SWAMP WITH ANEMOPSIS AND SPERGULARIA MACROTHECA.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1966 COLLECTION BY ROOS.

Owner/Manager: UNKNOWN

Occurrence No.	6	**Map Index:** 35235	**EO Index:**	4014		**Element Last Seen:**	XXXX-XX-XX
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	XXXX-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1996-06-28

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	1050
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SAN BERNARDINO.

Detailed Location:

Ecological:

General: BASED ON COLLECTION HISTORY ONLY.

Owner/Manager: UNKNOWN

Abronia villosa var. aurita

Element Code: PDNYC010P1

chaparral sand-verbena

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3T4
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 1B.1, BLM_S-Sensitive, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB			
	Micro:	SANDY AREAS. 80-1600M.			

Occurrence No.	41	**Map Index:** 60450	**EO Index:** 60486	**Element Last Seen:**	2004-04-07
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	2004-04-07
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2008-09-24

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.82194 / -117.17308	**Accurracy:**	specific area
UTM:	Zone-11 N3742427 E483982	**Elevation (ft):**	1600
PLSS:	T04S, R03W, Sec. 14 (S)	**Acres:**	10.9

Location: ROUGHLY 1 AIR MILE SOUTH OF PERRIS RESERVOIR. 1.4 AIR MILES SSW OF BERNASCONI PASS.

Detailed Location: 0.2 TO 0.4 AIR MILES DIRECTLY SOUTH OF SOUTHERN END OF BEND IN RAMONA EXPRESSWAY.

Ecological: STABILIZED SAND FIELD ON CIENEBA SANDY LOAM. 8-15% SLOPES. TOPOGRAPHY AND VEGETATION CAPTURED SAND, WHICH ACCUMULATED AGAINST A SLOPE ABOVE ACTIVE AGRICULTURAL FLATS. ASSOCIATES INCLUDE CROTON CALIFORNICUS AND CAMISSONIA BISTORTA.

General: OTHER ASSOCIATES INCLUDE ERIASTRUM SAPHIRINUM, ERIOGONUM FASCICULATUM, NICOTIANA BIGELOVI, TRIBULUS TERRESTRIS, TETRADYMIA COMOSA, AND EREMOCARPUS SETIGERUS. >16 PLANTS OBSERVED IN 2003. 30 PLANTS OBSERVED IN 2004.

Owner/Manager: PVT

Chorizanthe parryi var. parryi

Element Code: PDPGN040J2

Parry's spineflower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3T2
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 1B.1, BLM_S-Sensitive, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL.			
	Micro:	DRY SLOPES AND FLATS; SOMETIMES AT INTERFACE OF 2 VEG TYPES, SUCH AS CHAP AND OAK WDLAND; DRY, SANDY SOILS. 40-1705M.			

Occurrence No.	2	**Map Index:**	03430	**EO Index:**	10156	**Element Last Seen:**	1882-05-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1882-05-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-09

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07139 / -117.30560	**Accurracy:**	1 mile
UTM:	Zone-11 N3770113 E471801	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: COLTON.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS IN VICINITY OF COLTON.

Ecological:

General: SITE BASED ON SEVERAL COLLECTIONS FROM APRIL & MAY OF 1882. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	3	**Map Index:**	17762	**EO Index:**	10127	**Element Last Seen:**	1952-05-11
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	200X-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-23

Quad Summary: Redlands (3411712), San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.02671 / -117.23967	**Accurracy:**	1 mile
UTM:	Zone-11 N3765143 E477873	**Elevation (ft):**	1400
PLSS:	T02S, R03W, Sec. 06 (S)	**Acres:**	0.0

Location: SCOTT CANYON, ABOUT 2.5 MI SE OF LOMA LINDA.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS AROUND SCOTT CANYON. A 1926 SPALDING COLLECTION FROM "SUMMIT OF HILLS S OF SANITARIUM" ALSO ATTRIBUTED TO THIS SITE.

Ecological: ON DRY SOUTH SLOPE WITH ENCELIA FARINOSA, ARISTIDA PARISHII, SALVIA MELLIFERA, RHUS OVATA, ETC.

General: SITE BASED ON A 1952 ROOS & ROOS COLLECTION; MENTIONED AS LOCALLY COMMON IN 1952. SANDERS (2008) MENTIONS THAT HE HAS VISITED THIS AREA MULTIPLE TIMES (DATES UNKNOWN) AND HAS NOT SEEN THE SPECIES. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	6	**Map Index:**	17768	**EO Index:**	10151	**Element Last Seen:**	1980-05-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-05-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80992 / -117.35561	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3741138 E467086	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location: HARFORD SPRINGS COUNTY PARK, GAVILAN HILLS.

Detailed Location: MAPPED TO ENCOMPASS INFORMATION FROM TWO 1980 BOYD COLLECTIONS FROM "W SIDE OF GAVILAN RD" AND FROM "E SIDE OF GAVILAN RD, E OF THE TRAILER PARK."

Ecological: CHAMISE CHAPARRAL-COASTAL SAGE SCRUB-JUNIPER SAVANNA MOSAIC. FLAT GRASSY OPENING.

General: SITE BASED ON TWO 1980 BOYD COLLECTIONS. NEEDS FIELDWORK.

Owner/Manager: RIV COUNTY

Occurrence No.	15	**Map Index:**	22516	**EO Index:**	21746	**Element Last Seen:**	1992-05-22
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-21

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08061 / -117.05429	**Accurracy:**	specific area
UTM:	Zone-11 N3771096 E494991	**Elevation (ft):**	2600
PLSS:	T01S, R02W, Sec. 14 (S)	**Acres:**	59.0

Location: MILL CREEK WASH, JUST DOWNSTREAM FROM THE MOUTH OF CANYON AND 0.5 MILE WEST OF RANGER STATION, MENTONE.

Detailed Location: MAPPED ALONG UNPAVED ACESS ROAD ALONG WOOD-POLE TRANSMISSION LINE ACCORDING TO A 1992 STONE MAP. AN 1898 HALL COLLECTION & A 1992 REY COLLECTION FROM THE "MOUTH OF MILL CREEK CANYON" ALSO ATTRIBUTED TO THIS SITE.

Ecological: RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB WITH ADENOSTOMA FASCICULATUM, ERIOGONUM FASCICULATUM, OPUNTIA LITTORALIS VASEYI, O. PARRYI, YUCCA WHIPPLEI PARISHII, AND RHUS GLABRA. COLONIES IN DISTURBED AREAS AND NATURAL OPENINGS ON FINE LOAMY SAND.

General: UNKNOWN # SEEN BY BRAMLET IN 1990. 1000+ PLANTS ESTIMATED TO OCCUR IN THIS VICINITY IN 1992. INCLUDES FORMER EO #16.

Owner/Manager: PVT-SCE

Occurrence No.	17	**Map Index:**	22514	**EO Index:**	13771	**Element Last Seen:**	1992-05-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary: Forest Falls (3411618), Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.03034 / -116.99717	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3765520 E500260	**Elevation (ft):**	3000
PLSS:	T02S, R01W, Sec. 04 (S)	**Acres:**	0.0

Location: BIRMINGHAM RANCH IN WATER CANYON, YUCAIPA.

Detailed Location: EXACT LOCATION UNK. MAPPED AROUND BIRMINGHAM RANCH TO ENCOMPASS MULTIPLE 1992 SANDERS COLLECTIONS. A 1900 PARISH COLL FROM "YUCAIPA" ALSO ATTRIBUTED HERE. SANDERS (2008) SAYS SITE IS NOW WITHIN A STATE PARK; UNK IF ENTIRE EO IS IN PARK.

Ecological: CHAPARRAL AND OAK GROVES ON CANYON AND ON RIDGES. ON OPEN CLEARED RIDGETOP N OF HUBNER HOUSE AT EDGE OF CHAPARRAL IN BARE ZONE & ON OPEN MESA TOP (CLEARED AREA) S OF THE HUBNER HOUSE.

General: SITE BASED ON 3 1992 SANDERS COLLECTIONS FROM S & N OF THE HUBNER HOUSE & FROM THE SW CORNER OF BIRMINGHAM RANCH; MENTIONED AS "LOCALLY COMMON" IN 1992 WITH <1000 PLANTS. NEEDS FIELDWORK. INCLUDES FORMER EO #19.

Owner/Manager: DPR-WILDWOOD CANYON

Occurrence No.	20	**Map Index:**	22519	**EO Index:**	16384	**Element Last Seen:**	1950-05-27
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1950-05-27
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary: Sunnymead (3311782)

County Summary: Riverside

Lat/Long:	33.98616 / -117.20490	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3760640 E481074	**Elevation (ft):**	2500
PLSS:	T02S, R03W, Sec. 21 (S)	**Acres:**	0.0

Location: HILLS NORTHEAST OF RECHE CANYON SUMMIT.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS NE OF THE HIGHEST ELEVATION ALONG RECHE CANYON.

Ecological: ON SANDY SLOPE WITH ADENOSTOMA FASCICULATUM, BROMUS RUBENS, AND STYLOCLINE SP. ETC.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1950 ROOS COLLECTION. SANDERS (2008) MENTIONS THAT HE HAS NOT SEEN THE SPECIES IN THIS AREA BUT THAT THE HABITAT HAS BEEN DEGRADED BY DEVELOPMENT & WEED INVASION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	21	**Map Index:**	22521	**EO Index:**	9608	**Element Last Seen:**	1969-05-05
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1969-05-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-22

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.84830 / -117.00475	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3745336 E499559	**Elevation (ft):**	1520
PLSS:	T04S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: HIGHWAY 79, 1.5 MI NW OF GILMAN HOT SPRINGS.

Detailed Location: 200 YARDS N OF THE ROAD JUNCTION. PLANTS LOCATED ON S-FACING SLOPE 100 YARDS FROM THE ROAD IN SHADE. MAPPED BY CNDDB AS BEST GUESS ABOUT 200 YARDS NW OF ROAD JUNCTION AROUND HWY 79.

Ecological: OPEN GRASSLAND WITH MANY SHRUBS ESPECIALLY ADENOSTOMA FASCICULATUM AND ENCELIA FARINOSA. FAIRLY HARD-PACKED SANDY DRY SOIL.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1969 HOLLIDAY COLLECTION. SANDERS (2008) MENTIONS THAT HE HAS NOT SEEN THE PLANT AT THIS SITE OR ANYWHERE NEARBY; DATE OF SITE VISIT UNKNOWN. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	22	**Map Index:**	22520	**EO Index:**	21742	**Element Last Seen:**	1997-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-21

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.81794 / -117.07191	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3741972 E493344	**Elevation (ft):**	2600
PLSS:	T04S, R02W, Sec. 15 (S)	**Acres:**	0.0

Location: VICINITY OF MT. RUDOLPH, LAKEVIEW MOUNTAINS.

Detailed Location: EXACT LOCATION UNK. MAPPED BY CNDDB TO ENCOMPASS A 1997 PITZER COLL FROM "~0.75 MI SSE OF MT. RUDOLPH" & A 1981 BOYD COLLECTION FROM "BELOW THE SUMMIT OF MT. RUDOLPH, 2600 FT."

Ecological: ADENOSTOMA CHAPARRAL AND SAGE SCRUB ON ROCKY SLOPES.

General: SITE BASED ON A 1981 COLLECTION & A 1997 COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	23	**Map Index:**	22522	**EO Index:**	16571	**Element Last Seen:**	1981-05-09
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1981-05-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97458 / -117.29261	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3759376 E472969	**Elevation (ft):**	2450
PLSS:	T02S, R04W, Sec. 27 (S)	**Acres:**	0.0

Location: SW CORNER OF BOX SPRINGS RD INTERSECTION WITH DIRT SIDE ROAD, 1.8 MI S OF PIGEON PASS RD, BOX SPRINGS MTNS.

Detailed Location: 1 M (WE THINK THEY MEAN "METERS" HERE) FROM SW EDGE OF BOX SPRINGS RD, 10 M S FROM SIDE ROAD.

Ecological: GROWING IN RECENTLY BURNED AREA OF COASTAL SAGE SCRUB WITH CHAPARRAL ELEMENTS. ASSOCIATED WITH ADENOSTOMA FASCICULATUM, BRASSICA GENICULATA, CALYPTRIDIUM MANANDRUM, CRYPTANTHA MICROSTACHYS, CRYPTANTHA SP., PHACELIA DISTANS

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1981 GALLAGHER COLLECTION. SANDERS (2008) MENTIONS THAT HE CAN NOT FIND THIS SPECIES ANYWHERE IN THE BOX SPRINGS MTNS; PERHAPS SCARCE DUE TO MASSIVE WEED INVASION. NEEDS FIELDWORK.

Owner/Manager: RIV CO-BOX SPRINGS MTN PARK

Occurrence No.	28	**Map Index:**	42067	**EO Index:**	42067	**Element Last Seen:**	1917-05-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1917-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.96451 / -117.33629	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3758272 E468930	**Elevation (ft):**	1000
PLSS:	T02S, R04W, Sec. 30 (S)	**Acres:**	0.0

Location: CITRUS EXPERIMENTAL STATION, RIVERSIDE.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS IN VICINITY OF THE UNIVERSITY OF CALIFORNIA EXPERIMENT STATION.

Ecological:

General: ONLY SOURCE OF INFO FOR THIS SITE IS A 1917 SUN COLLECTION. SANDERS (2008) MENTIONS THAT HE HAS NEVER SEEN THIS SPECIES IN THE HILLS AROUND THE CAMPUS AND IT IS LIKELY EXTIRPATED OR SCARCE; DATES OF SITE VISITS UNKNOWN. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	30	**Map Index:**	42069	**EO Index:**	42069	**Element Last Seen:**	1991-09-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-09-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-16

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09434 / -117.12572	**Accurracy:**	specific area
UTM:	Zone-11 N3772623 E488402	**Elevation (ft):**	1650
PLSS:	T01S, R02W, Sec. 07 (S)	**Acres:**	29.0

Location: SANTA ANA WASH, ABOUT 0.9 MILE SOUTH OF GREENSPOT ROAD AND 3 MILES EAST OF ORANGE STREET, EAST HIGHLANDS.

Detailed Location: MAPPED AS 3 POLYGONS ACCORDING TO A 1992 JIGOUR MAP.

Ecological: JUNIPER AND CHAPARRAL PHASES OF RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB. ERIASTRUM DENSIFLORUM SSP. SANCTORUM GROWING NEARBY.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 6 COLONIES (MAPPED AS 3 POLYGONS) IN 1991.

Owner/Manager: UNKNOWN

Occurrence No.	31	**Map Index:**	42070	**EO Index:**	42070	**Element Last Seen:**	1991-09-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-09-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09334 / -117.13763	**Accurracy:**	specific area
UTM:	Zone-11 N3772514 E487303	**Elevation (ft):**	1560
PLSS:	T01S, R02W, Sec. 07 (S)	**Acres:**	10.0

Location: SANTA ANA WASH, ABOUT 1.0 MILE SOUTH OF GREENSPOT ROAD AND 2.5 MILES EAST OF ORANGE STREET, EAST HIGHLANDS.

Detailed Location: MAPPED AS 1 POLYGON ACCORDING TO A 1992 JIGOUR MAP.

Ecological: JUNIPER AND CHAPARRAL PHASES OF RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB. ERIASTRUM DENSIFLORUM SSP. SANCTORUM GROWING NEARBY.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 2 COLONIES (MAPPED AS 1 POLYGON) IN 1991.

Owner/Manager: UNKNOWN

Occurrence No.	32	**Map Index:**	42071	**EO Index:**	42071	**Element Last Seen:**	2006-06-05
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-05
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09885 / -117.14509	**Accurracy:**	specific area
UTM:	Zone-11 N3773126 E486616	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	81.0

Location: SANTA ANA WASH, ABOUT 0.4-1.0 MILE SOUTH OF GREENSPOT ROAD AND 2 MILES EAST OF ORANGE STREET, EAST HIGHLANDS.

Detailed Location: MAPPED AS 5 POLYGONS ACCORDING TO A 1992 JIGOUR MAP (4 SW-MOST POLYS) & COORDINATES FROM THE LABEL OF A 2006 SANDERS COLLECTION (NE-MOST POLY). PLANTS IN MUCH OF S1/2 AND E1/2 SEC 12.

Ecological: JUNIPER AND CHAPARRAL PHASES OF RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB. ERIASTRUM DENSIFLORUM SSP. SANCTORUM & DODECAHEMA LEPTOCERAS GROWING NEARBY. OTHER ASSOCIATES INCL ERIOGONUM FASCICULATUM, ERIODICTYON TRICHOCLAYX, ENCELIA FARINOSA, ETC.

General: 4 SW-MOST POLYS: UNKNOWN NUMBER OF PLANTS OBSERVED IN 17 COLONIES (MAPPED AS 4 POLYGONS), BUT AREA LIKELY HOLDS A MORE EXTENSIVE POPULATION OF THIS SPECIES. NE-MOST POLY: MENTIONED AS "FAIRLY COMMON IN OPEN PLACES BTWN SHRUBS" IN 2006.

Owner/Manager: UNKNOWN

Occurrence No.	33	**Map Index:**	42072	**EO Index:**	42072	**Element Last Seen:**	1991-09-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-09-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09466 / -117.15910	**Accurracy:**	80 meters
UTM:	Zone-11 N3772663 E485323	**Elevation (ft):**	1420
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: SANTA ANA WASH, ABOUT 1.0 MILE SOUTH OF GREENSPOT ROAD AND 1.3 MILES EAST OF ORANGE STREET, EAST HIGHLANDS.

Detailed Location: MAPPED ACCORDING TO A 1992 JIGOUR MAP.

Ecological: JUNIPER AND CHAPARRAL PHASES OF RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB. ERIASTRUM DENSIFLORUM SSP. SANCTORUM AND DODECAHEMA LEPTOCERAS GROWING NEARBY.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 1 COLONY IN 1991.

Owner/Manager: UNKNOWN

Occurrence No.	34	**Map Index:**	42073	**EO Index:**	42073	**Element Last Seen:**	1991-09-25
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-09-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-16

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09763 / -117.16592	**Accurracy:**	80 meters
UTM:	Zone-11 N3772993 E484694	**Elevation (ft):**	1650
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: SANTA ANA WASH, ABOUT 0.3 MILE SOUTH OF GREENSPOT ROAD AND 1 MILE EAST OF ORANGE STREET, EAST HIGHLANDS.

Detailed Location: MAPPED ACCORDING TO A 1992 JIGOUR MAP IN NE1/4 OF SW1/4 SEC 11.

Ecological: JUNIPER AND CHAPARRAL PHASES OF RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB. ERIASTRUM DENSIFLORUM SSP. SANCTORUM, DODECAHEMA LEPTOCERAS, AND CHORIZANTHE CALIFORNICA GROWING NEARBY.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 1 COLONY IN 1991.

Owner/Manager: UNKNOWN

Occurrence No.	76	**Map Index:**	72584	**EO Index:**	73481	**Element Last Seen:**	2005-04-21
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-04-21
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79767 / -117.35110	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3739778 E467499	**Elevation (ft):**	2040
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	0.0

Location: S OF HARFORD SPRINGS COUNTY PARK AND IDA LEONA RD, 1.5 MI ESE OF GAVILAN PEAK.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS APPROXIMATELY 1.5 AIR MI ESE OF GAVILAN PEAK.

Ecological: EDGE OF GRASSLAND AND CHAPARRAL; CLAY SOIL ON HILLTOP. IN OPEN AREAS WITH SPARSE VEGETATION.

General: SITE BASED ON A 1991 REISER COLLECTION AND A 2005 SANDERS COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	80	**Map Index:**	72588	**EO Index:**	73485	**Element Last Seen:**	2005-05-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-17

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.94057 / -117.01321	**Accurracy:**	80 meters
UTM:	Zone-11 N3755567 E498778	**Elevation (ft):**	2458
PLSS:	T03S, R01W, Sec. 05 (S)	**Acres:**	0.0

Location: APPROX 0.65 AIR MI WSW OF THE INTERSECTION OF I-10 AND SAN TIMOTEO CANYON RD, JUST S OF NICKLIN.

Detailed Location: MAPPED ACCORDING TO 2005 GPS COORDINATES PROVIDED BY GALVIN.

Ecological: GRAVELLY, EXPOSED OPEN, N-FACING SLOPE WITH RIPGUT BROME, SPREADING PHACELIA, FIDDLENECK, ETC.

General: 10+ PLANTS SEEN IN 2005.

Owner/Manager: PVT

Occurrence No.	81	**Map Index:**	35065	**EO Index:**	73486	**Element Last Seen:**	1936-04-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1936-04-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-11-03

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.94129 / -117.32668	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3755694 E469810	**Elevation (ft):**	1200
PLSS:	T03S, R04W, Sec. 05 (S)	**Acres:**	0.0

Location: S SLOPE SYCAMORE CANYON, BOX SPRINGS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS IN SYCAMORE CANYON NEAR THE 1200 FT ELEVATION LINE.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1936 TRUE COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	82	**Map Index:**	72591	**EO Index:**	73487	**Element Last Seen:**	1993-05-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1993-05-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-22

Quad Summary: Forest Falls (3411618), Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.06458 / -117.00208	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3769316 E499807	**Elevation (ft):**	3280
PLSS:	T01S, R01W, Sec. 20 (S)	**Acres:**	0.0

Location: NE CORNER OF THE INTERSECTION OF CARTER ST AND SPRIG AVE, AT THE SW FOOT OF YUCAIPA RIDGE.

Detailed Location: MAPPED IN THE NE CORNER OF THE INTERSECTION ACC TO A 1993 SANDERS & LOTT COLL. SANDERS (2008) BELIEVES THIS POP HAS BEEN ELIMINATED AS IT WAS ON A SMALL PVT PARCEL; HOWEVER, HABITAT LOOKS EXTANT BASED ON 2008 AERIAL IMAGERY.

Ecological: OPEN AREA WITH SPARSE LOW VEGETATION, MOSTLY ON S-FACING SLOPES; DRY AND WARM. HIGHLY DISTURBED CHAPARRAL, MOSTLY CLEARED AND USED FOR PASTURE.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1993 SANDERS & LOTT COLLECTION. NEEDS FIELDWORK.

Owner/Manager: PVT

Occurrence No.	83	**Map Index:**	72592	**EO Index:**	73488	**Element Last Seen:**	2007-08-02
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-08-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-20

Quad Summary:	Yucaipa (3411711)
County Summary:	San Bernardino

Lat/Long:	34.07635 / -117.11496	**Accurracy:**	specific area
UTM:	Zone-11 N3770627 E489392	**Elevation (ft):**	1900
PLSS:	T01S, R02W, Sec. 20 (S)	**Acres:**	10.0

Location:	APPROX 0.75 AIR MI NE OF THE INTERSECTION OF MILL CREEK RD AND AGATE AVE, S OF MILL CREEK, REDLANDS.
Detailed Location:	MAPPED AS 4 POLYGONS ACCORDING TO A 2007 CHAMBERS GROUP, INC MAP. A 2001 HILL & KRAMER COLLECTION FROM "N SIDE OF MENTONE BLVD, ~1 MI E OF MENTONE" ALSO ATTRIBUTED TO THIS SITE.
Ecological:	IN OPEN PATCHES WITHIN RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB (ENCELIA FARINOSA, ERIOGONUM FASCICULATUM, ARTEMISIA CALIFORNICA, ADENOSTOMA FASCICULATUM). SOBOBA SANDY SOIL. 1 CA GNATCATCHER ALSO HEARD.
General:	229 INDIVIDUALS OBSERVED IN 2007.
Owner/Manager:	PVT

Occurrence No.	84	**Map Index:**	72593	**EO Index:**	73489	**Element Last Seen:**	2006-06-07
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-06-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-17

Quad Summary:	Yucaipa (3411711)
County Summary:	San Bernardino

Lat/Long:	34.07511 / -117.09466	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3770488 E491265	**Elevation (ft):**	2100
PLSS:	T01S, R02W, Sec. 21 (S)	**Acres:**	167.0

Location:	MOUTH OF MILL CREEK CANYON AT GREENSPOT, E OF REDLANDS.
Detailed Location:	N SIDE OF HWY 38 (MILL CREEK RD) FROM GREENSPOT RD TO 1 KM E, S SIDE OF WASH. MAPPED BY CNDDB AS BEST GUESS IN THE N 1/4 OF SEC 21 ACCORDING TO A 2006 SANDERS COLLECTION.
Ecological:	ALLUVIAL SLOPE WITH STREAM AND SPREADING PONDS, GRAVELLY SOIL WITH BOULDERS; CHAMISE CHAPARRAL WITH RIPARIAN AND COASTAL SAGE ELEMENTS.
General:	ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 2006 SANDERS COLLECTION. COLLECTION MENTIONS THAT POPULATIONS ARE SCATTERED FOR AT LEAST A MILE UP THE CANYON WITH THOUSANDS OF PLANTS PRESENT; NEED MAP DETAIL.
Owner/Manager:	UNKNOWN

Occurrence No.	85	**Map Index:**	72594	**EO Index:**	73490	**Element Last Seen:**	2003-03-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-03-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-17

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10523 / -117.12905	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3773832 E488096	**Elevation (ft):**	1650
PLSS:	T01S, R02W, Sec. 07 (S)	**Acres:**	0.0

Location: S SIDE OF GREENSPOT RD JUST E OF NEW DEVELOPMENTS, EAST HIGHLANDS.

Detailed Location: IN OPEN AREA AT ROADSIDE. MAPPED BY CNDDB AS BEST GUESS S OF THE INTERSECTION OF GREENSPOT RD AND ALDER CREEK RD WHICH IS JUST SE OF A LARGE DEVELOPMENT.

Ecological: SANDY ALLUVIAL SLOPE AT THE FOOT OF THE MOUNTAINS; ALLUVIAL FAN SAGE SCRUB WITH ADENOSTOMA FASCICULATUM, YUCCA WHIPPLEI, ETC.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 2003 SANDERS COLLECTION; MENTIONED AS "SCARCE" IN 2003. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	87	**Map Index:**	58908	**EO Index:**	73492	**Element Last Seen:**	1919-05-07
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1919-05-07
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-10-17

Quad Summary: Redlands (3411712), Harrison Mtn. (3411722)

County Summary: San Bernardino

Lat/Long:	34.12971 / -117.20520	**Accurracy:**	1 mile
UTM:	Zone-11 N3776557 E481078	**Elevation (ft):**	1000
PLSS:	T01N, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: HIGHLAND.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS IN VICINITY OF HIGHLAND.

Ecological: SANDY WASH.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1919 SPENCER COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Chorizanthe polygonoides var. longispina

Element Code: PDPGN040K1

long-spined spineflower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T3
	State:	None		**State:**	S3
	Other:	Rare Plant Rank - 1B.2, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB, MEADOWS, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	GABBROIC CLAY. 30-1450M.			

Occurrence No.	18	**Map Index:**	77848	**EO Index:**	477	**Element Last Seen:**	1980-05-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1980-05-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-01-26

Quad Summary: Perris (3311772), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80963 / -117.25070	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3741077 E476796	**Elevation (ft):**	1700
PLSS:	T04S, R04W, Sec. 24 (S)	**Acres:**	0.0

Location: MOTTE RESERVE, HILLS ABOUT 2.5 MILES NORTHWEST OF PERRIS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB IN SECTION 24 OF MOTTE RESERVE AT ~1700'.

Ecological: ROCKY HILLS; COASTAL SAGE SCRUB COMMUNITY THAT WAS BURNED BY A WILDFIRE IN AUGUST 1979. DOMINATED BY ERIOGONUM FASCICULATUM AND SALVIA MELLIFERA.

General: MENTIONED AS "SCARCE" IN 1980. NEEDS FIELDWORK.

Owner/Manager: UCNR-MOTTE RIMROCK RES

Occurrence No.	19	**Map Index:**	77823	**EO Index:**	480	**Element Last Seen:**	1998-04-02
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-04-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-03

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80424 / -117.35099	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3740506 E467512	**Elevation (ft):**	2000
PLSS:	T04S, R05W, Sec. 24 (S)	**Acres:**	226.0

Location: SOUTH END OF HARFORD SPRINGS COUNTY PARK, NORTHWEST CORNER OF GAVILAN PLATEAU.

Detailed Location: MAPPED BY CNDDB AS BEST GUESS IN SOUTHERN HALF OF HARFORD SPRINGS COUNTY PARK.

Ecological: JUNIPER WOODLAND IN SHALLOW VALLEYS WITH COASTAL SAGE SCRUB/CHAPARRAL MOSAIC ON SLOPES. ADOBE SOIL.

General: MENTIONED AS "COMMON" IN 1998. ACCORDING TO REISER (2001), "A LARGE POPULATION OCCURS ON OPEN FLATS NEAR IDALEONA ROAD ON THE GAVILAN PLATEAU."

Owner/Manager: RIV COUNTY

Occurrence No.	20	**Map Index:** 34720	**EO Index:**	475		**Element Last Seen:**	1992-06-04
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	1992-06-04
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1996-02-27

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.83366 / -117.36780	**Accurracy:**	80 meters
UTM:	Zone-11 N3743773 E465968	**Elevation (ft):**	1460
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	0.0

Location: ALONG CAJALCO ROAD ABOUT 0.1 MILE WEST OF EL SOBRANTE ROAD, NORTH OF GAVILAN PLATEAU.

Detailed Location: SINGLE COLONY MAPPED SOUTH OF ROAD WITHIN THE NW 1/4 OF THE SE 1/4 OF SECTION 11.

Ecological: GRAVELLY CLEARING WITHIN GRASSLAND OF BROMUS RUBENS, AVENA BARBATA, ARTEMISIA CALIFORNICA, LOTUS SCOPARIUS, AND ENCELIA.

General: 74 PLANTS OBSERVED IN 1992. SITE IS WITHIN BIOLOGICAL PRESERVE SURROUNDING LAKE MATHEWS AND METROPOLITAN WATER DISTRICT LAND ADJACENT TO THE PRESERVE.

Owner/Manager: MWD

Occurrence No.	21	**Map Index:** 34719	**EO Index:**	476		**Element Last Seen:**	1992-06-04
Occ. Rank:	Good		**Presence:**	Presumed Extant		**Site Last Seen:**	1992-06-04
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	1996-03-19

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.83290 / -117.37541	**Accurracy:**	specific area
UTM:	Zone-11 N3743692 E465263	**Elevation (ft):**	1480
PLSS:	T04S, R05W, Sec. 11 (S)	**Acres:**	27.8

Location: ALONG CAJALCO ROAD, ABOUT 0.4 MILE WEST OF EL SOBRANTE ROAD, NORTH OF GAVILAN PLATEAU AND EAST OF LAKE MATHEWS.

Detailed Location: SIX COLONIES MAPPED SOUTH OF THE ROAD WITHIN THE S 1/2 OF THE SW 1/4 OF SECTION 11.

Ecological: GRAVELLY OPENING WITHIN GRASSLAND OF BROMUS RUBENS, AVENA BARBATA, ARTEMISIA CALIFORNICA, LOTUS SCOPARIUS, AND ENCELIA.

General: 196 PLANTS OBSERVED IN 1992. SITE IS WITHIN BIOLOGICAL PRESERVE SURROUNDING LAKE MATHEWS AND ON MWD LAND ADJACENT TO THE PRESERVE.

Owner/Manager: MWD

Occurrence No.	58	**Map Index:** 61259	**EO Index:**	61295		**Element Last Seen:**	2003-04-16
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2003-04-16
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-02-03

Quad Summary: Lake Elsinore (3311763), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.74732 / -117.36823	**Accurracy:**	specific area
UTM:	Zone-11 N3734201 E465893	**Elevation (ft):**	2200
PLSS:	T05S, R05W, Sec. 11 (S)	**Acres:**	133.8

Location: ~5.5 AIR MILES NNW OF THE TOWN OF LAKE ELSINORE; ROUGHLY 1 MILE WEST OF STOVEPIPE RD, GAVILAN HILLS.

Detailed Location: MAPPED BY CNDDB BASED ON A 2003 WHITE FIELD SURVEY MAP.

Ecological: BROAD, OPEN, 10 DEGREE, WNW-FACING SLOPE OF HEAVY, FINE, SILTY SOIL INTERSPERSED WITH COBBLES ON MESA SURFACE. ASSOCIATED WITH ALLIUM MUNZII, LASTHENIA CALIFORNICA, BROMUS MADRITENSIS SSP. RUBENS AND ERIOGONUM FASCICULATUM.

General: MENTIONED AS "OCCASIONAL" IN 2003.

Owner/Manager: PVT

Chorizanthe xanti var. leucotheca

Element Code: PDPGN040Z1

white-bracted spineflower

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T2
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 1B.2, BLM_S-Sensitive			
Habitat:	**General:**	MOJAVEAN DESERT SCRUB, PINYON-JUNIPER WOODLAND, COASTAL SCRUB (ALLUVIAL FANS).			
	Micro:	SANDY OR GRAVELLY PLACES. 300-1200M.			

Occurrence No.	34	**Map Index:** 79286	**EO Index:**	80265		**Element Last Seen:**	2011-07-01
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2011-07-01
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-12-13

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.08038 / -117.06436	**Accurracy:**	80 meters
UTM:	Zone-11 N3771070 E494062	**Elevation (ft):**	2300
PLSS:	T01S, R02W, Sec. 14 (S)	**Acres:**	0.0

Location: 200 METERS SOUTH OF REDLANDS HEIGHTS RANCH ROAD, NORTH OF MILL CREEK RD, EAST OF NEWPORT RD, MILL CREEK, NE OF MENTONE.

Detailed Location:

Ecological: ALLUVIAL FAN SAGE SCRUB. ASSOCIATED WITH ERIOGONUM FASCICULATUM POLIFOLIUM, SENECIO FLACCIDUS, YUCCA WHIPPLEI, SALVIA COLUMBARIAE, ETC.

General: PRIMARY SOURCE OF INFORMATION FOR THIS SITE IS A 2008 SCHWARTZ COLLECTION. A 2011 LAWREY REPORT NOTES SPECIES AS OCCURRING IN THE VICINITY; SURVEYS PERFORMED JUNE 23-JULY 1, 2011.

Owner/Manager: UNKNOWN

Dodecahema leptoceras

Element Code: PDPGN0V010

slender-horned spineflower

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB (ALLUVIAL FAN SAGE SCRUB).			

Micro: FLOOD DEPOSITED TERRACES AND WASHES; ASSOC INCLUDE ENCELIA, DALEA, LEPIDOSPARTUM, ETC. 200-760M.

Occurrence No.	2	**Map Index:** 03747	**EO Index:** 18420	**Element Last Seen:**	1999-04-XX
Occ. Rank:	Fair		**Presence:** Presumed Extant	**Site Last Seen:**	1999-04-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Decreasing	**Record Last Updated:**	2008-07-28

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09515 / -117.18415	**Accurracy:**	specific area
UTM:	Zone-11 N3772721 E483013	**Elevation (ft):**	1280
PLSS:	T01S, R03W, Sec. 10 (S)	**Acres:**	97.0

Location: EAST HIGHLANDS, WHERE HIGHWAY 30 CROSSES WASH OF SANTA ANA RIVER.

Detailed Location: E & W SIDES OF HWY 30 (ORANGE-BOULDER AVE). MAPPED BY CNDDB ACC TO A 1992 VAIL SPECK ASSOC MAP & A 1985 KRANTZ MAP. PORTIONS ACROSS FROM LA CARRERA FIELD ROPING ARENA WERE EXTIRP IN 1983 FROM SAND/GRAVEL GRADING (N-MOST PORTION OF POLY).

Ecological: ON UNDISTURBED GRAVELLY BENCH OF WASH WITH JUNIPERUS CALIFORNICA AND ERIODICTYON TRICHOCALYX. GROWING IN ALLUVIAL FAN SCRUB WITH ERIASTRUM DENSIFOLIUM SANCTORUM. NOT FOUND IN AREAS WITH DUMPING AND GROUND DISTURBANCE.

General: SEV SMALL POCKETS IN 1979. IN 1985: W SIDE W/ 2 SMALL POCKETS OF 100-200 PLANTS AND 14 PLANTS, E SIDE HAD NO MORE THAN SEVERAL HUNDRED SCATTERED POCKETS. UNK # IN 1990 & 1992. 70 PLANTS IN 1998 AND 30 PLANTS IN 1999. INCL FRMR EO #20.

Owner/Manager: BLM-ESCONDIDO RA

Occurrence No.	4	**Map Index:** 40810	**EO Index:** 41051	**Element Last Seen:**	1923-05-01
Occ. Rank:	None		**Presence:** Extirpated	**Site Last Seen:**	1983-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2008-07-28

Quad Summary: Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713), Fontana (3411714), San Bernardino North (3411723)

County Summary: Riverside, San Bernardino

Lat/Long:	34.05389 / -117.31364	**Accurracy:**	5 miles
UTM:	Zone-11 N3768175 E471054	**Elevation (ft):**	1100
PLSS:	T01S, R04W, Sec. 29 (S)	**Acres:**	0.0

Location: VICINITY OF SAN BERNARDINO.

Detailed Location: VAGUE LOCALITY; INCLUDES COLLECTIONS FROM COLTON, SAN BERNARDINO, & SAN BERNARDINO VALLEY.

Ecological: MESAS, PLAINS.

General: NUMEROUS COLLECTIONS ATTRIBUTED TO THIS VICINITY. SUITABLE HABITAT NO LONGER PRESENT AT THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	11	**Map Index:**	41053	**EO Index:**	41053	**Element Last Seen:**	1923-05-08
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1983-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1999-05-14

Quad Summary: Beaumont (3311688), El Casco (3311781), Sunnymead (3311782), Forest Falls (3411618), Yucaipa (3411711), Redlands (3411712)

County Summary: Riverside, San Bernardino

Lat/Long:	34.01700 / -117.06700	**Accurracy:**	5 miles
UTM:	Zone-11 N3764042 E493813	**Elevation (ft):**	2200
PLSS:	T02S, R02W, Sec. 11 (S)	**Acres:**	0.0

Location: YUCAYPA VALLEY (YUCAIPA VALLEY).

Detailed Location:

Ecological:

General: MAIN SOURCE OF INFORMATION FOR THIS SITE IS 1923 COLLECTION BY LEMMON.

Owner/Manager: UNKNOWN

Occurrence No.	22	**Map Index:**	17850	**EO Index:**	5688	**Element Last Seen:**	1992-07-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-02-04

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09761 / -117.16752	**Accurracy:**	specific area
UTM:	Zone-11 N3772991 E484547	**Elevation (ft):**	1345
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	11.2

Location: UPPER SANTA ANA WASH; EAST OF CHURCH STREET.

Detailed Location: MAPPED WITHIN THE NE 1/4 OF THE SW 1/4 OF SECTION 11. INCLUDES POPULATIONS DA, DB, DC, AND D2 (JIGOUR 1992).

Ecological: IN OPENINGS WITHIN ALLUVIAL FAN SAGE SCRUB WITH JUNIPERUS CALIFORNICUS, CHORIZANTHE CORIACEA, FILAGO CALIFORNICA. NOT EXCESSIVELY COVERED BY BROMUS RUBENS.

General: 150-200 PLANTS IN 1988. 1100+ PLANTS OBSERVED IN 4 SUB-POPULATIONS IN 1992. EXTENSIVE POTENTIAL HABITAT EXISTS IN SEC 11. SBD VALLEY MUTUAL WATER CO. LEASES THE SITE TO PHARRIS CO (SAND MINING).

Owner/Manager: SBD VALLEY MUTUAL WATER CO

Occurrence No.	30	**Map Index:**	23941	**EO Index:**	11990	**Element Last Seen:**	1992-07-14
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-14
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-01-27

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09492 / -117.15986	**Accurracy:**	80 meters
UTM:	Zone-11 N3772692 E485253	**Elevation (ft):**	1385
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	0.0

Location: SANTA ANA RIVER WASH; APPROX 0.9 MI ESE OF LA CARRERA FIELD, 0.95 MI N OF PIONEER AVE.

Detailed Location: MAPPED WITHIN THE NW 1/4 OF THE SE 1/4 OF SECTION 11. JIGOUR SITE D1 (1992).

Ecological: FLAT DEPRESSION OF COMPACTED FINE SAND ON A TERRACE BETWEEN AND WITHIN TWO FORMER CHANNEL BRAIDS.

General: APPROX 250 PLANTS IN 1990. 102 PLANTS OBSERVED BY JIGOUR IN 1992. SITE IS OWNED BY GRAVEL MINING COMPANY. COMPANY IS AWARE OF THIS SITE.

Owner/Manager: PVT

Occurrence No.	31	**Map Index:**	23942	**EO Index:**	11989	**Element Last Seen:**	1990-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1993-08-12

Quad Summary: Redlands (3411712)
County Summary: San Bernardino

Lat/Long:	34.09636 / -117.15202	**Accurracy:**	80 meters
UTM:	Zone-11 N3772850 E485976	**Elevation (ft):**	1460
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	0.0

Location: 1.3 MI E OF LA CARRERA FIELD, 1.0 MI N OF PIONEER AVE. SANTA ANA RIVER WASH.
Detailed Location:
Ecological: IN WASH WITH ERIASTRUM DENSIFOLIUM SANCTORUM.
General: 95 PLANTS IN 1990.
Owner/Manager: UNKNOWN

Occurrence No.	32	**Map Index:**	23940	**EO Index:**	12154	**Element Last Seen:**	1990-07-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1990-07-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-07-15

Quad Summary: Redlands (3411712)
County Summary: San Bernardino

Lat/Long:	34.09575 / -117.14274	**Accurracy:**	specific area
UTM:	Zone-11 N3772782 E486832	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	18.0

Location: 1.6-2.0 MI E OF LA CARRERA FIELD, 0.85-1.0 MI N OF PIONEER AVE. SANTA ANA RIVER WASH.
Detailed Location: MAPPED AS 2 POLYGONS IN SE1/4 SEC 12 AND SW1/4 ADJACENT SEC 7.
Ecological: IN WASH WITH ERIASTRUM DENSIFOLIUM SANCTORUM.
General: W POLY: OVER 650 PLANTS IN 2 SUBPOPULATIONS IN 1990. E POLY: 350 PLANTS IN 1990. INCLUDES FORMER EO #33.
Owner/Manager: UNKNOWN

Occurrence No.	34	**Map Index:**	23944	**EO Index:**	27236	**Element Last Seen:**	1992-07-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-01-27

Quad Summary: Redlands (3411712)
County Summary: San Bernardino

Lat/Long:	34.09394 / -117.13153	**Accurracy:**	80 meters
UTM:	Zone-11 N3772579 E487866	**Elevation (ft):**	1600
PLSS:	T01S, R02W, Sec. 07 (S)	**Acres:**	0.0

Location: 1.0 MI S OF GREENSPOT RD, 0.5 MI E OF OLD RAILROAD GRADE. SANTA ANA RIVER WASH.
Detailed Location:
Ecological: ASSOCIATED WITH ERIASTRUM DENSIFOLIUM SANCTORUM.
General: OVER 1000 PLANTS IN 1990.
Owner/Manager: UNKNOWN

Eriastrum densifolium ssp. sanctorum **Element Code:** PDPLM03035

Santa Ana River woollystar

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G4T1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL.			
	Micro:	IN SANDY SOILS ON RIVER FLOODPLAINS OR TERRACED FLUVIAL DEPOSITS. 150-610M.			

Occurrence No.	1	**Map Index:** 03730	**EO Index:** 18417	**Element Last Seen:**	1997-10-22
Occ. Rank:	Fair		**Presence:** Presumed Extant	**Site Last Seen:**	1997-10-22
Occ. Type:	Natural/Native occurrence		**Trend:** Decreasing	**Record Last Updated:**	2008-08-07

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.11565 / -117.19194	**Accurracy:**	specific area
UTM:	Zone-11 N3774995 E482298	**Elevation (ft):**	1250
PLSS:	T01S, R03W, Sec. 04 (S)	**Acres:**	20.0

Location: BOTH SIDES OF BOULDER AVENUE ON THE E SIDE OF PERCOLATION BASIN, SE EDGE OF TOWN OF HIGHLAND, CITY CREEK FLOODPLAIN.

Detailed Location: MAPPED BY CNDDB ACCORDING TO A 1990 CHAMBERS GROUP INC MAP.

Ecological: ON ALLUVIAL BENCH WITH GRAVELLY SOIL. IN ALLUVIAL FAN SCRUB W/ ERIOGONUM FASCICULATUM, PLATANUS RACEMOSA, JUNIPERUS CALIFORNICA, LEPIDOSPARTUM SQUAMATUM, SENECIO FLACCIDUS, SCHISMUS BARBATUS, HETEROTHECA GRANDIFLORA, YUCCA SCHIDIGERA, ETC.

General: ~250 PLANTS IN 1984, ~50 PLANTS SEEN IN 1985. UNKNOWN HOW MANY PLANTS SEEN IN 1988. 110 PLANTS ON EAST SIDE OF BOULDER AVE IN 1994. ~10 PLANTS SEEN ON SW SIDE OF BOULDER AVE IN 1997.

Owner/Manager: PVT

Occurrence No.	5	**Map Index:** 13042	**EO Index:** 1256	**Element Last Seen:**	2010-06-12
Occ. Rank:	Fair		**Presence:** Presumed Extant	**Site Last Seen:**	2010-06-12
Occ. Type:	Natural/Native occurrence		**Trend:** Decreasing	**Record Last Updated:**	2011-12-16

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09588 / -117.16994	**Accurracy:**	specific area
UTM:	Zone-11 N3772800 E484323	**Elevation (ft):**	1290
PLSS:	T01S, R03W, Sec. 11 (S)	**Acres:**	3594.0

Location: SANTA ANA RIVER WASH; FLOODPLAIN OF THE SANTA ANA RIVER, NORTH OF REDLANDS.

Detailed Location: HUGE AREA OF SCATTERED SUBPOPS, FROM NORTON AIR FORCE BASE EAST TO GREENSPOT ROAD. MAP DETAIL FROM A 1990 CHAMBERS GROUP INC MAP. VARIOUS PORTIONS OF THIS OCCURRENCE HAVE BEEN EXTIRPATED. INCL FRMR EO #S 6-9, 11-14, & 16.

Ecological: IN ALLUVIAL FAN SAGE SCRUB, ASSOCIATED W/ ERIOGONUM FASCICULATUM, ERIODICTYON TRICHOCALYX, ENCELIA FARINOSA, BEBBIA JUNCEA, LOTUS SCOPARIUS, LEPIDOSPARTUM SQUAMATUM, CROTON CALIFORNICA, ETC. ALSO FOUND W/ DODECAHEMA LEPTOCERAS.

General: 1000'S IN VARIOUS PORTIONS OF EO IN 1984-1986. SOME PLANTS TRANSPL AS MITIGATION FOR HWY 30 (1987). 20 IN PORTION IN 1987. ~330 IN PORTION IN 1992. UNK # IN 1988 & 1993. >1000 IN 1999. SEEN IN 2005, 2006, 2007. ~5140 IN 2008. SEEN IN 2010.

Owner/Manager: SBD COUNTY FLOOD CONTROL, BLM

Occurrence No.	10	**Map Index:**	04031	**EO Index:**	18412	**Element Last Seen:**	1992-07-31
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-07-31
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-01-27

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10906 / -117.09909	**Accurracy:**	specific area
UTM:	Zone-11 N3774252 E490860	**Elevation (ft):**	2000
PLSS:	T01S, R02W, Sec. 04 (S)	**Acres:**	4.7

Location: SANTA ANA RIVER CANYON, 0.6 AIR MILE NORTH OF MOUTH OF MORTON CANYON, BETWEEN GAGING STATION AND POWERHOUSE.

Detailed Location: MAPPED ALONG THE EAST SIDE OF THE CANYON ALONG ROAD JUST SOUTH OF GAGING STATION.

Ecological: RIVERSIDIAN SAGE SCRUB IN SANDY SOILS. ASSOCIATED WITH ERIOGONUM FASCICULATUM, LEPIDOSPARTUM SQUAMATUM, BEBBIA JUNCEA, ENCELIA FARINOSA, AND SENECIO DOUGLASII.

General: ABOUT 30 PLANTS SEEN IN 1984 AND 1987, UNKNOWN HOW MANY SEEN IN 1988, 60 SEEN IN 1992 (30 MATURE, 30 SEEDLINGS). PART OF LAND OWNED BY SO CAL EDISON (?). LIKELY TO BE IMPACTED OR POSSIBLY ELIMINATED BY CONSTRUCTION OF THE SEVEN OAKS DAM.

Owner/Manager: PVT IN USFS-SAN BERNARDINO NF

Occurrence No.	17	**Map Index:**	20052	**EO Index:**	12586	**Element Last Seen:**	2010-07-29
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2010-07-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-16

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.07906 / -117.10523	**Accurracy:**	specific area
UTM:	Zone-11 N3770927 E490290	**Elevation (ft):**	1920
PLSS:	T01S, R02W, Sec. 17 (S)	**Acres:**	22.0

Location: MILL CREEK, ABOUT 1 AIR MILE NORTHEAST OF MENTONE AND 0.25 MILE WEST OF GARNET SREET BRIDGE.

Detailed Location: MAPPED IN THE EAST HALF OF THE SE 1/4 OF SECTION 17 ACCORDING TO A 1990 MAP PROVIDED BY CHAMBERS GROUP, INC.

Ecological: SANDY FLATS/CHANNEL ON MATURE ALLUVIAL SAGE SCRUB BENCHES.

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 1988. ~35 PLANTS OBSERVED IN A 2010 WOOD COLLECTION FROM "0.1 MILE DOWNSTREAM OF GARNET STREET BRIDGE." 1876 LEMMON COLLECTION FROM MILL CREEK ALSO ATTRIBUTED TO THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	20067	**EO Index:**	12519	**Element Last Seen:**	1987-06-10
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	1987-06-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-01-27

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.11935 / -117.34207	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3775442 E468454	**Elevation (ft):**	1200
PLSS:	T01S, R04W, Sec. 06 (S)	**Acres:**	41.8

Location: SOUTH SIDE OF BASE LINE AVE, WEST OF LYTLE CREEK WASH.

Detailed Location: THIS SITE REPRESENTS THE SOUTHERN-MOST EXTENT OF LYTLE CREEK POPULATIONS. JUST SOUTH OF HERE, CREEK ENTERS A DETENTION BASIN AND IS THEREAFTER CHANNELIZED TO CONFLUENCE WITH SANTA ANA RIVER. MAPPED AS NON-SPECIFIC POLYGON; NO MAP GIVEN.

Ecological: HIGHLY DISTURBED AREA WITH ADENOSTOMA FASCICULATUM AND ERIOGONUM FASCICULATUM.

General: ABOUT 20 PLANTS SEEN IN 1987.

Owner/Manager: UNKNOWN

Occurrence No.	21	**Map Index:**	28748	**EO Index:**	29461	**Element Last Seen:**	1994-08-01
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-08-01
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1997-02-04

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.02406 / -117.36409	**Accurracy:**	specific area
UTM:	Zone-11 N3764883 E466386	**Elevation (ft):**	840
PLSS:	T02S, R05W (S)	**Acres:**	7.4

Location: SANTA ANA RIVER WASH, JUST WEST OF RIVERSIDE AVENUE BRIDGE, SOUTH OF RIALTO.

Detailed Location: ONE PLANT IS RIGHT UNDER THE BRIDGE, THE SECOND IS ABOUT 200 METERS DOWNSTREAM.

Ecological: ELEVATED ALLUVIAL FAN WITHOUT DENSE VEGETATION. ASSOCIATED PLANTS INCLUDE ERIOGONUM FASCICULATUM, E. THURBERI, CROTON CALIORNICA, HETEROTHECA SESSILIFLORA, AND CRYPTANTHA MURICATA. SANDY SOILS.

General: TWO PLANTS OBSERVED IN 1994.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	22	**Map Index:**	28747	**EO Index:**	9581	**Element Last Seen:**	2007-05-28
Occ. Rank:	Poor			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-05-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-17

Quad Summary: San Bernardino South (3411713), Fontana (3411714)

County Summary: Riverside

Lat/Long:	34.01362 / -117.37257	**Accurracy:**	specific area
UTM:	Zone-11 N3763729 E465598	**Elevation (ft):**	840
PLSS:	T02S, R05W, Sec. 11 (S)	**Acres:**	21.0

Location: SANTA ANA RIVER WASH, ABOUT 0.8 MILE SOUTHWEST OF RIVERSIDE AVENUE BRIDGE, RIVERSIDE.

Detailed Location: MAPPED AS THREE POLYGONS IN WASH BETWEEN MARKET STREET AND RIVERSIDE AVENUE (MAIN ST).

Ecological: ELEVATED ALLUVIAL FAN WITHOUT DENSE VEGETATION. ASSOCIATED WITH ERIOGONUM FASCICULATUM, E. THURBERI, CROTON CALIFORNICA, HETEROTHECA SESSILIFLORA, AND CRYPTANTHA MURICATA. SANDY SOILS.

General: 3 PLANTS OBSERVED IN 2 NE POLYS IN 1994. 3 PLANTS OBSERVED IN SW-MOST POLY IN 2007.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	23	**Map Index:** 28749	**EO Index:**	29320		**Element Last Seen:**	1998-07-07
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	1998-07-07
Occ. Type:	Natural/Native occurrence		**Trend:**	Decreasing		**Record Last Updated:**	2008-08-07

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.05674 / -117.31838	**Accurracy:**	specific area
UTM:	Zone-11 N3768493 E470617	**Elevation (ft):**	940
PLSS:	T01S, R04W, Sec. 29 (S)	**Acres:**	27.4

Location: COLTON AREA; SANTA ANA RIVER WASH, ABOUT 0.5 MILE WEST OF MOUNT VERNON AVENUE.

Detailed Location: MAPPED AS 4 POLYGONS ALONG ALLUVIAL FAN THAT FEEDS INTO THE WASH SOUTH OF THE SP RR YARDS AND EAST OF VETERANS PARK. A 1902 BRAUNTON COLLECTION FROM "COLTON, IN RIVER BED" ALSO ATTRIBUTED TO THIS SITE.

Ecological: STREAM DRAINAGE OF ALLUVIAL FAN. ASSOCIATED WITH LEPIDOSPARTUM SQUAMATUM, ERIODICTYON TRICHOCALYX, AMBROSIA ACANTHOCARPA, LESSINGIA GLANDULIFERA, ERODIUM CICUTARIUM, AND WEEDY GRASSES. SANDY SOILS.

General: ABOUT 200 PLANTS OBSERVED IN 1994 PRE-PROJECT SURVEY CONDUCTED BY B. COLLINS. IMPACTS MAY BE AVOIDED IF TRANSMISSION LINES SPAN THE ALLUVIAL WASH. ~1,500-2,000 INDIVIDUALS OBSERVED IN 1998.

Owner/Manager: CITY OF COLTON

Occurrence No.	25	**Map Index:** 49454	**EO Index:**	49454		**Element Last Seen:**	2003-06-19
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2003-06-19
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-02-25

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.08318 / -117.25438	**Accurracy:**	specific area
UTM:	Zone-11 N3771408 E476531	**Elevation (ft):**	1476
PLSS:	T01S, R04W, Sec. 13 (S)	**Acres:**	34.3

Location: JUST NORTH OF THE SANTA ANA RIVER, APPROXIMATELY 0.9 AIRMILE SOUTH OF NORTON AIR FORCE BASE.

Detailed Location: ALLUVIAL TERRACE, APPROXIMATELY 500' NORTH OF THE SANTA ANA RIVER. SIX COLONIES MAPPED AS TWO POLYGONS PRIMARILY LOCATED IN THE SW 1/4 OF SECTION 13.

Ecological: RIVERSIDIAN ALLUVIAL FAN SAGE SCRUB, ASSOC: ERIOGONUM FASCICULATUM VAR. FOLIOLOSUM, LESSINGIA GLANDULIFERA, ARTEMISIA DRACUNCULUS, OPUNTIA PARRYI, HETEROTHECA SESSILIFLORA SSP. FASTIGIATA, CROTON CALIFORNICUS, ET AL.

General: 59 INDIVIDUALS OBSERVED IN 1998, EASTERN COLONY; 51 INDIVIDUALS OBSERVED IN 2003 IN WESTERN COLONY.

Owner/Manager: PVT, UNKNOWN

Occurrence No.	26	**Map Index:**	71668	**EO Index:**	72568	**Element Last Seen:**	2007-07-02
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-07-02
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-02-17

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.10906 / -117.14996	**Accurracy:**	80 meters
UTM:	Zone-11 N3774259 E486169	**Elevation (ft):**	1421
PLSS:	T01S, R03W, Sec. 01 (S)	**Acres:**	0.0

Location: AT PLUNGE CREEK AND GREENSPOT ROAD, S OF GREENSPOT ROAD, APPROX. DUE S OF BRIDGE OVER PLUNGE CREEK.

Detailed Location: MAPPED ACCORDING TO COORDINATE INFORMATION PROVIDED BY DE GROOT 2007.

Ecological: BENCH ABOVE WASH. CHAPARRAL WITH ERIODICTYON TRICHOCALYX, CROTON CALIFORNICA, ERIOGONUM FASCICULATUM, YUCCA WHIPPLEI, BEBBIA JUNCEA, PHACELIA, OPUNTIS, BROMUS RUBENS, STEPHANOMERIA, SALVIA COLUMBARIAE, ERICAMERIA, ETC.

General: 120+ PLANTS IN 2007. PLANTS WERE IN SMALL PATCHES, FREQUENT IN OPEN SPACES BETWEEN SHRUBS.

Owner/Manager: SBD COUNTY FLOOD CONTROL DIST

Occurrence No.	28	**Map Index:**	71676	**EO Index:**	72575	**Element Last Seen:**	1985-05-28
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1985-05-28
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-07-11

Quad Summary: Yucaipa (3411711), Keller Peak (3411721)

County Summary: San Bernardino

Lat/Long:	34.13603 / -117.07333	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3777242 E493238	**Elevation (ft):**	2300
PLSS:	T01N, R02W, Sec. 27 (S)	**Acres:**	474.0

Location: 3-6 MI NNE OF MENTONE, FROM THE MOUTH OF THE SANTA ANA CANYON ~3.2 MI UPSTREAM,

Detailed Location: INCORP THE BROAD FLOODPLAIN OF THE SANTA ANA RIVER & ADJ SLOPES. MAPPED BY CNDDB ACC TO TRS PROVIDED ON SPECIMEN LABEL ALONG THE SANTA ANA RIVER IN SECTIONS 26, 27, 34. ALSO MENTIONED IN SEC. 33 BUT RIVER DOES NOT EXTEND INTO SEC 33.

Ecological: WITH CHAPARRAL AND COASTAL SAGE SCRUB.

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS A 1985 HENRICKSON COLLECTION. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	29	**Map Index:** 71721	**EO Index:**	72619		**Element Last Seen:**	2008-07-24
Occ. Rank:	Fair		**Presence:**	Presumed Extant		**Site Last Seen:**	2008-07-24
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-02-17

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04660 / -117.32175	**Accurracy:**	specific area
UTM:	Zone-11 N3767370 E470302	**Elevation (ft):**	889
PLSS:	T01S, R04W, Sec. 32 (S)	**Acres:**	3.0

Location: APPROX 1.8 AIR MI NE OF THE INTERSECTION OF I-215 AND LA CADENA DRIVE JUST N OF WASHINGTON ST., COLTON.

Detailed Location: NE POLY MAPPED ACC TO A 2004 AMEC MAP; DATA COLLECTED BY MOORHATCH. MIDDLE POLY BASED ON A 2008 HOGENAUER MAP. SW POLY MAPPED ACC TO 2008 GPS COORDINATES FROM DE GROOT WHO MENTIONS THIS POP APPEARS TO BE A HYBRID SWARM.

Ecological: OPEN FLAT BENCH JUST ABOVE WASH BED. ALLUVIAL SAGE SCRUB WITH POPULUS FREMONTII, ARTEMISIA, CROTON CALIFORNICA, ERIODICTYON TRICHOCALYX, LOTUS SCOPARIUS, SALIX, ERIOGONUM FASCICULATUM, LEPIDOSPARTUM SQUAMATUM, SCHISMUS, BRASSICA, ETC.

General: NE POLY: 17 PLANTS SEEN IN 2004. MIDDLE POLY: 2 PLANTS SEEN IN 2008. SW POLY: 300+ PLANTS SEEN IN 2008 (40-50 ADULT FLOWERING PLANTS & 200-1000 SEEDLINGS).

Owner/Manager: SBD COUNTY FLOOD CONTROL DIST?

Occurrence No.	30	**Map Index:** 71722	**EO Index:**	72620		**Element Last Seen:**	2002-09-06
Occ. Rank:	Poor		**Presence:**	Presumed Extant		**Site Last Seen:**	2002-09-06
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2008-09-15

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.04745 / -117.33822	**Accurracy:**	1/10 mile
UTM:	Zone-11 N3767469 E468782	**Elevation (ft):**	900
PLSS:	T01S, R04W, Sec. 31 (S)	**Acres:**	0.0

Location: SANTA ANA RIVER WASH, ~0.4 MI N OF PEAK 1389 (LA LOMA HILLS).

Detailed Location: MAPPED ACCORDING TO A 2002 MAP FROM CASKEY & KRAMER; INFO SUBMITTED BY FWS CARLSBAD. A 2000 PROVANCE COLLECTION FROM "0.4 MI N OF PEAK 1389" ALSO ATTRIBUTED TO THIS SITE.

Ecological: DENSE WILLOW FOREST.

General: 1 MATURE SHRUB, 2-3 YOUNGER SHRUBS, & ~75 SEEDLINGS CONFINED TO A SMALL AREA OF ~20 FT BY 4 FT IN 2000. 36 PLANTS SEEN IN 2002.

Owner/Manager: UNKNOWN

Navarretia fossalis

Element Code: PDPLM0C080

spreading navarretia

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G1
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.1			
Habitat:	**General:**	VERNAL POOLS, CHENOPOD SCRUB, MARSHES AND SWAMPS, PLAYAS.			
	Micro:	SAN DIEGO HARDPAN & SAN DIEGO CLAYPAN VERNAL POOLS; IN SWALES & V.P'S, OFTEN SURR. BY OTHER HABITAT TYPES. 30-1300M.			

Occurrence No.	17	**Map Index:**	03716	**EO Index:**	1720	**Element Last Seen:**	1995-07-26
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-07-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-02-25

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76517 / -117.21192	**Accurracy:**	80 meters
UTM:	Zone-11 N3736139 E480375	**Elevation (ft):**	1410
PLSS:	T05S, R03W, Sec. 05 (S)	**Acres:**	0.0

Location: SOUTH SIDE OF CASE ROAD, 0.2 MILE EAST OF PERRIS VALLEY AIRPORT.

Detailed Location: SW 1/4 OF NE 1/4 OF SECTION 5.

Ecological: MARGINS OF LARGE VERNAL POOL W/ CRYPSIS SCHOENOIDES, EPILOBIUM DENSIFLORUM, PSILOCARPHUS BREVISSIMUS, PLAGIOBOTHRYS LEPTOCLADUS, ATRIPLEX CORONATA NOTATIOR, HORDEUM INTERCEDENS, HEMIZONIA FASCICULATA, JUNCUS BUFONIUS, AND MALVELLA LEPROSA.

General: 1425 PLANTS IN 1995. A 1952 ROOS COLLECTION FROM "1 MILE SE PERRIS" AND A 1968 HOOVER COLLECTION FROM "1 MILE EAST OF PERRIS" ALSO ATTRIBUTED TO THIS SITE.

Owner/Manager: UNKNOWN

Occurrence No.	22	**Map Index:**	22006	**EO Index:**	8349	**Element Last Seen:**	1998-XX-XX
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-03-05

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.83406 / -117.13962	**Accurracy:**	specific area
UTM:	Zone-11 N3743766 E487080	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 12 (S)	**Acres:**	88.0

Location: ALONG THE SAN JACINTO RIVER FLOOD CONTROL CHANNEL, FROM 0.3 MILE SOUTH OF RAMONA EXPRESSWAY, SOUTH TO 11TH STREET.

Detailed Location: IN DITCHES ON BOTH SIDES OF CHANNEL, EXTENDS 0.5 MILE TO WEST AND 0.1 MILE EAST. ON BOTH SIDES OF MWD AQUEDUCT MAINTENANCE ROAD. MAPPED MOSTLY ACCORDING TO VARIOUS 1991 BRAMLET MAPS AND A 1992 BRAMLET MAP.

Ecological: IN SWALES AND DEPRESSIONS IN ALKALINE SINK SCRUB WITH ATRIPLEX SERENANA, A. ARGENTEA EXPANSA, A. CORONATA NOTATIOR, SUAEDA SP., CRESSA SP., CRYPSIS SCHOENOIDES, PHALARIS PARADOXA, ETC. IN WILLOWS; SILTY CLAY, SALINE-ALKALINE SOILS.

General: 20 PLANTS SEEN IN NW PORTION OF EO IN 1990. ~550 SEEN IN 1991 IN SEVERAL SUBPOPS. MORE INTENSIVE SURVEYS NEEDED SINCE POTENTIAL FOR MORE POPS EXISTS. IN 1998, SEEDS COLLECTED FROM SITE FOR FUTURE MITIGATION PROJECTS. INCL FORMER EO #28.

Owner/Manager: RIV COUNTY FLOOD CONTROL

Occurrence No.	23	**Map Index:**	22007	**EO Index:**	8348	**Element Last Seen:**	2007-05-10
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2007-05-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-09

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.81417 / -117.15568	**Accuracy:**	specific area
UTM:	Zone-11 N3741563 E485591	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 24 (S)	**Acres:**	22.0

Location: AT ENDS OF 12TH AND 13TH STREETS; ALONG THE SAN JACINTO RIVER FLOOD CHANNEL.

Detailed Location: MAPPED BY CNDDB AS 4 POLYGONS ACCORDING TO 1991 BRAMLET MAPS, A 2000 GLEN LUKOS & ASSOCIATES MAP, AND COORDINATES FROM A 2007 MENUZ COLLECTION.

Ecological: SWALE AREA WITHIN ALKALINE SINK SCRUB. IN WILLOWS SILTY CLAY ASSOCIATED WITH ATRIPLEX ARGENTEA, A. CORONATA NOTATIOR, BASSIA HYSSOPIFOLIA, CRESSA TRUXILLENSIS, RUMEX SP., CRYPSIS SCHOENOIDES, VERONICA PEREGRINA, ERODIUM CICUTARIUM, ETC.

General: >10,000 PLANTS SEEN IN 1991 EAST OF SAN JACINTO RIVER. 529 PLANTS SEEN IN 2000 WEST OF THE SAN JACINTO RIVER. SEEN IN SOUTH-MOST POLYGON IN 2007.

Owner/Manager: RIV COUNTY FLOOD CONTROL?, PVT

Occurrence No.	27	**Map Index:**	22008	**EO Index:**	9783	**Element Last Seen:**	1995-11-29
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-11-29
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-02-19

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85279 / -117.11947	**Accuracy:**	nonspecific area
UTM:	Zone-11 N3745841 E488947	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	75.0

Location: IN VICINITY OF DAVIS ROAD AND THE SAN JACINTO RIVER, SAN JACINTO WILDLIFE AREA, NORTH OF LAKEVIEW.

Detailed Location: THE TWO POLYGONS EAST OF DAVIS ROAD ARE BASED ON A 1992 BRAMLET MAP. SOUTH-MOST POLYGON ALONG THE ROAD IS BASED ON A 1995 RIEFNER COLLECTION FROM "DAVIS ROAD, SAN JACINTO WILDLIFE SANCTUARY, 0.4 MILE SOUTH OF OLD SAN JACINTO RIVER."

Ecological: IN RIVERBED, ALKALINE MEADOW (?)/VERNAL POOL-LIKE HABITATS. WITH CRESSA TRUXILLENSIS, BASSIA HYSSOPIFOLIA, BERGIA TEXANA, MARSILEA VESTITA, VERONICA PEREGRINA, SUAEDA TORREYANA, ETC. IN WILLOWS SILTY CLAY, & TRAVER LOAMY, FINE SAND SOILS.

General: TOTAL OF 326 PLANTS SEEN IN 1991 IN THE 2 POLYGONS EAST OF DAVIS ROAD. ALSO SEEN IN THIS AREA IN 1993 & 1995. NEED BETTER MAP DETAIL FOR THIS OCCURRENCE. INCLUDES FORMER OCCURRENCE #36.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	33	**Map Index:**	31992	**EO Index:**	23124	**Element Last Seen:**	2006-05-09
Occ. Rank:	Excellent			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-05-09
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-02-19

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.86982 / -117.11958	**Accurracy:**	specific area
UTM:	Zone-11 N3747728 E488939	**Elevation (ft):**	1425
PLSS:	T03S, R02W, Sec. 32 (S)	**Acres:**	16.0

Location: 500 FT EAST OF DAVIS ROAD, 300 FT NORTH OF THE OLD SAN JACINTO RIVER CHANNEL, SAN JACINTO WILDLIFE AREA.

Detailed Location: SITE IS 200-600 FT WEST OF THE EXISTING WATERFOWL POND.

Ecological: ALKALI PLAYA W/ PLAGIOBOTHRYS LEPTOCLADUS, POLYGONUM ARGYROCOLEON, FRANKENIA SALINA, PHALARIS MINOR, VERONICA PEREGRINA, HORDEUM DEPRESSUM, EPILOBIUM DENSIFOLIUM. MAPPED NEAR LASTHENIA GLABRATA COULTERI. WILLOWS SILTY CLAY, SALINE-ALKALINE.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 1993. 100,000 PLANTS ESTIMATED IN 1995. IN 1998 SEEDS COLLECTED FROM THIS SITE FOR GERMINATION STUDIES FOR FUTURE MITIGATION PROJECTS. UNKNOWN NUMBER OF PLANTS SEEN IN 2006.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	37	**Map Index:**	38919	**EO Index:**	33926	**Element Last Seen:**	1992-05-15
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-05-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-02-19

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84927 / -117.12944	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3745452 E488024	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	36.0

Location: BOTH SIDES OF SAN JACINTO RIVER ABOUT 0.5-0.7 MILE NE OF RAMONA EXPRESSWAY CROSSING, NORTHWEST OF LAKEVIEW.

Detailed Location: NORTH POLY IS ~700 M WEST OF DAVIS ROAD & 60 M EAST OF THE SAN JACINTO RIVER. SOUTH POLYGON IS ~50 M EAST OF RIVER LEVEE. MAPPED ACCORDING TO A 1992 BRAMLET MAP.

Ecological: DRYING BED IN AN ALKALINE PLAYA COMMUNITY. WILLOWS SILTY CLAY SALINE ALKALINE & TRAVER LOAMY FINE SAND ALKALINE SOILS. ASSOC INCL CRYPSIS SCHOENOIDES, CRESSA TRUXILLENSIS, RUMEX PERSICARIODES, LYTHRUM HYSSOPIFOLIA, VERONICA PEREGRINA, ETC.

General: 1331 PLANTS SEEN IN NORTH POLYGON IN 1992. 75 PLANTS OBSERVED IN SOUTH POLYGON IN 1992. NEEDS FIELDWORK. INCLUDES FORMER OCCURRENCE #38.

Owner/Manager: UNKNOWN

Occurrence No.	39	**Map Index:**	38921	**EO Index:**	33928	**Element Last Seen:**	2006-05-25
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-07

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.80311 / -117.16555	**Accurracy:**	specific area
UTM:	Zone-11 N3740338 E484675	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 23 (S)	**Acres:**	9.0

Location: NEAR THE INTERSECTION OF NUEVO ROAD WITH THE SAN JACINTO RIVER, EAST OF PERRIS.

Detailed Location: MAPPED BY CNDDB AS 4 POLYGONS ACCORDING TO A 2000 GLEN LUKOS & ASSOCIATES MAP AND 2006 BRAMLET MAPS.

Ecological: VERNAL POOL. ASSOCIATED WITH EPILOBIUM DENSIFLORUM, LYTHRUM HYSSOPIFOLIUM, MALVELLA LEPROSA, SPERGULARIA MARINA, ELEOCHARIS PALUSTRIS, RUMEX MARITIMUS, CRYPSIS SCHOENOIDES, CRESSA TRUXILLENSIS, PSILOCARPHUS BREVISSIMUS, ETC.

General: UNKNOWN NUMBER OF PLANTS SEEN BY KIRTLAND IN 1992. 2 NORTH-MOST POLYGONS HAD 1526 PLANTS IN 2000, SOUTH-MOST POLYGON HAD 30 PLANTS IN 2000. 2 SOUTH-MOST POLYGONS HAD 3609 PLANTS IN 2006.

Owner/Manager: RIV CO FLOOD CONTROL, PVT

Occurrence No.	47	**Map Index:**	55247	**EO Index:**	55247	**Element Last Seen:**	2005-05-25
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2005-05-25
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-09

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77534 / -117.19631	**Accurracy:**	specific area
UTM:	Zone-11 N3737264 E481822	**Elevation (ft):**	1410
PLSS:	T04S, R03W, Sec. 33 (S)	**Acres:**	61.0

Location: SAN JACINTO RIVER; BOTH SIDES OF THE ESCONDIDO FREEWAY NW OF ITS INTERSECTION WITH ELLIS AVENUE, EAST OF PERRIS.

Detailed Location: MAPPED BY CNDDB AS 9 POLYGONS. 5 WEST-MOST POLYGONS MAPPED ACCORDING TO A 1994 KIRTLAND MAP; 4 EAST-MOST POLYGONS MAPPED ACCORDING TO A 1993 ROBERTS MAP AND A 2000 GLEN LUKOS AND ASSOCIATES MAP.

Ecological: FLAT RIVER FLOOD PLAIN, DISTURBED ALKALI VERNAL POOLS WITH SEASONALLY FLOODED ALKAI VERNAL PLAINS. HORDEUM INTERCEDENS, CRYPSIS VIRGINICA, LOLIUM PERENNE, POLYPOGON MONSPELIENSIS, RUMEX SP., AVENA BARBATA, & HELIANTHUS ANNUUS.

General: 5 W-MOST POLYS: SEEN IN 1994. 4 E-MOST POLYS: 50,000+ INDIVIDUALS IN 1993. 5,520 INDIVIDUALS IN 2000. A 2005 ELVIN COLLECTION ALSO ATTRIB HERE; MENTIONED AS SCARCE BUT LOCALIZED IN VERNAL POOL AREAS & DRAINAGES IN 2005. INCL FORMER EO #65.

Owner/Manager: PVT

Occurrence No.	74	**Map Index:**	77453	**EO Index:**	78368	**Element Last Seen:**	2000-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-12-02

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78470 / -117.18836	**Accurracy:**	specific area
UTM:	Zone-11 N3738300 E482561	**Elevation (ft):**	1400
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	1.0

Location: SAN JACINTO RIVER CHANNEL; CA. 0.25 KM SW OF SAN JACINTO AVENUE BRIDGE, EAST OF PERRIS.

Detailed Location:

Ecological: DISTURBED RIVER CHANNEL ON WILLOWS SOIL.

General: 165 PLANTS SEEN IN 2000 (SURVEYS CONDUCTED IN APRIL-JUNE).

Owner/Manager: PVT

Myosurus minimus ssp. apus

Element Code: PDRAN0H031

little mousetail

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T2Q
	State:	None		**State:**	S2.2
	Other:	Rare Plant Rank - 3.1			
Habitat:	**General:**	VERNAL POOLS. THIS SUBSPECIES HAS TAXONOMIC PROBLEMS; DISTINGUISHING BETWEEN THIS AND M. SESSILIS IS DIFFICULT. HYBRID?			
	Micro:	ALKALINE SOILS. 20-640M. (NOTE: CENTRAL VALLEY EO'S NOT MAPPED).			

Occurrence No.	10	**Map Index:**	03369	**EO Index:**	21598	**Element Last Seen:**	1980-05-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1981-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1996-04-09

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.80076 / -117.34921	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3740119 E467675	**Elevation (ft):**	2000
PLSS:	T04S, R05W (S)	**Acres:**	0.0

Location: HARFORD SPRINGS COUNTY PARK IN THE GAVILAN HILLS.

Detailed Location:

Ecological: VERNAL POOLS ON BOSANKO CLAY WITH VERONICA PEREGRINA XALAPENSIS.

General: LESS THAN 50 SEEN IN 1980. 1981 RAINS DID NOT FILL POOLS; SO, THERE WAS NO GERMINATION.

Owner/Manager: UNKNOWN

Horkelia cuneata ssp. puberula

Element Code: PDROS0W045

mesa horkelia

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G4T2
	State:	None		**State:**	S2.1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, CISMONTANE WOODLAND, COASTAL SCRUB.			
	Micro:	SANDY OR GRAVELLY SITES. 70-810M.			

Occurrence No.	7	**Map Index:** 20580	**EO Index:**	54868		**Element Last Seen:**	1888-05-20
Occ. Rank:	None		**Presence:**	Possibly Extirpated		**Site Last Seen:**	1888-05-20
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2004-04-03

Quad Summary:	San Bernardino South (3411713)
County Summary:	San Bernardino

Lat/Long:	34.07608 / -117.35507	**Accurracy:**	1 mile
UTM:	Zone-11 N3770648 E467239	**Elevation (ft):**	1100
PLSS:	T01S, R05W, Sec. 24 (S)	**Acres:**	0.0

Location:	MESAS WEST OF COLTON.
Detailed Location:	EXACT LOCATION UNKNOWN. MAPPED AS BEST GUESS BY CNDDB, IN THE VICINITY OF COLTON, SW OF SAN BERNARDINO.
Ecological:	
General:	TWO COLLECTIONS BY PARISH WITH SAME DATE ATTRIBUTED TO THIS SITE. POSSIBLY EXTIRPATED DUE TO DEVELOPMENT IN THE AREA SINCE DATE OF COLLECTION. UNKNOWN NUMBER OF PLANTS SEEN IN 1888. NEEDS FIELDWORK.
Owner/Manager:	CITY OF RIALTO, PVT

Galium californicum ssp. primum

Element Code: PDRUB0N0E6

Alvin Meadow bedstraw

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5T1Q
	State:	None		**State:**	S1
	Other:	Rare Plant Rank - 1B.2, BLM_S-Sensitive, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, LOWER MONTANE CONIFEROUS FOREST.			
	Micro:	GROWS IN SHADE OF TREES AND SHRUBS AT THE LOWER EDGE OF THE PINE BELT, IN PINE FOREST-CHAPARRAL ECOTONE. 360M.			

Occurrence No.	2	**Map Index:**	03468	**EO Index:**	17317	**Element Last Seen:**	1891-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1967-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1989-08-11

Quad Summary: San Bernardino South (3411713)

County Summary: Riverside, San Bernardino

Lat/Long:	34.03195 / -117.28449	**Accurracy:**	1 mile
UTM:	Zone-11 N3765735 E473737	**Elevation (ft):**	1180
PLSS:	T02S, R04W, Sec. 03 (S)	**Acres:**	0.0

Location: RECHE CANYON, (S OF SAN BERNARDINO).

Detailed Location:

Ecological: ASSOCIATED WITH GALIUM NUTTALLII.

General: GENETIC SWAMPING BY G. NUTTALLII MAY ACCOUNT FOR DISAPPEARANCE.

Owner/Manager: UNKNOWN

Chloropyron maritimum ssp. maritimum

Element Code: PDSCR0J0C2

salt marsh bird's-beak

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G4?T1
	State:	Endangered		**State:**	S1
	Other:	Rare Plant Rank - 1B.2			
Habitat:	**General:**	COASTAL SALT MARSH, COASTAL DUNES.			
	Micro:	LIMITED TO THE HIGHER ZONES OF THE SALT MARSH HABITAT. 0-30M.			

Occurrence No.	16	**Map Index:** 40810	**EO Index:**	34954		**Element Last Seen:**	1888-XX-XX
Occ. Rank:	None		**Presence:**	Possibly Extirpated		**Site Last Seen:**	1888-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2009-08-19

Quad Summary: Riverside East (3311783), Redlands (3411712), San Bernardino South (3411713), Fontana (3411714), San Bernardino North (3411723)

County Summary: Riverside, San Bernardino

Lat/Long:	34.05389 / -117.31364	**Accurracy:**	5 miles
UTM:	Zone-11 N3768175 E471054	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 29 (S)	**Acres:**	0.0

Location: SAN BERNARDINO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN; MAPPED IN GENERAL VICINITY OF SAN BERNARDINO VALLEY ACCORDING TO NOTE PROVIDED BY SANDERS (2003).

Ecological: ALKALINE MEADOW.

General: SEVERAL COLLECTIONS BY PARISH ATTRIBUTED TO THIS SITE. COLLECTION SITE IS ATYPICAL FOR SPECIES; SPECIMENS MAPPED BY CNDDB DUE TO NOTATION BY CHUANG AND HECKARD (1973) AS BEING INTERMEDIATE TO C. MARITIMUS SSP. CANESCENS.

Owner/Manager: UNKNOWN

Lycium parishii **Element Code:** PDSOL0G0D0

Parish's desert-thorn

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3?
	State:	None		**State:**	S2S3
	Other:	Rare Plant Rank - 2.3			
Habitat:	**General:**	COASTAL SCRUB, SONORAN DESERT SCRUB.			
	Micro:	300-1000M.			

Occurrence No.	4	**Map Index:** 37024	**EO Index:**	32021		**Element Last Seen:**	1885-04-XX
Occ. Rank:	None		**Presence:**	Extirpated		**Site Last Seen:**	1885-04-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-04-05

Quad Summary: San Bernardino South (3411713), Fontana (3411714), San Bernardino North (3411723), Devore (3411724), Silverwood Lake (3411733)

County Summary: San Bernardino

Lat/Long:	34.17968 / -117.34622	**Accurracy:**	5 miles
UTM:	Zone-11 N3782133 E468094	**Elevation (ft):**	1600
PLSS:	T01N, R04W, Sec. 07 (S)	**Acres:**	0.0

Location: MESAS NORTH OF SAN BERNARDINO.

Detailed Location: EXACT LOCATION NOT KNOWN. MAPPED IN THE GENERAL VICINITY OF THE BENCHES & FOOTHILLS NORTH OF SAN BERNARDINO.

Ecological:

General: MAIN SOURCE OF INFORMATION FOR THIS OCCURRENCE IS 1885 COLLECTION BY PARISH. SANDERS REPORTS THAT THE SAN BERNARDINO POPULATIONS OF LYCIUM PARISHII ARE ALMOST CERTAINLY EXTIRPATED (1993).

Owner/Manager: UNKNOWN

Carex comosa

Element Code: PMCYP032Y0

bristly sedge

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S2
	Other:	Rare Plant Rank - 2.1			
Habitat:	**General:**	MARSHES AND SWAMPS.			
	Micro:	LAKE MARGINS, WET PLACES; SITE BELOW SEA LEVEL IS ON A DELTA ISLAND. -5-1005M.			

Occurrence No.	1	**Map Index:** 03430	**EO Index:** 29005	**Element Last Seen:**	1882-05-XX
Occ. Rank:	None		**Presence:** Possibly Extirpated	**Site Last Seen:**	1882-05-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1996-05-23

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07139 / -117.30560	**Accurracy:**	1 mile
UTM:	Zone-11 N3770113 E471801	**Elevation (ft):**	1000
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: SAN BERNARDINO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN. BEST GUESS MAPPED IN VICINITY OF URBITA HOT SPRINGS; A LATER SAN BERNARDINO VALLEY COLLECTION BY S.B. PARISH (FOR A DIFFERENT SPECIES) HAS BEEN ATTRIBUTED TO THIS SITE.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS SITE IS 1882 COLLECTION BY PARISH AND PARISH. D. TAYLOR SUGGESTS THIS POPULATION HAS BEEN EXITIRPATED.

Owner/Manager: PVT,SBD COUNTY FLOOD CONT DIST

Allium munzii

Element Code: PMLIL022Z0

Munz's onion

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Threatened		**State:**	S1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL, COASTAL SCRUB, CISMONTANE WOODLAND, PINYON-JUNIPER WOODLAND, VALLEY AND FOOTHILL GRASSLAND.			
	Micro:	HEAVY CLAY SOILS; GROWS IN GRASSLANDS & OPENINGS WITHIN SHRUBLANDS OR WOODLANDS. 300-1035M.			

Occurrence No.	1	**Map Index:**	03317	**EO Index:**	14359	**Element Last Seen:**	1930-XX-XX
Occ. Rank:	None			**Presence:**	Extirpated	**Site Last Seen:**	1998-05-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1998-09-19

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.79338 / -117.37453	**Accurracy:**	specific area
UTM:	Zone-11 N3739309 E465329	**Elevation (ft):**	2100
PLSS:	T04S, R05W, Sec. 26 (S)	**Acres:**	121.4

Location: ALONG LAKE MATTHEWS ROAD, ABOUT 0.5 MILE WEST OF JUNCTION WITH GAVILAN ROAD, GAVILAN PLATEAU.

Detailed Location:

Ecological: IN OPEN GRASSY AREA SURROUNDED BY CHAPARRAL, ON BOSANKO CLAY. ASSOCIATED WITH ZIGADENUS FREMONTII. IN 1998, DICHELOSTEMMA PULCHELLUM WAS PRESENT, BUT NO SIGN OF A. MUNZII.

General: SP SEEN IN 1930. SITE HAD BEEN CONVERTED TO CITRICULTURE WHEN VISITED IN 1981. IN 1998, CITRUS TREES HAD BEEN REMOVED IN PREPARATION FOR A HOUSING AND GOLF DEVELOPMENT PROJECT.

Owner/Manager: PVT

Occurrence No.	2	**Map Index:**	15952	**EO Index:**	17854	**Element Last Seen:**	1998-05-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1998-05-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-02-29

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79938 / -117.35021	**Accurracy:**	specific area
UTM:	Zone-11 N3739967 E467582	**Elevation (ft):**	2040
PLSS:	T04S, R05W, Sec. 25 (S)	**Acres:**	59.7

Location: HARFORD SPRINGS COUNTY PARK (ALONG SOUTH BORDER) AND ON HILL ACROSS IDA-LEONA RD, GAVILAN PLATEAU.

Detailed Location: PLANTS N OF IDA-LEONA ROAD ARE ON COUNTY PARK LAND AND ARE SOMEWHAT PROTECTED. PLANTS S OF IDA-LEONA ROAD ARE ON PRIVATE LAND. ENTIRE OCCURRENCE CONSISTED OF 101-1000 PLANTS IN 1981, >5000 PLANTS IN 1986. SEE BELOW FOR MORE YEAR'S DATA.

Ecological: GRASSY OPENING ON CLAY SOIL WITH SCATTERED QUERCUS DUMOSA, JUNIPERUS CALIFORNICA, ERIOGONUM FASCICULATUM, ADENOSTOMA FASCICULATUM, FRITILLARIA BIFLORA, ZIGADENUS FREMONTII, MUILLA MARITIMA, ETC. THE RARE HARPAGONELLA PALMERI ALSO AT SITE.

General: S OF ROAD (PVT PROPERTY): UNK # IN 1987, 1256-6771 IN '90, UNK # IN '91, 4000 IN '92, 6500 IN '93, 5115 IN '94, 2500-5000 IN '98. N OF ROAD (COUNTY PARK): UNK # SEEN IN 1979, < 500 IN '92, 38700 IN '93, 23865 IN '94, 5000-20000 IN '98.

Owner/Manager: RIV COUNTY, PVT

Occurrence No.	16	**Map Index:**	30347	**EO Index:**	4528	**Element Last Seen:**	2003-04-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-02-13

Quad Summary: Lake Elsinore (3311763), Alberhill (3311764), Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.74596 / -117.37172	**Accurracy:**	specific area
UTM:	Zone-11 N3734051 E465570	**Elevation (ft):**	1800
PLSS:	T05S, R05W, Sec. 11 (S)	**Acres:**	56.0

Location: NORTHEAST OF ALBERHILL, 0.9 MILE NORTH OF CORONA FREEWAY.

Detailed Location: SEVERAL COLONIES MAPPED IN THIS VICINTITY. PLANTS JUST ABOVE POWERLINE ROAD (NOT SHOWN ON TOPO), ABOUT 0.2 MI W OF INTERSECTION WITH MAPPED ROAD. FOUND IN VARIOUS LOCATIONS IN S 1/2 SEC 11 AND NW1/4 SEC 14.

Ecological: OPEN GRASSLAND DOMINATED BY AVENA BARBATA. OTHER ASSOCIATES INCLUDE DELPHINIUM, LASTHENIA CALIFORNICA, BLOOMERIA CALFORNICA, CLARKIA, & BROMUS MOLLIS.

General: UNKNOWN NUMBER OF PLANTS SEEN IN 1989. 300 PLANTS ESTIMATED IN 1993. ABOUT 3000 PLANTS ESTIMATED DURING EXPANDED SURVEY IN 2003.

Owner/Manager: UNKNOWN

Occurrence No.	20	**Map Index:**	49288	**EO Index:**	49288	**Element Last Seen:**	1931-03-23
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1931-03-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2008-02-01

Quad Summary: Steele Peak (3311773), Lake Mathews (3311774)

County Summary: Riverside

Lat/Long:	33.80418 / -117.37593	**Accurracy:**	1/5 mile
UTM:	Zone-11 N3740507 E465204	**Elevation (ft):**	1969
PLSS:	T04S, R05W, Sec. 23 (S)	**Acres:**	0.0

Location: GAVILAN PEAK.

Detailed Location: EXACT LOCATION UNKNOWN. SITE MAPPED AT PEAK.

Ecological: HARD, DRY SOIL.

General: ONLY SOURCES OF INFORMATION FOR THIS OCCURRENCE ARE MULTIPLE COLLECTIONS BY TEMPLETON ET AL. AND CLOKEY ET AL. IN 1930 AND 1931. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	23	**Map Index:** 70780	**EO Index:**	71692		**Element Last Seen:**	1999-04-16
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1999-04-16
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2008-02-04

Quad Summary: Steele Peak (3311773)

County Summary: Riverside

Lat/Long:	33.79911 / -117.32676	**Accurracy:**	80 meters
UTM:	Zone-11 N3739930 E469752	**Elevation (ft):**	2223
PLSS:	T04S, R04W, Sec. 29 (S)	**Acres:**	0.0

Location: APPROXIMATELY 0.5 MILE ESE FROM IDA-LEONA MINE AND 0.2 MILE NW OF PEAK 2557.

Detailed Location: MAPPED ACCORDING TO A HAND-DRAWN MAP OF THE AREA. 2 POPULATIONS OF A. MUNZII WERE FOUND IN THIS AREA.

Ecological: ASSOCIATED WITH JUNIPERUS CALIFORNIA, ARTEMISIA CALIFORNICA, LESSINGIA FILAGINIFOLIA, LOTUS SCOPARIUS, ISOMERIS ARBOREA, ERIOPHYLLUM CONFERTIFLORUM, AND NON-NATIVE GRASSES.

General: IN 1999, 10 PLANTS FOUND IN ONE POPULATION & 2 PLANTS IN ANOTHER POPULATION.

Owner/Manager: PVT

Brodiaea filifolia

Element Code: PMLIL0C050

thread-leaved brodiaea

Listing Status:	**Federal:**	Threatened	**CNDDB Element Ranks:**	**Global:**	G2
	State:	Endangered		**State:**	S2.1
	Other:	Rare Plant Rank - 1B.1, USFS_S-Sensitive			
Habitat:	**General:**	CHAPARRAL (OPENINGS), CISMONTANE WOODLAND, COASTAL SCRUB, PLAYAS, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.			
	Micro:	USUALLY ASSOCIATED WITH ANNUAL GRASSLAND AND VERNAL POOLS; OFTEN SURR BY SHRUBLAND HABITATS. OCCURS IN OPENINGS ON CLAY SOILS. 25-1120 M.			

Occurrence No.	1	**Map Index:** 03663	**EO Index:**	21809		**Element Last Seen:**	1930-XX-XX
Occ. Rank:	None		**Presence:**	Possibly Extirpated		**Site Last Seen:**	1996-09-XX
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2005-04-08

Quad Summary: Romoland (3311762), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.75321 / -117.22350	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3734816 E479300	**Elevation (ft):**	1410
PLSS:	T05S, R03W, Sec. 08 (S)	**Acres:**	0.0

Location: 2 MILES SOUTH OF PERRIS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS.

Ecological: ON CLAY FLATS.

General: LAST SEEN 1930. MAY BE EXTIRPATED AS AREA NOW AGRICULTURAL PER 1983 PRESERVATION PLAN (LARRY LAPRE). ACCORDING TO S. WHITE (1996), SUITABLE HABITAT STILL EXISTS IN THE AREA. MORE SURVEYS ARE NEEDED TO DETERMINE STATUS.

Owner/Manager: PVT

Occurrence No.	2	**Map Index:**	22074	**EO Index:**	15217	**Element Last Seen:**	2000-05-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2000-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-08

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.76803 / -117.20909	**Accurracy:**	specific area
UTM:	Zone-11 N3736455 E480638	**Elevation (ft):**	1420
PLSS:	T05S, R03W, Sec. 05 (S)	**Acres:**	45.5

Location: SOUTHEAST OF PERRIS, EAST OF ELLIS AND NORTHEAST OF PERRIS VALLEY AIRPORT.

Detailed Location: ON FLOODPLAIN ON BOTH SIDES OF CASE ROAD, 0.3 TO 0.7 MILE SW OF ELLIS. MAPPED WITHIN THE NW 1/4 OF THE NW 1/4 OF SECTION 4 AND THE NE 1/4 OF SECTION 5.

Ecological: SALTBUSH SCRUB ON SALINE-ALKALINE DOMINO SILTY LOAM/WILLOWS SILTY CLAY SOILS. WITH: SUAEDA SP, HORDEUM SP, SALSOLA IBERICA, ATRIPLEX ARGENTA, ATRIPLEX CORONATA NOTATIOR, AND HEMIZONIA PUNGENS. IN 2000, PLANTS IN DISTURBED ALKALI GRASSLAND.

General: 25 PLANTS SEEN IN 1990, 50 IN 1996, SEARCH WAS EARLY AND NOT THOROUGH. AREA CONTAINS SOME OF THE LAST VALLEY SALTBUSH SCRUB REMAINING IN THE REGION, SHOULD BE PROTECTED AS PRESERVE. 367 PLANTS SOUTH OF ROAD AND 52 NORTH OF ROAD IN 2000.

Owner/Manager: PVT

Occurrence No.	27	**Map Index:**	22073	**EO Index:**	22903	**Element Last Seen:**	1995-05-03
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1995-05-03
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-26

Quad Summary: Lakeview (3311771), Perris (3311772)

County Summary: Riverside

Lat/Long:	33.84679 / -117.12783	**Accurracy:**	specific area
UTM:	Zone-11 N3745176 E488173	**Elevation (ft):**	1420
PLSS:	T04S, R02W, Sec. 06 (S)	**Acres:**	35.9

Location: 1 KM NORTH OF LAKEVIEW; SOUTH OF SAN JACINTO WILDLIFE AREA.

Detailed Location: TWO LARGE POPULATION GROUPS; ONE IS 650 FEET WEST OF DAVIS ROAD AND 5-150 FEET NORTH OF MARVIN ROAD, THE OTHER IS 750-1000 FEET NORTH OF MARVIN ROAD AND 100-200 FEET WEST OF DAVIS ROAD.

Ecological: GROWING ON STRONGLY SALINE-ALKALINE WAUKENA LOAM/DOMINO SILT LOAM IN ANNUAL GRASSLAND/ALKALI SINK SCRUB HABITAT. ASSOCIATES INCLUDE HORDEUM DEPRESSUM, PLAGIOBOTHRYS LEPTOCLADUS, LASTHENIA CALIFORNICA, LEPIDIUM DICTYOTUM, AND ATRIPLEX SP.

General: 518 PLANTS SEEN IN 1992. 2580 PLANTS OBSERVED IN 1995. SITE STILL RETAINS A LARGE PORTION OF THE NATIVE FLORA DISTURBED. PART OF THE SAN JACINTO WILDLIFE AREA.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	43	**Map Index:**	31922	**EO Index:**	2132	**Element Last Seen:**	1996-04-22
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1996-04-22
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2007-11-26

Quad Summary: Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85597 / -117.11437	**Accurracy:**	specific area
UTM:	Zone-11 N3746192 E489420	**Elevation (ft):**	1400
PLSS:	T04S, R02W, Sec. 05 (S)	**Acres:**	7.0

Location: SAN JACINTO WILDLIFE AREA, 1.2 MILES NORTH OF LAKEVIEW, JUST NORTH OF THE SAN JACINTO RIVER.

Detailed Location: SEVEN COLONIES MAPPED PARALLEL WITH RIVER IN NW1/4 SEC 5. EAST OF DAVIS ROAD AND SOUTH OF THE DIRT ACCESS ROAD.

Ecological: IN ANNUAL GRASSLAND ADJACENT TO ALKALI PLAYA HABITAT. WITH VULPIA MYUROS, BROMUS MADRITENSIS, AVENA BARBATA, HEMIZONIA PUNGENS, AMSINCKIA MENZIESII, SALICORNIA SUBTERMINALIS, AND ISOCOMA MENZIESII. ATRIPLEX CORONATA VAR. NOTATIOR ALSO HERE.

General: 900 PLANTS OBSERVED IN 1995. 45 PLANTS IN FAR WESTERN COLONY IN 1996.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	65	**Map Index:**	48071	**EO Index:**	48071	**Element Last Seen:**	2003-04-26
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-04-26
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-08

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.78415 / -117.17538	**Accurracy:**	specific area
UTM:	Zone-11 N3738237 E483763	**Elevation (ft):**	1420
PLSS:	T04S, R03W, Sec. 34 (S)	**Acres:**	6.0

Location: 3 MILES EAST OF PERRIS, 0.65 AIR MILE WSW OF JUNCTION OF SAN JACINTO ROAD AND SAN JACINTO AVE, NORTHEAST OF I-15.

Detailed Location: 2 COLONIES, 198 TO 457 METERS SOUTH OF SAN JACINTO AVE AND 853 TO 1100 METERS WEST OF SAN JACINTO ROAD. MAPPED WITHIN THE EAST HALF OF THE NE 1/4 OF SECTION 34.

Ecological: IN DISTURBED ALKALI GRASSLAND WITH HORDEUM MURINUM SSP. LEPORINUM, ATRIPLEX ARGENTEA SSP. MOHAVENSIS, HORDEUM INTERCEDENS, MEDICAGO POLYMORPHA, LEPIDIUM DICTYOTUM, HEMIZONIA PUNGENS SSP. LAEVIS, ATRIPLEX CORONATA VAR. NOTATIOR, ET AL.

General: 115 PLANTS OBSERVED IN 2000, 1 INDIVIDUAL OBSERVED IN 2003. SITE SHOULD BE PROTECTED AS PART OF A SAN JACINTO RIVER CORRIDOR RESERVE.

Owner/Manager: UNKNOWN

Occurrence No.	87	**Map Index:** 78331	**EO Index:**	79249		**Element Last Seen:**	2008-06-26
Occ. Rank:	Poor		**Presence:**	Presumed Extant		**Site Last Seen:**	2008-06-26
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-03-11

Quad Summary: Perris (3311772)

County Summary: Riverside

Lat/Long:	33.77682 / -117.20468	**Accurracy:**	80 meters
UTM:	Zone-11 N3737429 E481048	**Elevation (ft):**	1415
PLSS:	T04S, R03W, Sec. 33 (S)	**Acres:**	0.0

Location: ESCONDIDO FREEWAY (I-215); ~0.4 MI NW OF SAN JACINTO RIVER CROSSING, PERRIS.

Detailed Location: ON N BOUND SIDE OF FREEWAY.

Ecological: DEGRADED VERNAL POOL IN ROADSIDE DITCH.

General: ~25 INDIVIDUALS SEEN IN 2008.

Owner/Manager: UNKNOWN

Calochortus plummerae

Element Code: PMLIL0D150

Plummer's mariposa-lily

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G3
	State:	None		**State:**	S3
	Other:	Rare Plant Rank - 1B.2, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL, VALLEY AND FOOTHILL GRASSLAND, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.			
	Micro:	OCCURS ON ROCKY AND SANDY SITES, USUALLY OF GRANITIC OR ALLUVIAL MATERIAL. CAN BE VERY COMMON AFTER FIRE. 90-1610M.			

Occurrence No.	5	**Map Index:** 26638	**EO Index:**	1207		**Element Last Seen:**	1978-06-10
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	2003-07-07
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2011-12-07

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.96785 / -117.03576	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3758591 E496695	**Elevation (ft):**	2400
PLSS:	T02S, R02W, Sec. 25 (S)	**Acres:**	0.0

Location: CHERRY VALLEY EXIT OFF I-10; ABOUT 2 MILES SOUTH OF CALIMESA.

Detailed Location:

Ecological: ON SOUTH-FACING SLOPE OF GRASSLAND HILLSIDE.

General: OCCURRENCE KNOWN ONLY FROM A 1978 COLLECTION BY L. BATES. PLANTS COULD NOT BE RELOCATED IN 2003.

Owner/Manager: UNKNOWN

Occurrence No.	6	**Map Index:**	26639	**EO Index:**	17330	**Element Last Seen:**	1932-05-25
Occ. Rank:	None			**Presence:**	Possibly Extirpated	**Site Last Seen:**	1989-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2011-12-01

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.93552 / -117.10816	**Accurracy:**	1 mile
UTM:	Zone-11 N3755012 E490003	**Elevation (ft):**	1800
PLSS:	T03S, R02W, Sec. 05 (S)	**Acres:**	0.0

Location: BADLANDS SOUTHWEST OF BEAUMONT, 1.5 MILES SOUTHWEST OF THE SUMMIT OF MORENO GRADE.

Detailed Location: MAPPED ALONG HIGHWAY 60, ABOUT 1 MILE EAST OF GILMAN SPRINGS ROAD.

Ecological: UPPER SONORAN. DECOMPOSED GRANITE; IN SUN.

General: MAIN SOURCE OF INFORMATION FOR THIS SITE IS 1932 COLLECTION BY WOLF. AREA SEARCHED BETWEEN 1989-1991 BUT NO PLANTS OBSERVED (MCDONALD AND STOKKINK, 1991).

Owner/Manager: UNKNOWN

Occurrence No.	12	**Map Index:**	26646	**EO Index:**	1535	**Element Last Seen:**	1991-XX-XX
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1992-XX-XX
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2009-07-14

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.10391 / -117.01391	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3773677 E498717	**Elevation (ft):**	3400
PLSS:	T01S, R01W, Sec. 08 (S)	**Acres:**	33.6

Location: MILL CREEK CANYON, ALONG HIGHWAY 38 ABOUT 2.8 MILES EAST OF BRYANT STREET.

Detailed Location:

Ecological:

General: 1 PLANT OBSERVED BY MCDONALD AND STOKKINK IN 1991. NONE SEEN IN 1992. AREA FIRST REPORTED IN 1897 COLLECTION BY HALL FROM "LOWER MILL CREEK CANYON".

Owner/Manager: UNKNOWN

Occurrence No.	13	**Map Index:**	26647	**EO Index:**	1533	**Element Last Seen:**	1994-06-15
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	1994-06-15
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-12-07

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.11114 / -117.09350	**Accurracy:**	specific area
UTM:	Zone-11 N3774483 E491376	**Elevation (ft):**	2600
PLSS:	T01S, R02W, Sec. 04 (S)	**Acres:**	4.7

Location: LOWER SANTA ANA RIVER CANYON ABOUT 0.5 MILE NORTHEAST OF THE MOUTH OF DEEP CREEK, SAN BERNARDINO MOUNTAINS.

Detailed Location: JUST ABOVE, AND EAST OF, SEVEN OAKS DAM (UNDER CONSTRUCTION, 1994). ABOVE OLD ACCESS ROAD TO SOUTHERN CALIFORNIA EDISON FLUME LINE. IN THE NW 1/4 OF THE SE 1/4 OF SECTION 4.

Ecological: GRASSY CLEARINGS AND GRANITIC ROCK OUTCROPS IN DIVERSE RIVERSIDEAN SAGE SCRUB/MIXED CHAPARRAL MOSAIC. ASSOCIATED WITH ERIOGONUM FASCICULATUM, YUCCA WHIPPLEI, TOXICODENDRON, SALVIA APIANA, LOTUS SCOPARIUS, BROMUS RUBENS, AND B. TECTORUM.

General: 30 PLANTS OBSERVED IN 1994. PLANTS FOUND ONLY IN CLEARINGS--ABSENT IN AREAS WITH DENSE SHRUB COVER.

Owner/Manager: USFS-SAN BERNARDINO NF

Occurrence No.	14	**Map Index:**	20013	**EO Index:**	1316	**Element Last Seen:**	1991-06-20
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1991-06-20
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2004-04-13

Quad Summary: Yucaipa (3411711)

County Summary: San Bernardino

Lat/Long:	34.05836 / -117.09792	**Accurracy:**	3/5 mile
UTM:	Zone-11 N3768631 E490963	**Elevation (ft):**	2200
PLSS:	T01S, R02W, Sec. 28 (S)	**Acres:**	0.0

Location: WEST END OF CRAFTON HILLS, ABOUT 0.5 MILE SOUTHEAST OF CRAFTON RESERVOIR.

Detailed Location: AT EASTERN TERMINUS OF CITRUS AVENUE.

Ecological: GROWING IN BROKEN ROCK OUTCROP IN DRAINAGE ON A NORTH-FACING SLOPE. ASSOCIATED WITH ZAUSCHNERIA CALIFORNICA, ERIOGONUM FASCICULATUM, MIMULUS LONGIFLORUS, ERIGERON FOLIOSUS, ETC.

General: SITE KNOWN FROM 1991 COLLECTION BY WHITE.

Owner/Manager: PVT

Occurrence No.	15	**Map Index:**	35041	**EO Index:**	1260	**Element Last Seen:**	1997-05-13
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1997-05-13
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-18

Quad Summary: Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.09897 / -117.14760	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3773139 E486384	**Elevation (ft):**	1500
PLSS:	T01S, R03W, Sec. 12 (S)	**Acres:**	636.3

Location: SANTA ANA RIVER WASH BETWEEN EAST HIGHLANDS AND MENTONE.

Detailed Location: EAST OF ORANGE STREET, SOUTH AND WEST OF GREENSPOT ROAD, NORTH SIDE OF THE RIVER. SUNWEST MATERIALS GRAVEL MINE SITE. EXACT LOCATION UNKNOWN. MAPPED ACCORDING TO T-R-S PROVIDED BY WEAR.

Ecological: ALLUVIAL SLOPE, SETTLING BASINS OF SANDY ROCKY SOIL WITH ERIODICTYON TRICHOCALYLX, RHUS OVATA, ADENOSTOMA FASCICULATA, OPUNTIA PARRYI, AND INTRODUCED GRASSES.

General:

Owner/Manager: PVT

Occurrence No.	56	**Map Index:**	27626	**EO Index:**	944	**Element Last Seen:**	1982-06-24
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1982-06-24
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	1995-12-01

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.92163 / -117.04756	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3753467 E495603	**Elevation (ft):**	2200
PLSS:	T03S, R02W, Sec. 12 (S)	**Acres:**	22.3

Location: EAST SIDE OF JACKRABBIT TRAIL ABOUT 1.2 MILES SOUTH OF HIGHWAY 60.

Detailed Location: GROWING ON A BANK ON THE EAST SIDE OF THE ROAD THAT IS EXTREMELY STEEP AND DIFFICULT TO ACCESS. WITHIN THE BADLANDS SOUTHWEST OF BEAUMONT.

Ecological:

General: ONLY SOURCE OF INFORMATION IS OBSERVATION BRIEF PROVIDED BY LOWENS.

Owner/Manager: UNKNOWN

Occurrence No.	88	**Map Index:**	60995	**EO Index:**	61031	**Element Last Seen:**	2003-06-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-18

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.91508 / -117.00970	**Accurracy:**	specific area
UTM:	Zone-11 N3752740 E499102	**Elevation (ft):**	2400
PLSS:	T03S, R01W, Sec. 17 (S)	**Acres:**	9.2

Location: SW OF BEAUMONT. 1.7 AIR MILES SW OF INTERSECTION OF I-10 AND HIGHWAY 60.

Detailed Location:

Ecological: ON CLAY SOILS IN GRASSLAND OPENINGS IN CHAPARRAL. ASSOCIATES INCLUDE: NASSELLA PULCHRA, CHIA, TOYON, SCRUB OAK, BLACK SAGE, CHAMISE, BRASSICA RAPA, BROMUS MADRITENSIS SSP. RUBENS, AND CRYPTANTHA SP.

General: 17 PLANTS OBSERVED IN 2003.

Owner/Manager: PVT

Occurrence No.	89	**Map Index:**	60996	**EO Index:**	61032	**Element Last Seen:**	2003-06-11
Occ. Rank:	Good			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-11
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-18

Quad Summary: Beaumont (3311688), El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.90597 / -117.00093	**Accurracy:**	80 meters
UTM:	Zone-11 N3751730 E499913	**Elevation (ft):**	2548
PLSS:	T03S, R01W, Sec. 17 (S)	**Acres:**	0.0

Location: SW OF BEAUMONT. 0.3 AIR MILE SW OF THE SUMMIT OF MOUNT DAVIS.

Detailed Location: ON BOTH SIDES OF ROAD. IN THE SE 1/4 OF THE SE 1/4 OF SECTION 17.

Ecological: SANDY GRANITE SOILS AMONG IMMATURE COASTAL SCRUB. ASSOCITED INCLUDE: BUCKWHEAT, DEERWEED, FILAGO CALIFORNICA, LESSINGIA FILAGINIFOLIA VAR. FILAGINIFOLIA, RED BROME, ERODIUM CICUTARIUM, EREMOCARPUS SETIGERUS, BROMUS HORDEACEUS, NASSELLA SP.

General: 42 PLANTS OBSERVED IN 2003.

Owner/Manager: PVT

Occurrence No.	90	**Map Index:**	60997	**EO Index:**	61033	**Element Last Seen:**	2002-04-16
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2002-04-16
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2005-04-18

Quad Summary: El Casco (3311781)

County Summary: Riverside

Lat/Long:	33.89068 / -117.02745	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3750036 E497461	**Elevation (ft):**	1900
PLSS:	T03S, R01W, Sec. 19 (S)	**Acres:**	0.0

Location: SW OF BEAUMONT, 1 MILE EAST OF MOUNT EDEN. LABORDE CANYON AND ADJACENT SLOPES AND SIDE CANYONS.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS BEST GUESS.

Ecological: CANYON IN STEEP HILLS OF POORLY CONSOLIDATED SILTY SEDIMENTS. CHAPARRAL WITH COASTAL SAGE AND RIPARIAN PATCHES. YUCCA SCHIDIGERA AND OPUNITA LOCALLY COMMON. CHAPARRAL BURNED CIRCA 1999.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2002 COLLECTION BY SANDERS, ET AL. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	91	**Map Index:**	60998	**EO Index:**	61034	**Element Last Seen:**	2003-06-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97966 / -117.30867	**Accurracy:**	80 meters
UTM:	Zone-11 N3759943 E471487	**Elevation (ft):**	1200
PLSS:	T02S, R04W, Sec. 21 (S)	**Acres:**	0.0

Location: JUST INSIDE BOUNDARY OF BOX SPRINGS MOUNTAIN PARK, IMMEDIATELY NE OF A BEND IN THE RAILROAD, ~1 MILE NE OF UC RIVERSIDE.

Detailed Location:

Ecological: COASTAL SAGE SCRUB, ROCKY SLOPES AND CUTS.

General: 9 PLANTS OBSERVED IN 2003.

Owner/Manager: RIV CO-BOX SPRINGS MTN PARK

Occurrence No.	198	**Map Index:**	80689	**EO Index:**	81704	**Element Last Seen:**	2008-06-18
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2008-06-18
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: San Jacinto (3311678), Lakeview (3311771)

County Summary: Riverside

Lat/Long:	33.85356 / -116.98847	**Accurracy:**	4/5 mile
UTM:	Zone-11 N3745920 E501065	**Elevation (ft):**	2000
PLSS:	T04S, R01W, Sec. 04 (S)	**Acres:**	0.0

Location: SMALL DRAINAGE FLOWING INTO MASSACRE CANYON, WESTERN FOOTHILLS OF THE SAN JACINTO MOUNTAINS.

Detailed Location:

Ecological: FORBLAND DOMINATED BY BRASSICA GENICULATA, DEINANDRA SP, BLOOMERIA CROCEA, ERODIUM CICUTARIUM, AND BROMUS RUBENS.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 2008 COLLECTION BY GALVIN.

Owner/Manager: DFG-SAN JACINTO WA

Occurrence No.	202	**Map Index:**	80693	**EO Index:**	81712	**Element Last Seen:**	2003-06-17
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	2003-06-17
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2010-11-16

Quad Summary: Riverside East (3311783)

County Summary: Riverside

Lat/Long:	33.97410 / -117.29288	**Accurracy:**	80 meters
UTM:	Zone-11 N3759323 E472944	**Elevation (ft):**	2400
PLSS:	T02S, R04W, Sec. 27 (S)	**Acres:**	0.0

Location: 1.1 AIR MILES NW OF BOX SPRINGS LOOKOUT, JUST WEST OF BOX SPRINGS MOUNTAIN ROAD, ABOUT 2 AIR MILES EAST OF UC RIVERSIDE.

Detailed Location: IN THE NW 1/4 OF THE NW 1/4 OF SECTION 27, NEAR A DIRT ROAD.

Ecological:

General: UNKNOWN NUMBER OF PLANTS OBSERVED IN 2003.

Owner/Manager: RIV CO-BOX SPRINGS MTN PARK

Imperata brevifolia **Element Code:** PMPOA3D020

California satintail

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G2
	State:	None		**State:**	S2.1
	Other:	Rare Plant Rank - 2.1, USFS_S-Sensitive			
Habitat:	**General:**	COASTAL SCRUB, CHAPARRAL, RIPARIAN SCRUB, MOJAVEAN SCRUB, MEADOWS AND SEEPS (ALKALI).			
	Micro:	MESIC SITES, ALKALI SEEPS, RIPARIAN AREAS. 0-500M.			

Occurrence No.	6	**Map Index:** 69056	**EO Index:** 69825	**Element Last Seen:**	1891-07-25
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1891-07-25
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2007-04-25

Quad Summary: Yucaipa (3411711), Redlands (3411712)

County Summary: San Bernardino

Lat/Long:	34.07004 / -117.13222	**Accurracy:**	1 mile
UTM:	Zone-11 N3769930 E487799	**Elevation (ft):**	
PLSS:	T01S, R02W, Sec. 19 (S)	**Acres:**	0.0

Location: NEAR MENTONE.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS A BEST GUESS.

Ecological:

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS AN 1891 COLLECTION BY LEMMON. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	7	**Map Index:** 35235	**EO Index:** 69826	**Element Last Seen:**	1904-11-01
Occ. Rank:	None		**Presence:** Possibly Extirpated	**Site Last Seen:**	1904-11-01
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	2007-04-27

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.10869 / -117.29133	**Accurracy:**	1 mile
UTM:	Zone-11 N3774245 E473130	**Elevation (ft):**	1100
PLSS:	T01S, R04W (S)	**Acres:**	0.0

Location: NEAR SAN BERNARDINO.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB AS A BEST GUESS IN CENTER OF SAN BERNARDINO.

Ecological:

General: ONLY SOURCES OF INFORMATION FOR THIS OCCURRENCE ARE COLLECTIONS TAKEN BETWEEN 1881 AND 1904. 1891 COLLECTION BY LEMMON GAVE LOCALITY AS LAGONIA DITCH, NEAR SAN BERNARDINO.

Owner/Manager: UNKNOWN

Sphenopholis obtusata **Element Code:** PMPOA5T030

prairie wedge grass

Listing Status:	**Federal:**	None	**CNDDB Element Ranks:**	**Global:**	G5
	State:	None		**State:**	S2.2
	Other:	Rare Plant Rank - 2.2			
Habitat:	**General:**	CISMONTANE WOODLAND, MEADOWS AND SEEPS.			
	Micro:	OPEN MOIST SITES, ALONG RIVERS AND SPRINGS, ALKALINE DESERT SEEPS. 360-2325M.			

Occurrence No.	11	**Map Index:** 54529	**EO Index:**	81340		**Element Last Seen:**	1917-06-21
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1917-06-21
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-10-11

Quad Summary: San Bernardino South (3411713)

County Summary: San Bernardino

Lat/Long:	34.07033 / -117.28088	**Accurracy:**	nonspecific area
UTM:	Zone-11 N3769990 E474082	**Elevation (ft):**	1000
PLSS:	T01S, R04W, Sec. 22 (S)	**Acres:**	128.0

Location: SANTA ANA RIVER BOTTOMS, SAN BERNARDINO VALLEY.

Detailed Location: EXACT LOCATION UNKNOWN. MAPPED AS BEST GUESS BY CNDDB ALONG THE RIVER IN THE VICINITY OF GIVEN ELEVATION OF 300 M (~984 FT).

Ecological: DAMP LAND, MEADOWS, OR SWAMPS.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1917 COLLECTION BY PARISH. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Occurrence No.	12	**Map Index:** 80353	**EO Index:**	81341		**Element Last Seen:**	1907-06-23
Occ. Rank:	Unknown		**Presence:**	Presumed Extant		**Site Last Seen:**	1907-06-23
Occ. Type:	Natural/Native occurrence		**Trend:**	Unknown		**Record Last Updated:**	2010-10-11

Quad Summary: San Bernardino South (3411713), Fontana (3411714)

County Summary: Riverside

Lat/Long:	34.00698 / -117.37947	**Accurracy:**	2/5 mile
UTM:	Zone-11 N3762994 E464959	**Elevation (ft):**	800
PLSS:	T02S, R05W, Sec. 11 (S)	**Acres:**	0.0

Location: OLD FIELD IN THE SANTA ANA RIVER BOTTOM ABOVE THE BRIDGE ON THE WEST RIVERSIDE ROAD.

Detailed Location: EXACT LOCATION UNKNOWN. UNSURE WHICH BRIDGE IS "THE BRIDGE ON THE WEST RIVERSIDE ROAD". MAPPED AS BEST GUESS BY CNDDB IN VICINITY OF SANTA ANA RIVER BRIDGES FOR POMONA FWY AND MARKET ST; BOTH ARE NEAR GIVEN ELEVATION OF 800 FT.

Ecological: OLD FIELD IN RIVER BOTTOM.

General: ONLY SOURCE OF INFORMATION FOR THIS OCCURRENCE IS A 1907 COLLECTION BY REED. NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

CALIFORNIA resources AGENCY — CALIFORNIA ENVIRONMENTAL INFORMATION CLEARINGHOUSE

Catalog: California Department of Fish and Game

Dataset: California Department of Fish and Game (DFG) Owned and Operated Lands

XML ESRI st
XML classic st
XML no st

Citation Information

Title:	California Department of Fish and Game (DFG) Owned and Operated Lands
Originator:	California Department of Fish and Game
Edition:	
Publication Date:	2011-04-29
Information Resource Type:	downloadableData
Other Citation Details:	

Identification Information

Abstract: The DFG Owned and Operated Lands dataset is a subset of the DFG Lands dataset. It contains only lands owned (fee title) and operated (wildlife areas and ecological reserves that are leases/agreements with other agencies and are publicly accessible) by DFG. The old version, DFG Owned Lands, only included fee title lands. <P> The DFG Lands dataset is a digitized geographical inventory of selected lands owned and/or administered by the California Department of Fish and Game (DFG). Properties su as ecological reserves, wildlife areas, undesignated lands containing biological resource values, public and fishing access lands, and DFG fish hatcheries are among those lands included in this inventory. Types of properties owned or administered by DFG which may not be included in this dataset are parce less than 1 acre in size, such as fishing piers, fish spawning grounds, fish barriers, and other minor parcels. All DFG properties (mapped herein or not) are assigned a unique Real Property Number (PROP_NBR). A given property may consist of one or more parcels, each identified by a unique Parcel History Number (HIST_NBR). These two identifiers are assigned by the State of California Department General Services (DGS). Physical boundaries of individual parcels are determined by the descriptions contained in legal documents and assessor parcel maps relating to that parcel. The approximate parcel boundaries are drawn onto U.S. Geological Survey 7.5'-series topographic maps, then digitized and attributed before being added to the dataset. In some cases, assessor parcel or best available dataset are used to digitize the boundary. Using parcel data to adjust the boundaries is a work in progress and v be incorporated in the future. Township, range, and section lines were based on the U.S. Geological Survey 7.5' series topographic maps (1:24,000 - scale). In some areas, the boundaries will not align wit the Bureau of Land Management's Public Lands Survey System (PLSS). <P>

Purpose: This dataset is intended to provide information on the location of lands owned by the Department of Fis and Game and for general conservation planning within the state. The DFG Lands Inventory database, a separate table related to the dataset, may be queried to generate geographic subsets of properties (e.g by county, DFG Region), or subsets based on type of acquisition (fee title, etc.), cost, and purpose of acquisition (riparian habitat, wetlands, listed species protection, etc.). This dataset is not intended for navigation to access all properties. Users should contact the DFG, Wildlife Branch, Land's Program or DFG Regional offices for access information to a particular property. This coverage does not provide legal determination of parcel acreages or boundaries. Legal parcel acreages are based on County Assessor records. Users should contact the Wildlife Branch, Lands Program for this information and related data. <P>

Supplemental Info: View Supplemental Information

Time Period: Start: End:

Currentness: Ground Condition

Progress: Complete

Update Frequency: As Needed

Places:	CERES CLIP: () Other Place Names: California
Geographic Region:	West: -124.3910 East: -113.8604 North: 42.0329 South: 32.5125
Themes:	Land Ownership,Resource Lands,Ecological Reserves,Wildlife Areas,Wildlife Protection,Conservation Planning,Threatened and Endangered Species,Fishing,Hunting,State Lands,Biological Database,California Department of Fish and Game,Boundaries,Planning Casdastre
Access Limitations:	*none*
Use Limitations:	*This is not a survey product. GIS base maps are referential only. They are not legal records of origin survey measurements. They are representations or reproductions of information taken from original documents. As such, GIS maps do not carry legal authority to determine a boundary or the location fixed works. Please contact Lisa Ohara (lohara@dfg.ca.gov - 916-445-3542) at DFG before re-distributing or altering the data.*
Data Contact:	

Distribution Information

Online Link:	ftp://ftp.dfg.ca.gov/BDB/GIS/DFG_Lands/
Distribution Format:	
Ordering Instructions:	

Metadata Information

Date:	2011-05-13
Metadata Contact:	
Metadata Standard:	

Last Updated: 2011/00/05 17:02:02 GMT

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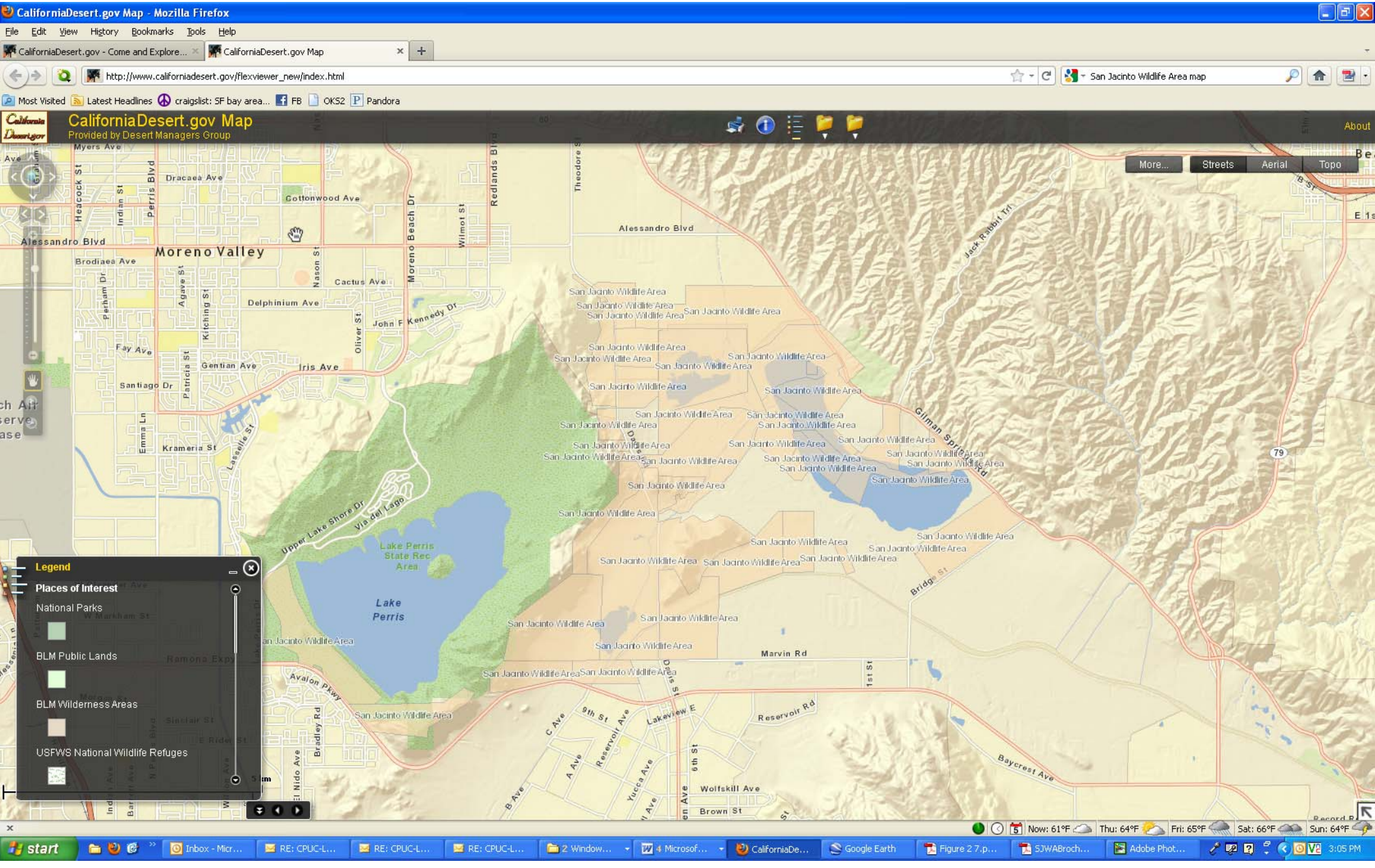
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Lake Perris State Rec Area
San Jacinto Wildlife Area
Legend
Places of Interest
National Parks
BLM Public Lands
BLM Wilderness Areas
USFWS National Wildlife Refuges
Now: 61°F Thu: 64°F Fri: 65°F Sat: 66°F Sun: 64°F
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3:05 PM

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

Plant List

54 matches found. *Click on scientific name for details*

Search Criteria

Found in 9 Quads around 33117H2

Scientific Name	Common Name	Family	Lifeform	Rare Plant Rank	State Rank	Global Rank
Abronia villosa var. aurita	chaparral sand-verbena	Nyctaginaceae	annual herb	1B.1	S2	G5T3T4
Allium munzii	Munz's onion	Alliaceae	perennial bulbiferous herb	1B.1	S1	G1
Arenaria paludicola	marsh sandwort	Caryophyllaceae	perennial stoloniferous herb	1B.1	S1	G1
Asplenium vespertinum	western spleenwort	Aspleniaceae	perennial rhizomatous herb	4.2	S3.2	G3?
Astragalus hornii var. hornii	Horn's milk-vetch	Fabaceae	annual herb	1B.1	S1S2	G4G5T2T3
Astragalus pachypus var. jaegeri	Jaeger's bush milk-vetch	Fabaceae	perennial shrub	1B.1	S1	G4T1
Atriplex coronata var. notatior	San Jacinto Valley crownscale	Chenopodiaceae	annual herb	1B.1	S1.1	G4T1
Atriplex pacifica	South Coast saltscale	Chenopodiaceae	annual herb	1B.2	S2.2	G3G4
Atriplex parishii	Parish's brittlescale	Chenopodiaceae	annual herb	1B.1	S1.1	G1G2
Atriplex serenana var. davidsonii	Davidson's saltscale	Chenopodiaceae	annual herb	1B.2	S2?	G5T2?
Berberis nevinii	Nevin's barberry	Berberidaceae	perennial evergreen shrub	1B.1	S2.2	G2
Brodiaea filifolia	thread-leaved brodiaea	Themidaceae	perennial bulbiferous herb	1B.1	S2.1	G2
California macrophylla	round-leaved filaree	Geraniaceae	annual herb	1B.1	S2	G2
Calochortus plummerae	Plummer's mariposa lily	Liliaceae	perennial bulbiferous herb	1B.2	S3	G3
Carex comosa	bristly sedge	Cyperaceae	perennial rhizomatous herb	2.1	S2?	G5
Caulanthus simulans	Payson's jewel-flower	Brassicaceae	annual herb	4.2	S3.2	G3
Centromadia pungens ssp. laevis	smooth tarplant	Asteraceae	annual herb	1B.1	S2.1	G3G4T2
Chloropyron maritimum ssp. maritimum	salt marsh bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	1B.2	S2.1	G4?T2
Chorizanthe parryi var. parryi	Parry's spineflower	Polygonaceae	annual herb	1B.1	S2	G3T2
Chorizanthe polygonoides var. longispina	long-spined spineflower	Polygonaceae	annual herb	1B.2	S3	G5T3
Chorizanthe xanti var. leucotheca	white-bracted spineflower	Polygonaceae	annual herb	1B.2	S2	G4T2
Deinandra paniculata	paniculate tarplant	Asteraceae	annual herb	4.2	S3.2	G3G4
Dodecahema leptoceras	slender-horned spineflower	Polygonaceae	annual herb	1B.1	S1	G1
Eriastrum densifolium ssp. sanctorum	Santa Ana River woollystar	Polemoniaceae	perennial herb	1B.1	S1	G4T1
Galium californicum ssp. primum	Alvin Meadow bedstraw	Rubiaceae	perennial herb	1B.2	S1	G5T1Q
Harpagonella palmeri	Palmer's grapplinghook	Boraginaceae	annual herb	4.2	S3.2	G4
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	Asteraceae	perennial rhizomatous herb	1A	SH	G5TH
Horkelia cuneata ssp. puberula	mesa horkelia	Rosaceae	perennial herb	1B.1	S2.1	G4T2
Imperata brevifolia	California satintail	Poaceae	perennial rhizomatous herb	2.1	S2.1	G2
Juglans californica	Southern California black walnut	Juglandaceae	perennial deciduous tree	4.2	S3.2	G3
Juncus duranii	Duran's rush	Juncaceae	perennial rhizomatous herb	4.3	S3.3	G3
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	Asteraceae	annual herb	1B.1	S2.1	G4T3
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	Brassicaceae	annual herb	1B.2	S2.2	G5T2?
Lilium humboldtii ssp. ocellatum	ocellated Humboldt lily	Liliaceae	perennial bulbiferous herb	4.2	S3.2	G4T3
Malacothamnus parishii	Parish's bush-mallow	Malvaceae	perennial deciduous shrub	1A	SH	GHQ
Monardella macrantha ssp. hallii	Hall's monardella	Lamiaceae	perennial rhizomatous herb	1B.3	S3	G5T3
Monardella pringlei	Pringle's monardella	Lamiaceae	annual herb	1A	SX	GX
Muilla coronata	crowned muilla	Themidaceae	perennial bulbiferous herb	4.2	S3.2?	G3
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	3.1	S2.2	G5T2Q
Nama stenocarpum	mud nama	Hydrophyllaceae	annual / perennial herb	2.2	S1S2	G4G5
Nasturtium gambelii	Gambel's water cress	Brassicaceae	perennial rhizomatous herb	1B.1	S1	G1
Navarretia fossalis	Moran's nosegay	Polemoniaceae	annual herb	1B.1	S1	G1
Phlox dolichantha	Big Bear Valley phlox	Polemoniaceae	perennial herb	1B.2	S2.2	G2
Piperia leptopetala	narrow-petaled rein orchid	Orchidaceae	perennial herb	4.3	S3.3	G3
Ribes divaricatum var. parishii	Parish's gooseberry	Grossulariaceae	perennial deciduous shrub	1A	SH	G4TH
Romneya coulteri	Coulter's matilija poppy	Papaveraceae	perennial rhizomatous herb	4.2	S3.2	G3
Rupertia rigida	Parish's rupertia	Fabaceae	perennial herb	4.3	S3.3	G3
Senecio astephanus	San Gabriel ragwort	Asteraceae	perennial herb	4	S3	G3
Sidalcea hickmanii ssp. parishii	Parish's checkerbloom	Malvaceae	perennial herb	1B.2	S1.2	G3T1

Sidalcea neomexicana	salt spring checkerbloom	Malvaceae	perennial herb	2.2	S2S3	G4?
Sphenopholis obtusata	prairie wedge grass	Poaceae	perennial herb	2.2	S2.2	G5
Streptanthus campestris	southern jewel-flower	Brassicaceae	perennial herb	1B.3	S2.3	G2
Symphyotrichum defoliatum	San Bernardino aster	Asteraceae	perennial rhizomatous herb	1B.2	S2	G2
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Asteraceae	annual herb	2.1	S1.1	G4T3

Suggested Citation

California Native Plant Society (CNPS). 2011. Inventory of Rare and Endangered Plants (online edition, v8-01a). California Native Plant Society. Sacramento, CA. Accessed on Wednesday, June 08, 2011.

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ORDINANCE NO. 663.10

AN ORDINANCE OF THE COUNTY OF RIVERSIDE

AMENDING ORDINANCE NO. 633 ESTABLISHING THE RIVERSIDE

COUNTY STEPHENS' KANGAROO RAT HABITAT CONSERVATION PLAN

PLAN FEE ASSESSMENT AREA AND SETTING MITIGATION FEES

The Board of Supervisors of the County of Riverside Ordains as Follows:

Ordinance No. 663 is amended to read as follows:

Section 1. TITLE. This ordinance shall be known as the Stephens' Kangaroo Rat Mitigation Fee Ordinance.

Section 2. FINDINGS. The Board of Supervisors finds and determines that:

(a) The Stephens' Kangaroo Rat is listed as a threatened species by the State of California, and the California Department of Fish and Game has recommended changing its status to endangered.

(b) The U.S. Fish and Wildlife Service has listed the Stephens' Kangaroo Rat as an endangered species, effective October 31, 1988, pursuant to the Federal Endangered Species Act of 1973, 16 U.S.C. Section 1531 et. seq.

(c) Following the federal listing of the Stephens' Kangaroo Rat as an endangered species, occupied habitat of the species may not be altered without a Section 10(a) permit issued by the Secretary of the Interior. All requests for a Section 10(a) permit must be accompanied by a Habitat Conservation Plan approved by the U.S. Fish and Wildlife Service. Said permit will then allow for the loss of occupied habitat due to development on the basis that the Habitat Conservation Plan will provide protection for the species and guarantee its survival.

(d) Development within the historic range of the Stephens' Kangaroo Rat has resulted in loss and degradation of occupied Stephens' Kangaroo Rat habitat, increased isolation of Stephens' Kangaroo Rat populations, reduction of potential habitat areas for future colonization, and elimination of corridors which allow the species to relocate as environmental conditions warrant.

(e) The Stephens' Kangaroo Rat's survival cannot be insured on small isolated acreages surrounded by, or in close proximity to, development or human populations.

(f) Impacts to the Stephens' Kangaroo Rat are not limited to loss or degradation of actually occupied habitat only.

(g) The successful completion and implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat would be jeopardized by not implementing a procedure that requires review of each proposed development within the Fee Assessment Area to determine the best means of mitigating impacts to the Stephens' Kangaroo Rat.

(h) Each proposed development project shall be reviewed to determine the most appropriate course of action to ensure the survival of the species through one or more of the following: (1) on-site mitigation of impacts to the Stephens' Kangaroo Rat through the reservation or addition of lands included within or immediately adjacent to a potential habitat reserve site, or (2) payment of the Mitigation Fee set by this ordinance or (3) any combination of (1) and (2) consistent with the intent and purpose of this ordinance. A proposed development project may be referred, for review, to Federal and State resource agencies based upon criteria which may be established and agreed upon by the County and said agencies.

(I) A program providing for off-site project mitigation in accordance with the development of a Habitat Conservation Plan will provide a mechanism for establishing sufficient habitat areas which can be effectively protected and managed for the Stephens' Kangaroo Rat's survival and recovery.

(j) Immediate implementation of this ordinance is necessary to make use of other potential funding opportunities for the development and implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat.

(k) The successful completion of a Habitat Conservation Plan depends upon providing protection to potential habitat reserve sites until the mechanisms for land acquisition contained within the Plan can be put into effect.

(l) All Mitigation Fees collected pursuant to the provisions of this ordinance shall be used for the development, preparation and implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat, including, but not limited to, the acquisition and management of habitat reserve sites, and for the application of a Section 10(a) permit under the Federal Endangered Species Act of 1973, as well as authorization to take the species pursuant to the California Endangered Species Act.

(m) Adoption of this ordinance will provide mitigation for projects within the historical range of the Stephens' Kangaroo Rat allowing said projects to proceed during the preparation and implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat, provided said projects are not located in areas identified as and meeting the criteria for potential habitat reserve sites needed for the conservation of the species. The approval of such development projects could jeopardize the survival of the species and therefore would be inconsistent with a Habitat Conservation Plan, even if the Mitigation Fee is paid.

(n) Adoption and implementation of this ordinance demonstrates the County's intent to cooperate with federal and state agencies to provide for the survival of the Stephens' Kangaroo Rat.

(o) The passage of this ordinance is intended to be consistent with the requirements of state and federal environmental legislation, including the California Environmental Quality Act.

Section 3. PURPOSE. The purpose of this ordinance is to finance the preparation, development and implementation of a Habitat Conservation Plan, including the acquisition of habitat reserve sites, and the application for a Section 10(a) permit under the Federal Endangered Species Act of 1973. It is the further purpose of this ordinance to provide a method for mitigation of impacts to the Stephens' Kangaroo Rat caused by the loss of its habitat due to development during the preparation and implementation of a Habitat Conservation Plan and provide for habitat mitigation to be identified in the Habitat Conservation Plan. Mitigation of impacts to the Stephens' Kangaroo Rat will be accomplished through the review of each proposed development project within the Fee Assessment Area to determine whether on-site mitigation through the reservation or addition of lands included within or immediately adjacent to a potential habitat reserve site or payment of the Mitigation Fee or a combination of both is appropriate and furthers the ultimate Habitat Conservation Plan objectives. A proposed development project may be referred, for review, to Federal and State resource agencies based upon criteria which may be established and agreed upon by the County and said agencies.

This ordinance provides for the establishment of this review process and satisfaction of on-site mitigation to protect potential habitat reserve sites or payment of the Mitigation Fee or a combination of both, which upon implementation will satisfy U.S. Fish and Wildlife Service, California Department of Fish and Game, as well as County mitigation requirements for the Stephens' Kangaroo Rat and its habitat which may occur within the unincorporated areas of the County designated herein.

Section 4. DEFINITIONS. As used in this ordinance, the following terms shall have the following meanings:

(a) BOARD OF SUPERVISORS. The Board of Supervisors of the County of Riverside.

(b) CERTIFICATE OF OCCUPANCY. "Certificate of Occupancy" shall mean a certificate of occupancy as defined by Ordinance No. 457 or state law.

(c) COUNTY. The County of Riverside.

(d) DEVELOPMENT PERMIT. County approval of a tentative tract map, tentative parcel map, conditional use permit, public use permit, plot plan, surface mining permit, or grading permit pursuant to the provisions of all applicable County ordinances. Where a development project has been previously reviewed and approved pursuant to the provisions of this ordinance, any subsequent implementing development permit shall not be subject to further review under this ordinance.

(e) FEE ASSESSMENT AREA. All real property located within the area as described in Section 5 of this ordinance.

(f) FINAL INSPECTION. "Final Inspection" shall mean a final inspection as defined by Ordinance No. 457 or state law.

(g) HABITAT CONSERVATION PLAN. A plan prepared pursuant to Section 10(a) of the Federal Endangered Species Act of 1973, 16 U.S.C. Section 1539.

(h) MITIGATION FEE. The fee imposed pursuant to the provisions of this ordinance.

(i) PARCEL. All real property for which a development permit is applied for.

(j) RESIDENTIAL UNIT. A building or portion thereof used by one (1) family and containing but one (1) kitchen, and designed for single family residential purposes only.

(k) SECTION 10(a) PERMIT. A permit issued by the Secretary of the Interior pursuant to Section 10(a) of the Federal Endangered Species Act of 1973, 16 U.S.C. Section 1539.

(l) STEPHENS' KANGAROO RAT. An animal species known as Dipodomys Stephensi.

(m) GRADING PERMIT. "Grading Permit" shall mean a grading permit as defined by Ordinance No. 457, provided, however, that for purposes of this ordinance, 'grading permit' shall not include the following:

(1) A grading permit wherein grading was previously performed pursuant to a grading permit issued within one (1) year prior to November 15, 1988, and subsequently inspected and approved by the Riverside County Department of Building and Safety. In addition, the area to be graded pursuant to said permit shall be the same or substantially the same area previously graded.

(2) A grading permit for real property upon which a detached or attached second unit will be constructed pursuant to Sections 18.28a and 18.28b of Ordinance 348.

Section 5. DESIGNATION OF THE FEE ASSESSMENT AREA.

All those certain lands located in the unincorporated areas of the County of Riverside, State of California, as hereinafter particularly described, are hereby designated as the Fee Assessment Area. Said

Fee Assessment Area is described as follows:

Beginning at the intersection of the West line of the Northeast 1/4 of the Northeast 1/4 of Section 11, Township 2 South, Range 5 West with the northerly boundary line of the County of Riverside, California.

Thence Southerly along the West line of the Northeast 1/4 of the Northeast 1/4 of said Section 11 to the Southwest corner thereof.

Thence Easterly along the South line of the Northeast 1/4 of the Northeast 1/4 of said Section 11 to the Southeast corner thereof.

Thence Southerly along the West line of Sections 12 and 13, Township 2 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of said Section 13 and the South line of Secti9ns 18 and 17, Township 2 South, Range 4 West to the Southeast corner thereof.

Thence Southerly along the West line of Sections 21, 28 and 33, Township 2 South, Range 4 West to the Southwest corner thereof.

Thence Westerly along the North line of Section 5, Township 3 South, Range 4 West to the Northwest corner thereof.

Thence Southerly along the West line of said Section 5 to the Southwest corner thereof.

Thence Westerly along the North line of Section 7, Township 3 South, Range 4 West and the North line of Sections 12, 11 and 10, Township 3 South, Range 5 West to its intersection with the centerline of Victoria Avenue in the City of Riverside, California.

Thence Southwesterly along said centerline of Victoria Avenue to its intersection with the North line of Section 19, Township 3 South, Range 5 West.

Thence Westerly along the North line of said Section 19 and the North line of Section 24, Township 3 South, Range 6 West to the Northwest corner thereof.

Thence Southerly along the West line of said Section 24 to the Southwest corner thereof.

Thence Westerly along the North line of Sections 26 and 27, Township 3 South, Range 6 West to the Northwest corner thereof.

Thence Southerly along the West line of the Northwest 1/4 of said Section 27 to the Southwest corner thereof.

Thence Westerly along the North line of the Southeast 1/4 of Section 28, Township 3 South, Range 6 West to the Northwest corner thereof.

Thence Southerly along the West line of the Southeast 1/4 of said Section 28 and the West line of the East 1/2 of Section 33, Township 3 South, Range 6 West to the Southwest corner thereof.

Thence Southerly along the West line of the East 1/2 of the West 1/2 of Section 4, Township 4 South, Range 6 West to the Southwest corner thereof.

Thence Easterly along the South line of the East 1/2 of the West 1/2 and the South line of the West 1/2 of the East 1/2 of said Section 4 to the Southeast corner thereof.

Thence Southerly along the West line of the East 1/2 of the East 1/2 of Section 9, Townshnip 4 South, Range 6 West to the Southwest corner thereof.

Thence Easterly along the South line of the East 1/2 of the East 1/2 of said Section 9 to the Southeast corner thereof.

Thence Southerly along the West line of Section 15, Township 4 South, Range 6 West to the centerline of Cajalco Road.

Thence Southwesterly along the said centerline of Cajalco Road to its intersection with the centerline of Interstate 15.

Thence Southeasterly along said centerline Interstate 15 to its intersection with the West line of Section 1, Township 5 South, Range 6 West.

Thence Southerly along the West line of said Section 1 and the West line of the Northwest 1/4 of Section 12, Township 5 South, Range 6 West to the Southwest 1/4 thereof.

Thence Easterly along the South line of the Northwest 1/4 of said Section 12 to the Southeast corner thereof.

Thence Southerly along the West line of the Southeast 1/4 of said Section 12 to the Southwest corner.

Thence Easterly along the South line of said Section 12 to the Southeast corner thereof.

Thence Southerly along the West line of the North 1/2 of the North 1/2 of Section 18, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the North 1/2 of the North 1/2 of said Section 18 to the Southeast corner thereof.

Thence Southerly along the West line of the South 1/2 of the North 1/2 of Section 17, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the South 1/2 of the North 1/2 of said Section 17 to the Southeast corner thereof.

Thence Southerly along the West line of the South 1/2 of Section 16, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of said Section 16 to the Southeast corner thereof.

Thence Southerly along the West line of the North 1/2 of Section 2, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the North 1/2 of said Section 22 to the Southeast corner thereof.

Thence Southerly along the West line of the Southwest 1/4

of Section 23, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the Southwest 1/4 of said Section 23 to the Southeast corner thereof.

Thence Southerly along the West line of the Northeast 1/4 of Section 26, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the Northeast 1/4 of said Section 26 to the Southeast corner thereof.

Thence Southerly along the West line of the Southwest 1/4 of Section 25, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the Southwest 1/4 of said Section 25 to the Southeast corner thereof.

Thence Southerly along the West line of the East 1/2 of Section 36, Township 5 South, Range 5 West to the Southwest corner thereof.

Thence Easterly along the South line of the East 1/2 of said Section 36 to the Southeast corner thereof.

Thence Southerly along the West line of the Northwest 1/4 of Section 6, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of the Northwet 1/4 of said Section 6 to the Southeast corner thereof.

Thence Southerly along the West line of the Southeast 1/4 of said Section 6 to the Southwest corner thereof.

Thence Easterly along the South line of the Southeast 1/4 of said Section 6 to the Southeast corner thereof.

Thence Southerly along the West line of the Northwest 1/4 of Section 8, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of the Northwest 1/4 of said Section 8 to the Southeast corner thereof.

Thence Southerly along the West line of the Southeast 1/4 of said Section 8 to the Southwest corner thereof.

Thence Easterly along the South line of the Southeast 1/4 of said Section 8 to the Southeast corner thereof.

Thence Southerly along the West line of Section 16, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of said Section 16 to the Southeast corner thereof.

Thence Southerly along the West line of the West 1/2 of Section 22, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of the West 1/2 of said Section 22 of the Southeast corner thereof.

Thence Southerly along the West line of the Northeast 1/4 of Section 27, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of the Northeast 1/4 of said Section 27 to the Southeast corner thereof.

Thence Southerly along the West line of the Southwest 1/4 of Section 26 and the West line of the Northwest 1/4 of Section 35, Township 6 South, Range 4 West to the Southwest corner thereof.

Thence Easterly along the South line of the Northwest 1/4 of said Section 35 to the Southeast corner thereof.

Thence Westerly along the South line of projected Section 35 and Section 34, Township 6 South, Range 4 West to its intersection with the Northerly Boundary Line of The Santa Rosa Rancho.

Thence Southerly along the West line of the Southeast 1/4 of said Section 35 to the Southwest corner thereof.

Thence Northwesterly and Southwesterly along said boundary line to its intersection with the centerline of Via Serreno.

Thence Southwesterly along said centerline of Via Serreno and the centerline of Hombre Lane to its intersection with the centerline of Avenida La Cresta.

Thence Southeasterly along said centerline of Avenida La Cresta to its intersection with the centerline of Sierra Maria Road.

Thence Northerly along the centerline of Sierra Maria Road to its intersection with the centerline of Buenos Tiempos Road.

Thence Northwesterly along said centerline of Buenos Tiempos Road to its intersection with the centerline of Via Caballos.

Thence Southwesterly and Northwesterly along said centerline of Via Caballos to its intersection with the centerline of Avenida Castilla.

Thence Northeasterly along said centerline of Avenida Castilla to its intersection with the centerline of Avenida La Cresta.

Thence Northwesterly along said centerline of Avenida La Cresta to its intersection with Calle Centro.

Thence Northerly along said centerline of Calle Centro to its intersection with Avenida Arbolos.

Thence Easterly along said centerline of Avenida Arbolos to its intersection with the centerline of Via Majorca.

Thence Northeasterly along said centerline of Via Majorca ot its intersection with Via Vista Grande.

Thence Northeasterly along said centerline of Via Vista Grande to the most Westerly corner of Parcel 7 of Record of Survey recorded in Book 54, Page 59, in The County of Riverside, California.

Thence North 74 Degrees 38'39" East a distance of 532.45'.

Thence North 04 Degrees 15'22" East a distance of 800.00'.

Thence South 85 Degrees 44'38" East a distance of 4011.73'.

Thence North 54 Degrees 49'53" East a distance of 1308.88' to the Northeasterly boundary line of The Santa Rosa Rancho.

Thence Southeasterly along said Northeasterly boundary line to the most Easterly corner of Parcel 3 of a Parcel Map recorded in Book 106, Pages 29 through 36, in The County of Riverside, California.

Thence continuing South 47 Degrees 19'01" East along said Northeasterly boundary line a distance of 8883.69'.

Thence leaving said boundary line South 41 Degrees 42'23" West a distance of 185.62'.

Thence South 13 Degrees 07'27" East a distance of 185.97'.

Thence South 43 Degrees 24'26" West a distance of 1230.44'.

Thence South 11 Degrees 33'09" West a distance of 1121.89'.

Thence South 64 Degrees 12'10" West a distance of 1753.24" to an angle point in the boundary of Parcel Map No. 19515 recorded in Book 119, Pages 27 and 28, in the County of Riverside, California.

Thence Southwesterly along said boundary South 85 Degrees 50'07" West a distance of 1083.42'.

Thence North 02 Degrees 26'46" East a distance of 1171.03'.

Thence North 51 Degrees 08'17" East a distance of 311.41'.

Thence North 42 Degrees 05'20" West a distance of 443.63'.

Thence North 17 Degrees 33'08" West a distance of 556.92'.

Thence North 03 Degrees 11'26" East a distance of 751.38'.

Thence North 47 Degrees 40'31" West a distance of 226.42'.

Thence South 49 Degrees 25'04" West a distance of 740.54'.

Thence North 54 Degrees 33'51" West a distance of 1187.10'.

Thence North 30 Degrees 57'50" East a distance of 870.64'.

Thence North 79 Degrees 18'05" West a distance of 584.42'.

Thence North 39 Degrees 00'28" West a distance of 386.67'.

Thence South 60 Degrees 08'58" West a distance of 358.06'.

Thence South 35 Degrees 51'19" West a distance of 1063.12'.

Thence North 12 Degrees 26'34" West a distance of 858.58'.

Thence North 30 Degrees 44'33" East a distance of 481.79'.

Thence North 68 Degrees 19'30" West a distance of 462.92'.

Thence South 72 Degrees 55'47" West a distance of 418.38'.

Thence North 79 Degrees 18'03" West a distance of 397.36'.

Thence North 08 Degrees 58'06" East a distance of 701.96'.

Thence North 79 Degrees 34'51" West a distance of 817.94'.

Thence South 69 Degrees 36'06" West a distance of 329.91'.

Thence South 26 Degrees 53'49" West a distance of 580.01'.

Thence South 79 Degrees 38'43" West a distance of 785.06'.

Thence leaving said Parcel Map boundary in a Northwesterly direction North 52 Degrees 24'41" West a distance of 4453.07' to an angle point in the boundary line of Parcel Map No. 19516, recorded in Book 119, Pages 22 through 26, in the County of Riverside, California.

Thence continuing Northwesterly along said boundary line North 69 Degrees 45'26" West a distance of 661.92' to the centerline of Slinton Keith Road as shown on said Parcel Map.

Thence Southerly along said centerline of Clinto Keith Road South 15 Degrees 58'45" West a distance of 1167.82' to the beginning of a tangent curve, concave to the East, and having a radius of 3600.00'.

Thence Southerly along said curve through a central angle of 14 Degrees 21'20" and having a length of 901.99'.

Thence South 01 Degrees 37'25" West a distance of 1010.95' to the beginning of a tangent curve, concave to the East, and having a radius of 6000.00'.

Thence Southerly along said curve Through a central angle of 05 Degrees 03'33" and having a length of 529.79'.

Thence South 03 Degrees 26'08" East a distance of 456.53' to the beginning of a tangent curve, concave to the West, and having a radius of 2000.00'.

Thence Southerly along said curve through a central angle of 15 Degrees 40'22" and having a length of 547.08'.

Thence leaving said centerline in a Westerly direction North 74 Degrees 25'38" West a distance of 7844.89' to an angle point on the most Westerly boundary line of Parcel Map No. 22375, recorded in Book 144, Pages 7 through 10, in The County of Riverside, California.

Thence Southerly along said boundary line South 12 Degrees 47'19" West a distance of 1707.19'.

Thence South 21 Degrees 58'58" West a distance of 3527.68' to a point on the centerline of Sierra Allena as shown on said Parcel Map.

Thence Easterly and Southeasterly along said centerline to its intersection with the centerline of Tenaja Road as shown on said Parcel Map.

Thence Southwesterly and Southerly along said centerline to a point, said point also being an intersection with the centerline of Avacado Mesa as shown on Parcel Map 19516, recorded in Book 77, Page 77, in The County of Riverside, California. Said point also being the beginning of a non-tangent curve, concave to the North, and having a radius of 1400.00'. A radial line from said point bears South 00 Degrees 22'28" West.

Thence Easterly along said curve and said centerline of Avacado Mesa through a central angle of 10 Degrees 04'02" and having a length of 245.99'.

Thence North 80 Degrees 18'26" East a distance of 559.10'.

Thence leaving said centerline along the Southerly boundary line of said Parcel Map South 01 Degrees 58'18" East a distance of 1125.46'.

Thence North 55 Degrees 45'24" East a distance of 819.60'.

Thence South 75 Degrees 03'27" East a distance of 797.86'.

Thence South 47 Degrees 33'58" East a distance of 608.30'.

Thence North 35 Degrees 37'25 East a distance of 978.34'.

Thence North 87 Degrees 44'52" East a distance of 839.89'.

Thence North 62 Degrees 38'14" East a distance of 2703.03'.

Thence South 54 Degrees 15'29" East a distance of 617.25'.

Thence North 78 Degrees 40'27" East a distance of 1462.83'.

Thence South 69 Degrees 27'30" East a distance of 2370.44'.

Thence South 20 Degrees 06'29" East a distance of 1570.29'.

Thence North 56 Degrees 07'25" East a distance of 777.48'.

Thence North 15 Degrees 23'24" East a distance of 906.54'.

Thence North 86 Degrees 25'18" East a distance of 1321.76'.

Thence North 65 Degrees 36'25" East a distance of 300.23'.

Thence North 19 Degrees 24'52" West a distance of 4974.39'.

Thence North 01 Degrees 51'13" East a distance of 785.93'.

Thence North 32 Degrees 04'45" West a distance of 380.82'.

Thence North 61 Degrees 22'38" West a distance of 669.33'.

Thence leaving the boundary of said Parcel Map North 45 Degrees 01'03" East a distance of 5251.91' to an angle point in the Northwesterly boundary line said Parcel Map No. 19516.

Thence Southeasterly along said boundary line South 15 Degrees 08'17" East a distance of 1653.19'.

Thence South 27 Degrees 02'39" West a distance of 368.26'.

Thence South 02 Degrees 47'23" East a distance of 742.67'.

Thence South 53 Degrees 14'19" East a distance of 720.31'.

Thence South 19 Degrees 31'44" East a distance of 916.70'.

Thence North 84 Degrees 07'41" East a distance of 711.71'.

Thence South 11 Degrees 22'53" East a distance of 424.06'.

Thence South 54 Degrees 58'53" East a distance of 179.72'.

Thence North 61 Degrees 33'54" East a distance of 396.56'.

Thence South 18 Degrees 51'58" East a distance of 636.64'.

Thence North 52 Degrees 26'17" East a distance of 1090.83'.

Thence South 54 Degrees 33'49" East a distance of 612.68'.

Thence South 13 Degrees 02'07" East a distance of 1024.25'.

Thence South 36 Degrees 58'48" East a distance of 526.98'.

Thence South 76 Degrees 34'31" East a distance of 681.25'.

Thence South 54 Degrees 54'12" East a distance of 941.25'.

Thence North 69 Degrees 28'21" East a distance of 553.52'.

Thence South 74 Degrees 21'23" East a distance of 653.97'.

Thence North 38 Degrees 52'12" West a distance of 2216.15'.

Thence North 28 Degrees 21'03" East a distance of 456.68'.

Thence North 81 Degrees 12'02" East a distance of 709.99'.

Thence leaving the boundary line of said Parcel Map South 24 Degrees 58'52" East a distance of 405.02' to the most westerly corner of Parcel 84 of Parcel Map recorded in Book 2, pages 42 through 68, in The County of Riverside, California.

Thence Northeasterly along the Northwesterly boundary line of said Parcel 84 North 43 Degrees 04'23" East a distance of 1355.03'to the most Westerly corner of Parcel 85 of said Parcel Map.

Thence Northeasterlly along the Northwesterly boundary line of said Parcel 85 North 65 Degrees 35'21" East a distance of 1437.56' to the centerline of DeLuz Road.

Thence Northerly and Northeasterly along said centerline to its intersection with the Northeasterly boundary line of The Santa Rosa Rancho.

Thence along said boundary line South 47 Degrees 19'01" East a distance of 6731.56'.

Thence South 47 Degrees 18'54" East a distance of 2168.17'.

Thence South 39 Degrees 48'45" East a distance of 5192.67'.

Thence leaving said boundary line North 44 Degrees 52

56" East a distance of 2590.77'.

Thence South 45 Degrees 05'53" East a distance of 1431.39'.

Thence South 44 Degrees 55'54" West a distance of 793.37'.

Thence South 38 Degrees 21'30" East a distance of 2638.92' to the beginning of a non-tangent curve, concave to the North, and having a radius of 4550.00'. A radial line bears North 00 Degrees 37'07" West.

Thence Northwesterly along said curve through a central angle of 06 Degrees 19'00" and having a length of 501.62'.

Thence North 83 Degrees 03'53" East a distance of 1140.23'.

Thence South 06 Degrees 56'07" East a distance of 44.00'.

Thence South 26 Degrees 16'04" East a distance of 369.98'.

Thence South 00 Degrees 43'59" West a distance of 259.98'.

Thence South 71 Degrees 46'11" East a distance of 305.00'.

Thence South 54 Degrees 16'11" East a distance of 380.00'.

Thence South 85 Degrees 16'27" East a distance of 439.97'.

Thence South 53 Degrees 46'16" East a distance of 269.99'.

Thence South 33 Degrees 59'30" East a distance of 348.67'.

Thence South 45 Degrees 28'43" East a distance of 300.81'.

Thence South 45 Degrees 30'01" East a distance of 226.24'.

Thence South 45 Degrees 28'43" East a distance of 1954.04'.

Thence South 44 Degrees 31'14" West a distance of 206.39'.

Thence South 15 Degrees 39'21" East a distance of 1945.58'.

Thence South 45 Degrees 26'04" East a distance of 1495.92'.

Thence South 19 Degrees 54'54" East a distance of 235.93'.

Thence South 70 Degrees 12'40" West a distance of 1495.31'.

Thence South 33 Degrees 28'43" East a distance of 543.70'.

Thence South 39 Degrees 45'49" East a distance of 408.24'.

Thence South 49 Degrees 04'11" East a distance of 1528.81'.

Thence South 50 Degrees 07'21" West a distance of 2306.79'.

Thence North 39 Degrees 47'24" West a distance of 370.04' to the Southeasterly boundary line of The Santa Rosa Rancho.

Thence Southwesterly along said Southeasterly boundary line of the Santa Rosa Rancho to its intersection with the West line of Section 24, Township 8 South, Range 3 West.

Thence Southerly along the West line of said Section 24 and the West line of Sections 25 and 36, Township 8 South, Range 3 West to the Southwest corner thereof. Said corner also being a point on the Southerly boundary line of the County of Riverside, California.

Thence Easterly along said Southerly boundary line to its intersection with the East line of the West 1/2 of the West 1/2 of Section 33, Township 8 South, Range 2 West.

Thence Northerly along the East line of the West 1/2 of the West 1/2 of said Section 33 to the Northeast corner thereof.

Thence Easterly along the South line of the East 1/2 of the West 1/2 of Section 28, Township 8 South, Range 2 West to the Southeast corner thereof.

Thence Northerly along the East line of the East 1/2 of the West 1/2 of said Section 28 to its intersection with the Southeasterly boundary line of the Little Temecula Rancho.

Thence from said intersection Northeasterly to the intersection of the centerline of De Portola Rd. and the centerline of Butterfield Stage Rd.

Thence along said centerline of De Portola Rd. a distance of 1110.00' said point being on a line between the Southeast corner of Section 14, Township 7 South, Range 2 West and the intersection of the North-South quarter section line of Section 28, Township 8 South, Range 2 West with the Southerly boundary line of The Little Temecula Rancho. Said line hereinafter referred to as Line "A".

Thence along said line "A" South 21 Degrees 03'43" West a distance of 3503.49'.

Thence leaving said line "A" North 83 Degrees 52'28" East a distance of 1391.95' to the beginning of a tangent curve concave to the Northeast and having a radius of 2000.00.

Thence Northwesterly along said curve through a central angle of 01 Degrees 07'57" a distance of 39.53'.

Thence North 22 Degrees 56'22" West a distance of 295.47' to the beginning of a tangent curve concave Southerly and having a radius of 3000.00'.

Thence Easterly along said curve through a central angle of 01 Degrees 24'38" a distance of 73.86'.

Thence tangent from said curve North 81 Degrees 39'22" East a distance of 2497.32' to the beginning of a tangent curve concave Northwesterly and having a radius of 4200.00'.

Thence Easterly along said curve Through a central angle of 10 Degrees 54'22" a distance of 799.46'.

Thence tangent from said curve North 70 Degrees 45'00" East a distance of 51147.52' to the beginning of a tangent curve concave Southerly and having a radius of 4200.00'.

Thence Northeasterly along said curve through a central angle of 17 Degrees 00'24" a distance of 1246.29'.

Thence tangent from said curve North 87 Degrees 45'06" East a distance of 1635.73' to the beginning of a curve concave Northwesterly and having a radius of 6250.00'.

Thence Easterly along said curve through a central angle of 36 Degrees 39'21" a distance of 3998.53'.

Thence tangent from said curve North 51 Degrees 05'45" East a distance of 2355.02' to the beginning of a tangent curve concave Southeasterly and having a radius of 10540.00'.

Thence Easterly along said curve through a central angle of 15 Degrees 30'13" a distance of 2852.04'.

Thence South 20 Degrees 58'19" East a distance of 325.30' to the beginning of a non-tangent curve concave Southerly and having a radius of 3000.00'. A radial line bears North 23 Degrees 23'40" West.

Thence Southerly along said curve through a central angle of 57 Degrees 07'25" a distance of 2991.74'.

Thence South 86 Degrees 39'42" East a distance of 284.32'.

Thence South 46 Degrees 49'32" East a distance of 555.37'.

Thence South 38 Degrees 39'35" East a distance of 224.11'.

Thence South 51 Degrees 24'55" East a distance of 185.07'.

Thence South 80 Degrees 50'16" East a distance of 157.00'.

Thence North 88 Degrees 31'25" East a distance of 194.06'.

Thence North 62 Degrees 25'22" East a distance of 632.91'.

Thence North 38 Degrees 17'25" East a distance of 435.73'.

Thence North 22 Degrees 28'46" East a distance of 156.92'.

Thence North 40 Degrees 01'49" East a distance of 163.25'.

Thence South 65 Degrees 57'21" East a distance of 142.35'.

Thence North 10 Degrees 10'09" East a distance of 226.56'.

Thence North 61 Degrees 41'57" East a distance of 295.30'.

Thence North 88 Degrees 27'06" East a distance of 185.07'.

Thence South 66 Degrees 48'05" East a distance of 228.47'.

Thence South 15 Degrees 27'30" East a distance of 420.20'.

Thence South 29 Degrees 10'58" East a distance of 303.53'.

Thence South 43 Degrees 59'42" East a distance of 201.56'.

Thence South 56 Degrees 18'36" East a distance of 246.33'.

Thence South 78 Degrees 06'41" East a distance of 97.08'.

Thence South 01 Degrees 58'03" East a distance of 145.09'.

Thence South 25 Degrees 13'16" East a distance of 152.54'.

Thence North 27 Degrees 26'06" East a distance of 206.19'.

Thence South 49 Degrees 53'57" East a distance of 248.39'.

Thence North 87 Degrees 03'51" East a distance of 390.51'.

Thence North 68 Degrees 38'01" East a distance of 397.40'.

Thence North 56 Degrees 46'06" East a distance of 173.35'.

Thence North 62 Degrees 06'10" East a distance of 288.53'.

Thence North 53 Degrees 23'34" East a distance of 218.00'.

Thence South 04 Degrees 23'55" West a distance of 130.38".

Thence South 26 Degrees 33'54" West a distance of 368.95'.

Thence South 36 Degrees 09'30" West a distance of 322.02'.

Thence South 27 Degrees 19'26" West a distance of 337.68'.

Thence South 22 Degrees 30'46" West a distance of 445.19' to the beginning of a tangent curve concave Northeasterly and having a radius of 250.00'.

Thence Southeasterly along said curve through a central angle of 112 Degrees 58'16" a distance of 492.93'.

Thence tangent to said curve Nroth 89 Degrees 32'30" East a distance of 247.52'.

Thence South 81 Degrees 07'09" East a distance of 161.94'.

Thence South 13 Degrees 14'26" West a distance of 87.32'.

Thence South 73 Degrees 14'15" East a distance of 86.68'.

Thence North 19 Degrees 17'24" East a distance of 127.14'.

Thence North 77 Degrees 49'43" East a distance of 260.86'.

Thence South 85 Degrees 41'60" East a distance of 133.38'.

Thence North 62 Degrees 51'01" East a distance of 131.49'.

Thence North 78 Degrees 41'24" East a distance of 127.48'

Thence South 69 Degrees 26'38" East a distance of 128.16'.

Thence South 42 Degrees 46'03" East a distance of 544.89'.

Thence North 25 Degrees 38'28" East a distance of 544.89'.

Thence South 49 Degrees 53'57" East a distance of 248.39'.

Thence South 17 Degrees 06'10" East a distance of 136.01'.

Thence North 11 Degrees 04'13" East a distance of 234.36'.

Thence South 86 Degrees 54'21" East a distance of 185.27'.

Thence South 09 Degrees 51'57" East a distance of 116.73'.

Thence North 46 Degrees 32'54" East a distance of 130.86'.

Thence North 82 Degrees 114'05" East a distance of 111.02'.

Thence South 71 Degrees 33'54" East a distance of 110.68'.

Thence South 20 Degrees 11'39" East a distance of 92.70'.

Thence South 00 Degrees 58'16" West a distance of 118.02'.

Thence South 17 Degrees 44'41" West a distance of 131.24'.

Thence North 71 Degrees 04'31" East a distance of 185.00'.

Thence North 23 Degrees 11'55" East a distance of 190.39'.

Thence South 75 Degrees 57'50" East a distance of 103.08'.

Thence South 23 Degrees 57'45" East a distance of 147.73'.

Thence South 33 Degrees 18'38" East a distance of 209.40'.

Thence North 58 Degrees 14'26" East a distance of 123.49'.

Thence South 72 Degrees 05'22" East a distance of 276.39'.

Thence South 06 Degrees 52'54" West a distance of 292.10'.

Thence South 22 Degrees 39'34" West a distance of 111.62'.

Thence South 44 Degrees 20'02" West a distance of 121.63'.

Thence South 16 Degrees 14'20" East a distance of 107.28'.

Thence South 06 Degrees 28'59" West a distance of 132.85'.

Thence South 38 Degrees 13'13" West a distance of 101.83'.

Thence South 02 Degrees 07'16" East a distance of 270.19'.

Thence South 34 Degrees 31'41" West a distance of 303.45'.

Thence South 29 Degrees 21'28" West a distance of 91.79'.

Thence South 11 Degrees 33'36" East a distance of 224.56'.

Thence South 04 Degrees 05'08" West a distance of 140.36'.

Thence South 41 Degrees 11'09" West a distance of 106.30'.

Thence South 11 Degrees 46'06" West a distance of 122.58'.

Thence South 23 Degrees 11'55" West a distance of 114.24'.

Thence South 53 Degrees 07'48" West a distance of 125.00'.

Thence South 38 Degrees 59'28" West a distance of 96.30' to the beginning of a tangent curve concave Northwesterly and having a radius of 325.00'.

Thence Westerly along said curve through a central angle of 56 Degrees 17'56" a distance of 319.35'.

Thence tangent to said curve North 84 Degrees 42'36" West a distance of 97.26'.

Thence South 78 Degrees 53'13" West a distance of 130.45' to the beginning of a tangent curve concave Southeasterly and having a radius of 75.00'.

Thence Southerly along said curve through a central angle of 128 Degrees 19'41" a distance of 167.98'.

Thence tangent to said curve South 49 Degrees 26'28" East a distance of 137.31'.

Thence South 86 Degrees 33'09" East a distance of 83.15'.

Thence South 31 Degrees 13'35" West a distance of 187.11'.

Thence North 82 Degrees 14'05" East a distance of 111.02'.

Thence South 36 Degrees 42'10" West a distance of 205.80'.

Thence South 78 Degrees 115'57" West a distance of 255.34 to the beginning of a tangent curve concave Easterly and having a distance of 30.00'.

Thence Southerly along said curve through a central angle of 142 Degrees 41'04" a distance of 74.71'.

Thence tangent to said curve South 64 Degrees 25'07" East a distance of 223.80'.

Thence South 59 Degrees 02'10" East a distancee of 145.77'.

Thence South 39 Degrees 02'08" East a distance of 238.17'.

Thence West a distance of 170.00'.

Thence South 25 Degrees 12'04" East a distance of 187.88'.

Thence South 36 Degrees 52'12" East a distance of 102.01' to the beginning of a tangent curve concave Westerly and having a radius of 95.00'.

Thence Southerly along said curve through a central angle of 91 Degrees 46'27" a distance of 152.17'.

Thence tangent to said curve South 54 Degrees 54'15" West a distance of 128.12'.

Thence South 68 Degrees 27'32" West a distance of 204.27'.

Thence South 41 Degrees 11'09" West a distance of 106.30'.

Thence South 81 Degrees 01'39" West a distance of 96.28'.

Thence South 03 Degrees 00'46" East a distance of 95.13'.

Thence South 39 Degrees 59'13" West a distance of 202.30'.

Thence South 07 Degrees 07'30" East a distance of 241.87'.

Thence South 55 Degrees 29'29" West a distance of 291.25'.

Thence South 77 Degrees 04'26" West a distance of 120.28' to the beginning of a tangent curve concave Southeasterly and having a radius of 300.00'.

Thence Westerly along said curve through a central angle of 65 Degrees 24'53" a distance of 342.51'.

Thence North 65 Degrees 00'00" East a distance of 125.00'.

Thence North 55 Degrees 00'29" East a distance of 122.07'.

Thence North 72 Degrees 53'50" East a distance of 204.02'.

Thence North 81 Degrees 42'51" East a distance of 416.35'.

Thence East a distance of 50.00'.

Thence North 19 Degrees 39'14" West a distance of 193.26'.

Thence North 39 Degrees 48'20" East a distance of 101.53'.

Thence North 17 Degrees 39'00" East 115.43'.

Thence North 32 Degrees 32'30" East 124.56'.

Thence North 47 Degrees 24'48" East a distance of 184.72'.

Thence South 04 Degrees 21'25" West a distance of 105.30'.

Thence South 30 Degrees 52'00" East a distance of 101.36'.

Thence South 47 Degrees 45'22" East a distance of 145.78'.

Thence North 55 Degrees 26'15" East a distance of 109.29'.

Thence South 89 Degrees 27'16" East a distance of 210.01'.

Thence South 27 Degrees 12'58" East a distance of 393.57'.

Thence South 33 Degrees 41'24" East a distance of 108.17'.

Thence South 66 Degrees 48'05" East a distance of 114.24'.

Thence South 27 Degrees 17'58" East a distance of 174.43'.

Thence North 16 Degrees 41'57" East a distance of 104.40'.

Thence North 74 Degrees 49'38" East a distance of 183.39'.

Thence South 74 Degrees 11'51" East a distance of 110.16'.

Thence North 10 Degrees 18'17" East a distance of 134.16'.

Thence South 86 Degrees 11'09" West a distance of 120.27'.

Thence South 76 Degrees 33'05" West a distance of 94.59'.

Thence North 66 Degrees 22'14" West a distance of 174.64'.

Thence North 43 Degrees 34'04" West a distance of 113.17'.

Thence North 00 Degrees 46'27" West a distance of 148.01'.

Thence East a distance of 110.00'.

Thence North 73 Degrees 47'28" East a distance of 83.84' to the beginning of a tangent curve concave Northwesterly and having a radius of 180.00'.

Thence Easterly along said curve through a central angle of 55 Degrees 47'13" a distance of 175.26'.

Thence tangent to said curve North 18 Degrees 00'15" East 157.08'.

Thence East a distance of 130.00'.

Thence North 06 Degrees 37'57" West a distance of 173.16'.

Thence North 66 Degrees 25'31" West a distance of 120.02'.

Thence North 24 Degrees 05'15" West a distance of 93.11'.

Thence North 40 Degrees 47'41" East a distance of 96.43'.

Thence North 01 Degrees 28'08" West a distance of 117.04'.

Thence North 75 Degrees 41'20" East a distance of 101.14'.

Thence North 34 Degrees 59'31" West a distance of 122.07'.

Thence South 87 Degrees 16'25" East a distance of 210.24'.

Thence North 15 Degrees 51'22" West a distance of 277.22'.

Thence North 15 Degrees 56'43" West a distance of 109.20'.

Thence North 19 Degrees 08'01" West a distance of 259.33'.

Thence South 87 Degrees 47'51" East a distance of 130.10'.

Thence South 68 Degrees 11'55" East a distance of 107.70'.

Thence South 51 Degrees 20'25" East a distance of 192.09'.

Thence North 13 Degrees 12'04" West a distance of 166.40'.

Thence South 80 Degrees 45'52" East a distance of 124.62'.

Thence North 33 Degrees 10'43" West a distance of 155.32'.

Thence North 53 Degrees 15'09" East a distance of 93.60'.

Thence North 85 Degrees 06'03" East a distance of 140.51'.

Thence South 72 Degrees 53'50" East a distance of 136.02'.

Thence North 76 Degrees 51'10" East a distance of 140.69'.

Thence North 80 Degrees 52'11" West a distance of 113.44'.

Thence North 52 Degrees 07'30" West a distance of 114.02'.

Thence North 76 Degrees 45'34" West a distance of 174.64'.

Thence South 86 Degrees 03'17" West a distance of 145.34'.

Thence North 40 Degrees 54'52" East a distance of 99.25'.

Thence North 50 Degrees 11'40" East a distance of 195.26'.

Thence North 03 Degrees 10'47" East a distance of 90.14'.

Thence North 48 Degrees 07'20" East a distance of 194.74'.

Thence South 79 Degrees 02'45" East a distance of 157.88'.

Thence North 14 Degrees 51'01" West a distance of 136.56'.

Thence North 83 Degrees 22'45" East a distance of 112.75'.

Thence North 25 Degrees 10'25" West a distance of 110.49'.

Thence North 36 Degrees 28'09" West a distance of 143.00'.

Thence North 57 Degrees 59'41" East a distance of 94.34'.

Thence North 29 Degrees 03'17" East a distance of 102.96'.

Thence North 59 Degrees 02'10" West a distance of 87.46'.

Thence North 01 Degrees 47'24" East a distance of 160.08'.

Thence North 14 Degrees 11'37" West a distance of 265.09'.

Thence North 22 Degrees 55'56" West a distance of 141.16'.

Thence North 03 Degrees 24'23" West a distance of 168.30'.

Thence South 67 Degrees 54'46" East a distance of 372.32'.

Thence South 80 Degrees 13'03" East a distance of 176.57'.

Thence South 42 Degrees 17'14" East a distance of 283.87'.

Thence South 41 Degrees 49'13" West a distance of 127.48'.

Thence South 30 Degrees 22'45" West a distance of 168.08'.

Thence South 65 Degrees 39'32" West a distance of 230.49'.

Thence South 79 Degrees 27'58" East a distance of 246.15'.

Thence South 20 Degrees 28'20" East a distance of 80.06'

Thence South 27 Degrees 00'46" West a distance of 286.23'.

Thence South 11 Degrees 53'19" West a distance of 194.16'.

Thence South 03 Degrees 21'59" East a distance of 170.29'.

Thence South 28 Degrees 26'34" East a distance of 272.95'.

Thence South 05 Degrees 48'24" East a distance of 296.52'.

Thence South 39 Degrees 28'21" East a distance of 110.11'.

Thence South 71 Degrees 33'54" East a distance of 94.87'.

Thence South 04 Degrees 23'55" East a distance of 130.38'.

Thence South 21 Degrees 20'13" East a distance of 343.55'.

Thence North 43 Degrees 31'52" East a distance of 137.93'.

Thence South 62 Degrees 14'29" East a distance of 107.35'.

Thence South 14 Degrees 02'10" East a distance of 144.31'.

Thence South 26 Degrees 33'54" East a distance of 122.98'.

Thence North 19 Degrees 39'14" East a distance of 222.99'.

Thence South 80 Degrees 32'16" East a distance of 91.24'.

Thence South 23 Degrees 52'06" East a distance of 123.57'.

Thence North 49 Degrees 23'55" East a distance of 92.20'.

Thence South 85 Degrees 06'03" East a distance of 140.51'.

Thence South 02 Degrees 43'35" West a distance of 105.12'.

Thence North 59 Degrees 32'04" East a distance of 98.62'.

Thence South 56 Degrees 18'36" East a distance of 90.14'.

Thence North 87 Degrees 42'34" East a distance of 125.10'.

Thence North 80 Degrees 04'26" East a distance of 203.04'.

Thence North 74 Degrees 21'28" East a distance of 129.81'.

Thence South 33 Degrees 16'30" East a distance of 191.38'.

Thence South 31 Degrees 25'47" West a distance of 105.48'.

Thence South 08 Degrees 52'51" West a distance of 129.55'.

Thence North 73 Degrees 18'03" East a distance of 167.04'.

Thence South 01 Degrees 35'28" East a distance of 180.07'.

Thence South 17 Degrees 01'14" West a distance of 102.49'.

Thence South 80 Degrees 44'39" East a distance of 136.78'.

Thence South 19 Degrees 42'51" West a distance of 127.47'.

Thence South 61 Degrees 36'25" West a distance of 252.36'.

Thence North 79 Degrees 37'27" East a distance of 228.72' to the beginning of a tangent curve concave Southwesterly and having a radius of 80.00'.

Thence Southerly along said curve through a central angle of 117 Degrees 37'57" a distance of 164.25'.

Thence tangent to said curve South 17 Degrees 15'24" West a distance of 113.90'.

Thence North 67 Degrees 02'10" East a distance of 128.16'.

Thence South 11 Degrees 46'06" West a distance of 122.58'.

Thence South 72 Degrees 38'46" West a distance of 167.63'.

Thence South 67 Degrees 53'26" East a distance of 172.70'.

Thence South 21 Degrees 02'15" East a distance of 139.28'.

Thence South 46 Degrees 50'51" West a distance of 109.66'.

Thence South 69 Degrees 08'44" East a distance of 112.36'.

Thence North 38 Degrees 17'25" East a distance of 242.07'.

Thence South 43 Degrees 52'36" East a distance of 180.35'.

Thence North 41 Degrees 59'14" East a distance of 134.54'.

Thence South 49 Degrees 14'11" East a distance of 191.44'.

Thence South 03 Degrees 41'29" West a distance of 155.32'.

Thence South 26 Degrees 33'54" West a distance of 111.80'.

Thence South 03 Degrees 34'35" East a distance of 160.31'.

Thence North 50 Degrees 37'51" East a distance of 252.24'.

Thence South 74 Degrees 03'17" East a distance of 109.20'.

Thence North 27 Degrees 33'10" East a distance of 103.77'.

Thence North 32 Degrees 44'07" West a distance of 199.72'.

Thence North 26 Degrees 33'54" East a distance of 100.62'.

Thence North 88 Degrees 21'48" East a distance of 105.04'.

Thence North 72 Degrees 04'56" East a distance of 315.29'.

Thence South 60 Degrees 15'18" East a distance of 161.25'.

Thence East a distance of 72.00'.

Thence South 20 Degrees 15'57" East a distance of 138.58'.

Thence South 33 Degrees 10'43" West a distance of 155.32'.

Thence North 87 Degrees 36'51" East a distance of 120.10'.

Thence South 05 Degrees 54'22" West a distance of 145.77'.

Thence South 30 Degrees 15'23" West a distance of 138.92'.

Thence South 04 Degrees 45'49" East a distance of 120.42'.

Thence South 15 Degrees 25'20" West a distance of 150.42'.

Thence South a distance of 235.00'.

Thence South 06 Degrees 34'55" East a distance of 130.86'.

Thence South 08 Degrees 58'21" West a distance of 192.35'.

Thence South 51 Degrees 48'33" East a distance of 95.43'.

Thence South 28 Degrees 47'12" West a distance of 103.83'.

Thence South 14 Degrees 02'10" East a distance of 103.08'.

Thence South 05 Degrees 11'40" West a distance of 165.68'.

Thence South 22 Degrees 50'01" East a distance of 103.08'.

Thence South 61 Degrees 11'21" West a distance of 114.13'.

Thence South 71 Degrees 33'54" East a distance of 126.49'.

Thence South 05 Degrees 26'25" East a distance of 105.48'.

Thence South 46 Degrees 32'54" East a distance of 130.86'.

Thence South 41 Degrees 20'52" East a distance of 133.21'.

Thence South 50 Degrees 49'15" East a distance of 292.84'.

Thence South 10 Degrees 00'29" East a distance of 86.31'.

Thence South 45 Degrees 00'00" East a distance of 205.06'.

Thence South a distance of 130.00'.

Thence North 86 Degrees 25'25" East a distance of 320.62'.

Thence South 60 Degrees 01'06" East a distance of 150.08'.

Thence South 24 Degrees 26'38" East a distance of 120.83'.

Thence South 49 Degrees 41'09" East a distance of 216.39'.

Thence North 55 Degrees 42'47" East a distance of 266.27'.

Thence North 62 Degrees 02'56" East a distance of 277.35'.

Thence North 72 Degrees 21'00" East a distance of 230.87'.

Thence North 59 Degrees 02'10" East a distance of 204.08'.

Thence North 77 Degrees 00'19" East a distance of 133.42'.

Thence North 47 Degrees 07'16" East a distance of 95.52'.

Thence North 24 Degrees 13'40" East a distance of 109.66'.

Thence North 43 Degrees 09'09" East a distance of 219.32'.

Thence North 55 Degrees 00'29" East a distance of 122.07'.

Thence North 49 Degrees 11'06" West a distance of 145.34'.

Thence North 68 Degrees 37'46" East a distance of 123.49'.

Thence North 82 Degrees 41'39" East a distance of 196.60'.

Thence South 63 Degrees 26'06" East a distance of 212.43'.

Thence South 49 Degrees 23'55" East a distance of 92.20'.

Thence South 71 Degrees 50'02" East a distance of 336.79'.

Thence South 43 Degrees 15'51" East a distance of 233.45'.

Thence South 47 Degrees 01'17" East a distance of 300.71'.

Thence South 42 Degrees 11'04" East a distance of 215.93'.

Thence South 48 Degrees 53'16" East a distance of 365.00'.

Thence South 47 Degrees 47'51" East a distance of 280.00'.

Thence South 71 Degrees 42'59" East a distance of 500.00' to the beginning of a tangent curve concave Southwesterly and having a radius of 2500.00'.

Thence Easterly along said curve through a central angle of 17 Degrees 31'51" to a point on the East boundary line of The Pauba Rancho.

Thence Southwesterly along said rancho boundary line to the most Southeasterly corner thereof.

Thence Westerly along said rancho boundary line to the Northwest corner of Section 24, Township 8 South, Range 1 West.

Thence Southerly along the West line of said Section 24 to the Southwest corner thereof.

Thence Easterly along the South line of said Section 24 to the Southeast corner thereof.

Thence Southerly along the West line of Section 30, Township 8 South, Range 1 East to the Southwest corner thereof.

Thence Easterly along the South line of said Section 30 and the South line of Section 29, Township 8 South, Range 1 East to the Southeast corner thereof.

Thence Southerly along the West line of Section 33, Township 8 South, Range 1 East to the Southwest corner thereof. Said corner also being a point in the Southerly boundary line of the County of Riverside, California.

Thence Easterly along said Southerly boundary line to its intersection with the East line of Section 35, Township 8 South, Range 1 East.

Thence Northerly along the East line of said Section 35 to the Northeast corner thereof.

Thence Westerly along the North line of said Section 35 to the Northwest corner thereof.

Thence Northerly along the East line of Sections 27 and 22, Township 8 South, Range 1 East to the Northeast corner thereof.

Thence Easterly along the South line of the West 1/2 and the West 1/2 of the East 1/2 of Section 14, Township 8 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the West 1/2 of the East 1/2 of said Section 14 to the Northeast corner thereof.

Thence Westerly along the North line of said Section 14 and the North line of Section 15, Township 8 South, Range 1 East to the Northwest corner thereof.

Thence Southerly along the West line of said Section 15 and the West line of Section 22, Township 8 South, Range 1 East to the Southwest corner thereof.

Thence Westerly along the North line of Sections 28 and 29, Township 8 South, Range 1 East to the Northwest corner thereof.

Thence Northerly along the East line of Section 19, Township 8 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of said Section 19 to the Northwest corner thereof.

Thence Northerly alogn the East line of Section 13, Township 8 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of said Section 13 to its intersection with the Easterly boundary line of the Pauba Rancho.

Thence Southwesterly along said rancho boundary line a distance of 3800.00'.

Thence leaving said rancho boundary line South 77 Degrees 12'23" West a distance of 1542.24' to the beginning of a non-tangent curve concave Northeasterly and having a radius of 600.00'. A radial line bears North 03 Degrees 16'45" East.

Thence Westerly along said curve through a central angle of 35 Degrees 39'40" a distance of 373.44'.

Thence leaving said curve North 33 Degrees 45'20" East a distance of 484.24'.

Thence North 47 Degrees 46'03" East a distance of 700.84'.

Thence North 54 Degrees 32'56" East a distance of 152.89'.

Thence North 82 Degrees 13'56" East a distance of 187.36'.

Thence North 87 Degrees 54'05" East a distance of 390.53'.

Thence North 78 Degrees 01'53" East a distance of 201.31'.

Thence South 80 Degrees 36'13" East a distance of 353.91' to a point on the Easterly boundary line of The Pauba Rancho.

Thence along said rancho boundary line North 13 Degrees 35'32" East a distance of 224.85'.

Thence North 80 Degrees 21'04" West a distance of 630.44'.

Thence South 87 Degrees 33'13" West a distance of 511.46'.

Thence South 72 Degrees 43'11" West a distance of 184.78'.

Thence South 59 Degrees 31'31" West a distance of 429.17'.

Thence South 67 Degrees 09'37" West a distance of 577.07'.

Thence South 29 Degrees 09'59" West a distance of 480.00'.

Thence South 46 Degrees 38'12" West a distance of 123.79'.

Thence North 85 Degrees 01'49" West a distance of 230.87'.

Thence North 55 Degrees 48'50" West a distance of 120.00'.

Thence North 19 Degrees 42'53" East a distance of 191.37'.

Thence North 39 Degrees 18'41" East a distance of 406.86'.

Thence North 41 Degrees 53'28" East a distance of 609.71'.

Thence North 37 Degrees 14'26" East a distance of 60.83'.

Thence North 52 Degrees 27'24" West a distance of 80.09'.

Thence South 60 Degrees 33'10" West a distance of 553.62'.

Thence South 37 Degrees 53'43" West a distance of 800.00'.

Thence South 54 Degrees 41'20" West a distance of 147.05'.

Thence West a distance of 160.00'.

Thence South 78 Degrees 31'05" West a distance of 326.53'.

Thence South 72 Degrees 33'10" West a distance of 183.44'.

Thence North 59 Degrees 32'04" West a distance of 98.62'.

Thence South 80 Degrees 32'16" West a distance of 121.66'.

Thence North 78 Degrees 13'54" West a distance of 122.58'.

Thence North 60 Degrees 15'18" West a distance of 161.25'.

Thence North 34 Degrees 17'13" West a distance of 133.14'.

Thence North 12 Degrees 05'41" East a distance of 143.18'.

Thence North 79 Degrees 00'41" West a distance of 104.92'.

Thence North 11 Degrees 18'36" West a distance of 112.18'.

Thence North 21 Degrees 48'05" West a distance of 107.70'.

Thence North 08 Degrees 07'48" West a distance of 282.84'.

Thence North 70 Degrees 33'36" East a distance of 90.14'.

Thence North 49 Degrees 45'49" West a distance of 170.29'.

Thence North 15 Degrees 22'35" West a distance of 207.42'.

Thence North 51 Degrees 50'34" East a distance of 178.04'.

Thence South 58 Degrees 23'13" East a distance of 152.64'.

Thence South 85 Degrees 36'05" East a distance of 130.38'.

Thence North 45 Degrees 00'00" West a distance of 169.71'.

Thence North 40 Degrees 36'05" East a distance of 92.20'.

Thence North 59 Degrees 20'57" West a distance of 156.92'.

Thence South 83 Degrees 39'35" East a distance of 90.55'.

Thence North 70 Degrees 20'46" West a distance of 148.66'.

Thence South 34 Degrees 22'49" West a distance of 115.11'.

Thence South 54 Degrees 09'44" West a distance of 111.02'.

Thence North 69 Degrees 08'44" West a distance of 112.36'.

Thence North 39 Degrees 24'03" East a distance of 362.35'.

Thence South 70 Degrees 01'01" West a distance of 117.05'.

Thence South 54 Degrees 14'46" West a distance of 154.03'.

Thence North 34 Degrees 59'31" West a distance of 122.07'.

Thence North 09 Degrees 39'36" East a distance of 238.38'.

Thence North 77 Degrees 35'33" East a distance of 255.98'.

Thence North 35 Degrees 32'16" West a distance of 86.02'.

Thence North 55 Degrees 42'47" East a distance of 266.27'.

Thence North 87 Degrees 08'15" East a distance of 200.25'.

Thence North 63 Degrees 26'06" East a distance of 223.61'.

Thence South 86 Degrees 59'14" West a distance of 190.26'.

Thence North 74 Degrees 28'33" West a distance of 280.22'.

Thence North 11 Degrees 53'19" West a distance of 97.08'.

Thence South 15 Degrees 49'09" West a distance of 187.09'.

Thence South 67 Degrees 22'48" West 130.00'.

Thence South 61 Degrees 23'22" West a distance of 125.30'.

Thence North 06 Degrees 06'56" East a distance of 140.80'.

Thence North 07 Degrees 07'30" West a distance of 120.93'.

Thence South 29 Degrees 03'17" West a distance of 102.96'.

Thence South 68 Degrees 11'55" West a distance of 107.70'.

Thence North 20 Degrees 00'15" East a distance of 149.03'.

Thence North 13 Degrees 11'26" East a distance of 328.67'.

Thence North 00 Degrees 40'56" West a distance of 420.00'.

Thence North 50 Degrees 42'38" West a distance of 142.13'.

Thence North 22 Degrees 50'01" West a distance of 103.08'.

Thence North 43 Degrees 01'30" West a distance of 102.59'.

Thence North 21 Degrees 48'05" West a distance of 107.70'.

Thence North 47 Degrees 36'09" West a distance of 155.72'.

Thence North 77 Degrees 28'16" West a distance of 58.37' to the beginning of a tangent curve concave Northeasterly and having a radius of 125.00'.

Thence Northerly along said curve through a central angle of 90 Degrees 27'57" a distance of 197.37'.

Thence tangent to said curve North 12 Degrees 59'41" East a distance of 74.10'.

Thence North 85 Degrees 14'10" East a distance of 120.42'.

Thence South 79 Degrees 06'52" East a distance of 132.38'.

Thence East a distance of 120.00'.

Thence North 77 Degrees 28'16" East a distance of 507.70'.

Thence South 88 Degrees 05'27" East a distance of 300.17'.

Thence South 51 Degrees 20'25" East a distance of 96.05'.

Thence North 81 Degrees 24'59" East a distance of 268.00'.

Thence North 52 Degrees 07'30" West a distance of 171.03'.

Thence North 31 Degrees 15'49" East a distance of 163.78'.

Thence North 52 Degrees 48'55" East a distance of 182.00'.

Thence North 41 Degrees 49'13" East a distance of 127.48'.

Thence North 27 Degrees 17'59" East a distance of 174.43'.

Thence North 43 Degrees 36'10" East a distance of 145.00'.

Thence North 72 Degrees 07'17" East a distance of 162.86'.

Thence North 51 Degrees 50'34" West a distance of 89.02'.

Thence North 05 Degrees 11'40" East a distance of 110.45'.

Thence North 15 Degrees 04'07" East a distance of 134.63'.

Thence North 72 Degrees 28'28" East a distance of 99.62'.

Thence North 54 Degrees 27'44" West a distance of 86.02'.

Thence North 11 Degrees 00'13" West a distance of 183.37'.

Thence North 79 Degrees 54'29" East a distance of 228.54'.

Thence South 68 Degrees 33'08" East a distance of 150.42'.

Thence North 03 Degrees 56'43" East a distance of 145.34'.

Thence North 56 Degrees 18'36" East a distance of 144.22'.

Thence South 37 Degrees 18'14" East a distance of 132.00'.

Thence South 46 Degrees 07'24" East a distance of 180.35'.

Thence South 47 Degrees 38'33" East a distance of 230.05'.

Thence North 03 Degrees 21'59" East a distance of 85.15'.

Thence North 17 Degrees 21'14" East a distance of 83.82'.

Thence North 22 Degrees 46'57" West a distance of 271.15'.

Thence North 61 Degrees 41'57" East a distance of 147.65'.

Thence South 21 Degrees 58'28" East a distance of 196.17' to the beginning of a tangent curve concave Northeasterly and having a radius of 120.00'.

Thence Easterly along said curve through a central angle of 85 Degrees 37'05" a distance of 179.32'.

Thence tangent to said curve North 72 Degrees 24'27" East a distance of 103.90'.

Thence North 56 Degrees 18'36" East a distance of 90.14'.

Thence South 58 Degrees 40'17" East a distance of 134.63'.

Thence South 39 Degrees 17'22" East a distance of 142.13'.

Thence North 10 Degrees 07'29" East a distance of 142.21'.

Thence North 08 Degrees 21'57" West a distance of 171.83'.

Thence North 36 Degrees 15'14" West a distance of 186.01'.

Thence North 59 Degrees 32'04" East a distance of 98.62'.

Thence North 82 Degrees 05'34" East a distance of 181.73'.

Thence North 65 Degrees 43'32" East a distance of 279.73'.

Thence North 46 Degrees 23'50" East a distance of 145.00'.

Thence North 35 Degrees 50'16" East a distance of 111.02'.

Thence North 59 Degrees 02'10" East a distance of 204.08'.

Thence North 35 Degrees 45'14" East a distance of 154.03'.

Thence North 55 Degrees 55'22" East a distance of 205.24'.

Thence North 75 Degrees 46'26" East a distance of 366.23'.

Thence North 68 Degrees 11'55" East a distance of 188.48'.

Thence North 74 Degrees 57'44" East a distance of 346.88'.

Thence North 66 Degrees 15'02" East a distance of 136.57'.

Thence North 30 Degrees 34'45" East a distance of 127.77'.

Thence North 11 Degrees 58'34" West a distance of 168.67'.

Thence South 60 Degrees 38'32" East a distance of 91.79'.

Thence South 34 Degrees 59'31" East a distance of 122.07'.

Thence South 41 Degrees 38'01" East a distance of 120.42'

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Thence North 12 Degrees 31'44" West a distance of 92.20'.

Thence South 81 Degrees 28'09" East a distance of 101.12'.

Thence North 67 Degrees 50'01" West a distance of 145.77'.

Thence South 75 Degrees 59'45" East a distance of 915.00' to a point on the Easterly boundary line of The Pauba Rancho.

Thence along said rancho boundary line North 13 Degrees 35'32" East a distance of 655.26'.

Thence leaving said rancho boundary line North 44 Degrees 20'36" West a distance of 114.98' to the beginning of a tangent curve concave Easterly and having a radius of 150.00'.

Thence Northerly along said curve through a central angle of 105 Degrees 00'00 a distance of 274.89'.

Thence tangent from said curve North 60 Degrees 39'24" East a distance of 150.00'.

Thence North 06 Degrees 50'36" West a distance of 92.39'.

Thence North 74 Degrees 20'36" West a distance of 300.00'.

Thence North 70 Degrees 45'43" West a distance of 491.69'.

Thence North 48 Degrees 04'02" West a distance of 505.79'.

Thence North 18 Degrees 21'47" East a distance of 458.89'.

Thence South 87 Degrees 10'09" West a distance of 1250.40'.

Thence South 08 Degrees 12'01" West a distance of 385.08'.

Thence South 27 Degrees 12'07" East a distance of 223.45'.

Thence South 13 Degrees 42'18" West a distance of 120.01'.

Thence South 77 Degrees 25'51" West a distance of 631.86'.

Thence North 45 Degrees 05'45" West a distance of 178.80'.

Thence North 23 Degrees 39'02" West a distance of 724.70'.

Thence North 34 Degrees 49'03" West a distance of 211.87'.

Thence North 62 Degrees 41'17" West a distance of 254.81.'

Thence North 86 Degrees 37'15" West a distance of 334.80'.

Thence South 66 Degrees 05'48" West a distance of 261.74'.

Thence South 67 Degrees 10'15" West a distance of 293.59'.

Thence South 85 Degrees 01'36" West a distance of 375.77'.

Thence North 85 Degrees 49'14" West a distance of 446.34'.

Thence North 57 Degrees 51'27" West a distance of 292.38'.

Thence North 29 Degrees 42'26" West a distance of 214.87'.

Thence North 07 Degrees 53'17" East a distance of 210.39'.

Thence North 35 Degrees 38'42" East a distance of 394.07'.

Thence North 86 Degrees 55'06" West a distance of 417.69'.

Thence South 43 Degrees 16'41" West a distance of 211.99'.

Thence South 15 Degrees 17'49" West a distance of 573.11'.

Thence South 41 Degrees 49'02" West a distance of 255.56'.

Thence South 38 Degrees 27'42" East a distance of 391.47'.

Thence South 13 Degrees 21'05" East a distance of 767.66'.

Thence South 14 Degrees 02'10" East a distance of 176.87' to the beginning of a tangent curve concave Westerly and having a radius of 140.00'.

Thence Southerly along said curve through a central angle of 39 Degrees 14'14" a distance of 95.88'.

Thence tangent to said curve South 25 Degrees 12'04" West a distance of 17.44' to the beginning of a tangent curve concave Northerly and having a radius of 50.00'.

Thence Westerly along said curve through a central angle of 134 Degrees 56'37" a distance of 117.76'.

Thence tangent to said curve North 19 Degrees 51'19" West a distance of 70.84'.

Thence West a distance of 80.00'.

Thence South a distance of 130.00'.

Thence North 70 Degrees 01'01" West a distance of 117.05'.

Thence South 22 Degrees 14'56" West a distance of 118.85'.

Thence South 62 Degrees 06'10" East a distance of 96.18'.

Thence South 16 Degrees 18'50" West a distance of 213.60'.

Thence South 72 Degrees 28'28" West a distance of 99.62'.

Thence North 48 Degrees 48'51" West a distance of 106.30'.

Thence South 41 Degrees 11'09" West a distance of 159.45'.

Thence North 23 Degrees 57'45" West a distance of 98.49'.

Thence South 71 Degrees 33'54" West a distance of 94.87'.

Thence North 53 Degrees 36'56" West a distance of 118.00'.

Thence North 23 Degrees 25'43" East a distance of 163.48'.

Thence North 06 Degrees 20'25" West a distance of 90.55'.

Thence North 23 Degrees 11'55" East a distance of 76.16'.

Thence South 48 Degrees 48'51" West a distance of 106.30'.

Thence South 33 Degrees 41'24" West a distance of 108.17'.

Thence South 48 Degrees 10'47" West a distance of 127.48'.

Thence North 12 Degrees 31'44" West a distance of 138.29'.

Thence South 82 Degrees 24'19" West a distance of 75.66'.

Thence North 11 Degrees 18'36" West a distance of 50.99'.

Thence North 71 Degrees 33'54" West a distance of 63.25'.

Thence North 08 Degrees 07'48" West a distance of 70.71'.

Thence South 75 Degrees 04'07" West a distance of 155.24'.

Thence North 81 Degrees 52'12" West a distance of 106.07'.

Thence South 34 Degrees 41'43" West a distance of 79.06'.

Thence South 69 Degrees 26'38" West a distance of 128.016'.

Thence North 80 Degrees 32'16" West a distance of 91.24'.

Thence South 63 Degrees 26'06" West a distance of 67.08'.

Thence North 33 Degrees 41'24" West a distance of 72.11'.

Thence West a distance of 130.00'.

Thence North 18 Degrees 26'06" East a distance of 73.99' to the beginning of a tangent curve concave Southeasterly and having a radius of 150.00'.

Thence Easterly along said curve through a central angle of 58 Degrees 34'13" a distance of 153.34'.

Thence tangent to said curve North 77 Degrees 00'19" East a distance of 182.70'.

Thence North 40 Degrees 36'05" East a distance of 92.20'.

Thence North 66 Degrees 02'15" West a distance of 98.49'.

Thence North 29 Degrees 21'28" West a distance of 91.79'.

Thence North 77 Degrees 54'19" West a distance of 71.59'.

Thence South 62 Degrees 21'14" West a distance of 118.53'.

Thence North 02 Degrees 12'09" East a distance of 130.10'.

Thence North 17 Degrees 39'00" West a distance of 115.43'.

Thence North a distance of 85.00'.

Thence South 62 Degrees 06'10" West a distance of 96.18'.

Thence South 16 Degrees 59'27" West a distance of 188.22'.

Thence South 36 Degrees 01'39" West a distance of 136.02'.

Thence South 15 Degrees 56'43" West a distance of 145.60'.

Thence South 37 Degrees 34'07" West a distance of 82.01'.

Thence South 18 Degrees 26'06" West a distance of 79.06'.

Thence North 83 Degrees 36'35" West a distance of 135.83'.

Thence South 62 Degrees 06'10" West a distance of 96.18'.

Thence North 26 Degrees 33'54" West a distance of 78.26'.

Thence North 38 Degrees 59'28" East a distance of 135.09'.

Thence North 54 Degrees 46'57" East a distance of 104.04'.

Thence North 20 Degrees 19'23" East a distance of 143.96'.

Thence North 05 Degrees 21'21" East a distance of 321.40'.

Thence South 31 Degrees 49'39" West a distance of 170.66'.

Thence South 12 Degrees 31'34" West a distance of 92.20'.

Thence South 40 Degrees 06'03" West a distance of 124.20'.

Thence South 76 Degrees 36'27" West a distance of 107.94'.

Thence South 55 Degrees 29'29" West a distance of 97.08'.

Thence South 19 Degrees 39'14" West a distance of 74.33'.

Thence North 82 Degrees 52'30" West a distance of 80.62'.

Thence South 12 Degrees 05'41" West a distance of 143.18'.

Thence South 86 Degrees 43'46" West a distance of 175.29'.

Thence South 46 Degrees 16'23" West a distance of 159.14'.

Thence West a distance of 70.00'.

Thence North 42 Degrees 16'25" West a distance of 74.33'.

Thence North a distance of 105.00'.

Thence North 78 Degrees 01'26" West a distance of 168.67'.

Thence North 56 Degrees 18'36" West a distance of 126.10'.

Thence North 60 Degrees 15'18" East a distance of 120.93'.

Thence South 87 Degrees 30'37" East a distance of 115.11'.

Thence North 60 Degrees 38'32" East a distance of 183.58'.

Thence North 73 Degrees 00'33" East a distance of 188.22'.

Thence North 76 Degrees 45'34" West a distance of 174.64'.

Thence North 01 Degrees 38'12" West a distance of 175.07'.

Thence North 08 Degrees 31'51" West a distance of 303.36'.

Thence South 39 Degrees 48'20" West a distance of 78.10'.

Thence South 05 Degrees 26'25" East a distance of 105.48'.

Thence South 15 Degrees 38'32" West a distance of 129.81'.

Thence South 03 Degrees 34'35" West a distance of 80.16'.

Thence South 31 Degrees 25'47" West a distance of 105.48'.

Thence North 43 Degrees 09'09" West a distance of 109.66'.

Thence South 25 Degrees 27'48" West a distance of 116.30'.

Thence North 59 Degrees 44'37" West a distance of 138.92'.

Thence North 80 Degrees 04'26" West a distance of 203.04'.

Thence South 51 Degrees 20'25" West a distance of 96.05'.

Thence South 20 Degrees 33'22" West a distance of 85.44'.

Thence South 82 Degrees 38'51" West a distance of 312.57'.

Thence South 57 Degrees 22'51" West a distance of 148.41'.

Thence North 29 Degrees 14'56" East a distance of 143.27'.

Thence North 10 Degrees 26'15" East a distance of 193.20'.

Thence South 41 Degrees 25'25" West a distance of 113.36'.

Thence South 33 Degrees 01'26" West a distance of 119.27'.

Thence South 83 Degrees 17'25" West a distance of 171.17'.

Thence North 40 Degrees 21'52" West a distance of 131.24'.

Thence North 04 Degrees 34'10" East a distance of 125.45'.

Thence North 07 Degrees 35'45" West a distance of 75.61'.

Thence North 36 Degrees 23'04" East a distance of 118.00'.

Thence South 71 Degrees 01'47" West a distance of 169.19'.

Thence South 36 Degrees 52'12" West a distance of 100.00'.

Thence North 05 Degrees 42'38" East a distance of 100.50'.

Thence 38 Degrees 22'03" East a distance of 153.05'.

Thence North 31 Degrees 40'32" East a distance of 276.13'.

Thence North a distance of 125.00'.

Thence North 14 Degrees 02'10" East a distance of 144.31'.

Thence North 45 Degrees 00'00" East a distance of 141.42'.

Thence North 06 Degrees 50'34" West a distance of 125.90'.

Thence South 45 Degrees 00'00" West a distance of 113.14'.

Thence South 21 Degrees 02'15" West a distance of 69.64'.

Thence North 75 Degrees 04'07" West a distance of 77.62'.

Thence North 11 Degrees 46'05" West a distance of 122.58'.

Thence North 27 Degrees 45'31" West a distance of 107.35'.

Thence South 02 Degrees 07'16" West a distance of 135.09'.

Thence South 06 Degrees 34'55" West a distance of 130.86'.

Thence South 04 Degrees 34'26" East a distance of 125.40'.

Thence South 11 Degrees 00'13" West a distance of 183.37'.

Thence South 63 Degrees 26'06" West a distance of 145.34'.

Thence South 38 Degrees 39'35" West a distance of 96.35'.

Thence South 70 Degrees 42'36" West a distance of 105.95'.

Thence South 25 Degrees 38'28" West a distance of 138.65'.

Thence North 33 Degrees 41'24" West a distance of 108.17'.

Thence North 09 Degrees 43'39" East a distance of 177.55'.

Thence North 18 Degrees 26'06" East a distance of 110.68'.

Thence North 49 Degrees 05'08" West a distance of 99.25'.

Thence South 12 Degrees 31'44" West a distance of 92.20'.

Thence North 71 Degrees 33'54" West a distance of 94.87'.

Thence South 02 Degrees 43'35" East a distance of 105.12'.

Thence South 57 Degrees 22'51" West a distance of 148.41'.

Thence North 59 Degrees 02'10" West a distance of 87.46'.

Thence South 89 Degrees 07'55" West a distance of 174.53' to the beginning of a tangent curve concave Easterly and having a radius of 25.00'.

Thence Southerly along said curve through a central angle of 161 Degrees 44'04" a distance of 70.57'.

Thence tangent to said curve North 70 Degrees 51'59" East a distance of 103.82'.

Thence North 32 Degrees 44'07" East a distance of 83.22'.

Thence North 10 Degrees 05'51" West a distance of 74.15'.

Thence North 33 Degrees 00'11" East a distance of 115.66'.

Thence North 19 Degrees 21'32" East a distance of 196.09'.

Thence North 23 Degrees 57'45" West a distance of 98.49'.

Thence North 20 Degrees 51'16" East a distance of 112.36'.

Thence South 67 Degrees 45'04" West a distance of 118.85'.

Thence South 10 Degrees 32'21" West a distance of 218.69'.

Thence South 87 Degrees 08'15" West a distance of 100.12'.

Thence South 08 Degrees 44'46" East a distance of 65.75'.

Thence South 49 Degrees 05'08" West a distance of 99.25'.

Thence North 30 Degrees 57'50" West a distance of 145.77'.

Thence South 14 Degrees 32'04" West a distance of 139.46'.

Thence North 67 Degrees 50'01" West a distance of 145.77'.

thence South a distance of 90.00'.

Thence South 25 Degrees 51'59" West a distance of 183.37'.

Thence North 54 Degrees 09'44" West a distance of 111.02'.

Thence North 02 Degrees 56'09" West a distance of 195.26'.

Thence North 27 Degrees 45'31" East a distance of 107.35'.

Thence North 23 Degrees 29'55" West a distance of 125.40'.

Thence South 20 Degrees 37'48" West a distance of 454.12'.

Thence South 07 Degrees 18'21" East a distance of 196.60'.

Thence North 78 Degrees 13'54" West a distance of 122.58'.

Thence North 12 Degrees 59'41" West a distance of 200.12'.

Thence North 08 Degrees 58'21" East a distance of 192.35'.

Thence North a distance of 205.05'.

Thence North 29 Degrees 44'42" West a distance of 241.87'.

Thence South 02 Degrees 17'26" East a distance of 125.10'.

Thence South 10 Degrees 29'29" East a distance of 137.30'.

Thence South 15 Degrees 56'43" West a distance of 145.60'.

Thence South 33 Degrees 41'24" West a distance of 108.17'.

Thence South 23 Degrees 57'45" West a distance of 98.49'.

Thence South 16 Degrees 35'14" West a distance of 245.20'.

Thence South 68 Degrees 57'45" West a distance of 139.28'.

Thence North a distance of 95.01'.

Thence South 54 Degrees 27'44" West a distance of 86.02'.

Thence North 10 Degrees 18'17" West a distance of 111.80'.

Thence North 02 Degrees 23'09" East a distance of 120.10'.

Thence North 04 Degrees 23'55" West a distance of 130.38'.

Thence North 38 Degrees 39'35" West a distance of 128.06'.

Thence South 07 Degrees 54'26" East a distance of 181.73'.

Thence South 16 Degrees 41'57" West a distance of 156.60'.

Thence South 08 Degrees 31'51" West a distance of 202.24'.

Thence South 82 Degrees 52'30" West a distance of 80.62'.

Thence North 26 Degrees 33'54" East a distance of 111.80'.

Thence North 05 Degrees 42'38" West a distance of 100.50'.

Thence North 32 Degrees 37'09" West a distance of 148.41'.

Thence North 47 Degrees 38'33" West a distance of 230.05'.

Thence North 84 Degrees 41'08" West a distance of 215.93'.

Thence North a distance of 90.03'.

Thence South 30 Degrees 34'45" West a distance of 127.77'.

Thence South 59 Degrees 32'04" East a distance of 197.23'.

Thence South 12 Degrees 31'44" East a distance of 92.20'.

Thence South 66 Degrees 22'14" East a distance of 87.32'.

Thence South 39 Degrees 33'35" East a distance of 119.16'.

Thence South 26 Degrees 33'54" West a distance of 167.71'.

Thence South 10 Degrees 18'17" West a distance of 111.80'.

Thence South 45 Degrees 00'00" East a distance of 98.99'.

Thence East a distance of 100.00'.

Thence South 23 Degrees 57'45" East a distance of 98.49'.

Thence South 45 Degrees 00'00" East a distance of 113.14'.

Thence South 41 Degrees 38'01" West a distance of 120.42'.

Thence South 77 Degrees 28'16" West a distance of 138.29'.

Thence South 87 Degrees 56'17" West a distance of 139.09'.

Thence South 30 Degrees 57'55" West a distance of 93.29'.

Thence North 82 Degrees 45'20" West a distance of 118.95'.

Thence South 37 Degrees 34'07" West a distance of 246.02'.

Thence North 54 Degrees 09'44" West a distance of 111.02'.

Thence North 86 Degrees 25'25" West a distance of 160.31'.

Thence South 49 Degrees 45'49" West a distance of 85.15'.

Thence North 61 Degrees 36'25" West a distance of 210.30'.

Thence South 84 Degrees 30'28" West a distance of 261.20'.

Thence North 75 Degrees 57'50" West a distance of 268.00'.

Thence South 71 Degrees 06'50" West a distance of 200.81'.

Thence North 59 Degrees 25'15" West a distance of 127.77'.

Thence North 45 Degrees 00'00" West a distance of 212.13'.

Thence North 78 Degrees 41'24" West a distance of 127.48'.

Thence North 49 Degrees 14'11" West a distance of 114.87'.

Thence South 85 Degrees 42'00" West a distance of 133.38'.

Thence North 86 Degrees 22'01" West a distance of 315.63'.

Thence South 47 Degrees 36'09" West a distance of 155.72'.

Thence North 74 Degrees 44'42" West a distance of 114.02'.

Thence South 67 Degrees 22'48" West a distance of 260.00'.

Thence North 11 Degrees 00'13" West a distance of 183.37'.

Thence North 14 Degrees 55'53" East a distance of 155.24'.

Thence North 67 Degrees 45'04" East a distance of 118.85'.

Thence South 73 Degrees 29'44" East a distance of 140.80'.

Thence North 34 Degrees 35'32" West a distance of 176.14'.

Thence North 19 Degrees 32'12" East a distance of 164.47'.

Thence North 75 Degrees 10'25" East a distance of 175.86'.

Thence North 25 Degrees 16'40" West a distance of 199.06'.

Thence North 33 Degrees 30'12" East a distance of 425.73'.

Thence North 03 Degrees 30'50" East a distance of 571.07'.

Thence North 47 Degrees 02'43" West a distance of 198.12'.

Thence South 78 Degrees 41'24" West a distance of 356.93'.

Thence South 86 Degrees 59'14" West a distance of 380.53'.

Thence South 63 Degrees 26'06" West a distance of 301.87'.

Thence South 58 Degrees 46'54" West a distance of 192.94'.

Thence South 39 Degrees 33'35" West a distance of 149.16'.

Thence South 75 Degrees 15'23" West a distance of 196.47'.

Thence North 77 Degrees 11'45" West a distance of 225.61'.

Thence North 65 Degrees 53'52" West a distance of 208.15'.

Thence North 31 Degrees 14'21" West a distance of 356.72'.

Thence North 25 Degrees 36'56" West a distance of 809.57'.

Thence North 55 Degrees 05'51" West a distance of 262.15'.

Thence North 82 Degrees 28'03" West a distance of 244.11'.

Thence South 60 Degrees 10'08" West a distance of 164.84'.

Thence South 71 Degrees 43'56" West a distance of 542.33'.

Thence South 37 Degrees 24'19" West a distance of 214.01'.

Thence South 47 Degrees 21'12" West a distance of 206.65'.

Thence South 34 Degrees 23'22" West a distance of 545.31'.

Thence South 47 Degrees 29'23" West a distance of 162.79'.

Thence North 87 Degrees 13'47" West a distance of 310.36'.

Thence North 50 Degrees 11'40" West a distance of 117.15'.

Thence North 69 Degrees 46'30" West a distance of 202.48'.

Thence North 38 Degrees 59'28" West a distance of 135.09'.

Thence North 23 Degrees 47'35" West a distance of 240.44'.

Thence North 01 Degrees 38'12" West a distance of 280.10'.

Thence North 40 Degrees 36'05" East a distance of 92.20'.

Thence North 03 Degrees 04'44" East a distance of 181.92'.

Thence North 54 Degrees 46'57" West a distance of 1546.13' to the beginning of a tangent curve concave Southerly and having a radius of 1000.00'.

Thence Northwesterly and westerly along said curve through a central angle of 29 Degrees 44'48" a distance of 519.18'.

Thence tangent to said curve North 84 Degrees 31'45" West a distance of 492.72' to the Southeasterly corner of Parcel 7 of Parcel Map 38 as recorded in Book 4, Pages 12 through 13, records of Riverside County, California.

Thence Northeasterly to a turning point in the boundary line of The Pauba Rancho. Said point lies in the North 1/2 of Section 5, Township 8 South, Range 1 West.

Thence leaving said boundary line on a Northeasterly bearing to a point. Said point being an intersection of the East line of Section 8, Township 7 South, Range 1 West with the Northerly boundary line of the Pauba Rancho.

Thence Northerly along the East line of said Section 8 and the East line of Section 5, Township 7 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of said Section 5 and the North line of the East 1/2 of Section 6, Township 7 South, Range 1 West to the Northwest corner thereof.

Thence Northerly along the East line of the West 1/2 of Sections 31 and 30, Township 6 South, Range 1 West to the Northeast corner thereof.

Thence Easterly along the South line of the East 1/2 of Section 19, Township 6 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of said Section 19 to the Northeast corner thereof.

Thence Easterly along the South line of the West 1/2 of the West 1/2 of Section 17, Township 6 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the West 1/2 of the West 1/2 of said Section 17 to the Northeast corner thereof.

Thence Easterly along the South line of the East 1/2 of the West 1/2 of Section 8, Township 6 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the East 1/2 of the West 1/2 of said Section 8 to the Northeast corner thereof.

Thence Easterly along the South line of the Southeast 1/4 of Section 5, Township 6 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the Southeast 1/4 of said Section 5 to the Northeast corner thereof.

Thence Easterly along the South line of the Northwest 1/4 of Section 4, Township 6 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the Northwest 1/4 of said Section 4 to the Northeast corner thereof.

Thence Easterly along the South line of the Southeast 1/4 of Section 33 and the South line of the Southwest 1/4 of Section 34, Township 5 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the Southwest 1/4 of said Section 34 to the Northeast corner thereof.

Thence Easterly along the South line of the Northeast 1/4 of said Section 34 and the South line of the South 1/2 of the North 1/2 of Section 35, Township 5 South, Range 1 West to the Southeast corner thereof.

Thence Northerly along the East line of the South 1/2 of the North 1/2 of said Section 35 to the Northeast corner thereof.

Thence Easterly along the South line of the North 1/2 of the North 1/2 of Section 36, Township 5 South, Range 1 West and the South line of the North 1/2 of the North 1/2 of Section 31, Township 5 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the North 1/2 of the North 1/2 of said Section 31 to the Northeast corner thereof.

Thence Easterly along the South line of the South 1/2 of Section 29 and 28, Township 5 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the South 1/2 of said Section 28 to the Northeast corner thereof.

Thence Easterly along the South line of the Northwest 1/4 of Section 27, Township 5 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the Northwest 1/4 of said Section 27 to the Northeast corner thereof.

Thence Easterly along the South line of the East 1/2 of Section 22 and the South line of the West 1/2 of the West 1/2 of Section 23 to the Southeast corner thereof.

Thence Northerly along the East line of the West 1/2 of the West 1/2 of said Section 23 to the Northeast corner thereof.

Thence Westerly along the North line of the West 1/2 of the West 1/2 of said Section 23 to the Northwest corner thereof.

Thence Northerly along the East line of the East 1/2 of Section 15, Township 5 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the East 1/2 of said Section 15 to the Northwest corner thereof.

Thence Northerly along the East line of the West 1/2 of Sections 10 and 3, Township 5 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the West 1/2 of said Section 3 to the Northwest corner thereof.

Thence Northerly along the East line of the East 1/2 of Section 33, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the East 1/2 of said Section 33 to the Northwest corner thereof.

Thence Northerly along the East line of the Southwest 1/4 of Section 28, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the Southwest 1/4 of said Section 28 to the Northwest corner thereof.

Thence Northerly along the East line of the Northeast 1/4 of Section 29, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the Northeast 1/4 of said Section 29 to the Northwest corner thereof.

Thence Northerly along the East line of the Southwest 1/4 of Section 20, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the Southwest 1/4 of said Section 20 to the Northwest corner thereof.

Thence Northerly along the East line of the Northeast 1/4 of Section 19, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the Northeast 1/4 of said Section 19 to the Northwest corner thereof.

Thence Northerly along the East line of the Southwest 1/4 of Section 18, Township 4 South, Range 1 East to the Northeast corner thereof.

Thence Westerly along the North line of the Southwest 1/4 of said Section 18 and the North line of the Southeast 1/4 of Section 13, Township 4 South, Range 1 West to the Northeast corner thereof.

Thence Northerly along the East line of the Northwest 1/4 of said Section 13 to the Northeast corner thereof.

Thence Westerly along the North line of the Northwest 1/4 of said Section 13 to the Northwest corner thereof.

Thence Northerly along the East line of the South 1/2 of Section 11, Township 4 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of the South 1/2 of said Section 11 to the Northwest corner thereof.

Thence Northerly along the East line of the Northeast 1/4 of Section 10, Township 4 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of the Northeast 1/4 of said Section 10 to the Northwest corner thereof.

Thence Northerly along the East line of the Southwest 1/4 of Section 3, Township 4 South, Range 1 West to the Northeast corner thereof.

Thence Easterly along the South line of the South 1/2 of the Northeast 1/4 of said Section 3 to the Southeast corner thereof.

Thence Northerly along the East line of the South 1/2 of the Northeast 1/4 of said Section 3 to the Northeast corner thereof.

Thence Easterly along the South line of the North 1/2 of the North 1/2 of Sections 2 and 1, Township 4 South, Range 1 West and the South line of the Northwest 1/4 of the Northwest 1/4 of Section 6, Township 4 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the Northwest 1/4 of the Northwest 1/4 of said Section 6 to the Northeast corner thereof.

Thence Easterly along the South line of the West 1/2 and the South line of the West 1/2 of the East 1/2 of Section 31, Township 3 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of the West 1/2 of the East 1/2 of said Section 31 to the Northeast corner thereof.

Thence Easterly along the South line of the East 1/2 of the East 1/2 of Section 30, Township 3 South, Range 1 East to the Southeast corner thereof.

Thence Northerly along the East line of said Section 30 to the Northeast corner thereof.

Thence Westerly along the North line of said Section 30 to the Northwest corner thereof.

Thence Northerly along the East line of the North 1/2 of Section 25 and the East line of the South 1/2 of Section 24, Township 3 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of the South 1/2 of said Section 24 and the North line of the Southeast 1/4 of Section 23, Township 3 South, Range 1 West to the Northwest corner thereof.

Thence Southerly along the West line of the Southeast 1/4 of said Section 23 and the West line of the East 1/2 of Section 26 and the West line of the Northeast 1/4 of Section 35, Township 3 South, Range 1 West to the Southwest corner thereof.

Thence Westerly along the North line of the Southwest 1/4 of said Section 35 and the North line of the Southeast 1/4 and the North line of the East 1/2 of the Southwest 1/4 of Section 34, Township 3 South, Range 1 West to the Northwest corner thereof.

Thence Westerly along the North line of the West 1/2 of the Northwest 1/4 of Section 3 and the North line of Section 4, Township 3 South, Range 1 West to the Northwest corner thereof.

Thence Northerly along the East line of the Section 32, Township 3 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of said Section 32 to the Northwest corner thereof.

Thence Northerly along the East line of Section 30, Township 3 South, Range 1 West to the Northeast corner thereof.

Thence Westerly along the North line of the said Section 30 to the Northwest corner thereof.

Thence Northerly along the East line of the East 1/2 of Section 24, Township 3 South, Range 2 West to the Northeast corner thereof.

Thence Westerly along the North line of the East 1/2 of said Section 24 to the Northwest corner thereof.

Thence Northerly along the East line of the West 1/2 of Sections 13 and 12, Township 3 South, Range 2 West to the Northeast corner thereof.

Thence Westerly along the North line of the West 1/2 of said Section 12 and the North line of Sections 11 and 10, Township 3 South, Range 2 West to the Northwest corner thereof.

Thence Northerly along the East line of Section 4, Township 3 South, Range 2 West to the Northeast corner thereof.

Thence Westerly along the North line of said Section 4 to the Northwest corner thereof.

Thence Northerly along the East line of the South 1/2 of Section 32, Township 2 South, Range 2 West to the Northeast corner thereof.

Thence Westerly along the North line of the South 1/2 of said Section 32 of the Northwest corner thereof.

Thence Northerly along the East line of the North 1/2 of Section 31, Township 2 South, Range 2 West to the Northeast corner thereof.

Thence Westerly along the North line of said Section 31 to the Northwest corner thereof.

Thence Northerly along the East line of the Southeast 1/4 of Section 25, Township 2 South, Range 3 West to the Northeast corner thereof.

Thence Westerly along the North line of the Southeast 1/4 of said Section 25 to the Northwest corner thereof.

Thence Northerly along the East line of the Northwest 1/4 of said Section 25 to the Northeast corner thereof.

Thence Westerly along the North line of the Northwest 1/4 of said Section 25 to the Northwest corner thereof.

Thence Northerly along the East line of the South 1/2 of Section 23, Township 2 South, Range 3 West to the Northeast corner thereof.

Thence Westerly along the North line of the South 1/2 of said Section

23 to the Northwest corner thereof.

Thence Northerly along the East line of the North 1/2 of Section 22, Township 2 South, Range 3 West to the Northeast corner thereof.

Thence Westerly along the North line of the North 1/2 of said Section 22 to the Northwest corner thereof.

Thence Northerly along the East line of the South 1/2 of Section 16, Township 2 South, Range 3 West to the Northeast corner thereof.

Thence Westerly along the North line of the South 1/2 of said Section 16 to the Northwest corner thereof.

Thence Northerly along the East line of the North 1/2 of Section 17, Township 2 South, Range 3 West to the Northeast corner thereof. Said point also being a point in the Northerly boundary line of the County of Riverside, California.

Thence following said boundary line Westerly, Northerly and Westerly to the TRUE POINT OF BEGINNING.

Section 6. MITIGATION FEE. All applicants for development permits within the boundaries of the Fee Assessment Area who cannot satisfy mitigation requirements through on-site mitigation as determined through the environmental review process shall pay a Mitigation Fee of $500.00 per gross acre of the parcels proposed for development. However, for single family residential development, wherein all lots within the development are greater than one-half (1/2) acre in size, a Mitigation Fee of $250.00 per residential unit shall be paid; and for agricultural development which requires a development permit excluding the construction of single family residences in connection with said agricultural development, a Mitigation Fee of $100.00 or one percent (1%) of the valuation of the buildings to be constructed whichever is greater shall be paid, provided that at no time shall such fee exceed the amount

required to be paid if a fee of $500.00 per gross acre

were applied to the parcel proposed for agricultural development. The determination of value or valuation of an agricultural building shall be made by the building official.

Section 7. IMPOSITION OF FEE. No development permit for real property located within the boundaries of the Fee Assessment Area shall be issued or approved except upon the condition that on-site mitigation will be provided as determined through the environmental review process or the Mitigation Fee required by this ordinance be paid, and it is determined that said development will not jeopardize the implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat.

Section 8. PAYMENT OF FEE. The Mitigation Fee shall be paid upon issuance of a grading permit or a certificate of occupancy or upon final inspection, whichever occurs first. Payment of the Mitigation Fee shall satisfy County conditions of approval previously placed on development permits with regard to impact mitigation for the Stephens' Kangaroo Rat which have not been previously satisfied and no further review and approval pursuant to the provisions of this ordinance shall be required.

For a parcel subject to a surface mining permit, the Mitigation Fee due pursuant to the provisions of this ordinance shall be paid upon submission of an application for a special inspection permit under Ordinance No. 555 prior to the commencement of the mining operation or in the alternative, may be paid in increments upon submission of an application for a special inspection permit under Ordinance No. 555 prior to the commencement of each phase of the mining operation authorized by the surface mining permit. Each increment of payment shall be equal to $1,950.00 multiplied by the sum of (1) the total number of surface acres of land within the applicable phase pursuant to the surface mining permit and (2) the quotient which results from dividing the total number of acres of land covered by the surface mining permit and subject to this ordinance,

which are prohibited from disturbance or designated as setback or buffer areas pursuant to the surface mining permit, by the total number of approved phases. The total number of surface acres of land within each phase shall be determined through a physical survey prepared by a licensed surveyor or registered civil engineer.

Section 8.1. DEFERRAL OF PAYMENT OF THE FEE. At the option of the applicant for a grading permit, payment of the Mitigation Fee may be deferred until the issuance of the first building permit within the parcels proposed for development. Prior to issuance of the grading permit, an instrument shall be recorded by the applicant in the Office of the County Recorder of Riverside County which gives notice that prior to issuance of the first building permit, the entire Mitigation Fee as calculated prior to issuance of the grading permit shall be required to be paid.

Section 9. REDUCTION FOR NON-PROFIT ENTITIES. The fees required pursuant to Section 6 shall be reduced by 75 percent for non-profit entities. For purposes of this section, non-profit entities shall be defined as those entities identified in 26 U.S.C. Section 501(c)(3).

Section 10. EXEMPTIONS. For purposes of this ordinance, the following types of development shall not be required to pay the Mitigation Fee unless such development voluntarily participates in order to mitigate the disturbance of occupied Stephens' Kangaroo Rat habitat:

(a) Reconstruction of any structure damaged or destroyed by

fire or other natural causes;

(b) Rehabilitation or remodeling of existing structures, or

additions to existing structures;

(c) Development of any parcel for which the California

Department of Fish and Game has approved other mitigation procedures;

(d) Development of any parcel used by local, state or federal

entities for governmental purposes (i.e. public works, schools);

(e) Development of any parcel for which the Mitigation

Fee has been previously paid. However, in instances where the fee previously paid was the fee for single family residential development, wherein all lots within the development were greater than 1/2 gross acre in size, and the applicant for a development permit subsequently requests an increase in residential density or a change from a residential to a non-residential use, or in instances where the fee previously paid was the fee for agricultural development and the applicant for a development permit subsequently requests a change from an agricultural to a residential, commercial or industrial use, the fee shall be recalculated for the new density or use pursuant to the provisions of this ordinance. Any difference between the recalculated fee and the previously paid fee shall be required to be paid by the applicant.

(f) The construction of public utility transmission facilities where ground surface disturbance is minimal or where substantially all of the disturbed ground surface can be restored to its original condition as may be determined by the Planning Director. Said exemption shall not include substations, treatment facilities or pumping stations.

(g) Development of any parcel for which approval of a tentative tract map,

tentative parcel map, conditional use permit, public use permit, plot plan or surface mining permit is sought and said development will not require the construction of new or additional buildings or the grading or mining of the parcel which may be considered negligible or insignificant as determined by the Planning Director.

(h) Development of any parcel for which approval of an amendment, minor change or revision to a tentative tract map or tentative parcel map is sought; or development of any parcel for which approval of a request for substantial conformance or a revised conditional use permit, public use permit or plot plan is sought; or development of any parcel for which approval of an application for substantial conformance or a minor change to a surface mining permit is sought; and all grading permits necessary for the development of the parcel have previously been issued.

Section 11. REFUND.

(1) In the event that the fee provided for by the final Habitat Conservation Plan is less than the Mitigation Fee paid, the current property owner of record may apply for a partial refund of said fee. The amount of any refund due shall be determined by the County in its sole discretion after review of said application and shall be limited to the funds collected in excess of any amount received as a credit against the Habitat Conservation and Open Space Land Bank Fee pursuant to the provisions of Ordinance No. 659.

(2) If an applicant for a grading permit has paid the Mitigation Fee pursuant to the provisions of this ordinance and said fee would not have been required to be paid, had Subsections (m)(l) and (2) of Section 4 of Ordinance No. 663 been in effect at the time of payment, the applicant may apply for a refund of the Mitigation Fee paid. The Building Director shall make the determination as to whether the applicant is entitled to a refund of the fee paid and shall provide a refund, if appropriate.

Section 12. FEE ADJUSTMENT. The Board of Supervisors may periodically review and cause an adjustment to be made to the Mitigation Fee. By amendment to this ordinance, the fee may be increased or decreased to reflect changes in estimated costs for the development, preparation and implementation of a Habitat Conservation Plan. The adjustment in the fee may also reflect changes in estimated revenues received pursuant to this ordinance, as well as the availability or lack thereof of other funds with which to prepare and implement the Habitat Conservation Plan. Any adjustment in the fee shall be prospective only and shall become effective as of the date any such amendment is effective, provided however, that the amount of the Mitigation Fee for any development permit shall be the fee in effect at the time of payment.

Section 13. FEE ADMINISTRATION. All Mitigation Fees collected pursuant to the provisions of this ordinance shall be deposited into a Mitigation Fee Account. Funds in said account shall be expended solely for the development, preparation and implementation of a Habitat Conservation Plan for the Stephens' Kangaroo Rat, including the acquisition of habitat reserve sites, and for the application for a Section 10(a) permit under the Federal Endangered Species Act of 1973.

Section 14. VALIDITY. This ordinance and the various parts, sections and clauses thereof are hereby declared to be severable. If any part, sentence, paragraph, section or clause is adjudged unconstitutional or invalid, the remainder of this ordinance shall not be affected thereby. If any part, sentence, paragraph, section or clause of this ordinance, or its application to any person or entity is adjudged unconstitutional or invalid, such unconstitutionality or invalidity shall affect only such part, sentence, paragraph, section or clause of this ordinance, or person or entity; and shall not affect or impair any of the remaining provisions, parts, sentences, paragraphs, sections or clauses of this ordinance, or its application ot other persons or entities. The Board of Supervisors hereby declares that this ordinance would have been adopted had such unconstitutional or invalid part, sentence, paragraph, section or clause of this ordinance not been included herein; or had such person or entity been expressly exempted from the application of this ordinance.

Section 15. CREDIT. Where a development project is subject to the provisions of a Development Agreement entered into with the County pursuant to the provisions of Government Code Section 65864 et seq. and the project involves the construction of residential units, the Mitigation Fee required to be paid pursuant to the provisions of this

ordinance shall be reduced by $175.00 per residential unit.

This ordinance is an urgency measure and shall take effect immeditely upon its adoption. Ordinance No. 663 previously provided for termination of the Mitigation Fee upon issuance of a Section (10)a permit. It is anticipated that the Secretary of the Interior will approve an Interim Habitat Conservation Plan for the Stephens' Kangaroo Rat and issue a Section 10(a) permit during the last week of January or the week of February 1990. The Mitigation Fee is a required component of the Interim Habitat Conservation Plan for the Stephens' Kangaroo Rat. It is therefore necessary that this ordinance be adopted as an urgency measure in order for the Mitigation Fee to remain in effect and for the immediate preservation of the species and the public peace, health and safety. The Board declares that this ordinance shall be construed as a continuation of existing Ordinance No. 663 and not as a new enactment, except as to any provisions of this ordinance which are inconsistent therewith. Any development permit previously issued pursuant to Ordinance No. 663 and complying therewith shall be deemed to comply with this ordinance.

ADOPTED: 11-15-1988 (Eff. 1-14-1989)

663.1 (Eff. 12-13-1988)

663.2 (Eff. 10-28-1989)

663.3 (Eff. 4-20-1989)

663.4 (Eff. 12-28-1989)

663.5 (Eff. 1-2-1990)

663.6 (Eff. 11-27-1993)

(663.7 thru 663.9: not adopted)

663.10 (Eff. 9-05-1996)

County of Riverside General Plan
Lakeview/Nuevo Area Plan

COUNTY OF RIVERSIDE

Transportation and Land Management Agency
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October 2003
[GPA 775; BOS RSLN 2007-494; 12/18/07]

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Vision Summary

The County of Riverside General Plan and Area Plans have been shaped by the RCIP Vision. Following is a summary of the Vision Statement that includes many of the salient points brought forth by the residents of the Lakeview/Nuevo Area Plan as well as the rest of the County of Riverside. The RCIP Vision reflects the County of Riverside in the year 2020. So, "fast forward" yourself to 2020 and here is what it will be like.

"Riverside County is a family of special communities in a remarkable environmental setting."

It is now the year 2020. This year (incidentally, also a common reference to clear vision), is an appropriate time to check our community vision. Twenty years have passed since we took an entirely new look at how the County of Riverside was evolving. Based on what we saw, we set bold new directions for the future. As we now look around and move through the County, the results are notable. They could happen only in response to universal values strongly held by the people. Some of those values are:

- Real dedication to a sense of community;
- Appreciation for the diversity of our people and places within this expansive landscape;
- Belief in the value of participation by our people in shaping their communities;
- Confidence in the future and faith that our long term commitments will pay off;
- Willingness to innovate and learn from our experience;
- Dedication to the preservation of the environmental features that frame our communities;
- Respect for our differences and willingness to work toward their resolution;
- Commitment to quality development in partnership with those who help build our communities;
- The value of collaboration by our elected officials in conducting public business.

Those values and the plans they inspired have brought us a long way. True, much remains to be done. But our energies and resources are being invested in a unified direction, based on the common ground we have affirmed many times during the last 20 years. Perhaps our achievements will help you understand why we believe we are on the right path.

Population Growth

The almost doubling of our population in only 20 years has been a challenge, but we have met it by focusing that growth in areas that are well served by public facilities and services or where they can readily be provided. Major transportation corridors serve our communities and nearby open space preserves help define them. Our growth focus is on quality, not quantity. That allows the numbers to work for us and not against us. We enjoy an unprecedented clarity regarding what areas must not be developed and which ones should be developed. The resulting pattern of growth concentrates development in key areas rather than spreading it uniformly throughout the County. Land is used more efficiently, communities operate at more of a human scale, and transit systems to supplement the automobile are more feasible. In fact, the customized "Oasis" transit system now operates quite successfully in several cities and communities.

Our Communities and Neighborhoods

Our choices in the kind of community and neighborhood we prefer is almost unlimited here. From sophisticated urban villages to quality suburban neighborhoods to spacious rural enclaves, we have them all. If you are like most of us, you appreciate the quality schools and their programs that are the centerpiece of many of our neighborhoods. Not only have our older communities matured gracefully, but we boast several new communities as well. They prove that quality of life comes in many different forms.

Housing

We challenge you to seek a form of housing or a range in price that does not exist here. Our housing choices, from rural retreat to suburban neighborhood to exclusive custom estate are as broad as the demand for housing requires. Choices include entry level housing for first time buyers, apartments serving those not now in the buying market, seniors' housing, and world class golf communities. You will also find "smart" housing with the latest in built-in technology as well as refurbished historic units. The County of Riverside continues to draw people who are looking for a blend of quality and value.

Transportation

It is no secret that the distances in this vast County can be a bit daunting. Yet, our transportation system has

kept pace amazingly well with the growth in population, employment and tourism and their demands for mobility. We are perhaps proudest of the new and expanded transportation corridors that connect growth centers throughout the County. They do more than provide a way for people and goods to get where they need to be. Several major corridors have built-in expansion capability to accommodate varied forms of transit. These same corridors are designed with a high regard for the environment in mind, including providing for critical wildlife crossings so that our open spaces can sustain their habitat value.

Conservation and Open Space Resources

The often-impassioned conflicts regarding what lands to permanently preserve as open space are virtually resolved. The effort to consider our environmental resources, recreation needs, habitat systems, and visual heritage as one comprehensive, multi-purpose open space system has resulted in an unprecedented commitment to their preservation. In addition, these spaces help to form distinctive edges to many of our communities or clusters of communities. What is equally satisfying is that they were acquired in a variety of creative and equitable ways.

Air Quality

It may be hard to believe, but our air quality has actually improved slightly despite the phenomenal growth that has occurred in the region. Most of that growth, of course, has been in adjacent counties and we continue to import their pollutants. We are on the verge of a breakthrough in technical advances to reduce smog from cars and trucks. Not only that, but our expanded supply of jobs reduces the need for people here to commute as far as in the past.

Jobs and Economy

In proportion to population, our job growth is spectacular. Not only is our supply of jobs beyond any previously projected level, it has become quite diversified. Clusters of new industries have brought with them an array of jobs that attract skilled labor and executives alike. We are particularly enthusiastic about the linkages between our diversified business community and our educational system. Extensive vocational training programs, coordinated with businesses, are a constant source of opportunities for youth and those in our labor force who seek further improvement.

Agricultural Lands

Long a major foundation of our economy and our culture, agriculture remains a thriving part of the County of Riverside. While we have lost some agriculture to other forms of development, other lands have been brought into agricultural production. We are still a major agricultural force in California and compete successfully in the global agricultural market.

Educational System

Quality education, from pre-school through graduate programs, marks the County of Riverside as a place where educational priorities are firmly established. A myriad of partnerships involving private enterprise and cooperative programs between local governments and school districts are in place, making the educational system an integral part of our communities.

Plan Integration

The coordinated planning for multi-purpose open space systems, community based land use patterns, and a diversified transportation system has paid off handsomely. Integration of these major components of community building has resulted in a degree of certainty and clarity of direction not commonly achieved in the face of such dynamic change.

Financial Realities

From the very beginning, our vision included the practical consideration of how we would pay for the qualities our expectations demanded. Creative, yet practical financing programs provide the necessary leverage to achieve a high percentage of our aspirations expressed in the updated RCIP.

Intergovernmental Cooperation

As a result of the necessary coordination between the County, the cities and other governmental agencies brought about through the RCIP, a high degree of intergovernmental cooperation and even partnership is now commonplace. This way of doing public business has become a tradition and the County of Riverside is renowned for its many model intergovernmental programs.

Introduction

Throughout the Area Plan, special features have been included to enhance the readability and practicality of the information provided. Look for these elements:

❝

Quotes — quotations from the RCIP Vision or individuals involved or concerned with Riverside County.

★

Factoids — interesting information about Riverside County that is related to the element

☞

References — contacts and resources that can be consulted for additional information

📖

Definitions — clarification of terms and vocabulary used in certain policies or text.

📖

Unincorporated land is all land within the County that is not within an incorporated city or an Indian Nation. Generally, it is subject to policy direction and under the land use authority of the Board of Supervisors. However, it may also contain state and federal properties that lie outside of Board authority.

Lakeview/Nuevo, despite its dry, semi-desert climate, includes a segment of one of the major waterways in Riverside County: the San Jacinto River. The San Jacinto River is located in a valley pressed between the Bernasconi Hills and the Lakeview Mountains, which dominate the southeasterly half of the planning area. The Lakeview/Nuevo Area Plan is surrounded by mountain ranges in virtually every direction that create the sense of expanse so predominant in Riverside County.

The Lakeview/Nuevo Area Plan doesn't just provide a description of the location, physical characteristics, and special features here. It contains a Land Use Plan, statistical summaries, policies, and accompanying exhibits that allow anyone interested in the future of this distinctive valley to understand the physical, environmental, and regulatory characteristics that make this such a unique area. Background information also provides insights that help in understanding the issues that require special focus here and the reasons for the more localized policy direction found in this document.

Each section of this plan addresses critical issues facing Lakeview/Nuevo. Perhaps a description of these sections will help in understanding the organization of the Area Plan as well as appreciating the comprehensive nature of the planning process that led to it. The Location section explains where the planning area fits with what is around it and how it relates to the cities that impact it. Physical features are described in a section that highlights the planning area's communities, surrounding environment and natural resources. This leads naturally to the Land Use Plan section, which describes the land use system guiding development at both the countywide and area plan levels.

While a number of these designations reflect the unique features found only in the Lakeview/Nuevo planning area, a number of special policies are still necessary to address unique situations. The Policy Areas section presents these policies. Land use related issues are addressed in the Land Use section. The Area Plan also describes relevant transportation issues, routes, and modes of transportation in the Circulation section. The key to understanding our valued open space network is described in the Multipurpose Open Space section. There are both natural and man made hazards to consider, and they are spelled out in the Hazards section.

The Lakeview/Nuevo planning area contains only unincorporated land. The incorporated cities of Perris and San Jacinto abut the planning area on the western and eastern borders. Coordination with these cities was a critical component in shaping the Area Plan.

A Special Note on Implementing the Vision

The preface to the Lakeview/Nuevo Area Plan is a summary version of the Riverside County Vision. That summary is, in turn, simply an overview of a much more extensive and detailed Vision of Riverside County two decades or more into the future. This area plan, as part of the Riverside County General Plan, is one of the major devices for making the Vision a reality.

No two area plans are the same. Each represents a unique portion of the incredibly diverse place known as Riverside County. While many share certain common features, each of the plans reflects the special characteristics that define its area's unique identity. These features include not only physical qualities, but also the particular boundaries used to define them, the stage of development they have reached, the dynamics of change expected to affect them, and the numerous decisions that shape development and conservation in each locale. That is why the Vision cannot and should not be reflected uniformly.

Policies at the General Plan and Area Plan levels implement the Riverside County Vision in a range of subject areas as diverse as the scope of the Vision itself. The land use pattern contained in this area plan is a further expression of the Vision as it is shaped to fit the terrain and the conditions in the Lakeview/Nuevo planning area.

To illustrate how the Vision has shaped this area plan, the following highlights reflect certain strategies that link the Vision to the land. This is not a comprehensive enumeration; rather, it emphasizes a few of the most powerful and physically tangible examples.

Community Centers. This method of concentrating development to achieve community focal points, stimulate a mix of activities, promote economic development, achieve more efficient use of land, create a transit friendly and walkable environment, and offer a broader mix of housing choices is a major device for implementing the Vision. The Community Center designation has been given to two areas, each encompassing portions of two adjacent specific plans westerly of the San Jacinto River. These areas are considered Village Centers because they are intended to serve the surrounding areas and act as a focal point for the community. The surrounding land uses, such as Medium Density Residential and Commercial Retail, complement the intended pedestrian-friendly atmosphere by creating a human-scaled environment.

San Jacinto River. The San Jacinto River, like other waterways in Riverside County, is seasonal and is normally dry during the summer months. However, the San Jacinto River is one of the most significant waterways in western Riverside County. In addition to offering the obvious benefits to drainage, flood control, and water conservation, the San Jacinto River is an important corridor for species migration and habitat preservation. A channelization project is planned for the San Jacinto River that will balance the need for protection against flood hazards with the need for a healthy ecosystem.

Environmental Setting. The Lakeview Mountains and the Bernasconi Hills are both a part of the Lakeview/Nuevo planning area. Their distinct rock outcroppings and rugged character provide a visual identity for the planning area. Both ranges provide some recreational opportunities and an area for some wildlife habitat.

It is important to note that the data in this area plan is current as of October 7, 2003. Any General Plan amendments approved subsequent to that date are not reflected in this area plan and must be supported by their own environmental documentation. A process for incorporating any applicable portion of these amendments into this area plan is part of the General Plan Implementation Program.

Location

The central location of the Lakeview/Nuevo area is clearly evident in Figure 1, Location. This planning area is surrounded by four area plans that constitute a major portion of western Riverside County. Starting to the south and moving clockwise, we find the adjacent Harvest Valley/ Winchester, Mead Valley, Reche Canyon/Badlands and San Jacinto Valley Area Plans. The City of Perris borders this area plan on the west and the City of San Jacinto borders this area plan on the east, while Lake Perris is located immediately to the north.

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Figure 1: Location

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Features

The Riverside County Vision builds heavily on the value of its remarkable environmental setting. That applies here as well. The central location of Lakeview/Nuevo affords an ample view of the mountain vistas that dominate the remarkable setting of the western County. These defining characteristics are shown on Figure 2, Physical Features, and further described below. This section describes the setting, features, and functions that are unique to the Lakeview/Nuevo planning area.

An overview of Lakeview/Nuevo planning area

SETTING

The Lakeview/Nuevo planning area contains a wide valley formed by the San Jacinto River. This valley contains agricultural land as well as much of the development within the planning area. The Bernasconi Hills create a border in the northwest, while the Lakeview Mountains form the eastern boundary of the planning area. The rural community of Juniper Flats is located easterly of Nuevo, close to the Lakeview Mountains. The San Jacinto Wildlife Area is located at the foot of the Bernasconi Hills and forms the northern boundary of the planning area. The Colorado River Aqueduct runs underground in an east-to-west orientation through the northern portion of the planning area.

UNIQUE FEATURES

Lakeview Mountains

The Lakeview Mountains define the bulk of the central and southeastern portion of the Lakeview/Nuevo planning area and create a scenic backdrop for the planning area. The mountains, which are dotted with picturesque rock outcroppings, gently slope west to the valley that contains the San Jacinto River. Juniper Flats, a small rural area, is located close to the Lakeview Mountains.

A view of the Bernasconi Hills.

Bernasconi Hills

The Bernasconi Hills are located within the Lake Perris State Recreation Area. A portion of these hills are located in the northwest corner of the Lakeview/Nuevo planning area. The Bernasconi Hills are barren, steep, and rugged peaks that are a stark contrast to Lake Perris, which is located immediately north of this planning area. The hills and lake offer opportunities for such outdoor recreational activities as camping, hunting, water sports, fishing, picnicking, and biking.

Watercourses are the corridors of streams, rivers, and creeks, whether permanent or seasonal, and whether natural or channelized.

San Jacinto River

The San Jacinto River flows westward from Lake Hemet in the Santa Rosa Mountains, through Canyon Lake, and then to Lake Elsinore. It flows through the central portion of this planning area and has a profound influence over its land use patterns. Currently, the river is a semi-natural watercourse that is normally dry. Through the planning area, the river is partially channelized with

earthen levees. The lands adjacent to the river are currently vacant or agricultural in nature.

Local serving commercial center in Lakeview

Dairies help characterize the community of Lakeview.

Currently, there is a proposal to channelize the river with earthen berms from the Ramona Expressway to Interstate 215 to reduce flood threats and facilitate future development of adjacent properties. The project is sponsored by property owners in the area and is being prepared by the County of Riverside Flood Control and Water Conservation District. If this project is approved by Federal agencies, the flood threat posed by this river will be significantly reduced. The broad valley in which this river sits may then be developed per the Area Plan Land Use Map. It is assumed that the channelization project will be approved, and it is included in the Area Plan Land Use Map. While the location and width of the channel has been decided, the Open Space-Conservation Habitat areas required to facilitate wildlife movement and biological diversity are not precisely known. Therefore, the Land Use Plan is subject to changes to reflect the final configuration of the habitat conservation areas.

San Jacinto Wildlife Area

The San Jacinto Wildlife Area is nestled at the base of the Bernasconi Hills in the northwestern portion of the planning area. While the San Jacinto Wildlife Area is comprised of over 5,945 acres of restored natural lands, including wetlands, only a portion of the Wildlife Area is located within the Lakeview/Nuevo planning area. Because of the wetlands within the reserve, a large array of bird species, including birds of prey and waterfowl, migrate to this area every year.

Majestic palm trees line Hansen Avenue in Lakeview

UNIQUE COMMUNITIES

Lakeview

The community of Lakeview, in the northeast corner of the planning area, is characterized by predominantly residential and agricultural uses. Dairies and agricultural uses dominate the land north of the Ramona Expressway, and residential/equestrian uses are found south of the expressway. The residential uses in Lakeview are rural in nature and typically are located on lots between one-half and two acres in size. There is a small cluster of commercial uses at the intersection of the Ramona Expressway and Hansen Avenue, and a prominent warehouse distribution center located on the eastern edge of the community. Hansen Avenue, which runs north-south, is the major roadway in Lakeview, and is lined with tall, majestic palm trees.

A ballfield, above, and church are part of the focus for the community of Nuevo.

Figure 2: Physical Features

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Nuevo

The Nuview Elementary School.

The community of Nuevo is located between the San Jacinto River on the west and the foothills of the Lakeview Mountains on the east. Nuevo Road and Lakeview Avenue are the major streets within this community. Nuevo is a rural community with an equestrian focus. While there are some smaller parcels, the vast majority of lots are typically between one-half and two acres in size. The community of Nuevo is anchored by a small neighborhood village located at the intersection of Lakeview Avenue and Nuevo Road. This village includes local serving commercial uses, a school, a ballfield, and a church. Surrounding the village are some of the smaller residential lots in the area. Community facilities, including a fire station, post office, and school, and a number of private equestrian facilities, are located in the area north of Nuevo Road.

Juniper Flats

Juniper Flats is a rural residential community tucked away close to the Lakeview Mountains. This small rural, equestrian-oriented community consists of single family homes on large lots. Juniper Flats Road, a two-lane road, provides the only all weather access through this community.

The Lakeview Mountains provide a backdrop for the community.

Boulder Rise

Nestled on the western face of the Lakeview Mountains is the small rural community of Boulder Rise. Boulder Rise is located roughly in the area east of Menifee Road and south of San Jacinto Avenue. This area is characterized by the large lot residential uses set among numerous boulder outcroppings.

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Land Use Plan

> *Each of our rural areas and communities has a special character that distinguishes them from urban areas and from each other. They benefit from some conveniences such as small-scale local commercial services and all-weather access roads, yet maintain an unhurried, uncrowded lifestyle.*
>
> *-RCIP Vision*

The Lakeview/Nuevo Land Use Plan focuses on preserving the unique features in the Lakeview/Nuevo planning area and, at the same time, guides the accommodation of future growth. To accomplish this, more detailed land use designations are applied than for the countywide General Plan.

The Lakeview/Nuevo Land Use Plan, Figure 3, depicts the geographic distribution of land uses within this planning area. The Area Plan is organized around 30 Area Plan land use designations and 5 overlays. These area plan land uses derive from, and provide more detailed direction than, the five General Plan Foundation Component land uses: Open Space, Agriculture, Rural, Rural Community, and Community Development. Table 1, Land Use Designations Summary, outlines the development intensity, density, typical allowable land uses, and general characteristics for each of the Area Plan land use designations within each Foundation Component. The General Plan Land Use Element contains more detailed descriptions and policies for the Foundation Components and each of the Area Plan land use designations.

Many factors led to the designation of land use patterns. Among the most influential were the Riverside County Vision and Planning Principles, both of which focused, in part, on preferred patterns of development within the County; the Community and Environmental Transportation Acceptability Process (CETAP) that focused on major transportation corridors; the Multiple Species Habitat Conservation Plan (MSHCP) that focused on opportunities and strategies for significant open space and habitat preservation; established patterns of existing uses and parcel configurations; current zoning; and the oral and written testimony of County residents, property owners, and representatives of cities and organizations at the many Planning Commission and Board of Supervisors hearings. The result of these considerations is shown in Figure 3, Land Use Plan, which portrays the location and extent of proposed land uses. Table 2, Statistical Summary of Lakeview/Nuevo Area Plan, provides a summary of the projected development capacity of the plan if all uses are built as proposed. This table includes dwelling unit, population, and employment capacities.

LAND USE CONCEPT

The Lakeview/Nuevo Land Use Plan provides for significant growth in its western half, near the City of Perris. Residential density gradually decreases east of the San Jacinto River until the Lakeview Mountains, where the Mountainous and Rural land use designations reflect the area's rugged nature. A series of adopted specific plans, concentrated west of the San Jacinto River, have influenced land use patterns and residential densities in this area. East of the San Jacinto River, the Land Use Plan generally reflects a pattern of predominantly low density residential character with pockets of commercial uses interspersed within the communities of Lakeview and Nuevo. Continuing east past Lakeview Avenue, the land use pattern provides primarily for Rural Community-Low Density Residential land uses with clusters of Medium Density Residential neighborhoods, Public Facilities, and Commercial Retail designations.

Community Centers

For more information on Community Center types, please refer to the Land Use Policies within this area plan and the Land Use Designations section of the General Plan Land Use Element.

Two Community Centers are designated in the Lakeview/Nuevo planning area. The first Community Center has been identified in the valley adjacent to the Bernasconi Hills along the Ramona Expressway. The second Community Center is located west of the San Jacinto River on Nuevo Road. These Community Center designations would accommodate Village Center type development, which includes pedestrian oriented "downtowns" with uses that serve the nearby residential neighborhoods. Some typical uses found in a Village Center include residential units, retail commercial, office, public facilities, parks, museums, public services, employment, and entertainment uses.

Both of these Community Center designations include portions of two adjacent approved Specific Plans, and are rooted in Planning Areas identified as mixed use planning areas or areas that could accommodate either commercial or higher intensity residential development.

Figure 3: Land Use Plan

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Table 1: Land Use Designations Summary

Foundation Component	Area Plan Land Use Designation	Building Intensity Range (du/ac or FAR) [1, 2,3]	Notes
Agriculture	Agriculture (AG)	10 ac min.	• Agricultural land including row crops, groves, nurseries, dairies, poultry farms, processing plants, and other related uses. • One single-family residence allowed per 10 acres except as otherwise specified by a policy or an overlay.
Rural	Rural Residential (RR)	5 ac min.	• Single-family residences with a minimum lot size of 5 acres. • Allows limited animal keeping and agricultural uses, recreational uses, compatible resource development (not including the commercial extraction of mineral resources) and associated uses and governmental uses.
	Rural Mountainous (RM)	10 ac min.	• Single-family residential uses with a minimum lot size of 10 acres. • Areas of at least 10 acres where a minimum of 70% of the area has slopes of 25% or greater. • Allows limited animal keeping, agriculture, recreational uses, compatible resource development (which may include the commercial extraction of mineral resources with approval of a SMP) and associated uses and governmental uses.
	Rural Desert (RD)	10 ac min.	• Single-family residential uses with a minimum lot size of 10 acres. • Allows limited animal keeping, agriculture, recreational, renewable energy uses including solar, geothermal and wind energy uses, as well as associated uses required to develop and operate these renewable energy sources, compatible resource development (which may include the commercial extraction of mineral resources with approval of SMP), and governmental and utility uses.
Rural Community	Estate Density Residential (RC-EDR)	2 ac min.	• Single-family detached residences on large parcels of 2 to 5 acres. • Limited agriculture, intensive equestrian and animal keeping uses are expected and encouraged.
	Very Low Density Residential (RC-VLDR)	1 ac min.	• Single-family detached residences on large parcels of 1 to 2 acres. • Limited agriculture, intensive equestrian and animal keeping uses are expected and encouraged.
	Low Density Residential (RC-LDR)	½ ac min.	• Single-family detached residences on large parcels of ½ to 1 acre. • Limited agriculture, intensive equestrian and animal keeping uses are expected and encouraged.
Open Space	Conservation (C)	N/A	• The protection of open space for natural hazard protection, and natural and scenic resource preservation. Existing agriculture is permitted.
	Conservation Habitat (CH)	N/A	• Applies to public and private lands conserved and managed in accordance with adopted Multi Species Habitat and other Conservation Plans.
	Water (W)	N/A	• Includes bodies of water and natural or artificial drainage corridors. • Extraction of mineral resources subject to SMP may be permissible provided that flooding hazards are addressed and long term habitat and riparian values are maintained.
	Recreation (R)	N/A	• Recreational uses including parks, trails, athletic fields, and golf courses. • Neighborhood parks are permitted within residential land uses.
	Rural (RUR)	20 ac min.	• One single-family residence allowed per 20 acres. • Extraction of mineral resources subject to SMP may be permissible provided that scenic resources and views are protected.
	Mineral Resources (MR)	N/A	• Mineral extraction and processing facilities. • Areas held in reserve for future mineral extraction and processing.
Community Development	Estate Density Residential (EDR)	2 ac min.	• Single-family detached residences on large parcels of 2 to 5 acres. • Limited agriculture and animal keeping is permitted, however, intensive animal keeping is discouraged.
	Very Low Density Residential (VLDR)	1 ac min.	• Single-family detached residences on large parcels of 1 to 2 acres. • Limited agriculture and animal keeping is permitted, however, intensive animal keeping is discouraged.
	Low Density Residential (LDR)	½ ac min.	• Single-family detached residences on large parcels of ½ to 1 acre. • Limited agriculture and animal keeping is permitted, however, intensive animal keeping is discouraged.
	Medium Density Residential (MDR)	2 - 5 du/ac	• Single-family detached and attached residences with a density range of 2 to 5 dwelling units per acre. • Limited agriculture and animal keeping is permitted, however, intensive animal keeping is discouraged. • Lot sizes range from 5,500 to 20,000 sq. ft., typical 7,200 sq. ft. lots allowed.
	Medium High Density Residential (MHDR)	5 - 8 du/ac	• Single-family attached and detached residences with a density range of 5 to 8 dwelling units per acre. • Lot sizes range from 4,000 to 6,500 sq. ft.
	High Density Residential (HDR)	8 - 14 du/ac	• Single-family attached and detached residences, including townhouses, stacked flats, courtyard homes, patio homes, townhouses, and zero lot line homes .
	Very High Density Residential (VHDR)	14 - 20 du/ac	• Single-family attached residences and multi-family dwellings.

Table 1: Land Use Designations Summary

Foundation Component	Area Plan Land Use Designation	Building Intensity Range (du/ac or FAR) [1, 2,3]	Notes
Community Development	Highest Density Residential (HHDR)	20+ du/ac	• Multi-family dwellings, includes apartments and condominium. • Multi-storied (3+) structures are allowed.
	Commercial Retail (CR)	0.20 - 0.35 FAR	• Local and regional serving retail and service uses. The amount of land designated for Commercial Retail exceeds that amount anticipated to be necessary to serve the County's population at build out. Once build out of Commercial Retail reaches the 40% level within any Area Plan, additional studies will be required before CR development beyond the 40 % will be permitted.
	Commercial Tourist (CT)	0.20 - 0.35 FAR	• Tourist related commercial including hotels, golf courses, and recreation/amusement activities.
	Commercial Office (CO)	0.35 - 1.0 FAR	• Variety of office related uses including financial, legal, insurance and other office services.
	Light Industrial (LI)	0.25 - 0.60 FAR	• Industrial and related uses including warehousing/distribution, assembly and light manufacturing, repair facilities, and supporting retail uses .
	Heavy Industrial (HI)	0.15 - 0.50 FAR	• More intense industrial activities that generate significant impacts such as excessive noise, dust, and other nuisances.
	Business Park (BP)	0.25 - 0.60 FAR	• Employee intensive uses, including research & development, technology centers, corporate offices, "clean" industry and supporting retail uses.
	Public Facilities (PF)	≤ 0.60 FAR	• Civic uses such as County administrative buildings and schools.
	Community Center (CC)	5 - 40 du/ac 0.10 - 0.3 FAR	• Includes combination of small-lot single family residences, multi-family residences, commercial retail, office, business park uses, civic uses, transit facilities, and recreational open space within a unified planned development area. This also includes Community Centers in adopted specific plans.
	Mixed Use Planning Area		• This designation is applied to areas outside of Community Centers. The intent of the designation is not to identify a particular mixture or intensity of land uses, but to designate areas where a mixture of residential, commercial, office, entertainment, educational, and/or recreational uses, or other uses is planned.

Overlays and Policy Areas
Overlays and Policy Areas are not considered a Foundation Component. Overlays and Policy Areas address local conditions and can be applied in any Foundation Component. The specific details and development characteristics of each Policy Area and Overlay are contained in the appropriate Area Plan.

Community Development Overlay (CDO)	• Allows Community Development land use designations to be applied through General Plan Amendments within specified areas within Rural, Rural Community, Agriculture, or Open Space Foundation Component areas. Specific policies related to each Community Development Overlay are contained in the appropriate Area Plan.
Community Center Overlay (CCO)	• Allows for either a Community Center or the underlying designated land use to be developed.
Rural Village Overlay (RVO) and Rural Village Overlay Study Area (RVOSA)	• The Rural Village Overlay allows a concentration of residential and local-serving commercial uses within areas of rural character. • The Rural Village Overlay allows the uses and maximum densities/intensities of the Medium Density Residential and Medium High Density Residential and Commercial Retail land use designations. • In some rural village areas, identified as Rural Village Overlay Study Areas, the final boundaries will be determined at a later date during the consistency zoning program. (The consistency zoning program is the process of bringing current zoning into consistency with the adopted general plan.)
Watercourse Overlay (WCO)	• The Watercourse Overlay designates watercourses, including natural or controlled stream channels and flood control channels.
Specific Community Development Designation Overlay	• Permits flexibility in land uses designations to account for local conditions. Consult the applicable Area Plan text for details.
Policy Areas	• Policy Areas are specific geographic districts that contain unique characteristics that merit detailed attention and focused policies. These policies may impact the underlying land use designations. At the Area Plan level, Policy Areas accommodate several locally specific designations, such as the Limonite Policy Area (Jurupa Area Plan), or the Scott Road Policy Area (Sun City/Menifee Valley Area Plan). Consult the applicable Area Plan text for details.

NOTES:
[1] FAR = Floor Area Ratio, which is the measurement of the amount of non-residential building square footage in relation to the size of the lot. Du/ac = dwelling units per acre, which is the measurement of the amount of residential units in a given acre.
[2] The building intensity range noted is exclusive, that is the range noted provides a minimum and maximum building intensity.
[3] Clustering is encouraged in all residential designations. The allowable density of a particular land use designation may be clustered in one portion of the site in smaller lots, as long as the ratio of dwelling units/area remains within the allowable density range associated with the designation. The rest of the site would then be preserved as open space or a use compatible with open space (e.g., agriculture, pasture or wildlife habitat). Within the Rural Foundation Component and Rural Designation of the Open Space Foundation Component, the allowable density may be clustered as long as no lot is smaller than ½ acre. This ½ acre minimum lot size also applies to the Rural Community Development Foundation Component. However, for sites adjacent to Community Development Foundation Component areas, 10,000 square foot minimum lots are allowed. The clustered areas would be a mix of 10,000 and ½ acre lots. In such cases, larger lots or open space would be required near the project boundary with Rural Community and Rural Foundation Component areas.

~~Table 2: Statistical Summary of Lakeview/Nuevo Area Plan~~

~~Base Land Use Designations [a, b]~~				
~~Land Use Designation~~	~~Acreage~~	~~Dwelling Units~~	~~Population~~	~~Employment~~
~~Agriculture Foundation Component~~				
~~Agriculture (AG)~~	~~2,031~~	~~102~~	~~306~~	~~102~~
~~*Agriculture Total*~~	~~*2,031*~~	~~*102*~~	~~*306*~~	~~*102*~~
~~Rural Foundation Component~~				
~~Rural Residential (RR)~~	~~4,873~~	~~731~~	~~2,200~~	~~NA~~
~~Rural Mountainous (RM)~~	~~4,122~~	~~206~~	~~620~~	~~NA~~
~~Rural Desert (RD)~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~*Rural Total*~~	~~*8,995*~~	~~*937*~~	~~*2,820*~~	~~*0*~~
~~Rural Community Foundation Component~~				
~~Estate Density Residential (RC-EDR)~~	~~1,044~~	~~365~~	~~1,100~~	~~NA~~
~~Very Low Density Residential (RC-VLDR)~~	~~2,091~~	~~1,045~~	~~3,147~~	~~NA~~
~~Low Density Residential (RC-LDR)~~	~~3,009~~	~~3,611~~	~~10,869~~	~~NA~~
~~*Rural Community Total*~~	~~*6,144*~~	~~*5,021*~~	~~*15,116*~~	~~*0*~~
~~Open Space Foundation Component~~				
~~Open Space-Conservation (OS-C)~~	~~794~~	~~NA~~	~~NA~~	~~NA~~
~~Open Space-Conservation Habitat (OS-CH)~~	~~947~~	~~NA~~	~~NA~~	~~NA~~
~~Open Space-Water (OS-W)~~	~~212~~	~~NA~~	~~NA~~	~~NA~~
~~Open Space-Recreation (OS-R)~~	~~100~~	~~NA~~	~~NA~~	~~15~~
~~Open Space-Rural (OS-RUR)~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~Open Space-Mineral Resources (OS-MIN)~~	~~148~~	~~NA~~	~~NA~~	~~4~~
~~*Open Space Total*~~	~~*2,201*~~	~~*0*~~	~~*0*~~	~~*19*~~
~~Community Development Foundation Component~~				
~~Estate Density Residential (EDR)~~	~~126~~	~~44~~	~~133~~	~~NA~~
~~Very Low Density Residential (VLDR)~~	~~494~~	~~247~~	~~744~~	~~NA~~
~~Low Density Residential (LDR)~~	~~1,031~~	~~1,237~~	~~3,722~~	~~NA~~
~~Medium Density Residential (MDR)~~	~~3,388~~	~~11,856~~	~~35,687~~	~~NA~~
~~Medium High Density Residential (MHDR)~~	~~370~~	~~2,408~~	~~7,247~~	~~NA~~
~~High Density Residential (HDR)~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~Very High Density Residential (VHDR)~~	~~66~~	~~1,127~~	~~3,393~~	~~NA~~
~~Highest Density Residential (HHDR)~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~Commercial Retail (CR) [c]~~	~~448~~	~~941~~	~~2,831~~	~~2,692~~
~~Commercial Tourist (CT)~~	~~8~~	~~NA~~	~~NA~~	~~136~~
~~Commercial Office (CO)~~	~~0~~	~~NA~~	~~NA~~	~~0~~
~~Light Industrial (LI)~~	~~1,141~~	~~NA~~	~~NA~~	~~14,664~~
~~Heavy Industrial (HI)~~	~~8~~	~~NA~~	~~NA~~	~~73~~
~~Business Park (BP)~~	~~25~~	~~NA~~	~~NA~~	~~412~~
~~Public Facilities (PF)~~	~~174~~	~~NA~~	~~NA~~	~~47~~
~~Community Center (CC)~~	~~131~~	~~764~~	~~2,299~~	~~1,021~~
~~*Community Development Total*~~	~~*7,410*~~	~~*18,624*~~	~~*56,056*~~	~~*19,045*~~
~~Other Land Uses, Overlays and Policy Areas [d]~~				
~~Rural Community-Estate Density Residential 2~~	~~406~~	~~142~~	~~428~~	~~NA~~
~~Glen Eden Policy Area~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~Medium Density Residential (2-4 du/ac)~~	~~558~~	~~1,952~~	~~5,876~~	~~NA~~
~~Vista Santa Rosa Policy Area~~	~~0~~	~~0~~	~~0~~	~~NA~~
~~Rural Village Overlay~~	~~0~~	~~0~~	~~0~~	~~0~~
~~Rural Village Overlay Study Area~~	~~0~~	~~0~~	~~0~~	~~0~~
~~Community Center Overlay~~	~~0~~	~~0~~	~~0~~	~~0~~

~~Table 2: Statistical Summary of Lakeview/Nuevo Area Plan~~

~~Community Retail Overlay~~	~~0~~	~~0~~	~~0~~	~~0~~
~~***Other, Overlays and Policy Areas Total***~~	~~***964***~~	~~***2,094***~~	~~***6,304***~~	~~***0***~~
~~**BUILDOUT PROJECTIONS TOTAL**~~	~~**27,745**~~	~~**26,778**~~	~~**80,602**~~	~~**19,166**~~
~~**Other**~~				
~~City~~	~~0~~			
~~Indian Lands~~	~~0~~			
~~Freeways~~	~~0~~			
~~***Other Total***~~	~~***0***~~			
~~**AREA PLAN TOTAL ACRES**~~	~~**27,745**~~			

~~**Overlays and Policy Areas**~~	
~~The following provides the acreages for each Overlay and/or Policy Area within the Area Plan. Overlays and Policy Areas are districts that contain unique standards tailored to a local geographic area. In some instances, these Overlays and Policy Areas alter the allowable uses and maximum densities/intensities within the particular district. In these cases, the buildout potential resulting from the application of the Overlays and Policy Areas has been accounted for in the Base Land Use Designations above. Please see the Area Plan for a description of the unique features contained within each Overlay or Policy Area.~~	
	~~**Acreage**~~
~~**Overlays**~~	
~~Mixed Use Planning Area~~	~~0~~
~~Community Development Overlay~~	~~844~~
~~**Specific Community Development Designation Overlays and Policy Areas**~~	
~~San Jacinto River Project~~	~~2,015~~
~~2-4 DU/AC~~	~~558~~
~~San Jacinto River/2-4 DU~~	~~314~~
~~Winchester Newport~~	~~0~~
~~***Total***~~	~~***3,731***~~

~~NOTES:~~

~~a. Statistics reflect the midpoint for the theoretical range of build-out projections. Reference Appendix E of the General Plan for assumptions and methodology.~~

~~b. Overlay figures reflect the additional dwelling units, population and employment permissible under this category.~~

~~c. It is assumed that Commercial Retail designation will buildout at 40% Commercial Retail and 60% Medium Density Residential.~~

~~d. The acreage for the Overlays and Policy Areas have not been included in the acreage totals to avoid double counting.~~

Table 2: Statistical Summary of Lakeview/Nuevo Area Plan

LAND USE	AREA	STATISTICAL CALCULATIONS[1]		
	Acreage	Dwelling Units	Population	Employment
BASE LAND USE PLANNING AREAS				
BASE LAND USE DESIGNATIONS BY FOUNDATION COMPONENTS				
Agriculture Foundation Component				
Agriculture (AG)	2,794	140	420	140
Agriculture Foundation Component Sub-Total	***2,794***	***140***	***420***	***140***
Rural Foundation Component				
Rural Residential (RR)	5,331	800	2,407	NA
Rural Mountainous (RM)	4,150	208	625	NA
Rural Desert (RD)	0	0	0	NA
Rural Foundation Component Sub-Total	***9,481***	***1,008***	***3,032***	***0***
Rural Community Foundation Component				
Estate Density Residential (RC-EDR)	1,044	365	1,100	NA
Very Low Density Residential (RC-VLDR)	2,091	1,568	4,720	NA
Low Density Residential (RC-LDR)	3,009	4,514	13,586	NA
Rural Community Foundation Component Sub-Total	***6,144***	***6,447***	***19,406***	***0***
Open Space Foundation Component				
Open Space-Conservation (OS-C)	804	NA	NA	NA
Open Space-Conservation Habitat (OS-CH)	947	NA	NA	NA
Open Space-Water (OS-W)	212	NA	NA	NA
Open Space-Recreation (OS-R)	100	NA	NA	15
Open Space-Rural (OS-RUR)	0	0	0	NA
Open Space-Mineral Resources (OS-MIN)	148	NA	NA	4
Open Space Foundation Component Sub-Total	***2,211***	***0***	***0***	***19***
Community Development Foundation Component				
Estate Density Residential (EDR)	0	0	0	NA
Very Low Density Residential (VLDR)	366	275	826	NA
Low Density Residential (LDR)	895	1,343	4,041	NA
Medium Density Residential (MDR)	3,935	13,773	41,455	NA
Medium High Density Residential (MHDR)	370	2,405	7,239	NA
High Density Residential (HDR)	0	0	0	NA
Very High Density Residential (VHDR)	66	1,122	3,377	NA
Highest Density Residential (HHDR)	0	0	0	NA
Commercial Retail (CR) [2]	415	NA	NA	6,237
Commercial Tourist (CT)	0	NA	NA	0
Commercial Office (CO)	0	NA	NA	0
Light Industrial (LI)	761	NA	NA	10,395
Heavy Industrial (HI)	0	NA	NA	0
Business Park (BP)	0	NA	NA	0
Public Facilities (PF)	174	NA	NA	47
Community Center (CC) [3]	131	764	2,299	1,021
Mixed-Use Planning Area (MUPA)	0	0	0	0
Community Development Foundation Component Sub-Total	***7,113***	***19,682***	***59,237***	***17,700***
SUB-TOTAL FOR ALL FOUNDATION COMPONENT USES	**27,743**	**27,277**	**82,095**	**17,859**
NON-COUNTY LAND USES				
OTHER LANDS NOT UNDER PRIMARY COUNTY JURISDICTION				
Cities	0			
Indian Lands	0			
Freeways	0			

Table 2: Statistical Summary of Lakeview/Nuevo Area Plan

LAND USE	AREA	STATISTICAL CALCULATIONS[1]		
	Acreage	Dwelling Units	Population	Employment
Other Lands Sub-Total	*0*			
TOTAL FOR ALL BASE LANDS	**27,743**			
SUPPLEMENTAL LAND USE PLANNING AREAS				
These SUPPLEMENTAL LAND USES are overlays, policy areas and other supplemental items that apply OVER and IN ADDITION to the base land use designations listed above. The acreage and statistical data below represent possible ALTERNATE land use or build-out scenarios.				
OVERLAYS & POLICY AREA				
OVERLAYS[4,5]				
Community Development Overlay	843	---	---	---
Community Center Overlay	0	0	0	0
Rural Village Overlay	0	0	0	0
Rural Village Overlay Study Area	0	0	0	0
Specific Community Development Designation Overlays	0	0	0	0
Total Area Subject to Overlay[4,5]	***843***	---	---	---
POLICY AREAS[6]				
San Jacinto River	2,328	---	---	---
2-4 DU/AC	872	---	---	---
Juniper Flats	406	---	---	---
March Air Reserve Base Influence Area	2,553	---	---	---
Total Area Within Policy Areas[6]	***6,159***			
TOTAL AREA WITHIN SUPPLEMENTALS[7]	**7,053**			

FOOTNOTES:

1 Statistical calculations are based on the midpoint for the theoretical range of build-out projections. Reference Appendix E-1 of the General Plan for assumptions and methodology used.

2 For calculation purposes, it is assumed that CR designated lands will build out at 40% CR and 60% MDR.

3 Note that "Community Center" is used both to describe a land use designation and a type of overlay. These two terms are separate and distinct; are calculated separately; and, are *not* interchangeable terms.

4 Overlays provide alternate land uses that may be developed instead of the underlaying base use designations.

5 Policy Areas indicate where additional policies or criteria apply, in addition to the underlying base use designations. As Policy Areas are supplemental, it is possible for a given parcel of land to fall within one or more Policy Areas. It is also possible for a given Policy Area to span more than one Area Plan.

6 Overlay data represent the additional dwelling units, population and employment permissible under the alternate land uses.

7 A given parcel of land can fall within more than one Policy Area or Overlay. Thus, this total is not additive.

Policy Areas

Not all areas within an area plan are the same. Distinctiveness is a primary means of avoiding the uniformity that so often plagues conventional suburban development. A Policy Area is a portion of an Area Plan that contains special or unique characteristics that merit detailed attention and focused policies. The location and boundaries of the Policy Areas designated in this area plan are shown on Figure 4, Policy Areas, and are described in detail below.

POLICY AREAS

A row of trees at the base of the Bernasconi Hills delineates the San Jacinto River.

Four policy areas have been designated within the Lakeview/Nuevo planning area. In some ways, these policies are even more critical to the sustained character of the Lakeview/Nuevo planning area than some of the basic land use policies because they reflect deeply held beliefs about the kind of place this is and should remain. These boundaries are only approximate and may be interpreted more precisely as decisions are called for in these areas. This flexibility, then, calls for considerable sensitivity in determining where conditions related to the policies actually exist, once a focused analysis is undertaken on a proposed development project.

San Jacinto River

The intent of this policy area is to reflect the fact that the land use designations may change as a result of implementing the proposed San Jacinto River Channelization Project, which is an ongoing process that has not been finalized. However, at the time of the adoption of this area plan, the location, configuration, and width of the channel are known. The channelization project would widen the channel to a 500-foot-wide, soft bottomed channel with earthen berms that are protected with rip-rap. This project would reduce the threat of flooding during a 100-year flood event and allow for increased development on adjacent lands.

★

LNAP = Lakeview/Nuevo Area Plan Policy

The unknown portion of this project is the definition of the necessary habitat lands that would serve as a corridor for wildlife movement. Depending upon where these wildlife lands are identified, the underlying land use designations may change. The San Jacinto Policy Area acknowledges that future land use changes may occur as a part of the channelization project and minimizes the necessary General Plan amendment process.

Policies:

LNAP 1.1 Allow the land use designations within the San Jacinto River Policy Area to change by a technical amendment to the General Plan to reflect the habitat areas resulting from the adopted San Jacinto River Channelization Project.

2-4 Dwelling Units Per Acre (DU/AC)

The 2-4 DU/AC Policy Area is currently within the 100-year floodplain of the San Jacinto River. Its function is to restrict density from the maximum allowed by the Land Use Plan to four (4) dwelling units per acre. These density limitations are imposed to minimize the impacts of a 100-year flood event on residents and their property. This policy area also provides a transition from higher density uses west of the San Jacinto River to the Rural Community Low Density Residential uses found in the Lakeview and Nuevo communities.

Policies:

LNAP 2.1 Restrict the density within the 2-4 DU/AC Policy Area to a maximum of four (4) dwelling units per acre to reduce the risk of flood damage to residents and create a smooth transition from higher density to lower density residential uses.

March Air Reserve Base Influence Area

An aerial view of the March Air Museum

The former March Air Force Base is located northwest of the Lakeview/Nuevo planning area. The Base was established in 1918 and was continually used until 1993. In 1996, the land was converted from an operational Air Force Base to an Active Duty Reserve Base. A four party, Joint Powers Authority (JPA), comprised of the County of Riverside and the Cities of Moreno Valley, Perris and Riverside, now governs the facility. The JPA plans to transform a portion of the base into a highly active inland port, known as the March Inland Port. The March Air Reserve Base encompasses 6,500 acres of land including active cargo and military airport. The boundary of the March Air Reserve Base Airport Influence Area is shown in Figure 4, Policy Areas. There are a number of safety zones associated with the Airport Influence Area. These safety zones are shown in Figure 5, March Air Reserve Base Airport Influence Policy Area. Properties within these zones are subject to regulations governing such issues as development intensity, density, height of structures, and noise. These land use restrictions are fully set forth in Appendix L and are summarized in Table 4, Land Use Compatibility Guidelines for Airport Safety Zones for March, Flabob, Bermuda Dunes, Chino, and Skylark Airports. For more information on these zones and additional airport policies, refer to Appendix L and the Land Use, Circulation Safety and Noise Elements of the Riverside County General Plan.

Policies:

LNAP 3.1 To provide for the orderly development of March Air Reserve Base and the surrounding area, comply with the March JPA General Plan as fully set forth in Appendix L and as summarized in Table 4, as well as any applicable policies related to airports in the Land Use, Circulation, Safety and Noise Elements of the Riverside County General Plan.

Juniper Flats Policy Area

The Juniper Flats Policy Area is designated Rural Residential - 5 acre lot size. However, if developed pursuant to a unified plan for the entire area, a somewhat higher intensity of development may be considered.

Policies:

LNAP 4.1: Notwithstanding the Rural Residential - 5 acre designation of this area on the Lakeview/Nuevo Area Plan map, the Juniper Flats Policy Area may be developed at a maximum residential intensity of 0.4 dwelling units per acre, and the area may be developed with 2½ acre lots, provided that the area is developed pursuant to a unified plan for the entire area.

Specific Plans

The authority for preparation of specific plans is found in the California Government Code, Sections 65450 through 65457.

Specific Plans are highly customized policy or regulatory tools that provide a bridge between the General Plan and individual projects in a more area-specific manner than is possible with community-wide zoning ordinances. The specific plan is a tool that provides land use and development standards that are tailored to respond to special conditions and aspirations unique to the area being proposed for development. These tools are a means of addressing detailed concerns that conventional zoning cannot do.

Specific Plans are identified in this section as Policy Areas because detailed study and development direction is provided in each plan. Policies related to any listed specific plan can be reviewed at the Riverside County Planning Department.

The six specific plans located in the Lakeview/Nuevo planning area are listed in Table 3, Adopted Specific Plans in the Lakeview/Nuevo Area Plan.

Specific Plan No. 114 (Tracts 4437 and 4852), Specific Plan No. 183 (Rancho Nuevo), Specific Plan No. 239 (Stoneridge), Specific Plan No. 249 (Preissman), and Specific Plan No. 251 (Lake Nuevo Village) are determined to be Community Development Specific Plans. Specific Plan No. 134 (Sky Mesa) is determined to be a Rural Specific Plan.

Table 3: Adopted Specific Plans in the Lakeview/Nuevo Area Plan [1]

Specific Plan	Specific Plan #
Tracts 4437 & 4852	114
Sky Mesa	134
Rancho Nuevo	183
Stoneridge	239
Preissman	246
Lake Nuevo Village	251

[1] Source: County of Riverside Planning Department.

Table 4: Land Use Compatibility Guidelines for Airport Safety Zones for March, Flabob, Bermuda Dunes, Chino, and Skylark Airports [1,2]

Safety Zone	Maximum Population Density	Maximum Coverage by Structures	Land Use
Area I	0 [3]	0 [3]	No significant obstructions [4] No petroleum or explosives No above-grade powerlines
Area II	Uses in Structures: [5] 25 persons/ac. OR 150 persons/bldg. (see text in the source document for the Comprehensive Land Use Plan for explanation) Uses not in structures: 50 persons/ac. Residential 2.5 Acre minimum lots Uses in Structures: [5] 75 persons/ac. or 300 persons/bldg. (see text in the source document for the Comprehensive Land Use Plan for explanation)	25% of net area 50% of gross area or 65% of net area whichever is greater	No residential No hotels, motels No restaurants, bars No schools, hospitals, government services No concert halls, auditoriums No stadiums, arenas No public utility stations, plants No Public communications facilities No uses involving, as the primary activity, manufacture, storage, or distribution of explosives or flammable materials. [6]
Area III	Not Applicable	50% of gross area or 65% of net area whichever is greater	Discourage schools, auditoriums, amphitheaters, stadiums Discourage uses involving, as the primary activity, manufacture, storage, or distribution of explosives or flammable materials. [6]

1 The following uses shall be prohibited in all airport safety zones:
- a. Any use which would direct a steady light or flashing light of red, white, green, or amber colors associated with airport operations toward an aircraft engaged in an initial straight climb following takeoff or toward an aircraft engaged in a straight final approach toward a landing at an airport, other than an FAA-approved navigational signal light or visual approach slope indicator.
- b. Any use which would cause sunlight to be reflected towards an aircraft engaged in an initial straight climb following takeoff or towards an aircraft engaged in a straight final approach towards a landing at an airport.
- c. Any use which would generate smoke or water vapor or which would attract large concentrations of birds, or which may otherwise affect safe air navigation within the area.
- d. Any use which would generate electrical interference that may be detrimental to the operation of aircraft and /or aircraft instrumentation.

2 Avigation easements shall be secured through dedication for all land uses permitted in any safety zones.

3 No structures permitted in ETZ or ISZ.

4 Significant obstructions include but are not limited to large trees, heavy fences and walls, tall and steep berms and retaining walls, non-fragible street light and sign standards, billboards.

5 A structure includes fully enclosed buildings and other facilities involving fixed seating and enclosures limiting the mobility of people, such as sports stadiums, outdoor arenas, and amphitheaters.

6 This does not apply to service stations involving retail sale of motor vehicle fuel if fuel storage tanks are installed underground.

Source: Extracted from Riverside County Airport Land Use Commission Comprehensive Land Use Plan

Figure 4: Policy Areas

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Figure 5: March Air Reserve Base Influence Policy Area

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Land Use

While the General Plan Land Use Element and Area Plan Land Use Map guide future development patterns in the Lakeview/Nuevo planning area, additional policy guidance is often necessary to address local land use issues that are unique to the area or that require special policies that go above and beyond those identified in the General Plan. The Local Land Use Policies section provides policies to address these issues. These policies may reinforce County regulatory provisions, preserve special lands or historic structures, require or encourage particular design features or guidelines, or restrict certain activities. The intent is to enhance and/or preserve the identity and character of this unique area.

LOCAL LAND USE POLICIES

Community Centers

Two community centers are identified in the Lakeview/Nuevo Area Plan Land Use Plan that offer a unique mix of employment, commercial, public, and residential uses. These community centers are rooted in Planning Areas identified as mixed use planning areas in the adjacent Stoneridge and Preissman Specific Plans. These Specific Plans provide the direction and standards for the future design and development for the lands within their boundaries. However, the future development of these two community centers would benefit from utilization of the features in the Community Centers Area Plan Land Use Designation section of the Land Use Element.

Policies:

LNAP 5.1 Encourage the two mixed use planning areas in the adopted Stoneridge and Preissman Specific Plans to adhere to those policies listed in the Community Centers Area Plan Land Use Designation section of the Land Use Element.

Community Center

Guidelines have been prepared to aid in the physical development of vibrant community centers in Riverside County. These guidelines are intended to be illustrative in nature, establishing a general framework for design while allowing great flexibility and innovation in their application. Their purpose is to ensure that community centers develop into the diverse and dynamic urban places they are intended to be. These guidelines will serve as the basis for the creation of specified community center implementation tools such as zoning classifications and specific plan design guidelines.

The Community Center Guidelines are located in Appendix J of the General Plan.

Third & Fifth Supervisorial District Design Standards and Guidelines

In July 2001, the County adopted a set of design guidelines applicable to new development within the Third and Fifth Supervisorial Districts. The Development Design Standards and Guidelines for the Third and Fifth Supervisorial Districts are for use by property owners and design professionals submitting development applications to the County Planning Department. The guidelines have been adopted to advance several specific development goals of the Third and Fifth Districts. These goals include: ensuring that the building of new homes is interesting and varied in appearance; utilizing building materials that promote a look of quality development now and in the future; encouraging efficient land use while promoting high quality communities; incorporating conveniently located parks, trails and open space into designs; and encouraging commercial and industrial developers to utilize designs and materials that evoke a sense of quality and permanence.

Policies:

LNAP 6.1 Require development to adhere to standards established in the Design Standards and Guidelines for Development in the Third and Fifth Supervisorial Districts.

★

Light pollution occurs when too much artificial illumination enters the night sky and reflects off of airborne water droplets and dust particles causing a condition known as skyglow. It occurs when glare from improperly aimed and unshielded light fixtures cause uninvited illumination to cross property lines.

Mount Palomar Nighttime Lighting

The Mount Palomar Observatory, located in San Diego County, requires unique nighttime lighting standards so that the night sky can be viewed clearly. The following policies are intended to limit light leakage and spillage that may obstruct or hinder the Observatory's view. Please see Figure 6, Mt. Palomar Nighttime Lighting Policy, for areas that may be impacted by these standards.

Policies:

LNAP 7.1 Adhere to the lighting requirements specified in County Ordinance No. 655 for standards that are intended to limit light leakage and spillage that may interfere with the operations of the Mount Palomar Observatory.

Figure 6: Mt. Palomar Nighttime Lighting Policy

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Circulation

The circulation system is vital to the prosperity of a community. It provides for the movement of goods and people within and outside of the community and includes motorized and non-motorized travel modes such as bicycles, trains, aircraft, automobiles, and trucks. In Riverside County, the circulation system is also intended to accommodate a pattern of concentrated growth, providing both a regional and local linkage system between unique communities. This system is multi-modal, which means that it provides numerous alternatives to the automobile, such as transit, pedestrian systems, and bicycle facilities so that Riverside County citizens and visitors can access the region by a number of transportation options.

As stated in the Vision and the Land Use Element, the County is moving away from a growth pattern of random sprawl toward a pattern of concentrated growth and increased job creation. The intent of the new growth patterns and the new mobility systems is to accommodate the transportation demands created by future growth and to provide mobility options that help reduce the need to utilize the automobile. The circulation system is designed to fit into the fabric of the land use patterns and accommodate the open space systems.

> *Innovative designs allow for increased density in key locations, such as near transit stations, with associated benefits. In these and other neighborhoods as well, walking, bicycling, and transit systems are attractive alternatives to driving for many residents.*
>
> *- RCIP Vision*

While the following section describes the circulation system as it relates to the Lakeview/Nuevo area, it is important to note that the programs and policies are supplemental to, and coordinated with, the policies of the General Plan Circulation Element. In other words, the circulation system of the Lakeview/ Nuevo area is tied to the countywide system and its long range direction. As such, successful implementation of the policies in the Lakeview/Nuevo Area Plan will help to create an interconnected and efficient circulation system for the entire County.

LOCAL CIRCULATION POLICIES

Vehicular Circulation System

The vehicular circulation system that supports the Land Use Plan for the Lakeview/Nuevo Area Plan is shown on Figure 7, Circulation. The vehicular circulation system is anchored by the Ramona Expressway, which runs east to west forming part of the northern boundary of the planning area. Various major and secondary arterials and collector roads connect with the Ramona Expressway and serve local uses. Dawson and Menifee Roads are urban arterials that run north-south from the Ramona Expressway, and Nuevo and San Jacinto Roads are urban arterials that run east-west. Smaller secondary roads such as Juniper Flats Road and Lakeview Avenue serve the eastern portion of the planning area. Most of the roads are centered in the west to serve urban uses, while the rural areas in the east have fewer roads due to the natural features and rugged terrain found there.

Policies:

LNAP 8.1 Design and develop the vehicular roadway system per Figure 7, Circulation, and in accordance with the Functional Classifications and Standards section of the General Plan Circulation Element.

LNAP 8.2 Maintain the County's roadway Level of Service standards as described in the Level of Service section of the General Plan Circulation Element.

Trails and Bikeway System

The County of Riverside contains bicycle, pedestrian, and equestrian trails that traverse urban, rural, and natural areas. These multi-use trails accommodate hikers, bicyclists, equestrian users, and others as an integral part of the County's circulation system. These multi-use trails serve both as a means of connecting the unique communities and activity centers throughout the County and as an effective alternate mode of transportation. In addition to transportation, the trail system also serves as a community amenity by providing recreation and leisure opportunities as well as edges and separations between communities.

As shown on Figure 8, Trails and Bikeway System, an extensive trail system is envisioned for the Lakeview/Nuevo planning area. There is a web of community trails, as well as regional trails and bikeways planned to wind through rural and mountainous areas, as well as crossing busy streets. A multi-use trail runs north-south along the San Jacinto River. This trail capitalizes on the natural features of the area and enhances accessibility of residents to the river. This trail system is an important part of the Area Plan, and should continue to be preserved and expanded for future use by residents of Lakeview/Nuevo.

Policies:

LNAP 9.1 Develop, maintain and/or improve the trails and bikeways within the Lakeview/Nuevo Area Plan as depicted on Figure 8, Trails and Bikeway System, and as discussed in the Multipurpose Recreational Trails section of the General Plan Circulation Element.

Scenic Highways

★

The purpose of the California Scenic Highways program, which was established in 1963, is to "Preserve and protect scenic highway corridors from change which would diminish the aesthetic value of lands adjacent to highways."

Scenic highways provide the motorist with a view of distinctive natural characteristics that are not typical of other areas in the County. The intent of these policies is to conserve significant scenic resources along scenic highways for future generations and to manage development along scenic highways and corridors so that it will not detract from the area's natural characteristics.

As shown on Figure 9, Scenic Highways, the Ramona Expressway is a County Eligible Scenic Highway in the Lakeview/Nuevo Area Plan. This highway serves as a major entrance to Lake Perris, one of the County's most important recreation areas. It passes the Bernasconi Hills, the San Jacinto River, the Mystic Lake corridor, the San Jacinto Wildlife area, and agricultural land, and provides a link with the Pines-to-Palms Highway, which is a State Designated Scenic Highway.

Figure 7: Circulation

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Figure 8: Trails and Bikeway System

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Figure 9: Scenic Highways

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Policies:

LNAP 10.1 Protect the scenic highways in the Lakeview/Nuevo planning area from change that would diminish the aesthetic value of views of the Bernasconi Hills, the San Jacinto River, the Mystic Lake Corridor, and the San Jacinto Wildlife Area in accordance with the Scenic Highways section of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.

Community and Environmental Transportation Acceptability Process (CETAP) Corridors

The population and employment of Riverside County are expected to significantly increase over the next twenty years. The Community and Environmental Transportation Acceptability Process (CETAP) was established to evaluate the need and the opportunities for the development of new or expanded transportation corridors in western Riverside County to accommodate increased growth and to preserve quality of life. These transportation corridors include a range of transportation options such as highways or transit, and are developed with careful consideration for potential impacts to habitat requirements, land use plans, and public infrastructure. CETAP has identified three priority corridors for the movement of people and goods: Banning/Beaumont to Temecula, Hemet to Corona/Lake Elsinore, and Moreno Valley to San Bernardino County.

The Hemet to Corona/Lake Elsinore CETAP Corridor passes through the Lakeview/Nuevo planning area along the Ramona Expressway. This corridor could accommodate a number of transportation options, including vehicular traffic and high occupancy vehicle lanes.

Policies:

LNAP 11.1 Accommodate the Hemet to Corona/Lake Elsinore CETAP Corridor in accordance with the General Plan Circulation Element.

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Multipurpose Open Space

> *The open space system and the methods for its acquisition, maintenance, and operation are calibrated to its many functions: visual relief, natural resources protection, habitat preservation, passive and active recreation, protection from natural hazards, and various combinations of these purposes. This is what is meant by a multipurpose open space system.*
>
> *- RCIP Vision*

The Lakeview/Nuevo planning area contains a variety of open spaces that serve a multitude of functions, hence the open space label of "multi-purpose." The point is that open space is really a part of the public infrastructure and should have the capability of serving a variety of needs and diversity of users. The Lakeview/Nuevo planning area open space system is rich and varied, including such features as the Bernasconi Hills, the Lakeview Mountains, and the San Jacinto River, and provides open space, habitat, and recreation spaces. These quality spaces encompass a variety of habitats including riparian corridors, oak woodlands, chaparral habitats, and a number of lakes, groves, and agricultural fields, as well as a number of parks and recreation areas.

This Multipurpose Open Space section is a critical component of the character of the County of Riverside, and this is reflected in the Lakeview/Nuevo Area Plan. Preserving the scenic background and the natural resources within the Lakeview/Nuevo planning area gives meaning to the "remarkable environmental setting" portion of the overall Riverside County Vision. Not only that, these open spaces also help define the edges of and separation between communities, which is another important aspect of the Vision. Achieving a desirable end state of valued local open space to benefit residents and visitors will require sensitive design attention in laying out development proposals.

> *A watershed is the entire region drained by a waterway that drains into a lake or reservoir. It is the total area above a given point on a stream that contributes water to the flow at that point, and the topographic dividing line from which surface streams flow in two different directions. Clearly, watersheds are not just water. A single watershed may include combinations of forests, glaciers, deserts, and/or grasslands.*

LOCAL OPEN SPACE POLICIES

Watersheds, Floodplains, and Watercourses

The Lakeview/Nuevo planning area is located within the Santa Ana watershed, which includes the San Jacinto River. The San Jacinto River drains southwest toward Canyon Lake through the City of Perris. The San Jacinto River Channelization Project proposes to widen and improve the banks of the river in order to reduce the risk of flooding and, in the process, set aside a habitat area to accommodate wildlife movement. This watercourse provides a habitat corridor through developed land as well as links to other open space. This allows wildlife the ability to move from one open space to another without crossing developed land. The following policies preserve and protect this important watershed.

Policies:

LNAP 12.1 Protect the Santa Ana River watershed and surrounding habitats, and provide flood protection through adherence to the Watershed Management section of the General Plan Multipurpose Open Space Element.

> *A major thrust of the multipurpose open space system is the preservation of components of the ecosystem and landscape that embody the historic character and habitat of the County, even though some areas have been impacted by man-made changes.*
>
> *- RCIP Vision*

PROPOSED MULTIPLE SPECIES HABITAT CONSERVATION PLAN

*For further information on the MSHCP please see the **Multipurpose Open Space Element of the General Plan.***

★ *The Wildlife Agencies include The United States Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (CDFG).*

Regional resource planning to protect individual species such as the Stephens Kangaroo Rat has occurred in Riverside County for many years. Privately owned reserves and publicly owned land have served as habitat for many different species. This method of land and wildlife preservation proved to be piecemeal and disjointed, resulting in islands of reserve land without corridors for species migration and access. To address these issues of wildlife health and habitat sustainability, the proposed Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) has been developed by the County. This Plan has been adopted by the County and, as of October 7, 2003, awaits approval by other jurisdictions and the Wildlife Agencies. The MSHCP comprises a reserve system that encompasses core habitats, habitat linkages, and wildlife corridors outside of existing reserve areas and existing private and public reserve lands into a single comprehensive plan that can accommodate the needs of species and habitat in the present and future.

MSHCP Program Description

The Endangered Species Act prohibits the "taking" of endangered species. Taking is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" listed species. The Wildlife Agencies have authority to regulate this "take" of threatened and endangered specifies. The intent of the proposed MSHCP is for the Wildlife Agencies to grant a "take authorization" for otherwise lawful actions that may incidentally "take" or "harm" species outside of reserve areas, in exchange for supporting assembly of a coordinated reserve system. Therefore, the proposed Western Riverside County MSHCP will allow the County to "take" plant and animal species within identified areas through the local land use planning process. In addition to the conservation and management duties assigned to the County, a property owner initiated habitat evaluation and acquisition negotiation process has also been developed. This process is intended to apply to property that may be needed for inclusion in the MSHCP Reserve or subjected to other MSHCP criteria.

★ *The following sensitive, threatened and endangered species may be found within this Area Plan:*

- *loggerhead strike*
- *burrowing owl*
- *thread-leaved brodiaea*
- *bobcat*
- *cactus wren*
- *granite spiny lizard*
- *orange-throated whiptail*
- *California gnatcatcher*
- *Bell's sage sparrow*
- *arroyo southwestern toad*
- *Los Angeles pocket mouse*
- *San Jacinto Valley crownscale*
- *spreading navarretia*
- *Coulter's goldfields*
- *Parish's brittlescale*
- *Davidson's saltbrush*

Key Biological Issues

The habitat requirements of the sensitive and listed species, combined with sound habitat management practices, have shaped the following policies. These policies provide general conservation direction.

Policies:

LNAP 13.1 Conserve the existing intact upland habitat block in the Lakeview Mountains for the benefit of raptors, burrowing owl, and cactus wren.

LNAP 13.2 Conserve clay soils intermixed with or near vernal pools occurring in the middle reaches of the San Jacinto River supporting core populations of thread-leaved brodiaea.

LNAP 13.3 Conserve wetland habitats along the San Jacinto River including existing vernal playas, vernal pools and associated watersheds.

Maintain watershed processes that contribute to and enhance water quality and the hydrologic regime.

LNAP 13.4 Conserve Willow-Domino-Travers soils that support sensitive plants such as spreading navarretia, San Jacinto Valley crownscale, Coulter's goldfields, Parish's brittlescale, and Davidson's saltbrush.

LNAP 13.5 Maintain and enhance linkage value of the San Jacinto River for wildlife movement and live-in habitat.

LNAP 13.6 Conserve grasslands adjacent to coastal sage scrub habitats as foraging habitat for raptors.

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Hazards

Portions of the Lakeview/Nuevo planning area may be subject to hazards such as flooding, dam inundation, seismic occurrences, and wildland fire. These hazards are depicted on the hazards maps, Figure 10 to Figure 14, and are located throughout Lakeview/Nuevo at varying degrees of risk and danger. Some hazards must be avoided entirely while the potential impacts of others can be mitigated by special building techniques. The following policies provide additional direction for relevant issues specific to the Lakeview/Nuevo planning area.

LOCAL HAZARD POLICIES

Flooding and Dam Inundation

Since 1965, eleven Gubernatorial and Presidential flood disaster declarations have been declared for Riverside County. State law generally makes local government agencies responsible for flood control in California.

As shown on Figure 10, Flood Hazards, the flood prone portion of the planning area runs adjacent to the San Jacinto River. Within the Lakeview/Nuevo planning area, the 100-year floodplain follows the San Jacinto River and most greatly affects lowland areas. If approved, the proposed San Jacinto River Channelization Project would significantly reduce the size and threat of the 100-year flood to the Lakeview/Nuevo residents. As depicted by the dashed green line on Figure 10, Flood Hazards, the 100-year floodplain once the proposed channelization project is completed would be considerably narrower throughout the valley in the Lakeview/Nuevo planning area. There are also a series of Dam Hazard Zones within the Lakeview/Nuevo planning area. Failure of the Lake Perris Dam may cause flooding along the 100-year floodplain and into developed areas. Many techniques may be used to address the danger of flooding, such as avoiding development of floodplains, altering the water channels, utilizing specialized building techniques, elevating structures in floodplains, and enforcing setbacks. This set of policies addresses the hazards associated with flooding and dam inundation.

Policies:

LNAP 14.1 Protect life and property from the hazards of flood events through adherence to the Flood and Inundation section of the General Plan Safety Element.

LNAP 14.2 Adhere to the flood proofing, flood protection requirements, and Flood Management Review requirements of Riverside County Ordinance No. 458 Regulating Flood Hazard Areas.

LNAP 14.3 Require that proposed development projects that are subject to flood hazards, surface ponding, high erosion potential or sheet flow be submitted to the Riverside County Flood Control and Water Conservation District for review.

Wildland Fire Hazard

Fire Fact:

Santa Ana winds create a special hazard. Named by the early settlers at Santa Ana, these hot, dry winds enhance the fire danger throughout southern California.

Due to its remote and rugged nature, the eastern part of the Lakeview/Nuevo planning area is subject to a risk of wildland fires. The highest danger of wildfires can be found in the most rugged terrain, especially in the Lakeview Mountains. Methods to address this hazard include techniques such as avoidance of building in high-risk areas, creating setbacks that buffer development from hazard areas, maintaining brush clearance to reduce potential fuel, establishing low fuel landscaping, and utilizing fire-resistant building techniques. In still other cases, safety oriented organizations such as Fire Safe can provide assistance in educating the public and promoting practices that contribute to improved public safety. Refer to Figure 11, Wildfire Susceptibility, to see the locations of the wildfire zones within the Lakeview/Nuevo planning area.

Policies:

LNAP 15.1 Protect life and property from wildfire hazards through adherence to the Fire Hazards section of the General Plan Safety Element.

Liquefaction occurs primarily in saturated, loose, fine to medium-grained soils in areas where the groundwater table is within about 50 feet of the surface. Shaking causes the soils to lose strength and behave as liquid. Excess water pressure is vented upward through fissures and soil cracks and a water-soil slurry bubbles onto the ground surface. The resulting features are known as "sand boils ", "sand blows" or "sand volcanoes." Liquefaction-related effects include loss of bearing strength, ground oscillations, lateral spreading, and flow failures or slumping.

Seismic

There are a couple of short earthquake fault segments that are located northerly of Ramona Expressway within the Lakeview/Nuevo Area Plan itself. However, the nearby San Jacinto Fault, which is located outside of the planning area, poses a more significant threat to life and property. Threats from seismic events include ground shaking, fault rupture, liquefaction, and landslides.

The southwesterly and central portions of the Lakeview/Nuevo planning area, immediately adjacent to the San Jacinto River, have a very high susceptibility to shallow groundwater liquefaction. The remainder of the 100-year floodplain has a moderate susceptibility to deep groundwater liquefaction. The use of building techniques, the enforcement of setbacks from local faults, and practical avoidance measures will help to mitigate potentially dangerous circumstances. Refer to Figure 12, Seismic Hazards, for the location of faults and liquefaction areas within the Lakeview/Nuevo planning area.

Policies:

LNAP 16.1 Protect life and property from seismic related incidents through adherence to the Seismic Hazards section of the General Plan Safety Element.

Slope

The Lakeview/Nuevo planning area is home to the Lakeview Mountains and portions of the Bernasconi Hills. Both of these ranges contain slopes of 30% or greater. The terrain of these ranges helps to form the local character and a backdrop for the planning area. The areas that contain steep slopes require special development standards and care to prevent erosion and landslides, preserve significant views, and minimize grading and scarring. The following policies are intended to ensure life and property while protecting the character of the Lakeview/Nuevo communities. Figure 13, Steep Slope, reveals the areas of

steep slopes in the Lakeview/Nuevo planning area. Also refer to Figure 14, Slope Instability, for areas of possible landslide.

Policies:

LNAP 17.1 Identify ridgelines that provide a significant visual resource for the Lakeview/Nuevo planning area through adherence to the General Plan Land Use Element.

LNAP 17.2 Protect life and property through adherence to the Hillside Development and Slope policies of the General Plan Land Use Element and the Slope and Soil Instability Hazards policies of the General Plan Safety Element.

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Figure 10: Flood Hazards

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Figure 11: Wildfire Susceptibility

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Figure 12: Seismic Hazards

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Figure 13: Steep Slope

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Figure 14: Slope Instability

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Western Riverside County Regional Conservation Authority

MSHCP - Volume One - The Plan

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You may download the free software from the Adobe website by clicking the icon above.

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SECTION 1.0
INTRODUCTION

1.1 PROJECT LOCATION AND SCOPE

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP or Plan) is a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on Conservation of species and their associated Habitats in Western Riverside County. This Plan is one of several large, multi-jurisdictional habitat-planning efforts in Southern California with the overall goal of maintaining biological and ecological diversity within a rapidly urbanizing region. Large-scale HCP planning efforts have been completed in San Diego and Orange Counties and a similar effort is underway in the Coachella Valley. The MSHCP will allow Riverside County (hereafter, the County) and its Cities to better control local land-use decisions and maintain a strong economic climate in the region while addressing the requirements of the state and federal Endangered Species Acts.

The MSHCP Plan Area encompasses approximately 1.26 million acres (1,966 square miles); it includes all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, as well as the jurisdictional areas of the Cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, and San Jacinto (see *Figures 1-1 and 1-2*). This HCP is one of the largest plans ever attempted. It covers multiple species and multiple Habitats within a diverse landscape, from urban centers to undeveloped foothills and montane forests, all under multiple jurisdictions. It extends across many Bioregions as well, including the Santa Ana Mountains, Riverside Lowlands, San Jacinto Foothills, San Jacinto Mountains, Agua Tibia Mountains, Desert Transition, and San Bernardino Mountains. It will provide a coordinated MSHCP Conservation Area and implementation program to preserve biological diversity and maintain the region's quality of life.

The MSHCP will serve as an HCP pursuant to Section 10(a)(1)(B) of the federal Endangered Species Act of 1973 (FESA), as well as a Natural Communities Conservation Plan (NCCP) under the NCCP Act of 2001. The MSHCP will be used to allow the participating jurisdictions to authorize "Take" of plant and wildlife species identified within the Plan Area. The United States Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) (hereafter "Wildlife Agencies") have authority to regulate the Take of Threatened, Endangered, and rare Species. Under the MSHCP, the Wildlife Agencies will grant "Take Authorization" for otherwise lawful actions -- such as public and private Development that may incidentally Take or harm individual species or their Habitat outside of the MSHCP Conservation Area -- in exchange for the assembly and management of a coordinated MSHCP Conservation Area.

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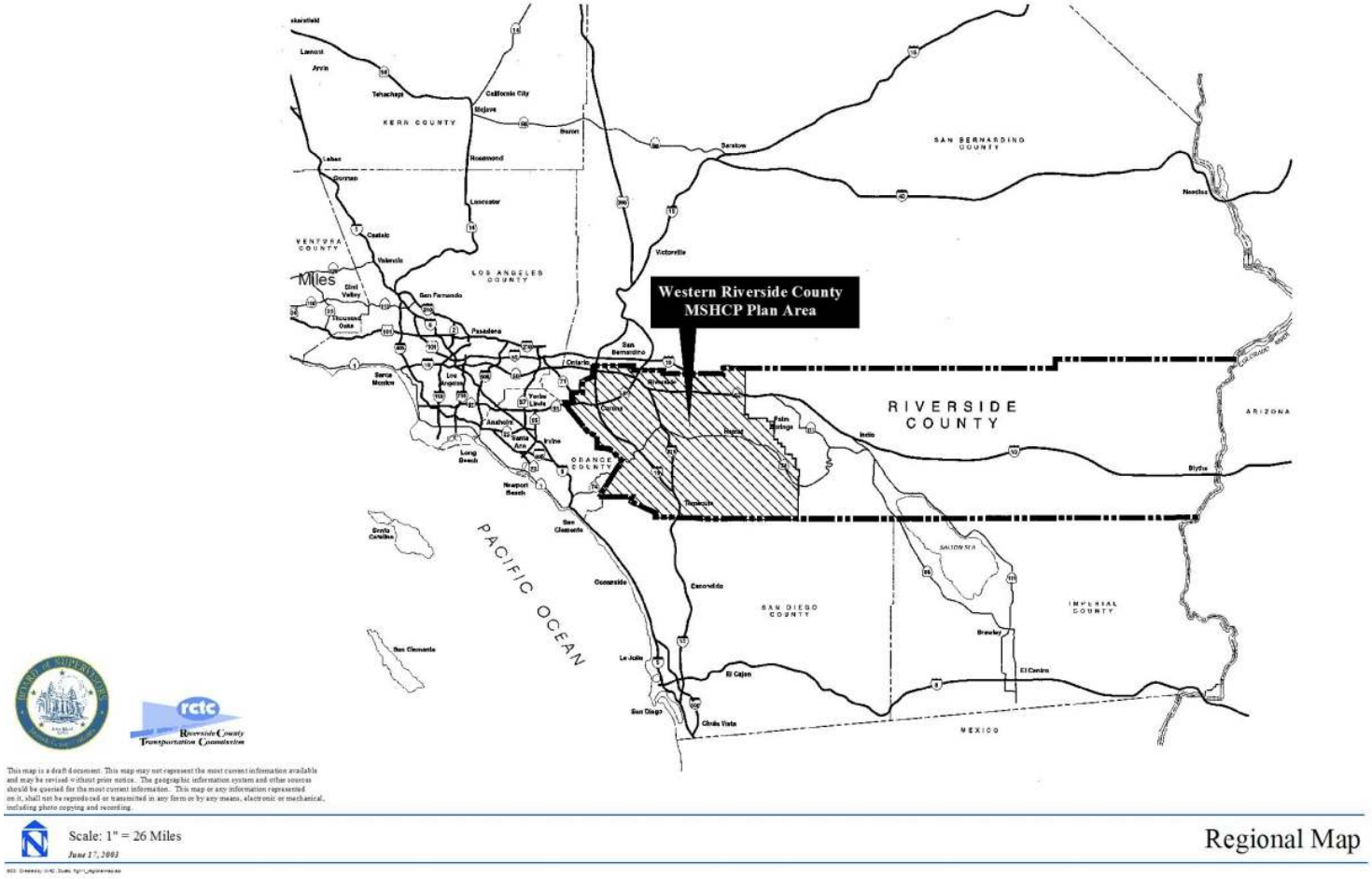

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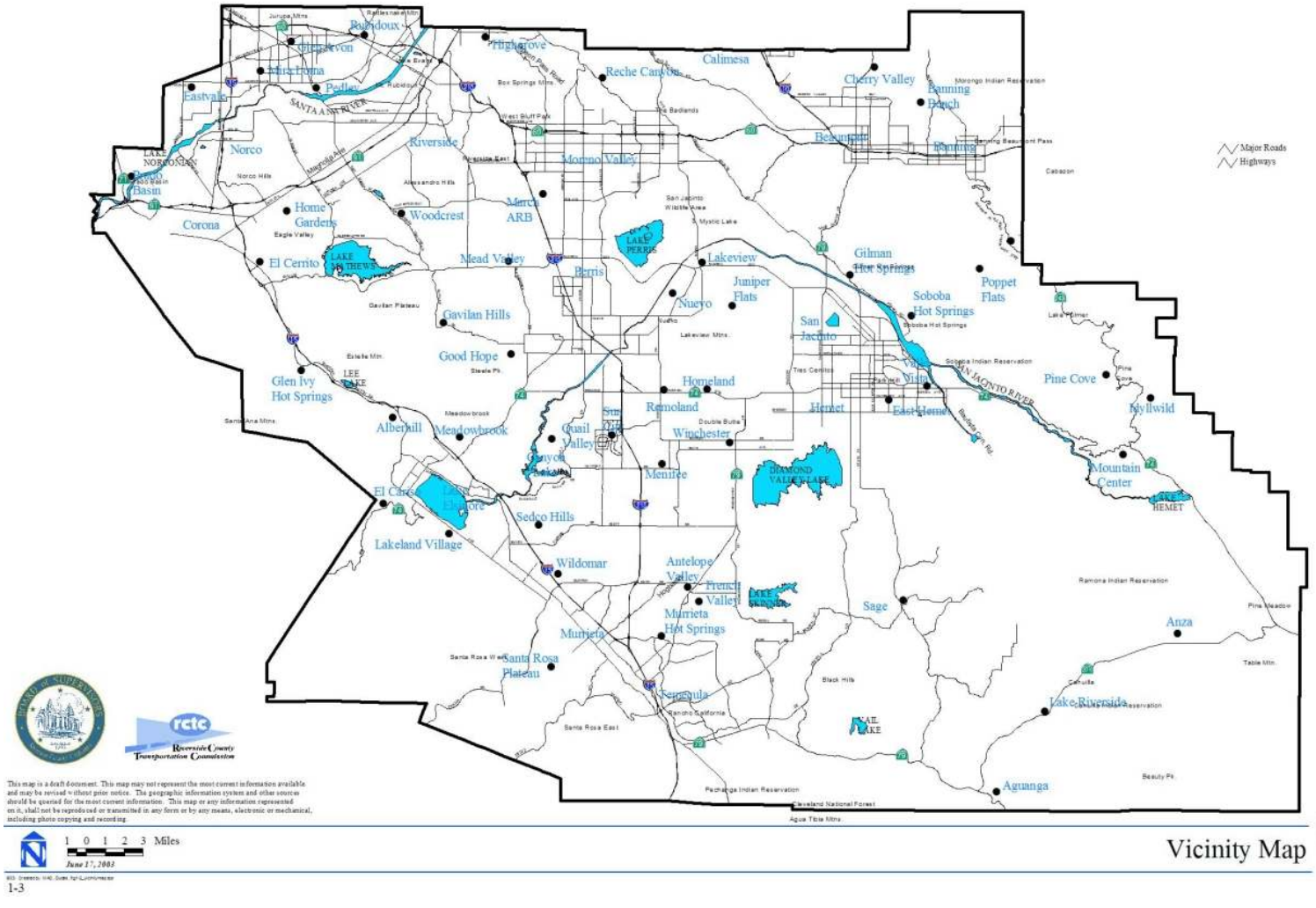

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The MSHCP's strategy for managing the MSHCP Conservation Area requires a balanced approach. It allocates responsibility for its assembly and long-term management to the County, state, and federal governments, the fourteen Cities in the western County, and private and public entities engaged in construction activities that potentially impact the species covered under the MSHCP. The MSHCP acknowledges the obligation of local projects, both public and private, to mitigate their impacts on species. To encourage Conservation on privately owned lands, the MSHCP's implementation strategy relies heavily on incentives. Where incentives are not sufficient, Conservation will require the purchase of properties from willing sellers.

1.2 PURPOSE AND NEED

1.2.1 Background

Historically, urban Development in Southern California has occurred in the coastal areas of Los Angeles, Orange, and San Diego Counties, resulting in a significant loss of important biological resources in the region. The inland valleys and hillsides of Riverside and San Bernardino Counties have, until recently, remained largely rural, agricultural, and relatively undeveloped. Natural Vegetation Communities that were once common and extensive in Southern California have rapidly declined due to this historic development pattern and to increasing development pressure in the northwestern and southwestern parts of the County over the past 15 years.

The burden of mitigating the effects of urbanization now falls largely on the County, the Cities and private landowners who hold much of the last remaining intact Vegetation Communities in the region. As development pressure has increased, so have conflicts between landowning interests and the state and federal regulatory processes associated with protecting Endangered, Threatened, and rare Species. Conflicts over species Conservation threaten the ability of local jurisdictions to plan for and provide the infrastructure necessary for economic development and a high quality of life in the County.

As urbanization has increased within the County, an increasing number of proponents of public and private Developments have been required to obtain "Take permits" from Wildlife Agencies for impacts to endangered, threatened, and rare species and their Habitats. This process, however, has resulted in costly delays in public and private Development projects and an assemblage of unconnected Habitats created on a project-by-project basis. This piecemeal and uncoordinated effort to mitigate the effects of Development does not sustain wildlife mobility, genetic flow, or ecosystem health, which require large, interconnected natural areas.

The County's population in 2000 was approximately 1.5 million people. Its population is expected to double by 2020, to reach approximately 3.5 million by 2030, and to be approximately 4.5 million by 2040, according to forecasts by the Southern California Association of Governments (SCAG). This is nearly a 400% increase over the next 40 years. Most of Southern California's growth over the next 40 years is expected to occur in the Inland Empire (San Bernardino and Riverside Counties) (SCAG 2001). Accommodating an increase in population of this magnitude will involve urbanizing thousands of acres of undeveloped land and result in significant conflicts with regulations protecting species and their Habitats. Conflicts and delays will escalate costs for all development projects, uncoordinated mitigation efforts will fragment Habitats, the region will miss opportunities to improve the quality of life and economic development opportunities for the current and future residents of the County will also not be realized.

1.2.2 Riverside County Integrated Project

The MSHCP is one element of a comprehensive regional planning effort begun in 1999. To accommodate the County's anticipated growth, the County must provide a range of housing alternatives, encourage economic development, create new jobs at a rate that exceeds its population growth, and build the supporting infrastructure. The natural question is how best to meet the demands of growth while protecting the environment. Local officials recognize that without a well-defined and implementable plan for the future, the County would face a very tenuous future.

To address this complex challenge, the Riverside County Board of Supervisors and the Riverside County Transportation Commission (RCTC) initiated the Riverside County Integrated Project (RCIP). RCIP includes:

- A Multiple Species Habitat Conservation Plan (MSHCP), which forms the nucleus of an open-space plan for the western part of the County.

- An updated General Plan for the unincorporated portion of the County; the General Plan addresses land use, circulation, housing and open space, conservation, and other mandatory elements in conformance with state statute. The General Plan includes several innovative programs, such as incentive programs, that will be utilized in implementing the MSHCP, programs to enhance transit alternatives, and programs that will encourage the development of mixed-use centers.

- The Community and Environmental Transportation Acceptability Process (CETAP) identifies future transportation Corridors in the western part of the County and provides the appropriate environmental documentation to allow early preservation of the necessary rights-of-way for future Corridor development. These Corridors will be designed to meet future mobility needs, for autos, buses, and trucks, as well as for goods and information. The Corridors will allow room to implement transit plans well into the next century. CETAP forms an essential component of the County's circulation element and its arterial highway plan, both associated with the General Plan.

Through RCIP, a broad array of stakeholders and individual citizens have been afforded opportunities to participate in the planning process and to communicate to the decision makers the factors that are important to improving their quality of life now and in the future. The purpose of RCIP is to integrate all aspects of land use, transportation, and conservation planning and implementation in order to develop a comprehensive vision for the future of the County.

In addition, a Special Area Management Plan (SAMP) planning process is being pursued to address watershed management and water-quality issues in the region.

On October 20, 1998, the County Board of Supervisors reviewed the following consensus "planning principles" submitted by the coalition of interest groups, and it endorsed their use as initial guidelines in the early stages of developing RCIP:

1. Create a new, comprehensive General Plan based on an overall vision of the future rather than piecemeal community plans.

2. Ensure that the General Plan anticipates future growth, with a sufficient measure of certainty, and provides for a high quality of life, including reasonable accommodation for housing, biological and multiple species resources, agriculture, watersheds, and scenic landscapes.

3. Acknowledge the rights of private property owners in the General Plan and offer just compensation according to federal and state laws regarding private property reserved for public purposes.

4. Include positive economic and regulatory incentives, where appropriate, in the General Plan.

5. Establish policies in the General Plan so that public benefits, improvements that serve the entire community are funded proportionately by the entire community, and new Developments bear their share of increased infrastructure costs.

6. Base community Development in the General Plan on a balanced, sustainable, and integrated set of mapped land uses and promote the continued viability of agricultural lands.

7. When mapping areas for Development, consider the following factors:

   - location of resource and hazard areas
   - opportunity for redevelopment
   - availability of infill sites
   - proximity of existing infrastructure
   - proximity of existing municipal spheres of influence
   - conformance with the policies of communities of interest
   - appropriately site new towns and villages

8. Coordinate the new General Plan with local and regional planning efforts to the maximum extent possible, and encourage mutually reinforcing actions by the Cities and the Local Agency Formation Commissions (LAFCO), as appropriate.

9. Plan for and encourage in the General Plan, the development of diverse and distinctive communities.

10. Incorporate into the General Plan the goal of creating a more compact urban form that requires less land per capita than current modes of Development.

11. Plan for and encourage economic development within the General Plan; emphasize employment opportunities situated within or nearby existing and future communities.

12. Integrate the General Plan with transportation planning, so that land use and circulation elements reinforce one another. CETAP should fully examine transit/rail Corridors, and the new General Plan should include them to the maximum extent possible.

13. Plan for and encourage within the General Plan, a wide range of housing choices suitable for residents of all economic means.

14. Integrate a comprehensive MSHCP into the General Plan.

15. Update existing community plans as part of the General Plan planning process to bring them into conformance with revised General Plan policies. Delay finalizing new community plans, if any, and consistency zoning until the new General Plan is completed.

1.2.3 Riverside County Conservation Planning Context

The County has had previous experience with single-species habitat conservation planning including the Fringe Toed Lizard HCP in the Coachella Valley in 1985 and later with the 1996 HCP for the Stephens' kangaroo rat in Western Riverside County. During the Stephens' kangaroo rat HCP planning process, multiple-species planning efforts occurred through the Riverside County Habitat Conservation Agency (RCHCA) and through the Riverside County Regional Parks and Open Space District (RCRPOSD). In June 1992, RCHCA, RCRPOSD, and the Western Riverside Council of Governments (WRCOG) initiated a program to develop a regional multiple-species plan for Western Riverside County. This effort began partially in response to the then-anticipated federal listing of the coastal California gnatcatcher as endangered under FESA. The initial multiple-species planning effort was intended to bring together the diverse assemblage of local and regional plans and develop a coordinated approach to protecting biodiversity on a regional basis. This effort focused on coastal sage scrub Vegetation Communities and resulted in the preparation of a Phase 1 document entitled *Information Collection and Evaluation* (Pacific Southwest Biological Services [PSBS]/KTU+A, February 1995).

As part of these initial multiple-species planning efforts, a Planning Agreement was drafted between the Wildlife Agencies and participating local entities (see *Appendix A* of this document.) Section 3 of the Planning Agreement presents the following goals and principles for development of the MSHCP:

1. During the development of the MSHCP and the development of both conservation measures and assurances to landowners and users, develop a general agreement regarding the scope, cost, sources of funding, time required for completion, and other important principles concerning the Plan. Develop this general agreement in the first six months of the planning process.

2. In comparison to the option of mitigating for species and Habitat impacts on a project-by-project basis, the MSHCP must be more equitable and efficient, and less expensive and less time consuming.

3. The MSHCP must produce more biologically effective Habitat and species Conservation than the project-by-project alternative.

4. Develop a comprehensive MSHCP that accomplishes the following:

- Promotes the biological viability and recovery of Western Riverside County's ecosystems and Habitats and species dependent thereupon, toward a goal of reducing the need to list additional species in the future.

- Provides a comprehensive means to coordinate, standardize, streamline, and ensure closure regarding mitigation requirements of the FESA, California Endangered Species Act (CESA), National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), California Native Plant Protection Act (CNPPA), and other applicable laws and regulations related to biological and natural resources within the Plan Area.

- Assures property owners, local governments, and other affected parties that conservation measures undertaken for species and wildlife Habitat are adequately covered by the MSHCP and will satisfy mitigation requirements of the FESA, CESA, NEPA, CEQA, and CNPPA concerning impacts to those Covered Species and Habitats.

- Establishes and emphasizes the use of incentives to encourage property owners to voluntarily conserve Habitat and species within the Plan Area as an alternative to regulatory mandates.

- Facilitates economic growth and prosperity so that it occurs in a manner consistent with the Conservation of biological resources within the Plan Area.

- Provides the basis for issuance of Incidental Take permits for listed species adequately covered by the MSHCP, by the USFWS and CDFG.

- Provides for issuance of Incidental Take permits for species within the Plan Area that are adequately covered by the MSHCP, both listed and Unlisted Species.

- Establishes consistent mitigation standards for MSHCP Covered Species for potential application by the USFWS under Section 7 of the FESA.

5. Equitably distribute costs for the preparation and implementation of the MSHCP among local, state, and federal participants, including equitably distributing costs among both new Development and general contribution. Federal and state contributions shall be made as provided in the Implementing Agreement (IA) and the MSHCP.

6. Expedite the MSHCP development and approval process, and complete it within a reasonable period of time, taking into consideration the complexity of the issues involved. All parties agree to use their best efforts to ensure that, if all legal requirements are met, the MSHCP and its environmental documents will be completed and approved within two years of the commencement of the MSHCP planning process.

7. Through MSHCP conservation actions, promote the recovery of species that occur within the Plan Area that are listed as threatened or endangered under CESA and/or FESA; taking into account factors related to the range of each species.

8. Decisions by all parties must be made in a timely fashion and in compliance with agreed time parameters.

9. Actively encourage public input and participation in order to obtain public support for the Conservation and economic benefits that the parties and participants seek from the MSHCP.

The County became the lead for the multiple-species planning effort with the initiation of the RCIP in 1999.

1.2.4 Regulatory Context

The approval of the MSHCP and execution of the IA by the Wildlife Agencies will allow them to issue Take Authorizations to the signatories of the IA. Issuance of Take Authorization to the local jurisdictions will allow Plan participants to implement land use decisions consistent with the MSHCP without project-by-project review and permitting by the Wildlife Agencies. A local, streamlined approach to planning for Endangered/sensitive Species will result in greater economic development certainty and provide for and maintain biological diversity by creating an interconnected MSHCP Conservation Area in the Plan Area. In addition to the preservation of species and associated Habitats, the MSHCP Conservation Area will provide open space and recreational opportunities, which will enhance the quality of life in Riverside County.

➤ Federal Regulatory Framework

Section 9 of the 1973 FESA prohibits the "Take" of wildlife species listed as endangered; it prohibits the Take of species listed as threatened unless otherwise specifically authorized by regulation. Take, as defined by the 1973 FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

In the 1982 amendments to FESA, Section 10 allows for the "Incidental Take" of Endangered and Threatened Species by non-federal entities. The 1973 FESA defines Incidental Take as Take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. " Prior to 1982, non-federal parties undertaking otherwise lawful activities that were likely to result in Take of listed species risked violating the provisions of Section 9 but had no recourse under the law for exemption. Until that time, only Take occurring during scientific research or conservation actions could be authorized under FESA. The "Incidental Take permit" process was established under Section 10(a)(1)(B) of the 1973 FESA precisely to resolve this difficulty.

Section 10(a)(2)(A) of the 1973 FESA requires an applicant for an Incidental Take permit to submit a "Conservation Plan" or "Habitat Conservation Plan (HCP)." Preparation of this MSHCP complies with this requirement. As outlined in the Habitat Conservation Planning and Incidental Take Permit Processing Handbook, published by the USFWS and the National Marine Fisheries Service (NMFS) in November 1996, under Section 10(a)(2)(A) of the 1973 FESA, and federal regulation [50 CFR 17.22(b)(1), 17.32(b)(1), and 222.22], a conservation plan submitted in support of an Incidental Take permit application must detail the following information:

1) Impacts likely to result from the proposed Taking of the species for which permit coverage is requested;

2) Measures the applicant will undertake to monitor, minimize, and mitigate such impacts;

3) Funding that will be made available to undertake such measures and the procedures to deal with unforeseen circumstances;

4) Alternative actions the applicant considered that would not result in Take, and the reasons why such alternatives are not being utilized; and

5) Additional measures USFWS may require as necessary or appropriate for purposes of the plan.

USFWS and NMFS published a final addendum to the HCP Handbook on June 1, 2000 (65 FR 35242). This addendum, also known as the Five-Point Policy guidance, provides clarifying guidance for the two agencies in conducting the Incidental Take permit program and for those applying for an Incidental Take permit under Section 10(a)(1)(B) of the 1973 FESA. Developed to promote efficiency and nationwide consistency within and between the USFWS and NMFS and to improve the HCP program, the five components addressed in the policy are: (1) biological goals, (2) adaptive management, (3) monitoring, (4) permit duration, and (5) public participation.

USFWS is charged with implementing not only the 1973 FESA but also the Fish and Wildlife Coordination Act (16 USC 661-666c) and Fish and Wildlife Act of 1956 (16 U.S.C. 742[f] et seq.). However, it is section 10(a)(1)(B) of FESA that authorizes the USFWS to issue a permit pursuant to Section 10(a)(1)(B) for the Incidental Take of species listed as threatened and endangered. Moreover, the legislative history of the Incidental Take permit process clearly indicates that Congress also intended for Unlisted Species to be addressed in HCPs.

> "Although the conservation plan is keyed to the permit provisions of the Act, which only apply to listed species, the Committee intends that conservation plans may address both listed and unlisted species. In the event that an unlisted species addressed in the approved conservation plan subsequently is listed pursuant to the Act, no further mitigation requirements should be imposed if the conservation plan addressed the conservation of the species and its habitat as if the species were listed pursuant to the Act (H.R. Report No. 97-835, 97th Congress, Second Session; and 50 FR 39681-39691)."

On February 23, 1998 (63 FR 8859), USFWS and NMFS published the "No Surprises" final rule that revised parts 17 (USFWS) and 222 (NMFS) of Title 50 of the Code of Federal Regulations, which was necessary to implement the HCP assurances. This rule provides that, as long as the HCP is being properly implemented, the federal government will not require any additional lands or money from the Permittee(s) in the event of unforeseen changed circumstances and that additional measures deemed necessary to respond to changed circumstances will be limited to those measures specifically identified in the HCP (and only to the extent of the mitigation specified). Such changed circumstances may involve listing of new species. Changed Circumstances and No Surprises are described in *Section 6.8* of this document.

➤ State Regulatory Framework

Section 2080 of the California Fish and Game Code ("FGC") prohibits the "Take" of species listed under the FGC as candidate, Threatened, or Endangered Species. FGC section 1908 prohibits the Take, possession or sale of rare native plants. FGC section 3503 prohibits the Take, possession or needless destruction of the nest or eggs of any bird. FGC section 3503.5 prohibits the Take, possession or destruction of any birds-of-prey or their nests or eggs. The NCCP Act, FGC section 2800 et seq., identifies the process and standards for NCCPs. FGC section 2835 authorizes CDFG to permit the Take of any covered species whose conservation and management are provided for in an NCCP approved by the CDFG. This includes listed (rare, threatened, or endangered) and Unlisted Species.

The state legislature found that NCCPs are an effective tool in protecting California's natural diversity and that they will reduce conflicts between efforts to protect the state's wildlife heritage and the reasonable use of natural resources for economic development. The legislature further found that development of NCCPs promotes the coordination and cooperation among public agencies, landowners, and other private interests, provides a mechanism by which landowners and Development proponents can effectively address concerns about cumulative impacts, promotes conservation of unfragmented Habitat areas, promotes multiple-species and management and conservation, provides one option for identifying and ensuring appropriate mitigation that is roughly proportional to impacts on fish and wildlife, and promotes the conservation of broad-based natural communities and species diversity. NCCPs provide for regional or areawide protection and perpetuation of plants, animals, and their Habitats while allowing compatible land use and economic activity; they are a cooperative planning process that involves local, state, and federal agencies and the public, including landowners, in the MSHCP Plan Area.

The NCCP Act, as amended, FGC section 2830(d), provides for CDFG to authorize the Incidental Take of identified species for NCCPs that are developed pursuant to a Planning Agreement entered into before January 1, 2001, and for which CDFG finds that the plan has been developed using a public participation process and scientific analysis process substantially in conformance with the intent of paragraph (5) of subdivision (b) of Section 2810 and Section 2815.

FGC section 2810, subdivision (b), paragraph (5) addresses the inclusion of independent scientific input to assist CDFG and plan participants to do the following:

1) Recommend scientifically sound conservation strategies for species and natural communities proposed for coverage by the plan;

2) Recommend a set of reserve design principles that addresses the needs of species, landscapes, ecosystems, and ecological processes in the Plan Area;

3) Recommend management principles and conservation goals that can be used in developing a framework for the monitoring and adaptive management component of the plan; and

4) Identify data gaps and uncertainties so that risk factors can be evaluated.

FGC section 2815 addresses the public participation process for plan development to ensure that interested persons, including landowners, have adequate opportunity to provide input to lead agencies, state and federal Wildlife Agencies, and others involved in preparing the plan. The public participation process may be achieved through public working groups and advisory committees and includes the following:

1) Making the draft NCCP available to the public for review and comment at least sixty (60) days prior to its adoption and providing documents to the public at least ten (10) days prior to any public hearing on the documents;

2) Making draft plans, memoranda of understanding, maps, conservation guidelines, species coverage lists, and other planning documents available to the public;

3) Using a public outreach program to provide access for persons interested in the plan to obtain information about it.

FGC section 2820(f) authorizes CDFG to provide assurance to plan participants commensurate with long-term conservation assurances and associated with implementation measures pursuant to the approved plan and further states:

> *When providing assurances pursuant to this subdivision, the department's determination of the level of assurances and the time limits specified in the Implementing Agreement for assurances may be based on localized conditions and shall consider all of the following:*

The level of knowledge of the status of the covered species and natural communities.

The adequacy of analysis of the impact of take on covered species.

The use of the best available science to make assessments about the impacts of take, the reliability of mitigation strategies, and the appropriateness of monitoring techniques.

The appropriateness of the size and duration of the plan with respect to quality and amount of data.

The sufficiency of mechanisms for long-term funding of all components of the plan and contingencies.

The degree of coordination and accessibility of centralized data for analysis and evaluation of the effectiveness of the plan.

The degree to which a thorough range of foreseeable circumstances are considered and provided for under the adaptive-management program.

The size and duration of the plan.

If there are unforeseen circumstances, additional land, water, or financial compensation or additional restrictions on the use of land, water, or other natural resources shall not be required without the consent of plan participants for a period of time specified in the Implementing Agreement, unless the department determines that the plan is not being implemented consistent with the substantive terms of the Implementing Agreement.

1.2.5 Public Outreach

Public involvement is an essential element of preparing a regional HCP such as this MSHCP. To ensure that the MSHCP, the General Plan, and CETAP reflect the priorities and vision of the

County's residents, a community-outreach program has been at the heart of RCIP. The County gathered initial community input in the summer and fall of 1999 through public meetings and surveys asking County residents what they thought their county should look like in 20 years. Residents expressed concerns about the County's ability to retain the rural environment, to attract high-paying jobs, and to focus growth around current city centers. This initial information was compiled into a "Vision Statement" to guide development of each element of RCIP. The County also set up a website to serve as an information portal for the public to learn about the status of each plan, upcoming meetings, and read/download documents produced during the planning process. RCIP and each of its elements has been the subject of hundreds of community meetings throughout the County. Numerous regularly scheduled meetings with representatives of stakeholders took place during development of RCIP documents between the years 1999-2002. Television, radio, and newspaper were also used during this time period to inform the public. Comprehensive documentation of the public outreach effort is available at the County.

1.2.6 Related Documentation

The MSHCP and CETAP are subject to California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) review and the General Plan is subject solely to CEQA review. The MSHCP's Joint Environmental Impact Report (EIR), required by CEQA, and an Environmental Impact Statement (EIS), required by NEPA, will be prepared in order to document the anticipated environmental consequences of implementing the MSHCP. The County is the local lead agency for CEQA, and USFWS is the federal lead agency under NEPA. While each element of RCIP will be subject to its own environmental document(s), the MSHCP will benefit from programs implemented under the General Plan and analyzed in the General Plan EIR. Although the other components of the RCIP are related through integration of the overall RCIP, the project description for the MSHCP EIR/EIS will be independent of the other two environmental documentation efforts. The MSHCP is also accompanied by an IA.

1.3 GOALS AND OBJECTIVES

The overall goal of the MSHCP is based on the RCIP Vision Statement and supporting policy directives. The MSHCP will enhance and maintain biological diversity and ecosystem processes while allowing future economic growth. Preserving a quality of life characterized by well-managed and well-planned growth integrated with an associated open-space system is a component of the RCIP vision. The MSHCP will result in an MSHCP Conservation Area in excess of 500,000 acres

and focuses on Conservation of 146 species. The MSHCP Conservation Area includes approximately 347,000 acres on existing Public/Quasi-Public Lands and approximately 153,000 acres of Additional Reserve Land. The overall goals of the MSHCP are:

Biological Goal: In the MSHCP Plan Area, Conserve Covered Species and their Habitats.

Economic Goal: Improve the future economic development in the County by providing an efficient, streamlined regulatory process through which Development can proceed in an efficient way. The MSHCP and the General Plan will provide the County with a clearly articulated blueprint describing where future Development should and should not occur.

Social Goal: Provide for permanent open space, community edges, and recreational opportunities, which contribute to maintaining the community character of Western Riverside County .

On December 19, 2000, the County Board of Supervisors provided the following specific policy direction for development and implementation of the MSHCP:

1. Prepare an MSHCP and draft IA based on Alternative 1 as identified in the October 4, 2000, MSHCP Alternatives Development Document (Dudek 2000).

2. Include a conservation analysis that anticipates the participation of all 14 Western Riverside Cities and provides a breakdown of the conservation analysis of the 14 Cities and the County.

3. Minimize the need for new local ordinances to ensure implementation of the MSHCP.

4. Utilize existing processes (including CEQA) to the maximum extent possible for the implementation of the MSHCP.

5. Include a range of incentives for land conservation to facilitate assembly of the MSHCP Conservation Area.

6. Identify the number of acres of Conservation that would be accomplished by state and federal agencies (primarily USFWS, CDFG, U.S. Bureau of Land Management (BLM), and California Department of Parks and Recreation [DPR]).

7. Provide for an MSHCP Conservation Area that offers assurances that additional CESA and FESA permits will not be needed for future infrastructure development during the term of the Permit.

8. Equitably apportion Conservation actions among local, state, and federal governments and new Development. The obligation of new Development shall be assigned in a manner that does not unnecessarily burden new housing and economic development in the Plan Area.

9. Include a process that allows farmers to be voluntarily covered for Incidental Take of Covered Species associated with their ongoing agricultural activities.

10. Include provisions that allow for the conversion of up to 10,000 acres of uncultivated lands to cultivated lands in a manner consistent with achieving the conservation goals of the MSHCP.

11. Focus the acquisition of lands in a manner consistent with achieving the conservation goals of the MSHCP.

12. Clearly demonstrate the linkage between Conservation, infrastructure, economic development, housing, and job creation within the County.

13. Include measurable goals, criteria, and safety nets that are easily administered by the local jurisdictions and understood by the public.

14. Include implementing mechanisms that:

    - provide incentives for landowner Conservation;
    - minimize the potential for the Wildlife Agencies to suspend or terminate the County's Permit as a result of local jurisdiction action on an individual project;
    - minimize the role of the Wildlife Agencies in future decisions regarding individual projects;
    - do not imply that the program would result in regulatory takings of property or other Fifth Amendment violations of the Constitution.

15. Provide clear guidance to incorporate public use of land consistent with achieving the conservation goals of the MSHCP.

16. Ensure that local land-use decisions are made by local jurisdictions.

17. Clearly define the process for monitoring and managing the participants as well as the associated costs.

1.0 Introduction

SECTION 2.0
PLAN AREA DESCRIPTION AND SETTING

This section describes the biological setting, land use, and demographic context for the MSHCP Plan Area. It also summarizes data sources used to develop the MSHCP, discusses the limitations of those data sources, and outlines features incorporated into the MSHCP to address those limitations.

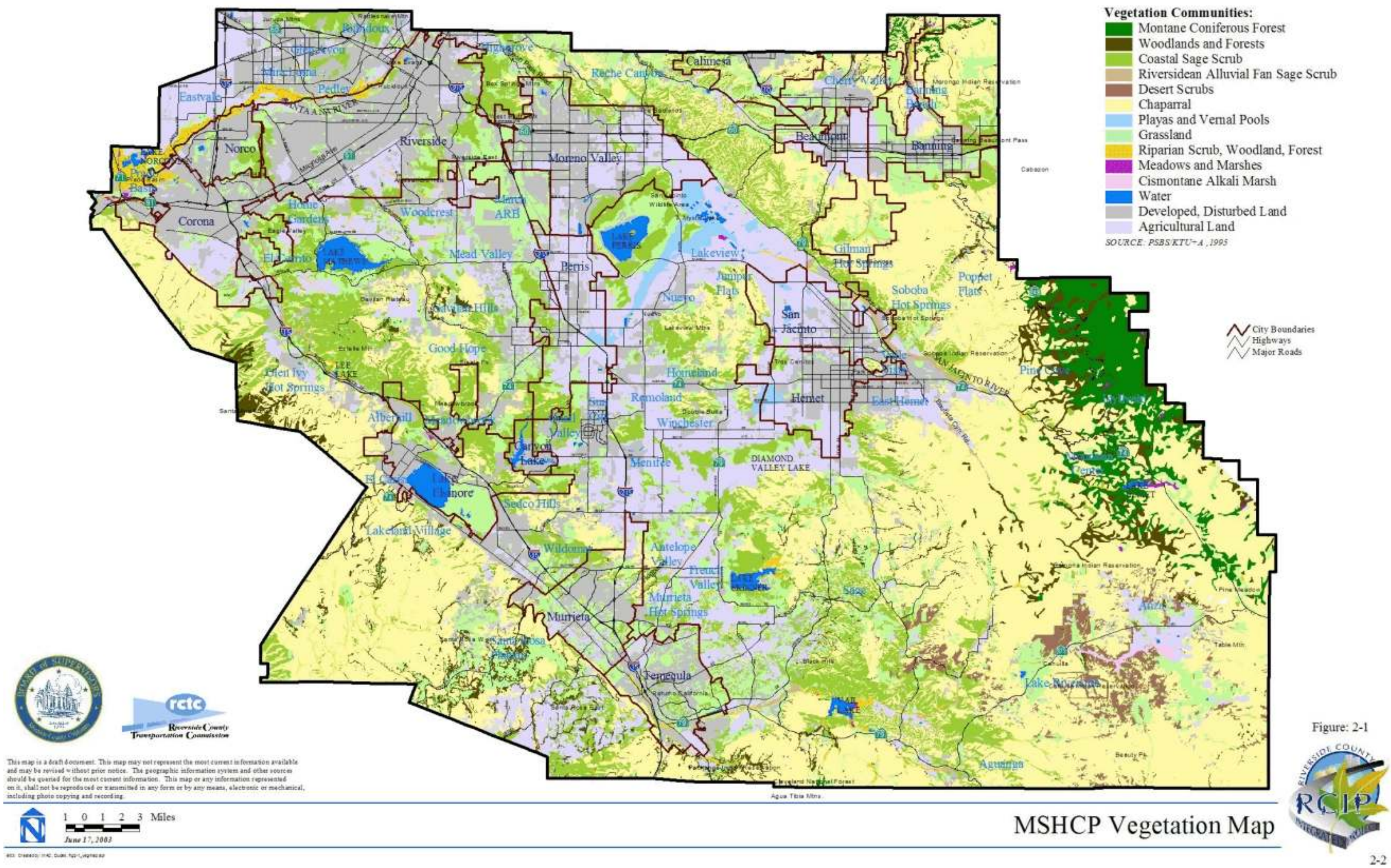
The general setting of the Plan Area is characterized by rural, urban and suburban Development intermixed with Agricultural Operations and large areas of undeveloped land. Large blocks of land along the southern, eastern, and western boundaries of the Plan Area consist of National Forest lands. The topography is generally lowland valleys intersected with rolling hills surrounded by mountain ranges. Lowland valleys occur at elevations below 600 m (2,000 ft), and hillsides dominated by scrub/chaparral occur at elevations of 600-900 m (2,000-3,000 ft). Mountainous areas within the Plan Area range from 900 m to over 3,000 m (3,000-10,000 ft) above mean sea level.

2.1 EXISTING BIOLOGICAL SETTING

2.1.1 Data Sources and Limitations

A comprehensive biological and physical database that includes information on vegetation, species occurrences, wetlands, topography, soils, and aerial photography is available for the MSHCP Plan Area and was used in the development of the Plan. This section describes the sources for and limitations of the various data layers used to develop the MSHCP.

MSHCP VEGETATION. The MSHCP vegetation map is depicted in *Figure 2-1*. This map was prepared by Pacific Southwest Biological Services (PSBS) and KTU+A in 1995. The methodology used to assemble the map is described in detail in the *Western Riverside County Multi-Species Habitat Conservation Plan Phase I Information Collection and Evaluation Report* (PSBS and KTU+A, February 1995). Data sources included aerial photography (1 in. = 2,000 ft, 1992–1993) and existing generalized vegetation maps (California Natural Diversity Data Base [CNDDB], Weislander Statewide Vegetation Survey, U.C. Santa Barbara Southern California Ecoregion "GAP" Analysis, 1991 Dangermond/RECON MSHCP Strategy Report). Methods used to create and interpret vegetation data include aerial photographs, edge matching, digitizing, and geographically registering the data. Areas of concern were ground-truthed. Vegetation types were classified according to Holland (1986).



Vegetation Communities:
Montane Coniferous Forest
Woodlands and Forests
Coastal Sage Scrub
Riversidean Alluvial Fan Sage Scrub
Desert Scrubs
Chaparral
Playas and Vernal Pools
Grassland
Riparian Scrub, Woodland, Forest
Meadows and Marshes
Cismontane Alkali Marsh
Water
Developed, Disturbed Land
Agricultural Land
SOURCE: PSBS/KTU+A, 1995
City Boundaries
Highways
Major Roads
Riverside
Moreno Valley
Calimesa
Beaumont
Banning
Norco
Corona
Perris
San Jacinto
Hemet
Lake Elsinore
Murrieta
Temecula
DIAMOND VALLEY LAKE
1 0 1 2 3 Miles
June 17, 2003
MSHCP Vegetation Map

Figure: 2-1

2-2

The MSHCP vegetation map is limited by the timeframe within which the data were assembled as well as the precision of those data. The vegetation map represents conditions at the time the data were assembled, in this case 1991-1995; the current extent and character of Vegetation Communities may differ from that depicted on the MSHCP vegetation map. Published and anecdotal data suggest that ecosystem state transition is occurring within some portions of the Plan Area--in particular, fire suppression has resulted in the conversion of frequently burned chaparral and coastal sage scrub to grassland and in shifts from Ponderosa pine and Jeffrey pine to incense cedar and white fir (Minnich *et al.* 1995; Keeley 1990; Zedler *et al.* 1983). The MSHCP incorporates features to update the vegetation map as new information is obtained, such as the development of a new vegetation map as part of the MSHCP Monitoring Program. The timing and methodology for developing this map is described in *Section 5.3* of this document. This approach is compatible with the criteria-based format of the MSHCP which calls for assembly of 153,000 acres of Additional Reserve Lands from within an approximate 300,000-acre Criteria Area. Reserve Assembly will involve review of a variety of project-specific vegetation data to refine and guide the Reserve Assembly process. This criteria-based format differs somewhat from large-scale NCCPs/HCPs for which a specific reserve boundary is delineated on a map at the time of permit issuance. Under that type of approach, validation of the vegetation map at the landscape level may be more important than under the criteria-based approach selected for this MSHCP. The organizational structure established for the MSHCP, as described in *Section 6.6* of this document, also provides opportunities to incorporate new information during the term of the MSHCP Permit.

COASTAL SAGE SCRUB HABITAT QUALITY MODEL. As part of the 1995 PSBS/KTU+A work referred to above in the discussion of MSHCP vegetation, PSBS and KTU+A modeled and evaluated variables potentially relevant to the suitability of coastal sage scrub Habitat within the Plan Area for the coastal California gnatcatcher. This is depicted in *Figure 2-2*. A detailed description of the methodology used to develop the model is presented in their report (PSBS and KTU+A 1995). Variables used in the model included elevation, degree of slope, patch size, patch shape, proximity to other coastal sage scrub patches, and adjacent land use. The modeling designated the quality of coastal sage scrub in the Plan Area and suitability for the gnatcatcher as very high, high, moderate, low, or very low. The primary limitations of the model with respect to MSHCP planning are the age and quality of the database used to develop the model. In this regard, the model has the same limitations as the MSHCP vegetation map.

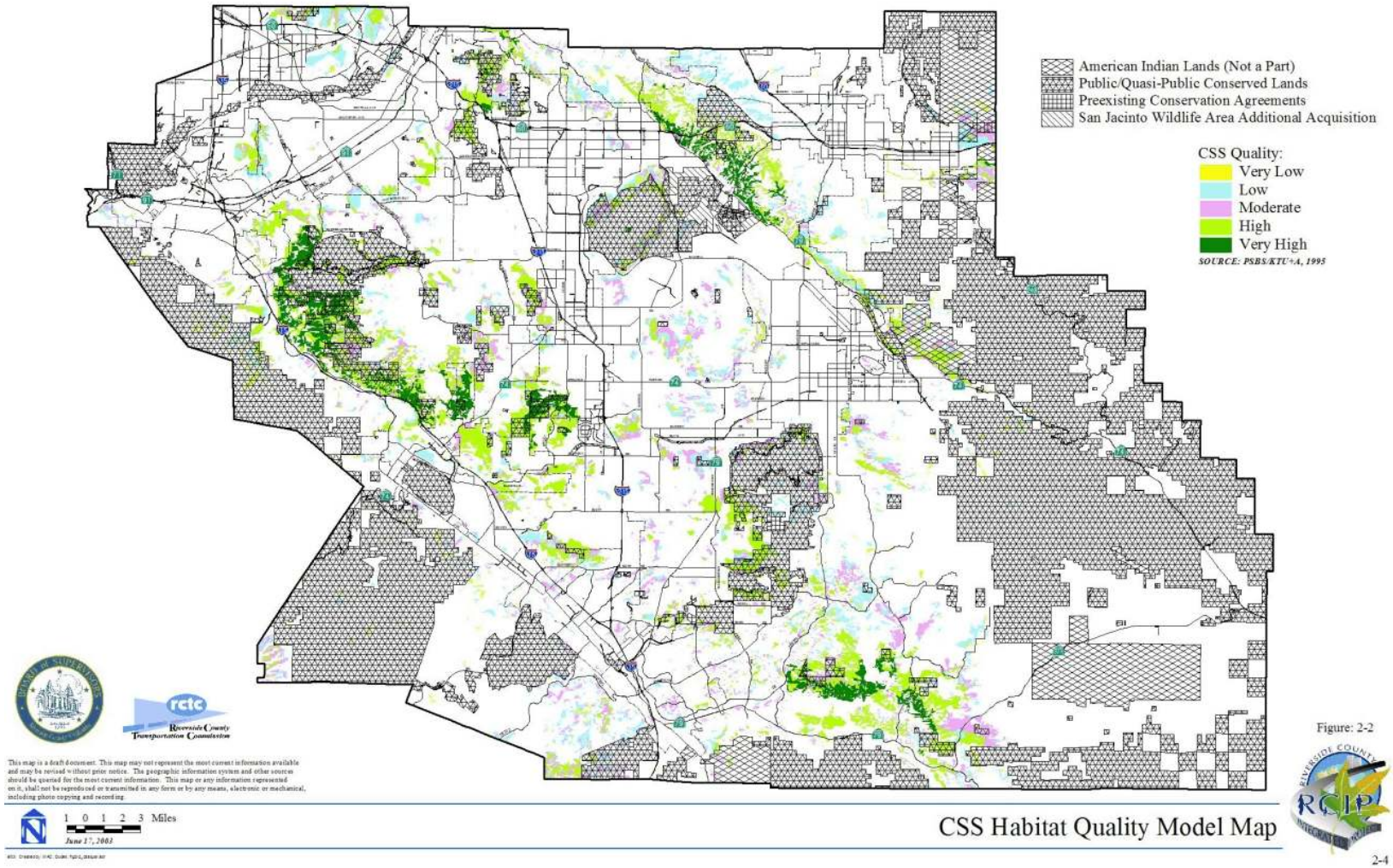


Figure: 2-2

CSS Habitat Quality Model Map

2-4

MSHCP Species Occurrence Database. The University of California, Riverside (UCR) assembled a species occurrence database for use during the MSHCP planning process. This database is accessible at <http://ecoregion.ucr.edu>. The web site is a clearinghouse for biological information for the MSHCP. Occurrence data were compiled from museum records, USFWS data, published and unpublished accounts, environmental impact reports, and field notes of local naturalists. As of August 2001, this database contained over 12,800 records.

The UCR species occurrence database incorporates accuracy and precision codes based on the code guides presented below. For the MSHCP species accounts included in *Section B* of the *MSHCP Reference Document – Volume II* of the MSHCP, precision of the various occurrence data is cited; less valid data are not used to draw conclusions regarding species Conservation. For example, species locations that have low precision are not valid for defining conservation areas.

UCR Species Occurrences Accuracy/Validity Code Guide

Code 1: Location data from voucher specimens in museums and public-trust institutions (data that can be referenced and reviewed directly).

Code 2: Peer-reviewed journal articles, where information on species distribution has been described at an appropriate scale (data that cannot be reviewed directly but have been published and reviewed by experts in the field).

Code 3: Field notes housed at museums and public-trust institutions, collection records of game agencies, technical reports by government agencies, biological sections of environmental (public-reviewed) documents (data from recognized but unpublished [unreferenced] documents).

Code 4: Field notes of local biologists (data from reasonable sources that may need to be documented by subsequent surveys).

Code 5: Incidental observations by interested parties (data from unconfirmed sources including the lay public that need to be documented by subsequent surveys).

UCR Species Occurrences Precision Code Guide

Precision 1: Location has *x, y* coordinates or equivalent, *e.g.*, 5 mi west of Hemet on Hwy 74, or location is a relatively small area, *e.g.*, UCR campus, head of Avery Canyon. Location is basically within an area of ± 500 m x 500 m.

Precision 2: Location has one *x* or one *y* coordinate or equivalent, *e.g.*, 5 mi west of Hemet, or location is moderate in size, *i.e.*, Avery Canyon, small towns, Three Sisters, Strawberry Flat, Tahquitz Valley, Skunk Cabbage Meadow. Location, is basically an area greater than 500 m x 500 m and less than ± 2 km x 2 km (up to 3 km x 3 km is OK). This includes small lakes/reservoirs, valleys, and mountains.

Precision 3: Location has no *x* or *y* coordinate. May include large areas such as large mountains, e.g., Black Mountain, or vicinity of larger city, *e.g.*, Riverside, Corona, Colton. Location is basically an area greater than 2–3 km x 2–3 km and less than ± approximately 8 km x 8 km. This includes large canyons, valleys, lakes, reservoirs, mountains, and mountain ranges.

Precision 4: Location is very ambiguous or vague and/or has been plotted as a "general" location for the purposes of the RCIP project. Examples include San Jacinto Mountains 1,000 m, San Jacinto River, San Gorgonio Pass. Area may be much greater than 8 km^2.

Herbarium Data Sources and Limitations

Additional occurrence/distribution data were gathered for particular plant species within the MSHCP Plan Area from herbarium specimens at the San Diego Natural History Museum (SDNHM), Rancho Santa Ana Botanical Gardens (RSA) herbarium, and UCR herbarium. Most of the occurrence and distribution data were downloaded from databases at SDNHM, RSA, and UCR. Additional data were hand copied from herbarium specimens that had not been previously databased (*e.g.*, the synoptic collection at RSA). The location data from each specimen were either copied or translated into one coordinate system to generate a point coverage depicting the spatial distribution of the sensitive plant species within the Plan Area. Approximately 800 data points were assembled with dates ranging from 1880-2001.

Precision codes were applied to individual occurrence records based on the quality and extent of both quantitative and qualitative geographic data using the precision code guide developed for the UCR species occurrence data described above.

Quantitative geographic data included species occurrences whose locations were reported as latitude and longitude in degrees, minutes, and seconds; as UTM coordinates in meters; or as locations described using township, range, and section designations. Species occurrences containing quantitative geographic data are considered to be the most valid and were typically coded Precision 1 or 2.

Qualitative geographic data include species occurrences whose locations were reported as written descriptions. Species occurrences with only qualitative geographic data were generally coded Precision 2, 3, or 4, depending upon the quality of the specific information provided.

It is recognized that new data regarding species occurrences will become available during the MSHCP implementation process including data assembled as part of the MSHCP Monitoring Program described in *Section 5.3* of this document. The species-specific conservation objectives and the MSHCP Management Plan contain measures to incorporate new occurrence data as they become available.

WETLANDS. Wetlands information for the Plan Area primarily is derived from the MSHCP vegetation map. Other potential wetland areas, including streams, rivers, canals or ditches, ponds, and lakes, were mapped by Earth Consultants International (ECI) as part of the geologic hazards mapping assembled for the RCIP General Plan update. A separate riparian coverage was created by UCR research assistants in 2000 through aerial photo interpretation of 1996 digital orthophoto quarter quadrangles (DOQQs) of the Plan Area. Riparian areas were "heads up" digitized and categorized into four wetland Vegetation Communities based on dominant vegetation cover. All of these data were combined to create an exhibit depicting mapped wetland resources in the Plan Area (*Figure 2-3*).

The wetlands map has the same limitations as the MSHCP vegetation map, and those limitations are addressed in the MSHCP in the same manner as those for the vegetation map. With respect to wetlands mapping, the U.S. Army Corps of Engineers (ACOE) is currently developing a functional assessment and programmatic wetlands delineation for the San Jacinto River and Upper Santa Margarita River Watersheds within the Plan Area as part of

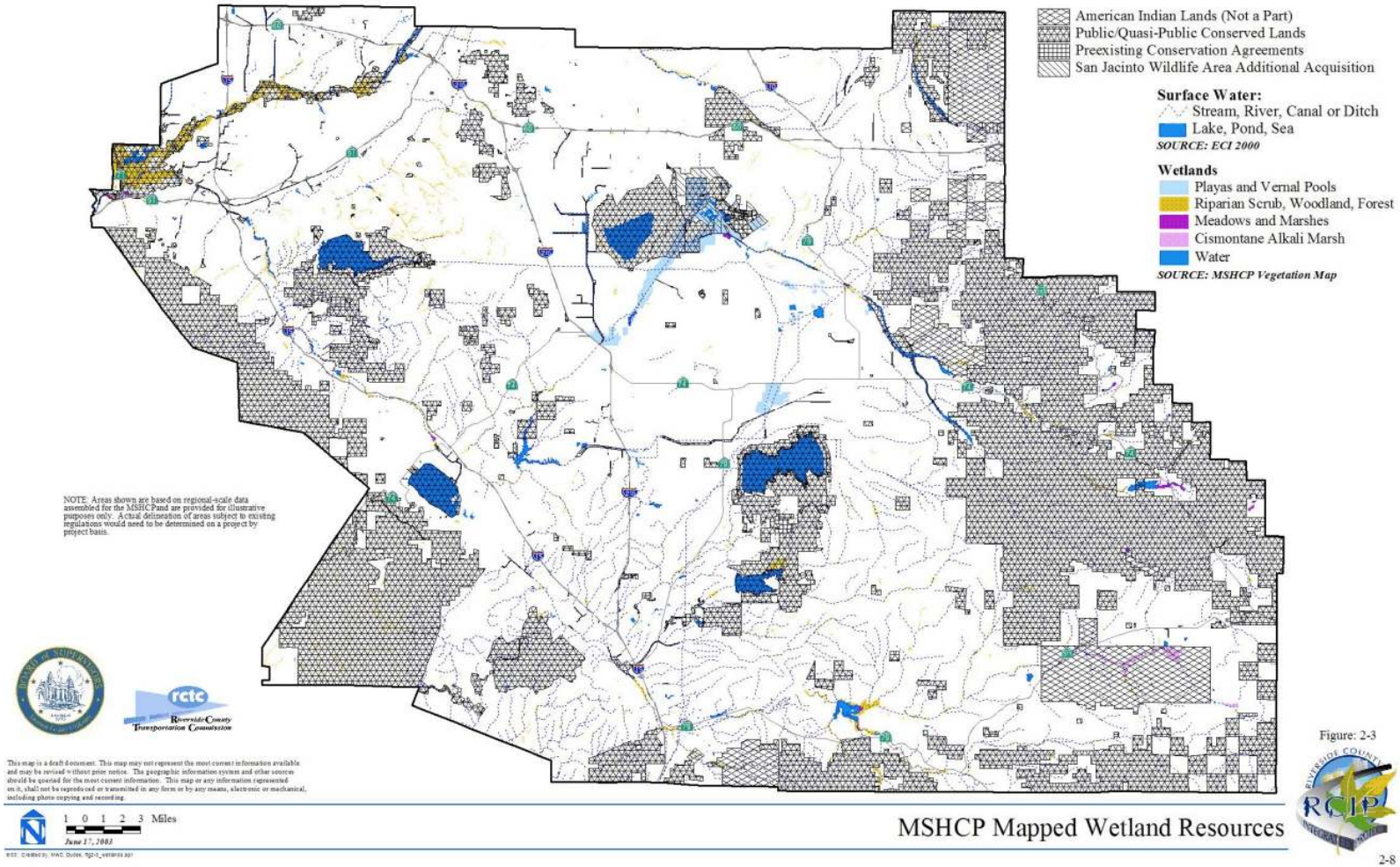


Figure: 2-3

MSHCP Mapped Wetland Resources

2-8

the ACOE Special Area Management Plan (SAMP) process currently underway for those watersheds. A planning level wetland delineation for the San Jacinto and Santa Margarita watersheds was recently completed which was based on a modification of the standard delineation sampling protocols outlined in the Corps of Engineers Wetland Delineation Manual, color infrared image interpretation and field verification visits. The delineation resulted in identification of 201 Vegetation Communities and development of a wetlands ratings system. Although this delineation produced a finer level of aquatic resource mapping, the ACOE wetlands map is limited in that it does not cover the entire MSHCP Plan Area.

SOILS. The U.S. Department of Agriculture, Soils Conservation Service (SCS) (Knecht 1971), and State Soil Geographic (STATSGO) database for California provided the generalized soils map that depicts 25 general soils types for the Plan Area. In addition, the following soil types were digitized from 1973 SCS maps (at a scale of 1:15, 840 or 1 in. = 1,320 ft) and registered with digital Eagle Aerial images onscreen:

Altamont clay (AaD, AaE2, AaF, Abf)
Auld clay (AuC, AuD, AyF)
Bosanko clay (BfC, BfD)
Claypit
Domino clay (Dt, Du, Dv, Dw)
Porterville cobbly clay (PoC, PrD< PsC, PtB, PvD2)
Traver (Tr2, Ts, Tp2, Tt2)
Willows (Wg, Wh, Wm, Wn)

Soils were digitized in areas identified by DUDEK biologists to enable quantitative analysis of soils considered important for the Conservation of certain plant species. Soils listed above were digitized for the following U.S. Geological Survey (USGS) quadrangles: Alberhill, Bachelor, El Casco, Elsinore, Hemet, Lake Mathews, Lakeview, Murrieta, Perris, Romoland, San Jacinto, Steele Peak, Sunnymead, Temecula, Wildomar, and Winchester. The digitized soils data layer is depicted in *Figure 2-4.*

A digital coverage for Delhi soils was also obtained from USFWS and used in the species analysis for the Delhi Sands flower-loving fly. The area currently identified as Delhi soils within the Plan Area may be updated based on site-specific mapping of Delhi soils by a qualified soil scientist within three years after Permit issuance.

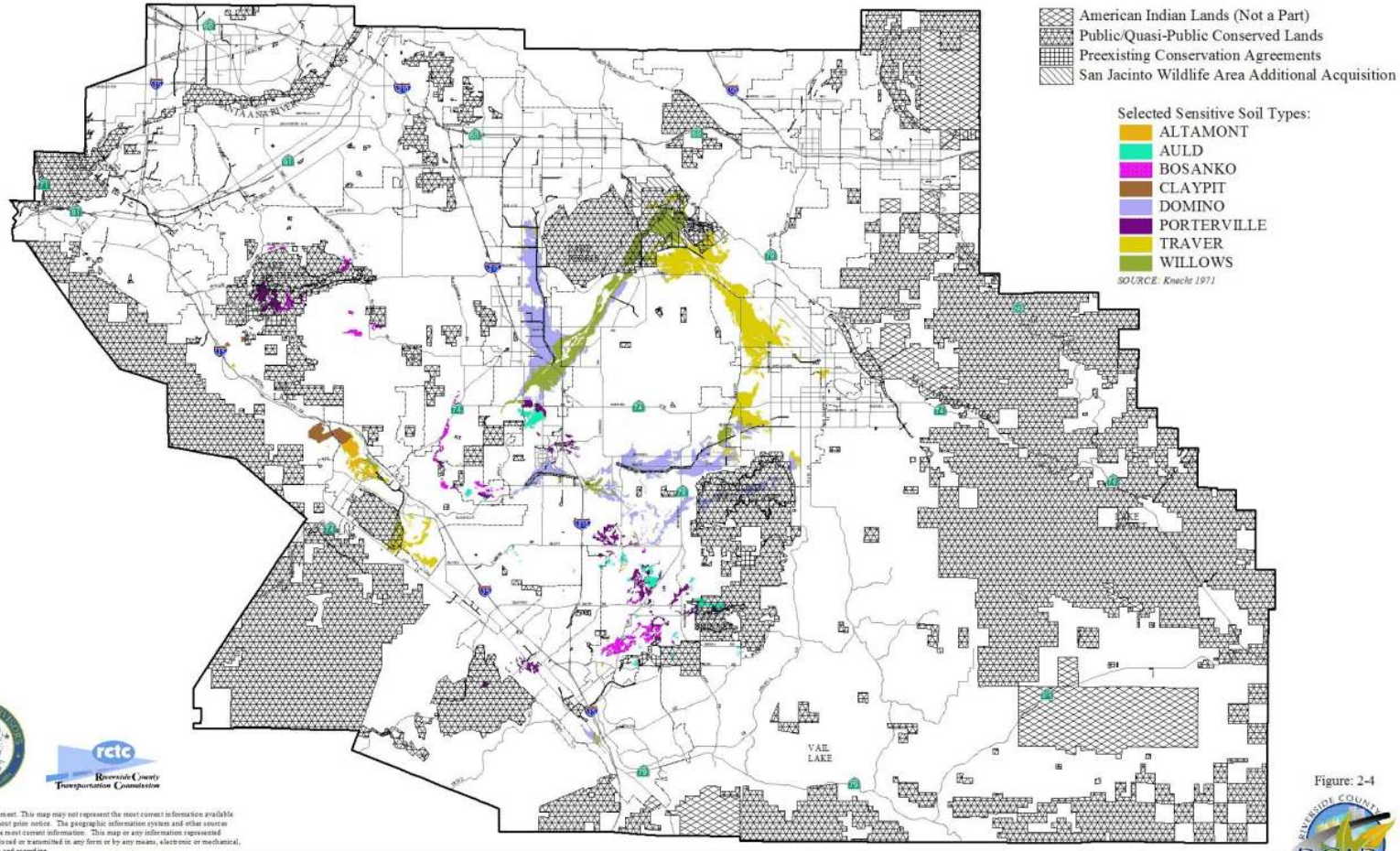


Figure: 2-4

2-10

TOPOGRAPHY. USGS topography was used for the MSHCP planning process. In addition, specific elevation analyses were developed using a 500-ft interval coverage developed from a USGS 30 m digital elevation model (DEM). A vegetation map with hillshaded relief was also used (see *Figures 2-5 and 2-6*).

The topographic database is not considered to be limited for purposes of landscape level MSHCP planning. It is anticipated that newly flown, more accurate topography will be available for certain areas for evaluation of specific Covered Activities and other MSHCP Reserve Assembly, management and monitoring issues during the MSHCP implementation process.

AERIAL PHOTOGRAPHY. Aerial photographs were obtained from Eagle Aerial and include digital aerial images flown in fall 1999 for Western Riverside County and flown on May 4, 2001 for the Temecula Valley. Pixel size: 1 m.

USGS Digital Orthophoto Quarter Quadrangles(DOQQs) were obtained from USFWS and cover the majority of the MSHCP Plan Area, with the exception of U.S. Forest Service (USFS) lands. The DOQQs were flown on September 30, 1996, false color infrared, 1m resolution.

The aerial photography database is not considered to be limited for purposes of landscape-level MSHCP planning. It is anticipated that current aerial photography will be available throughout the long-term MSHCP implementation process to permit evaluation of specific Covered Activities and other MSHCP Reserve Assembly, management and monitoring issues as they arise.

LITERATURE. A wide variety of literature was reviewed and used for the MSHCP planning process. Literature citations for the species accounts are provided for each MSHCP species in *Section B* of the *Reference Document, Volume II of the MSHCP*. Other literature references are listed in *Section D* of the *Reference Document, Volume II of the MSHCP*. It should be noted that a large body of scientific literature was made available to DUDEK by UCR. This literature was thoroughly reviewed but only specifically relevant literature was cited as appropriate. For example, many of the species references contained little or no relevant information for conservation planning in the MSHCP Plan Area.

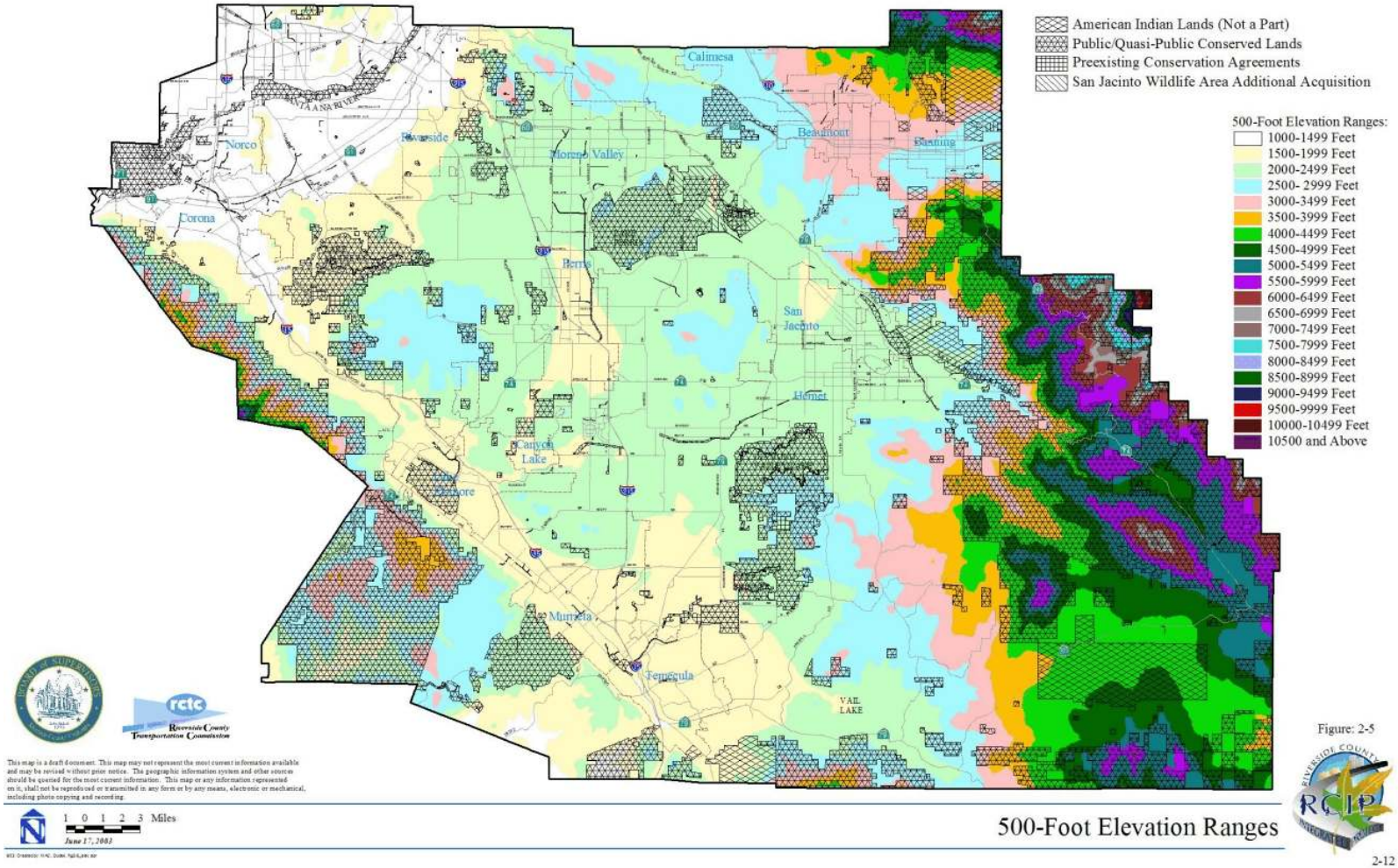

American Indian Lands (Not a Part)
Public/Quasi-Public Conserved Lands
Preexisting Conservation Agreements
San Jacinto Wildlife Area Additional Acquisition
500-Foot Elevation Ranges:
1000-1499 Feet
1500-1999 Feet
2000-2499 Feet
2500- 2999 Feet
3000-3499 Feet
3500-3999 Feet
4000-4499 Feet
4500-4999 Feet
5000-5499 Feet
5500-5999 Feet
6000-6499 Feet
6500-6999 Feet
7000-7499 Feet
7500-7999 Feet
8000-8499 Feet
8500-8999 Feet
9000-9499 Feet
9500-9999 Feet
10000-10499 Feet
10500 and Above
Calimesa
Norco
Riverside
Moreno Valley
Beaumont
Banning
Corona
Perris
San Jacinto
Hemet
Canyon Lake
Murrieta
Temecula
VAIL LAKE
Miles
June 17, 2003
500-Foot Elevation Ranges

Figure: 2-5

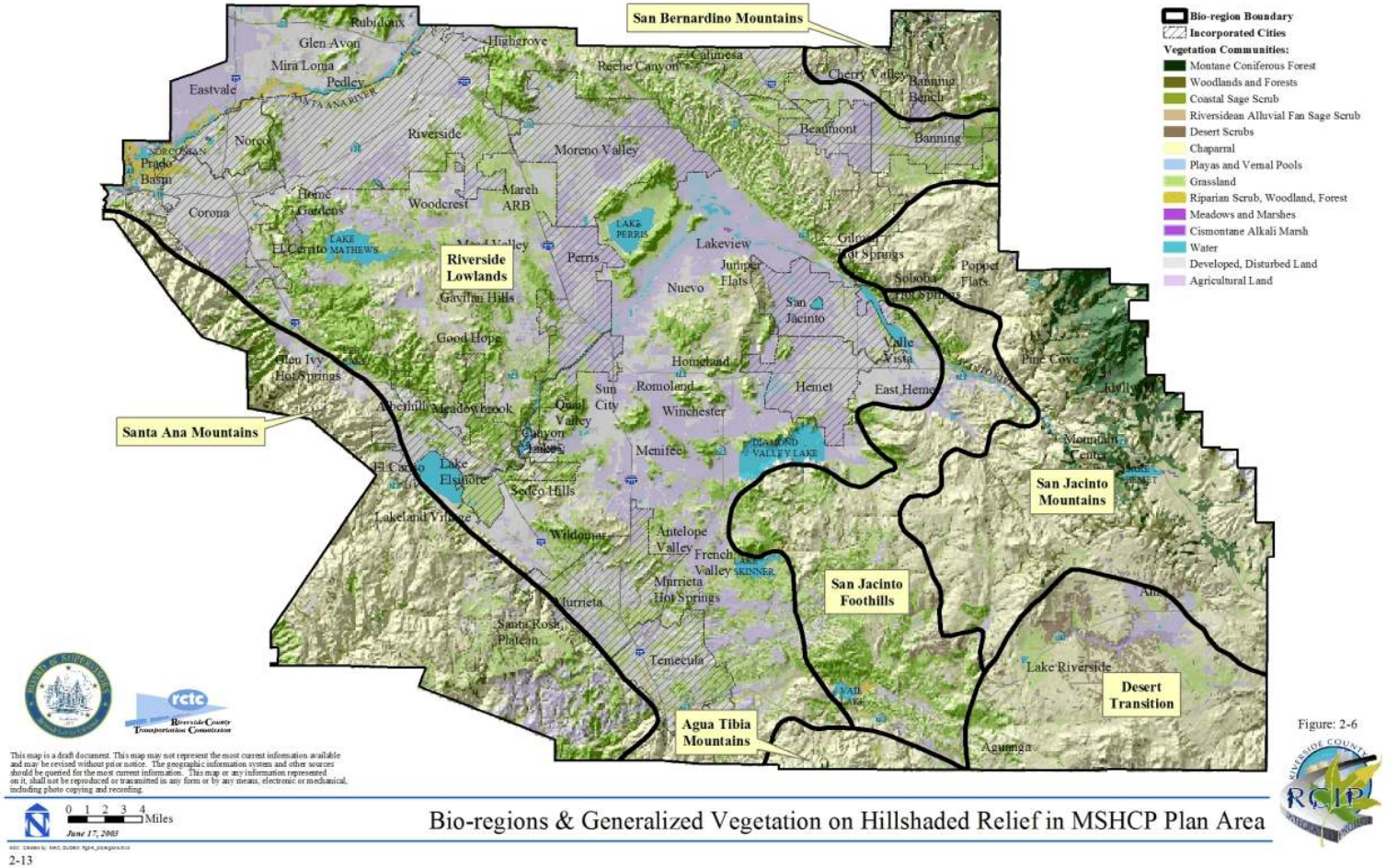


Figure: 2-6

Bio-regions & Generalized Vegetation on Hillshaded Relief in MSHCP Plan Area

2.1.2 Bioregions

The review of databases and literature shows that the existing vegetation database for the Plan Area does not adequately reflect the considerable variety of plant and animal species in Western Riverside County. Grinnell (1993) described biotic or "life" zones for Southern California, but the scale of these life zones is generally too coarse to be useful for analyzing potential biotic variation within the Plan Area. To address this limitation and better depict potential variation within and among species, a biogeographical map (referred to here simply as Bioregions) was created to help describe diversity of Habitats on a regional scale within the Plan Area; this was done under the assumption that regional diversity in conserved areas translates directly into biological and genetic diversity. By ensuring regional representation of species and redundancy of resources, there is some buffer against the effects of natural and anthropogenic catastrophic events, such as wildfires, floods, and disease, on conserved areas.

Using existing information on soils (Soil Conservation Service), elevation (30-meter digital elevation map data [DEM]), topography (hill-shaded DEM mapping), and local expertise, a draft map that roughly demarcates the general Bioregions within the MSHCP Plan Area was drawn. Existing levels of human disturbance (urbanization, intensive agriculture, grazing, etc.) were considered because they have had a substantial effect on the current biota of the Plan Area. While discrete Bioregion boundaries cannot capture the natural continuum or gradient of environmental changes and transitions within the Plan Area, these boundaries roughly represent areas where species turnover and Habitat zone transitions are pronounced in relation to changes in landform and other environmental features. Because continuous climatic maps showing precipitation and air temperature (maximums, minimums, averages) were not available, landform and elevation were used as surrogates for these variables in order to draw the initial map. DUDEK staff and subconsultants knowledgeable about the distribution of plant and animal species in Western Riverside County then fine-tuned the boundaries where elevation and landforms did not accurately reflect changes in species and Habitat distributions. This methodology is similar to the approach used to develop Bioregions for San Diego County. The validity of these Bioregions was initially tested by examining the distribution of vegetation types and sensitive species that fall within them. On the basis of existing data, it was determined that the Bioregions appear to reflect the different suites of species and Vegetation Communities in the Plan Area. Certainly, field studies to confirm or modify these Bioregions would be desirable. As a work in progress, these boundaries are subject to change based on further analyses, scientific study, and input from experts familiar with Western Riverside County.

Seven distinct Bioregions were identified: Santa Ana Mountains, Riverside Lowlands, San Jacinto Foothills, Agua Tibia Mountains, Desert Transition, San Bernardino Mountains, and San Jacinto Mountains (*Figure 2-6*). The characteristic features of each Bioregion are described below.

SANTA ANA MOUNTAINS BIOREGION. The Santa Ana Mountains Bioregion extends south of State Route 91 (SR-91) to the Riverside/San Diego County line and occurs west of Interstate 15 (I-15). It encompasses the Cleveland National Forest and areas north of the Santa Margarita River. This Bioregion generally occurs at elevations above 600 m (2,000 ft.) and supports Diegan coastal sage scrub, mesic chaparral, and sparse coniferous vegetation. The Santa Ana Mountains Bioregion is heavily influenced by coastal climate factors, such as fog, rainfall, and wind. This Bioregion is relatively undisturbed and not urbanized.

RIVERSIDE LOWLANDS BIOREGION. The Riverside Lowlands Bioregion characterizes areas east of the Santa Ana Mountains Bioregion, south of the Riverside/San Bernardino County line, west of Diamond Valley Lake, Lake Skinner, and Gilman Hot Springs, and north of the Riverside/San Diego County line. This Bioregion encompasses Estelle Mountain, Lake Mathews, Reche Canyon/Badlands, the San Jacinto Valley, Gavilan Hills, Lakeview Mountains, and French Valley. The Riverside Lowlands Bioregion generally occurs at elevations below 600 m (2,000 ft) and is characterized by Riversidian sage scrub and annual grasslands.

The relatively arid climate is in part the result of the rain shadow cast by the Santa Ana Mountains. A high level of disturbance and urbanization are noted within this Bioregion.

SAN JACINTO FOOTHILLS BIOREGION. The San Jacinto Foothills Bioregion generally includes areas north of SR-79, east of the Riverside Lowlands Bioregion and west of the San Jacinto Mountains Bioregion. This Bioregion encompasses Vail Lake, Sage, and Cactus Valley. The San Jacinto Foothills Bioregion occurs at elevations of 600-900 m (2,000-3,000 ft) and is dominated by Riversidean sage scrub and xeric chaparral associations. This Bioregion receives less frequent frost and snow than the mountainous areas. This Bioregion has not been heavily disturbed or urbanized.

AGUA TIBIA MOUNTAINS BIOREGION. The Agua Tibia Mountains Bioregion extends south from SR-79 to the Riverside/San Diego County line. It encompasses the Agua Tibia Mountains and generally occurs at elevations above 600 m (2,000 ft). This Bioregion supports Diegan

coastal sage scrub, mesic chaparral, and sparse coniferous vegetation. The Agua Tibia Mountains Bioregion has not been heavily disturbed or urbanized.

DESERT TRANSITION BIOREGION. The Desert Transition Bioregion is located in the southeastern portion of the Plan Area and encompasses the Cahuilla Indian Reservation and Lake Riverside area. The Desert Transition Bioregion generally occurs at elevations above 900 m (3,000 ft) and is arid and desert-influenced. This Bioregion supports red shank chaparral, big basin sage scrub, and semi-desert succulent scrub Vegetation Communities. This Bioregion has not been heavily disturbed or urbanized.

SAN BERNARDINO MOUNTAINS BIOREGION. The San Bernardino Mountains Bioregion is located in the northeastern portion of the Plan Area and encompasses areas north of I-10 within the Pass Area Plan; it generally occurs at elevations above 900 m (3,000 ft). This Bioregion supports coniferous forests, montane chaparral, and broad-leaved forest. The San Bernardino Mountains Bioregion is floristically distinct from the San Jacinto Mountains Bioregion. This Bioregion has not been heavily disturbed or urbanized.

SAN JACINTO MOUNTAINS BIOREGION. The San Jacinto Mountains Bioregion occurs in the eastern portion of the Plan Area and encompasses the San Bernardino National Forest, Pine Cove, Idyllwild, and upper San Jacinto River and Bautista Canyon Creek. This Bioregion supports coniferous forests, montane chaparral, and broad-leaved forest; it generally occurs at elevations above 900 m (3,000 ft). The San Jacinto Mountains Bioregion is floristically distinct from the San Bernardino Mountains Bioregion. This Bioregion has not been heavily disturbed or urbanized.

2.1.3 Vegetation Communities

The MSHCP vegetation map described in *Section 2.1.1* incorporates 50 Vegetation Community classifications. For purposes of MSHCP planning and analysis, the 50 classifications were collapsed to 14; both categories are summarized in *Table 2-1*.

TABLE 2-1
SUMMARY OF COLLAPSED AND UNCOLLAPSED VEGETATION COMMUNITIES CLASSIFICATIONS

Collapsed Vegetation Communities Classifications	Uncollapsed Vegetation Communities Classifications
Montane Coniferous Forest	Jeffrey Pine
	Lodgepole Pine
	Lower Montane Coniferous Forest
	Mixed Evergreen Forest
	Southern California White Fir
	Subalpine Coniferous
Woodland and Forests	Black Oak Forest
	Broadleaved Upland Forest
	Coast Live Oak Woodland
	Dense Engelmann Oak Woodland
	Oak Woodland
	Peninsular Juniper Woodland and Scrub
Coastal Sage Scrub	Coastal Scrub
	Diegan Coastal Sage Scrub
	Riversidean Sage Scrub
Riversidean Alluvial Fan Sage Scrub	Disturbed Alluvial
	Riversidean Alluvial Fan Sage Scrub
Desert Scrub	Big Sagebrush Scrub
	Colorado Desert Wash Scrub
	Semi-desert Succulent Scrub
	Sonoran Desert Scrub

TABLE 2-1 (*Continued*)
SUMMARY OF COLLAPSED AND UNCOLLAPSED VEGETATION COMMUNITIES CLASSIFICATIONS

Collapsed Vegetation Communities Classifications	Uncollapsed Vegetation Communities Classifications
Chaparral	Chamise Chaparral
	Chaparral
	Red Shank Chaparral
	Semi-Desert
Playas and Vernal Pools	Alkali Playa
	Southern Interior Basatt Vernal Pool
	Vernal Pool
Grassland	Non-native Grassland
	Valley and Foothill Grassland
Riparian Scrub, Woodland, Forest	Arundo/Riparian Forest
	Montane Riparian Forest
	Montane Riparian Scrub
	Mulefat Scrub
	Riparian Forest
	Riparian Scrub
	Southern Cottonwood/Willow Riparian
	Southern Sycamore/Alder Riparian Woodland
	Southern Willow Scrub
	Tamarisk Scrub
Meadows and Marshes	Meadow (Montane)
	Wet Montane Meadow
	Coastal and Valley Freshwater Marsh
	Marsh

TABLE 2-1 (*Continued*)
SUMMARY OF COLLAPSED AND UNCOLLAPSED VEGETATION COMMUNITIES CLASSIFICATIONS

Collapsed Vegetation Communities Classifications	Uncollapsed Vegetation Communities Classifications
Cismontane Alkali Marsh	Cismontane Alkali Marsh
Water	Open Water/Reservoir/Pond
Developed/Disturbed Land	Residential/Urban/Exotic
Agricultural Land	Dairy and Livestock Feedyards
	Field Croplands
	Grove/Orchard

The MSHCP Plan Area encompasses approximately 1.26 million acres with approximately 871,000 acres (69%) supporting natural vegetation. The 14 Vegetation Communities within the Plan Area include chaparral (434,950 acres), cismontane alkali marsh (1,260 acres), coastal (Diegan and Riversidean) sage scrub (156,450 acres), desert scrubs (14,570 acres), native and non-native grassland (154,140 acres), meadows and marshes (1,020 acres), montane coniferous forest (29,910 acres), playas and vernal pools (7,910 acres), riparian scrub/woodland/forests (15,030 acres), Riversidean alluvial fan sage scrub (7,940 acres), open water (12,210 acres), woodlands and forests (34,300 acres), and unknown (1,350 acres). In addition, approximately 169,480 acres are in agriculture, and the remaining 218,260 acres are considered disturbed or developed land. *Section C* of the *Reference Document, in Volume II of the MSHCP*, contains detailed Habitat accounts describing the biogeography, range and distribution, vegetation characteristics, species composition, physical environment, ecosystem processes, community relationships, and threats for each Vegetation Community within the Plan Area. A brief description of each Vegetation Community is provided below.

AGRICULTURE. Agricultural lands include areas occupied by dairies and livestock feed yards or areas that have been tilled for use as croplands or groves/orchards. Approximately 13.5 percent of the Plan Area (169,480 acres) consists of agricultural lands. The largest areas of dairy and livestock feed yards are located north of San Jacinto and north of Juniper Flats in the communities of Lakeview, Mystic Lake, Nuevo, southeast Perris, Eastvale, Lake

Norconian off of Bellegrave Avenue, Norco, and in Glen Avon. Field croplands are mapped extensively throughout the Plan Area. The largest areas are around State Route 371 (SR-371) in the vicinity of Anza; in an east-west strip from Murrieta Hot Springs; through French Valley; Antelope Valley; Paloma Valley; Menifee Valley; Winchester; Domenigoni Valley to West Hemet; the Diamond Valley area; and in Eastvale. The largest area of grove/orchard is in Santa Rosa East between Gavilan Mountain and Mesa de Colorado.

CHAPARRAL. Chaparral vegetation is the most abundant and widespread vegetation type in Western Riverside County, covering approximately 35 percent (434,950 acres) of the Plan Area. Large contiguous stands of chaparral occur along the Santa Ana Mountains in the western portion of the Plan Area, and along the San Bernardino, San Jacinto, and Agua Tibia Mountains in the eastern and southern portions. Although chaparral is less common than other vegetation types in the central lowlands of Riverside County, three large chaparral-dominated areas occur on steeper lands near the Gavilan Hills-Gavilan Plateau-Meadowbrook Region, the Lakeview Mountains-Double Butte area, and the Sedco Hills-Hogbacks area.

Chaparral is a shrub-dominated Vegetation Community that is composed largely of evergreen species that range from 1 to 4 m in height (Keeley 2000). The most common and widespread species within chaparral is chamise (*Adenostoma fasciculatum*) (Hanes 1971). Other common shrub species include manzanita (*Arctostaphylos* spp.), wild-lilac (*Ceanothus* spp.), oak (Quercus spp.), redberry (*Rhamnus* spp.), laurel sumac (*Malosma laurina*), mountain-mahogany (*Cercocarpus betuloides*), toyon (*Heteromeles arbutifolia*), and mission manzanita (*Xylococcus bicolor*) (Holland 1986). Soft-leaved subshrubs are less common in chaparral than in coastal sage scrub (see below) but occur within canopy gaps of mature stands (Holland 1986; Keeley and Keeley 1988; Sawyer and Keeler-Wolf 1995). Common species include California buckwheat (*Eriogonum fasciculatum*), sages (*Salvia* spp.), California sagebrush (*Artemisia californica*), and monkeyflower (*Mimulus* spp.). In addition, herbaceous species, including deerweed (*Lotus scoparius*), nightshade (*Solanum* spp.), Spanish bayonet (*Yucca whipplei*), rock-rose (*Helianthemum scoparium*), onion (Allium spp.), soap plant (*Chlorogalum* spp.), bunch grasses (*Nassella* spp., and *Melica* spp.), wild cucumber (*Marah* spp.), bedstraw (*Galium* spp.), and lupine (*Lupinus* spp.) are also present (Holland 1986; Keeley and Keeley 1988; Sawyer and Keeler-Wolf 1995).

CISMONTANE ALKALI MARSH. Cismontane alkali marsh Vegetation Communities are scattered sparsely over the Western Riverside County region, occupying approximately 0.1% (1,260

acres) of the Plan Area. Cismontane alkali marsh was mapped in two general localities along Cahuilla Creek south of Anza and upstream from Lake Mathews along the Colorado River aqueduct.

Typical cismontane alkali marsh species include yerba mansa (*Anemopsis californica*), saltgrass (*Distichlis spicata*), alkali-heath (*Frankenia salina*), cattails (*Typha* spp.), common pickleweed (*Salicornia virginica*), rushes (*Juncus* spp.), marsh flea-bane (*Pluchea odorata*), and sedges (*Carex* spp.) (Holland 1986).

COASTAL SAGE SCRUB. Coastal sage scrub is distributed throughout Western Riverside County, occupying approximately 12% (156,450 acres) of the Plan Area (PSBS 1995). It occurs from the eastern slopes of the Santa Ana Mountains to elevations in the San Jacinto Mountains less than 1,500 m (5,000 ft). Sage scrub often is distributed in patches throughout its range (O'Leary 1992); over a scale of several miles, it can be found in diverse Vegetation Community mosaics with other plant communities, particularly grassland and chaparral, and oak/riparian woodland in wetter areas. In Western Riverside County coastal sage scrub is found both in large contiguous blocks scattered throughout the County as well as integrated with chaparral and grasslands.

Coastal sage scrub is dominated by a characteristic suite of low-statured, aromatic, drought-deciduous shrubs and subshrub species. Composition varies substantially depending on physical circumstances and the successional status of the Vegetation Community; however, characteristic species include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), California encelia (*Encelia californica*), and several species of sage (e.g., *Salvia mellifera, S. apiana*) (Holland 1986; Sawyer-Wolf 1995). Other common species include brittlebush (*E. farinosa*), lemonadeberry (*Rhus integrifolia*), sugarbush (*Rhus ovata*), yellow bush penstemon (*Keckiella antirrhinoides*), Mexican elderberry (*Sambucus mexicana*), sweetbush (*Bebbia juncea*), boxthorn (*Lycium* spp.), shore cactus (*Opuntia littoralis*), coastal cholla (*O. prolifera*), tall prickly-pear (*Opuntia oricola*), and species of *Dudleya*.

DESERT SCRUB. Desert scrub, including big sagebrush scrub and Sonoran desert scrub, occurs mostly in the southeastern portion of the Plan Area. Desert scrub occupies approximately 1.2% (14,570 acres) of the Plan Area. Large acreages of the Vegetation Community occur north and south of SR-371 within Tule Valley, Culp Valley, Wilson Creek, Cahuilla, the

Ramona Indian Reservation, the community of Anza, and east of Aguanga and Lake Riverside.

Desert scrub is typically composed of shrubs such as big sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), rubber rabbit-bush (*Chrysothamus nauseosus*), yellow rabbitbrush (*C. viscidiflorus*) black bush (*Coleogyne ramosissima*), Mormon-tea (*Ephedra viridis*), horsebrush (*Tetradymia canescens*), plateau gooseberry (*Ribes velutinum*) and hopsage (*Grayia spinosa*), burro weed (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), crucifixion-thorn (*Canotia holacantha*), ocotillo (*Fouquieria splendens*), and creosote scrub (*Larrea tridentata*) (Holland 1986; California Gap Analysis Report 1998). The herbaceous cover generally is dominated by a mixture of perennial bunch grasses, such as ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Stipa comata)*, letterman's needlegrass (*S. lettermanii*), needlegrass (*S. occidentalis* and *S. thurberiana*), desert needlegrass (*S. speciosa*), one-sided bluegrass (*Poa secunda*), bluebunch wheatgrass (*Agropyron spicata*), and Great Basin wild rye (*Leymus cinereus*). Annual grasses and forbs may also occur within big sagebrush scrub. Cheatgrass (*Bromus tectorum*), an introduced annual grass, has become the dominant herbaceous species in many areas.

GRASSLANDS. Grasslands occur throughout most of Western Riverside County and cover approximately 12.2% (154,140 acres) of the Plan Area. Two general types of grasslands occur in Southern California: (1) non-native dominated, primarily annual grassland ("non-native grassland"); and (2) native dominated, perennial grassland ("valley and foothill grassland") (Heady 1977; Keeley 1989; Sims and Risser 2000). The only valley and foothill grasslands mapped within the Plan Area are distributed over approximately 0.2% (2,700 acres) of the Plan Area on the Santa Rosa Plateau. Non-native grasslands occur throughout the majority of the Plan Area (11.6%), usually within close proximity to urbanized or agricultural land uses. Large patches of non-native grasslands occur in the Riverside Lowlands near March Air Reserve base, Lake Mathews, Lake Perris, Lake Elsinore, near Banning, Cahuilla, and in the Terwilliger Valley south of Anza.

Valley and foothill grasslands typically contain the perennial bunch grasses *Nassella pulchra and Nassella lepida*. Lesser amounts of other native grasses, such as *Melica* spp., *Leymus* spp., Muhlenbergia spp., and beard grass (*Bothriochloa barbinodis*), may also be present. In addition, non-native grasses or forbs may be present to varying degrees. Native herbaceous plants commonly found within valley and foothill grasslands include yellow fiddleneck (*Amsinckia menziesii*), common calyptridium (*Calyptridium monardum*), suncup

(*Camissonia* spp.), Chinese houses (*Collinsia heterophylla*), California poppy (*Eschcholzia californica*), tarweed (*Hemizonia* spp.), coast goldfields (*Lasthenia californica*), common tidy-tips (*Layia platyglossa*), *Lupinus* spp., *Plagiobothrys* spp., blue dicks (*Dichelostemma capitata*), *Muilla* spp., blue-eyed grass (*Sisyrinchium bellum*), and *Dudleya* spp. (Holland 1986; Sims and Risser 2000).

Non-native grasslands are likely to be dominated by several species of grasses that have evolved to persist in concert with human agricultural practices: slender oat (*Avena barbata*), wild oat (*A. fatua)*, fox tail chess (*Bromus madritensis*), soft chess (*B. hordeaceus*), ripgut grass (*B. diandrus*), barley (*Hordeum* spp.), rye grass (*Lolium multiflorum*), English ryegrass (*L. perrene*), rat-tail fescue (*Vulpia myuros*), and Mediterranean schismus (*Schismus barbatus*) (Jackson 1985; Sims and Risser 2000).

MEADOWS AND MARSHES. Approximately 1,020 acres of meadow and marsh Vegetation Communities, including coastal and valley freshwater marsh, undifferentiated marsh, and wet montane meadow, exist within the Plan Area, comprising 0.08% of the Plan Area. Occurrences of this Vegetation Community have been mapped in the Prado Basin in the Santa Ana River Valley, on the Santa Ana River near Pedley, north of Lake Elsinore in Walker Canyon, near San Jacinto, along the shores of Lake Skinner and Vail Lake, and adjacent to the cismontane alkali marsh on Cahuilla Creek. Undifferentiated marsh was mapped in three locations, including the shore of Lake Mathews, near Mystic Lake, and upstream from Vail Lake along Temecula Creek in the Aguanga Valley. Wet montane meadow was mapped in the San Jacinto Mountains in the San Bernardino National Forest, primarily within the vicinity of Hemet Lake.

Meadow and marsh Vegetation Communities occur in both flowing and still water. This Vegetation Community includes cattails (*Typha* spp.), bulrush (*Scirpus* spp.), sedges (*Carex* spp.), spike rushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), smartweed (*Polygonum* spp.), watercress (*Rorippa* spp.) and yerba mansa (*Anemopsis californica*), and also contains perennial and biennial herbs (e.g., *Oenothera* spp., *Polygonum* spp., *Lupinus* spp., *Potentilla* spp., and *Sidalcea* spp.) and grasses (e.g., *Agrostis* spp., *Deschampsia* spp., and *Muhlenbergia* spp.) (Barbour and Major 1977; Sawyer and Keeler-Wolf 1995; Stephenson and Calcarone 1999; Holland and Keil 1995). Rooted aquatic plant species with floating stems and leaves also may be present, such as pennywort (*Hydrocotyle* spp.), water smartweed (*Polygonum amphibium*), pondweeds (*Potamogeton* spp.) and water-parsley (*Oenanthe sarmentosa*) (Holland and Keil 1995). Wet montane meadows that dry out by mid-summer have a higher percentage of perennial grasses than meadows that remain moist during the entire growing season (Holland and Keil 1995).

MONTANE CONIFEROUS FOREST. Montane coniferous forest, including Jeffrey pine, lodgepole pine forest, lower montane coniferous forest, mixed evergreen forest, Southern California white fir forest and subalpine coniferous forest, occupies 2.4% (29,910 acres) of the MSHCP Plan Area. It occurs within the San Jacinto Mountains, Agua Tibia, Cleveland National Forest, and Santa Rosa Mountains.

Montane coniferous forest is dominated by Jeffrey pine (*Pinus jeffreyi)*, ponderosa pine (*Pinus ponderosa*), Coulter pine (*Pinus coulteri*), lodgepole pine (*Pinus contorta* ssp. *murrayanna* ssp. *murrayana*), limber pine (*Pinus flexilis*), bigcone Douglas-fir (*Pseudotsuga macrocarpa*), Pacific madrone (*Arbutus menziesii*), bigleaf maple (*Acer macrophyllum*), Rocky Mountain white fir (*Abies concolor* var. *concolor*), and sugar pine (*Pinus lambertiana*). Common understory shrubs include manzanita (*Arctostaphylos* spp.), California lilac (*Ceanothus* spp.), chinquapin (*Chrysolepis*), currant (*Ribes*), and dwarf mistletoe (*Arceuthobium campylopodum*). The herbaceous layer is composed of morning-glory (*Calystegia occidentalis* ssp. *fulcrata*), sedge (*Carex multicaulis*), clarkia (*Clarkia rhomboidea*), and mountain-heather (*Phyllodoce breweri*).

PLAYAS AND VERNAL POOLS. These Vegetation Communities comprise 0.6% (7,910 acres) of the Plan Area. Playas and vernal pools are found in Western Riverside County in the San Jacinto Valley/Perris Basin and on the Santa Rosa Plateau.

Vernal pools are ephemeral wetlands that form in shallow depressions underlain by a substrate near the surface that restricts the downward percolation of water. Depressions in the landscape fill with rainwater and runoff from adjacent areas during the winter and may remain inundated until spring or early summer, sometimes drying more than once during the wet season. Smaller pools can fill and dry, and larger pools can hold water longer and may in the deeper portions support species that are more representative of freshwater marshes. Vernal pools are well-known for their high level of endemism (Stone 1990) and abundance of rare, Threatened, or Endangered Species (Sawyer and Keeler-Wolf 1995). Many vernal pools are characterized by concentric rings of plants that flower sequentially as the pools dry. Vernal pools are dominated by native annual plants, with low to moderate levels of perennial herbaceous cover. Common vernal pool plant species in Western Riverside County include woolly marbles (*Psilocarphus brevissimus*), toad rush (*Juncus bufonius*), and spike rush (*Eleocharis* spp.). In addition, the following sensitive or listed plant species are found in one or more of these pools: California Orcutt grass (*Orcuttia californica),* Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), little mousetail (*Myosurus minimus* ssp. *apus*), spreading navarretia (*Navarretia fossalis*), low navarretia (*N. prostrata*), Orcutt's brodiaea (*Brodiaea orcuttii*), thread-leaved brodiaea (*Brodiaea filifolia*), Parish brittlescale (*Atriplex parishii*),

Parish meadowfoam (*Limnanthes gracilis* ssp. *parishii*), San Diego button-celery (*Eryngium aristulatum* var. *parishii*), Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*), San Jacinto Valley crownscale (*Atriplex coronata*var. *notatior*), and smooth tarplant (*Hemizonia pungens* ssp. *laevis*) (Sawyer and Keeler-Wolf 1995). The Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*) occurs only in Western Riverside County, which is also the location of the southernmost record for the vernal pool fairy shrimp (*Branchinecta lynchi*) (Eriksen and Belk 1999).

RIPARIAN FOREST/WOODLAND/SCRUB. Riparian vegetation, including forest, woodland, and scrub subtypes, is distributed in waterways and drainages throughout much of Western Riverside County, covering approximately 1.2 percent (15,030 acres) of the Plan Area. Southern cottonwood/willow forest makes up the largest proportion of the riparian vegetation in the Plan Area, comprising nearly one-half (6,610 acres) of the acreage. Most of the southern cottonwood/willow forest Vegetation Community occurs along the Santa Ana River drainage from Lake Evans to beyond the Prado Basin, along the San Gorgonio River north of Banning and along Temecula Creek east of Vail Lake. Additional types of riparian vegetation can be found along the San Gorgonio River north of Banning (montane riparian forest), Temescal Canyon Wash and its tributaries (riparian scrub and mulefat scrub), the stream channels within the San Mateo Canyon watershed (riparian forest, southern sycamore/alder riparian woodland and riparian scrub), and Vail Lake (tamarisk scrub).

Riparian communities typically consist of one or more deciduous tree species with an assorted understory of shrubs and herbs (Holland and Keil 1995). Depending on community type, a riparian community may be dominated by any of several trees/shrubs, including box elder (*Acer negundo*), big-leaf maple (*A. macrophyllum*), coast live oak (*Q. agrifolia*), white alder (*Alnus rhombifolia*), sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii*), California walnut (*Juglans californica*), Mexican elderberry (*Sambucus mexicana*), wild grape (*Vitis girdiana*) giant reed (*Arundo donax*), mulefat (*Baccharis salicifolia*), tamarisk (*Tamarix* spp.), or any of several species of willow (*Salix* spp.). In addition, various understory herbs may be present, such as salt grass (*Distichlis spicata*), wild cucumber (*Marah macrocarpus*), mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and poison oak (*Toxicodendron diversilobum*).

RIVERSIDEAN ALLUVIAL FAN SAGE SCRUB. Riversidean alluvial fan sage scrub occurs throughout many drainages in the Plan Area and comprises approximately 0.6% (7,940 acres) of the Plan Area. Large acreages of the vegetation occur on the Santa Ana River near Lake Evans in the City of Riverside; along the San Gorgonio River and tributaries near Banning; on the San Jacinto River from the National Forest to the Soboba Indian Reservation; near Temecula

along Temecula Creek; the Aguanga area; Bautista Creek south of Hemet; and near Murrieta and Glen Ivy in the Temescal Valley.

Riversidean alluvial fan sage scrub is a Mediterranean shrubland type that occurs in washes and on gently sloping alluvial fans. Alluvial scrub is made up predominantly of drought-deciduous soft-leaved shrubs, but with significant cover of larger perennial species typically found in chaparral (Kirkpatrick and Hutchinson 1977). Scalebroom generally is regarded as an indicator of Riversidian alluvial scrub (Smith 1980; Hanes *et al.* 1989). In addition to scalebroom, alluvial scrub typically is composed of white sage (*Salvia apiana*), redberry (*Rhamnus crocea*), flat-top buckwheat (*Eriogonum fasciculatum*), our lord's candle (*Yucca whipplei*), California croton (*Croton californicus*), cholla (*Opuntia* spp.), tarragon (*Artemisia dracunculus*), yerba santa (*Eriodictyon* spp.), mule fat (*Baccharis salicifolia*), and mountain-mahogany (*Cercocarpus betuloides*) (Hanes *et al.* 1989; Smith 1980). Annual species composition has not been studied but is probably similar to that found in understories of neighboring shrubland vegetation. Two sensitive annual species are endemic to alluvial scrub vegetation in the Plan Area: slender-horned spine lower (*Dodecahema leptocerus*) and Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*).

WATER. Approximately 1.0% (12,210 acres) of the Plan Area consists of open water. Open water was mapped at Vail Lake, Lake Skinner, Diamond Valley Lake, Lake Perris, Mystic Lake, Canyon Lake, Lake Elsinore, Lee Lake, Lake Mathews, Hemet Lake, portions of the San Jacinto River, and portions of the Santa Ana River, as well as various small ponds, private reservoirs, and portions of stream channels.

Open water typically is unvegetated due to a lack of light penetration. However, open water may contain suspended organisms such as filamentous green algae, phytoplankton (including diatoms), and desmids (Grenfell 1988). Floating plants such as duckweed (*Lemna* spp.), water buttercup (*Ranunculus aquatilis*), and mosquito fern (*Azolla filiculoides*) also may be present (Holland and Keil 1995). Open water includes inland depressions, ponds, lakes, reservoirs, stream channels containing standing water and often occur in conjunction with riparian and upland Vegetation Communities. Depth may vary from hundreds of meters to a few centimeters.

WOODLANDS AND FORESTS. The Plan Area supports approximately 34,300 acres (2.7% of Plan Area) of woodlands and forests composed of black oak forest, broad-leaved upland forest,

oak woodlands and peninsular juniper woodland Vegetation Communities. Woodland and forest Vegetation Communities are dominated by Englemann oak (*Quercus englemannii*), coast live oak (*Q. agrifolia*), canyon live oak (*Q. chrysolepis*), interior live oak (*Q. wislizenii*), and black oak (*Q. kelloggii*) in the canopy, which may be continuous to intermittent or savannah-like. Four-needle pinyon (*Pinus quadrifolia*), single-leaf pinyon pine (*Pinus monophylla*) and California juniper (*Juniperus californica*) are the canopy species of peninsular juniper woodland which most commonly occur in Southern California, forming a scattered canopy from 3 to 15 m tall (Sawyer and Keller-Wolf 1995; Holland and Keil 1995).

Many understory plants in oak woodlands are shade tolerant and include wild blackberry *(Rubus ursinus)*, snowberry *(Symphoricarpos mollis)*, California walnut *(Juglans californica)*, California-lilac *(Ceanothus* spp.*), Rhus* spp.*,* currant *(Ribes* spp.), toyon *(Heteromeles arbutifolia)*, California bay *(Umbellularia californica)*, Engelmann oak, manzanita *(Arctostaphylos* spp.), laurel sumac *(Malosma laurina)*, poison-oak *(Toxicodendron diversilobum)* and herbaceous plants including bracken fern *(Pteridium aquilinum)*, polypody fern *(Polypodium californicum)*, fiesta flower *(Pholistorma auritum)* and miner's lettuce *(Claytonia perfoliata)* (Holland and Keil 1995, Sawyer and Keeler-Wolf 1995, Thorne 1976, Brown 1982). Munz and Keck (1968) identify similar species for this Vegetation Community and include that a variety of grasses and soft shrubs also are commonly found. This Vegetation Community can occur on all aspects, on stream sides, canyon bottoms and flat to very steep topography. Woodlands and forests are known to occur throughout the Plan Area.

DEVELOPED OR DISTURBED LAND. Approximately 218,260 acres (17.3%) of developed or disturbed lands occur within the Plan Area. Developed or disturbed lands consist of areas that have been disced, cleared, or otherwise altered. Developed lands may include roadways, existing buildings, and structures. The largest areas of developed land are in the Cities (and surrounding unincorporated communities) of Temecula, Murrieta, Lake Elsinore, Canyon Lake, (Meadowbrook, Alberhill, El Cariso and Lakeland Village), Hemet (East Hemet and Valle Vista), in Moreno Valley, and along the SR-91 corridor from Riverside through Corona and Norco. More medium-sized tracts of developed land are located in the communities of Canyon Lake, (Quail Valley, Sun City, Homeland), in Perris along I-215, (Mead Valley, Gavilan Hills, Woodcrest), Beaumont, Banning,(Cherry Valley), and Calimesa. Small and scattered occurrences include in the southeast portion of the Plan Area along SR-371 in the unincorporated communities of Terwilliger Valley, Sage, Aguanga and Anza, east of the city

of Temecula, and in (Sedco Hills). Disturbed lands may include ornamental plantings for landscaping, escaped exotics, or ruderal vegetation dominated by non-native, weedy species such as mustard (*Brassica* sp.), fennel (*Foeniculum vulgare*), tocalote (*Centaurea melitensis*), and Russian thistle (*Salsola tragus*).

UNKNOWN. Approximately 1,350 acres within the Plan Area were not classified into a Vegetation Community during the 1995 PSBS and KTU+A mapping effort.

2.1.4 Species Considered for Conservation in the MSHCP

The species considered for Conservation during the MSHCP planning process are summarized in *Table 2-2*. As shown in *Table 2-2*, the initial list of species considered for Conservation included 247 species identified for consideration by the MSHCP Advisory Committee in collaboration with the Wildlife Agencies. Early in the planning process, it was determined that sufficient information was not available for many of these species to proceed with conservation planning. The initial list of 247 species was reduced to 165 species as part of the *August 9, 1999 Draft MSHCP Proposal* prepared by DUDEK. The list was further refined to 146 species as the MSHCP planning process proceeded and information needed to proceed with conservation planning could not be obtained for certain species. Several species were added to the list during this process as suggested by stakeholders such as the Wildlife Agencies and the California Native Plant Society (CNPS). Species added included great blue heron, Dulzura kangaroo rat, Aguanga kangaroo rat, and six plant species.

Of the 146 Covered Species addressed in the MSHCP, 118 species are considered to be adequately conserved. The remaining 28 Covered Species will be considered to be adequately conserved when certain conservation requirements are met as identified in the species-specific conservation objectives for those species (species-specific conservation objectives for the 146 Covered Species are presented in *Section 9.0* of this document). For 16 of the 28 species, particular species-specific conservation objectives, which are identified in *Table 9-3*, must be satisfied to shift those particular species to the list of Covered Species Adequately Conserved. These 16 species are identified with the superscript (e) in the far right column of *Table 2-2*. For the remaining 12 species, a Memorandum of Understanding must be executed with the Forest Service that addresses management for these species on Forest Service Land in order to shift these species to the list of Covered Species Adequately Conserved. These 12 species are identified with the superscript (f) in the far right column of *Table 2-2*. Superscripts (a) through (d) in the far right column of *Table 2-2* indicate Covered Species Adequately Conserved for which surveys may be required. Specific survey requirements are included in the species-specific conservation objectives presented in *Section 9.0*

of this document and in *Sections 6.1.2, 6.1.3,* and *6.3.2* of this document. A complete summary of MSHCP species survey requirements is provided in *Appendix E* to this document.

TABLE 2-2
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Species Name	Listing Status State/ Federal {1}	Species Initially Considered for Conservation (3/99 - FWS Tables 1&2) {2} (247 species)	Species Considered for Conservation in "August 9, 1999 Draft MSHCP Proposal" {3} (165 species)	Species Considered for Conservation in "March 7, 2002 Admin Draft MSHCP Plan"{4} (142 species)	MSHCP Covered Species Adequately Conserved-{5} (146 species)
INVERTEBRATES/CRUSTACEANS					
Riverside fairy shrimp *Streptocephalus woottoni*	–/FE	✔	✔	✔	✔(a)
Santa Rosa Plateau fairy shrimp *Linderiella santarosae*	– / –	✔	✔	✔	✔(a)
vernal pool fairy shrimp *Branchinecta lynchi*	–/FT	✔	✔	✔	✔(a)
INVERTEBRATES/INSECTS					
Delhi Sands flower-loving fly *Rhaphiomidas terminatus abdominalis*	–/FE	✔	✔	✔	✔
Electra silkmoth *Hemileuca electra electra*	– / –	✔			
Frost's tiger beetle *Cicindela senilis frosti*	– / –	✔			
Greenest tiger beetle *Cicindela tranquebanca viridissima*	– / –	✔			
Harbisons dun skipper *Euphyes vestris harbisoni*	– / –	✔			
Quino checkerspot butterfly *Euphydryas editha quino*	–/FE	✔	✔	✔	✔
Ruth's cuckoo bee *Holcopasites ruthae*	– / –	✔			
San Jacinto blue butterfly *Euphilotes enoptes cryptorufes*	– / –	✔			
Simple hydroporus diving beetle *Hydroporus simplex*	– / –	✔			

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Species Name	Listing Status State/ Federal {1}	Species Initially Considered for Conservation (3/99 - FWS Tables 1&2) {2} (247 species)	Species Considered for Conservation in "August 9, 1999 Draft MSHCP Proposal" {3} (165 species)	Species Considered for Conservation in "March 7, 2002 Admin Draft MSHCP Plan"{4} (142 species)	MSHCP Covered Species Adequately Conserved-{5} (146 species)
FISH					
arroyo chub *Gila orcutti*	SSC/–	✔	✔	✔	✔
Santa Ana sucker *Catastomus santaanae*	SSC/FT	✔	✔	✔	✔
speckled dace *Rhinichthys osculus*	– / –	✔	✔		
AMPHIBIANS					
arroyo toad *Bufo californicus*	SSC/FE	✔	✔	✔	✔(c)
California red-legged frog *Rana aurora draytonii*	SSC/FT	✔	✔	✔	✔(c)
coast range newt *Taricha tarosa tarosa*	SSC/–	✔	✔	✔	✔
large-blotched salamander *Ensatina escholtzii klauberi*	SSC/–	✔	✔		
mountain yellow-legged frog *Rana mucosa*	SP, SSC/FE	✔	✔	✔	✔(c)
western spadefoot *Scaphiopus hammondii*	SSC/–	✔	✔	✔	✔
REPTILES					
Belding's orange-throated whiptail *Cnemidophorus hyperythrus beldingi*	SSC/–	✔	✔	✔	✔
California legless lizard *Anniella pulchra pulchra*	SSC/	✔	✔		
California red-sided garter snake *Thamnophis sirtalis infernalis*	– / –	✔	✔		
coast patch-nosed snake *Salvadora hexalepis virgultea*	SSC/–	✔	✔		
coastal glossy snake *Arizona elegans occidentalis*	– / –	✔	✔		
coastal rosy boa *Lichanura trivirgata roseofusca*	– / –	✔	✔		
coastal western whiptail *Cnemidophorus tigris multiscutatus*	– / –	✔	✔	✔	✔

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

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granite night lizard *Xantusia henshawi henshawi*	– / –	✔	✔	✔	✔
granite spiny lizard *Sceloporus orcutti*	– / –	✔	✔	✔	✔
long-nosed leopard lizard *Gambelia wislizenii*	– / –	✔	✔		
northern red-diamond rattlesnake *Crotalus ruber ruber*	SSC/–	✔	✔	✔	✔
San Bernardino mountain kingsnake *Lampropeltis zonata parvirubra*	SSC/–	✔	✔	✔	✔(f)
San Bernardino ringneck snake *Diadiphis punctatus modestus*	– / –	✔	✔		
San Diego banded gecko *Coleonyx variegatus abbottii*	– / –	✔	✔	✔	✔
San Diego horned lizard *Phrynosoma coronatum blainvillei*	SSC/–	✔	✔	✔	✔
San Diego mountain kingsnake *Lampropeltis zonata pulchra*	SSC/–	✔	✔	✔	✔(f)
San Diego ringneck snake *Diadophis punctatus similis*	– / –	✔	✔		
southern rubber boa *Charina bottae umbratica*	ST/–	✔	✔	✔	✔(f)
southern sagebrush lizard *Sceloporus graciosus vandenburgianus*	– / –	✔	✔	✔	✔(f)
two-striped garter snake *Thamnophis hammondii*	SSC/–	✔	✔		
western pond turtle *Clemmys marmorata pallida*	SSC/–	✔	✔	✔	✔
BIRDS					
American bittern *Botaurus lentiginosus*	– /	✔	✔	✔	✔
bald eagle *Haliaeetus leucocephalus*	SP, SE/FT	✔	✔	✔	✔
Bell's sage sparrow *Amphispiza belli belli*	SSC/	✔	✔	✔	✔

TABLE 2-2 (*Continued*)
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black swift (breeding) *Cypseloides niger*	SSC/	✔	✔	✔	✔
black-crowned night heron *Nycticorax nycticorax*	– / –	✔	✔	✔	✔
burrowing owl *Athene cunicularia hypugaea*	SSC/	✔	✔	✔	✔(c)
cactus wren *Campylorhynchus brunneicapillus*	SSC/–	✔	✔	✔	✔
California black rail *Laterallus jamaicensis*	SP, ST/	✔			
California horned lark *Eremophila alpestris actia*	SSC/–	✔	✔	✔	✔
California spotted owl *Strix occidentalis occidentalis*	SSC/	✔	✔	✔	✔(f)
coastal California gnatcatcher *Polioptila californica californica*	SSC/FT	✔	✔	✔	✔
Cooper's hawk *Accipiter cooperii*	SSC/–	✔	✔	✔	✔
double-crested cormorant *Phalacrocorax auritus*	SSC/–	✔	✔	✔	✔
downy woodpecker *Picoides pubescens*	– / –	✔	✔	✔	✔
ferruginous hawk *Buteo regalis*	SSC/	✔	✔	✔	✔
flammulated owl *Otus flammeolus*	– / –	✔	✔		
golden eagle *Aquila chrysaetos*	SP, SSC/–	✔	✔	✔	✔
grasshopper sparrow *Ammodramus savannarum*	– / –	✔	✔	✔	✔(e)
great blue heron *Ardea herodias*	– / –			✔	✔
greater sandhill crane *Grus canadensis tabida*	SP, ST/–	✔			

TABLE 2-2 (*Continued*)
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Le Conte's thrasher *Toxostoma lecontei*	SSC/	✔	✔		
least Bell's vireo *Vireo bellii pusillus*	SE/FE	✔	✔	✔	✔(a)
Lincoln's sparrow (breeding) *Melospiza lincolnii*	– / –	✔	✔	✔	✔(e)
loggerhead shrike *Lanius ludovicianus*	SSC/	✔	✔	✔	✔
long-eared owl (breeding) *Asio otus*	SSC/–	✔	✔		
Macgillivray's warbler *Oporornis tolmiei*	– / –	✔	✔	✔	✔
merlin *Falco columbarius*	SSC/–	✔	✔	✔	✔
mountain plover (wintering) *Charadrius montanus*	SSC/PT	✔	✔	✔	✔
mountain quail *Oreortyx pictus*	– / –	✔	✔	✔	✔
Nashville warbler *Vermivora ruficapilla*	– / –	✔	✔	✔	✔
northern goshawk *Accipiter gentilis*	SSC/	✔	✔	✔	✔
northern harrier (breeding) *Circus cyaneus*	SSC/–	✔	✔	✔	✔
northern pygmy owl *Glaucidium gnoma*	– / –	✔			
osprey *Pandion haliaetus*	SSC/–	✔	✔	✔	✔
peregrine falcon *Falco peregrinus*	SP, SE/ delisted	✔	✔	✔	✔
prairie falcon (breeding) *Falco mexicanus*	SSC/–	✔	✔	✔	✔
purple martin *Progne subis*	SSC/–	✔	✔	✔	✔

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sharp-shinned hawk *Accipiter striatus*	SSC/–	✔	✔	✔	✔
short-eared owl (breeding) *Asio flammeus*	SSC/–	✔	✔		
So. California rufous-crowned sparrow *Aimophila ruficeps canescens*	SSC/–	✔	✔	✔	✔
southwestern willow flycatcher *Empidonax traillii extimus*	SE/FE	✔	✔	✔	✔(a)
Swainson's hawk *Buteo swainsoni*	ST/	✔	✔	✔	✔
Swainson's thrush (breeding) *Catharus ustulatus*	– / –	✔	✔		
tree swallow *Tachycineta bicolor*	– / –	✔	✔	✔	✔
tricolored blackbird (colony) *Agelaius tricolor*	SSC/	✔	✔	✔	✔
turkey vulture (breeding) *Cathartes aura*	– / –	✔	✔	✔	✔
Vaux's swift *Chaetura vauxi*	SSC/	✔	✔		
western least bittern *Ixobrychus exilis hesperis*	SSC/–	✔	✔		
western snowy plover *Charadrius alexandrinus nivosus*	SSC/FT	✔	✔		
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	SE/–	✔	✔	✔	✔(a)
white-faced ibis *Plegadis chihi*	SSC/	✔	✔	✔	✔
white-tailed kite *Elanus leucurus*	SP/	✔	✔	✔	✔
Williamson's sapsucker *Sphyrapicus thyroideus*	– / –	✔	✔	✔	✔(f)
Wilson's warbler *Wilsonia pusilla*	– / –	✔	✔	✔	✔

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yellow warbler *Dendroica petechia brewsteri*	SSC/–	✔	✔	✔	✔
yellow-breasted chat *Icteria virens*	SSC/–	✔	✔	✔	✔
MAMMALS					
Aguanga kangaroo rat *Dipodomys merriami collinus*	– / –	✔		✔	✔(c)
American badger *Taxidea taxus*	SSC/–	✔			
big free tailed bat *Nyctinimops macrotis*	SSC/–	✔			
bobcat *Lynx rufus*	– / –	✔	✔	✔	✔
brush rabbit *Sylvilagus bachmani*	– / –	✔	✔	✔	✔
California leaf-nosed bat *Macrotus californicus*	SSC/–	✔			
California mastiff bat *Eumops perotis californicus*	SSC/	✔			
coyote *Canis latrans*	– / –	✔	✔	✔	✔
Dulzura California pocket mouse *Chaetodipus californicus femoralis*	SSC/–	✔	✔		
Dulzura kangaroo rat *Dipodomys simulans*	– / –			✔	✔
fringed myotis *Myotis thysanodes*	– /	✔			
long-eared myotis *Myotis evotis*	– /	✔			
long-legged myotis *Myotis volans*	– /	✔			
long-tailed weasel *Mustela frenata*	– / –	✔	✔	✔	✔
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	SSC/–	✔		✔	✔(c)

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Mexican long-tongued bat *Choeronyeteris mexicana*	SSC/–	✔			
mountain lion *Puma concolor*	– / –	✔	✔	✔	✔
Nelson's bighorn sheep *Ovis canadensis nelsoni*	– / –	✔			
northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	SSC/–	✔	✔	✔	✔
pale big-eared bat *Pleocotus townsendii pallescens*	SSC/	✔			
pallid bat *Antrozous pallidus*	SSC/–	✔			
peninsular bighorn sheep *Ovis canadensis cremnobates*	SP, SE/FE	✔			
pocketed free-tailed bat *Nyctinimops femorosaccus*	SSC/–	✔			
ringtail *Bassarisucs astutus*	– / –	✔			
San Bernardino flying squirrel *Glaucomys sabrinus californicus*	SSC/–	✔	✔	✔	✔(e)
San Bernardino kangaroo rat *Dipodomys merriami parvus*	SSC/FE	✔		✔	✔(c)
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	SSC/–	✔	✔	✔	✔
San Diego desert woodrat *Neotoma lepida intermedia*	SSC/–	✔	✔	✔	✔
southern grasshopper mouse *Onychomys torridus ramona*	SSC/	✔			
southern yellow bat *Lasiurus ega*	– / –	✔			
spotted bat *Euderma maculatum*	SSC/	✔			
Stephens' kangaroo rat *Dipodomys stephensi*	ST/FE	✔	✔	✔	✔

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western big-eared bat *Pleocotus townsendii townsendii*	SSC/	✔			
western small-footed myotis *Myotis ciliolabrum*	– /	✔			
PLANTS					
Adder's mouth *Malaxis monophyllos* ssp. *brachypoda*	– / –	✔			
Ayenia *Ayenia compacta*	– / –	✔			
beautiful hulsea *Hulsea vestita* ssp. *callicarpha*	– / –	✔	✔	✔	✔(e)
Big Bear Valley woollypod *Astragalus leucolobus*	– / –	✔			
bluish spike moss *Selaginella asprella*	– / –	✔	✔		
Brand's phacelia *Phacelia stellaris*	– / –				✔(b)
Braunton's milk-vetch *Astragalus brauntonii*	– /FE	✔			
California beardtongue *Penstemon californicus*	– / –	✔	✔	✔	✔
California bedstraw *Galium californicum* ssp. *primum*	– / –	✔	✔	✔	✔(f)
California black walnut *Juglans californica* var. *californica*	– / –	✔	✔	✔	✔
California muhly *Muhlenbergia californica*	– /–	✔	✔	✔	✔(e)
California Orcutt grass *Orcuttia californica*	SE/FE	✔	✔	✔	✔(b)
California spine-flower *Mucronea californica*	– / –	✔	✔	✔	
Caraway-leaved gilia *Gilia caruifolia*	– / –	✔			
chickweed oxytheca *Oxytheca caryophylloides*	– / –	✔	✔	✔	✔(e)

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chocolate lily *Fritillaria biflora*	– / –	✔	✔		
Cleveland's bush monkeyflower *Mimulus clevelandii*	– / –	✔	✔	✔	✔(f)
cliff cinquefoil *Potentilla rimicola*	– / –	✔	✔	✔	✔(e)
cliff spurge *Euphorbia misera*	– / –	✔			
coastal dunes milk-vetch *Astragalus tener* var. *titi*	SE/FE	✔			
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	– / –	✔	✔	✔	✔(d)
Coulter's matilija poppy *Romneya coulteri*	– / –	✔	✔	✔	✔(e)
Coulter's saltbush *Atriplex coulteri*	– / –	✔	✔	✔	
crested milk-vetch *Astragalus bicristatus*	– / –	✔			
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	– / –	✔	✔	✔	✔(d)
Davidson's stonecrop *Sedum niveum*	– / –	✔			
desert sage *Salvia eremostachya*	– / –	✔			
Duran's rush *Juncus duranii*	– / –	✔			
Engelmann oak *Quercus engelmannii*	– / –	✔	✔	✔	✔
Fish's milkwort *Polygala cornuta* var. *fishiae*	– / –	✔	✔	✔	✔(e)
graceful tarplant *Holocarpha virgata* ssp. *elongata*	– / –	✔	✔	✔	✔(e)

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Hall's monardella *Monardella macrantha* ssp. *hallii*	– / –	✔	✔	✔	✔
Hammitt's clay-cress *Sibaropsis hammittii*	– / –				✔(b)
heart-leaved pitcher sage *Lepechinia cardiophylla*	– / –	✔	✔	✔	✔(d)
hidden Lake bluecurl *Trichostema austromontanum* ssp. *compactum*	–/FT	✔			
intermediate mariposa lily *Calochortus weedii* var. *intermedius*	– / –	✔	✔	✔	✔
jackass clover *Wislizenia refracta* ssp. *refracta*	– / –	✔			
Jaeger's milk-vetch *Astragalus pachypus* var. *jaegeri*	– / –	✔	✔	✔	✔
Johnston's rock cress *Arabis johnstonii*	– / –	✔	✔	✔	✔(b)
Laguna Mountains jewel-flower *Streptanthus bernardinus*	– / –	✔			
Lakeside ceanothus *Ceanothus cyaneus*	– / –	✔			
leafy buckwheat *Eriogonum foliosum*	– / –	✔			
Lemmon's syntrichopappus *Syntrichopappus lemmonii*	– / –	✔			
lemon lily *Lilium parryi*	– / –	✔	✔	✔	✔(f)
light-gray lichen *Mobergia calculiformis*	– / –	✔			
little mousetail *Myosurus minimus*	– / –	✔	✔	✔	✔(d)
long-spined spine flower *Chorizanthe polygonoides* var. *longispina*	– / –	✔	✔	✔	✔
many-stemmed dudleya *Dudleya multicaulis*	– / –	✔	✔	✔	✔(b)

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Mission Canyon bluecup *Githopsis diffusa* ssp. *filicaulis*	– / –	✔			
Mojave tarplant *Deinandra mohavensis*	SE/ –	✔	✔	✔	✔(e)
mud nama *Nama stenocarpum*	– / –				✔(d)
Munz's mariposa lily *Calochortus palmeri* var. *munzii*	– / –	✔	✔	✔	✔(b)
Munz's onion *Allium munzii*	ST/FE	✔	✔	✔	✔(b)
Nevin's barberry *Berberis nevinii*	SE/FE	✔	✔	✔	✔(d)
ocellated Humboldt lily *Lilium humboldtii* ssp. *ocellatum*	– / –	✔	✔	✔	✔(f)
Orcutt's brodiaea Brodiaea orcuttii	– / –	✔	✔	✔	✔
Orcutt's linanthus *Linanthus orcuttii*	– / –	✔			
Palmer's mariposa lily *Calochortus palmeri* var. *palmeri*	– / –	✔			
Palmer's grapplinghook *Harpagonella palmeri*	– / –	✔	✔	✔	✔
Palomar monkeyflower *Mimulus diffusus*	– / –	✔	✔	✔	✔
panamint dudleya *Dudleya saxosa* ssp. *saxosa*	– / –	✔			
Parish's alumroot *Heuchera parishii*	– / –	✔			
Parish's brittlescale *Atriplex parishii*	– / –	✔	✔	✔	✔(d)
Parish's chaenactis *Chaenactis parishii*	– / –	✔			
Parish's daisy *Erigeron parishii*	–/FT	✔			

TABLE 2-2 (*Continued*)
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Parish's desert thorn *Lycium parishii*	– / –	✔			
Parish's meadowfoam *Limnanthes gracilis* var. *parishii*	SE/ –	✔	✔	✔	✔
Parish's onion *Allium parishii*	– / –	✔			
Parish's rupertia *Rupertia rigida*	– / –	✔			
Parry's spine flower *Chorizanthe parryi* var. *parryi*	– / –	✔	✔	✔	✔(e)
Parry's tetracoccus *Tetracoccus dioicus*	– / –	✔			
Payson's jewelflower *Caulanthus simulans*	– / –	✔	✔	✔	✔
peninsular spine flower *Chorizanthe leptotheca*	– / –	✔	✔	✔	✔(e)
Plummer's mariposa lily *Calochortus plummerae*	– / –	✔	✔	✔	✔(e)
prairie wedge grass *Sphenopholis obtusata*	– / –	✔	✔		
Pringle's monardella *Monardella pringlei*	– / –	✔			
prostrate navarretia *Navarretia prostrate*	– / –				✔(d)
prostrate spine flower *Chorizanthe procumbens*	– / –	✔	✔	✔	✔
Rainbow manzanita *Arctostaphylos rainbowensis*	– / –	✔	✔	✔	✔(e)
Robinson's pepper grass *Lepidium virginicum* var. *robinsonii*	– / –	✔			
round-leaved boykinia *Boykinia rotundifolia*	– / –	✔	✔		
round-leaved filaree *Erodium macrophyllum*	– / –	✔			✔(d)

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Species Name	Listing Status State/ Federal {1}	Species Initially Considered for Conservation (3/99 - FWS Tables 1&2) {2} (247 species)	Species Considered for Conservation in "August 9, 1999 Draft MSHCP Proposal" {3} (165 species)	Species Considered for Conservation in "March 7, 2002 Admin Draft MSHCP Plan"{4} (142 species)	MSHCP Covered Species Adequately Conserved-{5} (146 species)
sagebrush loeflingia *Loeflingia squarrosa* var. *artemisiarum*	– / –	✔			
salt spring checkerbloom *Sidalcea neomexicana*	– / –	✔			
San Bernardino Mountains owl clover *Castilleja lasiorhyncha*	– / –	✔			
San Diego ambrosia *Ambrosia pumila*	–/FE	✔	✔	✔	✔(b)
San Diego button-celery *Eryngium aristulatum* var. *parishii*	SE/FE	✔	✔	✔	✔
San Diego goldenstar *Muilla clevelandii*	– / –	✔			
San Jacinto beardtongue *Penstemon clevelandii* var. *connatus*	– / –	✔	✔		
San Jacinto Mountains bedstraw *Galium angustifolium* ssp. *jacinticum*	– / –	✔	✔	✔	✔(b)
San Jacinto Mountain daisy *Erigeron breweri* var. *jacinteus*	– / –	✔	✔		
San Jacinto prickly phlox *Leptodactylon jaegeri*	– / –	✔			
San Jacinto Valley crownscale *Atriplex coronata* var. *notatior*	–/FE	✔	✔	✔	✔(d)
San Miguel savory *Satureja chandleri*	– / –	✔	✔	✔	✔(b)
Santa Ana River woollystar *Eriastrum densifolium* ssp. *sanctorum*	SE/FE	✔	✔	✔	✔
Santa Rosa Mountains linanthus *Linanthus floribundus* ssp. *hallii*	– / –	✔			
Santiago Peak keckii *Phacelia suaveolens* ssp. *keckii*	– / –	✔			
shaggy-haired alumroot *Heuchera hirsutissima*	– / –	✔	✔	✔	✔(f)
slender bedstraw *Galium angustifolium* ssp. *gracillimum*	– / –	✔	✔		

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Species Name	Listing Status State/ Federal {1}	Species Initially Considered for Conservation (3/99 - FWS Tables 1&2) {2} (247 species)	Species Considered for Conservation in "August 9, 1999 Draft MSHCP Proposal" {3} (165 species)	Species Considered for Conservation in "March 7, 2002 Admin Draft MSHCP Plan"{4} (142 species)	MSHCP Covered Species Adequately Conserved-{5} (146 species)
slender-horned spine flower *Dodecahema leptoceras*	SE/FE	✔	✔	✔	✔(b)
small-flowered bluecurls *Trichostema micranthum*	– / –	✔			
small-flowered microseris *Microseris douglasii* var. *platycarpha*	– / –	✔	✔	✔	✔(e)
small-flowered morning-glory *Convolvulus simulans*	– / –	✔	✔	✔	✔
smooth tarplant *Centromadia pungens* ssp. *laevis*	– / –	✔	✔	✔	✔(d)
snake cholla *Opuntia parry* var. *serpentina*	– / –	✔			
Sonoran maiden form *Thelypteris puberula* var. *sonorensis*	– / –	✔	✔		
South coast saltscale *Atriplex pacifica*	– / –	✔			
southern skullcap *Scutellaria bolanderi* ssp. *austromontana*	– / –	✔			
southern jewel-flower *Streptanthus campestris*	– / –	✔			
spreading navarretia *Navarretia fossalis*	– / FT	✔	✔	✔	✔(b)
sticky-leaved dudleya *Dudleya viscida*	– / –	✔	✔	✔	✔(f)
summer holly *Comarostaphylis diversifolia* ssp. *diversifolia*	– / –	✔			
Tahquitz ivesia *Ivesia callida*	SR/–	✔			
thread-leaved brodiaea *Brodiaea filifolia*	SE/FT	✔	✔	✔	✔(d)
Thurber's penstemon *Penstemon thurberi*	– / –	✔			
Vail Lake ceanothus *Ceanothus ophiochilus*	SE/FT	✔	✔	✔	✔(d)

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Species Name	Listing Status State/ Federal {1}	Species Initially Considered for Conservation (3/99 - FWS Tables 1&2) {2} (247 species)	Species Considered for Conservation in "August 9, 1999 Draft MSHCP Proposal" {3} (165 species)	Species Considered for Conservation in "March 7, 2002 Admin Draft MSHCP Plan"{4} (142 species)	MSHCP Covered Species Adequately Conserved-{5} (146 species)
vernal barley *Hordeum intercedens*	– / –	✔	✔	✔	✔
white-bracted spine-flower *Chorizanthe xanti* var. *leucotheca*	– / –	✔			
white-margined oxytheca *Oxytheca emarginata*	– / –	✔			
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	– / –	✔	✔	✔	✔(b)
Yucaipa onion *Allium marvinii*	– / –				✔(b)
Ziegler's aster *Machaeranthera canescens* var. *ziegleri*	– / –	✔			

FOOTNOTES:

(1) FEDERAL DESIGNATIONS

FE **Endangered:** Species listed as endangered by the U.S. Fish and Wildlife Service. Taxa threatened throughout all or a significant portion of their range. The term "endangered species" means any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary to constitute a pest whose protection under the provisions of this Act would present an overwhelming and overriding risk to man (Section 3 (6) of the Endangered Species Act).

FT **Threatened:** Species listed as threatened by the U.S. Fish and Wildlife Service. Taxa likely to become endangered in the foreseeable future. The term "threatened species" means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (Section 3 (19) of the Endangered Species Act).

PT **Proposed Threatened:** Species proposed for listing as threatened by the U.S. Fish and Wildlife Service

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

Proposed: Any species of fish, wildlife, or plant that is proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act. The formal process of publishing a proposed federal regulation in the Federal Register and establishing a comment period for public input in the decision-making process. Plants and animals must be proposed for listing as threatened or endangered species, and the resulting public comments must be analyzed, before the UFWS can make a final decision.

Petition: A formal request, with the support of adequate biological data, suggesting that a species be listed, reclassified, or delisted, or that critical Habitat be revised for a listed species.

STATE DESIGNATIONS

SE **Endangered:** Species classified as endangered by the California Fish and Game Commission. Taxa which are in serious danger of becoming extinct throughout all, or a significant portion, of their range due to one or more causes including loss of Habitat, change in Habitat, over exploitation, predation, competition, or disease (Section 2062 of the Fish and Game Code).

ST **Threatened:** Species classified as threatened by the California Fish and Game Commission. Taxa which, although not presently threatened with extinction, are likely to become endangered species in the foreseeable future (Section 2067 of the Fish and Game Code).

SSC **California or CDFG Species of Special Concern:** Species considered by the California Department of Fish and Game as possibly facing extirpation in California due to declining populations or loss of Habitat. Taxa that appear to be vulnerable to extinction because of declining populations, limited ranges, and/or continuing threats.

California Special Concern Species: It is the goal and responsibility of the Department of Fish and Game to maintain viable populations of all native species. To this end, the Department has designated certain vertebrate species as "Species of Special Concern" because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. The goal of designating species as "Species of Special Concern" is to halt or reverse their declining by calling attention to their plight and addressing the issues of concern early enough to secure their long term viability. Not all "Species of Special Concern" have declined equally; some species may be just starting to decline, while others may have already reached the point where they meet the criteria for listing as a "Threatened" or "Endangered" species under the State and/or Federal Endangered species Acts.

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

SP	**Fully Protected**	Fully protected species may not be taken or possessed without a permit from the Fish and Game Commission and/or the Department of Fish and Game.
SR	**Rare:**	Taxa which, although not presently threatened with extinction, are present in such small numbers throughout their range that they may become endangered if the present environment worsens (Section 1901 of the Fish and Game Code).
	Candidate:	Taxa which the Fish and Game Commission has formally noticed as being under review by the Department in addition to the list of threatened and endangered species.

(2) The list of species initially considered for Conservation by the Wildlife Agencies in collaboration with the MSHCP Advisory Committee. This list was documented by FWS staff in Tables 1 and 2 prepared in March 1999. Tables 1 and 2 are included in the Appendix to the August 9, 1999 "Draft MSHCP Proposal" (DUDEK 1999) on file with the County of Riverside.

(3) This list of species was developed by DUDEK from the list of species initially considered for Conservation based on preliminary review of the MSHCP database. This list is described in the August 9, 1999 "Draft MSHCP Proposal" (DUDEK 1999) on file with the County of Riverside.

(4) This list of species was developed by DUDEK as a refinement of the list of species included in the August 9, 1999 "Draft MSHCP Proposal." The refinements were based on input from the Wildlife Agencies and a variety of stakeholders as well as additional research conducted by DUDEK. In general, species previously considered for Conservation were eliminated from the list because information needed to proceed with conservation planning for the species was determined to be unavailable.

(5) This list of species was developed by DUDEK as a refinement to the list of species included in the March 7, 2002 Administrative Draft MSHCP and reflects additions recommended by the Wildlife Agencies and CNPS as well as elimination of two plant species for which it was determined sufficient information was not available to proceed with conservation planning. A complete summary of all MSHCP species survey requirements is provided in *Appendix E* of this document.

(a) Surveys may be required for these species as part of wetlands mapping as described in *Section 6.1.2* of this document.

(b) Surveys may be required for these species within Narrow Endemic Plant Species survey area as described in *Section 6.1.3* of this document.

(c) Surveys may be required for these species within locations shown on survey maps as described in *Section 6.3.2* of this document.

(d) Surveys may be required for these species within Criteria Area as described in *Section 6.3.2* of this document.

(e) These Covered Species will be considered to be Covered Species Adequately Conserved when conservation requirements identified in species-specific conservation objectives have been met. Species-specific conservation

TABLE 2-2 (*Continued*)
SPECIES CONSIDERED FOR CONSERVATION
UNDER THE MSHCP SINCE 1999

objectives for these species are presented in *Section 9.0* of this document. Please refer to *Table 9-3* for specific conservation objectives that must be met for these 16 species prior to including them on the list of Covered Species Adequately Conserved.

(f) These Covered Species will be considered to be Covered Species Adequately Conserved when a Memorandum of Understanding is executed with the Forest Service that addresses management for these species on Forest Service Land. Please refer to *Table 9-3.*

2.2 LAND USE CONTEXT

2.2.1 Existing Land Use

Existing land uses within the MSHCP Plan Area can be characterized by developed, agriculture and open space/vacant land categories. Developed land uses include residential uses (single family detached, single family attached, high-density residential, and mobile homes), commercial uses (retail/office and tourist/commercial recreation), industrial uses (light industrial/business park, heavy industrial, mineral extraction, and warehouse), public facilities (utilities, other public facilities, and schools), recreational uses (recreation open space), and rural uses (rural residential). Open space/vacant lands are composed of natural, vacant, and water categories. *Figure 2-7* depicts existing land uses within the Plan Area. Approximately 218,260 acres of incorporated and unincorporated County lands are currently developed. A total of 169,480 acres are characterized as agriculture, and 871,040 acres are characterized as vacant land.

2.2.2 Planned Land Use

As outlined in *Section 1.0* of this document, the County is developing an updated General Plan for the unincorporated area concurrent with development of the MSHCP. The proposed General Plan incorporates four broad Foundation Component land uses: Agriculture, Rural, Open Space, and Community Development.

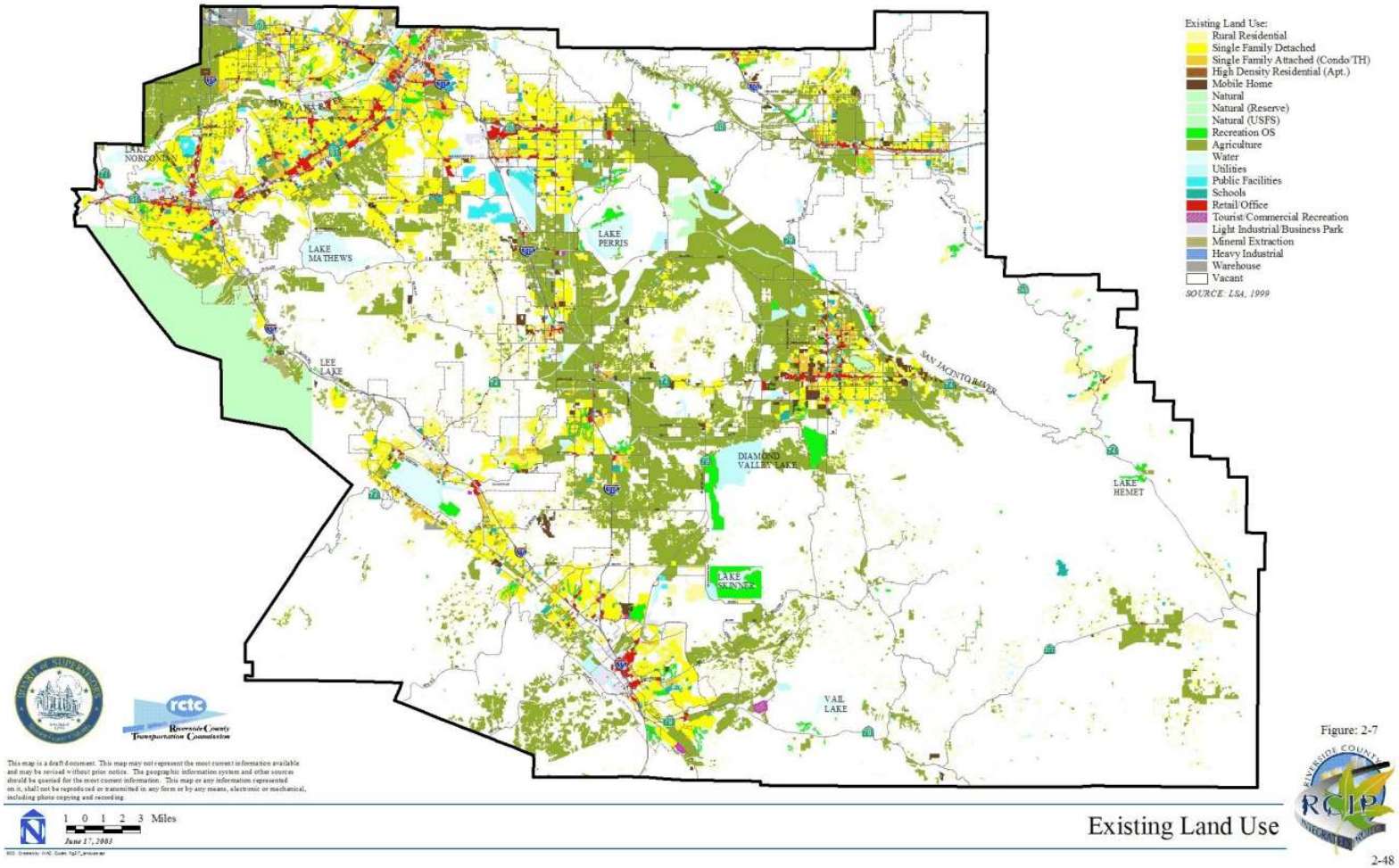

Figure: 2-7

2-48

2.2.3 Institutional/Political Framework

The MSHCP Plan Area is composed of the jurisdictional boundaries of 14 Cities as well as unincorporated lands within Western Riverside County. *Table 2-3* provides a breakdown of acreages for the various Jurisdictions within the Plan Area. As shown, unincorporated County lands comprise approximately 78% of the Plan Area with the remaining approximately 22% comprised of incorporated Cities. County and Cities boundaries are depicted in *Figure 2-8.*

TABLE 2-3. LAND DISTRIBUTION BY JURISDICTION

Unincorporated County	988,135 acres (78.5%)*
City of Temecula	16,670 acres (1.3%)
City of Murrieta	18,280 acres (1.5%)
City of Lake Elsinore	24,750 acres (1.9%)
City of Canyon Lake	2,965 acres (< 1%)
City of Corona	22,875 acres (1.8%)
City of Norco	8,550 acres (< 1%)
City of Riverside	50,020 acres (4.0%)
City of Moreno Valley	32,705 acres (2.6%)
City of Perris	20,290 acres (1.6%)
City of Hemet	16,165 acres (1.3%)
City of San Jacinto	16,220 acres (1.3%)
City of Beaumont	16,775 acres (1.3%)
City of Banning	14,845 acres (1.2%)
City of Calimesa	9,535 acres (< 1%)

* Includes all water bodies within both unincorporated and incorporated areas.
Source: RCIP Numbers Document.

Generalized land ownership within the MSHCP Plan Area is depicted in *Figure 2-9*. As shown, approximately 67% of the Plan Area is composed of private lands; approximately 3% is American Indian Lands, which are not a part of the MSHCP Plan; and the remaining approximately 30% of the Plan Area is composed of various public ownerships.

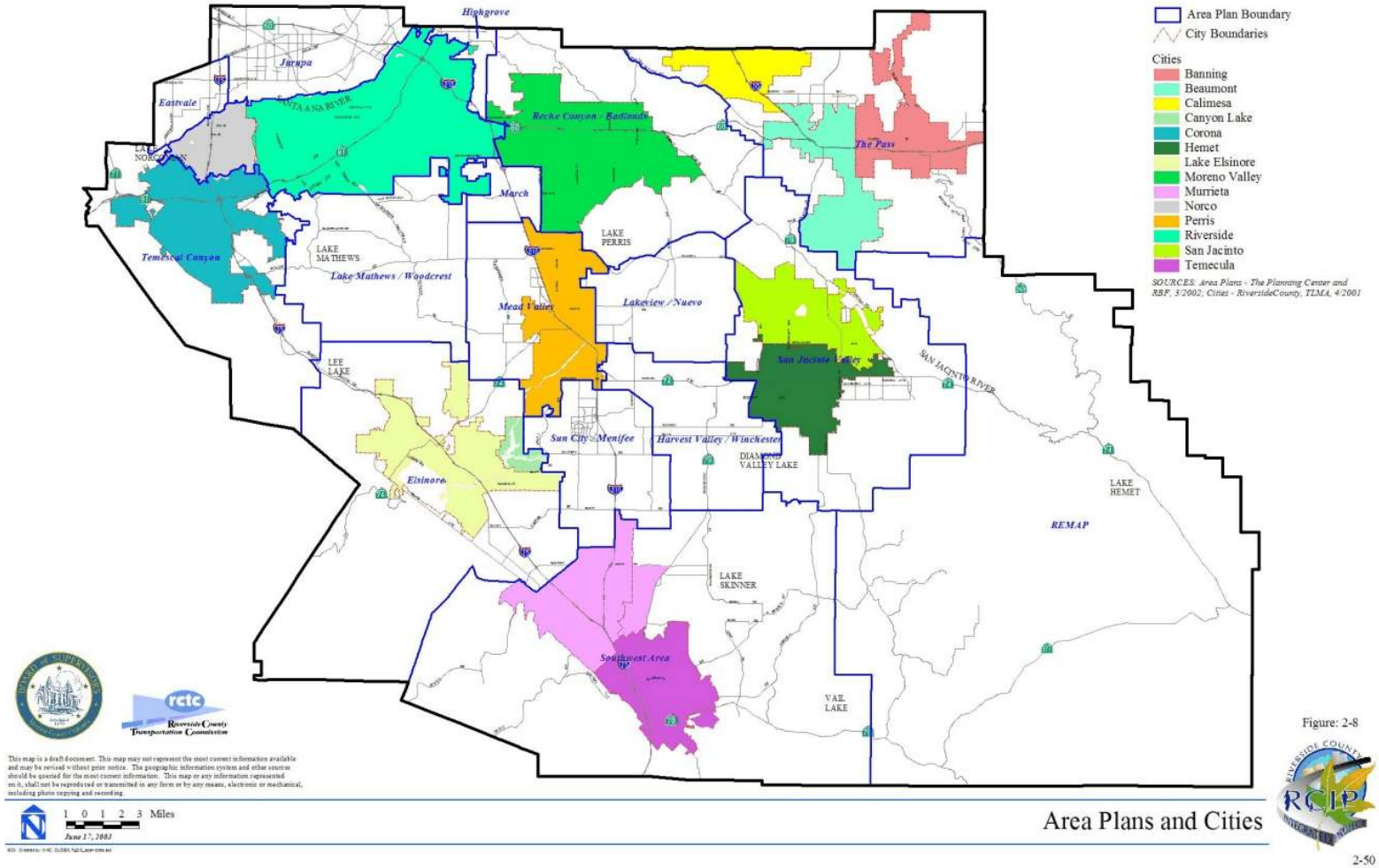

Figure: 2-8

2-50

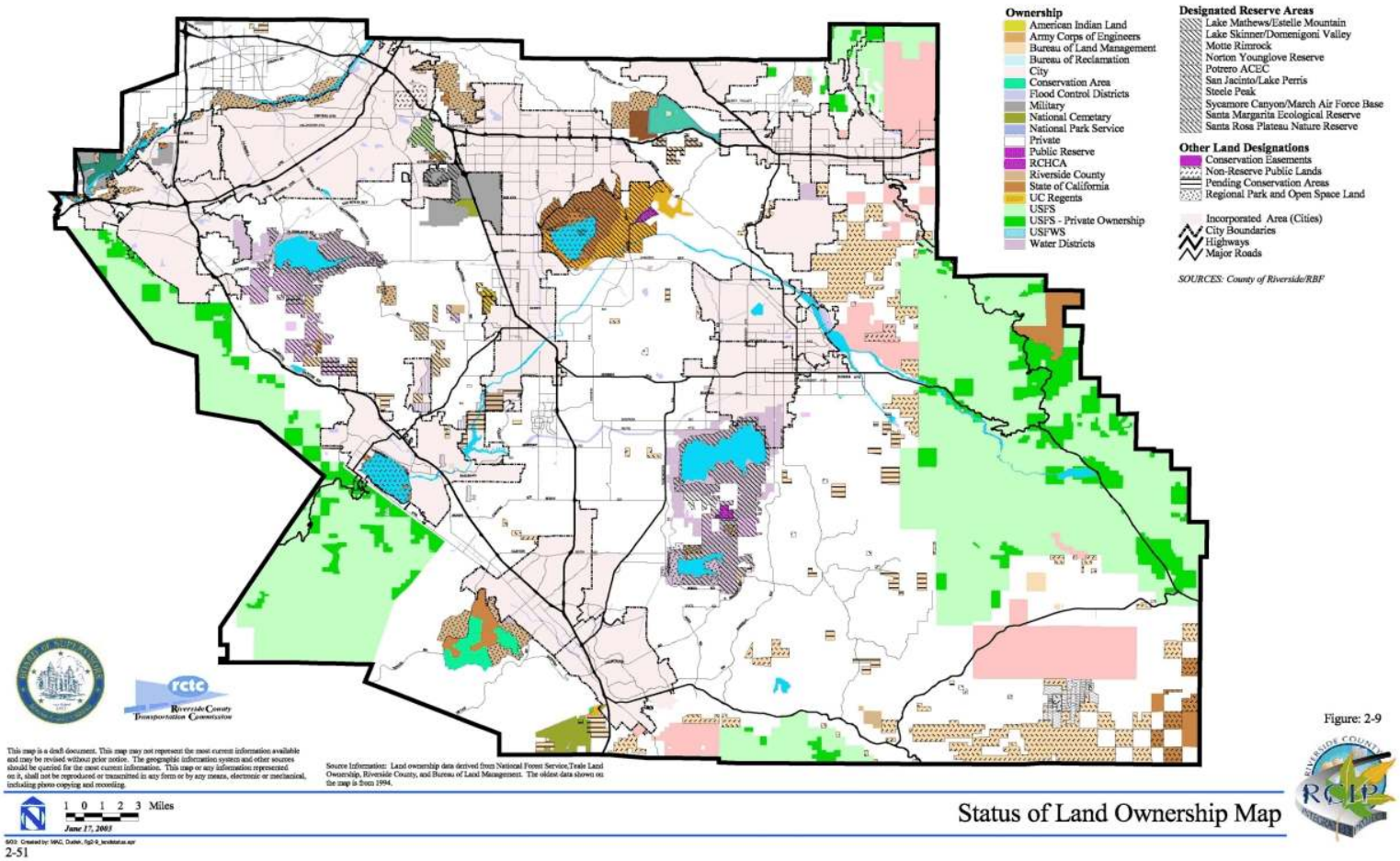

Figure: 2-9

Status of Land Ownership Map

Tables 2-4 and *2-5* summarize planned land uses within the MSHCP Plan Area for the unincorporated County lands and the 14 Cities, respectively, based on existing available General Plan data for the County and Cities. As shown, the proposed County General Plan designates a total of 179,940 acres as Community Development, 294,900 acres as Rural, 439,530 acres as Open Space/Conservation, and 30,610 acres as Agriculture within unincorporated County lands in the MSHCP Plan Area (General Plan Update Public Hearing Draft, April 5, 2002). Each of the 14 Cities within the MSHCP Plan Area has its own General Plan. According to the Cities' General Plans, a total of 222,530 acres would be designated for community development use, 12,190 acres for rural use, 29,840 acres for open space use, and 7,670 acres for agricultural use (WRCOG City General Plan land use database, October 2000).

TABLE 2-4
PLANNED LAND USES WITHIN UNINCORPORATED COUNTY LAND*

UNINCORPORATED COUNTY LAND	ACRES
Agriculture	30,610
Community Development	179,940
Open Space	439,530
Rural	294,900
American Indian Lands	41,570
TOTAL	**986,550**

* Based on proposed County General Plan - Public Hearing Draft (April 5, 2002)

Community Development includes the following designations: Very Low Density Residential, Low Density Residential, Medium Density Residential, Medium High Density Residential, High Density Residential, Very High Density Residential, Commercial Retail, Commercial Tourist, Commercial Office, Light Industrial, Heavy Industrial, Business Park, Public Facilities, Community Center, and Freeways.

Open Space includes the following designations: Open Space-Conservation, Open Space-Conservation Habitat, Open Space-Mineral Resource, Open Space-Recreation, Open Space-Rural, and Open Space-Water.

Rural includes the following designations: Rural Residential, Rural Mountainous, Rural Desert. (General Plan Update Public Hearing Draft, April 2002).

TABLE 2-5
PLANNED LAND USES WITHIN INCORPORATED LAND*

INCORPORATED LAND	ACRES
Agriculture	7,670
Community Development	222,530
Open Space	29,840
Rural	12,190
TOTAL	**272,230**

* Based on WRCOG City General Plan database (October 2000).

Community Development includes the following designations: High Density Residential, Medium Density Residential, Low Density Residential, Very Low Density Residential, Mixed Use, Commercial, Industrial/Business Park, Public Facilities, and Specific Plan Area.

Open Space includes the following designations: Open Space-Mineral Resources, Open Space-Multi-Purpose, Open Space-Recreational, Open Space-Water, and Watercourse Overlay.

Rural includes the following designations: Rural Mountainous and Rural Residential. (WRCOG City General Plan Database, October 2000)

Table 2-6 compares existing and planned land uses within the MSHCP Plan Area. As shown, planned land uses within the Plan Area indicate a shift in future use of land within Western Riverside County. At buildout, approximately 491,300 acres of currently vacant and agricultural lands are anticipated to shift to community Development/rural uses. This shift in land use is planned to accommodate projected growth within the Plan Area. The MSHCP is being prepared to provide for maintenance of biological diversity within the Plan Area through assembly and management of an approximately 500,000-acre MSHCP Conservation Area in the context of this projected growth and anticipated land use shift.

TABLE 2-6
EXISTING vs. PLANNED LAND USE WITHIN WESTERN RIVERSIDE COUNTY

EXISTING LAND USE	ACRES	PLANNED LAND USE	ACRES
Developed	218,260	Community Development/Rural	709,560
Vacant*	871,040	Open Space	469,370
Agriculture	169,480	Agriculture	38,280
		American Indian Lands	41,570
TOTAL*	**1,258,780**		**1,258,780**

* Includes American Indian Lands.

Sources: Existing Land Use: LSA Associates, 1999 with updates 2000, 2001.
Planned Land Use: County of Riverside General Plan Public Hearing Draft, April 5, 2002 and WRCOG City General Plan Land Use Database, October 2000.

2.3 DEMOGRAPHIC CONSIDERATIONS

2.3.1 Historical Growth

Southern California has experienced periods of rapid growth over most of the past century. As the coastal regions of Los Angeles, Orange, and San Diego Counties have built-out, much of the new growth has shifted to the inland regions of Riverside and San Bernardino Counties. During the 1980s and 1990s, Riverside County led the region in population growth. During the 1990s, Riverside County was also a leader in job growth. In 1970, Riverside County's total population was 456,916; approximately 224,032 people lived within Western Riverside County Cities, and 178,591 lived within unincorporated areas (it is assumed a majority of unincorporated County occupants reside within Western Riverside County) (Population Estimates for California Cities and Counties, 1970-1980, State of California, Department of Finance Web site at http://www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm, accessed April 2002). By 1980, Riverside County's total population increased to 663,199. Approximately 291,313 people lived in western County Cities, and 276,565 lived in the unincorporated County (Population Estimates for California Cities and Counties, 1970-1980, State of California, Department of Finance Web site, accessed April 2002). The County's total population grew from 663,199 in 1980 to 1,170,413 by 1990; western County Cities were populated by 594,046 people with an additional 385,384 people living in the unincorporated County (Revised Historical City, County, and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts, State of California, Department of Finance Web site, accessed April 2002). The County's total population grew from 1,170,413 in 1990 to 1,545,387 in 2000. By 2000, a total of 848,413 people resided in western County Cities, and an additional 420,721 resided in unincorporated County areas (Revised Historical City, County, and State Population Estimates, 1991-2000, with 1990 and 2000 Census Counts, State of California, Department of Finance Web site, accessed April 2002).

2.3.2 Forecast Growth

The Southern California Association of Governments (SCAG) and Western Riverside County Cities have historically prepared regional growth forecasts in an effort to allocate resources in the most efficient manner. Forecasts include population, housing, employment, and other economic data. SCAG estimates that by 2025 almost 7 million people and 4 million jobs -- the equivalent of adding two cities the size of Chicago -- will be added to the Southern California region (SCAG 1998, with draft update 2001). This would bring Southern California's regional population from 16 million to 22.8 million (SCAG 2001). Most of the population growth is expected to occur in north Los Angeles, Riverside, and San Bernardino Counties; however, experts believe job growth will also occur in Los Angeles and Orange Counties.

SCAG released Riverside County's population forecasts for 2020 in 1998; Riverside's population is projected to reach upwards of 2.8 million. This population growth equates to approximately 2.8% a year from now until 2020. Population will continue to increase within the County beyond the 2020 horizon; the County's population will reach 3.5 million by 2030 and 4.5 million by 2040. A total of approximately 569,600 housing units will be needed to accommodate this anticipated growth (approximately 426,400 in Western Riverside County and approximately 143,200 in Eastern Riverside County).

2.3.3 Infrastructure Needs

The demographics clearly lay out the demands associated with growth in population, housing, and jobs that the RCIP is designed to address as discussed in *Section 1.0* of this document. Among those are the demands that will be placed on local governments to provide critical infrastructure, municipal facilities, utilities, roads, parks, open space, and the state allocation of affordable housing units. Infrastructure needs are addressed as Covered Activities in the MSHCP as discussed in *Section 7.0* of this document. The demographics also foretell the increased stress on natural Habitats, native plants, and animal species. Merely recounting numbers does not truly describe the magnitude of the challenges facing Western Riverside County. Only by looking at the demographics in terms of their impacts on all aspects of the Plan Area's infrastructure, including the Conservation of natural resources, can Western Riverside County prepare for the future. The RCIP through each of its four elements looks at the impacts of the growth facing the County and begins the process of building the infrastructure necessary to sustain the natural environment and meet the needs of future citizens.

FAIRY SHRIMPS OF CALIFORNIA'S PUDDLES, POOLS, AND PLAYAS

by

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corded was 1,076 cysts for an 82.8 mm female, just imagine what the fecundity of the record-size 150-mm female might have been given her additional clutches over an extended life span...it must be mind boggling!

Fairy shrimps of warm-water pools which are low to moderate in dissolved solids, less predictable, and long-lived

Streptocephalus woottoni

(Map 5.3, p. 119; back cover)

Streptocephalus woottoni, first described by Eng *et al.* (1990), was given the name Riverside fairy shrimp because it was then known from but 5 pools about 45 km from the coast only in Western Riverside County. These included Skunk Hollow, the largest valley vernal pool remaining in all of southern California. Shortly thereafter, one of its refugia became the site of a gravel pit, the type locality was scraped for a housing development, and Skunk Hollow was slated to become a permanent lake surrounded by houses. Because of its limited occurrence, and further threats from construction, *Streptocephalus woottoni* was declared endangered by the Federal government in 1993. Thankfully, since that time several pools in Orange County, and some pool clusters on several mesa systems in western San Diego County, have been shown to house this rare beauty. Additionally, a couple of sites are now known on mesas immediately south of the international border in Baja California, Mexico. Even with these added locations, this species has one of the most restricted distributions among fairy shrimps endemic to the West Coast. With the exception of the remaining three in western Riverside County, all populations are within 15 km of the ocean over a north-south distance of about 140 km.

All pools benefiting *Streptocephalus woottoni* lie at elevations from 30-415 m in seasonal grasslands, some of which are interspersed among Chaparral or Coastal Sage Scrub vegetation. Several sites on the Chaparral-covered mesas immediately north of San Diego are considered San Diego Mesa Hardpan pools, while the two San Diego Mesa Claypan pools known to house this animal lie in the much finer grassland-supporting soils on the Otay Mesa east of the city (Keeler-Wolf *et al.* 1995). The remaining sites, including the pools on the coastal mesas near Oceanside, and Skunk Hollow of western Riverside County, have not yet been classified.

All of the swimming holes in which *Streptocephalus woottoni* plies its trade are seasonally astatic and are typically quite large, some exceeding 750 m^2. All have felt the impact of human activities, a number of them enlarged or deepened. They fill whenever late fall, winter, or spring rains generously bless the land, and because these basins are covered by 30 cm or more of water when full, they are comparatively long-lived, sometimes persisting into April or May (one record of early June). Such extended periods of wet soils usually allow the emergent rush *Eleocharis* to colonize the basins (Eng *et al.* 1990; Simovich & Fugate 1992). Although the water may be clear, more typically it is moderately turbid. Its very low TDS and alkalinity (means of 77 and 65 ppm, respectively) are corroborated by pH at neutral or just below (7.1-6.4) (Eng *et al.* 1990; Gonzalez *et al.* 1996; Moeur pers. comm.). Its appearance in waters with so few dissolved substances is explained in part by the fact it is an excellent hyperionic regulator, at least of Na^+, in very low TDS water. Once the environmental concentration reaches that of its blood, the animal dies. Additionally, *S. woottoni* can not tolerate 800-1,000 ppm of alkalinity for 24 hours. Although such amounts are much higher than any to which this species is naturally exposed, they are modest when compared to those with which several other southern California anostracans must

deal every day (Gonzalez *et al.* 1996).

Very little is known about any biological aspect of this fairy shrimp. Among what we do know is that, in the laboratory, female *S. woottoni* will produce from 17 to 427 cysts over their lifetime (Simovich & Hathaway 1997). Cysts of *S. woottoni* will hatch, at least in certain situations, when placed in locales sometimes far from their natural pools. Clyde put some soil containing cysts in a newly-constructed basin on the Robert J. Bernard Biological Field Station of The Claremont Colleges in Claremont, and Denton added his aliquot of the same soil to a child's wading pool in San Antonio, Texas. When the rains came and conditions were appropriate (whatever those were), *S. woottoni* made its appearance. We assume that the cysts, with mean diameters of 0.27-0.31 mm (Hill & Shepard in press; Moeur pers. comm.) released nauplii, but neither of us checked this out.

Some of the pools in which *Streptocephalus woottoni* is found are known to contain *Branchinecta lindahli* or *B. sandiegonensis* as well. However, collections have shown that these species are usually mature or absent when *S. woottoni* is first taken. The prevailing explanation for this was that *S. woottoni* required a higher temperature for hatch and therefore did not emerge until later in the season (Eng *et al.* 1990; Simovich & Fugate 1992). Several years ago, John Moeur told us he believed that cysts actually hatch at temperatures in the vicinity of 10°C, but because development is so slow below 15°C, and the typical sampling net does not trap tiny animals, *S. woottoni* may merely be missed rather than be absent. Good reason for his reasoning, we thought, for on a fine January morning, when John took big *B. lindahli* and *B. sandiegonensis* from a mesa pool north of Oceanside, he noticed lots of dinky shrimps passing through the mesh of his net and back into their 11°C home. After 13 days, the precocious branchinectids were still there, but the baby shrimps had grown enough to show the undeniable traits of *Streptocephalus woottoni*. Demonstrating that such informed guesses (hypotheses) are sometimes correct, Hathaway and Simovich (1996) have now shown in lab experiments that *S. woottoni* hatches in 7-12 days if water temperatures are between 10-20°C, with some even appearing at 25°C. They also note that, depending on conditions, maturity of this relatively large fairy shrimp is attained in 48-56 days, and animals may remain as long as 120 days, although John Moeur (pers. comm.) has seen one population hang in there for 150 days. Such extended development and long tenure are certainly reasons for *S. woottoni* to reside in long-lived pools, some of which last into late spring when individuals may tolerate temperatures in excess of 25°C.

Just because these pools are described as "long-lived" does not mean they persist for extended periods each and every year. In fact, rainstorms in southern California are often highly problematic. If this animal hatched in a partially-filled basin, the water may disappear before *S. woottoni*'s long period of development is fulfilled, a situation that Simovich and Hathaway (1997) have observed up to 5 times in a year. It is not surprising then that many cysts do not respond to the first, second, or even third wetting. In fact, after three hydrations, a total of only 2.8% had hatched (range 0-13). This is the lowest reported hatching rate for any anostracan (Simovich & Hathaway 1997), but it certainly assures that cysts will remain for the blessed event of a filled pool.

The last of our observations is a colorful one. On a field trip to some deeper, near-coast pools, John Moeur dipped surface waters to show Clyde that here swam grayish male *S. woottoni*. By sweeping his net through the depths of the pool, John hauled in orange-red females. Denton and others believe the red is due to hemoglobin which better enables fertilized females to swim, undis-

turbed by amorous males, in areas of lower O_2, but this might not be the only scenario (you may wish to review again p. 29 in the section on "Color").

Please remember that if you contemplate MS or PhD research on this endangered animal, you will have to tackle some paper work for the USFWS; but don't fret, like the research itself, the chore is surmountable.

Fairy shrimps of warm-water pools which are moderate in dissolved solids, less predictable, and short-lived

Streptocephalus dorothae

(Map 5.3, p. 119)

Streptocephalus dorothae is the only one of the state's 23 species of Anostraca that has never been observed swimming in California pools. How do we know it's here? Well, Marie Simovich of the University of San Diego has a propensity for wandering around southern California and collecting dry soil from what appear to be pool basins. In the lab she subdivides each sample into containers which will be placed at several different temperatures, then follows that old directive "add water and stir". If cysts are present, they should hatch at appropriate temperatures. Hatchlings can then be raised to adulthood for identification. This approach does not require her to visit each and every pool during the limited time when adults are present.

Among Marie's dirt collections was a sample from Sunset Crossing in Banning. This scenic site, some 750 m in elevation, and along the route out of the L.A. Basin toward Palm Springs (or vise versa), lies at the crossing of the Southern Pacific Railroad tracks by Sunset Avenue. Here, in a rail-side ditch, *Streptocephalus dorothae* must swim in all its glory when runoff from rare summer thunderstorms fills its tub. Unless there was a mix-up in samples, we know it seeks asylum there, because back in the lab, sometime in 1992, out popped nauplii which grew to be adults of this animal when the soil was hydrated at 25°C.

Why did *Streptocephalus dorothae* settle down only in Banning? Where did it come from, and how did it get there? Good questions! No answers. However, thanks to Denton's work on the zoogeography of Arizona fairy shrimps (Belk 1977a), we may have a clue. *Streptocephalus dorothae* is reasonably widespread in Arizona, and the Southern Pacific Railroad connects Banning with the southwest of Arizona via Yuma. If it didn't get here via the suspected bird route, perhaps it rode the rails, or was smuggled in on the underbelly of some off-road vehicle. Perhaps. Maybe. No one knows. But such speculation may not be as wild as you might think. Maeda-Martinez *et al.* (1992) reported on another highly disjunct population of *S. dorothae*, the first record of this species in Mexico. It was found in a man-made roadside pool near La Paz at the southern tip of Baja California. The authors note that this too may be an example of "a recent man-assisted immigrant".

In an article that included some facts about the biology of *S. dorothae*, Denton (Belk 1977a) determined that hatching happens from 15-35°C, with 20° being about the best temperature and 35° not being very good at all. This information of course corroborates Marie's success at 25°C noted above. In addition, it supports the fact that *S. dorothae* is a summer species, a status also confirmed by its one-hour LD/50 of 40°C. Worthy of note is that such indulgence in high temperatures places this animal within one degree of the most heat-tolerant of Arizona Anostraca. Maeda-Martinez *et al.* (1992) supplemented Denton's information with the laboratory-derived observations that hatching begins to yield nauplii 24 hours after cysts are covered with water of 20-23°C, and continues for 48 hours. After 9 days, both sexes reach maturity at a length of about 8.5-

The Jepson Manual

Higher Plants of California

James C. Hickman, Editor

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GEOGRAPHIC SUBDIVISIONS OF CALIFORNIA

The function of providing geographic ranges in a botanical resource is to help the user predict where plant taxa can be expected to grow. Formulating such predictions is always a challenge — particularly so in California. The state is large (some of it still poorly explored botanically), has great topographic complexity, and contains an unusual diversity of climates and habitats. In an attempt to increase the predictiveness of range descriptions, *The Jepson Manual* departed from earlier manuals in the way geographic ranges are described.

The geographic system used combines features of the natural landscape. The most important features are broadly defined natural vegetation types (and, at a finer scale, more specific plant communities) and geologic, topographic, and climatic variation.

The most useful single resource in creating the system used was the work of Professor A. W. Kuchler, especially his "Natural Vegetation of California", a chapter (p. 909) and detailed map in *Terrestrial Vegetation of California*, edited by Professors Michael G. Barbour and Jack Major (reprinted in 1988 by the California Native Plant Society). Professors Peter Raven & Daniel Axelrod's 1978 *Origins and Relationships of the California Flora* (U California Publ Bot 72) was also important to the development of these ideas. These works are recommended for further information. They contain detailed definitions of plant communities and discuss their composition, architecture, history, and relationships to climate, geology, soils, fire, and human disturbance.

The geographic system of *The Jepson Manual* is organized hierarchically, starting with broadly defined provinces and ending with districts (sub-sub-subdivisions of provinces). Directional modifiers on the geographic units, e.g., "sw NCoRI", are used to improve precision. Such a system allows distribution ranges to be conveyed with clarity, conciseness, and varying levels of precision that suit the state of knowledge or need (see also "Range Descriptions", pp. 9, 10). Combining geographic range descriptions with habitat descriptions and elevation ranges increases the predictiveness of overall range statements.

There are 50 geographic units in this system. Each has a unique abbreviation, used in the text and keys. The abbreviations are as consistent, self-explanatory, and easy to master as they could be made. If a user already knows basic California geography, the units and their abbreviations will prove readily understood. If not, the system (with abbreviations) will be a significant help in learning California geography.

Each of the 50 units is defined and described below. These descriptions will be easier to follow if studied in conjunction with the map and hierarchical outline of subdivisions (inside covers and p. 45).

Emphasis on predictiveness and biological meaning in range descriptions automatically diminishes the importance of county lines, which are the primary alternative for subdividing the state. Counties were added to naturally defined areas when the political information was judged useful. This was often done for rare plants, because county-by-county information is often sought for them. For more details on relationships between geographic subdivisions and counties, see the cross-reference table prepared by Dr. Barbara Ertter (pp. 46-48).

The system of geographic units is four-tiered: provinces, regions, subregions, and districts (see outline, p. 44). There are three provinces at the most inclusive level. All three extend outside of California but the largest, the California Floristic Province, includes most of the state and only small parts of adjacent Oregon, Nevada, and Baja California, Mexico. The other two provinces are Great Basin and Desert.

Each province is subdivided into regions. The California Floristic Province is made up of six regions; in California, each of the other provinces have two. Together, these three provinces and ten regions delineate the broad physiographic and biologic geography of California. It is with them that anyone wishing to understand California plant distributions should begin. They are shown most clearly on the "exploded" inset map (inside covers and p. 45). Like California itself, nearly all of the units are elongate in a more or less north-south direction.

Nine of the ten regions are further divided, into a total of 20 subregions (1–4 subregions per region). Subregions are also defined on the basis of topographic, climatic, and plant-community variations within the region. Seven of the subregions are further divided into districts; variations among them are more localized.

In contrast to the use of biologically arbitrary, often politically determined delimiters, such as county lines, the use of biologically meaningful criteria to define subdivisions results in sometimes frustratingly indefinite or fuzzy lines. Wherever possible, subdivisions are defined on the basis of all three of the main biologically relevant variables: topography, climate, and plant-community types.

There are situations in which these three features do not vary in concert. Where they do not, plant-community type generally takes priority. For example, the grassland-covered, treeless hills that are geologically and topographically lower foothills of the Sierra Nevada support most of the plant communities of the adjacent Great Central Valley; they are considered part of the latter region, up to the point where oak/pine woodlands can sustain themselves.

There are other situations in which plant-community types vary gradually, and there is no basis for drawing a sharp line. Where this occurs, reasonable lines have been sought using a combination of geological and topographic criteria (e.g., the North Fork of the Feather River divides the Cascade Ranges from the Sierra Nevada, with volcanic substrates predominant on the Cascade side) or easy-to-follow, man-made divisions (State Highway 58 through Tehachapi Pass divides the Tehachapi Mountains from the southern Sierra Nevada Foothills).

California Floristic Province (CA-FP)

The largest and most important geographic unit in California is the California Floristic Province (CA-FP). It comprises all of the state west of the dry regions of Great Basin (GB) and Desert (D). CA-FP is equivalent to "cismontane", as used by Jepson, Munz, and others; GB and D together are equivalent to "transmontane". The border between west (CA-FP) and east (GB and D) is thus the main phytogeographic boundary in California.

North of Lake Tahoe, this boundary lies between the Cascade Ranges (CaR) and the Sierra Nevada (SN) (with their predominant montane pine/fir forests) and the Great Basin Province (Modoc Plateau Region, with its predominant juniper savanna and sagebrush steppe). Vegetational, topographic, and geologic boundaries are all indistinct in the north; there are inclusions of sagebrush steppe in the Cascades (especially the large inclusion in Shasta Valley in north-central Siskiyou County) and of montane forest at higher elevations in GB. In CaR, volcanic cones and mountains are more numerous, while GB is generally flatter country, with a greater predominance of lava flows that have been faulted into small mountains with intervening basins.

The boundary runs south from the Oregon border at US Highway 97, along the south side of Lava Beds National Monument, and around Glass Mountain and Black Mountain (barely into Modoc County), curves west again around the Burnt Lava Flow area, and (from the Shasta County border) essentially follows Highways 89, 44, 36 (through Susanville), and 395 south, along the northeastern base of the Diamond Mountains. There is a floristically interesting indentation of the boundary at Sierra Valley (Plumas and Sierra counties). CA-FP extends slightly into Nevada east of Lake Tahoe (e.g., Mount Rose area), with the boundary nearly following Highways 395 and 88.

South of Lake Tahoe, the boundary of CA-FP follows the east slope of the Sierra Nevada, generally defined by an indefinite break between either upper montane (red-fir/lodgepole-pine) forest or Jeffrey-pine forest on the CA-FP side and either juniper/pinyon woodland or sagebrush steppe on the GB side. There is also Jeffrey-pine forest in GB (e.g., Mono Craters area). In some places, highway 395 approximates the boundary; south of Bishop, the boundary lies to the west of that highway, farther up the east slope of the Sierra Nevada.

South of Owens Valley, CA-FP abuts Desert (D), and the boundary lies between the chaparral or pinyon/juniper woodland on the CA-FP side and Joshua-tree or creosote-bush scrub in D; the Little San Bernardino Mountains are considered D. Montane vegetation of the eastern Sierra Nevada, northern Transverse, and eastern Peninsular ranges tends to grade into desert vegetation on the lower slopes of these mountains. Some taxa are limited to this interface, which might be specified as "lower n slope SnBr" or "w edge DSon". In Riverside, San Diego, and southwesternmost Imperial counties, the Santa Rosa, Volcan, Laguna, and Jacumba mountains make up the eastern edge of CA-FP.

Outside California, CA-FP extends north as the Klamath Mountains of southwestern Oregon and south into northwestern Baja California. In California, it is divided into the following six regions, 17 subregions, and 17 districts.

NORTHWESTERN CALIFORNIA (NW).

This region has the most predictable (and wettest) climate in California. The boundary between NW and CaR, the two northernmost regions of CA-FP, is marked geologically by a mostly metamorphic (NW) vs volcanic (CaR) substrate interface and, less clearly, by vegetational differences: oak woodland or montane fir/pine forest with hemlock on the NW side and Sierran montane forest (sugar pine but no hemlock) or sagebrush scrub on the CaR side. This boundary is approximated by Interstate 5 (and the Sacramento River) south to the Great Valley (GV) region at about Redding.

San Francisco Bay Area (SnFrB). This subregion occupies the northern one-third of CW, east of CCo. Reasonably defined physiographically, it includes Mount Tamalpais, the Santa Cruz Mountains, and the Diablo Range (including Mount Diablo and Mount Hamilton). The somewhat arbitrary southern boundary follows Highways 156 and 152 from CCo east of Castroville through Hollister and Pacheco Pass to GV near San Luis Reservoir. The subregion is less well defined vegetationally, containing a diversity of community types from wet redwood forest to dry oak/pine woodland and chaparral.

South Coast Ranges (SCoR). This subregion is bounded by CCo to the west, SnFrB to the north, SnJV to the east, and Southwestern California (SW) in the south. All these borders are described above. The subregion is divided into two districts, both of which contain many (generally small) outcrops of serpentine.

Outer South Coast Ranges (SCoRO). The district boundary with SCoRI runs up the Salinas River (approximated by Highway 101) to San Miguel in northern San Luis Obispo County, thence up the Estrella River to the western edge of SnJV near Shandon. The district includes Sierra de Salinas, Santa Lucia Mountains, and San Rafael Mountains to the crest of the Santa Ynez Mountains and Mono Creek. There are small stands of redwood and mixed-hardwood forest in the north near the coast, which give way to southern oak forest farther south. Hotter, more inland slopes support primarily blue-oak/foothill-pine woodland and chaparral.

Inner South Coast Ranges (SCoRI). This district includes the Diablo Range from Pacheco Pass to San Benito Mountain, Gabilan Range, Cholame Hills, and the higher elevations of the Temblor Range and associated ridges (isolated within the southern part of SnJV). It supports a mosaic primarily of summer-dry blue-oak/foothill-pine woodland and chaparral.

SOUTHWESTERN CALIFORNIA (SW).

This region is bounded by the Pacific Ocean (outside the Channel Islands) to the west and by Mexico to the south. It is separated from CW at the crest of the Santa Ynez Mountains and Mono Creek as described above; from GV at the grassland/woodland boundary; from Teh at Tejon Pass along Interstate 5; and from D on the northeast and east as defined under CA-FP above. The region is divided into four subregions and six districts.

South Coast (SCo). This subregion extends along the Pacific Coast from CW (at Point Conception) to Mexico. It is comparable to NCo and CCo of the NW and CW regions, respectively, but is hotter, drier, and extends much farther inland — to San Gorgonio Pass at Banning, the CA-FP/D boundary. Coastal-sage scrub and chaparral communities with many endemics would predominate, but most of the subregion from Santa Barbara to the Mexican border has been urbanized, with great loss of undisturbed habitat.

Channel Islands (ChI). The eight major islands off SCo are floristically similar to SCo, but include enough endemics to justify separate recognition. The subregion is divided into two districts.

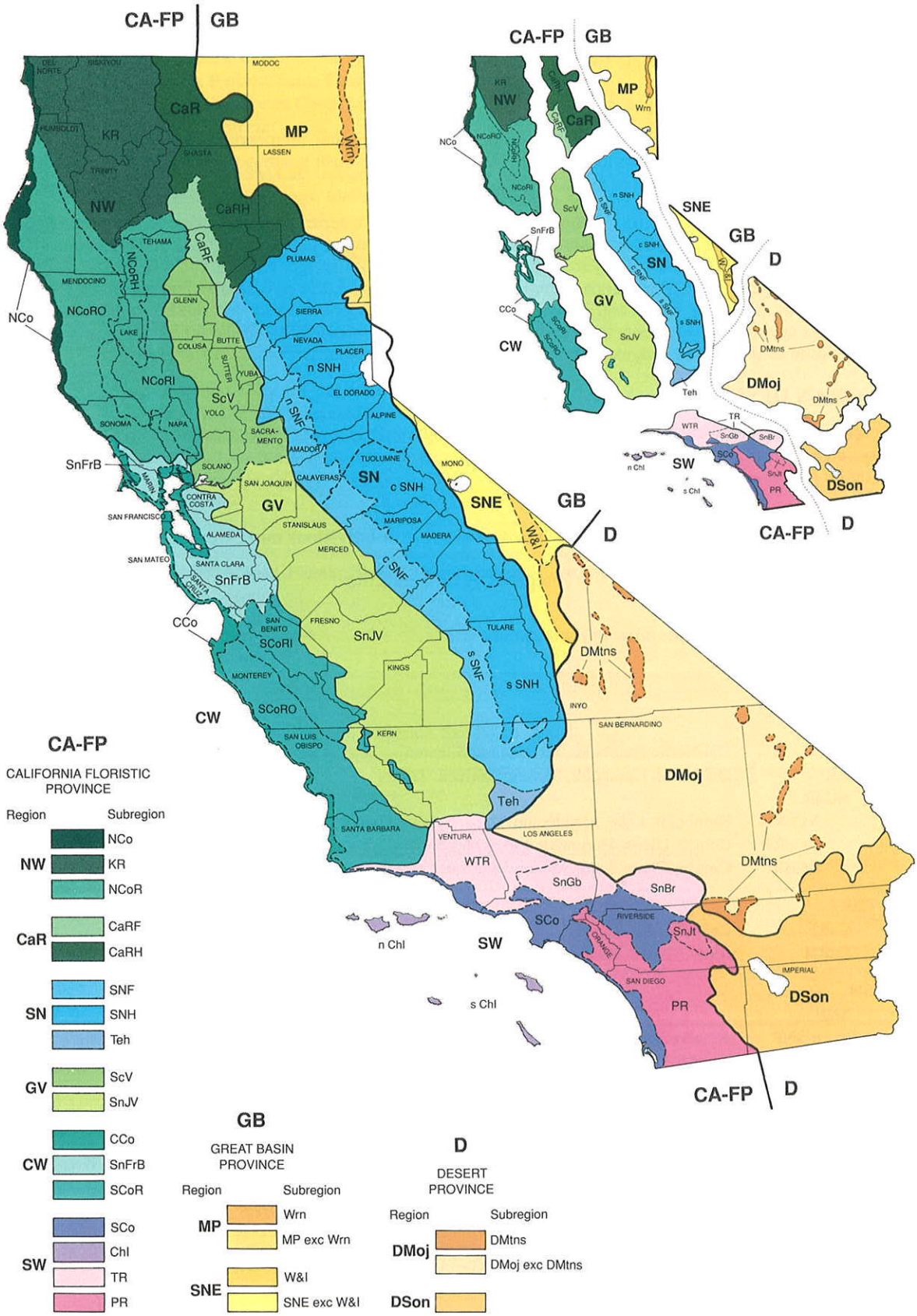
Northern Channel Islands (n ChI). This district includes San Miguel, Santa Rosa, Santa Cruz, and Anacapa islands, which are separated from the mainland by the Santa Barbara Channel. Geologically, they are western peaks of the Santa Monica Mountains, which are in the southern part of the Western Transverse Range district (see below).

Southern Channel Islands (s ChI). This district includes Santa Barbara, Santa Catalina, San Clemente, and San Nicolas islands, which are geologically and floristically more isolated and more diverse among themselves than the northern group. They were not so readily colonized from the mainland during glacial times of low sea levels as was the northern group of islands.

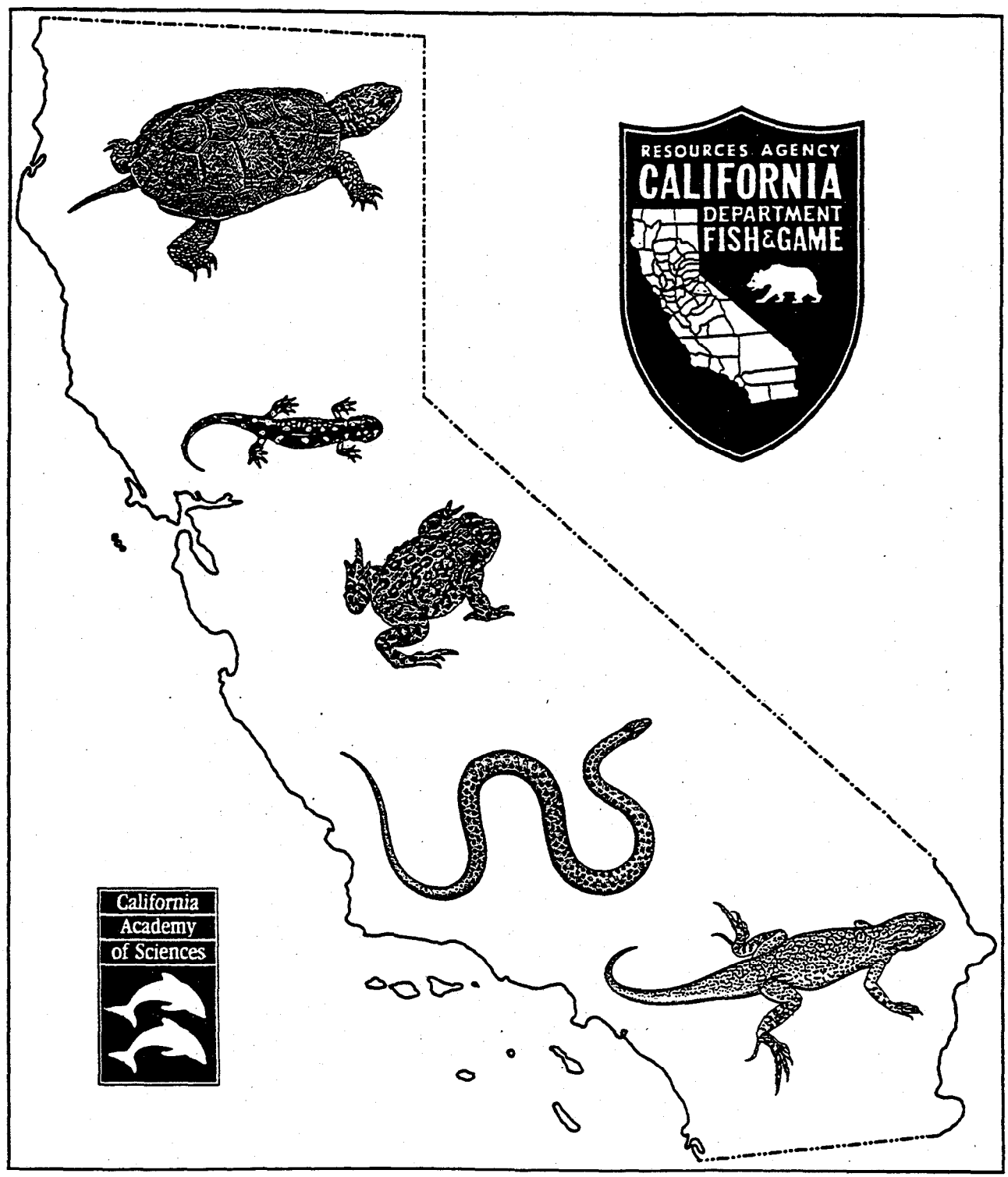
Transverse Ranges (TR). This is a subregion of abnormally oriented (east-west) mountains (see California's Geological History and Changing Landscapes, p. 49). TR is separated from the Peninsular Ranges (PR) at San Gorgonio Pass — an essentially four-way boundary (on Interstate 10 at Banning) between the San Bernardino Mountains, San Jacinto Mountains, South Coast, and Desert. The northern boundary with Desert (D) is discussed under CA-FP. TR is characterized at lower elevations by chaparral and at higher elevations by southern oak forest and dry montane forests of white fir or Jeffrey, sugar, or lodgepole pines. Some high peaks are treeless, but apparently none exceed climatic timberline at their latitude. TR is divided into three districts that are progressively higher, hotter, and drier to the east.

Western Transverse Ranges (WTR). This district includes Mount Pinos (2700 m — the highest point), the Santa Ynez, Topatopa, Santa Susanna, Santa Monica, and Liebre mountains, and Sierra Pelona. At the north end of the San Fernando Valley, the topographic boundary with the San Gabriel Mountains (SnGb)

Geographic Subdivisions of California



AMPHIBIAN AND REPTILE SPECIES OF SPECIAL CONCERN IN CALIFORNIA



CALIFORNIA DEPARTMENT OF FISH AND GAME

AMPHIBIAN AND REPTILE SPECIES
OF
SPECIAL CONCERN IN CALIFORNIA

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AMPHIBIAN AND REPTILE SPECIES OF SPECIAL CONCERN IN CALIFORNIA

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Abstract: Data on 80 amphibian and reptile taxa native to the State of California were reviewed. All taxa potentially candidates for State or Federal "Threatened" or "Endangered" species listing were examined. Review of available data revealed that 48 of these 80 taxa warranted listing at some level. Data for review were assembled from individuals having field experience with each taxon, available literature, museum records, unpublished field notes, field surveys, and archival records. Review was directed at determining if available data could establish whether threats existed, identifying the nature of those threats, suggesting directions that individuals or agencies involved in management of these taxa could take to minimize those threats, and providing a recommendation of the appropriate status for each taxon or portions of each taxon based on these collective data. Status was identified as one of four categories the State of California currently recognizes: Endangered, Threatened, Special Concern, and no official status. Status was prioritized on the basis of the presence, complexity, and imminence of existing or potential threats to each taxon as well as their distributions, both geographic and within California.

Of the 48 taxa that warranted having their status reconsidered (11 salamanders, 14 anurans, 2 turtles, 12 lizards, and 9 snakes), Endangered status is justified for 14, Threatened status is justified for 16, and Special Concern status is justified for 25. Seven taxa (5 anurans, 1 turtle, and 1 snake) are recommended for listing in at least two status categories because threats to these taxa vary significantly across their range within California. Anurans and turtles are the most imperilled groups. Populations over significant portions of the geographic ranges of 10 of the 14 anurans considered (71%) deserve Endangered status, 5 of 14 (36%) deserve Threatened status, and 5 of 14 (36%) deserve Special Concern status; populations of both turtle species considered deserve either Endangered or Threatened status. Remaining major groups, ranked from most to least imperilled, are: salamanders (1 Endangered, 3 Threatened, 7 Special Concern), lizards (5 Threatened, 7 Special Concern), and snakes (1 Endangered, 2 Threatened, 6 Special Concern).

Species occurring in aquatic habitats are at greatest risk. Of the taxa that use aquatic habitats, Endangered status is justified for most populations of 13 of the 20 taxa considered (65%), Threatened status is justified for most populations of 9 taxa (45%), and Special

Concern status is justified for most populations of 6 taxa (30%). In contrast, of taxa that use terrestrial habitats, Endangered status is justified for 2 of 28 taxa considered (7%), Threatened status is justified for most populations of 7 taxa (25%), and Special Concern status is justified for most populations of 19 taxa (68%). Aquatic habitats are threatened by alteration of their physical or biotic structure as a function of several types of human use of water and adjacent land. Excessive numbers of livestock that are area-confined; stream channelization; construction of hydroelectric, recreational, or water storage reservoirs of significant size; removal of ground and surface water near or beyond recharge or volume capacities; and the introduction of a suite of exotic species with which the native aquatic fauna frequently cannot coexist are the uses that most severely affect aquatic habitats and their contained species. The most imperilled aquatic habitats in California that harbor one or more of the taxa recommended for listing are springs, seeps, and bogs; rain (or vernal) pools; marshes; and small headwater streams. In California, taxa occurring in terrestrial habitats are generally less imperilled because most terrestrial habitats in the state have a much greater total area than most aquatic habitats. Yet, aside from outright destruction and development, several widespread activities and land uses continue to alter the structure and vegetation of most terrestrial habitats in a manner unfavorable to the survival of their contained taxa. Among such uses, most significant are the impact of the variety of vehicles used off-highway or off-road; livestock that are area-confined; and urbanization. The most imperilled terrestrial habitats in California that harbor one or more of the taxa recommended for listing are dunes, grasslands dominated by perennial grasses, and the saltbush scrub vegetative association in the San Joaquin Valley.

The need to list 48 amphibian and reptile taxa led to several pivotal recommendations. Current levels of funding and support for sensitive or potentially sensitive amphibians and reptiles and issues related to these species are, at minimum, two orders of magnitude smaller than that needed to support an agenda with some chance of improving the survival of these species. The historical inertia of an archaic view of, and funding system for, non-game species is a primary underpinning of the extreme funding shortfall. Many specific recommendations can be made to help alleviate the precarious conditions of imperilled taxa, but such recommendations will be ineffectual without broad-based public support. Education of the public at all levels that amphibians and reptiles are just as indispensable a part of California ecosystems as are species traditionally viewed as economically important are necessary to reverse the funding shortfall. In particular, recognition that amphibians and reptiles, as well as other non-game organisms, have value commensurate with the mineral and the renewable natural resource wealth of ecosystems, a view currently held by few, should be common knowledge and the object of unwavering public support. Such support is essential to effectively implement recommendations, the most important of which include: increased attention to aquatic ecosystems, and in particular, to maximizing their quality and quantity; increased attention to minimizing or eliminating the impacts of off-road use of vehicles of all types; increased attention to minimizing, eliminating, or mitigating the impacts of all forms of livestock; increased attention to prohibiting the translocation or introduction of exotic species; and increased attention to the preservation of entire hydrographic units. Finally, it needs emphasis that all these problems are directly or indirectly rooted in the absolute human population size and its continued growth in California. As a consequence, any solutions to minimize impacts on amphibians and reptiles that do not consider the present human population and its changing size will be no more than temporary solutions.

Preface

The intent of this document was to consider amphibians and reptiles in California that were not provided legal protection other than, for some, the limited protection afforded species with Special Concern status, but that might require reconsideration of their status for various reasons. Just the nature of assembling data for such a synthesis is complex. Vast differences in the current state of knowledge among taxa and the fact that most data needed to interpret the status of each were broadly scattered across varied sources contributed to this complexity. Very early during the process of data assimilation, it became apparent that too few data were available for some amphibians and reptiles to provide comprehensive reviews of their status. We have, nevertheless, reviewed available data on those taxa, if for no other reason than that the gaps in current knowledge need emphasis. The combination of limited data on many species; the continuing rapid, human-induced changes in many California environments; and the continual appearance of new data indicated that the most useful form that this document could take is one that could be readily modified. In particular, it should facilitate incorporating new data, an essential element of future reviews. We have attempted to structure the document with this idea in mind. We hope that it will induce students of the California herpetofauna to fill the essential data gaps so that those exercising stewardship over habitats in which these amphibians and reptiles occur can refine their management plans, and that consultants, legislators, planners, and others will be better advised or give sound advice where it relates to the biology and ecology of these organisms.

MRJ
MPH
30 November 1993

AMPHIBIAN AND REPTILE SPECIES OF SPECIAL CONCERN IN CALIFORNIA

Introduction

The human population in California (since 1957 the most populous state in the nation) experienced especially rapid growth during the 1960s and 1970s, and continues to grow beyond the 30 million mark (U.S. Department of Commerce 1990). Continued growth increasingly impacts the abundant natural resources found in California (California Department of Forestry and Fire Protection 1988), among them, the 130-odd species of native amphibians and reptiles (Jennings 1987a). The most compelling symptom that human population growth has significantly impacted native amphibians and reptiles in California is that the U.S. Fish and Wildlife Service (USFWS), in combination with the California Fish and Game Commission (the Commission), now list 8 amphibians and 14 reptiles as either "Endangered" or "Threatened", and at least 20 additional taxa are proposed for listing (Jennings 1987a, U.S. Fish and Wildlife Service 1991). State listing of those taxa fall under the purview of the California Endangered Species Act (CESA) of 1984 [Section 2050 et. seq., California Fish and Game Code]. An outgrowth of the California Endangered Species Act passed in 1970 (Mallette and Nicola 1980), CESA requires the California Department of Fish and Game (CDFG) to: 1) review the status of CDFG-listed taxa (which includes those on USFWS lists and any taxa CDFG officially recommended for listing) every five years, and 2) prepare annually a report summarizing the status of all State-listed Endangered, Threatened, and Candidate taxa (California Department of Fish and Game 1990). CESA-required reviews are one important way that recommendations can lead to directed action concerning each taxon. They are intended to determine if conditions that led to a taxon's listing are still present, and to ensure that listing reflects the most current status of each taxon accurately (California Department of Fish and Game 1990). With the lag time needed to begin implementing CESA, CDFG produced its first annual report based on the aforementioned requirement in 1986 (California Department of Fish and Game 1987) and four additional reports have been produced since that time (California Department of Fish and Game 1988, 1989, 1990, 1991). However, these reports only partly fulfilled the CESA review requirement because each summarizes only CESA-recognized Threatened, Endangered, and Candidate taxa (California Department of Fish and Game 1990; see also Section 2079 of the California Fish and Game Code). Nevertheless, each annual report advocated the broader intent of CESA review by cautioning that other unlisted taxa which might deserve official "Candidate" status were not included (see Sections 2062, 2067, and 2068 of the California Fish and Game Code). Further, CDFG has been hampered in recent years in its ability to effectively address, much less review, many taxa not officially designated by the Commission because the CDFG designation, Species of Special Concern, has no legal definition, and therefore is not expressedly included in the review requirement. Moreover, severe funding limitations have restricted the number of taxa that CDFG could address, and the highest priority taxa, the critically Threatened or Endangered species, absorbed the funding base. This is especially true of the nongame project within the Inland Fisheries Division, the branch of CDFG responsible for amphibians and reptiles, the funding levels of which have consistently represented less than 1.0% of the total CDFG budget (Appendix I).

Despite these problems, CDFG has made significant strides in attempting to address unlisted or "third-category taxa" since 1971, when the Department implemented the elements that led to its current non-game program (Mallette and Nicola 1980). In the early 1970s, CDFG gave third-category taxa two labels, "Status-Undetermined" or "Depleted"

(e.g., see Bury 1972a), in an attempt to refine their statuses. The 1970, California Species Preservation Act had defined CDFG's mandate to address third-category taxa. However, this Act, which directed CDFG to inventory all threatened fish and wildlife taxa, develop criteria for officially designated Rare and Endangered species, and provide a biennial report on the status of these animals (Mallette and Nicola 1980), was repealed when CESA was adopted in 1984. The adoption of CESA enabled the Commission to add or remove species from the lists of Endangered and Threatened taxa, but neither provided a vehicle for the addition of species nor for the review of Candidate species; CESA simply states that species could be added or removed from either list if the Commission finds that action is warranted upon receipt of sufficient scientific information (CESA, Article 2, Section 2070). Sufficient scientific information is never addressed in CESA in the context of either adding species to the lists of Threatened or Endangered species, or evaluating Candidate or potential Candidate species. CESA addresses scientific information only in the context of projects that may impact Endangered or Threatened species, requiring CDFG to base its written finding of the review of such projects on the best scientific information (CESA, Article 4, Section 2090). The steps that led to filling the current void CESA created began in 1978, before CESA's inception, when CDFG first used the label "Species of Special Concern" for third-category taxa (see Remsen 1978). The intent of the Special Concern category was that since such species lacked legal protection other than bag restrictions, giving them consideration wherever possible might help avert costly recovery efforts that would otherwise be required to save such species. CDFG provided the vehicle to address third-category species that had been treated under the California Species Preservation Act by initiating a series of reports that reviewed the members of vertebrate groups that could be included under the Special Concern heading before CESA actually repealed that Act in 1984. Three such reports have been published (birds: Remsen 1978; mammals: Williams 1986; and fishes: Moyle et al. 1989). In light of the lack of a CESA-designated vehicle for review, these higher taxon-oriented reports have gained greater importance because they summarize the status of all third-category species (i.e., those not yet officially listed as Candidate, Threatened, or Endangered, and including those acknowledged as Species of Special Concern) through the provision of the best scientific information for their review. The latter is the substance of these higher taxon-oriented reviews. This document, which addresses amphibians and reptiles, represents the fourth such review.

We have attempted to review amphibians and reptiles of Special Concern in California within CESA's mandate to add species to the lists of Endangered and Threatened species upon the receipt of sufficient scientific information by providing a well-defined structure for the recommendations we propose, and future, more refined, reviews. As a result, we have examined 80 taxa, including both those previously acknowledged as Special Concern (Jennings 1983, 1987a), and any other unlisted taxa that were suggested by at least one independent source (State or Federal resource agencies, museum personnel, university faculty, wildlife biologists, or other individuals) for consideration as Special Concern. State or Federally Endangered and Threatened taxa that might deserve a downgrade in status to Special Concern were not addressed since those taxa remain within the purview of the five-year reviews conducted by the State, but we did consider the possibility that some taxa currently recognized as Special Concern might require a downgrade in status.

Methods

Determination of which taxa should be included for review was the first step in this study. The CDFG (Inland Fisheries Division) had originally conducted an informal survey of herpetologists and other interested individuals in the early to mid-1970s to assemble data on taxa that might need protection. Stewart (1971), Bury (1972a), and Bury and Stewart (1973) reported some of the conclusions of that survey, but much data have remained

unreported. We reviewed those data and all available, reports, surveys, and CDFG files (including the Natural Diversity Data Base) for relevant information regarding the amphibian and reptile species we had under consideration (see Appendix II for species list).

A working list of 80 taxa for potential consideration was assembled from the most current state lists (Jennings 1983, 1987a) and data from the aforementioned files and surveys (Appendix II). The list and a questionnaire (Appendix III) was then sent to 127 individuals familiar with various aspects of the California herpetofauna (Appendix IV). Another 90 individuals were contacted (by letter or in person) to inquire on specifics about selected taxa (Appendix IV). Many respondents expressed a need to elaborate on the information they provided, so we conducted personal interviews whenever possible. Collectively, these different sources of data were used to generate the list of candidate taxa that warranted having their statuses reconsidered.

We also conducted field reconnaissance in specific regions of California to help assess the presence or absence of candidate taxa. During reconnaissance, standard techniques were used to aid detection of different groups, including light-assisted nocturnal examination of breeding or refuge habitats for amphibians (Stebbins 1985), baited traps for turtles (Iverson 1979, Feuer 1980), and night driving for some lizards and snakes (Klauber 1939). Additionally, electroshocking (Reynolds 1983) was used to help detect certain amphibians. Efforts were made to collect voucher specimens and tissue samples of amphibians and reptiles, particularly from regions where collections were poorly represented. Whenever possible, we searched for field evidence of threats to candidate taxa. Regions covered during field reconnaissance included: 1) the foothills of the central and southern Sierra Nevada Mountains (1-5 October 1988; 20-22 July 1990), 2) the upper Mojave River drainage (18-20 March 1989; 6 July 1990), 3) the coastal plain and coastal ranges of southern California (21-24 March 1989; 14-20 May 1990; 14-16 August 1989; 29 September-1 October 1989; 17-18 November 1989; 24 December 1989; 24 June-6 July 1990), 4) the Coast Range slope of the San Joaquin Valley and the central coast (13-14 and 21 May 1989), 5) the Colorado River Basin (9-14 August 1989; 3-4 July 1990), 6) northeastern California from the vicinity of Mt. Shasta eastward to the Warner Mountains and southward to Lassen Volcanic National Park and the northern half of Plumas County (7-14 September 1990), and 7) the Trinity Mountains and north coastal region of California from Mendocino to Del Norte Counties (30 October-4 November 1990; 18-27 April 1991). We also conducted 15 shorter surveys (2-3 days) in a number of areas on the north and central coast and the Sierra Nevada Mountains between August 1988 and September 1991. Additionally, a few data were gathered during a 26 August 1991 visit to Tule Lake National Wildlife Refuge in Siskiyou County, while this report was in draft form. Data gathered during field reconnaissance were systematically recorded in field notebooks, and specimens taken as vouchers were deposited in the herpetology collections of the California Academy of Sciences.

Historical assessments of past distributions of candidate taxa were made from a combination of museum specimens and the field notes of present and former naturalists (in addition to the surveys and interviews described above) as well as over 25 years of our own personal field experience in California. Museum collections examined for field notes and relevant specimens were: AMNH, ANSP, CAS, CAS-SU, CPSU, CSUC, CSUS, HSU, LACM, MCZ, MVZ, SBMNH, SDSNH, SSU, UCD, UCSB, UMMZ, and USNM (see Table 1 for explanation of institutional codes). Legal proceedings prevented us from reviewing records at San Jose State University. Additional records were sent to us from ASU, CPSLO, CRCM, CU, KU, and UIM; specimen loans were requested from these institutions for verification of important locality records.

Table 1. Museum collections examined or queried for specimens and information. Museum symbolic codes follow Leviton et al. (1985); asterisked (*)codes are not in Leviton et al. (1985).

Code	Museum, Location
AMNH	American Museum of Natural History, New York, New York.
ANSP	Academy of Natural Sciences, Philadelphia, Pennsylvania.
ASU	Arizona State University, Tempe, Arizona.
CAS	California Academy of Sciences, San Francisco, California.
CAS-SU	California Academy of Sciences-Stanford University Collection, San Francisco, California.
CPSLO*	California State Polytechnic University, San Luis Obispo, California.
CRCM	Charles R. Conner Museum, Washington State University, Pullman, Washington.
CSPU	California State Polytechnic University, Pomona, California.
CSUC*	Chico State University, Chico, California.
CSUS*	California State University Stanislaus, Turlock, California.
CU	Cornell University, Ithaca, New York.
FRC*	Feather River College, Quincy, California.
HSU	Humboldt State University, Arcata, California.
KU	University of Kansas, Lawrence, Kansas.
LACM	Natural History Museum of Los Angeles County, Los Angeles, California.
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.
MVZ	Museum of Vertebrate Zoology, University of California, Berkeley, California.
SBMNH	Santa Barbara Museum of Natural History, Santa Barbara, California.
SDSNH	San Diego Natural History Museum, San Diego, California.
SSU	Sacramento State University, Sacramento, California.
UCD*	University of California, Davis, California.
UCSB*	University of California, Santa Barbara, California.
UIM	University of Idaho, Moscow, Idaho
UMMZ	Museum of Zoology, University of Michigan, Ann Arbor, Michigan.
USNM	National Museum of Natural History, Washington, D.C.

Data from the aforementioned sources were organized into accounts for each species that included seven sections:

1) Description - This section provides a description of the taxon sufficient to characterize its physical appearance; it is not intended to be comprehensive. Included are data on body size (provided as a standard length measurement of the range in adult body sizes, taken as snout-vent length (SVL) for lizards, salamanders, and some snakes; total length (TL) for some snakes; snout-urostyle length (SUL) for frogs; and carapace length (CL) for turtles), the characteristic colors and patterns found on most body surfaces (including eye color), and to varying degrees, the characteristic shapes of the body or selected body parts (sometimes simply indicated by the higher-order group [usually the genus] to which a taxon belongs).

2) Taxonomic remarks - This section indicates the current systematic status of the taxon, noting any recent or pending changes in status. Because the use of genetic data has become indispensable for characterizing geographic variation and detecting cryptic species,

this section also indicates what genetic data are available for the taxon and, where possible, their potential systematic significance.

3) Distribution - This section describes the known geographic and elevational range of the taxon. A map identifies the historic and current range of the taxon in California, as far as is known. The elevational range of the taxon in California is provided only in those cases where it differs from that within the entire geographic range of the taxon.

Data for distribution maps are based on a total of 27,051 museum specimens, the identification of which were verified by one or both of us; and 2,085 sight records, the allocations of which were supported by one or more of the following types of evidence: a) living animals or preserved specimens, b) photographs, c) published evidence (such as peer-reviewed scientific papers), d) field notes, and e) personal interviews of the individual(s) who made the original observation(s). In a few cases, we had independent justification for not discarding records despite a lack of supporting evidence, such records are denoted on distribution maps with question marks. Circles versus square symbols differentiate verified museum records and verified sightings on the distribution maps. Solid versus open symbols differentiate locations where taxa are believed to be extant versus those likely to be extinct. The determination of extant versus extinct localities are either based on personal observations or interviews with individuals familiar with the area (and the taxa in question). In most cases, taxa are presumed to be extirpated from a given site if the habitat has been greatly modified by agriculture, roads, water projects, or urbanization, or repeated visits to historic sites revealed no organisms over a 10-year period. Data used to generate these distribution maps will be filed with the Natural Diversity Data Base (NDDB), California Department of Fish and Game, 1416 Ninth Street, Sacramento, CA 95814.

Wherever possible, an indication of the degree to which the geographic range of a taxon had been reduced was provided. For some taxa, it was possible to calculate the reduction in geographic range based on the known loss of selected populations, the known-loss of suitable habitat, or both. In a few cases, a map wheel could be used to measure the amount (in km or km^2) of stream or terrestrial habitat for the taxon on large-scale (1:7,920-1:26,400) AAA and United States National Forest maps based on our distribution maps. The percentage of reduction in geographic range was calculated by summing the amount of habitat with extirpated populations and dividing it by the amount of habitat with extant and extirpated populations.

4) Life history - This section provides a synoptic summary of the life history of the taxon based on the primary literature. Aspects of behavior, reproduction, and the physiological ecology of each taxon that help evaluate the relative vulnerability of a taxon are emphasized. Except where so stated, data are restricted to populations from California.

5) Habitat - This section characterizes the physical and, to the degree possible, the biotic habitat requirements of each taxon. Where known, emphasis is placed on characterizing nesting and oviposition sites; aestivation, hibernation, and refuge sites; and any partitioning of habitat that may occur among the different life stages of a taxon. The habitat utilization patterns of a taxon that will help evaluate its relative vulnerability are emphasized.

6) Status - This section indicates the state-level status recommended for a taxon (or portion of a taxon) and its justification. The collective data allowed assignment of taxa (or portions of a taxon) to one of three categories:

a) Taxa for which **Endangered** status is justified.
b) Taxa for which **Threatened** status is justified.
c) Taxa for which **Special Concern** status is justified.

Determination of whether Endangered or Threatened status was justified was based on the state-level definitions in the California Fish and Game Code (see Appendix V). For determining Special Concern status, we followed the criteria indicated in Williams (1986) and Moyle et al. (1989). The primary factor leading to our recommending the state-level listing of a taxon was the presence, complexity, and imminence of existing and potential threats to the survival of that taxon. We made every attempt to evaluate threats to each taxon within a holistic framework, one as encompassing as possible with regard to the biology and ecology of each taxon. Particular attention was given to how ecologically specialized a taxon might be. Consideration of ecological specialization meant that, in general, taxa occurring in geographically restricted (rare) habitats, taxa occurring in a single habitat type, or taxa occupying a higher trophic position in food webs were considered at greater risk than taxa occurring in geographically widespread (common) habitats, taxa occurring in more than one habitat type, and taxa occupying a lower trophic position in food webs. However, taxa with life cycles tied to more than one habitat type were considered at greater risk than those whose entire life cycle could be completed within a single habitat type. Because threats to some taxa were judged to vary significantly across their geographic ranges, more than one and as many as three status listings have been recommended for some taxa[1]. In addition to the presence, complexity, and imminence of threats to each taxon, we gave consideration, whenever possible, to three aspects of each taxon's abundance and distribution, its endemicity, the size of its geographic range, and its abundance across its geographic range. Endemicity refers to whether the organism's known geographic range occurs entirely within California, and thus, in the absence of human-assisted translocation, is found nowhere else in the world. Beyond the fact that endemic taxa were accorded greater importance simply because of the fact that this report focuses on the political subdivision of California, such taxa were given greater attention because the recommendations we made addressed the entire known geographic range of these taxa. For similar reasons, near endemics, taxa with known geographic ranges occurring almost entirely within California, were accorded greater importance than taxa with known geographic ranges that are more widespread outside of California. Endemic or not, taxa with smaller known geographic ranges were accorded greater importance than those with larger known geographic ranges because the former were considered to be at greater risk from regional-scale catastrophic events. The local abundance of individual taxa was also considered. In particular, taxa known to consist of numerically smaller local populations (demes) or complexes of subpopulations (metapopulations) were considered at greater risk than those known to consist of numerically larger or continuous ones.

In establishing the recommended listing of a taxon, a concerted effort was made to use criteria that might be universally applicable. Nevertheless, some criteria (e.g., the linkage of a taxon's life cycle to various habitat types) may not be universally applicable without caveats. Yet, all criteria used here could be applied unambiguously to the set of taxa reviewed; using them to evaluate other taxa in the same manner should be done cautiously.

Taxa that were reviewed, but that were judged to require no special status during the time that data for this report were being gathered are listed in Table 2.

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[1]We are cognizant that the California Fish and Game Code does not address multiple status listings for a taxon. Nevertheless, multiple listings are not specifically excluded by the Code, and a Federal precedent exists for their use.

Table 2. Taxa judged not to warrant any state-level status at this time. The habitat column refers to whether a taxon has one or more life stage in an aquatic habitat (A) or whether its life stages use exclusively terrestrial habitats (T). Lack of current data for taxa marked with an asterisk "*" indicates a particular need for some kind of monitoring.

Taxon	Habitat Category
California giant salamander, *Dicamptodon ensatus*[1]	A
Oregon giant salamander, *Dicamptodon tenebrosus*[1]	A
Red-bellied newt, *Taricha rivularis**	A
Channel Islands slender salamander, *Batrachoseps pacificus pacificus*	T
Fair-view slender salamander, *Batrachoseps* sp.[2]	T
Guadalupe slender salamander, *Batrachoseps* sp.[2]	T
Hell Hollow slender salamander, *Batrachoseps* sp.[2]	T
Kern Plateau slender salamander, *Batrachoseps* sp.[2]	T
San Gabriel slender salamander, *Batrachoseps* sp.[2]	T
Dunn's salamander, *Plethodon dunni*	T
Great Basin spadefoot, *Scaphiopus intermontanus**	A
Great Plains toad, *Bufo cognatus*	A
Arizona toad, *Bufo microscaphus microscaphus*	A
Red-spotted toad, *Bufo punctatus*	A
California treefrog, *Pseudacris cadaverina**	A
Peninsular leaf-toed gecko, *Phyllodactylus xanti nocticolus*	T
Baja collared lizard, *Crotaphytus insularis vestigium**	T
Long-nosed rock lizard, *Petrosaurus mearnsi mearnsi**	T
Pigmy short-horned lizard, *Phrynosoma douglassii douglassii**	T
Western chuckwalla, *Sauromalus obesus obesus*	T
Yellow-backed spiny lizard, *Sceloporus magister uniformis*	T
Granite spiny lizard, *Sceloporus orcutti*	T
Granite night lizard, *Xantusia henshawi henshawi*	T
Southwestern blind snake, *Leptotyphlops humilis humilis*	T
Desert rosy boa, *Lichanura trivirgata gracia**	T
Coastal rosy boa, *Lichanura trivirgata roseofusca**	T
Sharp-tailed snake, *Contia tenuis*	T
Sierra mountain kingsnake, *Lampropeltis zonata multicincta*	T
Coast mountain kingsnake, *Lampropeltis zonata multifasciata*	T
St. Helena mountain kingsnake, *Lampropeltis zonata zonata*	T
Sonoran lyre snake, *Trimorphodon biscutatus lambda*	T
California lyre snake, *Trimorphodon biscutatus vandenburghi*	T
Western diamondback rattlesnake, *Crotalus atrox**	T

[1]Systematics follow Good (1989).
[2]Description of this taxon is pending (D. Wake, pers. comm.).

7) Management recommendations - This section provides the recommendations that need to be implemented to have some possibility of reversing the threats that are currently impacting a taxon. Gaps in current data needed to refine present management alternatives are also presented in this section.

Scientific and vernacular names and current taxonomy follows Jennings (1987a) unless otherwise indicated. Controversies or departures from current taxonomy are noted in the taxonomic remarks sections of each species account. For the three taxa reviewed that await

description (two salamanders and one snake), a description section was omitted to protect the priority of publication of the describers. Only enough data on these three taxa were included so that they can be properly addressed once their descriptions appear.

Results

Of the 80 taxa reviewed, 33[2] were judged not to warrant listing at this time (Table 2). While a number of these taxa have declined or disappeared from some areas, these taxa are abundant and widespread enough at this writing that even current levels of environmental alteration do not significantly threaten their survival. Though we do not review these taxa, we identify several among them that bear watching because they are likely to encounter problems in the future (Table 2).

The remaining 48 taxa were found to warrant a reconsideration in status. One additional species, the desert tortoise *(Xerobates agassizii)*, was originally considered with the remaining taxa discussed here, but was listed as Endangered by the Commission and Threatened by the USFWS (U.S. Fish and Wildlife Service 1990) in the course of assembling our review, so we will not address it here. Those desiring information parallel to that presented here for the desert tortoise should refer to Dodd (1981, 1986), Luckenbach (1982), Berry (1984), and U.S. Fish and Wildlife Service (1990). Accounts of the 48 taxa that warrant a reconsideration in status follow.

[2]The actual number is 33 instead of 32 due to *Dicamptodon ensatus* being split into two taxa in California by Good (1989) after our questionnaire was compiled and mailed.

SALAMANDERS

CALIFORNIA TIGER SALAMANDER
Ambystoma californiense Gray 1853

Description: A large (75-125 mm SVL) terrestrial salamander with several white or pale yellow spots or bars on a jet-black field (Stebbins 1985, Barry and Shaffer 1994; pers. observ.). Undersurfaces are highly variable in pattern, ranging from nearly uniform white or pale yellow to variegated white or pale yellow and black (pers. observ.). The relatively small, but protruding eyes have black irises (pers. observ.).

Taxonomic Remarks: Although the California tiger salamander had been regarded for many years as one of several subspecies within the *Ambystoma tigrinum* complex (e.g., Dunn 1940, Gehlbach 1967, Frost 1985, Stebbins 1985), the most recent genetic work indicates that populations of the California tiger salamander seem to be consistently differentiated from the most proximate western populations within the complex (Jones 1989), which supports the older systematic allocation of this form as a full species (e.g., Storer 1925, Bishop 1943). Genetic variation within *A. californiense* consists of several well-differentiated geographically segregated clusters (Shaffer et al. 1993). Additionally, several novel tiger salamander populations both outside and inside the known historical range of *A. californiense* have been discovered (e.g., Mullen and Stebbins 1978; Shaffer and Stanley 1992; J. Brode, R. Hansen, B. Shaffer, and T. Taylor, pers. comm.). None of these *Ambystoma* populations are closely related to *A. californiense* (B. Shaffer, pers. comm.), and many of them may represent accidental introductions associated with the fishbait trade (Espinosa et al. 1970, Glaser 1970, Bury and Luckenbach 1976, Stebbins 1985).

Distribution: This species ranges from the vicinity of Petaluma, Sonoma County and Dunnigan, Colusa-Yolo County line (Storer 1925) with an isolated outpost north of the Sutter Buttes at Gray Lodge, Butte County (Hayes and Cliff 1982) in the Central Valley, south to vernal pools in northwest Tulare County, and in the Coast Range south to ponds and vernal pools between Buellton and Lompoc in the Santa Ynez drainage, Santa Barbara County (Figure 1). The known elevational range of this species extends from 3 m to 1054 m (Shaffer and Fisher 1991). Potential habitat along the west side of the Sacramento Valley may exist north of Yolo County to the vicinity of Coming (e.g., see specimen CSUC 1460), but surveys in this area have failed to reveal extant populations (Shaffer et al. 1993).

Life History: This species engages in nocturnal breeding migrations over distances of 1000 m or more that are likely highly stereotyped (e.g., see Myers 1930a, Twitty 1941). Movement occurs from subterranean refuge sites (small mammal burrows) to breeding sites (relatively long-lasting rain pools) following relatively warm late winter and spring rains (November-February; Voigt 1989, Shaffer and Fisher 1991, Barry and Shaffer 1994). Some evidence exists to indicate that males precede females during the breeding migration (Shaffer et al. 1993). Eggs are deposited singly or in small groups of 2-4, submerged in the relatively shallow water of rain pools (Storer 1925). A minimum of ca. 10 weeks is required to complete development through metamorphosis (P. Anderson 1968, Feaver 1971). Larvae generally weigh about 10 g at metamorphosis, although they may remain in water and grow to much larger sizes; sexually mature larvae, as occur in other ambystomatid salamanders, are unknown, but during 1993, the first observations of oversummering larvae were made (Shaffer et al. 1993). It needs emphasis that the latter pattern is unusual, and the temporary pools occupied by the California tiger salamander generally dry up during the hot summer months (Storer 1925). Larvae are often cryptic (S.

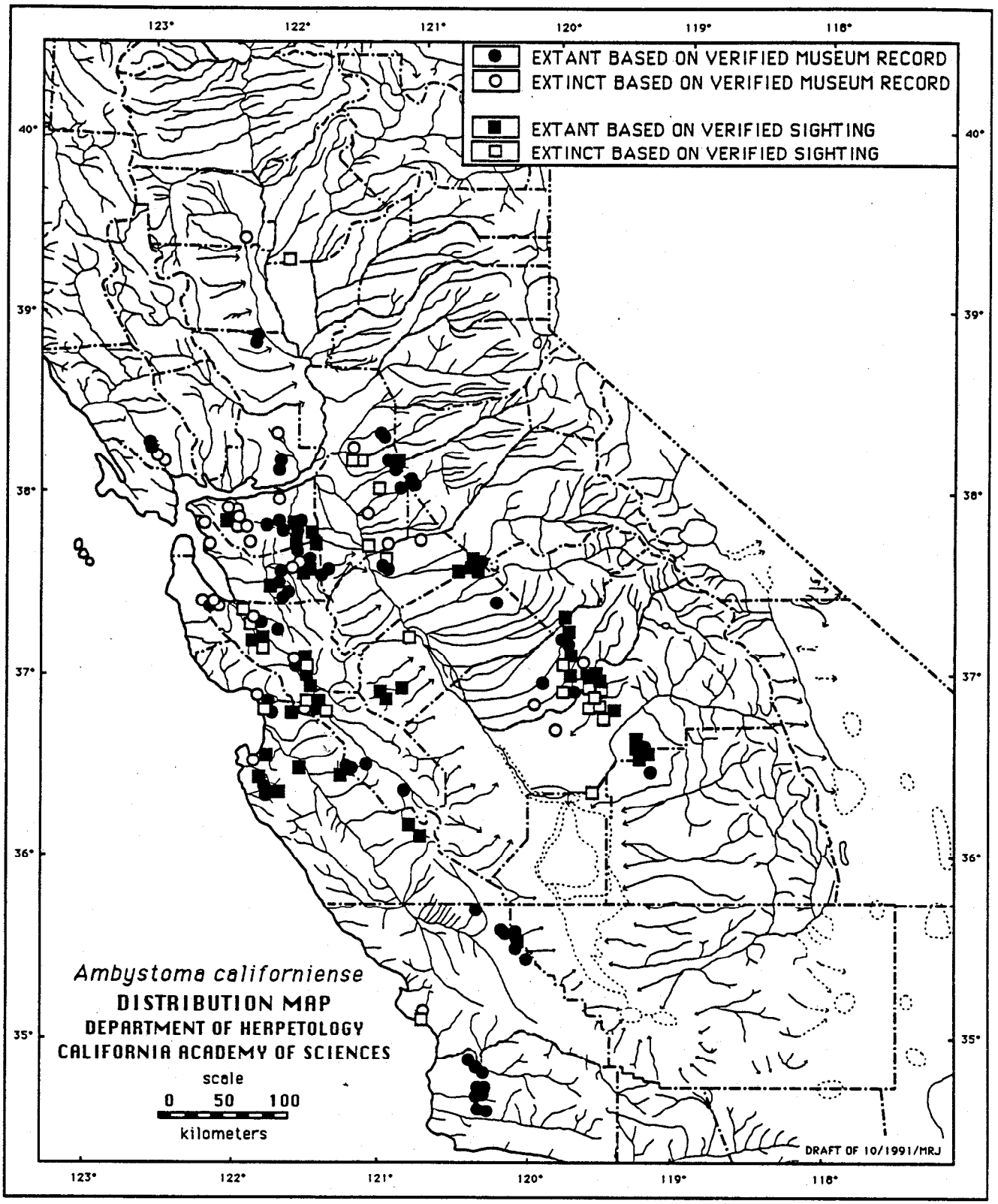

Figure 1. Historic and current distribution of the California tiger salamander (*Ambystoma californiense*) in central and northern California based on 383 locations from 769 museum records and 158 records from other sources.

Sweet, pers. comm.) and they exhibit short bursts of swimming activity when threatened (Shaffer et al. 1991, Austin and Shaffer 1992). However, the water of temporary pools they occupy may be turbid, so larvae are often difficult to detect visually (pers. observ.). Following metamorphosis, juveniles emigrate in mass at night from the drying breeding site after spending a few hours or days near the pond margin (Zeiner et al. 1988; S. Morey, pers. comm.). Juveniles have been found to migrate up to 1.6 km from breeding sites to refuge sites (Austin and Shaffer 1992). Except where refuge sites have been unearthed or disturbed (Storer 1925; Myers, ms.; N. Euless, pers. comm.) or under conditions of aseasonal rainfall (Holland et al. 1990), California tiger salamanders have not been observed outside of the wet-season interval (Morey and Guinn 1992, Barry and Shaffer 1994). During years of low rainfall, California tiger salamanders may not reproduce (K. Baldwin, B. Shaffer, and S. Sweet, pers. comm.). Preliminary data suggest that most individuals require 2 years to become sexually mature, but some individuals may be slower to mature (Shaffer et al. 1993).

Habitat: The California tiger salamander is a lowland species restricted to the grasslands and lowest foothill regions of Central and Northern California, which is where its breeding habitat (long-lasting rain pools) occurs (Shaffer and Stanley 1992). Permanent lowland aquatic sites are claimed to be used for breeding (Stebbins 1985; Zeiner et al. 1988; P. Moyle, pers. comm.), but use of such sites is unlikely unless they lack fish predators (Shaffer and Stanley 1992, Shaffer et al. 1993), so this species should be viewed as capable of breeding almost exclusively in temporary pools until data to the contrary show otherwise. Dry-season refuge sites within a reasonable distance of breeding sites (up to 1.6 km: Austin and Shaffer 1992) are likely a necessary habitat requirement since this species is absent from sites with seemingly suitable breeding habitat where surrounding hardpan soils are lacking in small mammal burrows; if the burrowing ability of California tiger salamanders is similar to that of its eastern congener (see Semlitsch 1983), they are probably poor burrowers. Although the range in types of burrows that California tiger salamanders regularly use needs study, those of the California ground squirrel *(Spermophilus beecheyi)* may be favored in some areas (Shaffer et al. 1993; J. Medeiros and S. Morey, pers. comm.), Botta's pocket gopher *(Thomomys bottae)* burrows are also known to be used (Shaffer et al. 1993, Barry and Shaffer 1994) as are certain man-made structures (e.g., wet basements, underground pipes, and septic tank drains: Zeiner et al. 1988; Myers, ms; S. Sweet, pers. comm.; pers. observ.).

Status: Threatened; this unique California endemic is the most vulnerable of the group of amphibians that breed in rain pools because its long developmental interval appears to restrict its ability to reach metamorphosis in only those rain pools that are the longest lasting, and as a consequence, often the largest in size. Moreover, the apparently stereotyped migrations to breeding sites are probably linked to use of sites over many years (e.g., Twitty 1941) and considerable longevity, which is likely the result of highly variable annual rainfall that does not consistently provide suitable environmental conditions for breeding or metamorphosis. Loss of rain (vernal) pools (Jain 1976, Stone 1990), and specifically, the degradation of complexes of long-lasting pools that are critical breeding [= core] habitat is a significant threat to the California tiger salamander, especially with the continued fragmentation of known breeding sites. Introduction of exotic and transplanted predatory fishes (including mosquitofish *[Gambusia affinis])* to rain pools for mosquito (Culicidae) control, a practice still engaged in by mosquito abatement agencies in California, or other purposes can eliminate an entire cohort of developing embryos or larvae (Zeiner et al. 1988; J. Medeiros and S. Morey, pers. comm.; see also Collins et al. 1988 and Shaffer et al. 1993). Shaffer and Fisher (1991), Shaffer and Stanley (1992), and Shaffer et al. (1993) identified a strong inverse correlation between the occurrence of California tiger salamanders and fishes, emphasizing that California tiger salamanders were very rarely found in any pond with fish. These data strongly suggest that California tiger

salamanders cannot survive in the presence of fish predators, perhaps because fishes are not recognized as predators, a condition in need of experimental investigation. Shaffer et al. (1993) also found the presence of California tiger salamanders inversely correlated with that of bullfrogs *(Rana catesbeiana)*, a condition that Shaffer and Fisher (1991) found only in unvegetated ponds, which suggests that California tiger salamanders perhaps gain a protective advantage when some vegetation structure is present. Some California tiger salamander populations also may have been eliminated by the widespread introduction of the Louisiana red swamp crayfish *(Procambarus clarkii)*. Historically, loss of populations in the Palo Alto area of San Mateo County was linked to groundwater pumping that lowered the water table and dried up springs, ponds, and wells (Myers, ms.). Loss of refuge habitat adjacent to breeding sites due to land use changes (e.g., grazing land to agriculture conversions, suburban housing development, or even converting grazing land to irrigated pasture) and poisoning of burrowing mammals are also significant threats (Barry and Shaffer 1994; J. Medeiros and H. Basey, pers. comm.). Further, artificial barriers that prevent or seriously impede migration (e.g., heavily travelled berms or roads, or solid road dividers) may have significantly affected California tiger salamander populations in certain areas (S. Morey, pers. comm.; see also Shaffer and Fisher 1991, Shaffer and Stanley 1992, Shaffer et al. 1993, Barry and Shaffer 1994). Decreased larval production or breeding during the years after 1986 suggests that the 1986-1990 drought may have negatively impacted California tiger salamander populations (Jones and Stokes 1988). Based on the data of Shaffer et al. (1993), California tiger salamanders were not found at 58% of the historical locations (see Shaffer et al. (1993) for a definition) and 55% of the ponds they sampled, leading to the conclusion that California tiger salamanders have disappeared from about 55% of their historic range in California.

Management Recommendations: Particular effort should be made to protect the vicinity of large rain pool complexes that are known core breeding sites in order to maintain the integrity of the breeding-refuge site ensembles that California tiger salamanders use (see Shaffer et al. 1993). Shaffer et al. (1993) also found a low level of gene flow between extant California tiger salamander populations, even those in close spatial proximity. As they emphasize, this suggests that each population is a genetically independent entity, and this warrants strong consideration for conservation to be resolved at a local population-level of protection. Because the large rain pools that salamanders use are also the only habitat for a number of plant species and invertebrates that are listed or proposed for listing (Jain 1976; Jain and Moyle 1984; Reiner 1992; T. Griggs, pers. comm.; see also Shaffer et al. 1993), ample justification exists for protection of these unique habitats beyond simply the presence of California tiger salamanders. The range of variation in physical characteristics of rain pools that allow California tiger salamanders to reproduce and metamorphose successfully is not well understood, but is currently under continued study (Shaffer and Stanley 1992, Shaffer et al. 1993). The latter urgently needs study for effective recommendations to be made about habitat management and protection for this species. Also poorly understood is the variation in distance between the breeding and refuge sites. Even minor habitat modifications that traverse the area between the breeding and refuge sites (such as roads, berms, and certain types of pipelines or fences) can impede or even prevent breeding migrations, and should be avoided. If one or more roads must traverse such a route, amphibian tunnels that allow continued migration beneath the road should be part of the road design (Shaffer et al. 1989; Barry and Shaffer 1994; see also Langton 1989). Moreover, solid road dividers should not be used where migratory routes exist so as not to hinder California tiger salamanders that may migrate across the roadbed (Shaffer et al. 1989). Introduction of exotic or transplanted aquatic fauna to rain pools should be avoided; efforts should be made to develop novel integrative programs with agencies like Mosquito Abatement Districts to develop management methods that are non-destructive to native rainpool inhabitants like California tiger salamanders. Soil disturbance to depressions that seasonally become rain pools should be avoided. In particular, special

care should be taken to avoid puncturing or altering any potentially thin hard pan that has developed in the pool substrate over many years (e.g., caliche hard pan). Such disturbances could increase percolation rate and shorten the duration of pool life enough that California tiger salamanders could no longer metamorphose successfully in such pools.

INYO MOUNTAINS SALAMANDER
Batrachoseps campi Marlow, Brode, and Wake 1979

Description: A robust (32.0-60.7 mm SVL), dark brown to black slender salamander with a relatively broad, rounded snout; large eyes (Papenfuss and Macey 1986); and patches of silvery iridophores concentrated on the upper eyelids, head, and the anterior body (Marlow et al. 1979), or forming a continuous network covering the entire dorsal surface (Yanev and Wake 1981). Sixteen to 18 costal grooves are present (Stebbins 1985). The distribution of iridophores often gives these salamanders a greenish or silvery green appearance (Yanev and Wake 1981). The iris color is undescribed.

Taxonomic Remarks: The Inyo Mountains salamander is a distinct species distinguished from all other species of *Batrachoseps* based on its large size, short tail, broad head, and distinctive coloration without a dorsal stripe (Marlow et al. 1979, Yanev and Wake 1981). Yanev (1980) and Yanev and Wake (1981) found *B. campi* genetically very distinctive from all other known species of *Batrachoseps*, but least differentiated from *B. wrighti* of Oregon.

Distribution: This California endemic is known only from 16 localities (Papenfuss and Macey 1986; J. Brode, pers. comm.) extending 32 km along the Inyo Mountains (Inyo County) between Waucoba Mountain and New York Butte, and 10.5-13.5 km east to west across the mountain range (Figure 2). Yanev and Wake (198 1) report the known elevational range of this species as extending from 550-600 m (Hunter Canyon) to 2590-2620 m (Upper Lead Canyon):

Life History: Almost nothing is known of the life history of this species although a report detailing the natural history and local distribution of *B. campi* is anticipated (K. Berry, in prep; see Yanev and Wake 198 1). Only the juvenile through the adult stage have been observed or collected (Marlow et al. 1979). The Inyo Mountains salamander appears to be nocturnal, taking shelter under moist rocks or in damp crevices during the daytime (Macey and Papenfuss 1991a). The species likely has direct development similar to other members of the genus *Batrachoseps* where the reproductive pattern is known. Nesting sites are likely to be moist subterranean localities within the talus slopes or fissures of the habitat where this species has been found. No data are available on the movement ecology or physiology of this species or on the potential differential use of habitat by various life stages.

Habitat: Currently, only the gross habitat requirements of *B. campi* are known. The original two known localities where this species was discovered each have permanent seepage springs with limited vegetation associated with talus rubble (Mat-low et al. 1979). Fissured limestone likely provides shelter for *B. campi* in the canyons where it is known to occur (Papenfuss and Macey 1986). Each of the sites where this species is known to occur has a narrow strip of riparian vegetation. Where habitat is suitable, cliffs, outcrops, or talus are in contact with spring flow and the flow passes through dense riparian vegetation (Papenfuss and Macey 1986, Macey and Papenfuss 1991a). The area estimated to be ideal habitat at each locality where this species is known to occur is very small, ranging from 0.17 ha to 4.34 ha (Giuliani 1977, Papenfuss and Macey 1986). This species may be more

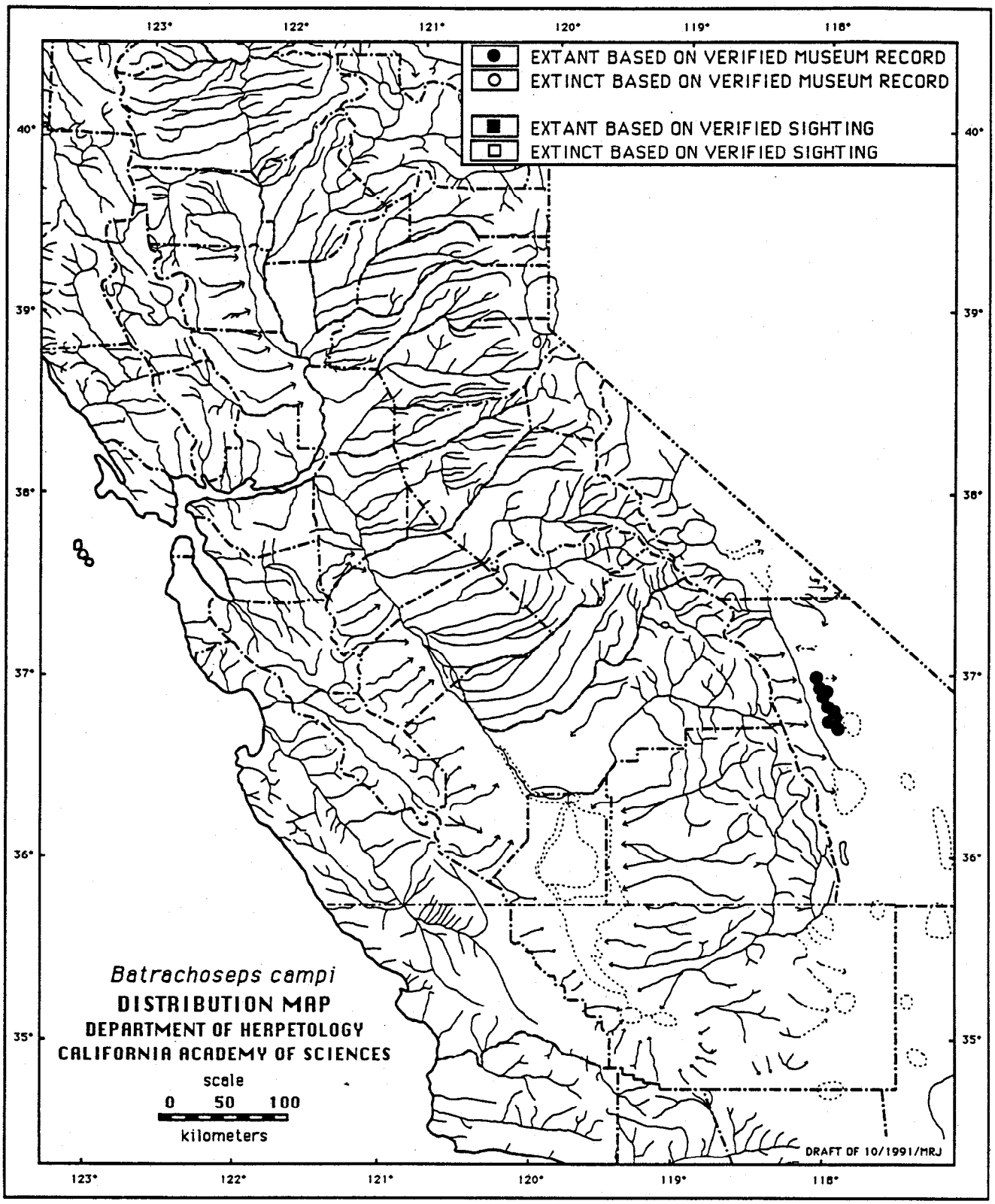

Figure 2. Historic and current distribution of the Inyo Mountains salamander (*Batrachoseps campi*) in central California based on 16 locations from 163 museum records and 29 records from other sources.

difficult to detect near the surface in non-spring situations, so it may be more widespread than current data indicate. Novel sampling techniques will be needed to verify this.

Status: Threatened; the relatively restricted distribution of this California endemic to limited habitat in the Inyo Mountains and the very small area of estimated ideal habitat may make this species especially vulnerable to habitat alteration. Much of its known habitat is associated with springs that can attract significant human *(Homo sapiens)*, horse *(Equus caballus)*, and burro *(E. asinus)* activity that is likely to imperil its survival. Its restricted geographic range also makes it particular susceptible to extinction from catastrophic climatic or geomorphologic events of regional scale.

Management Recommendations: A thorough understanding of the specific habitat requirements significant to the survival of this species are an absolute prerequisite to refining management efforts for this species. Until specific habitat data become available, efforts should be directed at protecting the habitat ensemble associated with the springs and other riparian areas where *B. campi* has been found, and in particular, efforts should be made to avoid any alterations that might modify the hydrology of these areas. The practice of opening and clearing springs with explosives for enhancement of upland species and other animals (see Marlow et al. 1979) should be prohibited within the known and suspected range of this species. Capping of springs has been identified as the major threat to the survival of *B. campi* (Macey and Papenfuss 1991a). A combination of water diversion from springs, disturbance of the substrate through mining, and damage to potentially sheltering riparian plants by feral burros and domestic cattle *(Bos taurus)* currently pose some degree of threat to every one of the 16 localities where this species is known to occur. Existing populations of *B. campi* would be better protected if the areas associated with the springs in which they occur were closed to vehicles and mining (see Marlow et al. 1979). Concerted efforts should be made to search for this species in other nearby springs when sufficient surface moisture is present to induce near-surface activity in this salamander. Protection of this species would be assisted through initiation of land use restriction measures in the Inyo Mountains, which would anticipate future finds of this species outside of its known range.

RELICTUAL SLENDER SALAMANDER
Batrachoseps relictus Brame and Murray 1968

Description: A moderate-sized (32.1-48.1 mm SVL), dark black slender salamander with a very dark brown dorsal band extending from the forelimbs to the base of the tail and gray-black undersurfaces (Brama and Murray 1968). Sixteen to 20 costal grooves are present (Stebbins 1985). The iris is dark brown or black (R. Hansen, pers. comm.).

Taxonomic Remarks: Brame and Murray (1968) included salamanders from four disjunct regions (the central Coast Ranges, the southern Sierra Nevada Mountains, Santa Cruz Island, and the San Pedro Mártir Mountains of Baja California) within *Batrachoseps relictus*, but Yanev (1980) restricted *relictus* to the Sierran populations. Yanev (1980) treats *relictus* as a subspecies of *B. pacificus*, but the geographic pattern of genetic variation across what is termed *B. relictus* here is poorly understood. Both the work of Yanev (1978) and unpublished data (D. Wake and R. Hansen, pers. comm.) suggest that *B. relictus*, as treated here, may represent several species.

Distribution: This California endemic complex of populations is currently known from the vicinity of Briceburg, Mariposa County south to the Kern River Canyon, Kern County (Figure 3), but the northern limits of the range remain poorly understood. Its known elevation range extends from 182 m to 2438 m (R. Hansen, pers. comm.).

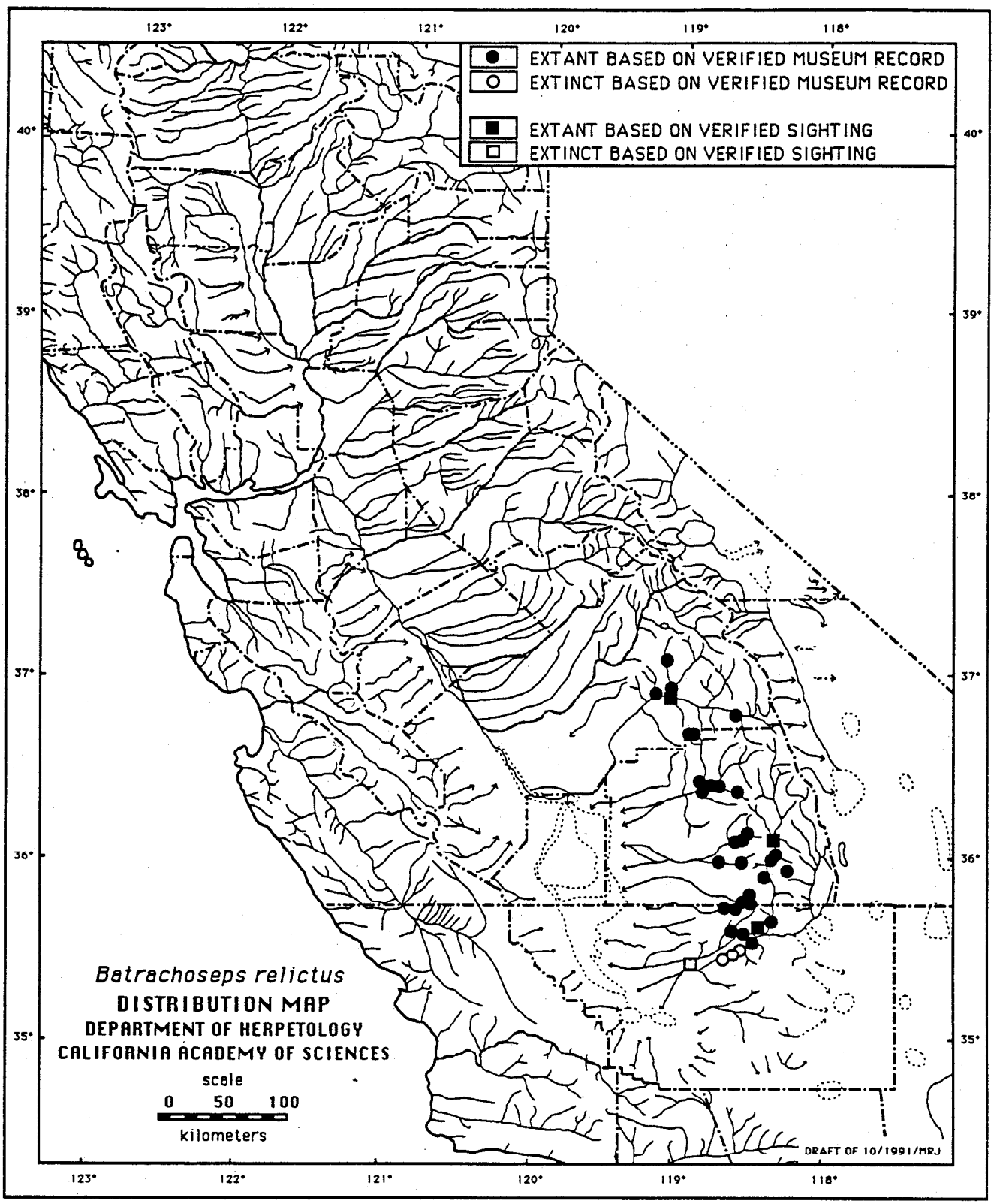

Figure 3. Historic and current distribution of the relictual slender salamander (*Batrachoseps relictus*) in central California based on 73 locations from 154 museum records and 19 records from other sources.

Life History: Virtually nothing is known of the life history of this taxon. As with other members of the genus, direct development is presumed. A probable communal nest of this taxon similar to the one described for the Breckenridge Mountain slender salamander (see subsequent account) has recently been discovered (R. Hansen, pers. comm.).

Habitat: Details of the habitat requirements of this taxon are poorly understood. It has been found under a range of surface objects ranging from rocks to bark and other tree debris. This taxon may be more difficult to detect near the surface in situations where movable surface objects are absent, so it may be more widespread than current data indicate. Novel sampling techniques will be needed to properly evaluate this possibility.

Status: Special Concern; The known range of this unique California endemic is relatively restricted (i.e., the southern Sierra Nevada) and lies within a region that has undergone extensive local development and changes in land use patterns over the last 20 years (Moyle 1973, California Department of Forestry and Fire Protection 1988). Despite extensive searches at suitable time intervals, no salamanders have been found at the type locality of *B. relictus* in Lower Kern River Canyon since 22 April 1970 (D. Wake, pers. comm.). Moreover, no salamanders have been found at eight sites in Kern Canyon where they were relatively common in the 1960s (R. Hansen, pers. comm.).

Management Recommendations: Systematic study of *B. relictus* to identify how many taxa are really present and the geographic range of each is the basic foundation needed prior to all other studies. Once taxa are identifiable, the habitat requirements of each need to be better understood before really effective management recommendations can be made. Much of the most basic data on the biology of this complex of populations are lacking. Phenological studies integrated with identifying the components of habitat structure essential to these salamanders are especially needed. In the absence of significant data, the recommendations made for *B. campi* apply to this species. Sites where *B. relictus* are known to occur should be protected from disturbance, especially alterations that may affect local hydrology. Particular attention should be paid to how more subtle (remote) effects may affect the local water table and soil moisture regimes, and such potential effects should be assessed for a significant radius around sites known to harbor *B. relictus.* What a significant radius is will have to be established through study of populations of *B. relictus* and the range of variation in local hydrologies. More specific recommendations will be possible after data from the suggested studies on *B. relictus* become available.

BRECKENRIDGE MOUNTAIN SLENDER SALAMANDER
Batrachoseps sp.

Taxonomic Remarks: Individuals representing this currently undescribed taxon were likely first found in 1977, although it was not recognized that this population represented a unique taxon until somewhat later on. Unpublished genetic data indicate that this taxon, which is being described by David B. Wake and Robert W. Hansen, is distinctive.

Distribution: This California endemic is known only from a single locality at approximately 1920 m near Squirrel Meadow on Breckenridge Mountain, Kern County (Figure 4).

Life History: Little is known of the life history of this species; only eggs and adults have been observed or collected. Robert W. Hansen (pers. comm.) found a probable communal oviposition site, approximately 150 eggs in a moist location under a large rock. Eggs and gravid females were observed in June. The eggs look similar to those of other *Batrachoseps,* so the species probably undergoes direct development.

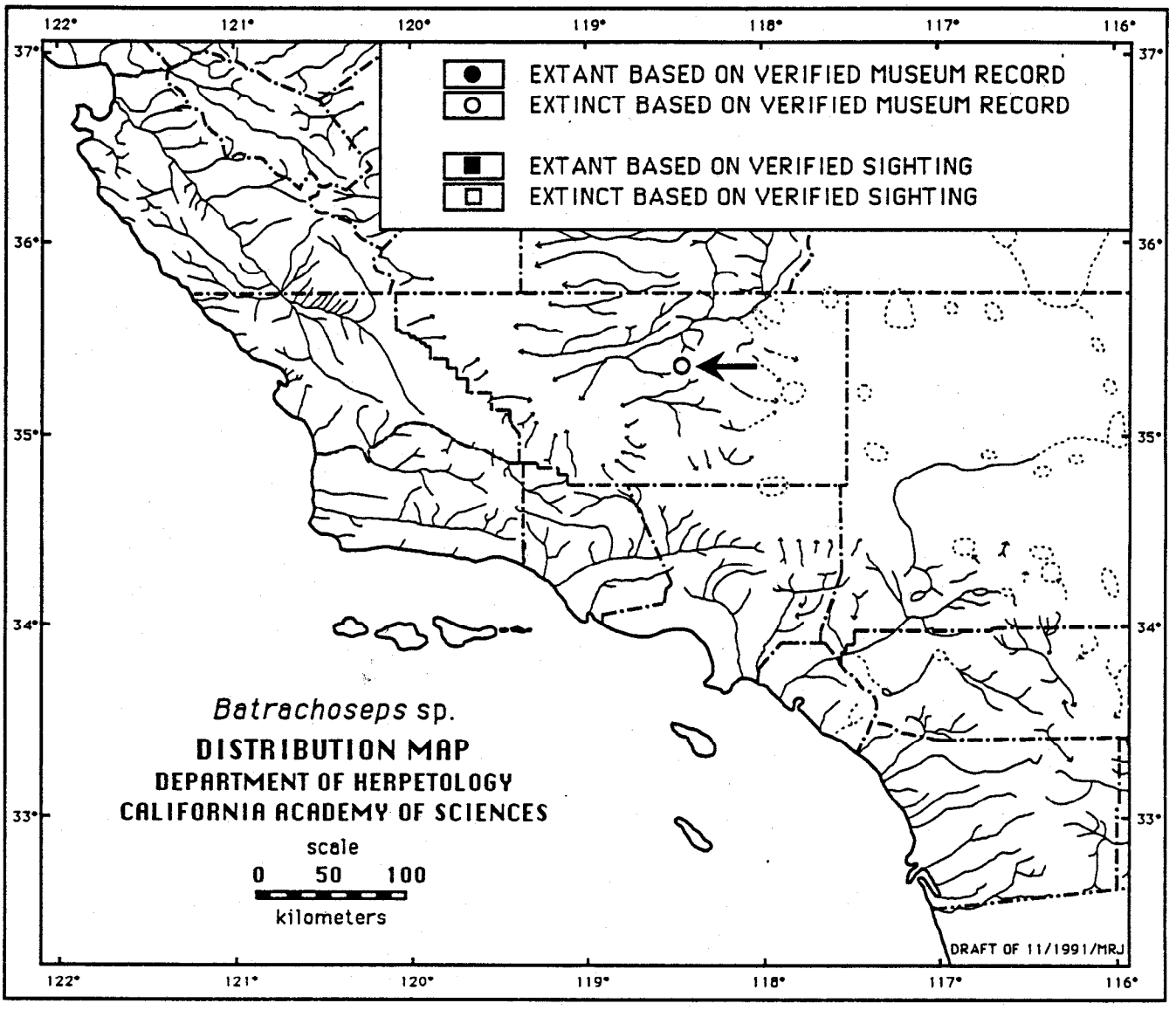

Figure 4. Historic and current distribution of the Breckenridge Mountain slender salamander (*Batrachoseps* sp.) in southern California based on 2 locations from 16 museum records and 52 records from other sources.

Habitat: All life stages of this taxon found thus far are restricted to a seep with a sandy loam substrate on a southeastern-facing slope. Rocks or rotting logs are used as cover during the interval of near-surface activity. This species may be much more difficult to detect near the surface in situations away from springs, so it may be more widespread than current data indicate. Novel sampling techniques will be needed to verify this possibility.

Status: Endangered; the highly restricted known distribution of this California endemic to the locality where it was discovered makes it especially vulnerable. Few observations of this taxon even exist. Larry Satterfield observed 26 individuals of what was presumably this taxon at the only known locality in 1977. On 13 June 1979, Robert W. Hansen observed 22 individuals and the communal nest described above. Between 1979-1983, the dirt road adjacent the locality where this taxon was found was judged too steep for logging trucks to negotiate the grade, so the Sequoia National Forest approved regrading and paving the road so that it was rerouted directly through a substantial portion of the bottom of the seep in which this taxon had been observed, considerably modifying its structure and hydrology. Additionally, the black oaks *(Quercus kelloggii)* that historically bordered this seep were cut (R. Hansen, pers. comm.). Following this alteration, Hansen has found only four adults of this taxon (all observed on 18 September 1983). More recent searches have failed to reveal this taxon.

Management Recommendations: What remains of the only seep on Breckenridge Mountain where this species has been found should be protected from further disturbance, including more remote effects that may influence local hydrology. Assuming a population can be relocated, data on the basic biology of this taxon need to be gathered. Efforts should also be made to search for this taxon in similar habitat nearby, particularly downslope from the only known locality on Breckenridge Mountain, where habitat is relatively inaccessible. In the absence of significant data, the recommendations made for *B. cuapi* and *B. relictus* apply to this species. More specific recommendations will be possible after data from the suggested studies on the Breckenridge Mountain slender salamander become available.

YELLOW-BLOTCHED SALAMANDER
Ensatina eschscholtzii croceater (Cope 1869)

Description: A moderate-sized (48.0-78.0 mm SVL) salamander with reasonably large (averaging 3-4 mm in width and up to 7 mm in length), irregular, pale, lemon-yellow to yellowish cream blotches (yellow in juveniles) on a deep blackish brown to black ground color and a prominent constriction at the base of the tail (Stebbins 1949; R. Hansen, pers. comm.). A single large rectilinear, although often irregularly outlined, blotch that does not extend onto the upper eyelids occurs in each parotid area. Twelve to thirteen costal grooves are present. The iris is dark brown or black with few or no guanophores (Stebbins 1949).

Taxonomic Remarks: This taxon is one of a series of morphologically (Stebbins 1949) and genetically (Wake and Yanev 1986) differentiated forms of *Ensatina.* The only population of yellow-blotched salamander which has been sampled genetically is well differentiated from populations currently allocated to the most proximate other subspecies of *Ensatina* (see Wake and Yanev 1986). Wake and Yanev (1986) have concluded that their genetic data support Stebbins' (1949) interpretation that *Ensatina eschscholtzii croceater* is simply a morph within a cline now recognized *as E. eschscholtzii;* but data on the geographic pattern of genetic variation within *E. e. croceater* are not currently available. Such data are absolutely necessary to exclude the possibility that specific-level recognition for this taxon is justified.

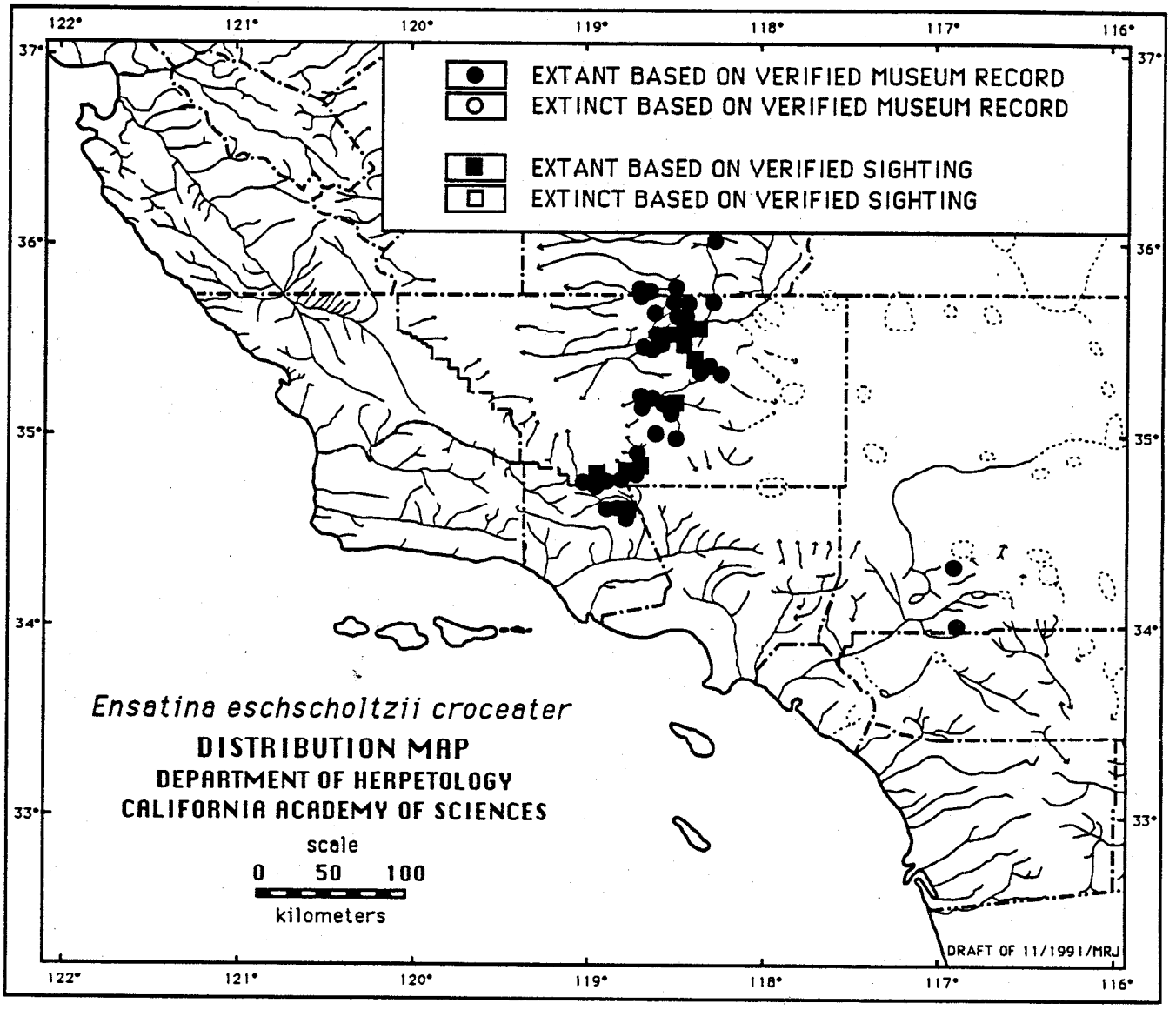

Figure 5. Historic and current distribution of the yellow-blotched salamander (*Ensatina eschscholtzii croceater*) in southern California based on 128 locations from 253 museum records and 35 records from other sources.

Distribution: The known range of this California endemic is restricted to Kern and Ventura counties, California, and extends from the Piute Mountains southwestward to the vicinity of Alamo Mountain (Figure 5). Its known elevation range is from 427 m to 2285 m (Piute Peak, Kern County).

Life History: Little is known of the life history of this nocturnal salamander and until very recently, it remained poorly represented in collections (see Stebbins 1949), probably because the region in which it occurs has been poorly searched relative to others areas in the state (R. Hansen and J. Boundy, pers. comm.; see also Stebbins 1949). If similar to other forms of *Ensatina* studied (see Stebbins 1954a), it likely deposits small clutches of terrestrial eggs that undergo direct development. Gravid females have been observed in April and May (R. Hansen and D. Holland, pers. comm.). This species may be much more difficult to detect near the surface than data would indicate, so it could be more widespread than even current data indicate. Novel sampling techniques will be needed to test whether this possibility is reasonable. No data are available on the movement ecology of this taxon or on the potential differential use of habitat by various life stages, although data on these aspects of the life history of *E. e. croceater* are anticipated to be similar to that described for *E. e. xanthoptica* (see Stebbins 1949). Longevity in the field is unknown, but captive adults have lived at least 3 years (Bowler 1977).

Habitat: Yellow-blotched salamanders occur in a reasonable broad range of vegetational associations from California black oak-, blue oak- *(Quercus douglasii)*, and gray pine- *(Pinus subiniana)* dominated open woodlands to Jeffrey pine- *(P. jeffreyi)*, ponderosa pine- *(P. ponderosa)*, and white fir- *(Abies concolor)* dominated open forest. They are also frequent in canyons amongst litter and debris from canyon live oaks *(Q. chrysolepis)*, and they extend onto slopes with California scrub oaks *(Q. dumosa)* and deerbrush *(Ceanothus* sp.). Ecologically, this taxon appears to be rather generalized; Stebbins (1949) suggested that the larger-blotched forms of *Ensatina* like the yellow-blotched salamander had a selective advantage other pattern variants of *Ensatina* over because they could be cryptic on both light and dark substrates instead of being cryptic on one substrate category. Woody debris is a key habitat component for other forms of *Ensatina* (Aubry et al. 1988; see Stebbins 1954a), and observations suggest a parallel pattern for *E. e. croceater (R.* Hansen, D. Holland, and S. Sweet, pers. comm.; see Block et al. 1988).

Status: Special Concern; this taxon is considerably more widespread and abundant than Stebbins (1949) originally realized largely because until recently most of its range had been poorly examined (R. Hansen, pers. comm.). Original concerns regarding exploitation of this salamander by the pet trade (J. Brode, pers. comm.) are less significant as it is now illegal to sell California amphibians and reptiles (Nicola 1981). Nevertheless, indications exist of considerable interest to modify land use practices and development in the Tehachapi Mountains that would threaten a significant portion of the range of the yellow-blotched salamander. The Tehachapi Mountains, Cummings Valley, and Bear Valley areas south of California Highway 58 have undergone significant development over the last 10 years (R. Hansen, pers. comm.). Moreover, the Tejon Ranch Company, probably the largest landowner in this region, has conducted extensive wood cutting operations for oak over the past decade (D. Holland and D. Jennings, pers. comm.), as well as opening up various areas of the ranch for hunting, camping, agriculture, mining, and potential investment (R. Hansen and D. Holland, pers. comm.; pers. observ.). Existing and planned development in these areas has focused largely on oak woodlands, perhaps the most important habitat used by yellow-blotched salamanders.

Management Recommendations: A better understanding of the local and geographic distribution of this taxon are needed. In particular, the habitat features that influence its local distribution are only vaguely understood and need study in the event that directed

management of this taxon becomes necessary. Surveys for this taxon should be a routine component of feasibility assessments addressing potential development in the area of its geographic range.

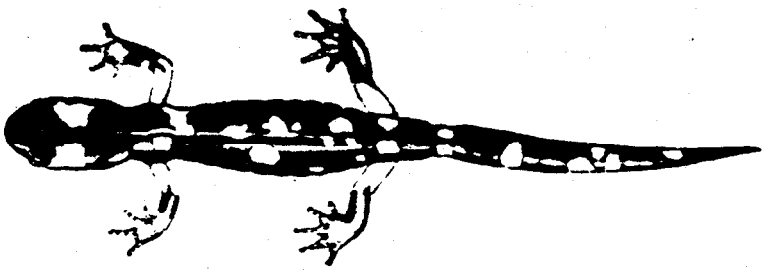

Plate 1. Adult yellow-blotched salamander (*Ensatina eschscholtzii croceater*) [from Stebbins 1954b).

LARGE-BLOTCHED SALAMANDER
Ensatina eschscholtzii klauberi Dunn 1929

Description: A moderate-sized (45.0-82.0 mm SVL) salamander with large (often 5-6 mm or more in greatest linear dimension), usually rectilinear orange blotches on a deep blackish brown to black ground color and a prominent constriction at the base of the tail (Stebbins 1949). Blotches are variable in size and arrangement, sometimes distributed in checkerboard fashion, often connected to form diagonal or transverse bands, or in varying combinations of spots and bands. Twelve to thirteen costal grooves are present. The iris is dark brown or black with few or no guanophores (Stebbins 1949).

Taxonomic Remarks: This taxon is one of a series of morphologically (Stebbins 1949) and genetically (Wake and Yanev 1986) differentiated forms of *Ensatina.* Only two populations of large-blotched salamanders have been sampled genetically, both of which are well-differentiated from populations currently allocated to other subspecies of *Ensatina* (see Wake and Yanev 1986, Wake et al. 1986). Further work on the geographic pattern of genetic and morphological variation in *Ensatina eschscholtzii klauberi* and its allies are needed to reveal whether specific-level recognition for this taxon is justified.

Distribution: The known range of this apparent California endemic is discontinuous from the San Jacinto Mountains in Riverside County to Cottonwood Creek, San Diego County, California (Figure 6). Its known elevational range extends from 518 m (Alpine, San Diego County) to 1646 m (Idyllwild, Riverside County). An old, single record reported as 120 km (75 mi) southeast of San Diego (Lockington 1880; this distance would actually place this record in the Sierra de Juarez) was thought to have come from from the Sierra San Pedro Mártir, Baja California (Dunn 1926, Slevin 1930), and Stebbins (1949) speculated they might occur there (see also Mahrdt 1975), but no further specimens attributed to localities outside of California have been found.

Life History: Little is known of the life history of this form of *Ensatina,* largely because little effort has been made to study it. Laurence Monroe Klauber found an adult female attending a group of 14 eggs on 25 July 1927 (Storer 1929). Like other forms of *Ensatina* studied (see Stebbins 1954a), development is presumed to be direct. Large-blotched salamanders are insectivorous and are known to eat a variety of ground- or litter-dwelling arthropods (Stebbins 1954a). Surface activity is restricted to the period of the year with sufficient surface moisture, usually November to April. Yet, *E. e. klauberi* has been found in logs that harbor a favorable microenvironment into July (Stebbins 1954a). Longevity in the field is unknown, but captive adults have lived over 4 years (Bowler 1977).

Habitat: Large-blotched salamanders occupy a reasonable broad range of habitats from canyon live oak- and Coulter pine *(Pinus coulteri*)-dominated woodland and yellow pine- and incense cedar *(Calocedrus decurrens)*- dominated coniferous forest to California scrub oak-, toyon *(Heteromeles arbutifolia)*-, and buckwheat *(Eriogonum fasciculatum)*-dominated shrubby assemblages. Ecologically, this taxon appears to be rather generalized; Stebbins (1949) suggested that-the larger-blotched forms of *Ensatina* such as the large-blotched salamander had a selective advantage over other pattern variants of *Ensatina* because they could be cryptic on both light and dark substrates instead of being cryptic on one substrate category. Oak logs and debris, especially that provided by coast live oak *(Quercus agrifolia)* and black oak may be favored (M. Long, D. Morafka, and D. Wake, pers. comm.; pers. observ.); woody debris has been identified as a key habitat component for other forms of *Ensatina* (Aubry et al. 1988; Block et al. 1988; see also Stebbins 1954a).

Status: Special Concern; this taxon is considerably more common than was historically believed. Its relatively broad habitat requirements and its occurrence in woodland habitats,

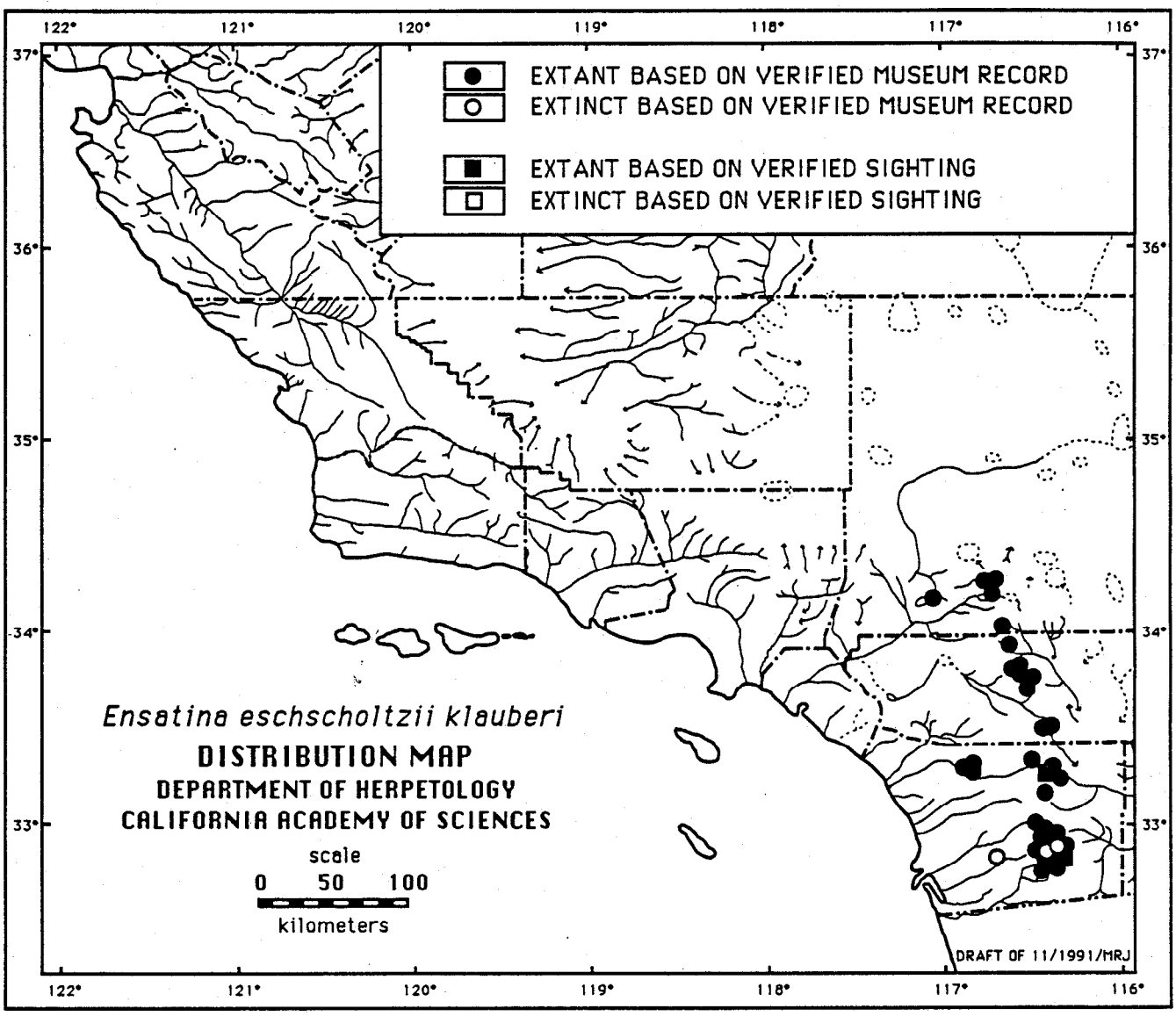

Figure 6. Historic and current distribution of the large-blotched salamander (*Ensatina eschscholtzii klauberi*) in southern California based on 133 locations from 639 museum records and 24 records from other sources.

including residential yards (J. Copp, pers. comm.), with a relatively undisturbed rocky granitic parent substrate that are less accessible may limit the potential threats to this species. Moreover, original concerns regarding exploitation of this salamander by the pet trade (J. Brode, pers. comm.) are less significant as it is now illegal to sell California amphibians and reptiles (Nicola 1981). Nevertheless, continued growth has resulted in a trend toward more intensive development of less accessible sandstone/woodland associations on steep slopes in montane Riverside and San Diego counties, particularly for improved pasture, drip-irrigated orchards and luxury homes, development that is often associated with more intensive substrate disturbance. Potential impacts to populations from mining exist in the Crystal Creek area of the San Bernardino Mountains (J. Brode, pers. comm.).

Management Recommendations: A better understanding of the local and geographic distribution of this taxon are needed. In particular, the habitat features that influence its local distribution are only vaguely understood and need study in the event that directed management of this taxon becomes necessary. Surveys for this taxon should be a routine component of feasibility assessments addressing potential development in the area of its geographic range.

MOUNT LYELL SALAMANDER
Hydromantes platycephalus (Camp 1916)

Description: A moderate-sized (44.0-70.0 mm SVL) salamander with a blotched rock-flake pattern resulting from flecks and patches of pale metallic gold, gray to whitish pigment on a brown to nearly black background color (Stebbins 1954b). Twelve costal grooves are present (Storer 1925), the feet are prominently webbed (Stebbins 1985), and the iris is bright yellow (Camp 1916a).

Taxonomic Remarks: This taxon is one of the three recognized species in the genus *Hydromantes* from California (Gorman 1988). The Mount Lyell salamander appears genetically distinct from other recognized species of *Hydromantes*, but only one population of *H. platycephalus* has been sampled genetically (Wake et al. 1978), so data on the geographic pattern of genetic variation within *H. platycephalus* are lacking.

Distribution: The known range of this California endemic extends from the Smith Lake area (El Dorado County) to the Franklin Pass area (Tulare County) in the Sierra Nevada Mountains (Figure 7). An isolated population is present on the Sierra Buttes, Sierra County (Stebbins 1985). Its known elevational range extends from 1260 m to 3635 m.

Life History: Mount Lyell salamanders are nocturnal (Adams 1942) and adapted to cool conditions; they are known to be active between -2.0°C and 11.5°C (mean = 5.6°C; Brattstrom 1963), which is the lowest temperature range under which any species of *Hydromantes* is known to be voluntarily active (Gorman 1988) and may be the lowest known for any North American salamander. They climb using the tail, a distinctive mode of locomotion that helps them move over the smooth, inclined surfaces of glacially polished rock, which is frequently encountered in their environment (Stebbins 1947). They are presumed to undergo direct development like other plethodontid salamanders; Gorman (1956) examined an 11 egg-bearing female *H. platycephalus* and concluded that they lay fertilized, but undeveloped eggs. Mount Lyell salamander are insectivorous with hatchlings and juveniles apparently restricted to eating smaller forms, such as globular springtails (Sminthuridae) and fungus gnats (Mycetophilidae: Adams 1938, 1942). The season of near-surface activity ranges from around May 1 to late August, after which individuals probably retreat to refugia in talus slopes and fissures with sufficient moisture.

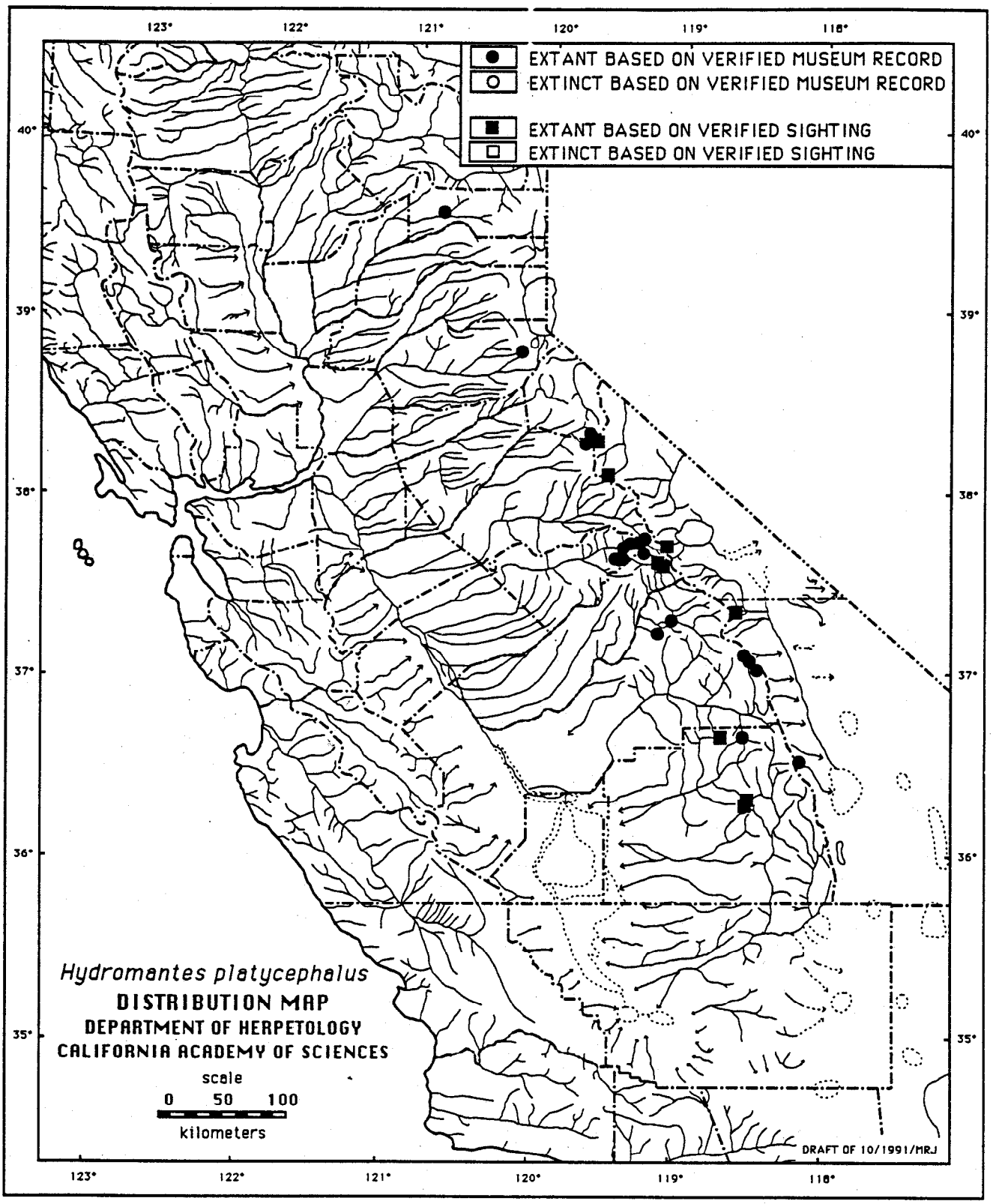

Figure 7. Historic and current distribution of the Mount Lyell salamander (*Hydromantes platycephalus*) in central and northern California based on 56 locations from 386 museum records and 13 records from other sources.

Habitat: *Hydromantes platycephalus* is largely restricted to alpine or subalpine vegetation associations (Adams 1938, 1942; Stebbins 1951), although scattered records of this species exist from somewhat lower elevations. Extensive outcrops of rock and scattered boulders are characteristic of the habitat of *H. platycephalus* (Stebbins 1985). Free surface water, such as a permanent stream, waterfall, seepage, or runoff from melting snow, is almost always present within a few meters, and usually within a few centimeters, of the sites where *H. platycephalus* is present as it has been described as being no more resistance to water loss than wet paper (Gorman 1988). This high elevation endemic is most frequently found beneath rocks on a moist-to-wet substrate of rock and soil with little humus (Gorman 1988), on north and east slopes (Zeiner et al. 1988). Woody vegetation (largely alpine willow *[Salix anglorum]*, heather *[Phyllodoce breweri]* scrubby whitebark pine *[Pinus albicaulis])*, is typically sparse or absent altogether; but grasses, sedges, mosses, or lichens may be present.

Status: Special Concern; although this California endemic has the broadest geographic range of the known species of *Hydromantes*, within that range, *H. platycephalus* may be very patchily distributed (Zeiner et al. 1988) with local populations of 6-60 individuals (Gorman 1988). Past observations indicate that large aggregations of adults may be susceptible to human intrusion during favorable years (Gorman 1988; H. Basey, pers. comm.). Until its microhabitat requirements are better understood, a conservative approach of giving it this designation is strongly recommended based on its potentially very patchy distribution that may be especially susceptible to local extirpation events. That listing may be modified as knowledge of its range and habitat requirements are acquired.

Management Recommendations: A much better understanding of the specific habitat requirements significant to the survival of this species are an absolute prerequisite to refining management efforts. Until specific habitat data become available, efforts should be directed at protecting the habitat ensemble associated with the rocky habitats where *H. platycephalus* has been found. In particular, efforts should be made to avoid any alterations that might result in alteration of the physical or hydrological structure of these areas. Wherever possible, talus slopes should be protected from intrusion. Disruption of exfoliated rocky shelves or granite fissures known to harbor salamanders should be avoided. Limiting or excluding climbing activity or the use of rock-altering climbing gear in areas where these salamanders are known to exist should be encouraged until the distribution of this salamander and how it responds to different habitat disturbances is better understood.

OWENS VALLEY WEB-TOED SALAMANDER
Hydromantes sp.

Taxonomic Remarks: This recently discovered, currently undescribed taxon appears to be a member of the genus *Hydromantes* (Jennings 1987a, Gorman 1988, Macey and Papenfuss 1991a). Individuals of this taxon that have been found appear to be morphologically (colorwise) distinct from *H. platycephalus* (J. Brode, pers. comm.).

Distribution: Preliminary data indicate that this taxon is endemic to California, and probably restricted to Mono and Inyo counties on the east slope of the Sierra Nevada Mountains (Macey and Papenfuss 1991a; Figure 8).

Life History: The life history of this taxon is unknown, but is presumed to be nocturnal with a pattern similar to that described for *H. platycephalus* (Macey and Papenfuss 1991a).

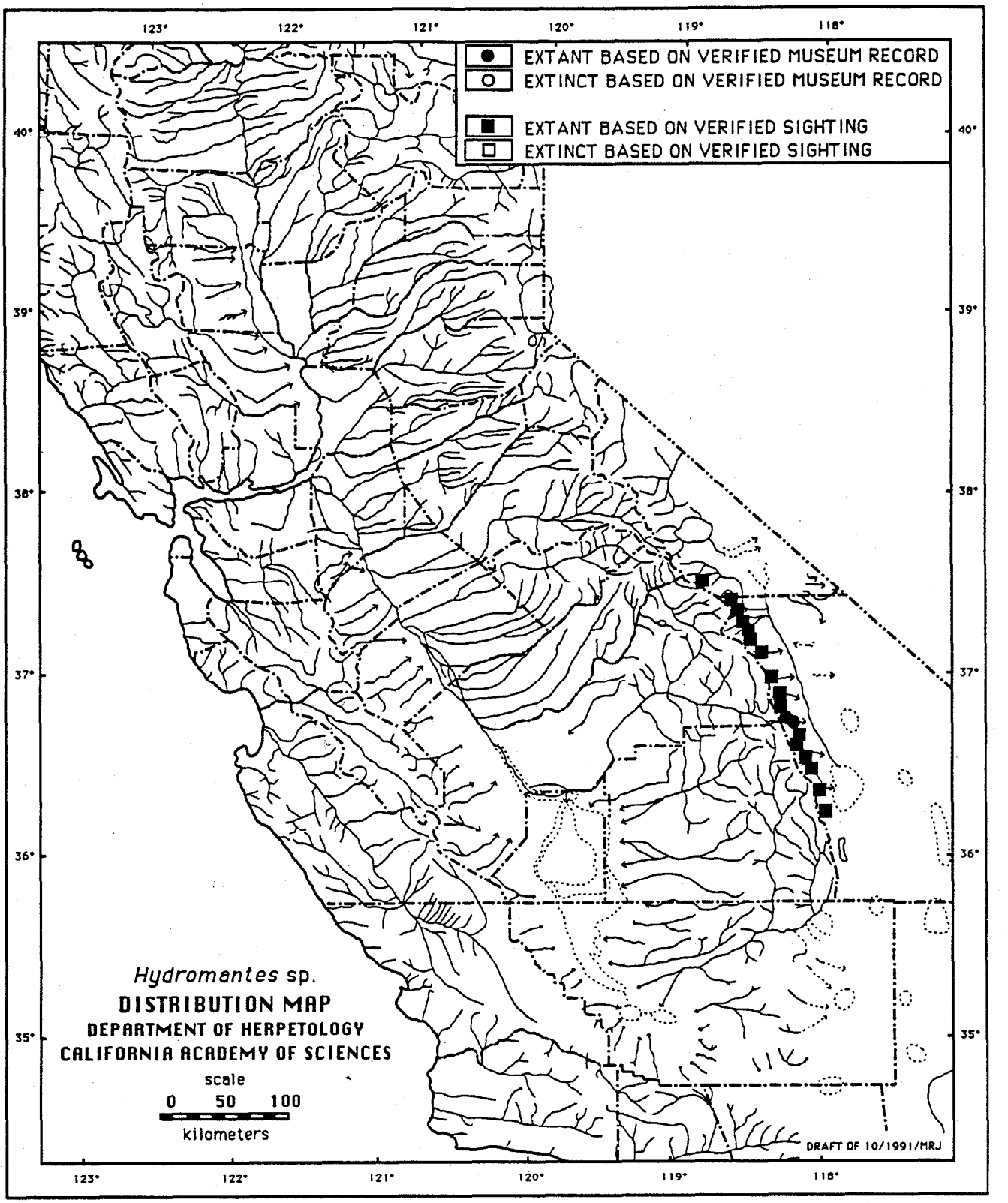

Figure 8. Historic and current distribution of the Owens Valley web-toed salamander (*Hydromantes* sp.) in central California based on 16 locations from 163 museum records and 29 records from other sources.

Habitat: This taxon is known to occur in localized talus adjacent to very moist riparian areas in the vicinity of permanent springs and mountain streams (Macey and Papenfuss 1991a). It can be found under woody debris or rocks in areas with moist soil. A more precise understanding of the habitat features of localities where the Owens Valley web-toed salamander has been found awaits its formal description.

Status: Special Concern; although not yet described, this taxon is likely to be restricted to the east slope of the Sierra Nevada in California. A conservative approach of listing this species at this level is strongly recommended based on its relatively restricted known range, small numbers of adults (≤ 8) observed in each population, and lack of knowledge of its habitat requirements. That listing may be modified as knowledge of its range and habitat requirements are acquired.

Management Recommendations: Efforts should be made to protect areas known to serve as habitat for this species on the east slope of the Sierra Nevada. In particular, activities that result in disturbance of the mesic, rocky talus or the seep hydrology where this salamander occurs should be prohibited. Recommendations made for *H. platycephalus* probably apply equally well to this species. Knowledge of habitat requirements must be greatly improved before recommendations can be refined.

DEL NORTE SALAMANDER
Plethodon elongatus elongatus Van Denburgh 1916

Description: A moderate-sized (51.0-75.0 mm SVL) black or dark brown salamander often with a reddish dorsal stripe (Brodie 1969, 1970). Undersurfaces are black except for a light gray throat that is often mottled. White and yellow iridophores are scattered over the body, but particularly concentrated on the sides of the head and body, the upper surfaces of the limbs, and the throat (Brodie and Storm 1971). Seventeen to 20 costal grooves are present (Stebbins 1985). The iris is dark brown with few or no iridophores (Brodie 1969, 1970).

Taxonomic Remarks: Genetically, *Plethodon elongatus* is well differentiated from its close relatives (Feder et al. 1978, Highton and Larson 1979), but no data exist on how populations within California may vary. Some authors include *P. stormi* in this taxon (e.g., Bury 1973a, Stebbins 1985), but genetic data appear to justify specific recognition for both taxa (Highton and Larson 1979). A much better understanding of the genetic pattern of geographic variation within *P. elongatus* is needed, especially in view of the fact geographically correlated differences in external morphology seem to exist. In particular, *P. elongatus* in coastal California are smaller and darker, have immaculate sides, and have the dorsal stripe nearly obscured in adults; *P. elongatus* from inland locations are larger and lighter-colored with a persistent dorsal stripe and scattered white spots on the sides (Nussbaum et al. 1983).

Distribution: The known distribution of the Del Norte salamander extends from the vicinity of Port Orford, Curry County, Oregon to central Humboldt County, California. In California, it ranges from the Oregon border adjacent Del Norte and eastern Siskiyou counties south to Humboldt County (Figure 9). Its known elevational range extends from near sea level to ca. 1097 m.

Life History: Similar to other plethodontid salamanders, this species lays terrestrial eggs and has direct development. Females oviposit in spring and brood eggs in a terrestrial nest during the summer (Nussbaum et al. 1983). A nest in a small cavity in a redwood *(Sequoia sempervirens)* post found on 27 July 1958 contained 10 eggs in a grape-like

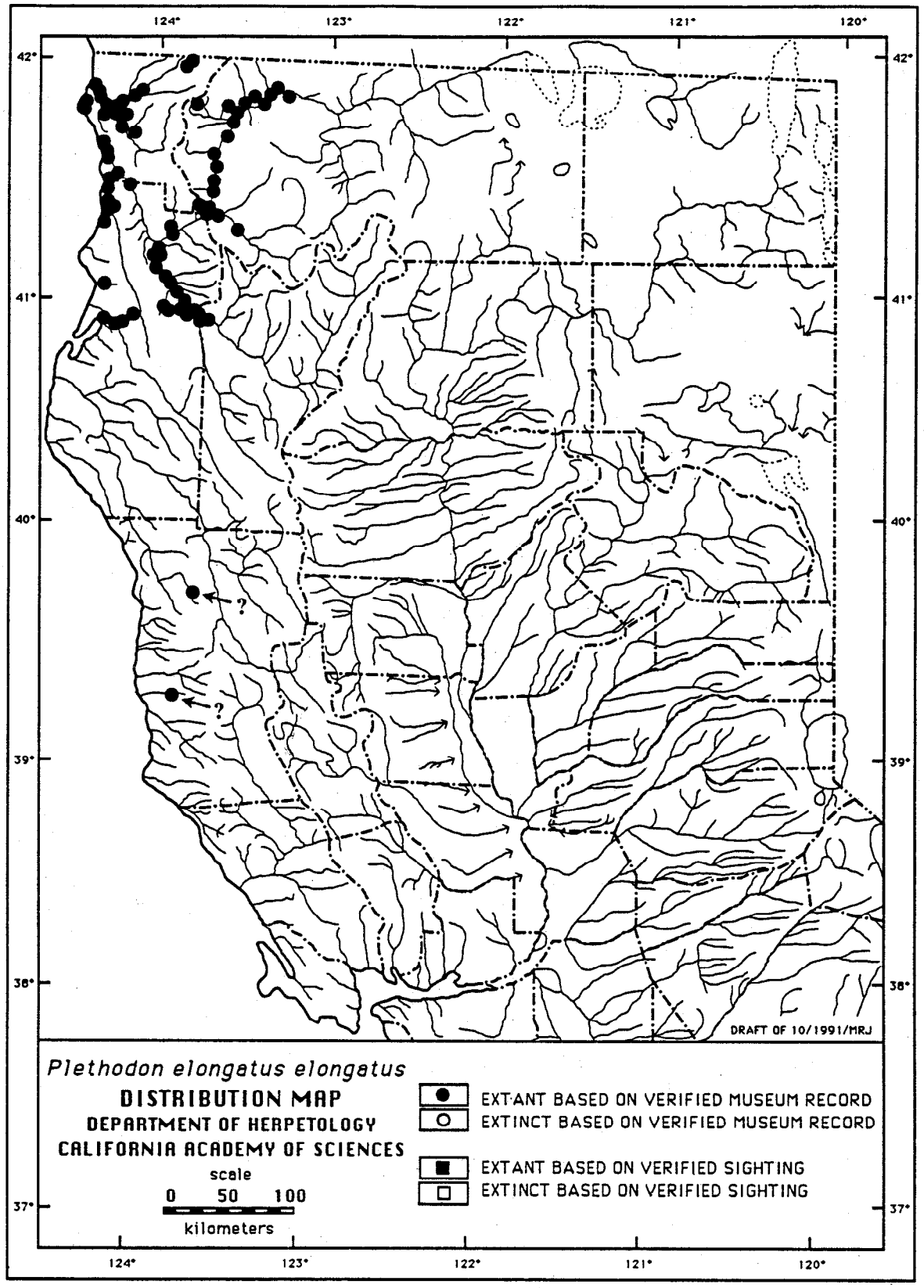

Figure 9. Historic and current distribution of the Del Norte salamander (*Plethodon elongatus elongatus*) in northern California based on 216 locations from 1297 museum records.

cluster (Livezey 1959). Eighteen mature gravid females from Siskiyou County, California contained 3-11 large eggs (Nussbaum et al. 1983). Stebbins (1951) reported gravid females obtained at Orick and near Willow Creek, Humboldt County, California on 15 February and 16 November to contain 10 and 11 eggs. On 17 November 1988, two females carrying spermatophores (= sperm packets) were also found at a site in this vicinity (Welsh and Lind 1992). Limited data indicate that *P. elongatus* eats mostly springtails (Collembola) and larval and adult beetles (Coleoptera: Bury and Johnson 1965) as well as termites (Isoptera), ants (Formicidae), and orbatid mites (H. Welsh, pers. comm.). During a 3-year study of *P. elongatus* in the Klamath Mountains of northwestern California, Welsh and Lind (1992) found this salamander to be a very sedentary species; 80% of adult recaptures moved < 7.5 m over 3 years. The greatest distance traveled by any salamander was 36 m (straight line) in 6 months. Welsh and Lind (1992) also reported that growth rates for females (averaged 1.1 mm/yr) less than half that for males (averaged 2.4 mm/yr). This species seems to be more frequently encountered near the surface following winter rains.

Habitat: The Del Norte salamander is largely restricted to the redwood and north coast forests of northwestern California and southwestern Oregon (Stebbins 1951). Relatively recent work has identified *P. elongatus* as most abundant in old-growth forest (Bury 1983, Raphael 1988, Welsh 1990, Welsh 1993) with intermediate levels of moisture (Welsh and Lind 1988), particularly in association with talus slopes (Bury 1973a, Herrington 1988, Diller and Wallace 1994) and outcrops of fractured metamorphic rock (Welsh and Lind 1988), which is consistent with *P. elongatus* being tolerant to intermediate levels of water loss relative to other salamanders (Ray 1958). The relative abundance of the hardwood understory in general and specifically that of tanbark oak *(Lithocarpus densiflora)* have been positively correlated with the relative abundance of *P. elongatus* (Raphael 1987, 1988; but see also Diller and Wallace 1994 for data from more mesic sites). However, what other hardwoods might be important to *P. elongatus* and how hardwoods are important'to the life history of *P. elongatus* needs study. Welsh and Lind (1991) and Welsh (1993) found the best-fit multivariate model describing the habitat characteristics of *P. elongatus* to be one where its distribution was positively correlated with seeps and a rocky substrate, and negatively correlated with the volume of downed hardwood logs and the weight of small downed logs. Their findings indicate that greater attention and study should be devoted to the presence of seeps with regard to understanding the distribution of *P. elongatus.*

Status: Special Concern; this species has a relatively restricted distribution in California (the extreme northwest portion of the state) and its range outside California is limited. Although still somewhat abundant along a narrow coastal strip of mesic habitats in northern California (Diller and Wallace 1994), inland populations have relatively specialized habitat requirements (mostly old-growth situations associated with a fractured rocky substrate) that make *P. elongatus* is vulnerable. Currently, timber harvest is the most significant activity within the range of *P. elongatus* that threatens remaining old-growth stands.

Management Recommendations: In the absence of data needed to understand whether inland populations of *P. elongatus* at low densities in non-old-growth stands can survive long-term, preservation of old-growth stands is imperative to ensure the survival of a significant proportion of *P. elongatus* populations. Efforts should be focused on protecting talus slopes and outcrops of fractured metamorphic rock from alteration, especially those in association with seeps in old-growth stands. Impacts to old-growth canopy and to the hydrology of seeps should especially be avoided. In particular, any type of alteration that modifies natural grade and canopy cover, such as logging, should be minimized or prohibited in the vicinity of such habitats (Corn and Bury 1989). Based on the data of Welsh and Lind (1991) and Welsh (1993), a better understanding of the relative importance of seeps to the distribution of *P. elongatus* is needed. An understanding of the

recolonization potential of *P. elongatus* under different alteration regimes in both coastal and inland locations is also needed.

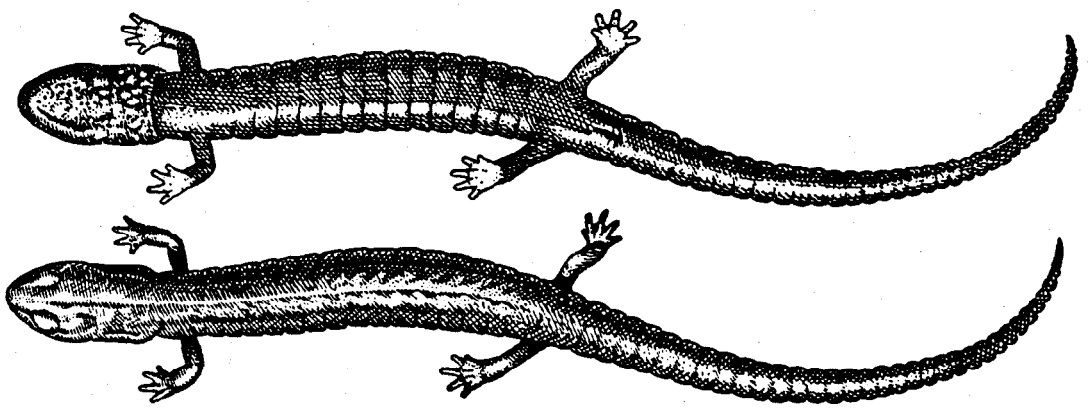

Plate 2. Adult Del Norte salamander (*Plethodon elongatus elongatus*) [from Stebbins 1951].

SOUTHERN SEEP SALAMANDER
Rhyacotriton variegatus Stebbins and Lowe 1951

Description: The southern seep salamander is a moderate-sized (ca. 40.0-51.4 mm SVL) olive or pale olive salamander with strongly black to brown spots, and some fine white guanophores dorsally (Stebbins and Lowe 1951, Good and Wake 1992). Undersurfaces range from greenish yellow to yellow, usually heavily flecked and spotted with dark melanic blotches of variable size (Fitch 1936; Stebbins and Lowe 1951; Good and Wake 1992; pers. observ.). The iris is blackish-brown with metallic, light-colored markings (Stebbins and Lowe 1951).

Taxonomic Remarks: *Rhyacotriton variegatus* had been previously recognized as part of a single, wide-ranging species, *R. olympicus* (e.g., Stebbins and Lowe 1951, J. Anderson 1968, Stebbins 1985), but Good et al. (1987) identified considerable genetic variation within this species, which ultimately led to the partitioning of the latter into four species, including *R. variegatus* (Good and Wake 1992). Information presented in this account is restricted to *R. variegatus,* the only one of the four species found in California.

Distribution: This species ranges from the vicinity of Point Arena, Mendocino County, California (Stebbins 1955) to the Little Nestucca River on the northwest coast of Oregon (Good et al. 1987, Good and Wake 1992). In California, this taxon ranges from Mendocino County to the Oregon border (Figure 10). Its known elevational range extends from near sea level to ca. 1200 m (Nussbaum et al. 1983).

Life History: The life histories of seep salamanders *(Rhyacotriton* spp.) are poorly known and even fewer data apply *R. variegatus* in California. Males found in California indicated reproductive readiness in mid-February, but females with ovarian eggs approaching full size on 1 October and ovarian eggs visible through the body wall in June (Welsh and Lind 1992) suggest that oviposition may occur as early as the fall (Stebbins and Lowe 1951). The only field description of a seep salamander oviposition site is that assumed to belong to *R. kezeri* (Nussbaum 1969); large (4.5 mm dia), pigmentless eggs found in December were loosely placed in cracks in saturated sandstone. If oviposition is similar to that observed for *R. olympicus* (see Noble and Richards 1932), communal deposition of singly laid eggs in concealed locations may be typical. Based on data from Fall Creek (Lincoln County), Oregon, the embryonic and larval interval combined is extremely long (ca. 4.0-4.5 years), and reproductive maturity may require 6-7 years or more (Nussbaum and Tait 1977). Adults are active at air and water temperatures lower than those known for any other aquatic salamander, between 5° and 10°C (Stebbins and Lowe 1951; Stebbins 1955; Brattstrom 1963; see also Nussbaum and Tait 1977), and have among the lowest critical thermal maxima (28.3°C: Brattstrom 1963) of any salamander known. *Rhyacotriton variegatus* may also be the most desiccation intolerant salamander found in California (see Ray 1958), which is likely related to a high degree of dependence of seep salamanders on cutaneous respiration for oxygen exchange (Whitford and Hutchinson 1966). Adults of *R. variegatus* eat mostly amphipods (Amphipoda), springtails, and the larvae of insects (Insecta) found in moist habitats (Bury and Martin 1967). Recent data collected by Welsh and Lind (1992) suggests that *R. variegatus is* highly sedentary. Welsh and Lind (1992) note, however, that caution is needed in the interpretation of the degree to which *R. variegatus* is sedentary because movement of salamanders beyond their sample area could not be determined. Their data also indicate that larvae are more vagile than adults, suggesting that larval dispersal is the most likely means of connectivity between populations. Welsh and Lind (1992) emphasize that such a scenario requires interconnecting aquatic habitats, which may be an infrequent rainy season phenomenon in the drier interior portions of the range of *R. variegatus* in California. Much of the movement ecology of *R. variegatus* remains to be understood.

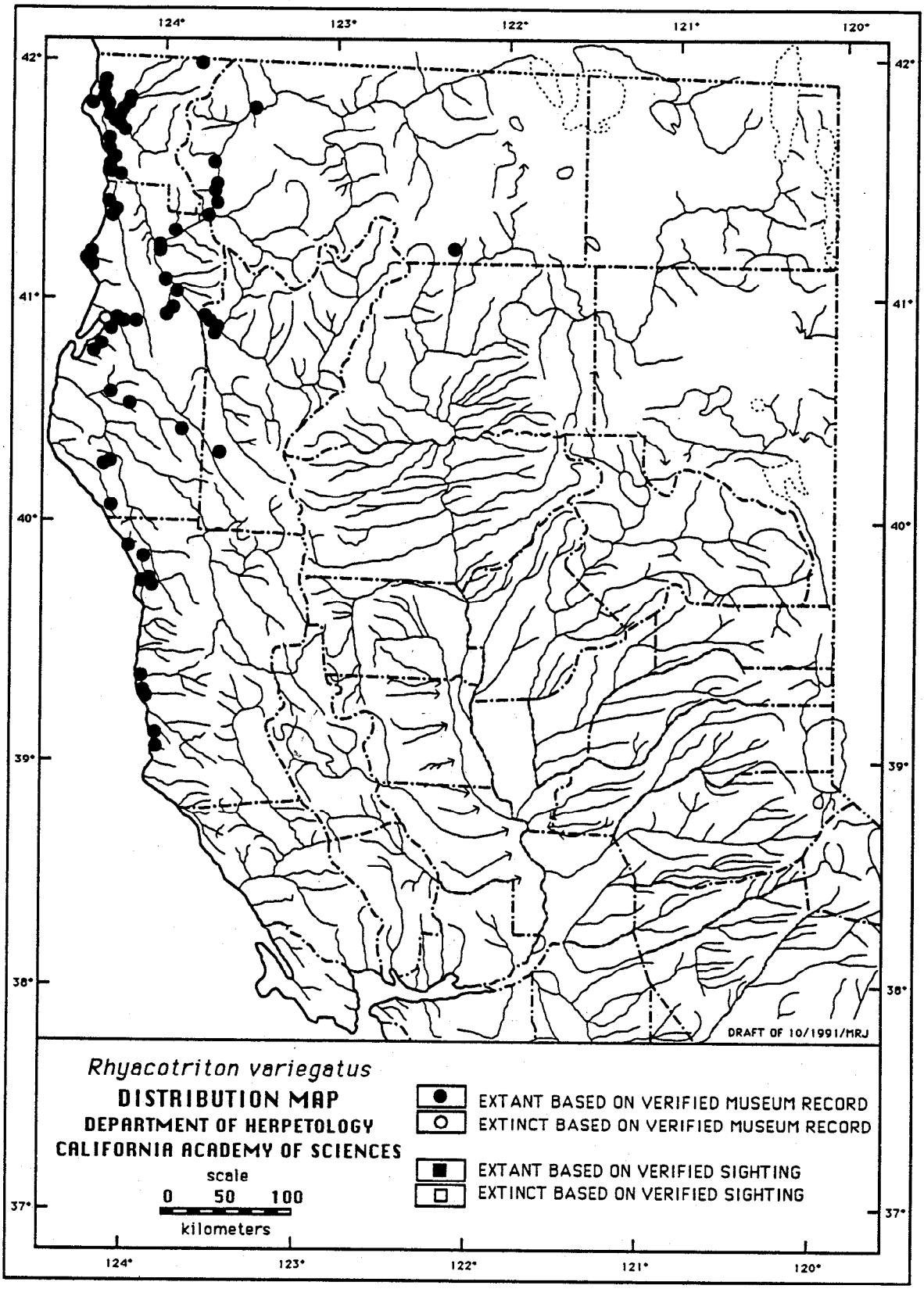

Figure 10. Historic and current distribution of the southern seep salamander (*Rhyacotriton variegatus*) in northern California based on 111 locations from 567 museum records.

Habitat: Cold, permanent seeps and small streams with a rocky substrate appear to be the preferred habitats (Fitch 1936, Stebbins and Lowe 1951, Stebbins 1955). Relatively recent work has linked this species to seeps, small streams, and waterfalls in wet or mesic, coastal old-growth habitats (Bury 1983; Welsh and Lind 1988; Corn and Bury 1989; Good and Wake 1992; Welsh 1993; see also Raphael 1988), an association that is likely influenced by the fact that old-growth provides the hydric and thermal environment more favorable (cooler and wetter) to the survival of *R. variegatus* for longer intervals than similar habitats in non old-growth situations (Welsh 1990). *Rhyacotriton variegatus* larvae may be found in somewhat larger streams (especially in the splash zone of waterfalls: D. Good, pers. comm.), but their abundance in seeps has led to the suggestion that predators, like the larvae of Pacific giant salamanders *(Dicamptodon ensatus* and *D. tenebrosus),* may largely exclude them from the former habitats (Stebbins 1955; see also Nussbaum 1969). The greater frequency of *R. variegatus* in seeps may also reflect the greater facility; and thus bias, with which seeps versus streams are sampled as well as the lack of systematic sampling for *R. variegatus* in streams, so the reasons for the apparent restriction of *R. variegatus* to seeps needs study in order to refine current understanding of the habitat requirements for this species. Adults and metamorphosed individuals have been found in concealed locations within a few meters of the seep habitat that displays surface flow; such locations typically have shallow free water or a saturated substrate (Stebbins and Lowe 1951).

Status: Threatened; The relatively narrow hydric and thermal requirements of *R. variegatus* make it particularly vulnerable, and are probably the reason this species is closely associated with seep habitats in coastal old-growth. Moreover, the apparently relatively long interval to reproductive maturity probably makes replacement of disturbed *R. variegatus* populations relatively slow. Until the variation in hydric and thermal requirements that appears to restrict this species to seep and small stream habitats are better understood, one must take the conservative approach that coastal old-growth seeps and small streams are the only habitats that can support viable populations of this species. Recent estimates place the amount of coastal old-growth redwood forests in California, which comprise a significant portion of coastal old-growth forests in California, at 12% of their historic extent (Fox 1988), over half of which is found on private or unreserved public lands, and therefore susceptible to significant timber harvest. Moreover, how *R. variegatus* is distributed through the remaining suitable habitat is poorly understood.

Management Recommendations: Efforts should be focused on protecting the remaining seep and small stream habitats that occur within coastal old-growth forests from alteration. Impacts to the hydrology of seeps and old-growth canopy should especially be avoided. In particular, logging activities or any type of construction that modifies natural grade should be minimized or prohibited in the vicinity of such habitats (Corn and Bury 1989). One of the biggest gaps in current understanding of the life history of *R. variegatus* is a better understanding of the movement ecology of larvae and post-metamorphs over diel and seasonal intervals. Until studies improve the understanding of its movement ecology, a significant impediment will exist to refining habitat-oriented management recommendations for California populations of *R. variegatus.* In particular, efforts should be made to determine whether the low densities of *R. variegatus* that occur outside of old-growth seeps and small streams do not simply represent individuals dispersing or moving from foci of suitable habitat or non-viable relict populations. Better survey and inventory methods for this cryptozooic species are especially needed.

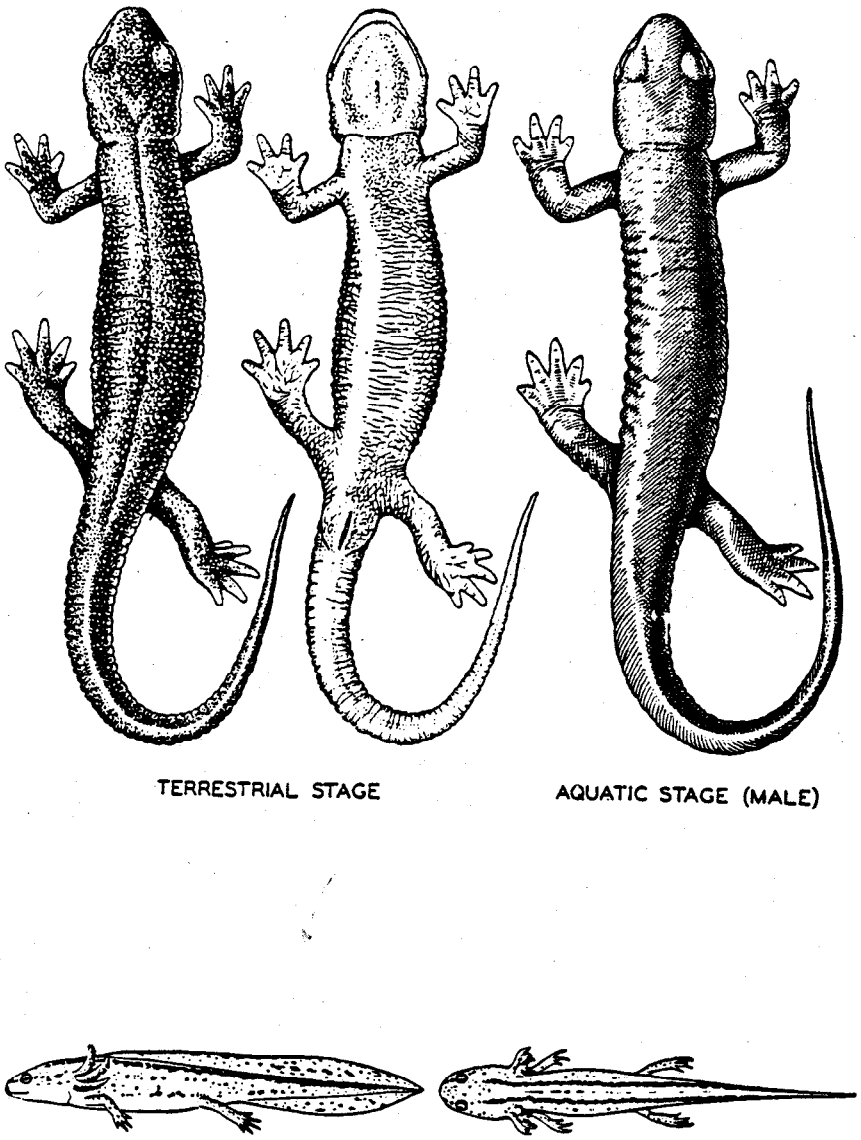

Plate 3. Larval, juvenile, and adult Coast Range newt (*Taricha torosa torosa*) [from Stebbins 1951].

COAST RANGE NEWT
Taricha torosa torosa (Rathke in Eschscholtz 1833)

Description: A moderate-sized (50.0-87.0 mm SVL) dark brown salamander with bright yellow-orange to orange undersurfaces (Riemer 1958); thick, relatively textured skin that becomes markedly rough-glandular during its terrestrial phase, but reverts to a relatively smooth condition during its aquatic phase (Nussbaum and Brodie 1981). Each iris has areas of dense gold iridophores interrupted by a prominent brown, horizontal eyestripe that broadens toward the outer edges of the iris (Riemer 1958).

Taxonomic Remarks: Genetic variation in *Taricha torosa torosa* is known from only 6 populations in central California, the southernmost two of which showed considerable genetic divergence from the northern four (Hedgecock and Ayala 1974, Hedgecock 1977). This coupled with apparent significant differences in timing of reproduction of *T. t. torosa* from Monterey County south may indicate that more than one taxon is currently concealed within *T. t. torosa.*

Distribution: Historically distributed in coastal drainages from the vicinity of Sherwoods (central Mendocino County) in the North Coast Ranges, south to Boulder Creek, San Diego County (Figure 11). Nevertheless, populations in southern California appear to be highly fragmented, even historically. The records of Slevin (1928) for Baja California are thought to be erroneous (Stebbins 1951). The known elevation range of this species extends from near sea level to ca. 1830 m (Stebbins 1985).

Life History: A frequently conspicuous diurnal salamander that, if the behavior of the related red-bellied newt *(T. rivularis)* can be considered an appropriate indicator (Hedgecock 1978), probably engages in stereotyped, sometimes long-distance (i.e., > 1 km) migrations to breeding sites. In spring, males congregate at breeding sites first (Ritter 1897), followed by females some days to weeks later (Smith 1941). In a relatively stereotyped courtship, females pick up sperm packets (spermatophores) deposited by males (Smith 1941), internal fertilization occurs, and females deposit 3-6 egg spheriodal masses each containing 7-47 eggs over a period of several days on rocks, stems, or root masses (Ritter 1897; Brame 1956,1968; Riemer 1958; pers. observ.). Eggs apparently hatch after 4-6 weeks (Kats et al. 1994). In central California, breeding appears to occur in two waves, the first in January or February and the second in March or April (Twitty 1942, Stebbins 1951, Miller and Robbins 1954), although Coast Range newts may enter ponds as early as December (Riemer 1958). Larvae take approximately 3-6 months to reach metamorphosis (pers. observ.) and subsist largely on aquatic invertebrates and also conspecifics (Ritter 1897). Adult newts eat a wide variety of aquatic and terrestrial invertebrates (earthworms, insects, snails, beetles, butterflies, and stoneflies; Stebbins 1972, Hanson et al. 1994), as well as egg masses and larvae (Kats et al. 1992), and carrion (Hanson et al. 1994). If *T. t. torosa* is similar to the related *T. rivularis*, adults are probably long-lived (i.e., > 20 yrs) and may not reproduce every year (Hedgecock 1978). The Coast Range newt is one of a group of related newts thought to possess warning (aposematic) coloration (Brodie 1977). Whether or not the bright ventral coloration of the post-metamorphic Coast Range newt is aposematic, its skin and eggs are endowed with toxic glands (Buchwald et al. 1964, Brodie et al. 1974) that appear to have the ability to repel at least some predators *(e.g., Thamnophis elegans,* Hubbard 1903) and can be presented to predators in distinctive postures (Brodie 1977). The Coast Range newt seems to have greater opportunity to display any distinctive coloration or noxious skin gland because its morphology (it possesses thicker skin and a significantly larger bladder capacity than most other salamanders), its behavior (it maintains more frequent body contact with the substrate than other salamanders), and its physiology (it has a higher temperature tolerance than most other salamanders) make it more resistant to desiccation than most other

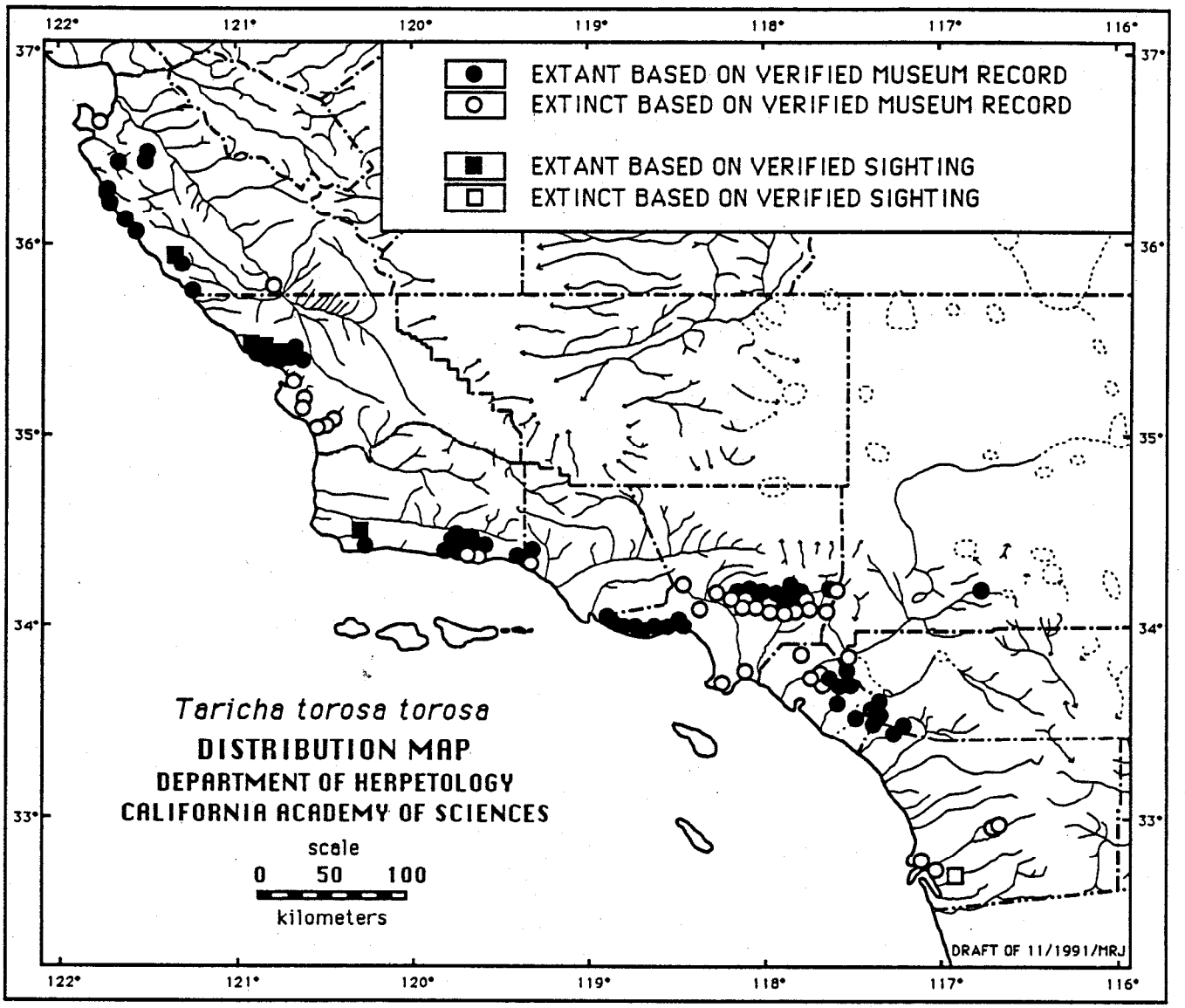

Figure 11. Historic and current distribution of the Coast Range newt (*Taricha torosa torosa*) in southern California based on 374 locations from 1,690 museum records and 29 records from other sources.

salamanders (Cohen 1952, McFarland 1955, Brattstrom 1963, Brown and Brown 1980). Larval *T. t. torosa* may be a seasonally very significant food resource for newborn individuals of certain species of garter snakes *(Thamnophis* sp.), including the federally endangered San Francisco garter snake, *Thamnophis sirtalis tetrataenia* (S. Barry, pers. comm.). Although the movement ecology of the related *T. rivularis* has been well-studied (Twitty et al. 1967a, 1967b), that of *T. t. torosa* is essentially unknown (Twitty 1959).

Habitat: Coast Range newts frequent terrestrial habitats, but breed in ponds, reservoirs, and slow-moving streams (Stebbins 1954b, 1985). Lack of data on the movement ecology of this species prevents a complete characterization of the microhabitats used.

Status: Special Concern--southern California populations only from south of the Salinas River in Monterey County; if the sizes of local populations (demes) of the related *T. granulosa* (pers. observ.) and *T. rivularis* (Hedgecock 1978) consisting of many thousands of individuals can be considered a suitable indicator, historically, *T. t. torosa* may have been one of the most abundant, if not the most abundant amphibian through much of its range. Only in the small coastal drainages of the Santa Ynez Mountains of Santa Barbara County were populations probably historically always relatively small (estimated at between 50 to 100 adults; S. Sweet, pers. comm.). This species has been depleted by large-scale historical commercial exploitation coupled with the loss and degradation of stream habitats, especially in Los Angeles, Orange, Riverside, and San Diego counties. Our own observations indicated that the breeding habitat of *T. t. torosa* has, at best, been severely degraded over much of its range, largely due to a shift in sedimentation dynamics that has resulted in greater filling and less frequent scouring of pools to allow them to retain their characteristic structure (Coming 1975 as modified and cited in Faber et al. 1989).

Management Recommendations: The movement ecology, age structure, and longevity of *T. t. torosa* must be better understood before really effective management recommendations can be made. Meanwhile, efforts should be made to preserve historic sites where *T. t. torosa* has been known to breed. Until a better understanding of its movement ecology is obtained, it is unclear how much terrestrial habitat will be needed to ensure long-term survival of *T. t. torosa* populations, but until that time, the decision to preserve terrestrial habitat associated with the breeding sites for this species should conservatively preserve the largest terrestrial areas possible. A thorough study of the geographic pattern of genetic variation within *T. t. torosa* is needed to determine whether more than one taxon is represented because if more than one taxon is present, each taxon will not only have a more restricted geographic range, but each will require more intensive life history study to determine if significant differences in their ecologies exist.

Plate 4. Larval and adult tailed frog (*Ascaphus truei*) [from Stebbins 1951].

ANURANS

TAILED FROG
Ascaphus truei Stejneger 1899

Description: A small (35.0-45.0 mm SUL) olive, brown, gray, or reddish frog, often with a pale yellow or greenish triangle extending between the eyes and snout, and a dark eyestripe (Mittleman and Myers 1949, Metter 1964a). The undersurfaces are white to yellowish white. The eyes are brown with gold iridophores on both the upper and lower portions of the iris, but a greater density of iridophores is present on the upper iris (Metter 1964a).

Taxonomic Remarks: *Ascaphus truei* is probably the most distinctive species of North American frog, and it is currently regarded as the only species within the genus *Ascaphus.* However, indications of potential geographic polymorphism in the karyotypes of *A. truei* (Green et al. 1980) and larval and postmetamorphic morphology (Mittleman and Myers 1949; Metter 1964a; J. Applegarth, pers. comm.) suggest that the geographic pattern of genetic variation within *A. truei* should be examined with the idea of identifying potentially cryptic taxa, particularly in view of the fact that a number of isolates between which there is little or no gene flow occur throughout its geographic range (Metter and Pauken 1969; see also Daugherty 1980).

Distribution: The known range of the tailed frog extends from extreme northern Mendocino County, California in the United States north to Bute Inlet, British Columbia in Canada; disjunct population systems also occur in Idaho, western Montana, and extreme southeastern British Columbia; extreme eastern Oregon; extreme eastern Washington (Metter 1968a); and the McCloud River system in the Shasta region of California (Bury et al. 1969). In California, the distribution extends from coastal Mendocino County (Salt 1952, Welsh 1985) north to the Oregon border (Grinnell and Camp 1917, Mittleman and Myers 1949) with the disjunct population system in the Shasta region (Figure 12). The known elevational range of the tailed frog extends from near sea level (Mill Creek, Humboldt County) to 1981 m (Pony Mountain, Trinity County: Bury 1968).

Life History: Most data in this summary of the life history of *A. truei* comes from outside of California. *Ascaphus truei* has one of the most distinctive life histories of any North American frog. Adults are nocturnal and have been observed to be active between April and October, and may reproduce during most months over that interval (Gaige 1920, Stebbins 1985). Amplexus is pelvic, males use their small tail as a penis in sperm transfer (Slater 1931, Wemz 1969), females can store sperm (Metter 1964b), and fertilization is internal (Metter 1964a). The unpigmented, heavily yolked eggs are among the largest of any North American frog (ca. 4.0 mm average diameter; Wright and Wright 1949) and are deposited in rosary-like strings of 33-98 eggs on the undersurfaces of submerged rocks (Nussbaum et al. 1983, Adams 1993). Embryos have the narrowest range of thermal tolerance (5°-18°C) and the lowest critical thermal maximum of any North American frog (Brown 1975a). The rate of oxygen consumption during development is also very low (Brown 1977). This suite of features gives *A. truei* the slowest rate of embryonic development among North American frogs. Tadpoles, which have the lower lip expanded into a distinctive sucker-like disk (Gaige 1920, Gradwell 1973), normally attach themselves to rocks in turbulent water (Altig and Brodie 1972), where they feed on diatoms, filamentous green algae, desmids, and conifer pollen for up to 9 months of the year (Metter 1964a, Brown 1990). Tadpoles exhibit a diel cycle that involves movement to high positions on rocks at night, presumably for feeding purposes (Altig and Brodie 1972). They also actively avoid water temperatures above 22°C and die at water temperatures

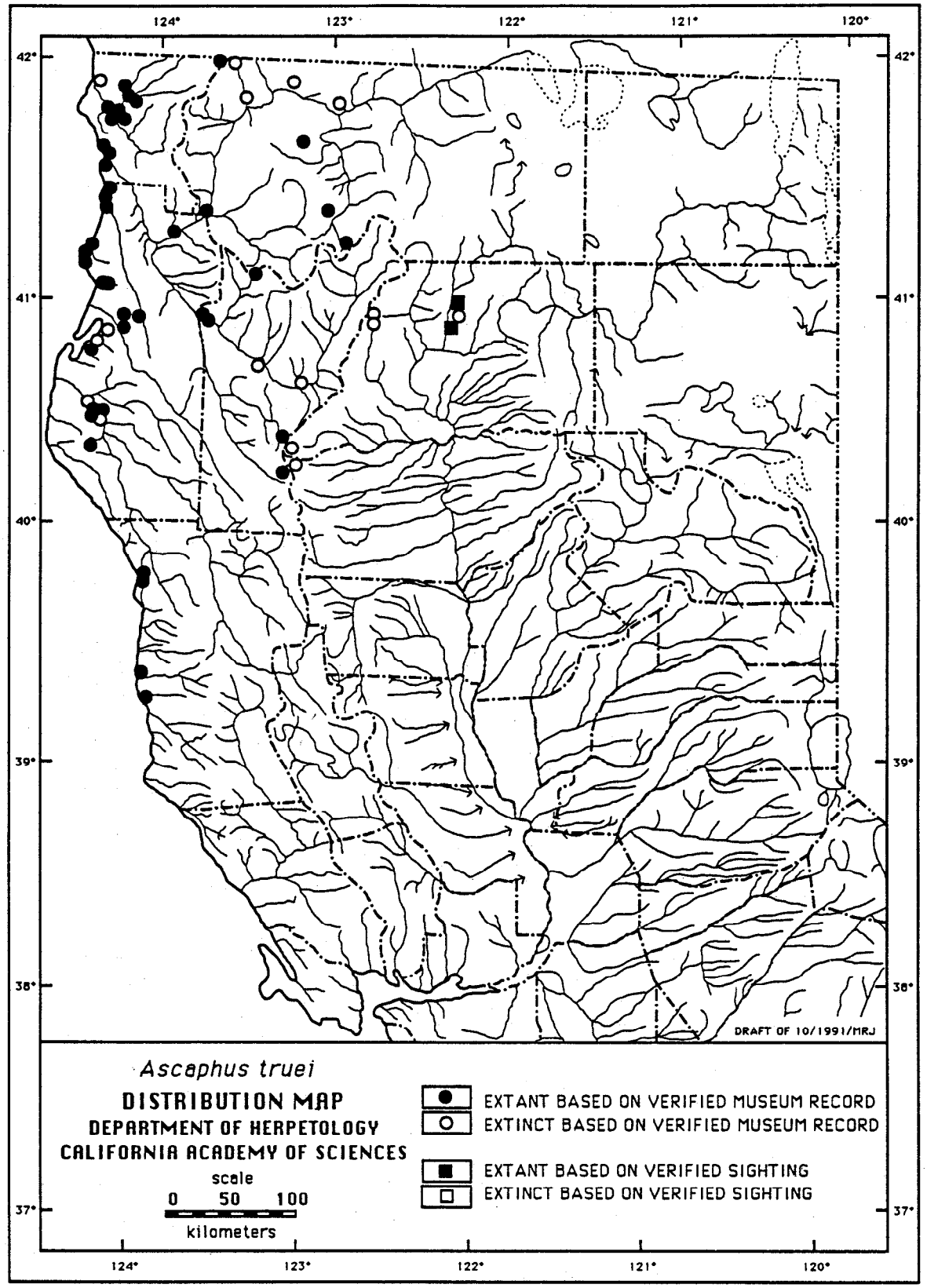

Figure 12. Historic and current distribution of the tailed frog (*Ascaphus truei*) in northern California based on 88 locations from 283 museum records and 2 records from other sources.

> 30°C (de Vlaming and Bury 1970). Preference for low temperatures and hibernation during winter months are probably two reasons why larval development is slow (Brown 1989), and the time required to reach metamorphosis requires at least 2-3 years (Ricker and Logier 1935; Metter 1964b, 1967), and has been recently postulated to take as long as 4 years (Brown 1990). Adults also appear sensitive to elevated temperatures (Metter 1966, Landreth and Ferguson 1967, Welsh 1990) with lethal thermal maxima at 23-24°C (Claussen 1973a). In western Montana, the minimum age at which *A. truei* first reproduce has been estimated at 7 years, males and females are estimated to first reproduce in their 8th and 9th years, respectively, and adults may have an average lifespan of 15-20 years (Daugherty and Sheldon 1982a). Following metamorphosis, pre-reproductive *A. truei* from Montana exhibited limited movement, and adults, who were highly philopatric, moved even less (Daugherty and Sheldon 1982b), probably spending the majority of their time immersed in water (e.g., Claussen 1973b). Nevertheless, occasional observations of *A. truei* some distance from streams (Slater 1934; Bury and Corn 1988a, 1988b) indicate that it is able to resist desiccation like other terrestrial anurans (Claussen 1973b) and that some variation in its movement ecology may exist across its geographic range. Pacific giant salamanders *(Dicamptodon ensatus* and *D. tenebrosus)*, foothill yellow-legged frogs *(Rana boylii)*, and Oregon garter snakes *(Thamnophis hydrophilus)* coexist with *A. truei in* streams in California (Myers 1931, Bury 1968), and may prey on tailed frog larvae (Metter 1963; Bury 1968; Welsh and Lind, pers. comm.). Adults and juveniles of *A. truei* eat mostly amphipods, springtails, and the larvae of insects found in moist habitats (Bury 1970).

Habitat: The habitat of *A. truei* is best characterized as permanent streams of low temperature to which many aspects of its life history can be correlated (Bury 1968). Intermittent streams with all the other proper environmental factors are unsuitable habitats (Brown 1990). Tailed frogs have been recorded in forested assemblages dominated by Douglas fir *(Pseudotsuga menziesii)*, redwood, Sitka spruce *(Picea sitchensis)*, Ponderosa pine, and western hemlock *(Tsuga hererophylla)*. Although not correlated with any specific forest assemblage, recent work has established that tailed frogs are either recorded more frequently or solely in mature and old-growth stands (Bury 1983; Bury and Corn 1988a, 1988b; Raphael 1988; Welsh and Lind 1988; Corn and Bury 1989; Welsh 1990; Welsh 1993), which possess the habitat structure most likely to create the low temperature and clear water conditions that the life stages of *A. truei* require (Welsh 1990; Welsh 1993). In California, tailed frogs are largely restricted to coastal forests with ≥ 100 cm annual precipitation (Bury 1968).

Status: Threatened in upper Sacramento River system; Special Concern elsewhere in the state; the highly specialized features of tailed frog biology (e.g., the low temperature requirements of various life stages coupled to densely forested streams) that result in long periods of development and long intervals to replace adults make this species vulnerable (Bury and Corn 1988b). Noble and Putnam (1931) and Metter (1964a) noted that *A. truei* disappeared with the removal of timber through harvesting or fire, presumably because of the increased temperatures that result when the stream is exposed (Gray and Edington 1969, Brown and Krygier 1970). Further support for the latter emerged recently when significantly different densities of tailed frogs were encountered in small streams with different temperatures because of differential removal of forest cover during the 1980 Mount Saint Helens eruption (Hawkins et al. 1988). Deforestation appears to be somewhat less detrimental along the immediate coast (Corn and Bury 1989), presumably because the maritime climate maintains a more favorable (cooler) temperature regime (Bury 1968), but the demography of *A. truei* in coastal situations needs study. For the aforementioned reason, populations of *A. truei* occupying interior locations in the upper Sacramento River system are considered at greater risk than those occupying coastal drainage systems in California. Flooding also appears to have the ability to significantly modify the structure of

A. truei populations (Metter 1968b), so modification of the historical flooding regime may influence whether this species survives locally.

Management Recommendations: The temperature requirements of *A. truei* makes it essential that stream systems be managed in a manner that will maintain the low temperature regimes essential to the survival of *A. truei.* To date, most data have focused on the critical thermal maxima of various life stages; more attention needs to be paid to the seasonal variance in stream temperatures in the habitats where *A. truei* occurs. Monitoring temperature variation in streams where *A. truei* occurs should be an essential part of any management plan directed at this species. This is particularly important where any sort of alteration likely to increase stream temperatures may occur. Foremost among this class of alterations within the range of *A. truei* in California is timber harvest. Where timber harvest must occur, a no-harvest band of a specified minimum width (e.g., two tree heights (based on mature trees) on each bank (see Fritschen et al. 1971)) along the stream corridor should be implemented (Mahoney and Erman 1984, Bury and Corn 1988b). Since timber harvest can also increase siltation load (Cordone and Kelly 1961, Newbold et al. 1980, Murphy and Hall 1981, Everest et al. 1985, Corn and Bury 1989), such a policy may also help decrease the silt load that has frequently been observed in timber harvest situations. The effect of the latter, especially on the developmental stages of *A. truei,* needs study. Road crossings of stream corridors should be designed in a manner that will minimize modification of the riparian corridor and the creation of migration barriers to tadpoles and metamorphosed *A. truei.* Although many significant aspects of the life history of *A. truei* are reasonably well known, an understanding of its movement ecology is not. The movement ecology of *A. truei* needs to be well understood to better gauge the terrestrial habitat needs of the species.

COLORADO RIVER TOAD
Bufo alvarius Girard in Baird 1859

Description: A large (110-187 mm SUL) olive brown to black toad with distinctive, large, oval to sausage-shaped glands located on some of the upper surfaces of all limbs (Fouquette 1970). One to four white warts (tubercles) occur just behind the angle of the mouth (Wright and Wright 1949, Fouquette 1970). The iris is dark brown or black with a few guanophores (pers. observ.).

Taxonomic Remarks: This large toad is unquestionably a distinct species, as indicated by data on eggs (Savage and Schuierer 1961), parotoid venom (Porter and Porter 1967), and skin secretions (Erspamer et al. 1967). The geographic pattern of genetic variation within *B. alvarius* is unknown and needs study.

Distribution: The known range of the Colorado River toad extends from southeastern California into lowland Arizona and extreme southwestern New Mexico in the United States and southward into the states of Sonora and northern Sinaloa, Mexico (Fouquette 1968, 1970). Colorado River toads are documented to occur up the Colorado River from Fort Yuma (Fouquette 1968) to the Blythe-Ehrenberg region (Vitt and Ohmart 1978), and historically, likely extended up the Colorado River bottomlands to extreme southern Nevada near Fort Mojave (Cooper 1869, Meams 1907, Storer 1925). In California, *B. alvarius* was historically present along the channel of the lower Colorado River and in the southern Imperial Valley (Figure 13). This toad ranges in elevation from near sea level to 1615 m (Cole 1962).

Life History: Colorado River toads generally appear just before summer showers, and congregate and breed in temporary pools after the rains begin (notes of J. J. Thomber in Ruthven 1907). Seven to eight thousand eggs are laid in long strings (Wright and Wright 1949) and are claimed to be distinctive in lacking an outer jelly envelope and any partitions between individual eggs (Savage and Schuierer 1961), although recent observations on other toads indicates this assertion needs re-evaluation (see Sweet 1991). Details of the larval period are lacking, but the interval is believed not to exceed 1 month (notes of John James Thomber in Ruthven 1907), and tadpoles metamorphose at a very small size (< 15 mm SUL; C. Schwalbe, pers. comm.). Adults may be long-lived; individuals are known to have survived over 9 years in captivity (Bowler 1977). *Bufo alvarius* has a rather catholic diet that includes other anurans (Gates 1957, Cole 1962). The skin toxins and parotoid poison of *B. alvarius* protect it from some predators (e.g., striped skunk *[Mephitis mephitis];* Hanson and Vial 1956), but others (e.g., raccoon *[Procyon lotor])* can avoid the toxins to prey on these toads (Wright 1966).

Habitat: Data on the habitat requirements of *B. alvarius* are scant. Although temporary pools and irrigation ditches are the habitat in which Colorado River toads have been observed to breed (Blair and Pettus 1954, Savage and Schuierer 1961, Stebbins 1985), an understanding of the range of conditions under which they may breed is not known.

Status: Endangered; in California, we did not observe Colorado River toads during our surveys, and no collections or observations of this species have been made since 31 July 1955 (Jennings 1987a) despite a 5 April-2 May 1991 search by CDFG personnel (Ring and Robbins 1991a). However, a single toad was taken in a can trap on a 30-ha barren dredged spoil on the Arizona side of the Colorado River in 1980 (Anderson and Ohmart 1982) and another was found on 8 September 1986 at the Cibola National Wildlife Refuge, which is adjacent to the dredge spoil site (J. Rorabaugh, pers. comm.). Both locations are approximately 37 river km south of Blythe. Additionally, sightings of 5-10 toads were made along agricultural borders on the Colorado Indian Reservation (in Arizona) during the

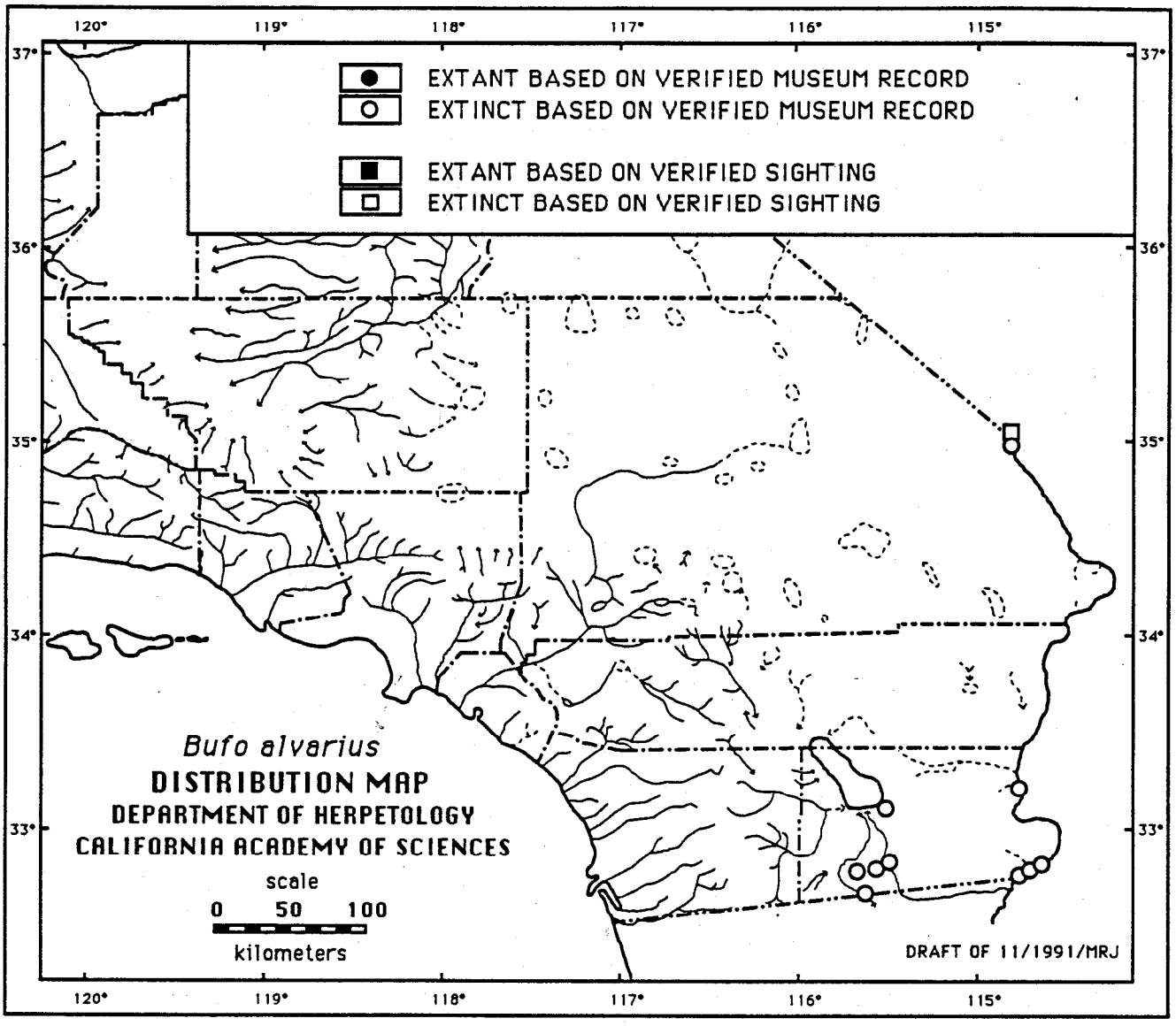

Figure 13. Historic and current distribution of the Colorado River toad (*Bufo alvarius*) in southern California based on 15 locations from 34 museum records and 2 records from other sources.

1970s (B. Loudermilk, pers. comm.). The species may have been extirpated over most its range in California because of habitat destruction (due to changing farming practices) and the extensive use of pesticides after World War II (Jennings 1987a). Moreover, although it has a relatively large range outside of California, some investigators have suggested that *B. alvarius* is imperilled throughout much of its range (B. Brattstrom, R. Ruibal, and C. Schwalbe, pers. comm.).

Management Recommendations: The severe habitat alteration that has taken place in the lower Colorado River region (e.g., see Ohmart et al. 1988) has undoubtedly impacted this species, but the lack of data on its habitat requirements hampers understanding how Colorado River toads may have declined in the region. Detailed information on the habitat requirements of this species are urgently needed to identify the range of conditions under which this species will thrive. A study needed to identify those conditions will probably have to be conducted outside of *B. alvarius'* range in California. An understanding of the microhabitats these toads use for refugia is unknown, and the latter need to be identified and coupled to knowledge of breeding habitat requirements so that a coherent picture of the toad's overall habitat requirements is available to guide land use managers.

Recently, law enforcement officers confiscated several shipments of *B. alvarius* that were in route to California. One Arizona raid resulted in the confiscation of 62 Colorado River toads (Banks 1994). These toads were intended to be used in the drug culture trade where individuals try to become intoxicated from licking the skin of toads (Leavitt 1989), or by smoking dried venom extracted [=milked] from the parotoid glands (Gallagher 1994, Richards 1994). The problem is extensive enough that some states have passed laws against toad licking (Landsberg 1990). The venom of toads is currently classified as controlled substance (Richards 1994). Any *B. alvarius* taken in drug raids should not be released into the wild.

YOSEMITE TOAD
Bufo canorus Camp 1916

Description: A moderate-sized (30.0-71.0 mm SUL) toad with rounded to slightly oval parotoid glands that displays a remarkable sexual dichromism (Karlstrom 1962). Females have black spots or blotches edged in white or cream that are set against a gray, tan, or brown ground color. Females also have prominent black spots or bars on the legs. In contrast, males have a nearly uniformly colored yellow-green to drab olive to darker greenish brown dorsum. A pencil-thin middorsal stripe is present in both juvenile males and females, but this stripe is lost more rapidly in males than females as they grow in size, resulting in younger adult females retaining a stripe fragment, whereas males of the same age generally lose the stripe entirely (D. Martin, pers. comm.). Iris color is dark brown with gold iridophores, the latter being especially dense on the upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: The Yosemite toad, long recognized as a distinct species (Camp 1916b), has not been confused with any other taxon (Karlstrom 1962). Feder (1977) found *B. canorus* to be distinctive based on electrophoretic data and based on her limited geographic sampling, also found some genetic variation within *B. canorus.* More comprehensive sampling is needed to assess genetic variation that may display geographic patterns. Yosemite toads are thought to hybridize with western toads *(B. boreas)* in the northern part of their range (Karlstrom 1962, Morton and Sokolski 1978), but no indication exists that western toads will threaten Yosemite toads through genetic swamping. Karlstrom and Livezey (1955) reported geographic variation in the pigmentation and size of *B. canorus* eggs, but the significance of this variation has not been investigated.

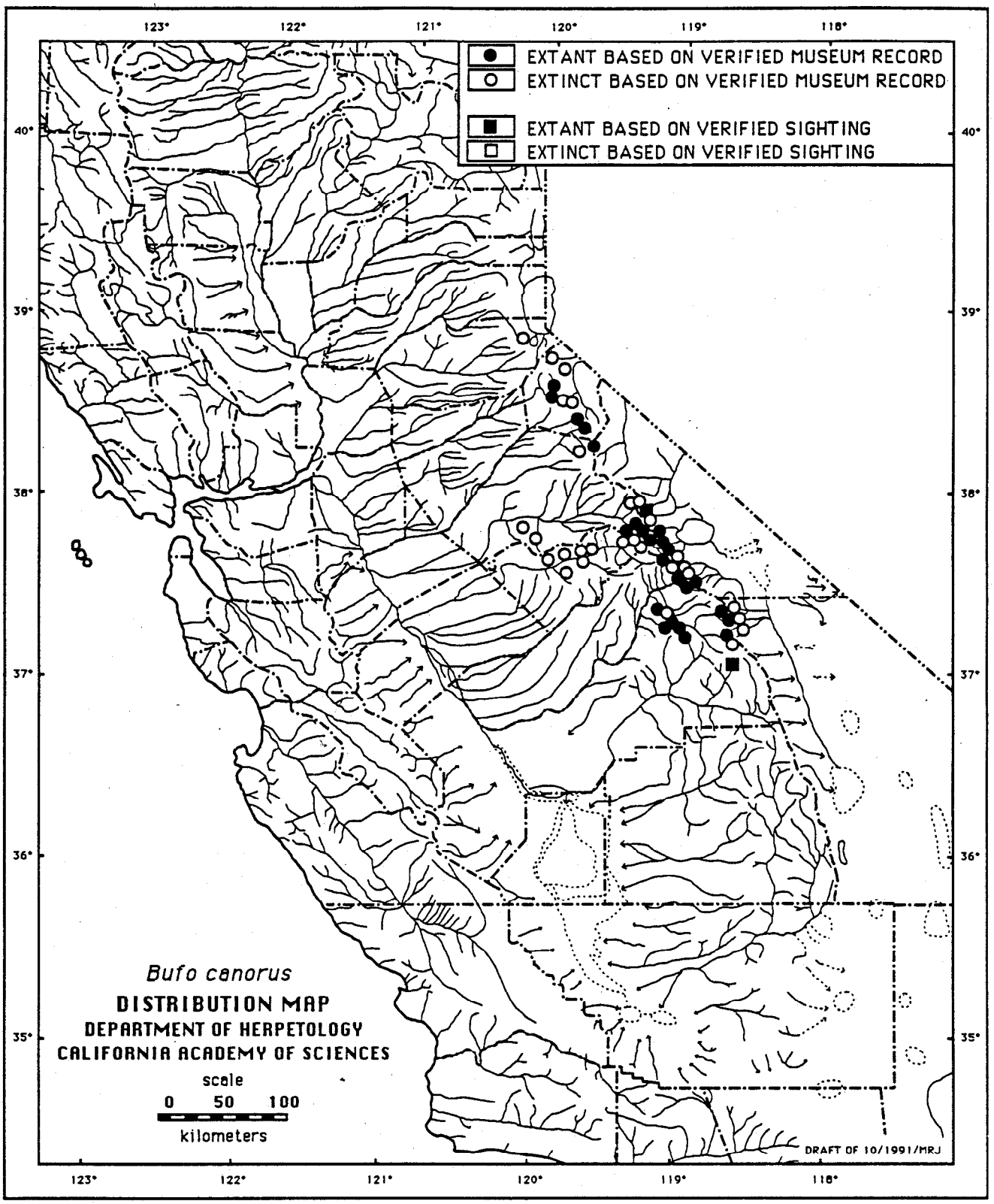

Figure 14. Historic and current distribution of the Yosemite toad (*Bufo canorus*) in central California based on 144 locations from 945 museum records and 14 records from other sources.

Distribution: This California endemic ranges in the Sierra Nevada from the Blue Lakes region north of Ebbetts Pass (Alpine County) south to 5 km south of Kaiser Pass in the Evolution Lake/Darwin Canyon area (Fresno County; Figure 14). Mullally and Powell (1958) reported two specimens collected from the vicinity of Heather and Grass Lakes (El Dorado County; see also Stebbins 1985), but these appear to represent misidentified high elevation isolates of *B. boreas* that have some *B. canorus*-like color dimorphism (D. Martin, pers. comm.). Its known elevational range extends from ca. 1950 m (Aspen Valley, Tuolumne County) to ca. 3450 m (Mount Dana, Tuolumne County: Karlstrom 1962).

Life History: *Bufo canorus* is a largely diurnal toad that emerges from winter hibernation as soon as snow-melt pools form near their winter refuge sites (Karlstrom 1962, Kagarise Sherman 1980). The timing of emergence varies with elevation and season, but known dates of emergence range from early May to mid-June (Kagarise Sherman 1980). Males form breeding choruses and breeding occurs soon after emergence. Large eggs (relative to other toads; 2.1 mm average diameter), brownish black or jet black over the upper three-fourths and gray or tannish gray on the lower fourth, are deposited in strings of single or double strands, or in a radiating network or cluster four or five eggs deep (Karlstrom and Livezey 1955). Females are estimated to deposit between 1,000 and 1,500 eggs (Kagarise Sherman 1980). Eggs strings are typically wound around short emergents in shallow (I 7.5 cm deep), still water with a flocculent or silty bottom (Karlstrom 1962). Following breeding, adults feed in subalpine meadows until entering hibernation (Kagarise Sherman 1980) and may be active after dark when the nights are warm during midsummer (A. McCready, pers. comm.). Larvae hatch in 3-6 days, depending on temperature, and typically metamorphose 40-50 days after fertilization. Based on observing immature tadpoles well into September, Mullally (1956) thought that *B. canorus* might overwinter as tadpoles, but corroboration for overwintering tadpoles has not been found (see Karlstrom 1962; Kagarise Sherman 1980; D. Martin, pers. comm.). Like many species of toad tadpoles, those of *B. canorus* are black and tend to aggregate (Brattstrom 1962). During daylight hours, *B. canorus* tadpoles tend to remain in warmer (average 23.3°C: Cunningham 1963), shallow water, but at night, they move to deeper water (Mullally 1953). Yosemite toad tadpoles tolerate higher temperatures as development advances and tadpoles with limb buds have critical thermal maxima ranging from 36°C to 38°C (Karlstrom 1962). At metamorphosis, juveniles are around 10 mm (SUL). Although some individuals may attain the minimum reproductive size at 30 mm (SUL) in 2 years, most probably require longer to become sexually mature. Both sexes grow slowly and males begin breeding at 3-5 years of age, whereas females begin breeding at 4-6 years of age (Kagarise Sherman 1980, Kagarise Sherman and Morton 1984). Females probably do not breed each year once they are sexually mature (Morton 198 1). A number of predators, such as the mountain yellow-legged frog *(Rana muscosa:* Mullally 1953), dragonfly naiads (species unspecified: Cunningham 1963; D. Martin, pers. comm.), and possibly larval long-toed salamanders *(Ambystoma macrodactylum:* A. McCready, pers. comm.), probably occasionally prey on the young life stages of Yosemite toads. However, garter snakes, particularly the western terrestrial garter snake *(Thamnophis elegans)*, likely prey on significant enough numbers of Yosemite toad larvae and metamorphs (Karlstrom 1962; D. Martin, pers. comm.) that they may be seasonally important prey in the diet of these snakes (Jennings et al. 1992). California gulls *(Larus californicus)* and Clark's nutcrackers *(Nucifraga columbiana)* have been observed to kill breeding toads (Kagarise Sherman 1980; Mulder et al. 1978; Kagarise Sherman and Morton 1993; M. Morton, pers. comm.), and American robins *(Turdus migratorius)* have eaten tadpoles (C. Kagarise Sherman, pers. comm.). Desiccation of pools before metamorphosis is a major cause of mortality (Zeiner et al. 1988; Kagarise Sherman and Morton 1993; R. Hansen, D. Martin, and M. Morton, pers. comm.).

Habitat: The Yosemite toad is a high-elevation endemic that seems to prefer relatively open montane meadows, although forest cover around meadows is also used (Karlstrom 1962, Kagarise Sherman and Morton 1984). Yosemite toads are found in high montane and subalpine associations in meadows surrounded by forests of lodgepole pine (Pinus *contorta)* or whitebark pines. Suitable breeding sites are generally found at the edges of meadows or slow, flowing runoff streams. Short emergent sedges *(Carex* spp.) or rushes (Juncus spp.) often dominate such sites. Overwintering sites are rodent burrows. Burrows of Belding's ground squirrels *(Spermophilus beldingi)* and yellow-bellied marmots *(Marmota flaviventris)* may be preferred for over-wintering because their greater depth probably make such overwintering sites less susceptible to freezing (Kagarise Sherman 1980). However, the burrows of meadow voles *(Microtus montanus)* and mountain pocket gophers *(Thomomys monticola)* are probably also used. Burrows of all four species are probably used as temporary refuge sites during the summer season (Mullally and Cunningham 1956a).

Status: Endangered; despite the fact that many populations of *B. canorus* occur in areas that are among the least physically disturbed in California, this species has declined or disappeared from more than 50% of the sites from which it has been recorded. Abundant populations Kagarise Sherman (1980) and Martin L. Morton (pers. comm.) studied have either disappeared or exist at very low densities (Kagarise Sherman and Morton 1993). Other observations (D. Bradford, L. Cory, R. Hansen, and D. Martin, pers. comm.) suggest similar patterns elsewhere within the range of the Yosemite toad. Some population declines can be attributed to the effects of extended drought and the grazing of livestock in breeding and rearing sites (R. Hansen, D. Martin, A. McCready, and M. Morton, pers. comm.). Attempts to link these declines to acidification from atmospheric deposition and inorganic aluminum have not been successful; some acidification has been identified, but it is above the levels that can induce significant mortality in the life stages of Yosemite toads (Bradford et al. 1991, 1992, 1994). Non-localized declines imply an atmospheric causal agent. In the light of overwhelming recent evidence of ozone depletion (Watson et al. 1988) and concomitant increases in ultraviolet radiation (UV) reported from alpine regions (Blumthaler and Ambach 1990), an unexamined, but potentially important atmospheric causal agent in such declines is increased levels of ambient UV (see also Blaustein et al. 1994). Increases in ambient UV may explain the immuno-suppressive effects hypothesized to have occurred in the decline of high-elevation toad populations in Colorado where individuals died presumably as consequences of the bacterial pathogen, *Aeromonas hydrophila* (Carey 1993). Differential mortality in egg masses at breeding sites associated with differential exposure to the sun (D. Martin, pers. comm.) may be explained by differences in exposure to UV (see also Blaustein et al. (1994) for data with closely related *B. boreas).* Some investigators also believe that introduced fishes may be responsible for declines in *B. canorus* (E. Karlstrom and D. Martin, pers. comm.). Despite the generalized dogma about the unpalatability of larval *Bufo* (e.g., see Voris and Bacon 1966), the palatability of *B. canorus* to various predators, especially fishes, has not been examined.

Management Recommendations: Systematic population monitoring of *Bufo canorus,* already begun on a localized scale by a few investigators (C. Kagarise Sherman, D. Martin, and M. Morton, pers. comm.), urgently needs implementation on a larger scale. Population monitoring especially needs to be coupled to experiments designed to establish whether an atmospheric causal agent, like UV, is involved. Experiments should also address whether an interaction between an atmospheric effect and immune-system function may be causal (see Carey 1993). Although the life history of *B. canorus* is reasonably well known, the pattern of local extinction and recolonization is not. This aspect of Yosemite toad biology is in urgent need of study because it can provide insight into the probability of survival of local populations.

ARROYO TOAD
Bufo microscaphus californicus Camp 1915

Description: A moderate-sized (55.0-74.0 mm SUL), light-olive green to gray to tannish brown toad with small, oval parotoid glands, a light-colored, "v" shaped stripe between the eyelids, and usually lacking a middorsal stripe (Camp 1915; S. Sweet, pers. comm.; pers. observ.). Undersurfaces are creamy to dirty white, but never blotched, mottled, or spotted with dark markings. The iris is dark brown with scattered gold iridophores on upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: Long treated as a subspecies of *B. microscaphus* (Price and Sullivan 1988), it is becoming increasingly clear that *B. m. californicus* is morphologically differentiated enough from Arizona populations of *B. m. microscaphus* that species recognition is justified (Frost and Hillis 1990) even though limited genetic data show little differentiation (S. Sweet, pers. comm.), as do advertisement and release calls (Sullivan 1992). Genetic data indicating what variation may exist across the geographic range of *B. m. californicus* are currently not available but are presently under study (E. Gergus, pers. comm.).

Distribution: *Bufo microscaphus californicus* historically extended from the upper Salinas River system in the vicinity of Santa Margarita (San Luis Obispo County), California (Miller and Miller 1936) southward to the Rio Santo Domingo system in Baja California, Mexico (Tevis 1944). Its known elevational range extended from near sea level to ca. 2440 m (La Grulla Meadow, Baja California: Welsh 1988). In California, its distribution extended from the Salinas River system south through the Los Angeles Basin (Myers 1930b, Sanders 1950) and the coastal drainages of Grange and Riverside counties to the San Diego River system (Figure 15). The arroyo toad has been recorded at six locations on the desert slope (Patton and Myers 1992): the Mojave River, Little Rock Creek, Whitewater River, San Felipe Creek, Vallecito Creek, and Pinto Canyon.

Life History: Until the work of Samuel S. Sweet begun in 1980, the life history of *B. m. californicus* was known from only a handful of scattered observations (e.g., Sanders 1950, Stebbins 1951, Cunningham 1962). Most of the life history data in this account were synopsized from the data of Sweet (1991, 1993), conducted mostly on the Los Padres National Forest. Adults are entirely nocturnal and mainly active between the first substantial rains (January-February) and mid-summer (early August). Males emerge from stream terrace overwintering sites, precede females to the breeding pools, and call nightly from late March to late June, with local variation depending on elevation and seasonal variation in climate (Sweet 1991, 1993). Calling males display relatively high site fidelity and generally position themselves in an exposed location along the edge of the breeding pool, which is typically occupied by one to three males calling on any particular night (Sweet 1991). Males stop calling when they are disturbed or air temperatures fall below 13-14°C (Myers 1930b; pers. observ.). Females must forage for several weeks in order to produce a clutch of eggs; wide variation exists in the time required for individual females to complete this process due to variations in rainfall and stream flows from year to year, which seasonally results in available females mating over a several-month interval (Sweet 1991, 1993). Breeding may occur at any time between early April and early July (Myers 1930b; Cunningham 1962; Sweet 1991, 1993; pers. observ.). Female arroyo toads lay 2,000-10,000 (mean = 4,750) small (ca. 1.5 mm average diameter), darkly pigmented eggs in two long (3.0-10.7 m) strings in the shallow (mean = 3.1 cm) water of the male's calling site (Sweet 1991). Embryonic development requires ca. 5 days, but larvae cannot swim effectively until they are nearly 2 weeks old. Arroyo toad larvae have a black dorsal coloration similar to the larvae of other toads when they first hatch, but they become progressively lighter and more cryptically colored after about 3 weeks of age, making them

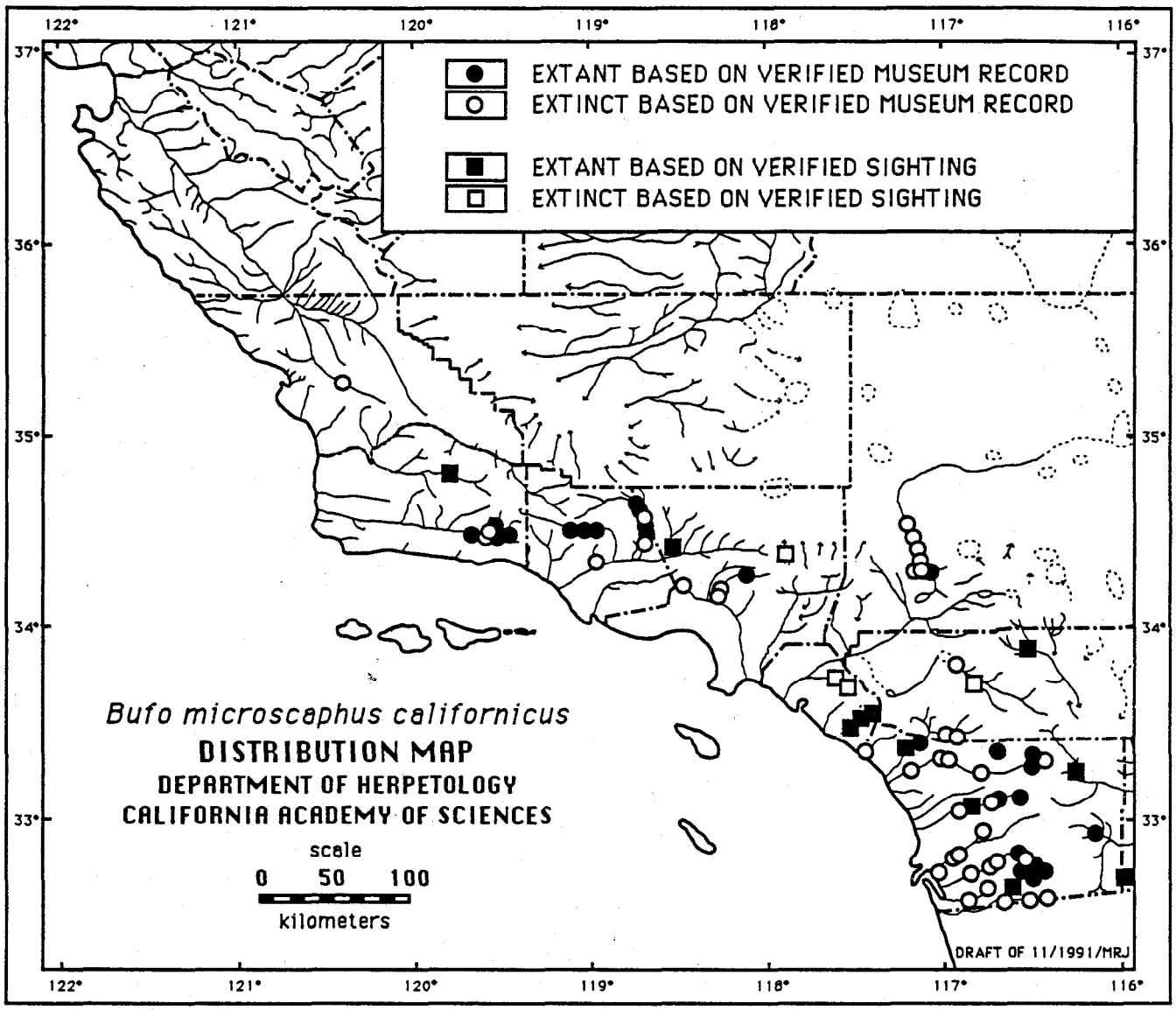

Figure 15. Historic and current distribution of the arroyo toad (*Bufo microscaphus californicus*) in southern California based on 157 locations from 1159 museum records and 32 records from other sources.

nearly invisible on a sandy substrate (Sweet 1991). This crypsis, their typically solitary behavior, and their inability to recognize fish predators suggests that arroyo toad larvae (like the larvae of many other native anurans in the western United States; see discussion in Hayes and Jennings 1986) are probably palatable, which makes them vulnerable to predation by exotic fishes and invertebrates such as crayfish *(Procambarus clarkii* and *Pacifasticus* spp). Arroyo toad larvae are also highly specialized when compared to the larvae of other California anurans; they are the only ones that feed by sifting the substrate for organic detritus and interstitial algae, bacteria, protozoans, and fungi (Sweet 1991). Larvae require 65 to 85 days to reach metamorphosis. Prior to metamorphosis, arroyo toad larvae stop feeding and assemble on the edges of open sand or gravel bars. Larvae need about 4 days to metamorphose, during which time their movements are impaired. Recently metamorphosed toads remain on the saturated margins of sand or gravel bars for about a week, then move to the somewhat drier areas of the bars for up to 8 weeks, depending on the variation in the physical environment of the bars (Sweet 1991, 1993; see also Linsdale 1932). Juveniles $\leq$ 22 mm (SUL) are highly cryptic on a mixed rocky-sandy substrate, diurnal, and actively select damp substrates with temperatures of 32-35°C; but they cannot burrow and avoid shade, dry substrates, and temperatures over ca. 42°C. During this interval, juveniles grow rapidly and feed mostly on ants (Sweet 1991). Around 20-25 mm SUL, juvenile toads begin to display burrowing capabilities, become nocturnal, and shift to a diet of small beetles. Sandy areas needed for burrowing are often limited on gravel-based bars, so juveniles in this size range may disperse to bordering willow *(Salix* spp.) areas at night (Sweet 1991). As juveniles approach 30 mm in size, they disperse into willow areas bordering the breeding pools regardless of substrate on the bars, and apparently burrow 10-18 cm into pockets of sandy substrate where they remain inactive for the next 6-8 months (Sweet 1993). Arroyo toads appear to require 2 years to reach reproductive maturity, although males can mature in a single year under favorable rainfall conditions (Sweet 1993). Adults return to stream terraces in mid-summer after breeding, where they construct relatively deep burrows and remain inactive through fall and winter (Sweet 1991). Data on longevity are largely unknown; some populations of arroyo toads have been identified as being not particularly long-lived (ca. 5 years; see Sweet 1991, 1993), a situation that may vary with local conditions. Much of the movement and physiological ecology of adults and juveniles is poorly understood, but recent data collected by Sweet (1993) show many subadults and some adult males moving alongstream frequently > 0.8 km in distance and > 1.0 km in a few cases.

Recruitment failures because of embryonic or larval mortality may be frequent. When stream levels are stable, most arroyo toad eggs hatch and little predation on eggs or larvae occurs (Sweet 1991, 1993). However, streamflow alteration by humans (e.g., suction dredge mining) can eliminate an entire cohort (Sweet 1993). Survivorship is high in pools lacking exotic fishes or with shallow refuge areas for larvae, but poor where introduced green sunfish *(Lepomis cyanellus),* juvenile bass *(Micropterus* spp.), fathead minnows *(Pimephales promelas),* bullfrogs, and red swamp crayfish occur (see Sweet 1993). Native garter snakes *(Thamnophis* spp.) and selected aquatic hemipterans (especially *Abedus indentatus)* are known to prey on arroyo toad larvae, but these predators do not seem abundant enough to be consistently significant (Sweet 1993). Direct human impact (through trampling, illegal road maintenance, and fires) and birds (especially killdeer *[Charadrius vociferus])* were identified as the principal agents of the catastrophic metamorphic and young juvenile mortality that most extant populations of arroyo toads sustained during 1991-1993 (Sweet 1993). Drought can also markedly affect cohort size by influencing the number of toads that breed. During 1989 and 1990 at the end of the 4-year drought, only 20 and 7 pairs of toads bred, respectively, at sites examined on the Los Padres National Forest, whereas in 1991, 166 pairs bred with above average rainfall totals (Sweet 1991). This improving trend continued in 1992 with above average rainfall totals resulting in the breeding of 263 pairs (Sweet 1993).

Habitat: Arroyo toads have perhaps the most specialized habitat requirements of any amphibian found in California. Adults require overflow pools adjacent to the inflow channel of 3rd- to greater-order streams that are free of predatory fishes in which to breed (Sweet 1991; pers. observ.). Exposed pools (i.e.; with little marginal woody vegetation) that are shallow, sand- or gravel-based and have a low current velocity are strongly favored (Sweet 1991). Pools with a minimum of silt are necessary for arroyo toad larvae to feed and grow rapidly (see Sweet 1993). Such breeding pools must occur in the vicinity (ca. 10-100 m) of juvenile and adult habitat, which consists of a shoreline or central bar and stable, sandy terraces. Shoreline or central bars dampened through capillarity and possessing some emergent vegetation (e.g., *Veronica)* seem preferred because they possess the thermal and refuge conditions that juvenile arroyo toads need to survive and grow rapidly (Sweet 1991). Inability of small juvenile toads (< 20 mm SUL) to burrow makes them vulnerable to desiccation; under hot, windy conditions, small juveniles must shelter in holes in drying algal mats or available small damp refuges and depressions. Stable, sandy terraces should possess a moderately well-developed, but scattered shrub and tree vegetation overstory (Sweet 1991), and typically have mulefat *(Baccharis viminea),* California sycamore *(Plutanus racemosa),* Fremont's cottonwood *(Populus fremontii),* or coast live oak present (Myers 1930b; Cunningham 1962; S. Sweet, pers. comm.; pers. observ.). The understory is generally barren or contains dead leaves or a few scattered grasses and rodent burrows (see also Linsdale 1932). Gravel or cobbles may be a part of such terraces, but fine sand seems to be the essential because adults and juveniles burrow or overwinter on terraces (Cunningham 1962, Sweet 1991).

Status: Endangered; the species has disappeared from 76% of its total historic range in the United States [= California]. Populations have disappeared entirely from the northern, central, and eastern parts of its range; the extreme habitat specialization of arroyo toads coupled with the fact that most factors that undoubtedly contributed to the extirpation of most populations still impact or threaten the few (less than 25) remaining small (30-100 adults) populations (Sweet 1991, 1993) probably make this taxon the most vulnerable in California Coupled requirements of relatively large, streamside flats with scattered vegetation (juvenile-adult habitat) adjacent to shallow pools with open sand or gravel bars place significant constraints on where arroyo toads may occur. Development and alteration of streamside flats (particularly by changing the natural hydrologic regime) may have been the crucial factors contributing to the extirpation of historic populations. One or more of excessive human use (campgrounds), manipulation of the hydrologic regime, urban development, placer mining (especially by suction dredges), off-road vehicle use, introduction of exotic predators, and cattle grazing threaten all known remaining populations (see examples in Sweet 1993). Additionally, natural disturbances such as forest fires and four consecutive years of drought have almost eliminated several already stressed populations (Sweet 1991, 1993; pers. observ.). The poor recruitment identified in the Los Padres National Forest is creating an aging population of breeding adults to which, based on existing levels of recruitment, few or no adults will be added until 1993 or 1994. Exactly what happens hinges mostly on the mortality of adult toads because those available to breed in 1992-1993 will be the mostly survivors from the 1991 breeding population. The current situation may become more precarious than realized if the short adult lifespan implied by the comparative size data Sweet (1991, 1993) presents are borne out. Whatever occurs, a population bottleneck in 1992-1994 is unavoidable; whether the bottleneck will cause local extinctions cannot be predicted precisely, but existing indications make this a likely possibility given the present human activities at some sites (see management update in Sweet 1993). Additionally, in the small populations of breeding adult arroyo toads, local chance effects, such as interference with successful breeding by male western toads *(Bufo boreas),* are more likely (e.g., see Awbrey 1972).

Management Recommendations: Greater protection of the habitat ensemble of overflow pools and streamside flats where extant populations of *B. m. californicus* exist is extremely urgent because of the precarious condition of existing populations (Sweet 1991, 1993). The stream conditions that create sandy, streamside flats in combination with appropriate shallow pools and adjacent open sand or gravel need detailed study to understand how stream hydrology can be maintained or manipulated to maintain or create habitat for *B. m. californicus.* Since it is likely that unfavorable habitat conditions impinging on the arroyo toad result from broad-scale manipulation of hydrologic basins and regimes, conditions now at least 2 decades old in most cases, habitat restoration will probably require radical solutions that will necessitate major changes in current patterns of hydrologic manipulation and land use policies. Such changes may require time intervals equal to or longer than those under which current pattern of hydrologic manipulation have existed simply to begin to be effective. Disturbance or development of streamside flats in the vicinity of known populations of *B. m. californicus* should be eliminated. Manipulations of the hydrologic: regime that scour overflow pools during the interval between breeding and metamorphosis of any year's cohort of *B. m. californicus* should he avoided. Land use conditions that contribute to siltation of streams during the breeding interval should also be avoided. Isolation of existing *B. m. californicus* populations from the exotic aquatic fauna should be maximized; translocation of the exotic aquatic fauna should be prohibited. Rangewide surveys are needed to determine if undetected populations stilt exist and focal surveys are needed for monitoring existing populations.

NORTHERN RED-LEGGED FROG
Rana aurora aurora Baird and Girard 1852

Description: A moderate-sized (42.0-101.0 mm SWL) brown, reddish brown to greenish gray frog with marked dorsolateral folds and a dorsal pattern of either small, irregular dark brown to black spots; small dark spots with light centers; or a fine dark reticulum (Dunlap 1955, Dumas 1966). A distinct, but irregular pattern of contrasting light and dark markings is consistently present in the groin; the light markings range from offwhite to sun yellow to red to green (Dunlap 1955; pers. observ.). Some red coloration, variable in intensity and extent, is present on undersurfaces. The latter ranges from bright red on the undersurfaces of the limbs, along the sides of the body, and the abdomen to a very pale red on the undersurfaces of only the hind limbs (Dunlap 1955; pers. observ.). Each iris is dark brown with gold iridophores that are particularly dense on the upper and, to a lesser extent, the lower portions of the iris (pers. observ.).

Taxonomic Remarks: Recent. work on vocal sac variation suggests that the red-legged frog *(Rana aurora)* may actually represent two species that approximate the previously recognized subspecies (Hayes and Krempels 1986). Populations with at least some individuals that exhibit features intermediate between northern *(R. a. aurora)* and California red-legged frogs *(R. a. draytonii)* occur between northern Humboldt County and Pt. Reyes National Seashore, Marin County, but further study is needed to understand the relationships among red-legged frogs and the distribution of red-legged frogs with different morphologies. For the purpose of this report, the intermediate populations are lumped with the northern red-legged frog with regard to listing status because of the greater ecological and morphological similarity of individuals in these populations to northern red-legged frogs; impacts on these populations are likely to be more similar to those affecting northern red-legged frogs.

Limited data indicate that northern red-legged frogs exhibit some degree of genetic differentiation from California red-legged frogs (Hayes and Miyamote 1984; Green 1985a, 1986b) and elsewhere:, similar data may be concealed because samples identified simply as

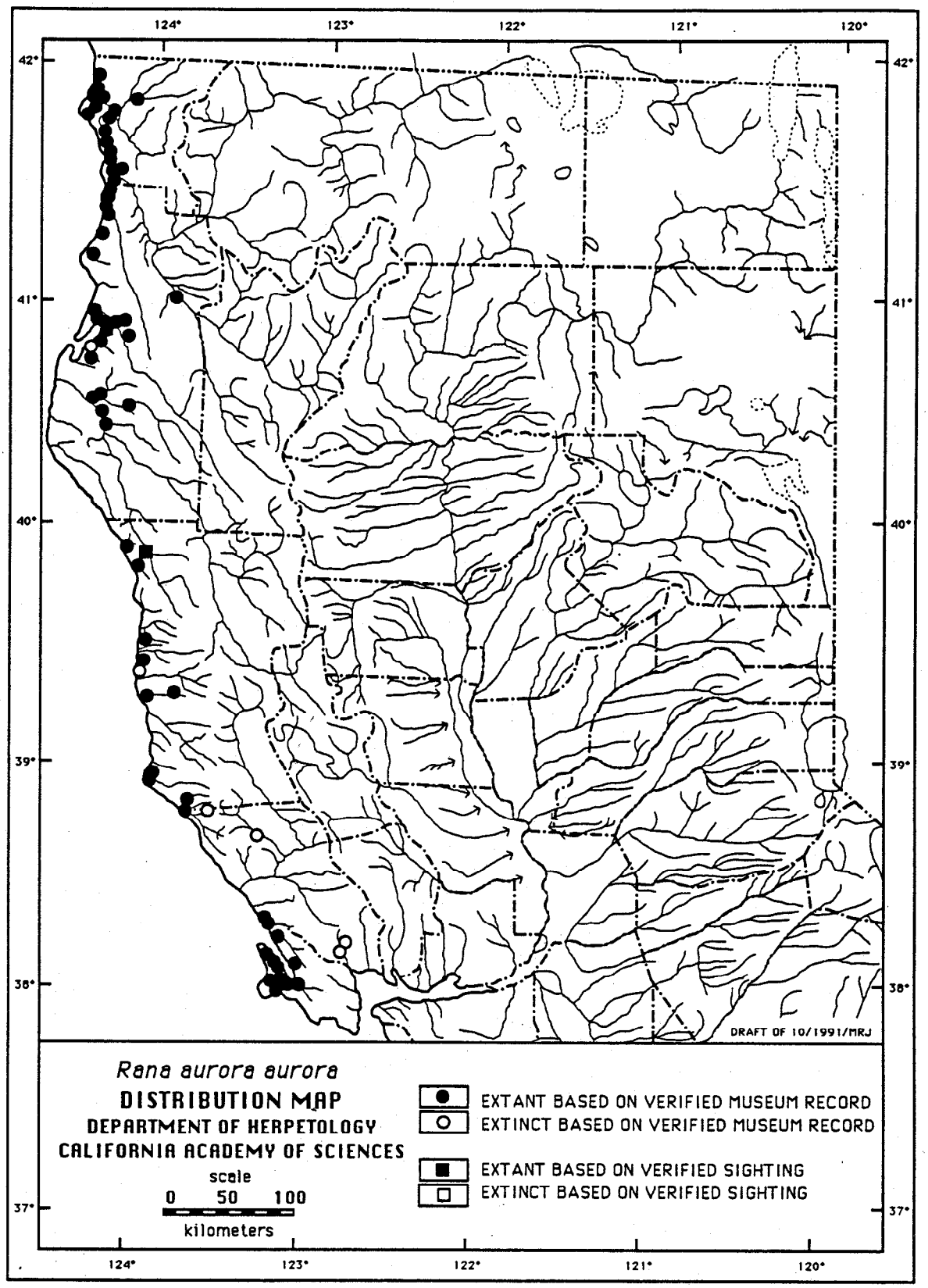

Figure 16. Historic and current distribution of the northern red-legged frog (*Rana aurora aurora*) and intergrades with the California red-legged frog (*Rana a. draytonii*) in northern California based on 96 locations from 286 museum records and 6 records from other sources.

red-legged frogs were lumped (Case 1976, 1978b). Because various studies have obtained material from geographically disparate localities within the range of red-legged frogs and analyses and standards are non-parallel, it is impossible to interpret the variation observed across these different studies. Genetic data are urgently needed to better understand the variation across the geographic range of both northern red-legged frogs and red-legged frogs in general to identify the distribution of taxa that may need recognition.

Distribution: The northern red-legged frog is known to occur from northern Humboldt County, California northward to Sullivan Bay, British Columbia (Stebbins 1985). Additionally, frogs that exhibit primarily features associated with the northern red-legged frog appear to extend southward into coastal California to the latitude of Pt. Reyes National Seashore, Marin County. The known elevational range of the northern red-legged frog and associated intermediate populations extends from near sea level to 1160 m (Salt Creek Falls, Lane County, Oregon; Dunlap 1955). In California, the northern red-legged frog and populations intermediate between northern and California red-legged frogs extend from Marin County north to the Oregon state line (Figure 16). The elevational range of the northern red-legged frog and intermediate populations in California is from near sea level to ca. 300 m.

Life History: Life history data on northern red-legged frogs, with rare exceptions (e.g., see Twedt 1993), come from populations outside California. Northern red-legged frogs have the lowest embryonic critical thermal maximum known (21°C) for any North American ranid frog (Licht 1971), which is probably the reason that oviposition is restricted to a time-window early in the year (January-March: Storm 1960, Licht 1969b, Brown 1975b). Males are observed at breeding sites for as much as a month before females appear at water temperatures as low as 2°C, and can be under skim ice (Licht 1969b). Moreover, males may typically call from underwater (Storm 1960, Licht 1969b, Calef 1973a). Male northern red-legged frogs are particularly tenacious in amplexus (Twedt 1993) and the female behavior needed to obtain release from the amplectic male is distinctive and highly stereotyped (Licht 1969a). Large (3.0 mm average diameter: Livezey and Wright 1945), pigmented eggs are laid in a rounded, submerged egg mass that contains 194-1081 eggs and is attached to a vegetation brace (Storm 1960, Licht 1974, Brown 1975b). After oviposition takes place, adult *R.* a. *aurora* vanish from the breeding site (Twedt 1993; R. Storm, pers. comm.) and disperse into moist areas of dense, thick vegetation, where they can be observed through late spring and summer (Twedt 1993; pers. observ.). The time required for *R. a. aurora* embryos to develop to hatching can vary from less than 1 week (at 20°C) to over 8 weeks (at 4.5°C), but embryos typically require around 4-5 weeks at field water temperatures of 6-9°C (Storm 1960, Licht 1971). At hatching, young larvae are 11-12 mm total length (Storm 1960, Brown 1975b). Larvae are often cryptic and may display a preference for a light- and dark- striped substrate which is correlated with their developing in a habitat with a striped light and shade mosaic (Wiens 1970). Larvae are algal grazers, and can significantly reduce the standing crop of epiphytic algae under certain conditions (Dickman 1968). Larval development to metamorphosis seems to require ca. 3.5 months (Licht 1974, Brown 1975b), but an understanding of the variation in the length of the larval developmental interval is lacking.

Males can become sexually mature the breeding season following metamorphosis, at ca. 45 mm SUL (Licht 1974; pers. observ.), but most probably do not reproduce until their second breeding season following metamorphosis. Females do not appear to become sexually mature until at least the second breeding season following metamorphosis, at ca. 60 mm SUL (Licht 1974; pers. observ.), but most probably do not reproduce until their third breeding season following metamorphosis. Longevity of adults in the field is unknown, but data from captives indicate that adults can live in excess of 10 years (Cowan 1941). Postmetamorphic *R. a. aurora* are largely insectivorous, with larger frogs being

capable of eating larger prey (Licht 1986a). Different predators typically prey on the various life stages of the northern red-legged frog, but most mortality occurs during the larval, metamorphic, and recent post-metamorphic stages (Licht 1974). Throughout the range of *R. a. aurora*, the northwestern salamander *(Ambystoma gracile)* and the rough-skinned newt *(Taricha granulosa)* are probably among the most important predators of larval northern red-legged frogs (Calef 1973b, Licht 1974), whereas certain species of garter snakes are probably among the most important predators on metamorphic and recent post-metamorphic life stages (Fitch 1941, Licht 1974). In each case, these predators may be seasonally dependent, even if not for a long interval, on the particular life stage of *R. a. aurora* for food. Postmetamorphic *R. a. aurora* appear to depend largely on crypsis for concealment, remaining immobile until a predator, such as a garter snake, approaches too closely, whereupon they depend on their leaping ability to move out of the range of the predator and take up a new cryptic, immobile position (Gregory 1979, Licht 1986b). Recent field studies by Twedt (1993) show that introduced bullfrogs eat postmetamorphic northern red-legged frogs where the two coexist. The movement ecology of adult northern red-legged frogs is essentially unknown.

Habitat: Northern red-legged frog breeding habitat typically consists of permanent or temporary water bordered by dense grassy or shrubby vegetation (Storm 1960, Licht 1969b, Calef 1973a, Brown 1975b, Twedt 1993). If temporary, standing water is typically available for the life stages of *R. a. aurora* for a period of 4-6 months (see Storm 1960; pers. observ.). Habitat used by post-metamorphic frogs consists of patches of dense grassy or shrubby vegetation (Stebbins 1951, Storm 1960, Twedt 1993), such as willow thickets and dense sedge swales, that maintain significant substrate moisture (pers. observ.). Bury and Corn (1988a) found a high frequency of juvenile *R. aurora* in a mature Douglas fir forest stand having moderate moisture levels in the State of Washington, but the context of this observation is unclear. In northwestern California, the dense undergrowth created by sword ferns *(Polystichum munitum)* and sedges along streamside flats within coastal redwood forest is often used by adult and subadult northern red-legged frogs (see Twedt 1993). Habitat associated with beaver *(Castor canadenis)* dams seems to provide all the aforementioned conditions and may be particularly favorable for northern red-legged frogs because they frequently occur in such habitat (see Stebbins 1951 and Brown 1975b; pers. observ.).

Status: Special Concern; this taxon has been identified as declining in British Columbia, Oregon, and Washington (see summary in Hayes and Jennings 1986). Although surveys for this taxon have not been systematically conducted in California, many of the coastal watersheds in the region where it occurs have sustained significant alteration related to timber harvest (California Department of Forestry and Fire Protection 1988) and urban development. Bullfrogs and selected exotic predatory fishes now occur in a significant number of northwest coastal drainages where *R. a. aurora* are infrequently observed (pers. observ.; see also Twedt 1993). Habitat degradation because of local coastal development and grazing may have also contributed to the apparent decline of this taxon in California.

Management Recommendations: Systematic surveys of this taxon in California are urgently needed. Although a general idea of the impacts and problems with *R. a. aurora* exists, data are unavailable to indicate how serious impacts on this taxon are or what trends may be evolving. How disconnected the dense grassy or shrubby habitat for postmetamorphs can be from the aquatic breeding habitat before the habitat can no longer support this taxon is unknown; this aspect especially needs the type of study that will link it to the movement ecology of this taxon. Additionally, the significant populations of *R. a. aurora* that remain in California are associated with the freshwater marsh portions of the lagoons of coastal drainages. Although salinity tolerance of *R. a. aurora* is unknown, it is likely to be similar to that reported for *R. a. draytonii* (see Jennings and Hayes 1989), so

changes in the salinity gradients in coastal lagoons that could significantly impact the survivorship of *R. a. aurora* in a manner similar to that reported for *R. a. draytonii* (see Jennings and Hayes 1989) need study. Finally, because it is likely that many of the conditions that impact *R. a. aurora,* allowing for differences in their respective life histories, also impact *R. a. draytonii,* the account for the California red-legged frog should be read to gain a broader perspective on other potential impacts.

CALIFORNIA RED-LEGGED FROG
Rana aurora draytonii Baird and Girard 1852

Description: A large (85.0-138.0 mm SUL) brown to reddish brown frog with prominent dorsolateral folds and diffuse moderate-sized dark brown to black spots that sometimes have light centers (Storer 1925; pers. observ.). Distribution of red or red-orange pigment is highly variable, but usually restricted to the belly and the undersurfaces of the thighs, legs, and feet. Some individuals have red pigment extending over all undersurfaces and upper surfaces of the body; other individuals lack red pigment entirely or have it restricted to the feet (pers. observ.). The groin has a distinct black region with a complex arrangement of light blotches that range from white to pale yellow in color. The posterior thigh is a nearly uniform brown color with 3-12 distinct white to lemon-yellow spots. The iris is dark brown with iridophores on the upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: See the northern red-legged frog *(Rana aurora aurora)* account for pertinent remarks. The California red-legged frog *(R. a. draytonii)* is a morphologically (larger body size, males have paired vocal sacs), behaviorally (males always call in air, adults do not leave the site of oviposition), and probably genetically distinct form (Hayes and Miyamoto 1984; Green 1985a; pers. observ.). Comprehensive study of the geographic pattern of morphological, behavioral, and genetic variation, some of which is underway, is needed to determine whether the California red-legged frog represents a distinct species.

Distribution: The historic range of this frog extends through Pacific slope drainages from the vicinity of Redding (Shasta County: Storer 1925) inland and at least to Point Reyes (Marin County: pers. observ.), California (coastally) southward to the Santo Domingo River drainage in Baja California, Mexico (Linsdale 1932). Historically, it also occurred in a few desert slope drainages in southern California (Jennings and Hayes 1994). Populations in central southern Nevada are introduced (Linsdale 1940, Green 1985b). In California, it occurs from Shasta County south to the Mexican border (Figure 17). The records for Santa Cruz Island have been shown to represent an introduction (Jennings 1988a). Its known elevational range extends from near sea level to around 1500 m, although some of the populations toward the upper limit of the range of this species may represent translocations (unpubl. data).

Life History: California red-legged frogs breed early in the year (late November-late April: Storer 1925; Hayes and Jennings 1986; S. Sweet, pers. comm.; pers. observ.), undoubtedly because they have a low embryonic critical thermal maximum (see Hayes and Jennings 1986) that restricts them to using a time-window with a high probability of ensuring embryonic survival. Males appear at breeding sites from 2-4 weeks before females (Storer 1925). At breeding sites, males typically call in small, mobile groups of 3-7 individuals that attract females (pers. observ.). Females move toward male calling groups and amplex a male. Following amplexus, females move to the site of oviposition and attach egg masses containing ca. 2,000 to 6,000 moderate-sized (2.0-2.8 mm in diameter), dark reddish brown eggs to an emergent vegetation brace (Storer 1925; pers.

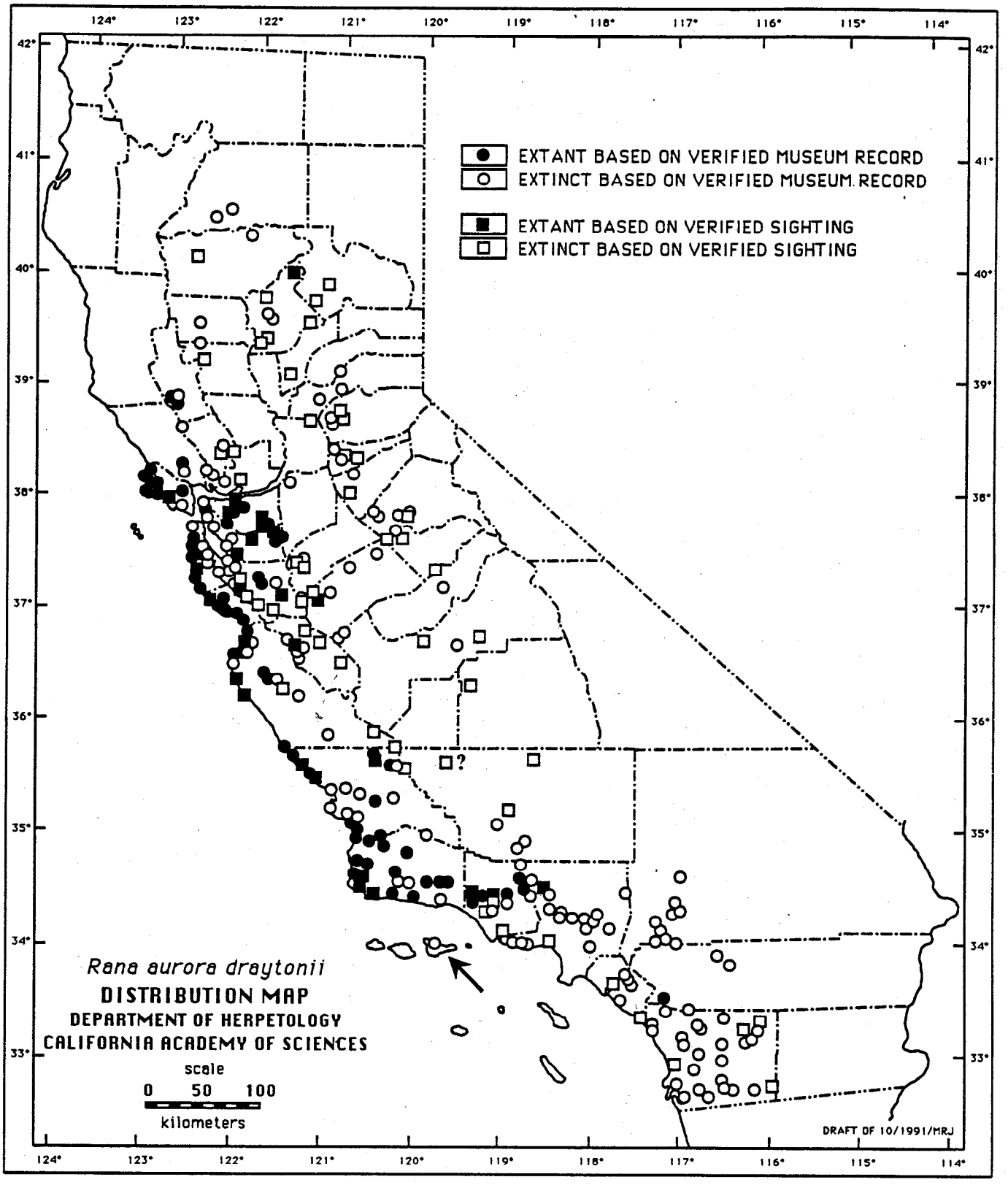

Figure 17. Historic and current distribution of the California red-legged frog (*Rana aurora draytonii*) in California based on 762 locations from 1229 museum records and 291 records from other sources.

observ.). Embryos hatch 6-14 days after fertilization, and larvae require 4-5 months to attain metamorphosis (Storer 1925). Larvae are thought to be algal grazers, but the foraging ecology of larval *R. a. draytonii* is unknown. Larvae are infrequently observed in the field because they spent most of their time concealed in submergent vegetation or organic debris (pers. observ.). Larvae, which are not known to overwinter, typically metamorphose between July and September (Storer 1925; pers. observ.). Postmetamorphs grow rapidly, and sexually maturity can be attained at 2 years of age by males and 3 years of age by females (Jennings and Hayes 1985), but both sexes may not reproduce until 3 and 4 years of age, respectively (pers. observ.). Females attain a significantly larger body size than males (138 mm vs. 116 mm SUL: Hayes and Miyamoto 1984). No data are available on the longevity of California red-legged frogs.

Unlike northern red-legged frogs, adult California red-legged frogs do not appear to move large distances from their aquatic habitat, although they are known to make pronounced seasonal movements within their local aquatic and terrestrial habitats. Adult *R. a. draytonii* move seasonally between the site of oviposition and the foraging habitat occupied in spring and summer (Jennings and Hayes 1989; pers. observ.), but a few data indicate that they move into terrestrial riparian thickets during the fall (Rathbun et al. 1993). It is also known that during periods of high water flow, California red-legged frogs are rarely observed (S. Sweet, pers. comm.; pers. observ.). Where frogs go during this interval is not well understood, but at least some individuals have been observed concealed in pockets or small mammal burrows beneath banks stabilized by shrubby riparian growth (pers. observ.). Nevertheless, much of the movement ecology of *R. a. draytonii* remains poorly understood.

Postmetamorphs have a highly variable animal food diet (Hayes and Tennant 1986). Most prey that can be swallowed that are not distasteful are eaten, with larger frogs capable of taking larger prey. Frogs (Anura) and small mammal prey may contribute significantly to the diet of adults and subadults (Arnold and Halliday 1986, Hayes and Tennant 1986). Adult frogs appear to use vibrations transmitted along willow branch runways to detect approaching small mammal prey (see Hayes and Tennant 1986; pers. observ.).

In general, adult frogs are quite wary. Highly nocturnal (Storer 1925, Hayes and Tennant 1986), adults appear to face frequent attempts at predation by wading birds (e.g., black-crowned night herons *[Nycticorax nycticorax]*, bitterns *[Botaurus lentiginosus])*, judging from the number of dorsal puncture-like wounds observed on frogs (pers. observ.). Moreover, adult frogs also seem to use vibrations transmitted along willow branches or vegetation upon which they are resting to detect the approach of certain predators (e.g., raccoons). In contrast, juveniles (< 60-65 mm SUL) are much less wary, are frequently active diurnally, and spend much of the daytime hours basking in the warm, surface-water layer associated with floating and submerged vegetation (see Hayes and Tennant 1986), where they can fall prey to predators such as San Francisco garter snakes (Wharton 1989) and two-striped garter snakes *(Thamnophis hammondii:* Cunningham 1959a). California red-legged frogs are seasonal prey in the diet of the San Francisco garter snake (Wharton 1989).

Habitat: Habitat of California red-legged frogs is characterized by dense, shrubby riparian vegetation associated with deep (≤ 0.7 m), still or slow-moving water (Jennings 1988b, Hayes and Jennings 1988). The shrubby riparian vegetation that structurally seems to be most suitable for California red-legged frogs is that provided by arroyo willow *(Salix lasiolepis);* cattails *(Typha* sp.) and bulrushes *(Scirpus* sp.) also provide suitable habitat (Jennings 1988b). Although California red-legged frogs can occur in ephemeral or permanent streams or ponds, populations probably cannot be maintained in ephemeral

streams in which all surface water disappears. Water should have a salinity of ≤ 4.5 ‰ to ensure the survival of embryonic stages (Jennings and Hayes 1989). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergents (pers. observ.).

Status: Endangered in the Central Valley hydrographic basin (includes the Sacramento, San Joaquin, Kings, Kaweah, and Kern River systems) and in southern California from the Santa Clara River system south to the Mexican border; Threatened throughout the remainder of its range in California; once the abundant species of large ranid frog throughout most of lowland California, this species has sustained large reductions both in geographic range and in the size of local populations. Historically, California red-legged frogs were heavily commercially exploited for food, a situation that led to their becoming severely depleted by the turn of the century (Jennings and Hayes 1985). Continued exploitation of depleted populations and the prior and subsequent establishment of a diverse exotic aquatic predator fauna that includes bullfrogs, crayfish, and a diverse array of fishes likely contributed to the decline of the California red-legged frog (Hayes and Jennings 1986), although it is not understood which exotic aquatic predator or predators may have been most significant (Hayes and Jennings 1988). Further, habitat alterations that are unfavorable to California red-legged frogs and favorable to most of the exotic aquatic predators are confounded with potential direct effects of predation by such exotics (Hayes and Jennings 1986). The tone of these suggestions is not new. Nearly 20 years ago, Robert L. Livezey (in litt., 3 February 1972 to Leonard Fisk, then Senior Fishery Biologist with CDFG charged with investigating the state of non-game amphibians and reptiles) attempted to draw attention to the fact that he believed that the California red-legged frog has suffered a drastic reduction over the previous 15 to 20 years because of bullfrogs and expanding human activities. Regardless of the exact cause, our surveys for California red-legged frogs at over 95% of the historical localities in the Central Valley hydrographic basin over the last 10 years indicate that this species has probably disappeared from over 99% of its former range within that region. The few remaining populations are threatened by proposed reservoir construction, off-road vehicle use, and continued habitat degradation due to the cumulative effects of abusive land use practices, especially with regard to livestock grazing (pers. observ.; see Kauffman et al. 1983; Kauffman and Krueger 1984; Bohn and Buckhouse 1986) and development of groundwater resources (see Groeneveld and Griepentrog 1985). The only locality within the Central Valley hydrographic basin that supports California red-legged frogs that receives some degree of protection, the Corral Hollow Ecological Reserve, is currently threatened by siltation promoted by an off-road vehicle park and livestock grazing practices upstream. Similarly, between the Santa Clara River system and the Mexican border, extant populations of California red-legged frogs are known from only four relatively small areas. These combined areas represent no more than 1% of the area historically occupied by California red-legged frogs within that region. Additionally, no more than 10% of the localities where California red-legged frogs were recorded within the Salinas River hydrographic basin and inner Coast Ranges between the Salinas basin and the San Joaquin south of the Pacheco Creek drainage still have *R. a. draytonii.*

Significant numbers of California red-legged frogs occur only in the relatively small coastal drainages between Point Reyes (Marin County) and Santa Barbara (Santa Barbara County). The drainages within this region are characterized by more suitable habitat and a less frequent occurrence of exotic aquatic predators than elsewhere. Yet, even the California red-legged frogs within this region are threatened by an exotic aquatic predator fauna that is still slowly expanding its range, continuing habitat degradation because of abusive grazing practices, and decreased water quality because of increases salinities related to decreased freshwater flows because of increased human use and recent decreases in annual rainfall potentially related to global climate changes.

Management Recommendations: Riparian habitats where California red-legged frogs still occur need a greater degree of protection. In particular, emphasis needs to be placed on retaining the dense riparian vegetation associated with deep water habitats used by this taxon. Additionally, the water quality standards (e.g., low salinity levels: Jennings and Hayes 1989) and water flow regimes of such sites need to be maintained. This taxon is suspected of being particularly sensitive to changes in water quality due to a variety of factors (e.g., various herbicides and pesticides, sulfate ions) that have not been examined specifically for their effects on the developmental stages of this taxon; these urgently need study. The local hydrology of sites where California red-legged frogs still occur should be carefully monitored. Impacts such as additional withdrawals of surface and groundwater that modify existing flow regimes and can change water quality should especially be avoided. Particular efforts need to be made to reduce or eliminate habitat modification that results from overgrazing because grazing and similar land use practices are especially effective at reducing or eliminating the dense riparian cover required by California red-legged frogs. Despite the fact that the total protection of entire local hydrographic basins has been suggested (Moyle 1973, Hayes and Jennings 1988), that suggestion remains unimplemented. That approach may ultimately be the only way to protect some of the remaining populations of this taxon.

FOOTHILL YELLOW-LEGGED FROG
Rana boylii Baird 1854

Description: A moderate-sized (37.2-82.0 mm SUL) highly variably colored frog, but usually dark to light gray, brown, green, or yellow with a somewhat mottled appearance often with considerable amounts of brick or reddish pigment, and rough, tubercled skin (Zweifel 1955; unpubl. data). A light band is present between the eyelids that often appears as a pale triangle between the eyelids and the nose. Undersurfaces of the legs and lower belly are yellow or orangish-yellow, the latter color usually present on the largest individuals (pers. observ.). The iris is silvery gray with a horizontal, black countershading stripe (pers. observ.).

Taxonomic Remarks: Since the work of Zweifel (1955), this frog has been recognized as a distinctive species. An understanding of the genetic and karyologic variation within *R. boylii* is limited to 13 populations in central and northern California and one population in Oregon (Houser and Sutton 1969; Haertel et al. 1974; Case 1976, 1978a, 1978b; Green 1986a, 1986b). Available data indicate complex genetic variation within *R. boylii*, but data are both difficult to interpret because of some lumping of nearby populations (Case 1978b) and too few to identify any geographic patterns to genetic variation conclusively. A sound understanding of the geographic pattern of genetic variation in *R. boylii*, with the intent of distinguishing potentially cryptic taxa, is needed.

Distribution: Historically, this species was known to occur in most Pacific drainages from the Santiam River system in Oregon (Mehama, Marion County) to the San Gabriel River system (Los Angeles County) in California (Storer 1923, 1925; Fitch 1938; Marr 1943; Zweifel 1955). Its known elevational range extends from near sea level to ca. 2040 m (lower end of La Grulla Meadow, Baja California, Mexico; Stebbins 1985). No desert slope populations are known, but an isolated outpost has been reported from the Sierra San Pedro Mártir, Baja California, Mexico (Loomis 1965). In California, *R. boylii* was historically distributed throughout the foothill portions of most drainages from the Oregon border to the San Gabriel River (Figure 18). Its known elevation range in California extends from near sea level to 1940 m (Snow Mountain, Trinity County: Hemphill 1952).

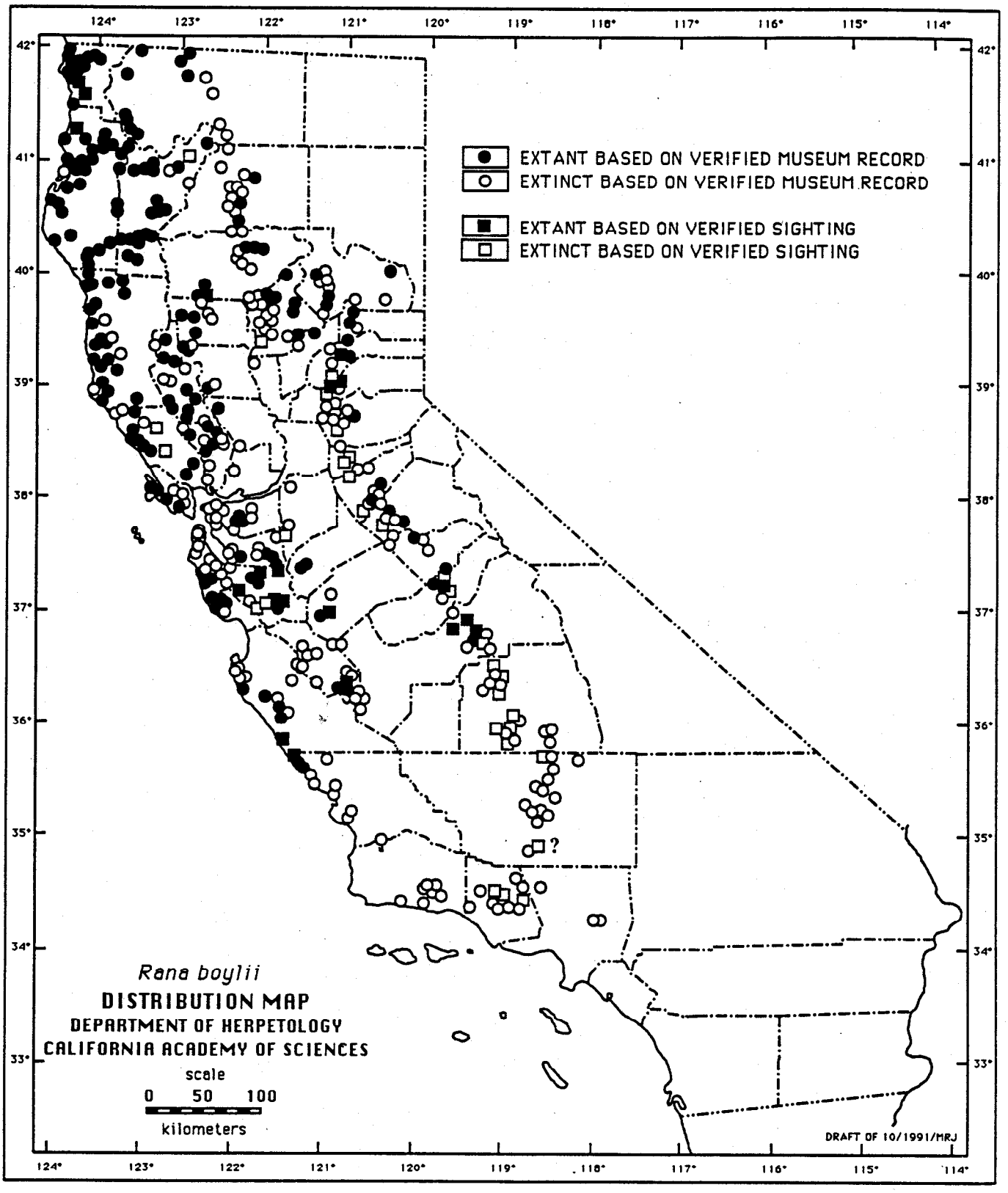

Figure 18. Historic and current distribution of the foothill yellow-legged frog (*Rana boylii*) in California based on 937 locations from 3195 museum records and 164 records from other sources.

Life History: *Rana boylii* is one of the most poorly known ranid frog species in California; no detailed study of its life history has ever been undertaken (although at least two investigators are currently gathering life history data on this species: H. Welsh, and A. Lind, pers. comm.). This species is a stream-dwelling form that deposits masses of 300-1200 eggs on the downstream side of cobbles and boulders over which a relatively thin, gentle flow of water exists (Storer 1925, Fitch 1936., Zweifel 1955). The timing of oviposition typically follows the period of high flow discharge resulting from winter rainfall and snowmelt, which results in oviposition usually occurring between late March and early June (Storer 1925; Grinnell et al. 1930; Wright and Wright 1949; unpubl. data). The embryos have a critical thermal maximum (CTM) of c 26°C (Zweifel 1955), but the precise embryonic CTM for this species is not known. Tadpoles display more dorsoventral flattening, have a more muscular tail fin, and have a larger number of tooth rows than most other ranid frogs native to the western United States, features thought to assist the larvae of this species in its flowing stream environment (Zweifel 1955). Tadpoles are infrequently observed because they are cryptic against the substrates of rocky pools and riffles in which they occur (pers. observ.). Tadpoles seem to be capable of growing much more rapidly on epiphytic diatoms than other types of algae, and have been observed to preferentially graze on this algal type (S. Kupferberg, pers. comm.). Such preferentially grazing has been observed to enhance the productivity of other algae (S. Kupferberg, pers. comm.) in a manner similar to that described for fishes (Power 1990). After oviposition, a minimum of roughly 15 weeks is needed to attain metamorphosis, which typically occurs between July and September (Storer 1925, Jennings 1988b). Upon metamorphosis, juveniles show a marked differential movement in an upstream direction (Twitty et al. 1967b) very similar to the compensating mechanism displayed by stream insects that are subject to downstream drift. Two years are thought to be required to reach adult size (Storer 1925), but no data are available on longevity. Postmetamorphs probably eat both aquatic and terrestrial insects, but few dietary data exist for this species (see Storer 1925, Fitch 1936). Red-sided *(Thamnophis sirtalis),* western terrestrial, and Oregon garter snakes have been reported as feeding on the post-hatching stages of *R. boylii* (Fitch 1941, Zweifel 1955, Lind 1990), whereas Evenden (1948) recorded *Taricha granulosa* predation on the eggs of *R. boylii.* The Oregon garter snake has been observed to feed more frequently on tadpoles than metamorphosed individuals (pers. observ.), whereas the other three garter snakes are recorded to feed more frequently on metamorphosed individuals. The diel and seasonal movement ecology and behavior of adults is essentially unknown.

Habitat: *Rana boylii* requires shallow, flowing water, apparently preferentially in small to moderate-sized streams situations with at least some cobble-sized substrate (Hayes and Jennings 1988, Jennings 1988b). This type of habitat is probably best suited to oviposition (see Storer 1925, Fitch 1936, Zweifel 1955) and likely provides significant refuge habitat for larvae and postmetamorphs (Hayes and Jennings 1988, Jennings 1988b). Foothill yellow-legged frogs have been found in stream situations lacking a cobble or larger-sized substrate gram (Fitch 1938, Zweifel 1955), but it is not clear whether such habitats are regularly utilized (Hayes and Jennings 1988). Foothill yellow-legged frogs are infrequent or absent in habitats where introduced aquatic predators (i.e., various fishes and bullfrogs) are present (Hayes and Jennings 1986, 1988; Kupferberg 1994), probably because their aquatic developmental stages are susceptible to such predators (Grinnell and Storer 1924).

Status: Endangered in central and southern California south of the Salinas River, Monterey County; foothill yellow-legged frogs have not been observed in or south of the Transverse Ranges since before 1978 (H, DeLisle, M. Long, G. Stewart, and S. Sweet, pers. comm.; pers. observ.). The last verifiable records from this region were a series of specimens collected 17 April 1970 on Piru Creek 10 miles north of Temescal Ranger Station, Ventura County (LACM 106062). and upstream from Piru Gorge (currently under

Pyramid Lake), Los Angeles County (California State University Northridge, uncat.; P. McMonagle, pers. comm.). High water conditions estimated to be of 500-year frequency, which occurred over much of southern California during the spring of 1969, are believed to be largely responsible for the apparent extirpation of this taxon in that region (Sweet 1983). The last reliable observation (unverified by specimens or photographs) of a foothill yellow-legged frog in the region occurred at 1-2 km south of Frenchman's Flat along Piru Creek (Los Angeles County) on 6 July 1977 (H. DeLisle, pers. comm.).

Threatened in the west slope drainages of the Sierra Nevada and southern Cascade Mountains east of the Sacramento-San Joaquin River axis; foothill yellow-legged frogs have not been observed for nearly 20 years at least 19 historical localities on the west slope of the southern Sierra Nevada (J. Brode, R. Hansen, D. Holland, and D. Wake, pers. comm.; pers. observ.), and localities at which this species is extant on the western slope of the northern Sierra Nevada and the extreme southern Cascades appear widely scattered.

Special Concern in the Coast Ranges north of the Salinas River; *Rana boylii* still occurs at many localities in coastal drainages north of the Salinas River system in California, some of which harbor significant numbers of frogs (E. Ely, A. Lind, and H. Welsh pers. comm.; pers. observ.). Nevertheless, even in this area, *R. boylii* is at risk due to the exotic predatory aquatic fauna that is still increasing its range in this region (Kupferberg 1993; S. Kupferberg and M. Power, pers. comm.), poorly timed water releases from upstream reservoirs that scour egg masses from their oviposition substrates (e.g., Trinity River system during the spring of 1991: H. Welsh and A. Lind, pers. comm.), and decreased waterflows that can force adult frogs to move into permanent pools where they may be more susceptible to predation (see Hayes and Jennings 1988). Additionally, aseasonally (late), forceful storms in most years since 1987 that are though to be responsible for scouring salmonid redds (M. McCain, pers. comm.) may have had similar effects on *R. boylii* egg masses (H. Welsh and A. Lind, pers. comm.). Aseasonal storms and decreases in annual rainfall that result in decreased waterflows may be linked to local and global anthropogenically influenced climatic changes.

Management Recommendations: A life history study that details the habitat requirements of *R. boylii,* especially for the larvae and early postmetamorphic stages, is urgently needed. Such a study would greatly facilitate refining the management recommendations made here. Until data indicate otherwise, habitat critical to the survival of *R. boylii* should be identified in part by the presence of oviposition habitat having riffle areas with a substrate of cobble-sized or larger rocks. Since such habitats are dynamic in stream systems based largely on the ability of the existing flow regime to differentially sort the loose substrate, particular attention should be paid to maintaining a flow regime that ensures the presence of suitable habitat for *R. boylii.* Moreover, an understanding of the variation in flow and shear conditions that egg masses and larvae will tolerate before they are damaged is needed, as well as a more precise understanding of the critical thermal maxima of the embryonic stages. Management should avoid water releases that create excess flow and shear conditions during the time interval that egg masses and the more fragile younger larval stages are present. *Rana boylii* egg masses are known to accumulate suspended particulates (Storer 1925), but how much silt deposition they can withstand and still survive is not known. Tolerance to silt deposition needs study because increased silt loads due to vegetation removal, such as logging and livestock grazing, are a frequent occurrence within the range of *R. boylii.*

CASCADE FROG
Rana cascadae Slater 1939

Description: A moderate-sized (50-75 mm SUL) brown, red-brown, or slightly greenish brown frog with prominent dorsolateral folds and a distinct light jaw stripe (Slater 1939a, Dunlap 1955, Dumas 1966). Individuals are usually spotted with a few to over 50 inky black, distinct-edged dorsal spots; rarely, individuals are entirely unspotted (Slater 1939a; pers. observ.). A diffuse light and dark reticulum is present in the groin (Dunlap 1955). Undersurfaces are yellow to cream without any dark pigment, the yellower areas largely confined to the posterior belly and the undersurfaces of the lower limbs. The iris is brown with some gold iridophores on the upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: *Rana cascadae* is a morphologically (Slater 1939a) and genetically (Case 1978b; Green 1986a, 1986b) distinct species. Although not universally recognized as such for a number of years following its description in 1939 (e.g., Stebbins 1951), Dunlap (1955) first confirmed its distinctiveness based on morphology, which was later reaffirmed by genetic data (Case 1978b; Green 1986a, 1986b). Data on genetic variation within *R. cascadae* is based on 6 populations in California (Case 1976, 1978a, 1978b) and 7 populations in Oregon and Washington (Haertel et al. 1974; Green 1986a, 1986b). Available allozyme data indicate some potentially significant genetic variation within *R. cascadae* (Case 1976, 1978b), but the data are both difficult to interpret because of lumping of adjacent populations (Case 1978b, Green 1986a) and are too few to identify any geographic patterns of genetic variation conclusively.

Distribution: Historically, *R. cascadae* was discontinuously distributed along the Cascade Mountain axis between northern Washington (Stebbins 1985) and northern California (Bury 1973b) and extended southward to the extreme northern end of the Sierra Nevada (Hayes and Cliff 1982). A disjunct population system also occurs in the Olympic Mountains in Washington (Stebbins 1985). The known elevation range of *R. cascadae* extends from near sea level to 2500 m (Emerald Lake, Lassen National Park, Shasta County). In California, *R. cascadae* was distributed from the Shasta-Trinity region eastward toward the Modoc Plateau and southward to the Lassen region and the upper Feather River system (Figure 19). Notably, numerous specimens identified as western spotted frog *(R. pretiosa)* from localities in eastern Siskiyou County are actually *R. cascadae*, so the historical range of *R. cascadae* in California shown here is more extensive than that shown by most current authorities (e.g., Altig and Dumas 1971, Stebbins 1985). The known elevational range of *R. cascadae* in California extends from 270 m (Anderson Fork, Butte County: Hayes and Cliff 1982) to 2500 m (Emerald Lake, Lassen National Park, Shasta County: Grinnell et al. 1930 as *R. pretiosa).*

Life History: Data on the life history of the Cascade frog are based almost entirely on studies conducted in Oregon, so inferences regarding the details of its life history in California should be viewed with caution. *Rana cascadae,* exclusively diurnal in its activity, appears soon after melting ice and snow creates some open water on the edges of ponds or ponded streams where this species hibernates in the mud bottom (Briggs 1976, 1987; pers. observ.)., Males appear hours to a few days in advance of females and intercept females as they appear (pers. observ.). The first female or first few females to deposit an egg mass seem to oviposit in the warmest melt-water available, whereas subsequent females appear to cue on the position, perhaps by olfaction, of previously laid egg masses. This results in most egg masses being aggregated (Sype 1975, Briggs 1987). Masses are globular, contain 400-600 eggs, are laid in shallow water, and are not attached to a vegetation brace. The aggregation of egg masses frequently results in their being stacked so that after their jelly swells, a significant number of the uppermost eggs are above the water line and can freeze (Sype 1975). Oviposition occurs some time in the interval of

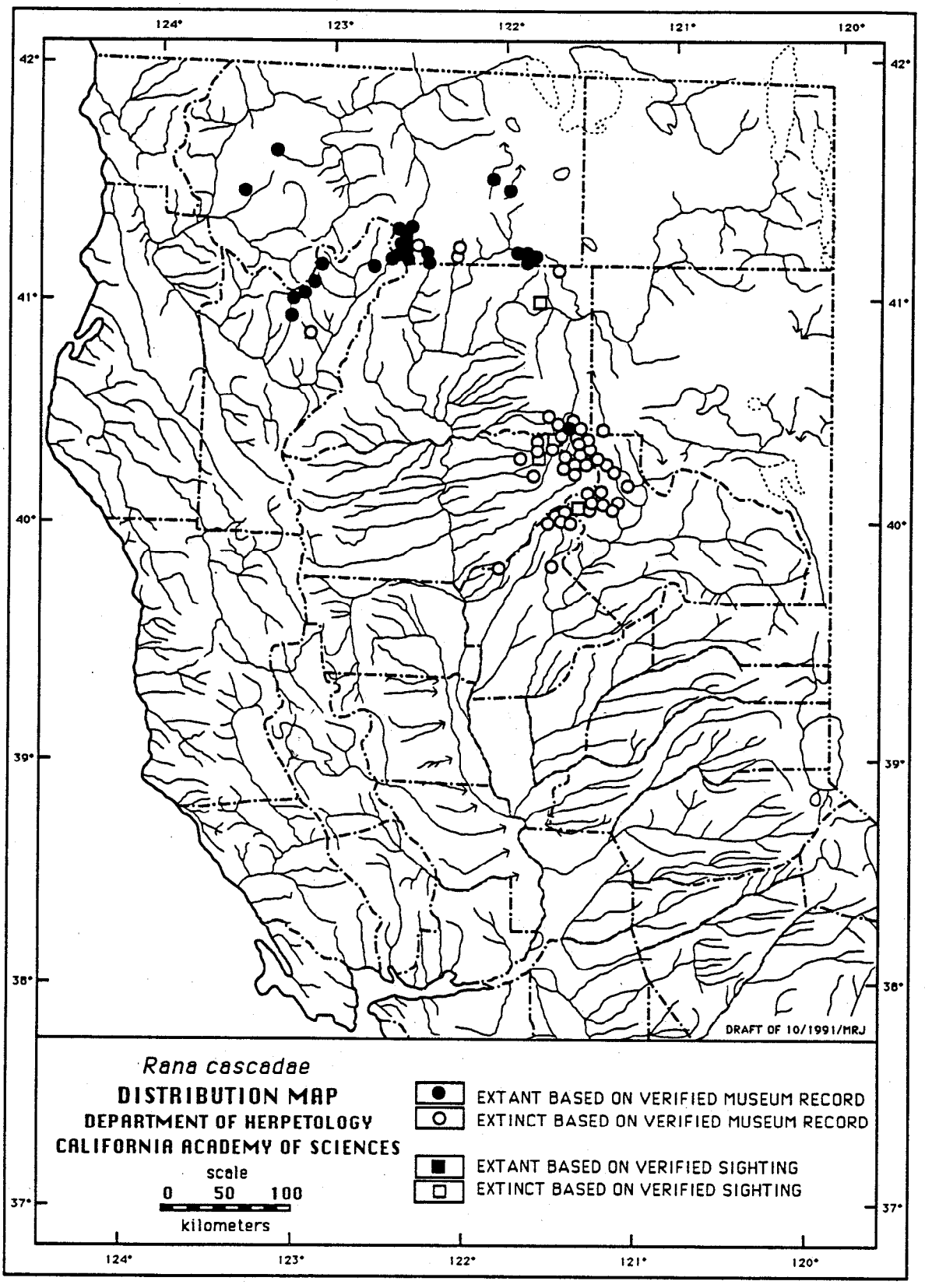

Figure 19. Historic and current distribution of the Cascade frog (*Rana cascadae*) in northern California based on 132 locations from 533 museum records and 6 records from other sources.

March-July depending on climatic conditions and elevation (Nussbaum et al. 1983); oviposition at any one locality, however, is completed in just a few days (T. Rodgers, pers. comm.; pers. observ.). Most embryos will die if water temperatures warm to ≥ 28ºC (Sype 1975). After hatching, *R. cascadae* larvae are almost never found alone, but form spatially loose social aggregations of generally < 100 individuals composed primarily of kin (O'Hara and Blaustein 1985, Blaustein and O'Hara 1987). *Rana cascadae* larvae voluntarily select a high water temperature (27.3 ± 0.6ºC; Wollmuth et al. 1987), presumably to optimize conditions for growth and development. The length of the larval period is also highly temperature dependent, but probably ranges from 1 to over 2 months in the field (Nussbaum et al. 1983, Briggs 1987). Upon entering metamorphosis, larvae voluntarily select the highest environmental temperatures (28.8 ± 0.4ºC) during their developmental history since all postmetamorphic life stages voluntarily select temperatures < 17°C (Wollmuth et al. 1987). At a pond located at 1285 m elevation in Oregon, males and females first exhibited signs of sexual maturity at 35 mm and 52 mm SUL, respectively (Briggs and Storm 1970). Based on growth rates of marked individuals, males could mature by 2 years of age and females by 4 years of age. However, both sexes may not reproduce until they are one or two years older than the minimum ages at maturity. Longevity in *R. cascadae* is unknown, but the species is probably long-lived (> 5 years).

Habitat: *Rana cascadae* occurs and reproduces in both ephemeral and permanent ponds or streams (Zweifel 1955; Nussbaum et al. 1983; Briggs 1987; pers. observ.), but probably cannot survive in ephemeral situations where at least some of the substrate does not remain saturated. Oviposition habitat is open, shallow water (Briggs 1987) that remains unshaded during the hours of strong sunlight (pers. observ.). Aquatic sites in which *R. cascadae* is found are relatively oligotrophic (Briggs and Storm 1970, Nussbaum et al. 1983), so a certain level of water quality is undoubtedly important to its survival. However, what its tolerance limits to various water quality parameters are (except temperature; see life history section) are unknown. Cascade frogs typically occur in waters lacking predatory fish and indications exist that a shift away from the use of more permanent aquatic sites, in a manner similar to that described for California red-legged frogs (Hayes and Jennings 1988), may have been induced in part by fish plants (see Liss and Larson 1991). Hibernation occurs underwater or in saturated ground (Briggs 1987), presumably because frogs cannot survive the level of water loss sustained if a dry terrestrial hibernation site were used.

Status: Special Concern in the Trinity Alps and Shasta region and the headwaters of the Sacramento and McCloud River systems; Endangered elsewhere in the state (i.e., from the Pit River system south); our field surveys from Butte County northward through the Lassen National Park region to the Modoc Plateau area of eastern Siskiyou County failed to reveal any Cascades frogs at localities where they were historically known to occur. Only two adults of this taxon were recently found in each of two different years at the same location in Lassen Volcanic National Park following extensive searches during the summers of 1991-1993 (Fellers and Drost 1993; G. Fellers, pers. comm.). All available indications are that *R. cascadae* is exceedingly rare in this region, which is in sharp contrast to its historic abundance (Grinnell et al. 1930 [as *R. pretiosa*]; Badaracco 1960). Collections (MVZ 136125-136127, 136131-136136, 136138-136143, 148944-148988, 175949-175954; n = 68) indicate that this species was abundant at several locations within Lassen National Park in the mid-1970s (see also Case 1976, 1978a; Fellers and Drost 1993). Our field surveys for *R. cascadae* during 1990 indicated that it was moderately to extremely abundant in lake and ponded stream situations where few or no fishes were present from the upper McCloud River system (Colby Meadows) westward into the Trinity Alps at localities where it had been historically recorded.

Management Recommendations: Comprehensive genetic data are needed to identify potential cryptic taxa within *R. cascadae.* In California, the Trinity Alps-Shasta region

population system may be sufficiently differentiated from populations in, the Oregon Cascades to justify species recognition. Judging from the large number of misidentifications of *R. cascadae* in museum collections alone, its distribution in California is still poorly understood. Comprehensive surveys for this taxon in California are urgently needed. Surveys should focus on how far west along the Trinity Alps ridge system this species extends, on its pattern of occurrence in the Siskiyou-Klamath region of western Siskiyou County, and on its pattern of occurrence west and northwest of Mt. Shasta. How adversely this species may have been affected by the planting of trout in high elevation lakes is poorly understood, but some effort should be focused at understanding both the current and historical bases of this problem. An attempt should be made to work toward a policy of discontinuing fish plants and encouraging management alternatives that will eliminate exotic or transplanted fishes where populations of *R. cascadae* still exist, As a start, fishless lakes should be clearly identified and no such lakes should be planted. Termination of fish stocking or elimination of exotic fish should be considered on a case-by-case basis. Water quality variables and the tolerance limits of the various life stages of *R. cascadae* to those variables especially need study, as well as the effects of varying levels of UV radiation on developing eggs (see Blaustein et al. 1994). Although dispersal abilities of *R. cascadae* seem to be poor (O'Hara 1981), the movement ecology of *R. cascadae,* particularly with respect to its ability for recolonization following local extirpation, is essentially unknown. That knowledge is essential to the proper management of local areas where this taxon occurs.

MOUNTAIN YELLOW-LEGGED FROG
Rana muscosa Camp 1917

Description: A moderate-sized (ca. 40-80 mm SUL), highly variably colored frog with a dorsal pattern ranging from discrete dark spots that can be few and large, smaller and more numerous ones with a mixture of size and shapes, irregular lichen-like patches, or a poorly defined reticulum (Zweifel 1955). Color is highly variable, usually a mix of brown and yellow, but often with gray, red, or green-brown; some individuals may be dark brown with little pattern (pers. observ.). The posterior half of the upper lip is weakly light-colored. Dorsolateral folds are present, but not usually prominent (Stebbins 1985). The throat is white or yellow, sometimes with mottling of dark pigment (Zweifel 1955). The belly and undersurfaces of the high limbs are yellow, which ranges in hue from pale lemon yellow to an intense sun yellow. The iris is gold with a horizontal, black countershading stripe (pers. observ.).

Taxonomic Remarks: *Rana muscosa* has been regarded as a distinct species since the work of Zweifel (1955), who differentiated it primarily on morphological grounds. Subsequent genetic work (Houser and Sutton 1969; Haertel et al. 1974; Case 1976, 1978b; Green 1986a, 1986b) has confirmed its distinctiveness. Allozyme data, based on 16 populations, show a complex pattern of genetic variation (Case 1976, 1978b; Green 1986b), but the data are difficult to interpret because of lumping of populations along political boundaries and because sample sizes from most populations are too small to allow conclusive identification of a pattern. Comprehensive genetic data, particularly among disjunct population systems within *R. muscosa* are needed to help identify genetic variation, particularly since morphological differences have been noted between frogs collected from the Sierra Nevada and frogs collected from southern California (Camp 1917, Zweifel 1955).

Distribution: This near endemic to California is distributed more or less continuously in the Sierra Nevada from the vicinity of La Porte (southern Plumas County) southward to Taylor and French Joe Meadows (southern Tulare County; Zweifel 1955; Figure 20). It extends out of California into Nevada only in the vicinity of Lake Tahoe (Zweifel 1955, Jennings 1984a). Disjunct populations occur north and south of the ends of the main body of its geographic range. The northernmost populations includes a population cluster from the vicinity of Butts Creek (Plumas County; CSUC 1132-1133) to the upper reaches of the Butte Creek drainage (Butte County: Zweifel 1955). In southern California, a single specimen collected on 13 September 1952 at the USFS campground (2013 m elevation) on Breckenridge Mountain, Kern County (MVZ 63389) has been tentatively identified by us as *R. muscosa.* Additional populations of *R. muscosa* occur in isolated clusters in the San Gabriel, San Bernardino, and San Jacinto Mountains (Zweifel 1955), and an isolated outpost occurs in Pauma Creek flowing through Doane Meadow on Mt. Palomar in northern San Diego County (Klauber 1929; Figure 21). Its known elevation range extends from ca. 1370 m (San Antonio Creek, Calaveras County: Zweifel 1955) to > 3650 m near Desolation Lake (Fresno County: Mullally and Cunningham 1956b) in the Sierra Nevada. In southern California, its historical elevational range extended from 370 m (Eaton Canyon, Los Angeles County; M. Long, pers. comm.) to > 2290 m near Bluff Lake (San Bernardino County: Zweifel 1955).

Life History: *Rana muscosa* is a diurnal frog that emerges from overwintering sites immediately following snowmelt (D. Bradford, pers. comm.). Oviposition typically occurs in shallow water (Mullally 1959), with the egg mass unattached, and clustering of eggs masses occurs frequently (H. Basey, S. Morey, and Jay Wright, pers. comm.); however, in stream situations, the egg mass may be attached (Zweifel 1955). Clutch size and the time required for embryonic development are unknown. Larvae maintain a

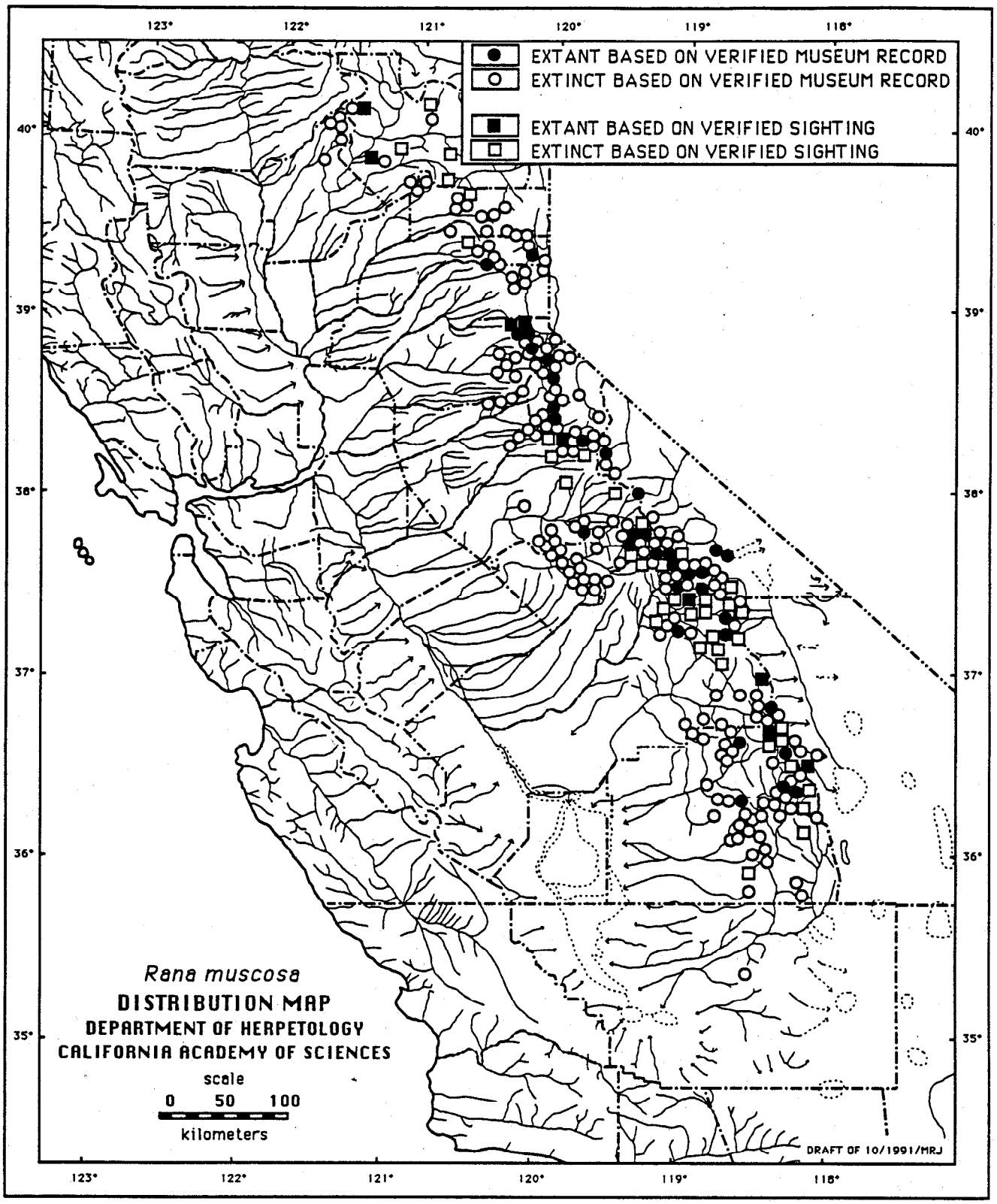

Figure 20. Historic and current distribution of the mountain yellow-legged frog (*Rana muscosa*) in central and and northern California based on 530 locations from 2270 museum records and 161 records from other sources. The distribution of *R. muscosa* in southern California is presented in Figure 21.

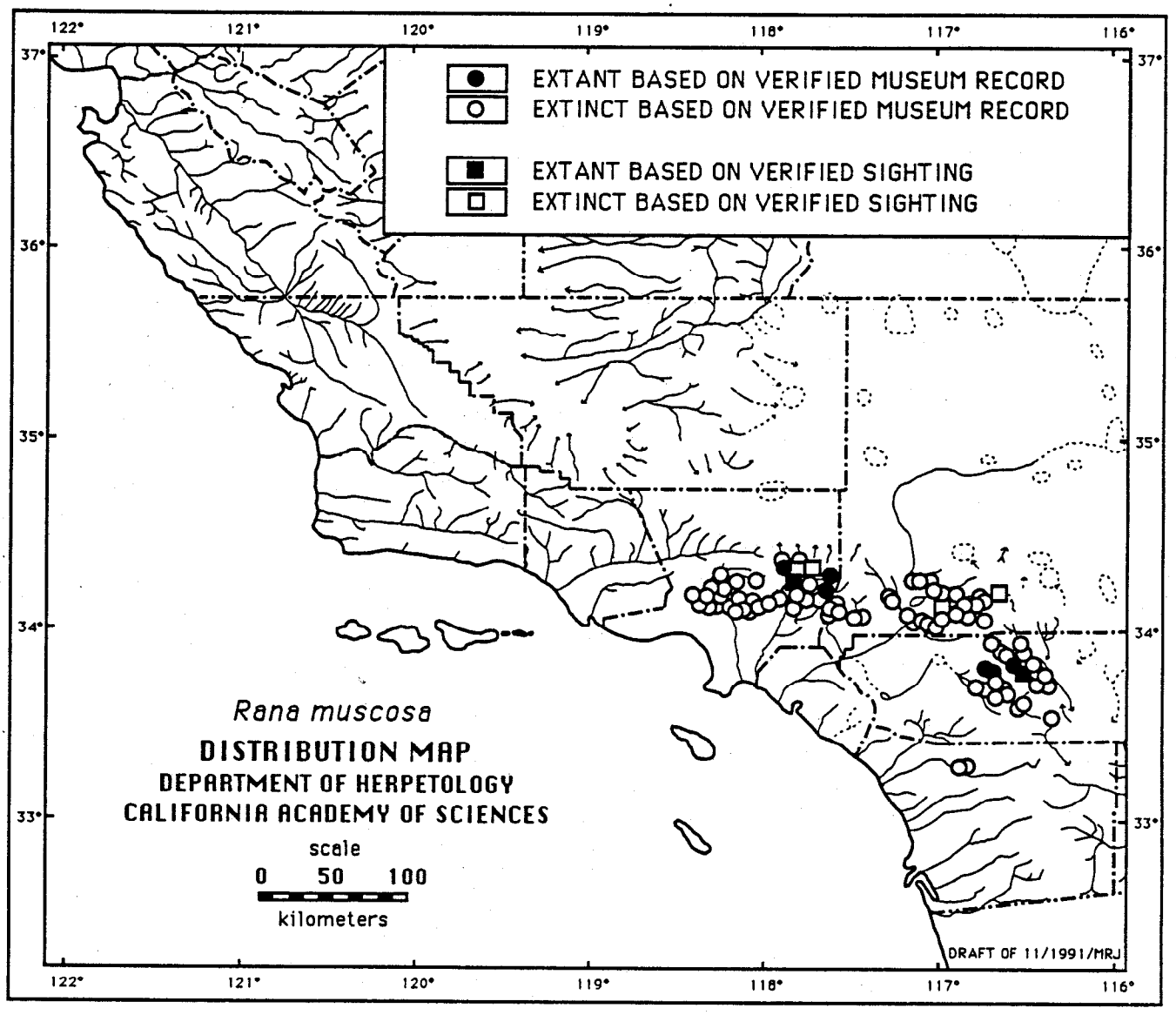

Figure 21. Historic and current distribution of the mountain yellow-legged frog (*Rana muscosa*) in southern California based on 166 locations from 651 museum records and 28 records from other sources. The distribution of *R. muscosa* in central and northern California is presented in Figure 20.

relatively high body temperature by selecting warmer microhabitats (Bradford 1984). Before spring overturn, larvae remain in warmer water below the thermocline; after spring overturn, they move to warm shallows on a daily basis, taking advantage of daily changes in water temperatures. Larvae may form diurnal aggregations in shallow water that may number in the hundreds, and voluntarily elevate their body temperatures to as high as 27°C (Bradford 1984). Despite such behavior, larvae apparently must overwinter up to two times for 6-9 month intervals (Cory 1962a, Bradford 1983) before attaining metamorphosis because the active season is short and the aquatic habitat maintains warm temperatures for only brief intervals (Mullally and Cunningham 1956b). Overwintering results in larvae dying when the aquatic habitat becomes ephemeral in some years (Mullally 1959). Larvae have the ability to survive anoxic conditions when shallow lakes freeze to the bottom for months (Bradford 1983). The time required to develop from fertilization to metamorphosis is believed to vary between 1 and 2.5 years. Data on the time required to reach reproductive maturity and longevity of adults is unknown. During the active season, postmetamorphs tend to maximize body temperature at nearly all times of day by basking in the sun, moving between water and land (depending on which is warmer), and concentrating in the warmer shallows along the shoreline (Bradford 1984). Postmetamorphs appear to be susceptible to winterkill in shallow lakes that undergo oxygen depletion because they are less tolerant of low oxygen tension than larvae (Bradford 1983). Frogs apparently must hibernate in water, probably because they can tolerate only limited dehydration (see Hillman 1980).

Postmetamorphic diet is dominated by beetles, flies (Diptera), ants, bees (Apoidea), wasps (Hymenoptera), and true bugs (Hemiptera: Long 1970). Larger frogs take more aquatic true bugs probably because of their more aquatic behavior. Coyotes *(Canis latrans)*, Brewer's blackbirds *(Euphagus cyanocephalus)*, and western terrestrial garter snakes are known to prey on the larvae and postmetamorphs of *R. muscosa* (Moore 1929, Mullally and Cunningham 1956b, Bradford 1991), but these life stages of *R. muscosa* are probably a regular seasonal component of the diet only for the western terrestrial garter snake (see Jennings et al. 1992). Mass mortality leading to a local extinction event was induced by unknown circumstances, although some of the affected frogs harbored pathogenic bacteria (Bradford 1991). *Rana muscosa* is apparently intolerant of introduced predatory fishes, since they rarely occur with such fishes where these have been introduced (Cory 1962b, 1963; Bradford 1989; Bradford et al. 1993, in press). Data on the movement ecology and recolonization capabilities of *R. muscosa* are lacking.

Habitat: *Rana muscosa* inhabits ponds, tams, lakes, and streams at moderate to high elevations (Mullally and Cunningham 1956b). It seems to be absent from the smallest creeks probably because these have insufficient depth for adequate refuge and overwintering. Although *R. muscosa* can occur in low numbers along a variety of shorelines, it appears to prefer open stream and lake margins that gently slope up to a depth of ca. 5-8 cm. Such shorelines are probably essential for oviposition and important for thermoregulation of larvae and postmetamorphs; additionally, this kind of shoreline configuration probably provides a refuge from predation if fishes occur in adjacent deeper water. *Rana muscosa* seems to be most successful where predatory fish are absent (Bradford 1989; Bradford et al. 1993, in press).

Status: Endangered in southern California; *R. muscosa* has probably been extirpated from > 99% of its historic range in southern California. No *R. muscosa* have been observed in the San Bernardino Mountains since the 1970s. In the San Gabriel Mountains small populations of frogs exist only in the upper reaches of Little Rock Creek, Devils Canyon, and the East Fork of the San Gabriel River (Jennings and Hayes 1994; unpubl. data). A visit to the Doane Meadow locality on Mt. Palomar found the pond overrun with bullfrogs and exotic fishes; *R. muscosa* and *R. aurora draytonii* have not been seen there

since the mid-1970s (T. Knefler and L. Grismer, pers. comm.). The only *R. muscosa* known to still occur in southern California (to our knowledge) can be found in four small tributaries of the upper reaches of the San Jacinto River system in the San Jacinto Mountains, and four small streams in the San Gabriel Mountains. Field surveys indicate that the entire remaining populations in the San Gabriel and San Jacinto Mountains probably numbers less than 100 adult frogs. Regardless of the precise number, *R. muscosa* in southern California is represented by a precariously small remnant.

Threatened in the Sierra Nevada; it is unclear from how much of its historic range in the Sierra Nevada *R. muscosa* has disappeared, but several indications suggest that the extent of disappearance is significant (Bradford et al. (in press); J. Boundy, D. Bradford, L. Cory, R. Hansen, D. Martin, and M. Morton, pers. comm.; unpubl. data). Introduced fishes have apparently eliminated *R. muscosa* from many lakes and streams (Grinnell and Storer 1924; Bradford 1989; Bradford et al. 1993, in press). However, *R. muscosa* was abundant at many sites at least until the 1960s (Zweifel 1955, Cory et al. 1970). Only a few *R. muscosa* have been observed at the extreme northern end of the range (Butte-Plumas counties) since the 1970s (unpubl. data). A significant number of local populations have also apparently become extinct in the central and southern Sierra Nevada since the 1960s (Bradford et al. (in press); L. Cory, R. Hansen, and D. Martin, pers. comm.). Some of these sites are unlikely to be recolonized because they are isolated from the nearest extant populations by aquatic habitats populated by exotic fishes (Bradford 1991, Bradford et al. 1993). Recent studies of the potential effects of acidification and inorganic aluminum indicate that neither of these factors is the likely explanation for the observed declines in the Sierra Nevada (Bradford et al. 1991, 1992, 1994).

Management Recommendations: A range-wide survey for extant populations of *R. muscosa* is needed to determine more precisely to what extent this taxon has disappeared. Such a survey should be conducted over several years to validate the accuracy of survey methods and to provide an indication of the degree of recolonization. Much of the basic life history of *R. muscosa* remains poorly understood, but for management, an understanding of its movement ecology, recolonization potential, and determination of whether the same oviposition sites are repeatedly used (as in *R. cascadae)* are especially needed. The policy of planting trout *(Oncorhynchus aguabonita, O. mykiss,* and *Salmo trutta),* charr *(Salvelinus fontinalis),* and other fishes in currently fishless high elevation lakes should be discontinued. In addition, a thorough inventory of Sierran sites supporting *R. muscosa* should be conducted. Such an inventory should be capable of identifying fish-linked recruitment failures. Where the inventory suggests fish-induced demographic changes, termination of stocking or eradication of exotics should be considered on a case-by-case basis. An economic argument for the retention of trout stocking in high elevation Sierran lakes is not justified based on backcountry use levels of these areas (P. Moyle, pers. comm.). Some recent declines are puzzling because the presence of pathogens suggests that a primary causative agent exists that makes frogs susceptible to pathogens and predators (see Bradford 1991). As with *Bufo canorus* and *R. cascadae,* the possibility exists that unexplained declines in *R. muscosa* are linked to non-acidification-mediated atmospheric effects (D. Bradford, pers. comm.); this alternative needs investigation (see Management Recommendations section of the Yosemite toad *(B. canorus)* account).

Plate 5. Larval and adult northern leopard frog (*Rana pipiens*) [from Stebbins 1951].

NORTHERN LEOPARD FROG
Rana pipiens Schreber 1782

Description: A moderate-sized (50-100 mm SUL) frog with moderate, to moderately large, dark brown spots, each edged with a narrow, halo of white, or pale yellow pigment (Pace 1974). Prominent, continuous dorsolateral folds are present. Dorsal ground color is highly variable, but typically includes a significant amount of green, the remaining areas being tan or beige (Stebbins 1985). Undersurfaces are cream, sometimes with a yellow taint, but without dark pigment or mottling of any kind. The iris is brown with some gold iridophores on the upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: Historically, this taxon was regarded as a highly variable species that included all taxa now regarded as part of the *R. pipiens* complex (Hillis 1988). The work of Pace (1974) conclusively separated *R. pipiens*, and later work helped define the geographic limits of this taxon (e.g., Dunlap and Kruse 1976, Lynch 1978). More recent genetic work (Hillis et al. 1983; see also discussion in Hillis 1988) has affirmed the specific status of this taxon. Genetic data on *R. pipiens*, which are limited to segments of its geographic range, have been used largely to differentiate *R. pipiens* from its close congeners rather than address the geographic pattern of genetic variation within the taxon (e.g., Kruse and Dunlap 1976, Platz 1976, Dunlap 1978). Studies are needed to determine whether a significant geographic pattern to genetic variation exists on a range-wide basis.

Distribution: Improved understanding and the relatively recent partitioning of the complex of species regarded as leopard frogs (Hillis et al. 1983, Hillis 1988) has still left the nominal species, *Rana pipiens*, as one of the most broadly distributed frogs in North America, with over 98% of its geographic range occurring outside California. The northern leopard frog extends northward to Great Slave Lake, southern MacKenzie District, Canada, eastward to southern Labrador and Newfoundland, Canada, and southward to Virginia, Nebraska, New Mexico, and northeastern Arizona (Stebbins 1985). Its known elevational range extends from near sea level to 3350 m (Stebbins 1985). In California, native populations of the northern leopard frog whose origin is largely unquestioned are historically recorded from only Modoc and Lassen counties (Figure 22). The origin of leopard frogs in the upper Owens Valley has been questioned (Bury and Luckenbach 1976), but no data dispute a native origin (see Macey and Papenfuss 1991b; pers. observ.), the treatment followed here. In California, its known elevational range extends from 1216 m (MVZ 71684: 1.6 km west of Big Pine, Inyo County) to 1503 m (CAS-SU 15230-15232: Pictograph Springs in Rattlesnake Creek above Big Sage Reservoir, Modoc County). Frogs in the vicinity of Lake Tahoe have been treated as native (Stebbins 1966, 1985), but historical evidence indicates that at least some of these are introduced populations (Bryant 1917, Storer 1925, Jennings 1984a). Leopard frogs that represent this taxon have been introduced at various sites elsewhere within the state (Storer 1925, Bury and Luckenbach 1976, Stebbins 1985), but no evidence exists that any of these introductions have resulted in large naturalized populations that continue to exist today (G. Hansen, and Jay Wright, pers. comm.; pers. observ.). The leopard frog historically present in the lower Colorado River, once labelled *R. pipiens* (Storer 1925, Ruibal 1959), is actually *R. yavapaiensis* (Platz and Frost 1984, Clarkson and Rorabaugh 1989).

Life History: No data are available on the life history of *R. pipiens* in California (e.g., see Storer 1925). This life history summary is a composite assembled from studies conducted at broadly scattered localities throughout the geographic range of *R. pipiens* outside California. Caution should be used to interpret the degree to which these studies reflect the behavior of *R. pipiens* that still occur in California. *Rana pipiens* emerges from underwater overwintering sites that consist of small pits the frogs apparently excavate in the bottom mud (Emery et al. 1972). Breeding seems to be initiated in spring when the

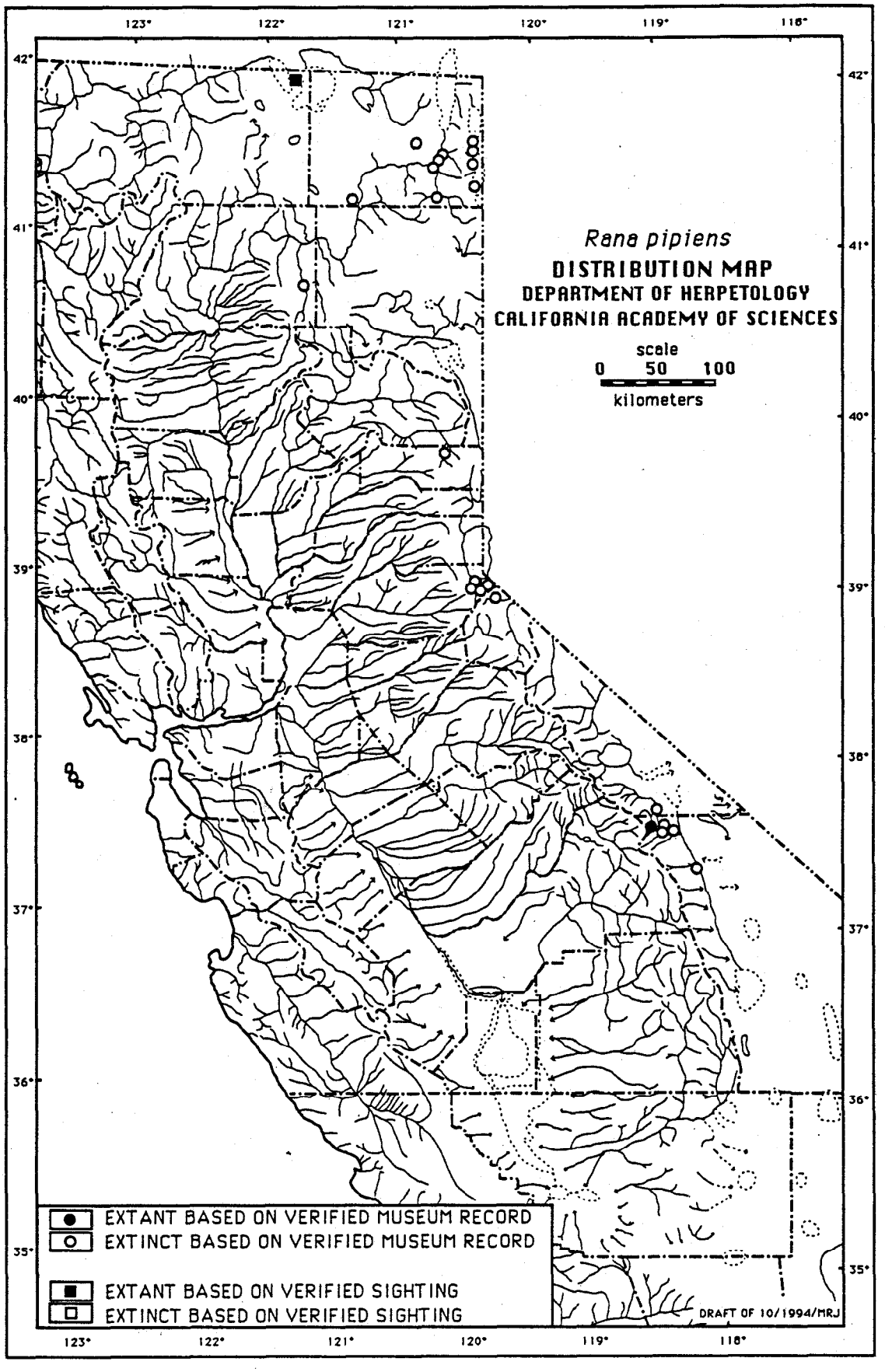

Figure 22. Historic and current distribution of presumed native populations of the northern leopard frog (*Rana pipiens*) in central and northern California based on 43 locations from 267 museum records and 2 records from other sources. Museum records based on known introductions are not plotted.

probability of minimum temperatures attaining the level of a hard freeze becomes very low (see Corn and Livo 1989). Males appear at breeding sites prior to females (Merrell 1977). When females begin to appear, males achieve an axillary (pectoral) amplexus (Noble and Aronson 1942), and females move to the site of egg deposition. Embryos hatch in 8-15 days (Hupf 1977) and larvae require 3-6 months before metamorphosing (Merrell 1977). Newly metamorphosed leopard frogs can move from natal ponds significant distances (800 m in 2-3 days; Dole 1971). Subadult frogs show a consistently higher degree of movement than adults (Dole 1965b, 1971). Males can mature at 1 year of age, but most probably become mature at 2, whereas females mature at 2 or 3 years of age (Rittschof 1975, Merrell 1977, Hine et al. 1981). Some indication exists that frogs at higher latitudes require longer to mature. Adults show a high degree of site fidelity, both intra- and inter-seasonally, although they will move under conditions that adversely modify their local habitat (e.g., lack of precipitation; Dole 1965a, 1965b). Adults frequently return to small pockets (called forms) at the base of dense graminoid or forb vegetation that has been molded into a resting location where frogs sit (Dole 1965a). Frogs may establish their adult home range as far as 5 km from their natal ponds (Dole 1971). Home ranges of adults may vary from < 20 m^2 to > 600 m^2 depending on local variation in habitat (Dole 1965b). Maximum longevity is unknown, but adults probably live 4-5 years (Rittschof 1975, Merrell 1977). Leopard frogs consume largely arthropods, with larger individuals capturing a higher frequency of larger, more mobile prey species (Linzey 1967).

Habitat: Leopard frogs require an aquatic habitat in which to overwinter (Emery et al. 1972) and lay eggs (Corn and Livo 1989). Emergent or submergent vegetation may be necessary both for oviposition and refuge during the breeding interval, but the degree to which leopard frogs require vegetation in the aquatic habitat where they deposit eggs has not been quantified nor experimentally evaluated. A dense, relatively tall, grass- or forb-dominated habitat with a moist substrate for foraging during the active season must occur in the vicinity of the aquatic habitat used for oviposition and overwintering (Dole 1965a, 1965b; Rittschof 1975; Merrell, 1977). A moist substrate is an essential aspect of *R. pipiens* habitat since they are relatively susceptible to water loss (Thorson 1955, 1956; Dole 1967; Gillis 1979). The degree to which the two required habitats must be juxtaposed to support a leopard frog population is poorly understood. Similarly, no understanding exists of the size of dense grass or forb habitat patches needed to sustain a leopard frog population (probably variable with habitat; see Dole 1965b) or inter-patch distances that will prevent recolonization of patches having sustained local extirpation.

Status: Endangered; no individuals of this taxon were encountered during our field surveys in California, and we know of only two recent sight records of this taxon from this region. A single adult leopard frog was observed beneath the outfall pipe moving water from the Lost River to the upper sump at the Tule Lake National Wildlife Refuge (Siskiyou County) during the summer of 1990 (R. Grove, pers. comm.), and 8-10 juveniles were observed in a marsh near Pine Creek, about 16 km northwest of Bishop (Inyo County), during the fall of 1994 (J. Brode, pers. comm.). Most of the habitat in the Pit River-Modoc Plateau area and the Owens Valley where this species occurred historically has been severely altered largely because of agricultural grazing practices. The dense tall-grass thickets and shelves bordering riparian zones that are essential habitat for this species are either no longer present or so fragmented that the habitat can no longer support populations of this taxon. Moreover, bullfrogs have become well-established along the riparian corridors where *R. pipiens* was historically present. Although the interaction between these two taxa is poorly understood, bullfrogs may have a negative effect on leopard frogs. Other members of the introduced predatory aquatic fauna that have been established alongside bullfrogs (e.g., red swamp crayfish, various exotic fishes) are likely to have negatively affected this species. Outside California, populations of *R. pipiens* from various

areas have been identified as being at risk. In the early 1970s widespread declines in the northern United States were attributed to overharvesting (Johnson 1975) coupled with other still unexplained factors (Hine et al. 1981). High elevation populations of this taxon in Colorado appear to be going extinct (Corn and Fogelman 1984). Like *Bufo canorus*, *Rana cascadae*, and *R. muscosa*, non-acidification atmospheric effects need investigation as a major cause for these declines.

Management Recommendations: Comprehensive surveys to determine the current distribution and status of *R. pipiens* in California are needed. We did not examine many aquatic habitats in the Siskiyou-Modoc-Lassen region that have some probability of harboring this species. Urgency is needed in addressing this taxon because four sequential years of drought in California (1986-1990) have exacerbated the already severe damage caused by grazing to potential *R. pipiens* habitat in this region. Special efforts should be made to implement programs that protect habitat for this species were populations of *R. pipiens* are detected. Particular attention should be paid to protecting juxtaposed grassy shelves and aquatic oviposition and overwintering habitat. Management should attempt to isolate this taxon from the introduced aquatic fauna; in particular, introduction of members of that fauna should be avoided. If significant populations of *R. pipiens* are found in California, some effort should be put into a local life history study to determine whether California leopard frogs behave in a manner consistent with what is known over the rest of their geographic range. Other studies should place some emphasis on assessing the patch sizes of habitat needed to sustain local populations long-term and evaluating the factors influencing recolonization potential when a local population become extinct.

SPOTTED FROG
Rana pretiosa Baird and Girard 1853

Description: A moderate-sized (60-110 mm SUL) brown frog with prominent dorsolateral folds and a highly variable pattern of dark spots ranging from large, "runny" ragged spots reminiscent of ink absorbed by a blotter, to diffuse-edged spots often with light centers (Dunlap 1955, Dumas 1966; pers. observ.). Undersurfaces are washed with reddish-orange, orange, or yellow in a manner that seems painted on (Dunlap 1955, Turner 1959a). Lower legs are relatively short (Dunlap 1955). The iris is brown with gold iridophores that are especially concentrated in the upper portions of the iris (pers. observ.).

Taxonomic Remarks: *Rana pretiosa* has been recognized as a distinctive taxon since the work of Dunlap (1955), but it is clearly a morphologically highly variable taxon with a broad geographic range that has made allocation of some populations difficult (Dunlap 1977). Allozyme data on *R. pretiosa* based on small samples from four populations in Idaho (Green 1986b), two populations in Montana (Case 1976, 1978b), and three populations in Oregon (Green 1986b), suggest considerable genetic variation. Current work now underway strongly suggests that at least three morphologically or genetically differentiated taxa are presently contained within *R. pretiosa* (D. Green, pers. comm.). Moreover, it has been recognized for some time that the variation in bright color pigments that different populations of *R. pretiosa* exhibit on their undersurfaces are geographically segregated (Nussbaum et al. 1983).

Distribution: As currently understood, this taxon is one of the most widely distributed frogs in the western United States. It ranges from southeastern Alaska westward to British Columbia and Alberta, Canada, southward to Montana, Wyoming, and Utah, and westward into Nevada, California, and Oregon (Turner and Dumas 1972). Its known elevational range extends from sea level to ca. 3050 m in western Wyoming (Stebbins 1985). In California, *R. pretiosa* is known from only 7 records (representing 5 localities) in Siskiyou and Modoc counties in the northeastern portion of the state (Figure 23). Its known elevational range in California extends from ca. 1000 m (Fall River Mills, Shasta County: USNM 38806) to ca. 1450 m (Pine Creek near New Pine Creek (town), Modoc County; J. Brode, pers. comm.).

Life History: No ecological or life history data exist for *R. pretiosa* from California. The life history summary presented here is a composite from studies conducted largely in British Columbia, Canada (Licht 1969b, 1971, 1974, 1986a, 1986b); Utah (Morris and Tanner 1969); and Wyoming (Turner 1958, 1959b, 1960). Caution should be used to interpret the degree to which these studies reflect the behavior of *R. pretiosa* in California, especially in view of the fact that this taxon may soon be partitioned (D. Green, pers. comm.). Whatever partitioning occurs, we anticipate that California populations will be ecologically and morphologically most similar to the *R. pretiosa* studied by Licht (1969b, 1971, 1974, 1986a, 1986b) along the Little Campbell River in British Columbia.

In southwestern British Columbia, *R. pretiosa* emerges from unspecified, but probably aquatic overwintering sites when air temperatures have attained at least 5.0°C; the first individuals appearing from late February to early March (from Licht 1969b). Males appear at breeding sites before females and form small aggregations in shallow-water areas that have emergent vegetation. The first females that appear are amplexed by males and they lay their eggs in shallow water that has reached at least 5°C in a manner that when the jelly becomes swollen, a significant portion of the eggs mass (often over half) is exposed to the air (Licht 1969b, 1971). Subsequent females oviposit on or immediately adjacent to the first egg mass laid, suggesting that they have to cue on the presence of an egg mass to deposit their own eggs (Licht 1969b). Egg masses of *R. pretiosa* contain a complement of

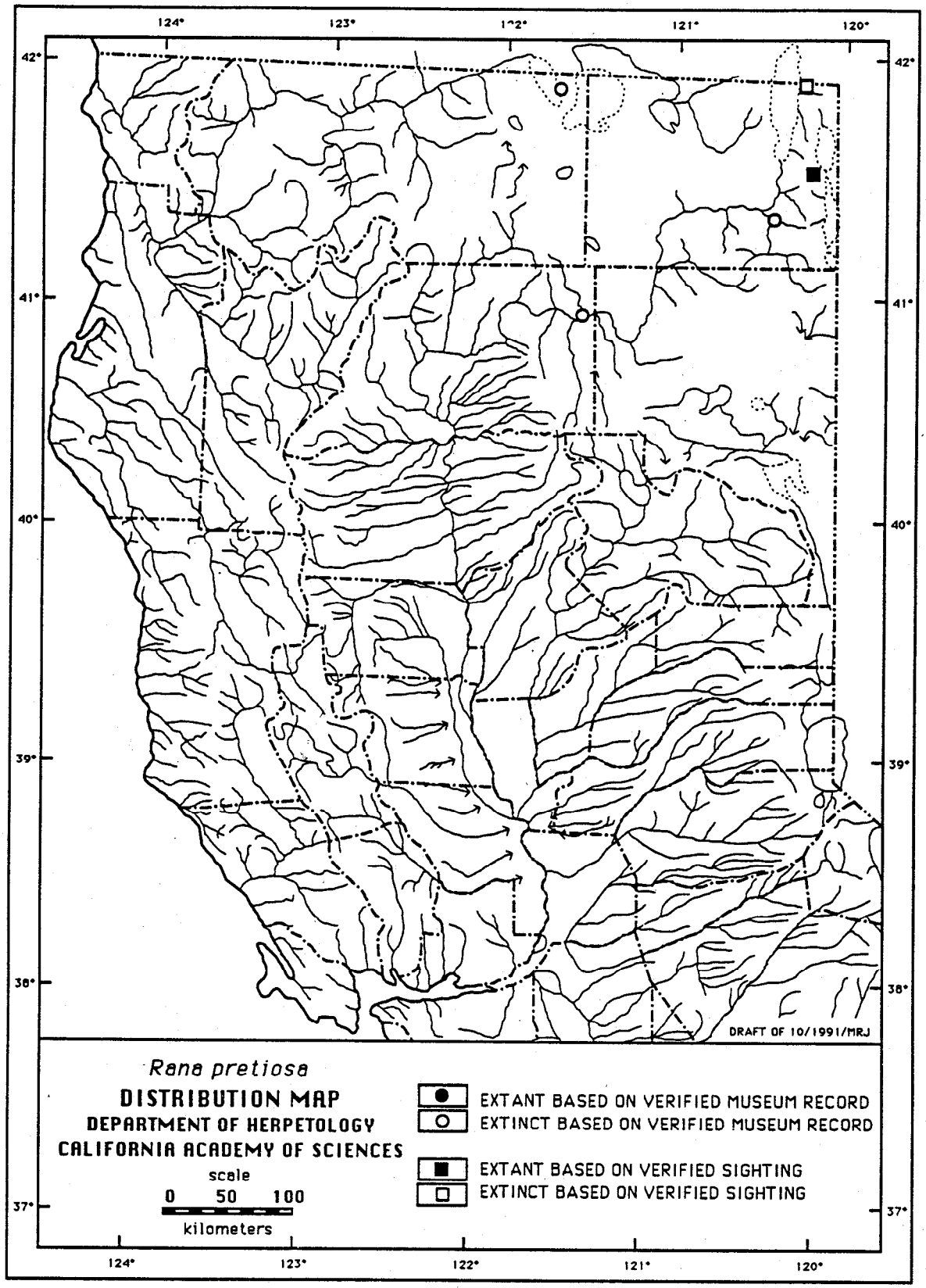

Figure 23. Historic and current distribution of the spotted frog (*Rana pretiosa*) in northern California based on 5 locations from 5 museum records and 2 records from other sources.

250-900+ moderate-sized (2.3 mm average diameter) eggs (Licht 1974). The thermal tolerance of *R. pretiosa* embryos ranges between 6°C and 28°C (Licht 1971). The pattern of oviposition often results in relatively high pre-hatching mortality (ca. ≥ 30%), largely because exposed embryos are susceptible to desiccation or freezing (Licht 1974). Larval mortality is greater and typically results in < 1% survival of eggs laid in any one season. Larvae require around 4 months to attain metamorphosis (Licht 1974). In British Columbia, *R. pretiosa* were sexually mature the third year after metamorphosis, but the time required to reach sexual maturity increases with altitude (see Turner 1960) and probably latitude, so *R. pretiosa* may mature at a younger age. In Wyoming, *R. pretiosa* were estimated to live in excess of 10 years (Turner 1960), but this pattern of longevity is probably related to the slow growth rates these frogs experience; populations at lower elevations or somewhat warmer clines may not live as long. Adult males have a somewhat lower survivorship than adult females, probably because of their increased exposure to predators during the breeding interval (Turner 1960, Licht 1974). Spotted frogs can engage in significant seasonal movements, primarily associated with movements between hibernacula and breeding sites in springs or movements out of drying aquatic habitats in late summer (Turner 1960); the magnitude of such movements is probably largely dependent on the local variation in habitat structure. Leeches *(Batrachobdella picta)* are significant predators on *R. pretiosa* eggs (Licht 1969b), and common garter snakes and great blue herons *(Ardea herodias)* are significant predators on tadpoles and postmetamorphs (Licht 1974). Postmetamorphic *R. pretiosa* nearly always escape predation by diving and submerging in the nearest water, from which they seldom leave (Licht 1986b). Postmetamorphic *R. pretiosa* are largely insectivorous, although larger frogs do eat smaller vertebrates (e.g., Pacific treefrogs, *Pseudacris regilla;* and juvenile northern red-legged frogs; Licht 1986a).

Habitat: The habitat requirements of *R. pretiosa* are poorly understood. Spotted frogs require shallow-water oviposition sites that may be in permanent or temporary water (Licht 1969b, 1971). If in temporary water, permanent water must occur in the vicinity for postmetamorphs, to survive. Historically, many oviposition sites were probably in overflow areas of large (≥ third order) streams flooded by high water during winter or spring months. Current indications that *R. pretiosa* typically uses temporary water for breeding may simply be an indication that most permanent sites are unsuitable because of introduced exotic aquatic predators not tolerated by the larval stages of *R. pretiosa* (see Hayes and Jennings 1986). Oviposition habitat is open (Licht 1971) and probably cannot be shaded because of the thermal requirements of the embryonic stages. Low emergent vegetation is probably also an important component of *R. pretiosa* habitat that is a significant element of the refuge habitat of postmetamorph juveniles and adult males (Licht 1969b; pers. observ.). Spotted frogs probably also require permanent water in which to overwinter, but the microhabitat characteristics of their overwintering site are unknown.

Status: Endangered; we found no individuals of this taxon during a concerted field effort on the Modoc Plateau, Pit River drainage, and in the Warner Mountains at sites where this taxon was historically present, and we know of only one recent sight record of this taxon in California. A single subadult frog was found beneath a woodpile at the Modoc National Forest Fire Station in Cedarville, Modoc County, on 24 September 1989 (G. Martinsen, pers. comm.). Virtually all frogs we encountered in museum collections allocated to this taxon from California are actually *R. cascadae.* The frogs found in California may be most closely related to the red- or orange-ventered *R. preriosa* populations in western Oregon and Washington. If this is the case, then the situation with *R. pretiosa* in California would be even more urgent because it may represent a species with an even more restricted range. Furthermore, accumulating evidence indicates that populations most likely related to those in California (e.g., western Oregon and Washington) have been largely extirpated over the past 50 years (McAllister and Leonard 1990, 1991; McAllister et al. 1993; unpubl. data).

Management Recommendations: Proper systematic characterization of *R. pretiosa* throughout its geographic range to determine what taxa may be represented in California is a top priority. Thorough field surveys for *R. pretiosa* are equally important. This taxon is most likely to exist in California in situations that are highly isolated from the widely distributed exotic predatory aquatic fauna and that have been least mechanically altered due to livestock grazing. Where populations of this taxon are identified, management should attempt to keep these populations isolated from exotic aquatic predators. Grazing should be excluded from such sites, but where this is impossible, levels of grazing should be managed to keep mechanical alteration of *R. pretiosa* habitat at an absolute minimum. If systematic studies identify more than one taxon within *R. pretiosa*, existing ecological studies will have to be linked to the proper taxon and studies will be needed to fill gaps in knowledge, especially those that characterize the difference in habitat utilization patterns between different taxa. Studies of the movement ecology and the ability of *R. pretiosa* or its contained taxa to recolonize are especially needed to establish better management guidelines.

Plate 6. Adult spotted frog (*Rana pretiosa*) [from Stebbins 1954b].

LOWLAND LEOPARD FROG
Rana yavapaiensis Platz and Frost 1984

Description: A moderate-sized (46-87 mm SUL) frog with prominent, light dorsolateral folds that are interrupted on the lower back and inset medially in the sacral region (Platz 1988). Background dorsal color is variable, but usually light gray-green to gray-brown, a low percentage of individuals are green; dorsal spots are irregularly elliptical, dark brown or black each surrounded by a narrow, light-colored halo; lemon yellow is present in the axillary region, the groin, and the posterior venter; remaining undersurfaces are cream to dirty white, sometimes with darker markings on the throat (Platz 1976; Platz and Frost 1984; M. Sredl, pers. comm.; pers. observ.). The iris is dark brown with some gold iridophores on the upper and lower portions of the iris (pers. observ.).

Taxonomic Remarks: This species is a genetically (Platz 1976, Hillis et al. 1983) and morphologically (Platz and Frost 1984) distinct member of the *Rana pipiens* complex that is most closely related to the Mexican species *Rana magnaocularis* (Hillis et al. 1983). Although this form has been recognized as distinct for over 15 years (Platz 1976), Platz and Frost (1984) did not formally describe it until 1984. The omission of *R. yavapaiensis* from Collins (1990) is apparently an oversight as this frog is a valid taxon (Frost 1985, Platz 1988).

Distribution: Historically, *R. yavapaiensis* was discontinuously distributed northward to Overton (Clark County), Nevada, and near St. George (Washington County), Utah; westward to San Felipe Creek (Imperial County), California; eastward to extreme western New Mexico; and southward into Sonora, Mexico (Platz and Frost 1984, Platz 1988). Its distributional range extended from near sea level to 1700 m (Platz 1988). In California, the known range extends discontinuously from San Felipe Creek near its junction with Carrizo Creek eastward through the Imperial Valley to the entire lower Colorado River (Jennings and Hayes 1994; Figure 24).

Life History: The life history of the lowland leopard frog is not well understood. In San Felipe Creek, Ruibal (1959) observed the initiation of breeding during the first 2 weeks of January in each of 3 years (1957-1959), and breeding adults were collected during 26-27 December 1938 (MVZ 27893-27897). Storer (1925) found an egg mass presumed to be that of this taxon in a pool 3.2 km east of Dixieland (Imperial County) on 28 March 1923. Oviposition is recorded for March-April and October in Maricopa and Yavapai counties, Arizona, suggesting that two breeding episodes are possible annually (Platz and Platz 1973, Collins and Lewis 1979, Frost and Platz 1983) and that cooler water temperatures may be necessary for reproduction. Salinities $\geq$ 5‰ are lethal to developing eggs, and those $\geq$13‰ are lethal to adults (Ruibal 1959), both of which are conditions likely to restrict the availability of sites where *R. yavapaiensis* can exist within its range in California; salinities in several of the few, widely scattered aquatic habitats in southeastern California are known to exceed these lethal limits seasonally. Larvae of this species can overwinter, and most individuals that overwinter are thought to result from fall breeding episodes (Collins and Lewis 1979). Other data on the development, growth, and phenology of the lowland leopard frog are currently lacking, but several individuals in Arizona are currently studying the ecology of this taxon (M. Sredl, pers. comm.).

Habitat: A detailed understanding of the habitat requirements of *R. yavapaiensis* is lacking, but this species apparently inhabited slackwater aquatic habitats dominated by bulrushes, cattails, and riparian grasses near or under an overstory of Fremont's cottonwoods and willows (Storer 1925, Stebbins 1951, Glaser 1970, Jennings and Hayes 1994; see also Lowe 1985, Jones 1988a [as *R. pipiens*]). Lowland leopard frogs were

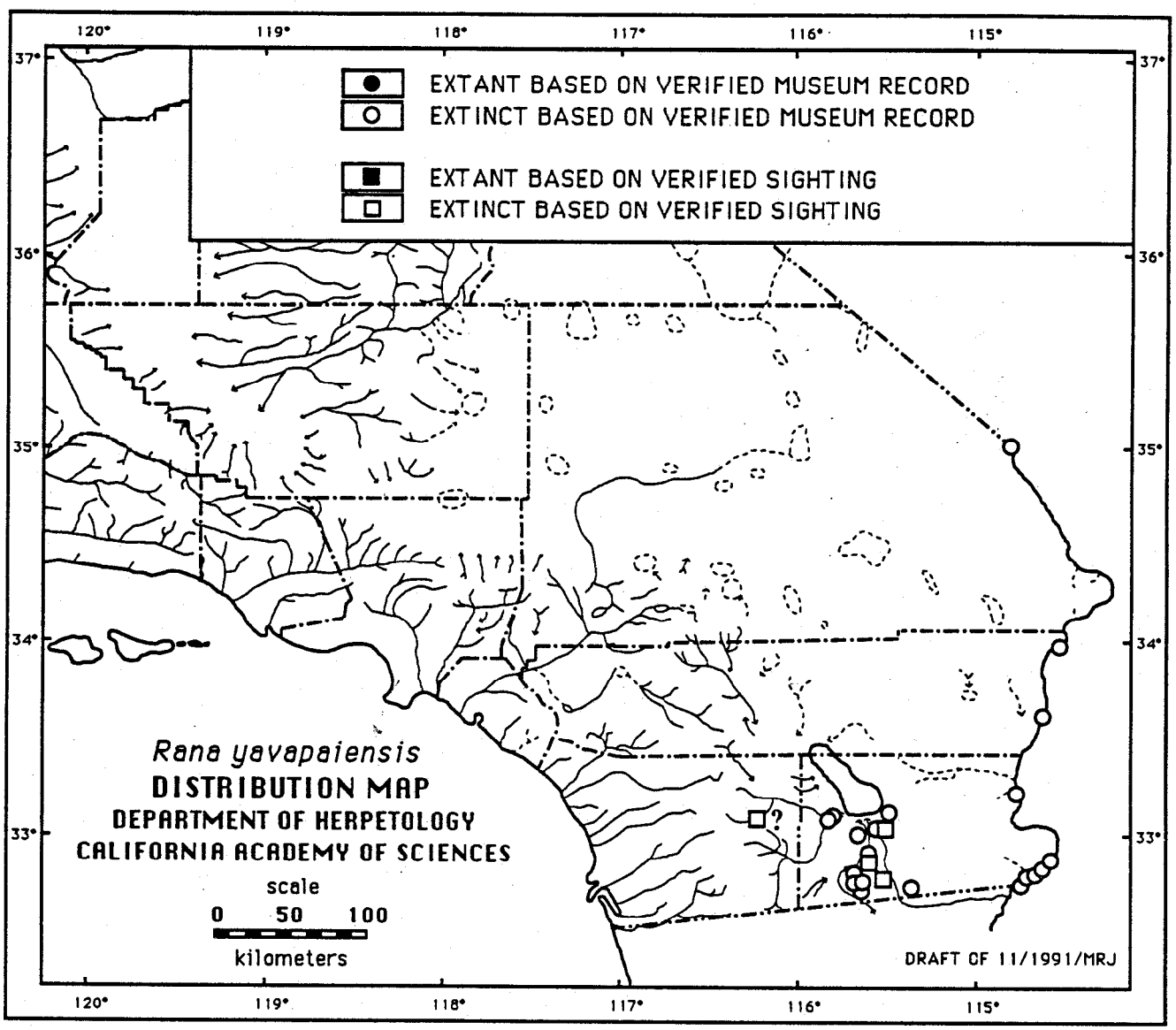

Figure 24. Historic distribution of the lowland leopard frog (*Rana yavapaiensis*) in southern California based on 28 locations from 116 museum records and 5 records from other sources.

also seen in canals, roadside ditches, and ponds in the Imperial Valley during the first quarter of this century (Storer 1925, Klauber 1934), but the context of its occurrence in those areas is not well understood because that era was a period of extensive habitat alteration. Lowland leopard frogs may have simply been transitory in those areas.

Status: Endangered; *Rana yavapaiensis* has been considered at risk in California for some time. Concern over this species was expressed nearly 20 years ago in a 7 February 1972 letter from Rudolfo Ruibal to Leonard Fisk (CDFG files), which indicated that this species was rare in California and should be protected. The habitat of the site at which Ruibal studied *Rana yavapaiensis* in the 1950s has been altered in a manner that makes it unsuitable for this species (B. McGurty, pers. comm.; see also Black 1980). Although this species has a reasonably broad range outside of California, scattered data indicate that this species has disappeared from > 50% of its historic range and is imperilled elsewhere, largely because of habitat changes associated with agriculture, livestock grazing, development, reservoir construction, and the introduction of exotic predatory fishes, crayfishes, and frogs (Clarkson and Rorabaugh 1989; M. Sredl, pers. comm.). In California, the most recent records of this species are from an irrigation ditch east of Calexico on 12-13 April 1965 (SSU 519-520). More recent surveys have failed to reveal this species in California (Vitt and Ohmart 1978, Clarkson and Rorabaugh 1989, Jennings and Hayes 1994), although an unverified sighting of a “leopard frog” exists from Sentenac Ciénega in May of 1988 (C. Fagan, pers. comm.). All post-1980 leopard frog records in the lower Colorado River have turned out to be the Rio Grande leopard frog *(Rana berlandieri)*, which has recently established itself in the Imperial and lower Colorado River valleys (Platz et al. 1990, Jennings and Hayes 1994); although leopard frogs of uncertain taxonomic status at an isolated series of springs in extreme southern Nevada (near Lake Mead along the Colorado River) are currently under study (R. Jennings and D. Bradford, pers. comm.). *Rana yavapaiensis* is still present at at least two locations close to the Colorado River in Arizona (Clarkson and Rorabaugh 1989).

Management Recommendations: Although *R. yavapaiensis* has not been recorded from California since 1965, surveys conducted that had some possibility of detecting it were either of a general nature (the survey was not exclusively focused on lowland leopard frogs) or limited in their scope, so we cannot dismiss it as extinct within the state (e.g., see Scott and Jennings 1989). Intensive surveys repeated over several years at localities known to have historically harbored this species as well as other localities with potential habitat are needed to really ascertain its current status in California. If any populations are found, management efforts will have to emphasize maintenance of the quality and quantity of aquatic habitat where frogs occur and promote isolation from the exotic aquatic fauna now widespread in the region of the lower Colorado River (see Ohmart et al. 1988). The continued spread of introduced *R. berlandieri* populations within the historic range of *R. yavapaiensis* also needs to be documented and monitored.

COUCH’S SPADEFOOT
Scaphiopus couchii Baird 1854

Description: A moderate-sized (45.0-82.0 mm SUL), highly variably colored toad with a distinctive, black, cornified, teardrop-shaped spade on each hindfoot (Stebbins 1985). The dorsal color pattern is highly variable; it may be a reticulated (green with black markings), mottled (black, green and yellow, or brown), or solid green pattern with black flecks (Wasserman 1970), often overlain with distinctive cream-colored, hourglass-shaped spots (pers. observ.). Hindlimbs are short, and undersurfaces are cream to dirty white. Constricted pupils have a vertical, fusiform shape and the iris is brown and liberally marked with gold iridophores (pers. observ.).

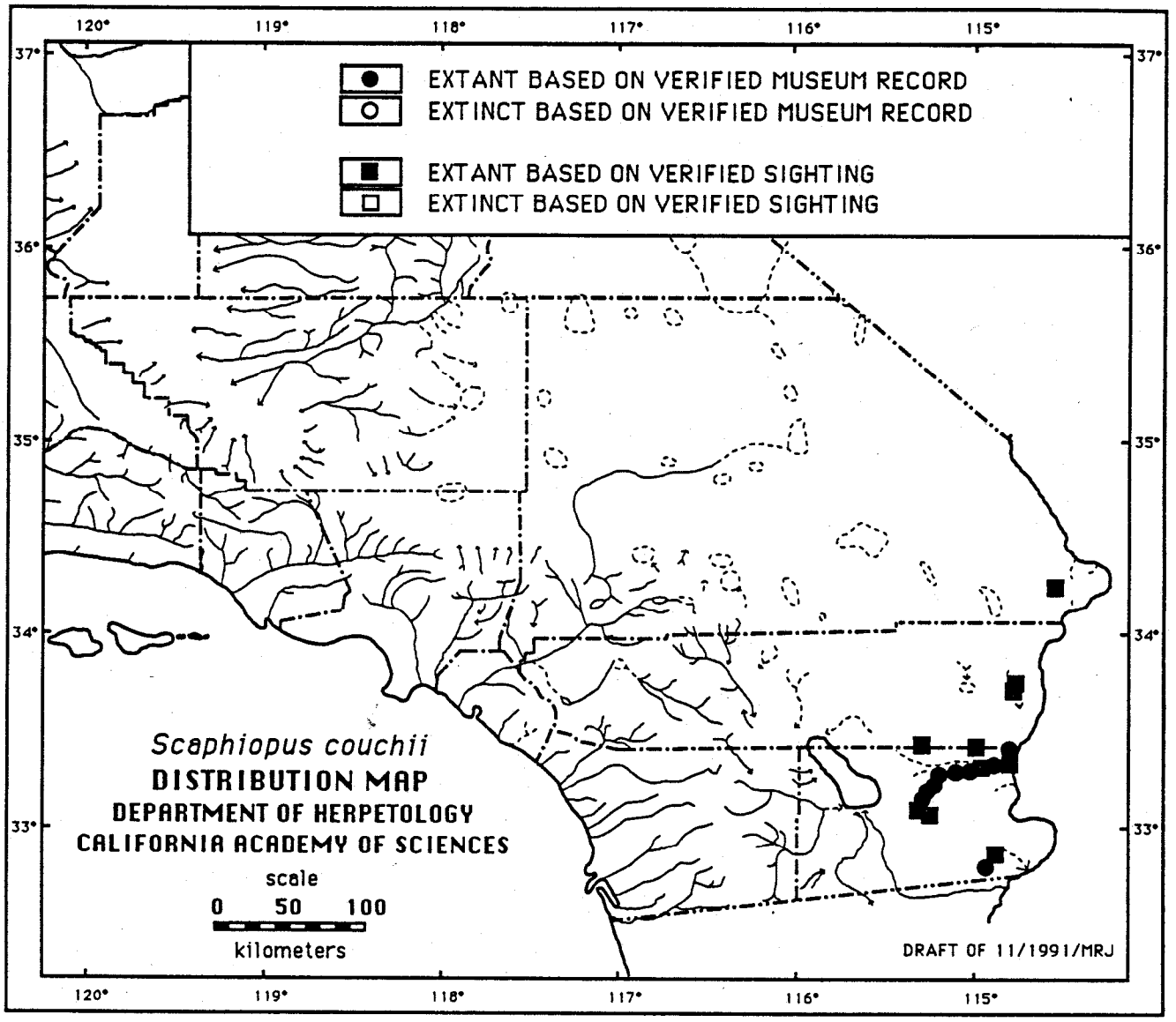

Figure 25. Historic and current distribution of Couch's spadefoot (*Scaphiopus couchii*) in southern California based on 30 locations from 24 museum records and 23 records from other sources.

Taxonomic Remarks: *Scaphiopus couchii* has been considered a distinct species since its description (Baird 1854), and has rarely been confused with other spadefoots. However, it is a wide-ranging, morphologically variable species, and no attempt has been made to identify potentially significant morphological or genetic variation across its geographic range.

Distribution: Couch's spadefoot has a broad geographic range that extends from extreme southeastern California eastward through Arizona, New Mexico, Texas, and Oklahoma, and southward into San Luis Potosí, Nayarit, and the southern tip of Baja California, Mexico (Wasserman 1970, Stebbins 1985). An isolated population cluster occurs in the vicinity of Petrified Forest National Monument, southeast of La Junta, Otero County, Colorado (Hammerson 1982). Its known elevational range extends from near sea level to ca. 1710 m (Stebbins 1985). In California, it is known only from the western side of the Colorado River from Chemehuevi Wash (ca. 9.32 km north of Vidal Junction), San Bernardino County, southward to the vicinity of Ogilby, Imperial County (Mayhew 1962, Tinkham 1962; Figure 25). In California, its known elevation range extends from ca. 210 m (near Palo Verde, Imperial County; pers. observ.) to 335 m (at Imperial Gables, Imperial County: Dimmitt 1977).

Life History: Couch's spadefoot is almost completely terrestrial, entering water only to reproduce (Bentley 1966, Mayhew 1968). A significant portion of current knowledge about the life history of *S. couchii* is based on studies done on Arizona populations. Couch's spadefoots remain dormant for 8-10 months in soil-filled "winter" burrows 20-90 cm deep (Shoemaker et al. 1969, Dimmitt 1975, Dimmitt and Ruibal 1980a). Surface activity is restricted to short periods following warm summer rains, during which Couch's spadefoot may appear suddenly in large numbers (Dimmitt and Ruibal 1980a). Low frequency sound (probably < 100 Hz) caused by falling rain, rather than rain *per se*, has been identified as the primary cue that *S. couchii* use to emerge, although low soil temperatures (≤ 15°C) appear to inhibit emergence notwithstanding a sound cue. Emergence coincides with the initiation of warm, late summer rains; the typical climatic pattern encountered throughout the range of *S. couchii*, but found in California only along the Colorado River. Woodward (1982) found that mating occurs only on the first night following the formation of temporary ponds. Females deposit 300-700 eggs which are attached in small clumps to vegetation or other solid objects (Stebbins 1954b). Couch's spadefoot is well-suited to breeding in the relatively warm, short-lived rainpools that form as a result of these summer rains. Early cleavage embryos have a higher lethal thermal minimum (ca. 15°C) and maximum (34°C) than most anurans known (Hubbs and Armstrong 1961, Ballinger and McKinney 1966, Zweifel 1968), and by Gosner (1960) stage 12, embryos tolerate even higher temperatures (lethal maximum temperature ca. 40°C) until they hatch (Zweifel 1977). Couch's spadefoot displays one of the most rapid rates of development known; at water temperatures > 30°C, it can hatch in considerably less than 1 day (Zweifel 1968) and can attain metamorphosis in as little as 7 days (Mayhew 1965a). Larvae also display high levels of temperature tolerance (39.0-42.5°C), the variation dependent on earlier temperature exposure (Brown 1969). Larvae often maximize their growth by cannibalizing conspecifics (Mayhew 1968). Postmetamorphic growth rates and longevity are unknown, but the unpredictability of the breeding habit may select for longevity.

Scaphiopus couchii displays a suite of features that make it well suited to the lengthy periods it spends in subterranean dormancy (Bentley 1966). During dormancy, it tolerates high water losses and high body fluid solute concentrations (McClanahan 1967, 1972; see also Hillman 1976, 1980), and displays a remarkably low level of oxygen consumption (Seymour 1973). Moreover, S. *couchii* displays a remarkable feeding ability; it can consume up to 55% of its body weight at one feeding (Dimmitt and Ruibal 1980b).

Coupled with a high assimilation efficiency (Dimmitt and Ruibal 1980b), this feeding ability allows it to potentially consume in one night the energy reserves for more than 1 year. Alate termites which constitute the major portion of the diet of *S. couchii* (Whitaker et al. 1977), emerge with the same summer rains that elicit emergence in *S. couchii* (Dimmitt and Ruibal 1980b). Alate termites have the highest lipid content by live weight of > 200 insect species reported in the literature (Past 1964, Basalingappa 1970), and they are more digestible (less sclerotized) than most insects, so they probably represent a significant proportion of the energy intake of *S. couchii.* The movement ecology and potential for colonization of *S. couchii* is unknown.

Habitat: Couch's spadefoot requires temporary desert rainpools with water temperatures $\geq$ 15°C (Zweifel 1968) in which to breed that last at least 7 days in order to metamorphose successfully (Mayhew 1965a). Subterranean refuge sites (with a loose-enough substrate to permit burial) must occur in the vicinity of rainpool depressions where reproduction takes place. An insect food base that probably includes alate termites must be available, which implies that minimal primary production must be available to sustain this food base.

Status: Special Concern; *S. couchii* has a very small range in California and seems to be declining in other states where it is found (J. Platz, pers. comm.). In fact, ponds created by road maintenance along Hwy 78 in eastern Imperial County have actually created breeding habitat for this toad (Dimmitt 1977). Its apparent tolerance for agricultural habitat modification appears to have allowed it to persist throughout most of its historical range in California. Despite an ability to tolerate certain types of disturbance, its subterranean refuge sites may be susceptible to disturbance from off-road vehicles that create noise similar to rainfall, inducing emergence under highly unfavorable (hot, dry) conditions that would be almost certainly fatal to adults (Brattstrom and Bondello 1979). The breeding sites of this species are potentially vulnerable to disturbance that alters the percolation characteristics of the substrate in a manner that makes pools too short-lived for larvae to attain metamorphosis.

Management Recommendations: Better morphological and genetic characterization of *S. couchii* is needed to determine whether more than one taxon is represented by this species, as well as identifying which taxon may be represented in California. While the energetics of *S. couchii* are reasonably well known, it is not clear at what level trends toward increasing xerification may ultimately affect this species. In particular, it is thought that *S. couchii* may be able to accumulate enough reserves to survive two rainless summers, but how frequently this may occur or how much more depletion of its energy reserves *S. couchii* may be able to tolerate is unknown. Such data and that on its movement ecology and colonization abilities are especially needed to formulate sound management guidelines. Rigorous field testing of the noise effects of off-road vehicles is needed to assess the potential importance of this impact. *Scaphiopus couchii* utilizes a significant number of pools that were created as the result of highway or railroad construction, but many of these pools are subject to washing out, getting leaky because of disturbance of the underlying substrate, or being eliminated by culverts (S. Morey, pers. comm.). Data on the contribution of these artificial pools when compared to natural pools of various sizes (such as at the base of the Algodones Dunes) is significant for the long-term management of this species. The substrate characteristics of pools suitable for this species, particularly with regard to percolation, need study.

WESTERN SPADEFOOT
Scaphiopus hammondii Baird 1859

Description: A moderate-sized (37.0-62.0 mm SUL) greenish, grayish, or brownish toad irregularly marked with dark orange- or reddish-tipped tubercles; having faint hourglass markings on the back consisting of four irregular, light-colored stripes; and possessing a distinctive, black, cornified, teardrop-shaped spade on each hindfoot (Storer 1925, Stebbins 1985). Hindlimbs are short, and undersurfaces are cream to dirty white. Constricted pupils have a vertical, fusiform shape, and the iris is pale gold because of a prominent reticulum of gold iridophores on a brown ground color (pers. observ.).

Taxonomic Remarks: For many years, *Scaphiopus hammondii* were regarded as having a broad geographic range from California to western Texas and Oklahoma with a hiatus across the Colorado River (Storer 1925; Stebbins 1951, 1966). However, Brown (1976) identified morphological, vocalization, and reproductive differences between eastern (Arizona eastward) and western (California) populations, justifying species recognition for each. Since the work of Brown (1976), the name *S. hammondii* has been applied exclusively to California populations. Genetic variation across the range of *S. hammondii* has not been studied.

Distribution: This near endemic to California ranges from the vicinity of Redding, Shasta County, southward into northwestern Baja California, Mexico (Stebbins 1985). Its known elevational range extends from near sea level to 1363 m (Zeiner et al. 1988). In California, the known range of *S. hammondii* is entirely west of the Sierran-desert range axis (Myers 1944; Figure 26).

Life History: *Scaphiopus hammondii* is almost completely terrestrial, entering water only to breed (see Dimmitt and Ruibal 1980a). Western spadefoots become surface active following relatively warm (≥ 10.0-12.8ºC) rains in late winter-spring and fall, emerging from burrows in loose soil to a depth of at least 1 m (Stebbins 1972; A. McCready, pers. comm.), but surface activity may occur in any month between October and April if enough rain has fallen (Morey and Guinn 1992; S. Morey, pers. comm.). Amount of rain may be a better predictor of surface activity than temperature (S. Morey, pers. comm.), but the cue or combination of cues that induces emergence in *S. hammondii* remains poorly understood. Western spadefoots can form large (> 1000 individuals), highly vocal, breeding aggregations (pers. observ.), although choruses are often much smaller (A. McCready, pers. comm.). Females deposit eggs in irregular small cylindrical clusters of 10-42 attached to plant stems or pieces of detritus in temporary rain pools, or sometimes pools in ephemeral streamcourses (Storer 1925; Stebbins 1985; pers. observ.). The critical thermal minimum of early embryos is 9ºC (Brown 1967), so oviposition does not occur until temperatures permit some warming of rainpools in late winter (pers. observ.). Depending on the temperature regime and annual rainfall, oviposition may occur between late February and late May (Storer 1925, Burgess 1950, Feaver 1971, Stebbins 1985).

Eggs hatch in 0.6-6 days, depending on temperature (Brown 1967), and larval development can be completed in 3-11 weeks (Burgess 1950; Feaver 1971; S. Morey and K. Baldwin, pers. comm.), the variation depending on food resources and temperature. No data are available to indicate how long *S. hammondii* needs to reach sexual maturity, but considering the relatively long period of subterranean dormancy (8-9 months; pers. observ.), individuals probably require at least 2 years to mature. Adults have a moderate stomach capacity (they can eat roughly 11% of their body mass at a single feeding; Dimmitt and Ruibal 1980b) and can probably acquire enough energy to survive the long annual dormancy interval in a few weeks. Known food items taken include crickets (Gryllacrididae), butterflies, beetles, flies, ants, and earthworms (Morey and Gullin 1992).

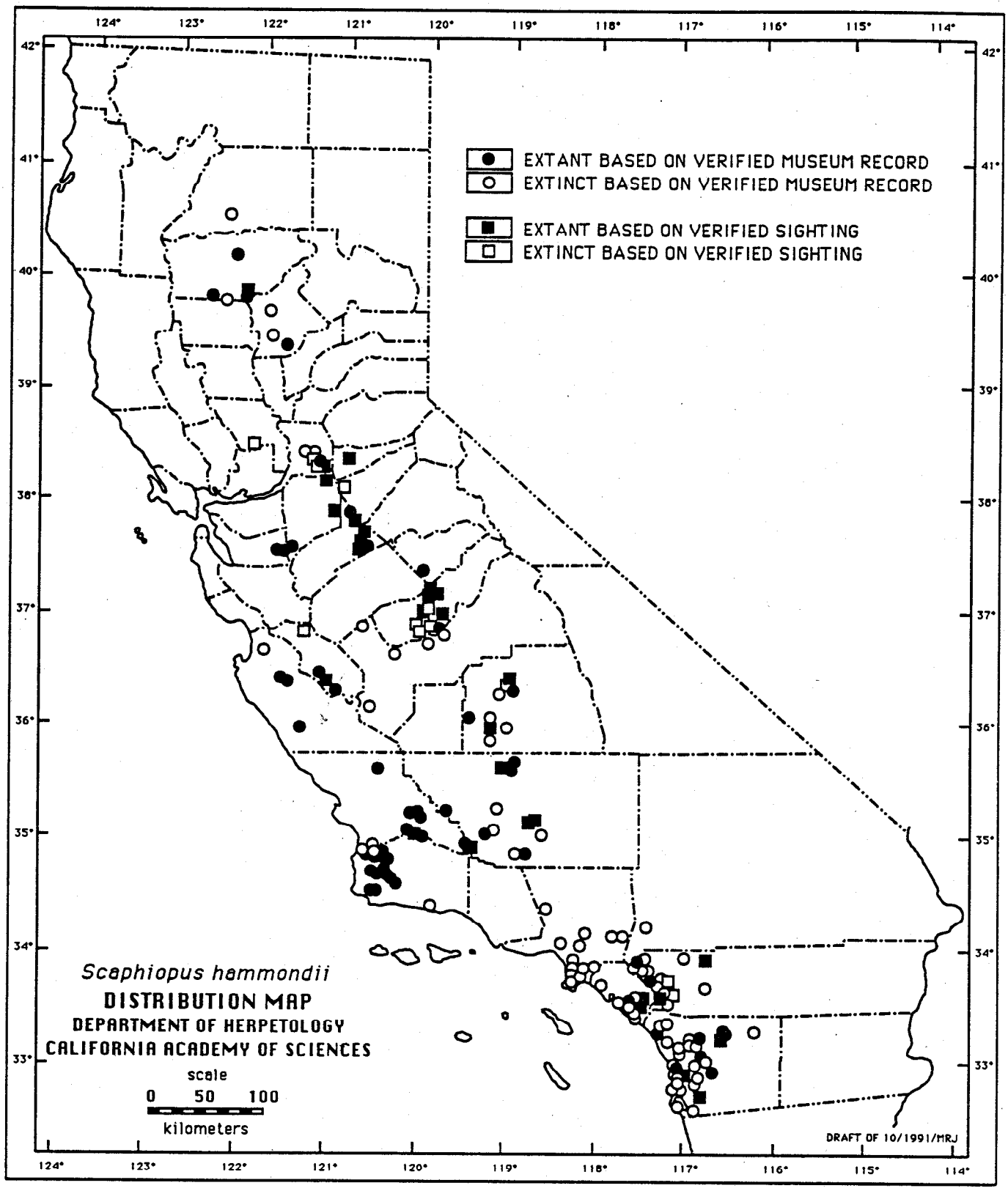

Figure 26. Historic and current distribution of the western spadefoot (*Scaphiopus hammondii*) in California based on 346 locations from 742 museum records and 90 records from other sources.

California tiger salamanders, garter snakes, great blue herons, and raccoons are probably the most important predators of larval and post-metamorphic *S. hammondii* (Childs 1953, Feaver 1971). No data are available on the movement ecology or colonization abilities of *S. hammondii*.

Habitat: Western spadefoots require temporary rainpools with water temperatures of ≥ 9°C and < 30°C (Brown 1966, 1967) in which to reproduce and that last ≥ 3 weeks (Feaver 1971) in order to metamorphose successfully. Rainpools in which western spadefoots reproduce and from which they are able to metamorphose successfully lack fishes, bullfrogs, and crayfishes; many indications exist that S. *hammondii* cannot recruit successfully in the presence of exotic predators, primarily introduced fishes, but also bullfrogs and crayfishes (K. Baldwin, S. Morey, B. Shaffer, pers. comm.; pers. observ.). Soil characteristics of burrow refuge sites that western spadefoots use have not been studied, but if they are similar to those of *S. multiplicatus*, the soil may become fairly compact and hard during the season of summer aestivation (Ruibal et al. 1969).

Status: Threatened; concern over the decline of *S. hammondii* is not new. Nearly 20 years ago, both Robert L. Livezey and Rudolfo Ruibal (in litt. 3 and 7 February 1972 to Leonard Fisk) believed that this taxon had sustained drastic reductions over the previous 15-20 years in the Central Valley and southern California. Current data indicate that in southern California (from the Santa Clara River Valley, Los Angeles and Ventura counties, southward), > 80% of habitat once known to be occupied by S. *hammondii* has been developed or converted to uses that are undoubtedly incompatible with its successful reproduction and recruitment. In northern and central California, loss of habitat has been less severe, but nevertheless significant; it is estimated that > 30% of the habitat once known to be occupied by *S. hammondii* has been developed or converted to uses incompatible with the survival of this taxon. Regions severely affected include the lower two-thirds of the Salinas River system, and much of the areas east of Sacramento, Fresno, and Bakersfield. Moreover, in many ares of the Central Valley, remaining suitable rainpool or vernal pool habitat, which is concentrated on valley terraces along the edges of the Valley Floor, has been disappearing in a fragmented fashion, which may present a significant threat to the metapopulation structure of *S. hammondii*. The continued placement of mosquitofish by mosquito abatement programs in vernal pools threatens some populations (S. Morey, pers. comm.; pers. observ.). Emigration of juvenile and adult bullfrogs into rainpool breeding sites may also pose a threat to some populations (Hayes and Warner 1985; Morey and Gullin 1992; A. McCready and S. Morey, pers. comm.).

Management Recommendations: Effort should be made to protect significant areas of rainpool habitat from alteration. Currently, rainpool habitats that harbor *S. hammondii* are protected in only a handfull of relatively small preserves, mostly under the jurisdiction of The Nature Conservancy (e.g., Santa Rosa Plateau, Riverside County; Pixley Vernal Pools Preserve, Tulare County). The biggest gap in current understanding of S. *hammondii* relates to its population structure and how habitat fragmentation may affect its likely metapopulation structure. Such an understanding is critical to determining the spatial population array that will allow *S. hammondii* to survive long-term. Much of the basic life history of *S. hammondii* remains poorly understood. In particular, variation in postmetamorphic survivorship, longevity, and movements must be understood in order to refine the direction of management. Finally, the features of suitable habitat remain poorly understood. It has often been assumed that *S. hammondii* requires loose soil for subterranean dormancy, but it has also been observed to occupy small mammal burrows (Stebbins 1951). Whether it uses the latter only as temporary refuges during its season of surface activity is unknown, but a better understanding of its pattern of utilization of subterranean refuges will allow refining of our current understanding of suitable habitat. Indications exist that western spadefoots can easily burrow into moist soils that would be

probably impossible to burrow into when they are dry (A. McCready, pers. comm.), but detailed study of the soil texture characteristics that may limit *S. hammondii* is needed for its management.

Plate 7. Adult and larval western spadefoot (*Scaphiopus hammondii*) [from Stebbins 1966].

TURTLES

WESTERN POND TURTLE
Clemmys marmorata (Baird and Girard 1852)

Description: A moderate-sized (120-210 mm CL), drab brown or khaki-colored turtle lacking prominent markings on its carapace (Holland 1991a). At close range, the carapace can frequently be observed to have a fine, vermiform reticulum of light and dark markings (pers. observ.). Males frequently develop a light, unmottled throat and lower facial area as they become sexually mature, markings that become even more prominent (contrasting) with increasing age; females typically retain the mottled or darker-colored throat and facial area juveniles possess into adulthood (Holland 1991a). The belly or plastron is variously marked with varying degrees of dark and light markings; turtles sometimes have an entirely dark or an entirely light plastron (pers. observ.). The iris is straw-colored with a brown eyestripe extending through the eye (D. Holland, pers. comm.).

Taxonomic Remarks: The western pond turtle is a distinct taxon that has not been confused with any other turtle. Seeliger (1945) described northern and southern subspecies that show some morphological differentiation and were envisioned as intergrading over a relatively broad range in central California. The pattern of geographic variation in this turtle, currently the focus of intensive study based on morphological and genetic data, suggests that more than one historical unit may be represented within its range in California (D. Holland, pers. comm.). Distribution of those units corresponds roughly to currently recognized subspecific taxa (Holland 1992).

Distribution: Historically, the western pond turtle had a relatively continuous distribution in most Pacific slope drainages from Klickitat County, Washington along the Columbia River (Slater 1962) to Arroyo Santo Domingo, northern Baja California, Mexico. Western pond turtles were also present at a cluster of nearby localities in Pierce and Thurston counties at the southem end of Puget Sound in Washington State (Slater 1939b). A single specimen reported from the Snake River above Shoshone [Falls] (Jerome County), Idaho (Slater 1962; CAS-SU 8624) is thought to be an error (D. Holland, pers. comm.; unpubl. data). Records also exist for the Carson, Humboldt, and Truckee drainages in Nevada (Cooper 1861, LaRivers 1942, Banta 1963a, Hattori 1982), but whether these records represent historical remnants, recent introductions (see LaRivers 1962, p. 20), or a combination of introductions and historical remnants is not known (D. Holland, pers. comm.). The known elevational range of the western pond turtle extends from near sea level to ca. 1430 m (Jose Basin Creek, Fresno County; D. Holland, pers. comm.). It has been recorded from somewhat higher elevations (e.g., Laurel Lake [2042 m]), but turtles are known to have been introduced at all such sites. In California, it was historically present in most Pacific slope drainages between the Oregon and Mexican borders (Figure 27). *Clemmys marmorata* is known from only two drainages on the desert slope in California: the Mojave River (San Bernardino County: Stebbins 1985) and Andreas Canyon (Riverside County; pers. observ.).

Life History: *Clemmys marmorata* is an aquatic turtle that usually leaves the aquatic site to reproduce, to aestivate, and to overwinter. Recent fieldwork has demonstrated that western pond turtles may overwinter on land or in water, or may remain active in water during the winter season; this pattern may vary considerably with latitude and habitat type, and remains poorly understood (Holland 1985a, 1991a; Rathbun et al. 1993). Western pond turtles markedly increase their level of activity when water temperatures near the surface consistently reach at least 15°C (D. Holland, pers. comm.). Thus, along the central and southern coast of California, western pond turtles may be active year-round (Holland

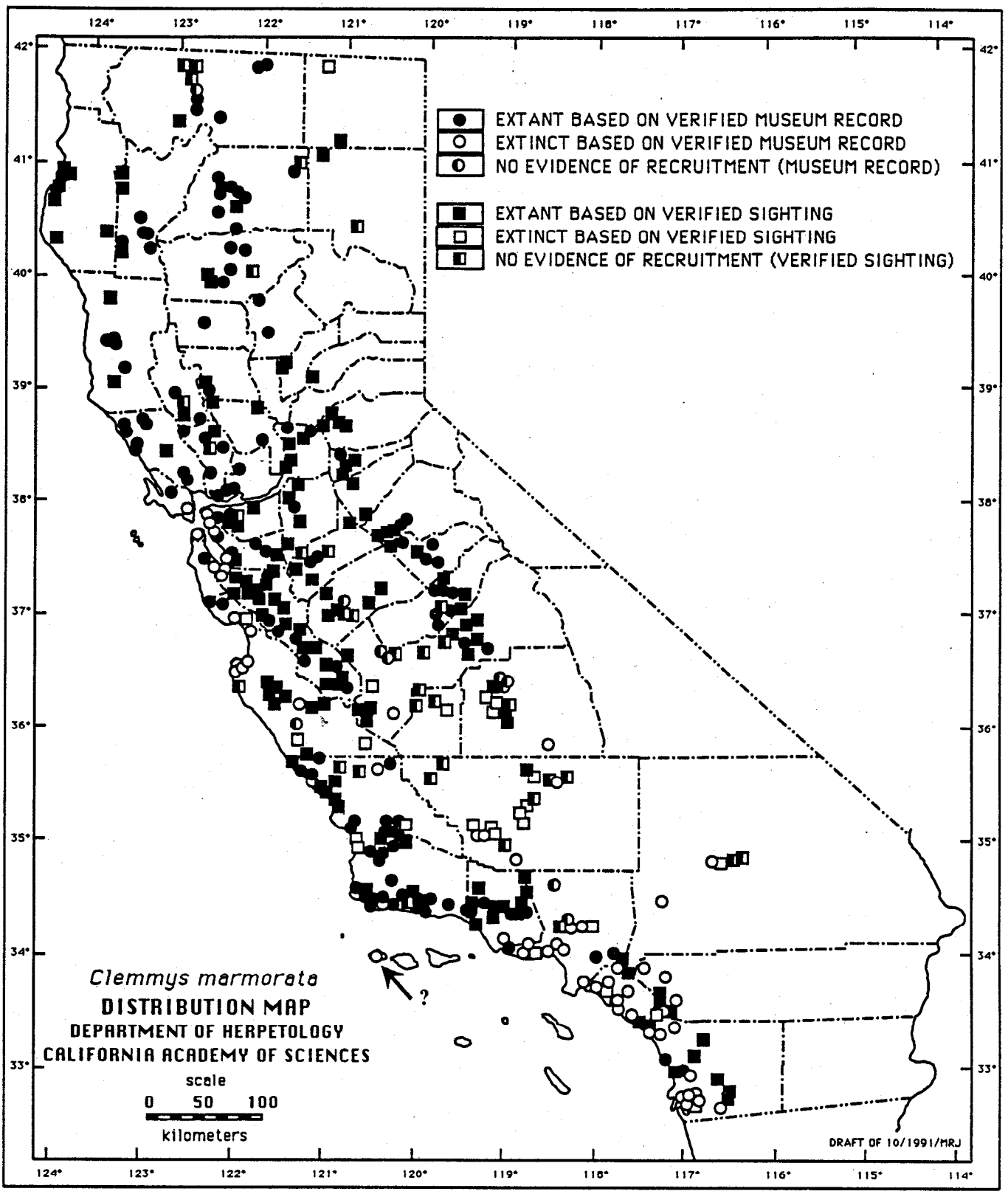

Figure 27. Historic and current distribution of the western pond turtle (*Clemmys marmorata*) in California based on 715 locations from 615 museum records and 322 records from other sources.

1985a, 1991a; Zeiner et al. 1988; Rathbun et al. 1993), whereas at interior localities or at higher latitudes in California, *C. marmorata* typically become active in March or April, and disappear to overwintering sites in October or November (Holland 1991a). The most prominent part of western pond turtle behavior is the activities they perform to thermoregulate, which vary with ambient temperature based on time of day and season. Turtles frequently perform aerial basking on logs or other objects out of the water when water temperatures are low and air temperatures are greater than water temperatures (Bury 1972b, Holland 1985a). Temperature preferenda of western pond turtles are not well understood, but they generally seem to avoid water at temperatures of > 39-40°C (D. Holland, pers. comm.). When air temperatures become too warm and almost invariably when they exceed 40°C, as they may later in the day and later in the season (especially at interior localities), western pond turtles water bask by lying in the warmer surface water layer with their heads out of water (Bury 1972b, Holland 1985a). Mats of submergent vegetation, such as pondweed *(Potamogeton* spp.) and ditch grass *(Ruppia maritima)*, are favored water basking locations because these mats trap surface water thus maintaining even higher surface water temperatures, and turtles require less energy to maintain their position in the surface layer when such a vegetation structure is present (Holland 1985a; pers. observ.). Mating, which has been rarely observed, typically occurs in late April or early May, but may occur year-round (Holland 1985a, 1991b). Females emigrate from the aquatic site to an upland location that may be a considerable distance (400 m or more) from the aquatic site to nest, but is often less, and deposit from 1-13 eggs that have a thin, but hard (calcified) outer shell in a shallow (ca. 10-12 cm deep) nest excavated by the female (Holland 1991a; Rathbun et al. 1992, 1993). Females may lay more than one clutch a year (Rathbun et al. 1993). Most oviposition occurs during May and June, although some individuals may deposit eggs as early as late April and as late as early August (Storer 1930; Buskirk 1992; Rathbun et al. 1992, 1993; D. Holland, pers. comm.). The young may hatch and overwinter in the nest because hatchling-sized turtles have almost never been observed in an aquatic site during the fall (Holland 1985a). Only a few records exist of hatchling emergence in the early fall in southern and central California (Buskirk 1992; D. Holland, pers. comm.). Most hatchling turtles are thought to emerge from the nest and move to the aquatic site in the spring (see data in Buskirk 1992). Neonates or hatchlings spend much of their time feeding in shallow water that typically has a relatively dense vegetation of submergents or short emergents (D. Holland, pers. comm.). Nekton, the zooplankton fauna that can occur at high densities in the water column in standing water, are an important food of hatchlings and young juveniles (Holland 1985b, 1991a), and these age groups may not grow as rapidly where this food resource is lacking. Much variation exists in the rates at which western pond turtles grow, with turtles presumably growing more slowly at higher latitudes and altitudes. In most areas, hatchlings (ca. 25 mm CL) typically double their length the first year and grow relatively rapidly over the next 4-5 years (Storer 1930; Holland 1985a; D. Holland, pers. comm.). Age and size at reproductive maturity varies with latitude. In California, reproductive maturity occurs at between 7 and 11 years of age, and approximately 110-120 mm CL, with turtles maturing at a larger size and a more advanced age as one moves north, and males generally maturing at a slightly smaller sizes and younger ages than females (D. Holland, pers. comm.). Data on longevity are lacking, but western pond turtles are thought to be long-lived since the minimum age of a recaptured individual was 42 years from a population studied in northern California (Trinity County: B. Bury and D. Holland, pers. comm.). Western pond turtles are dietary generalists and highly opportunistic (Holland 1991a), and will consume almost anything that they are able to catch and overpower. The relatively slow pursuit of western pond turtles results in their diet being dominated by relatively slow-moving aquatic invertebrates (e.g., the larvae of many aquatic insects) and carrion, although aquatic vegetation may be eaten (Holland 1985a, Bury 1986, Baldwin and Stanford 1987), especially by females having recently laid eggs (D. Holland, pers. comm.). The movement ecology of *C. marmorata* is partly known for only very restricted circumstances. In a pond

situation, movement away from water except to nest was rare (Rathbun et al. 1993). In a stream situation, turtles were highly variable in their movements. Some individuals would nest, aestivate, or overwinter only a few meters away from the watercourse, whereas others move considerable distances (e.g., 350 m) to overwinter (Rathbun et al. 1992, 1993).Turtles will move significant distances (at least 2 km) if the local aquatic habitat changes (e.g., disappears), and adult turtles can tolerate at least 7 days without water (D. Holland, pers. comm.), but dispersal abilities of juveniles and the recolonization potential of western pond turtles following extirpation of a local population are unknown.

Habitat: Western pond turtles require some slack- or slow-water aquatic habitat. Western pond turtles are uncommon in high gradient streams probably because water temperatures, current velocity, food resources, or any combination thereof may limit their local distribution (Holland 1991a). Habitat quality seems to vary with the availability of aerial and aquatic basking sites (Holland 1991a); western pond turtles often reach higher densities where many aerial and aquatic basking sites are available. Hatchlings (i.e. individuals through their first year of activity) require shallow water habitat with relatively dense submergent or short emergent vegetation in which to forage (D. Holland, pers. comm.). Such situations probably increase the probability that the nekton hatchlings require will be abundant Western pond turtles also require an upland oviposition site in the vicinity of the aquatic site (Holland 1991b). Suitable oviposition sites must have the proper thermal and hydric environment for incubation of the eggs. The porcelain-thin shelled eggs of *C. marmorata* are suited to development in a dry nest; an excessively moist nest has a high probability of failing (Feldman 1982, Holland 1991b). Nests are typically dug in a substrate with a high clay or silt fraction since the female moistens the site where she will excavate the nest prior to nesting (Holland 1991b). Nests also are typically located on a slope that is unshaded (Rathbun et al. 1993) that may be at least in part south-facing, probably to ensure that substrate temperatures will be high enough to incubate the eggs (pers. observ.). How close the aquatic site is to the nesting site probably depends largely on the availability of suitable nesting sites adjacent to aquatic sites where western pond turtles are known to occur because the array of features that make a nesting site suitable may significantly limit the availability of such sites. The nesting site can be up to 402 m from the aquatic site (Storer 1930), but the majority of nest located to date are within 200 m (D. Holland, pers. comm.). However, at localities with less gradient, soil moisture gradients and soil type may cause nesting sites to be located at a significantly greater distance than where the majority are located. Slope of the nest sites range up to 60°, but most nests are on slopes < 25°.

Status: Endangered from the Salinas River south coastally, and from the Mokelumne River south (inland) in the San Joaquin hydrographic basin; Threatened for the rest of California; the recent report on *C. marmorata* in southern California (Brattstrom and Messer 1988) indicates that few viable populations remain in this region (see also Brattstrom 1988). Even more recent fieldwork indicates that only 6-8 viable populations of *C. marmorata* remain south of the Santa Clara River system (including the desert slope) in California (Holland, 1991a). The situation in most of the Santa Joaquin Valley, Salinas and Pajaro drainages, and a significant number of coastal drainages between San Francisco Bay and the Santa Clara River is only a little better. Four years of drought (1986-1990) have exacerbated the negative effects of habitat alteration accumulated over many years over much of this region from changes in land and water use, and abusive grazing practices (Holland 1991a). In particular, most western pond turtle populations examined in this region appear to show an age (size) structure increasingly biased toward adults, indicating little or no recruitment is taking place. Many localities that harbor turtles populations seem to be affected because the nesting habitat is being impacted or altered during the incubation interval on an annual basis by some type of agriculture or the activity of livestock (D. Holland, pers. comm.; pers. observ.). These impacts probably create annual nesting

failures, leading to the increasingly adult-biased populations. Additionally, some introduced exotic aquatic predators or competitors likely extract a significant toll on turtle populations. Bullfrogs prey on hatchling or juvenile turtles (Moyle 1973; Holland 1991a; H. Basey, P. Lahanas, and S. Wray, pers. comm.), and may be responsible for significant mortality because they occupy shallow-water habitats in which the youngest age groups of turtles are frequently observed (pers. observ.). Bass *(Micropterus* spp.) are also known to prey on the smallest juveniles (Holland 1991a), and sunfishes *(Lepomis* spp.), although they are not large enough to prey on hatchling western pond turtles, probably compete with them for food since they are known to be able to keep available nekton at very low levels, stunting their own growth (see Swingle and Smith 1940). Increases in local raccoon activity because of local human disturbances or translocations by animal control agencies (S. Sweet, pers. comm.), introduced red foxes *(Vulpes vulpes* spp.), and translocated black bear *(Ursus americanus)* populations may have all contributed to increased predation on nests or post-hatching stages over historic background levels (D. Holland, pers. comm.). It also needs mention that historically, western pond turtles were heavily exploited for food in the Central Valley and that numbers of this species represent but a fraction of their historic levels (for example, the number of western pond turtles that existed in the southern San Joaquin Valley has been estimated at 3.35 million; Holland 1991a). The status of western pond turtles north of San Francisco Bay may be somewhat better, but trends similar to those observed in southern California have been noted in most populations examined within this region (D. Holland, pers. comm.). Moreover, the western pond turtle populations in some areas of northern California (e.g., the drainages entering Clear Lake, and portions of the Klamath River system in California) are in equally serious or worse condition than those in southern California (D. Holland, pers. comm.). Recent surveys indicate that western pond turtles are also seriously threatened throughout most of their range outside California. The state of Washington has fewer than six known populations, the most significant of which have been threatened by disease (Holland 1991b; D. Holland, pers. comm.). Recent observations also suggest the potential occurrence of a similar disease syndrome in one northern California population (D. Holland, pers. comm.). In the Willamette Valley in Oregon, western pond turtles appear to have declined to a level that represents roughly 1% of historic levels (Holland 1991a). Surveys in Oregon also indicate that western pond turtles are frequently caught on baited hooks and are subsequently released carrying a hook that can significantly impair or entirely prevent normal feeding (Mader 1988; T. DeLorenzo, pers. comm.; pers. observ.). Based on the weight loss observed in such turtles, a high likelihood exists that most of the individuals caught in this manner ultimately perish if released without removal of the hook. In Baja California, most historic populations have been extirpated and only a few populations remain at remote localities (Holland 1991a).

Management Recommendations: The systematic status of the various historical units that are represented by *C. marmorata* in California must be determined to establish whether different units need to be treated separately. The most significant gaps in current understanding of the ecology of what is currently called *C. marmorata* are variation in nesting location that accompanies variation in habitat, movement responses to habitat change, the pattern of movements in the absence of change, and recolonization ability in structurally different habitats. Current lack of knowledge of the first of these four has led to the recent recommendation that at least 500 m from the aquatic site known to harbor western pond turtles are needed to adequately protect nesting habitat (Rathbun et al. 1992).

Most critical for existing populations where declining trends have some opportunity of being reversed are protection of suitable nesting habitat associated with the sites where those populations exist, and reduction of mortality in the younger age (size) groups of turtles. Since nesting sites are located in areas that have some probability of having had historical use over many years, in order for the former suggestion to be effective, corridors

broad enough not to impede either the movement of adult females to and from the nesting location nor the movement of hatchlings from the nest to the aquatic site should be fenced in a manner to allow turtle movement and to ensure that nests will not be trampled during incubation. For the latter to be effective, every effort should be made to isolate such systems from the exotic aquatic fauna that may prey on or compete with western pond turtles, and in particular, discourage human translocation of such organisms within the state. Efforts should also be made to minimize mortality from terrestrial predators of nests and post-hatching stages. Regulation of fishing with baited hooks in those areas that harbor significant turtle populations should be implemented. Finally, more attention needs to be paid to the appearance of symptoms and mortality linked to upper respiratory disease syndrome, as this may be an unrecognized cause of mortality that may be linked to environmentally immuno-induced suppressive problems (see #5 under Recommendations).

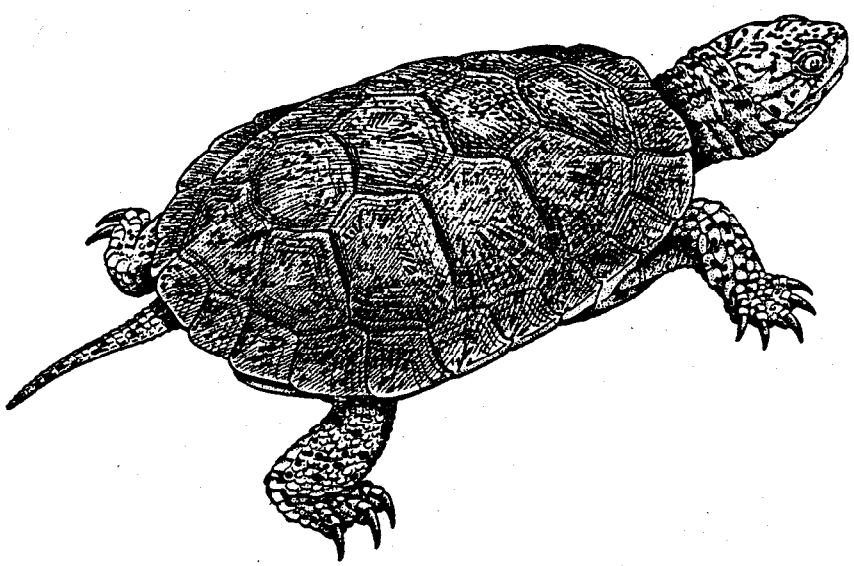

Plate 8. Adult western pond turtle (*Clemmys marmorata*) [from Stebbins 1954b].

SONORAN MUD TURTLE
Kinosternon sonoriense sonoriense (LeConte 1854)

Description: A small to moderate-sized (80-160 mm CL), drab brown or olive-colored turtle with darkly-marked seams on the carapace, webbed feet, a short tail, heavily mottled head, and barbels on the throat (Stebbins 1985). The plastron has well-developed hinges and is yellow to brown in color with darkly-marked seams (Iverson 1976). The iris is dark brown with a black eyestripe extending through the eye (pers. observ.).

Taxonomic Remarks: This taxon has long been recognized as a distinct species (Iverson 1976) within which two subspecies are currently recognized: *Kinosternon sonoriense longifemorale,* restricted to the drainage of the Río Sonoyta (Mexico), and *K. s. sonoriense,* which is distributed throughout the remainder of the range (Iverson 1981). The geographic pattern of genetic variation within *K. sonoriense* has not been examined.

Distribution: Historically, *K. sonoriense* occurred in the lower Colorado system in southeastern California, northward to southern Nevada, eastward through Arizona into New Mexico, and southward into Sonora and western Chihuahua, Mexico (Iverson 1976, 1981). A record from "Utah" attributed to *K. sonoriense* (Yarrow 1882) is based on an incorrectly labeled specimen (Iverson 1978). Its known elevational range extended from 43 m to 2040 m (Iverson 1981). In California, Sonoran mud turtles were historically present along the lower Colorado River from as far as north as the Nevada boundary (Cooper 1870, La Rivers 1942) downstream to past Palo Verde, Riverside County (Van Denburgh 1922b) and the Mexican border (Mearns 1907; Figure 28). Its known elevational range in California extended from 43 m along the Colorado River near Yuma (Imperial County: Iverson 1981) to 155 m along the Colorado River near Fort Mojave at the Nevada boundary (Cooper 1870). Two post-1920 records of Sonoran mud turtles exist from along canals in the Imperial Valley, Imperial County (SDSNH 17897, 33866), these specimens are undoubtedly based on individuals dispersing along human-created waterways.

Life History: Most ecological data on *K. sonoriense* are based on studies conducted in Arizona and New Mexico (Hulse 1976, Rosen 1987). Sonoran mud turtles seem to be active all year, although they may not feed during the colder winter months (Hulse 1982). *Kinosternon sonoriense* are active day and night, and are mostly nocturnal at low elevations during the warmer months (Hulse 1974a, Rosen 1987). Adults are known to mate during March and April, and females lay clutches of 1-10, large (average = 31.0 mm long x 14.3 mm wide) eggs in the interval from May to September (Hulse 1982, Rosen 1987). Where females locate their nests is not known. Females generally produce two or more clutches of eggs between July and September if sufficient food resources are available (Hulse 1982). Males take from 2-6 years and females take 6 years to mature after hatching (Hulse 1976, 1982). Size at sexual maturity is ca. 75 mm CL for males and is primarily age dependent in females, with newly mature females ranging from about 90 mm to over 130 mm CL (Hulse 1982; Rosen pers. comm.). The oldest Sonoran mud turtles that have been reliably aged in Arizona populations were females 12 and 13 years of age (Hulse 1976), so the species may be long-lived.

Juveniles and adults eat mostly mollusks, feeding on other plants and animals opportunistically (Hulse 1974a). Sonoran mud turtles in suboptimal habitat display a more generalized diet, lower growth rates, and smaller clutch sizes, and mature at smaller sizes than individuals that occur in optimal habitats probably because they lack the opportunity to consume more energy-rich benthic invertebrates (Hulse 1976, 1982). *Kinosternon sonoriense* often gives off a peculiar musky odor when it is handled (pers. observ.) whose function is unknown, but may be a deterrent to some predators. Known predators of *K.*

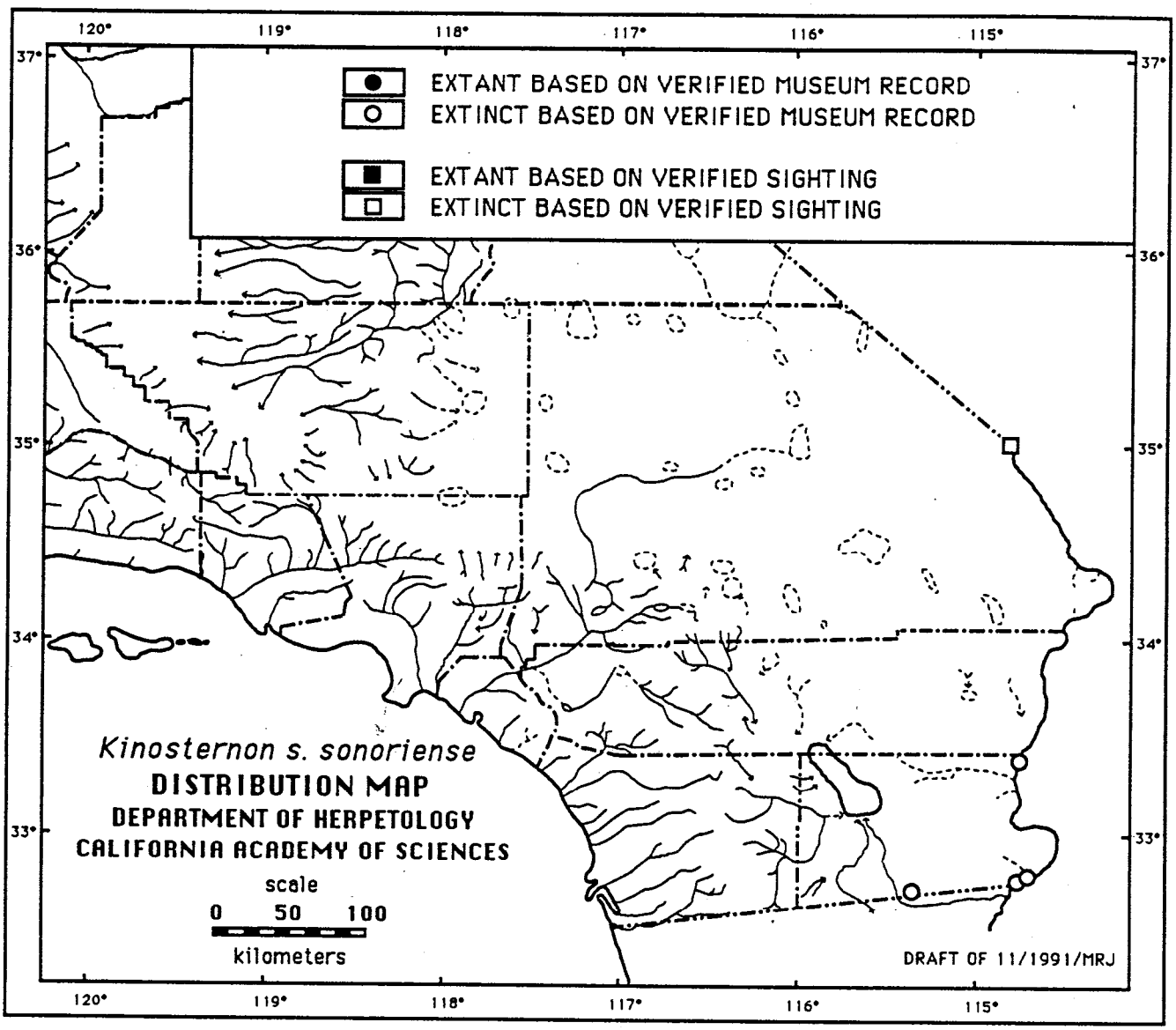

Figure 28. Historic and current distribution of the Sonoran mud turtle (*Kinosternon sonoriense sonoriense*) in southern California based on 5 locations from 4 museum records and 1 record from another source.

sonoriense include bald eagles (*Haliaeetus leucocephalus*), raccoons, humans, and black bears (W. Eakle and A. Hulse, pers. comm.). *Kinosternon sonoriense* also seems to be susceptible to introduced aquatic predators, such as bullfrogs and Louisiana red swamp crayfish (P. Rosen, pers. comm.). Available data suggest that Sonoran mud turtles are sedentary (P. Rosen, pers. comm.). They are very rarely seen moving overland on roads or elsewhere; however, no systematic studies on the movement ecology and colonization abilities of this turtle have been undertaken.

Habitat: *Kinosternon sonoriense* is largely restricted to permanent slackwater habitats along intermittent or perennial streams with abundant submergent vegetation and benthic invertebrates (Hulse 1974a, 1974b, 1976; Iverson, pers. comm.). Although adults in southern Arizona have been observed in open sandy creeks whose flow consists entirely of tertiary-treated wastewater (pers. observ.), Sonoran mud turtles normally occur in ponds and along slow-moving watercourses lined with willows, Fremont's cottonwood, sycamore (*Platanus* sp.), mesquite (*Prosopis* spp.), blue paloverde (*Cercidium floridum*), yellow paloverde *(C. microphyllum)*, or other native vegetation (Rosen 1987; see also Jennings 1987b). Optimal habitats are spring runs, quiet pools in streams, or oxbows or other ponds that contain abundant mollusks (J. Iverson and P. Rosen, pers. comm.). In such habitats, population densities can exceed 750-825 turtles/ha (Hulse 1982; P. Rosen, pers. comm.); Sonoran mud turtles are reported at such densities from selected quiet portions of the Salt River (W. Minckley, pers. comm.). Permanent or nearly permanent water must be present to support this taxon (P. Rosen, pers. comm.). Sonoran mud turtles appear to be rare in introduced salt cedar (*Tamarix* spp.)-dominated habitats in some parts of their range (e.g., Ohmart et al. 1988) for reasons that are not clear, but which may be related to available food resources.

Status: Endangered; once presumably common in overflow channels of the lower Colorado River (Van Denburgh 1922b, Dill 1944), this turtle has apparently disappeared with the widespread riparian habitat changes that have occurred along the Colorado River and the introduction of a suite of exotic aquatic predators (Jennings 1983, 1987a; Ohmart et al. 1988). A Sonoran mud turtle observed on 31 March 1962 in a canal about 1.6 km southwest of Laguna Dam on the Arizona side of the Colorado River (Funk 1974) is the last verifiable record known. A search for mud turtles along the Colorado River from 5 April-2 May 1991 with fyke traps revealed no aquatic turtles other than introduced Texas spiny softshells (*Trionyx spiniferus emory*i; King and Robbins 1991a). The impact that introduced softshell turtles may have had on Sonoran mud turtles is unknown. The Sonoran mud turtle also appears to be undergoing declines over much of its range in Arizona and Mexico (J. Iverson, pers. comm.).

Management Recommendations: Intensive surveys should be coordinated as joint efforts with Arizona agencies and conducted in remaining suitable habitat along the lower Colorado River (such as near Yuma or at the mouth of the Bill Williams River [Topock Marsh]) to determine if the Sonoran mud turtle is still part of the regional herpetofauna If any populations are located, steps need to be taken to protect the riparian and aquatic habitat where they are found from further degradation and life history studies of these populations should be initiated. Additionally, efforts should be made to isolate these populations from the introduced exotic aquatic fauna that may prey on Sonoran mud turtles. Sonoran mud turtles are apparently highly susceptible to habitat loss resulting from the construction of reservoirs, the manipulation of hydrologic regimes, and the widespread invasion of salt cedar, but which of these factors is really detrimental to Sonoran mud turtles and its underlying mechanism is not known. Sonoran mud turtles are easily caught on baited hooks (Dill 1944; pers. observ.); when released by cutting the line, they probably have a low survivorship (see the western pond turtle (*Clemmys marmorata*) account). Human manipulation of daily fluctuations in flows in the main Colorado River seems to have

altered the normal pattern of burrow and crevice use by mud turtles (P. Rosen, pers. comm.) and may alternately flood and dry potential nesting sites. An understanding of the nesting ecology and the seasonal activity patterns of this species is urgently needed to gain insight into how alteration of hydrologic regimes and concomitant habitat change may affect this species.

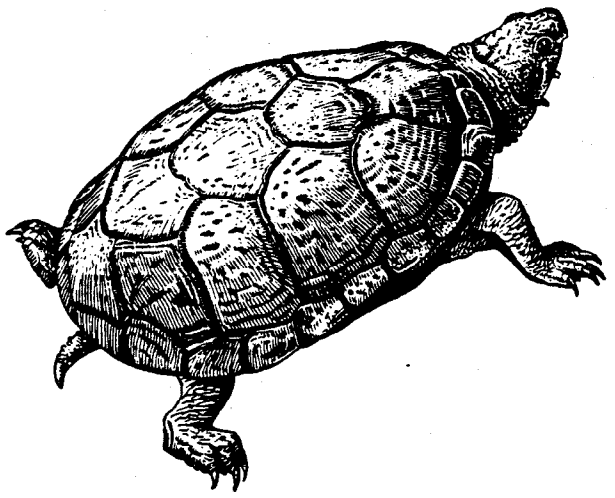

Plate 9. Adult Sonoran mud turtle (*Kinosternon sonoriense*) [from Stebbins 1954b].

LIZARDS

CALIFORNIA LEGLESS LIZARD
Anniella pulchra Gray 1852

Description: A small (95-170 mm SVL), slender limbless lizard with a shovel-shaped snout; a counter-sunk lower jaw; smooth, polished scales; and a blunt tail (Stebbins 1985). Dorsal coloration is highly variable, ranging from metallic silver, to beige, to dark brown, to jet black, with a dark vertebral line and several lateral stripes (Hunt 1983) that decrease in number as individuals mature (pers. observ.). Ventral coloration varies from pale yellow-white to bright yellow (Klauber 1932a; L. Hunt, pers. comm.). The iris is black (Klauber 1940).

Taxonomic Remarks: The name change to *A. nigra* proposed for this species (Hunt 1983) has not been followed because of its destabilizing effect on nomenclature (Murphy and Smith 1985, 1991; Jennings 1987a). Ongoing morphological and genetic studies of this taxon indicate that no evidence exists for its partitioning into subspecies (Hunt 1984; L. Hunt and S. Sweet, pers. comm.) along the lines various authors have proposed (Grinnell and Camp 1917, Miller 1943, Hunt 1983, Bury 1985, Stebbins 1985). However, genetic data that compare 11 populations in central (n = 9) and southern (n = 2) California indicate allozyme and karyotypic differences suggesting more than one species-level taxon may be concealed within what is currently recognized as *A. pulchra* (Bezy and Wright 1971, Bezy et al. 1977; Rainey as cited in Bury 1985). More comprehensive data are needed to characterize the geographic pattern of genetic variation and resolve the systematic status of potential units contained within *A. pulchra.*

Distribution: *Anniella pulchra* is a near-endemic to California, ranging from the vicinity of Antioch (Contra Costa County), California south through the Coast, Transverse, and Peninsular ranges; parts of the San Joaquin Valley; and the western edge of the Sierra Nevada Mountains and Mojave Desert to El Consuelo (Baja California Norte), Mexico (Hunt 1983). This lizard is also known from the East and South Los Coronados and Todos Santos Islands off the coast of Baja California (Stebbins 1985). The known elevational range extends from near sea level on the Monterey Peninsula (Monterey County: Bury 1985) to ca. 1800 m in the Sierra Nevada foothills (Hunt 1983). In California, its range extends from Contra Costa County to the Mexican border (Figure 29). Scattered desert slope records are known from Lancaster in Antelope Valley (Los Angeles County: Mullen 1989), Morongo Valley (San Bernardino County), Whitewater (Riverside County: Stebbins 1985), and in the San Felipe Creek drainage (San Diego County: Klauber 1932a). An old record from Redwood Canyon (Marin County: Rivers 1902, Stebbins 1985) is not verifiable, and may be based on a mislabeled specimen that has since been lost (L. Hunt, pers. comm.). This lizard has been inadvertently introduced into parts of the southern Sierra Nevada foothills through nursery and tree-planting operations (H. Basey, pers. comm.).

Life History: Most ecological and life history data on *A. pulchra* are the result of a field study Miller (1944) conducted during 1939 and 1940 in the dunes of the Monterey Peninsula (Monterey County) and Antioch (Contra Costa County), California. Legless lizards are fossorial animals that construct burrows in loose soil with a high sand fraction (Miller 1944, Stebbins 1954b). Several morphological and physiological traits facilitate efficient burrowing and allow them to live subsurface for extended intervals (Coe and Kunkel 1906, Bury and Balgooyen 1976, Kamel and Gatten 1983, Fusari 1984, Gans et al. 1992). Legless lizards appear to be active mostly during the morning and evening at which time they may rest just beneath the surface of the sunlight-warmed substrate (Miller

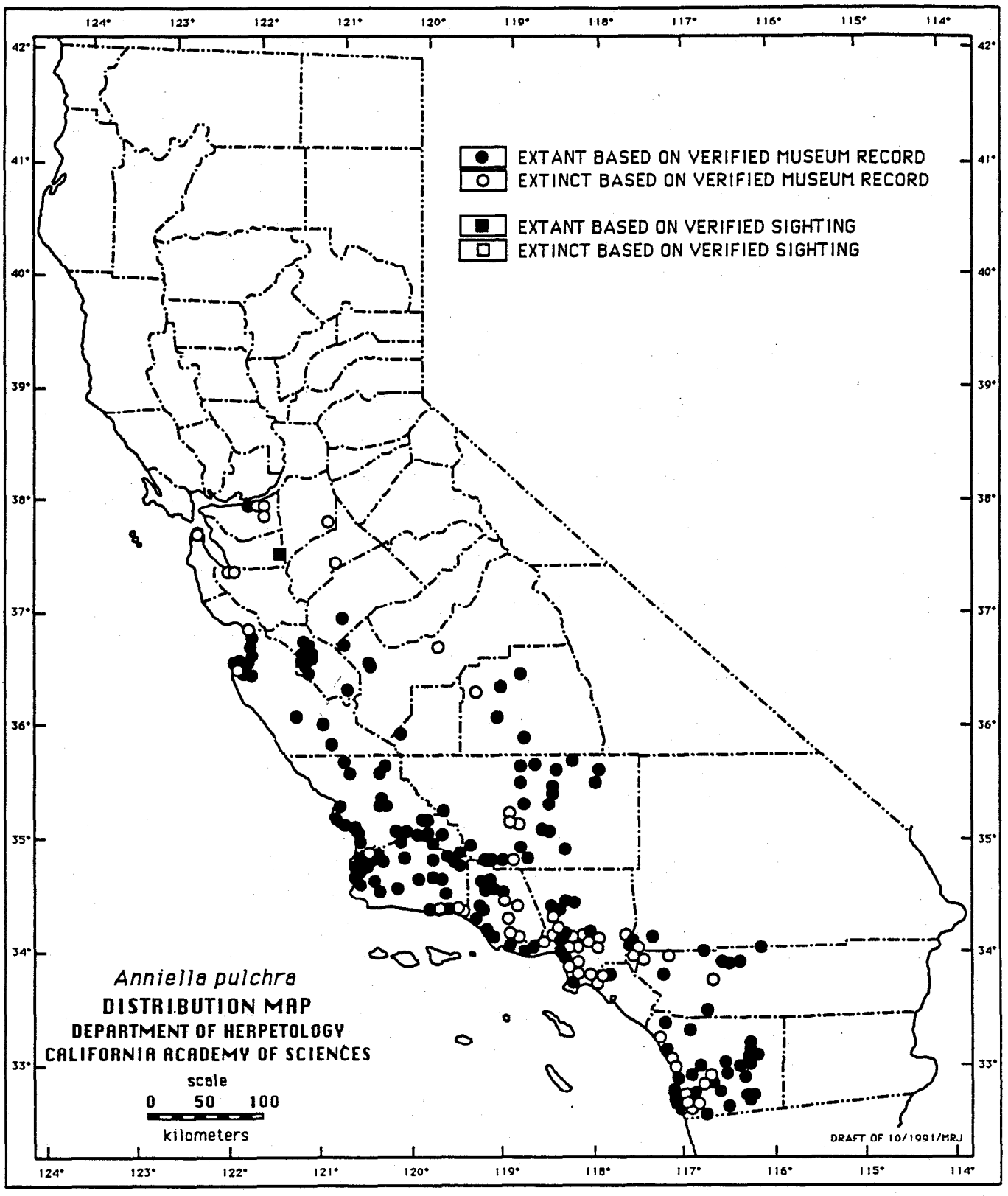

Figure 29. Historic and current distribution of the California legless lizard (*Anniella pulchra*) in California based on 490 locations from 2095 museum records and 7 records from other sources.

1944, Stebbins 1954b, Bury and Balgooyen 1976, Bury 1985), but they have also been observed on the surface at night, especially when substrate temperatures remain warm (probably > 21°C) for extended intervals (Miller 1944, Gorman 1957; pers. observ.). Adult and juvenile lizards are insectivorous and subsist largely on larval insects (especially microlepidopterans and beetles), adult beetles, termites, and spiders (Araneida; L. Hunt, pers. comm.); prey are typically ambushed from a concealed location beneath the leaf litter or substrate (Coe and Kunkel 1906, Miller 1944).

Laboratory experiments have shown that legless lizards have a relatively low thermal preferendum (generally 21-28°C; Bury and Balgooyen 1976) and a relatively low critical thermal maximum (34°C; Brattstrom 1965) when compared to other California lizards. These data are consistent with the range of temperatures at which legless lizards are encountered in the field (7.8-28.3°C, average = 21.0°C; Gorman 1957; Brattstrom 1965; L. Hunt, pers. comm.). The preference for low temperatures allows legless lizards to be active on relatively cool days (Miller 1944), and is consistent with the behavior of fossorial lizards not known to bask directly in sunlight. High ambient and substrate temperatures probably limit the daily pattern of activity of legless lizards in the field (Miller 1944). California legless lizards from coastal areas and the southern portions of its range may display some activity nearly year-round (see Banta and Morafka 1968), whereas lizards from the Sierra Nevada foothills and other inland locations are thought to hibernate during winter months (Zeiner et al. 1988).

Anniella pulchra is a live-bearing species that probably breeds in the interval between early spring and July (Goldberg and Miller 1985). Oviductal eggs are observed in females from July through October (Goldberg and Miller 1985) and litters of 1 to 4 (normally 2) young (ca 50 mm SVL) are born in the interval from September to November (Miller 1944), probably after a gestation period of about 4 months (Goldberg and Miller 1985). Young lizards grow rapidly (2.5-4.4 mm SVL/month) before reaching sexual maturity at ca. 90 mm SVL (males) and 121 mm SVL (females) typically in 2 to 3 years, respectively (Miller 1944, Goldberg and Miller 1985). Once they reach sexual maturity, females may not reproduce every year (Goldberg and Miller 1985), but insufficient data exist to identify biennial reproduction as the typical pattern for this species. Data on the longevity of this taxon in the field are lacking; sexually mature adults have been kept alive under laboratory conditions for almost 6 years (L. Hunt, pers. comm.).

Despite a small litter size, *A. pulchra* can attain high densities where habitat is suitable (S. Sweet, pers. comm.). California legless lizards seem to have high site fidelity, at least over the short term; marked lizards were recaptured < 10 m from their original capture points (average = 2.64 m; n = 10) after a period of 2 months (Miller 1944), but data on the movement ecology of *A. pulchra* are otherwise entirely lacking. The high incidence of tail injuries as indicated from the large percentage of scarred and broken tails seen on lizards found in the field and museum specimens suggests that fighting between adult males and encounters with natural predators are frequent (Bury 1985; pers. observ.); known predators include ringneck snakes *(Diadophis punctatus),* common kingsnakes *(Lampropeltis getulus),* deer mice *(Peromyscus maniculatus),* long-tailed weasels *(Mustela frenata),* domestic cats *(Felis sylvestris),* California thrashers *(Toxostoma redivivum),* American robins, and loggerhead shrikes *(Lanius ludovicianus;* Miller 1944; L. Hunt and S. Sweet, pers. comm.).

Habitat: California legless lizards occur primarily in areas with sandy or loose loamy soils under the sparse vegetation of beaches, chaparral, or pine-oak woodland; or sycamores, cottonwoods, or oaks that grow on stream terraces (Gorman 1957, Cunningham 1959b, Banta and Morafka 1968, Stebbins 1985). The sandy loam soils of stabilized dunes on which bush lupine *(Lupinus arboreus),* mock heather *(Eriogonum*

parvilfolium), mock aster *(Ericameria ericoides),* and other native coastal shrubs occur seems especially favorable habitat (Grinnell and Camp 1917, Miller 1944, Smith 1946, Bury 1985). Legless lizards also occur in desert scrub at the western edge of the Mojave Desert (Klauber 1932a). They are often found under, or in the close vicinity of, surface objects such as logs, rocks, old boards (Miller 1944, Gorman 1957, Banta and Morafka 1968) and the compacted debris of woodrat *(Neotoma* spp.) nests (S. Sweet, pers. comm.). Rocky soils or areas disturbed by agriculture, sand mining, or other human uses apparently lack legless lizards (Miller 1944, Bury 1972a, Hunt 1983, Stebbins 1985).

Soil moisture is essential for legless lizards. Preference for substrates with a higher moisture content has been identified in the laboratory and legless lizards die if they are unable to reach a moist substrate (Burt 1931, Miller 1944, Bury and Balgooyen 1976). Soil moisture is crucial for conserving energy at high temperatures (Fusari 1984) and also allows shedding to occur (Miller 1944). Legless lizards are though to be soil moisture-limited at the edges of portions of their geographic range (Miller 1944, Bury and Balgooyen 1976).

Status: Special Concern; its specialization for a fossorial existence in substrates with a high sand fraction renders *Anniella pulchra* vulnerable. Lack of comparable observational or sample data is the primary difficulty with evaluating the status of this cryptozooic lizard. Although key aspects of its habitat requirements are partly understood, that knowledge is insufficient to allow confident within-habitat evaluation of the distribution of this taxon. Nevertheless, some indications exist that various conditions place this species at risk. High confidence exists that legless lizards cannot survive in urbanized, agricultural, or other areas where a loose substrate in which to burrow has been removed or radically altered (e.g., the substrate severely disturbed by plowing or bulldozing). On this basis, *A. pulchra* has probably disappeared from ca. 20% of the area within its known historic range. A suite of other factors, including livestock grazing, off-road vehicle activities, sand mining, beach erosion, excessive recreational use of coastal dunes, and the introduction of exotic plant species (e.g., ice plants [*Carpobrotus edulis* and *Mesembryanthemum crystallinum*], Marram grass [*Ammophila arenaria*], veldt grass [*Ehrharta calycina*] and eucalyptus trees [*Eucalyptus* spp.]; Bury 1972a, 1985; Vivrette and Muller 1977; L. Hunt, pers. comm.) are likely to alter the substrate so that *A. pulchra* can no longer survive there. These factors decrease soil moisture or alter the conformation of the substrate, each of which may act singly or in concert to limit the food base or make the substrate physically unsuitable for *A. pulchra* to survive in. Exotic plants may be especially insidious because they support only a limited arthropod food base (Nagano et al. 1981) for *A. pulchra,* likely because they replace the native vegetation (Vivrette and Muller 1977, Powell 1978), which supports more significant arthropod populations. Some exotics, like *C. edulis,* also build up the salt concentration in the soil (Kloot 1983) that may create habitat unsuitable for legless lizards (Bury 1985) either because *A. pulchra* has difficulty osmoregulating in such a substrate, or indirectly, by limiting the arthropod food base. Legless lizards may also be susceptible to pesticide poisoning because of their insectivorous diet (Honegger 1975). Some areas in which legless lizards are known to occur are protected within several private and public reserves in central and southern California (e.g., Asilomar State Beach, Camp Joseph H. Pendleton Marine Corps Base, Carrizo Plain Preserve [The Nature Conservancy], Morro Bay State Park, Point Dume State Beach, Vandenberg Air Force Base), but these areas are becoming progressively smaller fragments because of losses of adjoining habitats due to development, road construction, poor land use practices (such as burning or clearing vacant lots), continued erosion of coastal beaches (due to the loss of sand supplies caused by water diversion projects and breakwaters), and the spread of exotic plants. The latter is especially true in State Beaches and other coastal reserves where much of the native vegetation has already been greatly reduced or replaced by exotic species. Over 45 years ago, Miller (1944) suggested that the increased presence of feral

house cats in parks and coastal areas may contribute to reducing legless lizard populations; that suggestion, while likely, has never been evaluated.

Management Recommendations: Detailed life history studies of legless lizards in various parts of California need to be undertaken in order to more precisely determine the habitat requirements of this animal. Information is especially needed on natural fluctuations in numbers and what constitutes a viable population size, as well as dispersion and colonization abilities. Management of this species needs to dovetail with ongoing biochemical studies on the taxonomy of this lizard, to determine if more than one taxon of legless lizard exists in California, so that the protection of each taxon can be individually addressed. Efforts should be made to enhance coastal beach habitat for legless lizards only after more precise ecological data become available on this species. Habitat restoration projects will have to be conducted to minimize impacts to existing legless lizard populations and other taxa that co-exist with them. The effects of removing exotic vegetation and restoring native plant communities in coastal dune habitats harboring legless lizards are in need of controlled experimental studies.

BELDING'S ORANGE-THROATED WHIPTAIL
Cnemidophorus hyperythrus beldingi (Stejneger 1894)

Description: A moderate-sized (50.0-94.0 mm SVL) gray, reddish brown, dark brown, or black lizard with five to seven pale yellow or tan stripes (Walker and Taylor 1968, Stebbins 1985, Rowland 1992). The top of the head has a single, fused frontoparietal scale (Rowland 1992), and is yellow-brown to olive gray. Undersurfaces are yellowish white, often with gray or bluish slate on the belly; adults have varying degrees of red-orange wash (Stebbins 1985) that may occur on all undersurfaces (Rowland 1992). The latter is especially prominent on the throat and chest in breeding males. The iris is brown (pers. observ.). In hatchlings and juveniles, the tail is a highly visible bright blue (Rowland 1992).

Taxonomic Remarks: This taxon is morphologically distinct (Walker and Taylor 1968), and has never been confused with any other taxon. No attempts have been made to characterize genetic variation across the geographic range of *C. h. beldingi.* An understanding of that variation is needed to elucidate potential geographic patterns to genetic variation.

Distribution: *Cnemidophorus h. beldingi* ranges from Corona del Mar (Orange County: LACM 14747) and near Colton (San Bernardino County), California southward to Loreto, Baja California, Mexico (Stebbins 1985). The upper elevational limit of this taxon, which probably occurs in Baja California, is not known, but the lower limit extends down to near sea level (Corona del Mar, Grange County). In California, *C. h. beldingi* ranges from the southern edges of Orange and San Bernardino counties southward to the Mexican border (Figure 30). In California, the known range of *C. h. beldingi* is located on the coastal slope of the Peninsular Ranges-and extends from near sea level to ca. 1040 m (northeast of Aguanga, Riverside County).

Life History: Data on the life history of *C. h. beldingi* are relatively limited. The studies of Bostic (1964, 1965a, 1965b, 1966a, 1966b, 1966c) and Rowland (1992) in California, and Karasov and Anderson (1984) in Mexico, include essentially all the ecological data known for this species. Orange-throated whiptails typically emerge from hibernation in February or March (Rowland 1992), but some lizards may be active in every month of the year whenever it is sufficiently warm (Bostic 1966a; see also Brattstrom 1990 and Rowland 1992). *Cnemidophorus h. beldingi* typically emerges from overwintering sites

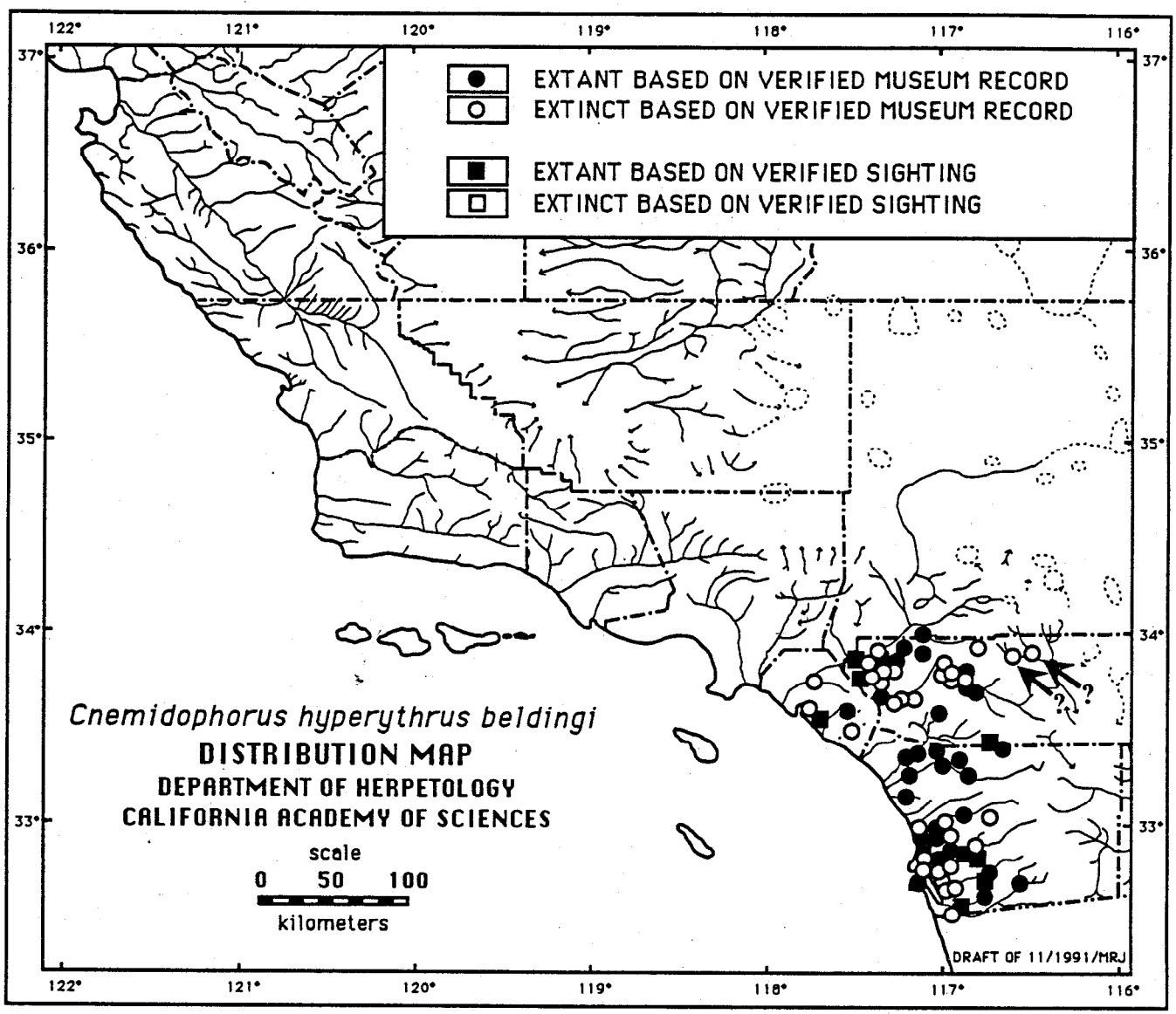

Figure 30. Historic and current distribution of Belding's orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*) in southern California based on 131 locations from 389 museum records and 14 records from other sources.

that consist of relatively short (7-30 cm long), J-shaped burrows with a small (3-19 cm^3) terminal chamber on a south-facing slope having open bare ground (Bostic 1964, 1966a). Orange-throated whiptails are typically active across a relatively high temperature range (36.3°C-41.0°C) and usually emerge only after soil temperatures have reached at least 28°C (Bostic 1966b; see also Rowland 1992). The daily activity cycle of this diurnal lizard is largely unimodal early in the season, but shifts to a bimodal pattern as midday near-surface temperatures become unfavorably hot during the summer months (Bostic 1966a, Rowland 1992). May matings are probably typical, although copulation in the field has been observed as late as July (Atsatt 1913). Females deposit two or three moderate-sized, leathery-shelled eggs in June or July in an unknown location (Bostic 1966c). Hatchlings are first observed in the field from the second week of August through the first week of September (Bostic 1966c, Rowland 1992). Orange-throated whiptails can become sexually mature in 1 year, but most individuals, especially females, require 2 years to become sexually mature (Bostic 1964). Longevity of *C. h. beldingi* is unknown. Perhaps the most distinctive aspect of the life history of *Cnemidophorus h. beldingi* is that it appears to be a dietary specialist, most (> 85%) of its prey being comprised of termites, specifically one subterranean species, *Reticulitermes hesperus* (Bostic 1966b); the degree of specialization may vary locally or geographically, because in Baja California, a considerably lesser percentage (ca. 40%) of termites were eaten (Karasov and Anderson 1984). Orange-throated whiptails appear to take other insects (mostly spiders, beetles, and grasshoppers [Orthoptera]) largely during late summer, when their staple prey (termites) migrate downward into the soil, and thus, are largely unavailable (Rowland 1992). Adults disappear into hibernation in the latter part of July through early September, whereas immature lizards begin to hibernate in the latter part of December (Bostic 1966a, Rowland 1992).

Habitat: The habitat characteristics of *C. h. beldingi* are poorly understood, largely because data are sparse. Historically, most populations occurred on the floodplains or terraces along streams (McGurfy 1980). This species appears to be tied to the presence of some perennial plants, probably because its major food resource, termites (Bostic 1966b), requires some kind of a perennial plant as a food base (Rowland 1992). California buckwheat *(Eriogonum fasciculatum)*, California sagebrush *(Artemisia californica)*, black sage *(Salvia mellifera)*, white sage *(Salvia apiana)*, and chamise *(Adenostema fasciculatum)*-redshank *(A. sparsifolium)* chaparral apparently fulfill the perennial plant requirement for *C. h. beldingi* (Bostic 1964; pers. observ.; see also Brattstrom 1990). Rowland (1992) found that adult orange-throated whiptails associated with California buckwheat and black sage at frequencies greater than which these species occurred in the habitat. Rowland also observed that all age groups of orange-throated whiptails tended to avoid open areas, but precisely how these aspects of its habitat requirements are linked to its overall life history remain poorly understood. Hibernation sites seem to occur on well-insolated, south-facing slopes (Bostic 1964, 1966a), so open slopes adjacent to terraces with woody perennials may represent the best available habitats. Oviposition sites remain to be discovered, but they probably also occur on well-insolated, south-facing slopes. Home ranges for this taxon have been reported to average between 363.6-445.0 m^2 (range: ca. 150 m^2-1400 m^2) for adults (Bostic 1964, 1965a; Rowland 1992).

Status: Threatened; Cooper et al. (1973) reviewed the status of *C. h. beldingi* in California in the course of an assessment of the Santa Margarita Ecological Reserve and environs, and concluded that this taxon was depleted, based on the definitions the California Department of Fish and Game used at that time. McGurty (1980) reviewed this taxon in California based on data that is now over 10 years old. His mapped data suggest that *C. h. beldingi* had been extirpated from ca. 60% of its historic range at the time of his survey. Based on comparing aerial photographs from roughly the time that McGurty did

his assessment (1980) to current aerials (i.e., 1990), we estimate that ca. 75% of the historic range of *C. h. beldingi* no longer supports this taxon. Most of the suitable habitat for *C. h. beldingi* occurs in floodplains and stream terraces, the most developed areas in southern California. Remaining populations of *C. h. beldingi* are highly fragmented because the lower floodplain of most coastal drainages, where most of the historical habitat for this species existed, has been developed, thus isolating the remaining populations in smaller floodplain and terraces at the higher elevations where this species is known to occur. Most of the latter are probably more susceptible to local extinction with little opportunity of recolonization because historically, the avenue for recolonization was likely via the larger populations on the lower floodplains and terraces. Further, *C. h. beldingi* is something of a habitat specialist that copes poorly with even minor modifications to local environments caused by humans. Furthermore, the four years of severe drought (1986-1990) may have reduced its insect food base, which may directly influence reproduction and have exacerbated the problem of small local populations staving off extinction. Finally, the likelihood that this whiptail is a dietary specialist on termites places it at some risk, particularly if it lacks other foods to switch to to a significant degree.

Management Recommendations: The life history of *C. h. beldingi* needs to be much better understood to refine any management recommendations. Life history data is currently being gathered and surveys are being conducted with state and federal (military) funding on orange-throated whiptails (Brattstrom 1990), but only limited results of these studies are available (see Rowland 1992). In particular, a better understanding is needed of how obligatory the termite diet of this species really is; of the relationship between this whiptail, perennial plants, and termites; of the nature and characteristics of oviposition sites; and of the movement ecology and colonization abilities of this species. Until these data are obtained, sites known to harbor this species should be surveyed on a site-by-site basis to identify the quality of existing populations and to take measures to provide some degree of protection for this species where it occurs in significant numbers. Additionally, Argentine ants *(Iridomyrmex humilis)* are an exotic pest species that displaces many native insects (see species account for the San Diego horned lizard [*Phrynosoma coronatum blainvilli*]), and may be influencing the food base of *C. h. beldingi.* The recommended life history studies of *C. h. beldingi* should be conducted with the idea of gaining an understanding of the potential negative effects of the exotic fauna and flora on this species.

PANAMINT ALLIGATOR LIZARD
Elgaria panamintina (Stebbins 1958)

Description: A large (90-150 mm SVL) alligator lizard with a light yellow or beige dorsum marked with seven or eight, relatively evenly spaced, brown crossbands between the head and the hindlimbs (Stebbins 1958). Crossbands extend onto the tail, but are much more contrasting in juveniles than adults. When unbroken, the tail is nearly twice the body length. Continuous or broken lines occur lengthwise down the center of scale rows on the light-colored venter (Stebbins 1985). The iris is pale yellow (Stebbins 1958).

Taxonomic Remarks: A distinctive alligator lizard that is considered a valid species (Stebbins 1958, Good 1988). Formerly a member of the genus *Gerrhonotus* (e.g., Stebbins 1958, 1985), recently revised alligator lizard systematics places this species in the genus *Elgaria* (Waddick and Smith 1974; Gauthier 1982; Good 1987a, 1987b, 1988). Genetic variation across the geographic range of *E. panamintina* has not been characterized, and genetic data on this species are based on a single individual (see Good 1988). An understanding of genetic variation is needed to determine whether any populations of *E. panamintina* are distinctive genetic units.

Distribution: This California endemic is known only from the vicinity of 15 isolated riparian localities below permanent springs in the Argus, Inyo, Nelson, Panamint, and White mountains of Inyo and Mono counties (Figure 31; see also Macey and Papenfuss 1991b). Its known elevational range extends from ca. 760 m to 2072 m.

Life History: Few data are available on the life history of *E. panamintina.* If similar to other alligator lizards whose life history is known, it probably has a relatively low preferred temperature range (Brattstrom 1965, Cunningham 1966a. Kingsbury 1994), it does not bask (*contra* Macey and Papenfuss 1991b), and it favors very dense cover, a habitat infrequently occupied by the easily observed, frequently abundant, basking lizard species (e.g., *Sceloporus occidentalis, Uta stansburiana).* Depending onelevation, Panamint alligator lizards emerge from hibernation in late winter or early spring, and seem to be active during the day and at dusk (Stebbins 1958, Dixon 1975). Based on pitfall capture dates, *E. panamintina* may be most active in May, June, and September, and less conspicuous due to aestivation or nocturnal activity during very hot periods (typically July-August; Banta 1963b), but these data are difficult to interpret, since the manner in which, and the frequency with which, traps were checked was not reported. A pair of captive Panamint alligator lizards were observed mating on 15 May (Banta and Leviton 1961) and a female obtained on 1 May 1959 contained 12 developing eggs (Banta 1963b), suggesting that the species lay eggs (Stebbins 1985) rather than being live-bearing. If reproduction is similar to that of the related *E. multicarinata,* which occurs nearby (see Macey and Papenfuss 1991b), the anticipated intervals for reproduction and oviposition would be spring and early summer, respectively (see Goldberg 1972), and if second clutches are laid, a second round of oviposition might occur in late summer (see Burrage 1965). Data on incubation time, growth, and feeding habits are lacking for the Panamint alligator lizard, but if similar to the southern alligator lizard, incubation of the eggs may take nearly 3 months (see Atsatt 1952 and Burrage 1965), sexual maturity probably requires at least 2 years (see Goldberg 1972), and terrestrial invertebrates likely dominate the diet (see Cunningham 1956).

No predators of *E. panamintana* are recorded, but several species known to eat other alligator lizards (e.g., coachwhip [*Masticophis flagellum*], striped whipsnake [*M. meniatus*], loggerhead shrike, red-tailed hawk [*Buteo jamaicensis*]: Fitch 1935) occur within the range of the Panamint alligator lizard, and may prey on it. Data on the movement ecology and colonization abilities of *E. panamintina* are lacking.

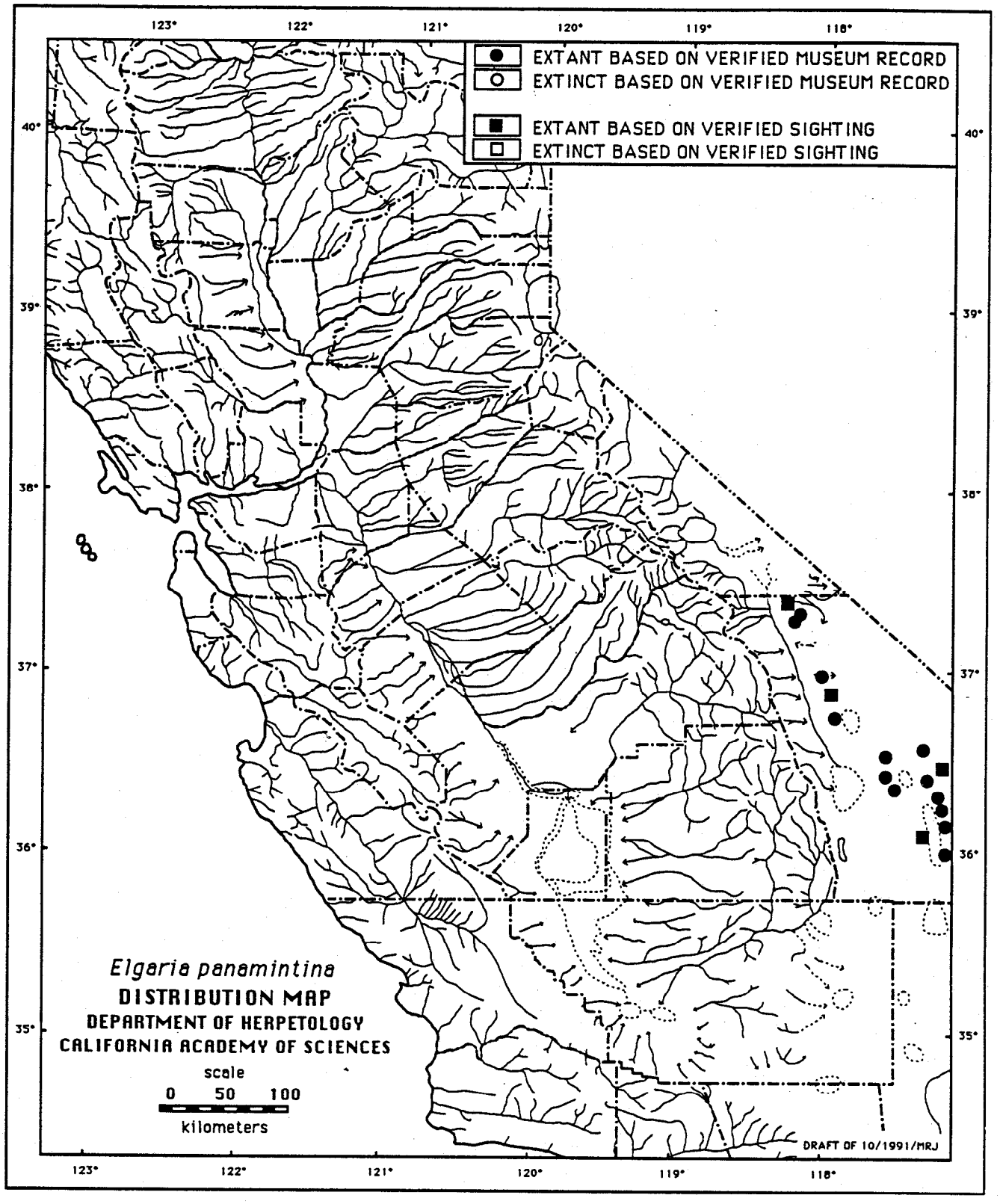

Figure 31. Historic and current distribution of the Panamint alligator lizard (*Elgaria panamintina*) in central California based on 19 locations from 25 museum records and 4 records from other sources.

Habitat: *Elgaria panamintina* is thought to be a relict species that occupies a now restricted habitat representative of a more mesic period (Good 1988). Panamint alligator lizards are confined mostly to narrow riparian strips associated with permanent springs in talus canyons composed of limestone, marble, and other metamorphic rocks (Stebbins 1958). These riparian zones are extremely limited in areal extent, being only a few meters wide and 0.75-3.1 km long and closely confined to canyon bottoms (Stebbins 1958, Banta 1963b). In most places, coyote bush *(Baccharis sergiloides),* virgins bower (*Clematis lugusticifolia),* and wild grape *(Vitis girdiana)* dominate the dense riparian growth (Stebbins 1958, Banta 1963b, Dixon 1975). At the edges of the riparian zones, more xeric-adapted vegetation (e.g., creosote bush [*Larrea divaricata*] and sagebrush [*Artemisia ludoviciana*]) predominates (Stebbins 1958, Banta 1963b). Although Panamint alligator lizards have been commonly observed in or under dense riparian thickets near damp soil (Stebbins 1958), they may forage in, or actually occupy, talus-covered slopes at some distance beyond the immediate influence of the riparian zone, where such areas shelter more mesic subsurface habitat, as suggested by the four specimens trapped in areas adjacent the riparian zone (see Banta 1963b).

Status: Threatened; all except two of the known populations of Panamint alligator lizard occur on private lands and are currently at risk because of habitat loss from mining, both feral and domestic livestock, and off-road vehicle activity in the restricted riparian habitats that shelter this species. Off-road activity in the Panamint-Inyo-White Mountain system has increased significantly over the last 10 years, so impacts to the Panamint alligator lizard are anticipated to increase.

Management Recommendations: A thorough understanding of the specific habitat requirements significant to the survival of this species are an absolute prerequisite to refining management efforts for this species. Until specific habitat data become available, efforts should be directed at protecting the habitat ensemble associated with the springs and other riparian areas where Panamint alligator lizards have been found. Since most known localities are on private land, particular efforts should be made to encourage landowners to manage for habitat preservation. Such guidance may not be well-received, so encouragement should emphasize the positive benefits that landowners would gain in their own operations if they choose to undertake such preservation. Habitat preservation should emphasize avoidance of alterations that might modify the hydrology of these areas. Many of the suggestions made here are similar to those that would help protect *B. campi* (see species account for the Inyo Mountains salamander), although we anticipate that the alligator lizard may be more tolerant of limited alteration. Minimizing mining-, feral livestock-, and off-road vehicle-associated disturbance of the vegetation or substrate in the riparian zones is particularly important. Concerted efforts should be made to search for the Panamint alligator lizard in nearby riparian areas where it has not yet been detected. Where possible, protection of this species would be assisted through initiation of land use restriction measures in the Inyo-Panamint-White Mountain system, which would anticipate future finds of this species outside of its known range.

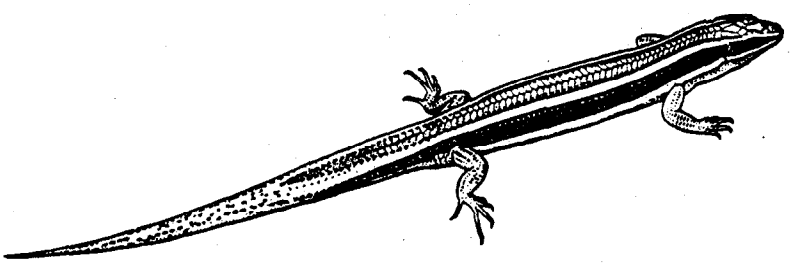

Plate 10. Adult western skink (*Eumeces skiltonianus*) [from Stebbins 1954b].

CORONADO SKINK
Eumeces skiltonianus interparietalis Tanner 1957

Description: A medium-sized (53-83 mm SVL) smooth-scaled lizard with relatively small limbs and four white or beige stripes on a brown dorsum (Stebbins 1985. Tanner 1988). The intervening middorsal and lateral dark stripes extend to or beyond the middle of the tail in adults (Tanner 1957). The tail has at least some blue coloration; the tail color is often brilliant blue in juveniles and adults having unbroken tails. This skink has a small interparietal scale enclosed posteriorly by the parietal scales (Tanner 1957). The iris is dark brown (pers. observ.).

Taxonomic Remarks: The Coronado skink is currently treated as a subspecies of the western skink (Tanner 1988), but the taxonomy of Pacific Coast skinks *(Eumeces skiltonianus-E. gilberti)* needs revision because of inconsistencies in many of the morphological characters used to distinguish taxa. Data on genetic variation across the geographic range of *Eumeces s. interparetalis* are lacking; available genetic data on this taxon are based on a single individual (Murphy et al. 1983). An understanding of that variation is needed to determine whether any populations of the Coronado skink are distinctive genetic units, and to resolve the relationship between the Coronado skink and other western skinks in the *skiltonianus* assemblage.

Distribution: The Coronado skink inhabits the coastal plain and Peninsular Ranges west of the deserts from approximately San Gorgonio Pass (Riverside County) southward to San Quentin (Baja California), Mexico (Tanner 1988). Isolated populations also occur on Santa Catalina, Los Coronados, and Todos Santos islands off the coast of southern California and Baja California (Zweifel 1952a, Stebbins 1985). The known elevational range of *E. s. interparetalis* extends from near sea level to about 2000 m (La Grulla, Baja California). In California, *E. s. interparetalis* ranges from near Banning (Riverside County: Tanner 1957) south to the Mexican border (Figure 32). The known elevational range of the Coronado skink in California extends from near sea level to about 1675 m (Strawberry Valley, Riverside County: Atsatt 1913). *Eumeces s. interparetalis* is described as intergrading with *E. s. skiltonianus* at the northern edge of its range (from near Escondido, San Diego County, north to Mt. San Jacinto, Riverside, County: Tanner 1957, 1988), but conclusive identification of this pattern awaits the systematic resolution of these taxa.

Life History: Few life history data are available for the Coronado skink and the following life history summary is based largely other subspecies of *E. skiltonianus.* Adults and juveniles are diurnal and are typically active from early spring through early fall, although activity is bimodal (early morning and late afternoon) during the summer months (Zweifel 1952a; see Tanner 1943, 1957). Coronado skinks are secretive lizards (pers. observ.), they may have a relatively low activity temperature (28.5°C-31.2°C, n = 2; Zweifel 1952a), and they likely prey upon many small invertebrates in leaf litter or dense vegetation at the edges of rocks and logs, but may selectively avoid ants (see Atsatt 1913, Tanner 1957; pers. observ.). Like other skinks, Coronado skinks are probably facile burrowers and undoubtedly construct similar tunnels under stones or other cover for refuge or use in hibernation or nesting. Breeding for closely related *E. s. skiltonianus* begins soon after spring emergence and females lay 2-6 eggs during June and July in nest chambers constructed in loose, moist soil under rocks, logs, or other cover (see Tanner 1957, Punzo 1982) Females may attend their eggs until they hatch (see Tanner 1943, 1957). Young *E. s. interparetalis* probably hatch in late summer, and sexual maturity may occur at 2 years of age., but most individuals probably do not reproduce until they are 3 years old; longevity of adults is probably 5 or 6 years (see Rodgers and Memmler 1943). Known predators include California mountain kingsnakes *(Lampropeltis zonata;* McGurty

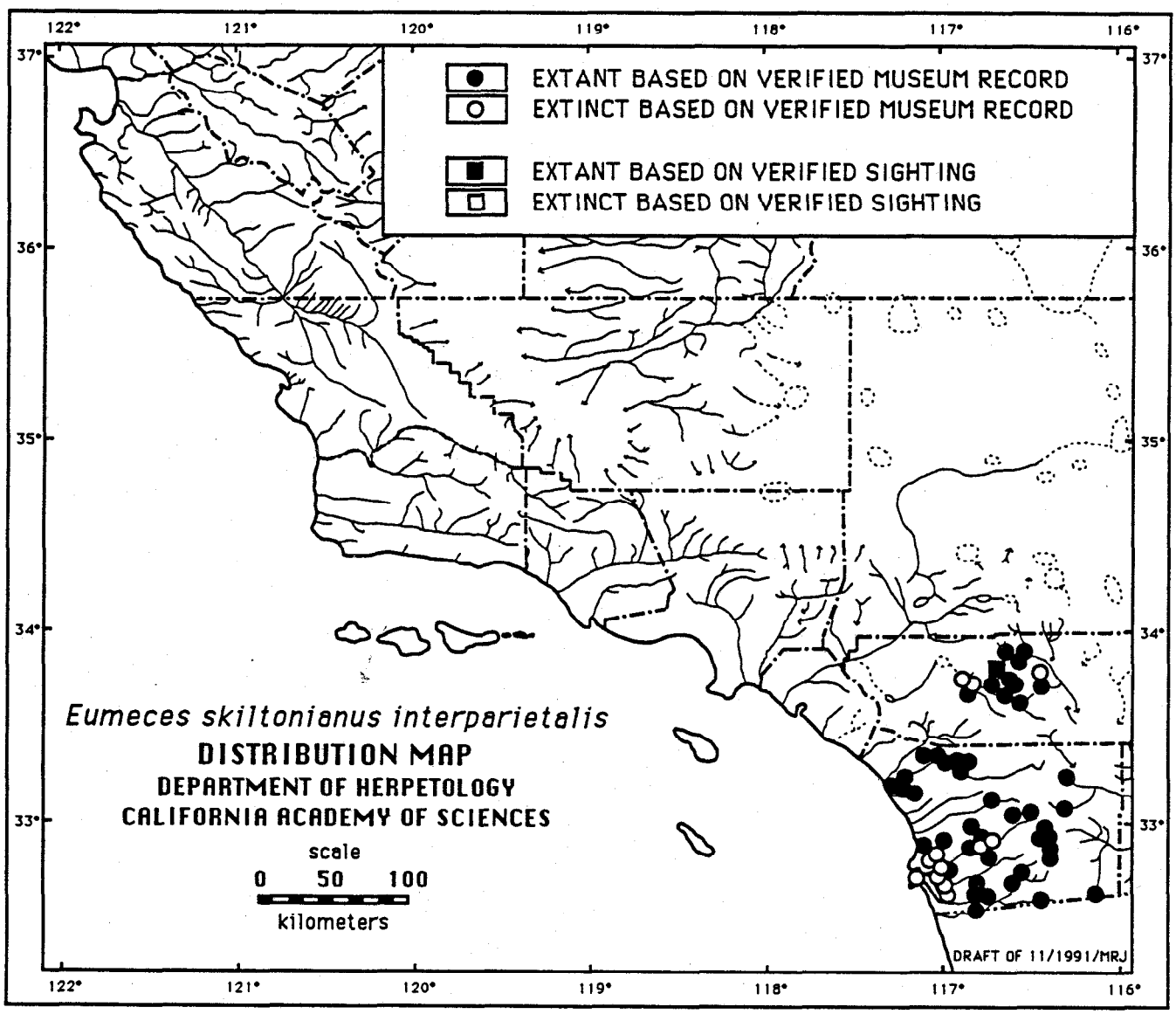

Figure 32. Historic and current distribution of the Coronado skink (*Eumeces skiltonianus interparietalis*) in southern California based on 104 locations from 245 museum records and 1 record from another source.

1988; see also Newton and Smith 1975), and western rattlesnakes *(Crotalus viridis*, Zweifel 1952a), but several birds and mammals probably also prey on Coronado skinks (see Tanner 1957; C. Fagan, pers. comm.). Brightly colored tails are postulated to be both an intraspecific age recognition device and a predator distraction device (Vitt et al. 1977). No data exist on movement ecology or the colonization abilities of *E. s. interparetalis.*

Habitat: The Coronado skink seems generalized in the sense that it occurs in a variety of plant associations ranging from coastal sage, chaparral, oak woodlands, pinon-juniper, and riparian woodlands to pine forests (Stebbins 1985), but within these associations it is often restricted to the more mesic pockets (Tanner 1957; Zeiner et al. 1988; see also Fowlie 1973). The latter often consist of open riparian or subriparian margins, but significant variation exists in the nature of the mesic habitats used (e.g., fog-bound islands; Zweifel 1952a).

Status: Special Concern; although the Coronado skink occurs in a number of vegetative associations, a large portion of the area of southern California with suitable habitat for this taxon has been developed or has undergone land use changes incompatible with its survival (e.g., see Brattstrom 1988). Large areas of habitat have been urbanized or converted into orchard crops (citrus [*Citrus* spp.] and avocado [*Persea americana*]). Although much of the physical habitat structure Coronado skinks require remains in many relatively recently planted steep-slope avocado orchards, the absence of skinks in such habitats suggests that something besides habitat structure may exclude this species; pesticide or herbicide use in orchards and on other agricultural crops may adversely affect this species. Human use of surface and underground water resources has made many of the more mesic pockets within various plant associations become increasingly dry, a situation that likely mitigates against the presence of Coronado skinks.

Management Recommendations: The systematic status of the Coronado skink relative to other western skinks needs clarification and any distinct genetic units need to be identified. A more refined understanding of the habitat requirements of the Coronado skink is especially needed. In particular, knowledge of what constitutes suitable refuge habitat and nest sites, focusing on key habitat parameters, is almost entirely lacking; these data are an absolutely prerequisite to providing sound management recommendations for this species. Also needed are data on local population dispersion, movement ecology, and the recolonization potential of this taxon. The effect of increased xerification on the local distribution of the Coronado skink, a situation likely to be significant in southern California, needs study. Current evaluation of the listing status of the Coronado skink suffers primarily from a generalized lack of data at most levels.

BANDED GILA MONSTER
Heloderma suspectum cinctum Bogert and Martín del Campo 1956

Description: A large (22-35 cm SVL), robust lizard with a short, stout tail and relatively short limbs with strongly curved claws (Stebbins 1985, Campbell and Lamar 1989). The back and sides are covered with beadlike scales colored in an orange, pink, or yellow and black-banded pattern that suggests Indian beadwork (Bogert and Martin del Campo 1956); belly scales are similarly colored, but squarish in shape (Stebbins 1985). The iris is dark brown or black (pers. observ.).

Taxonomic Remarks: *Heloderma suspectum cinctum* was described on the basis of morphological data (Bogert and Martín del Campo 1956); genetic data have never been used to verify this allocation. Moreover, no data exist on genetic variation within this taxon.

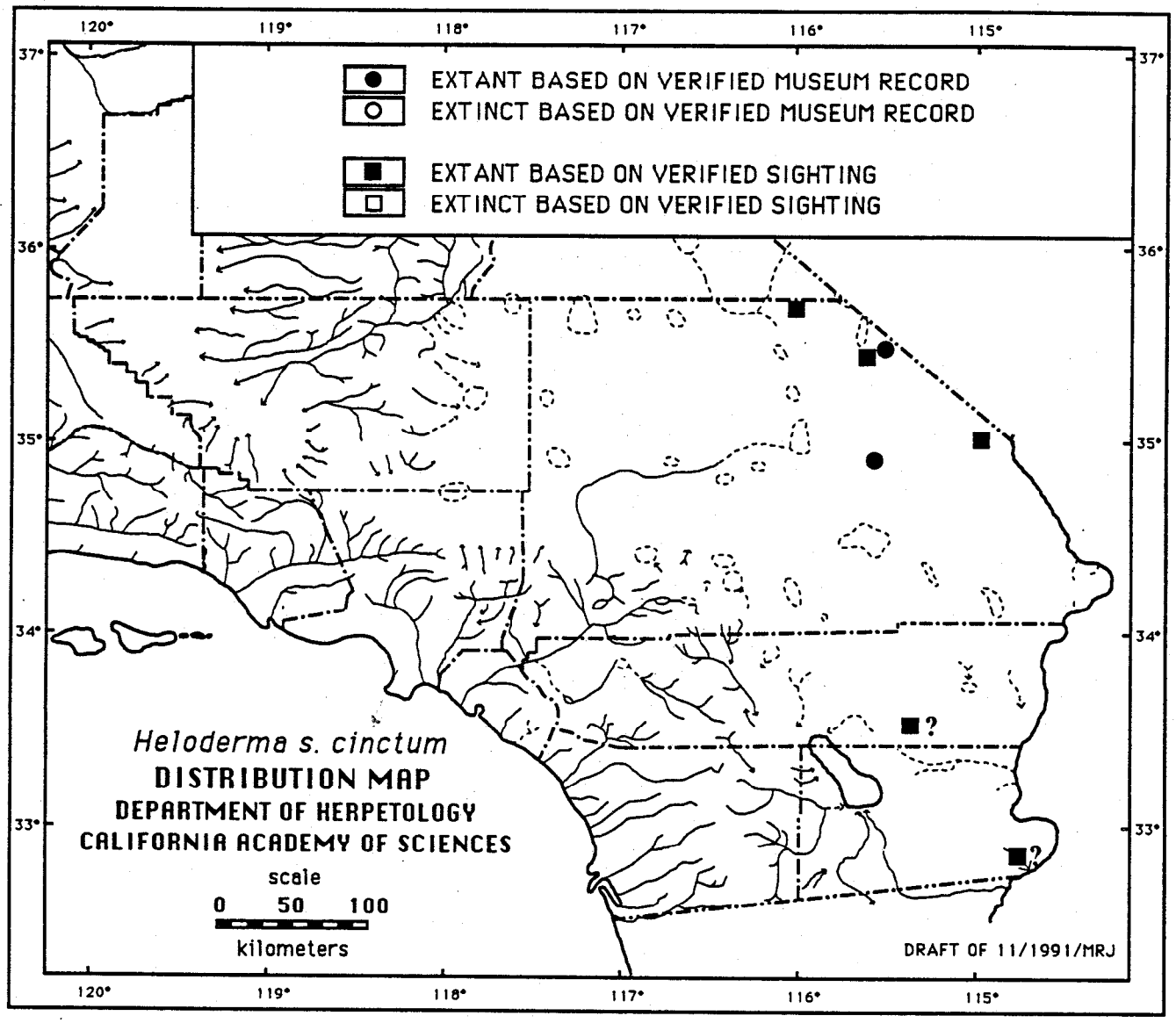

Figure 33. Historic and current distribution of the banded Gila monster (*Heloderma suspectum cinctum*) in southern California based on 9 locations from 3 museum records and 6 records from other sources.

Distribution: *Heloderma s. cinctum* ranges from the Vermillion Cliffs (Washington County), Utah (Woodbury 1931) southward through the lower Colorado River basin, which includes extreme southern Nevada (Bradley and Deacon 1966), southeastern California, and Arizona west of the Central Plateau to Yuma (Yuma County: DeLisle 1985). The known elevational range for *H. s. cinctum* extends from 45 m along lower Colorado River near Yuma to 1124 m at Congress (Yavapai County), Arizona (Bogert and Martín del Campo 1956). In California, *H.* s. *cinctum* is known from isolated records in the Clark, Kingston, Paiute, and Providence mountains of eastern San Bernardino County (DeLisle 1979, 1983, 1985; Ford 1981; Bicket 1982; Stebbins 1985: Figure 33). No specimens or photographs are available to verify other California records (i.e., 15.5 km east of Desert Center in the Chuckwalla Mountains [Riverside County: Tinkham 1971], and the Imperial Dam area [Imperial County: Funk 1966, DeLisle 1985]). In California, the known elevational range of *H. s. cinctum* extends from 45 m along the lower Colorado River to at least 1100 m in the Clark Mountains.

Life History: *Heloderma s. cinctum* is a relatively sedentary, venomous, largely diurnal lizard that often returns to the same overwintering sites year after year (Lowe et al. 1986). No life history studies of banded Gila monsters have been conducted in California. Much of this summary is based on recent work conducted in Utah (Beck 1990). Using it to interpret the behavior of *H. s. cinctum* in California should be done cautiously. *Heloderma s. cinctum* leaves overwintering sites located on elevated, rocky slopes during mid-March when temperatures consistently exceed 22°C and moves up to 1 km into less elevated, adjacent bajadas and valleys, where it occupies large (6-66 ha) home range areas during the spring-fall interval (Beck 1990). The banded Gila monster seems to spend most of its time (> 95%) underground in natural cavities or animal burrows (often not its own), and emerges only during the day, which is when foraging occurs (Jones 1983, Beck 1990). *Heloderma s. cinctum* feeds opportunistically, subsisting largely on eggs of birds (mourning dove [*Zenaida macroura*], Gambel's quail [*Lophortyx gambelii*]) and reptiles (desert tortoise), and rabbit (desert cottontail [*Sylvilagus audubonii*]) and ground squirrel (white-tailed antelope squirrel [*Ammospermophilus leucurus*]) young, which it finds while robbing nests over a broad area (Armberger 1948, Shaw 1948, Hensley 1949, Jones 1983, Vaughan 1987, Beck 1990; see also Barrett and Humphrey 1986). The venom is thought to be used solely for defensive purposes, rather than for subduing or predigesting prey (Lowe et al. 1986, Beck 1990). During the spring, banded Gila monsters may forage over significant distances (up to 1 km/day) to accumulate enough fat reserves (stored largely in the tail) for use during the rest of the year when food resources are scarce (Jones 1983, Beck 1990). Banded Gila monsters spend anywhere from a few minutes to 4-5 hours basking and foraging each day (Porzer 1982). The range of body temperatures at which Gila monsters are usually active is 22-37°C (Lowe et al. 1986, Beck 1990). As midday temperatures become warmer during April and May, surface activity shifts from a single midday interval to a bimodal pattern; most activity occurs during a 3-to-4 hour interval 1-2 hours after sunrise, but a less frequent, often shorter interval occurs in late afternoon (Porzer 1982, Jones 1983). Banded Gila monsters are frequently observed out of their burrows on warm cloudy days, but lizards out after dusk are usually hatchlings, or individuals that are starved, displaced by floods, or incapacitated from recent fights (Lowe et al. 1986). As temperatures cool during September, banded Gila monsters revert to a unimodal pattern of surface activity (Beck 1990). When air temperatures consistently drop below 25°C, lizards return to winter denning sites (Lowe et al. 1986).

In Arizona, banded Gila monsters normally breed from late April through early June (Lowe et al. 1986). Breeding adults can occupy the same burrow at this time and probably mate underground. Males appear to be territorial during the spring and early summer, often fighting rival males in bouts of up to several hours of intermittent combat (Beck 1990). Females lay 2-12 (average = 5), leathery, oblong (average = 59.8 mm long x 30.6 mm

wide), white eggs from mid-July to mid-August (Lowe et al. 1986). Eggs hatch from late April to early June after an incubation period of about 10 months, thus developing young overwinter in the nest. Hatchling *H. s. cinctum* average ca. 120 mm SVL (Bogert and Martín del Campo 1956) and grow rapidly until they attain approximately 260 mm SVL (minimum adult size), after which growth rates probably slow to 7-10 mm SVL/year (see Tinkham 1971). Adults grow more slowly (ca. 4-7 mm/year) until they reach 300 mm SVL, after which growth slows to < 2 mm/year (Beck 1990). Based on captive animals, sexual maturity is probably reached after about 4 years (DeLisle 1985). If the large sizes of adults found in the wild (up to 360 mm SVL) are an indication of extreme age (see Bogart and Martín del Campo 1956), then Gila monsters are extraordinarily long-lived; captives have been maintained in zoos for over 40 years (Jennings 1984b). These lizards have relatively few natural predators because of their large size, secretive habits, and venomous bite, but Harris hawks *(Parabuteo unicinctus)* and coyotes are known to prey on Gila monsters (DeLisle 1985).

Habitat: *Heloderma s. cinctum* occurs in several desert plant associations, but seem most common in the paloverde *(Cercidium* spp.)-saguaro *(Curnegia gigantea)* desertscrub association. However, Gila monsters can also occur in mesquite-grassland, creosote bush, and singleleaf pinyon *(Pinus monophylla)*-western juniper *(Juniperus occidentalis)* vegetation types (Bogert and Martín del Campo 1956, Ford 1981, Lowe et al. 1986, Beck 1990). In Arizona, they are absent in agriculturally-modified habitats and riparian zones (Lowe et al. 1986), but in California, *H. s. cinctum* has been recorded from willow-, mesquite-, salt cedar-, and mulefat-dominated rocky canyons (Bicket 1982), several of which could be construed as “desert riparian”. Banded Gila monsters are quite capable of digging (Lowe et al. 1986), but they depend largely on natural crevices, desert pack rat *(Neotoma lepida)* nests, or animal burrows (e.g., desert tortoise burrows) for shelter (Beck 1990). Significant differences exist between winter and summer homesites; banded Gila monsters winter at more elevated locations on rocky slopes, in rocky outcrops or below cliffs (often with other reptiles such as rattlesnakes and desert tortoises), whereas summer ranges are located in adjacent lower valleys or bajadas (Porzer 1982, Beck 1990). Preferred shelters normally face to the east, southeast, or south (Beck 1990). Habitat requirements appear similar for both juveniles and adults (Porzer 1982, Jones 1983). Data on nest sites are lacking.

Status: Special Concern; in California, this lizard is largely restricted to only a few isolated mountain ranges in the Mojave Desert, most of which are owned by the United States Bureau of Land Management or private mining companies. Known areas from which this species is recorded appear to be secure from immediate development. Banded Gila monsters are protected by the California Department of Fish and Game and it is illegal to pursue or possess this lizard without a special permit. However, a black market may exist for this species and some animals are still taken from the wild and sold as pets or for breeding purposes (unpubl. data). Banded Gila monsters are often killed by automobiles (DeLisle 1985) and sometimes by domestic dogs *(Canis familiaris:* Bogert and Martín del Campo 1956).

Management Recommendations: Directed field surveys for this taxon need to be conducted in the Mojave Desert to determine the true extent of its distribution in California. Historical locality records for this lizard in Riverside and Imperial counties need verification. Data regarding the basic biology of this taxon in California are especially needed. Notably, ecological studies to determine essential habitat requirements, namely refuge sites, nesting sites, and home ranges are needed in order to make sensible management recommendations. Telemetry is likely to be necessary to conduct studies of this taxon in California.

SAN DIEGO HORNED LIZARD
Phrynosoma coronatum blainvillii Gray 1839

Description: A large (65-110 mm SVL), dorsoventrally flattened lizard with five (four large, lateral, sometimes curved, and one moderate-sized, median) backwardly projecting head spines; a large shelf above each eye terminating a backwardly projecting, spine-like, scale (postrical); large, convex, smooth scales on the forehead (frontals); and two parallel rows of pointed scales fringing each side the side of the body (Reeve 1952, Jennings 1988c). No stripes radiate from the eyes (Stebbins 1985). The dorsal color is highly variable, but typically gray, tan, reddish-brown, or whitish, and usually resembles the prevailing soil color (Jennings 1988c). The venter is yellow to white with discrete, dark spots. The iris is black (pers. observ.).

Taxonomic Remarks: Wide disagreement has existed as to the allocation of horned lizards in the *coronatum-blainvillii* complex and their associated forms. Van Denburgh (1922a), Klauber (1936), Smith (1946), and Tinkham (1951) recognized two species *(P. blainvillii* and *P. coronatum)* each with several subspecies, while Linsdale (1932), Tevis (1944), Reeve (1952), and Murray (1955) argued for a single species *(P. coronatum).* Jennings (1988c) followed the latter arrangement based on the evolutionary arguments of Savage (1960, 1967) and Murphy (1983), but felt that *P. c. blainvillii* was a valid taxon. Taxonomy of this difficult group is currently being revised (R. Montanucci, pers. comm.). Genetic data on this taxon are based on only a few individuals from Baja California (Murphy 1983); characterization of genetic variation throughout the geographic range of *P. c. blainvillii* has never been attempted.

Distribution: *Phrynosoma c. blainvillii* was historically distributed from the Transverse Ranges in Kern, Los Angeles, Santa Barbara, and Ventura counties southward throughout the Peninsular Ranges of southern California to Baja California, Mexico as far south as San Vicente (Jennings 1988c). The known elevational range of this taxon is from ca. 10 m at the El Segundo dunes (Los Angeles County: Von Bloeker 1942) to approximately 2130 m at Tahquitz Meadow on Mt. San Jacinto (Riverside County: LACM 19890). In California, this taxon ranges from the Transverse Ranges to the Mexican border west of the deserts, although it occurs at scattered sites along the extreme western desert slope of the Peninsular Ranges (Jennings 1988c: Figure 34). In 1894, an attempted introduction of this taxon at Smugglers (= Pyramid) Cove, San Clemente Island (Los Angeles County: Mearns 1907) failed (Jennings 1988c). *Phrynosoma c. blainvillii* is thought to intergrade with *P. c. frontale* in extreme southern Kern County and northern Santa Barbara, Ventura, and Los Angeles counties (Reeve 1952, Montanucci 1968, Jennings 1988c).

Life History: *Phryosoma c. blainvillii* emerges from hibernation in late March (Pequegnat 1951, Howard 1974) and is surface active mostly during April-July, after which time most adults aestivate (Jennings 1987c, Hager 1992). San Diego horned lizards then reappear again briefly in August disappearing into overwintering sites from late August through early October, the variation depending on elevation (Klauber 1939, Howard 1974, Hager 1992) and perhaps local conditions. *Phrynosoma c. blainvillii* displays a distinctive sequence with regards to its daily diurnal activity. Frequently just before sunrise (when surface temperatures are > 19°C), San Diego horned lizards emerge from their burial sites in the substrate (sometimes with just the head exposed) and later move into a position where the first rays of the sun will allow them to bask (Heath 1965, Hager 1992). As temperatures warm, San Diego horned lizards thermoregulate by either shifting the orientation of their bodies relative to the sun or moving in and out of the shade; ultimately, an optimum body temperature range of 20.8-39.0°C (average = 34.9°C) is reached (Brattstrom 1965, Heath 1965). By late morning, body temperatures are elevated enough to allow the horned lizards to feed or engage in territorial and sexual behavior.

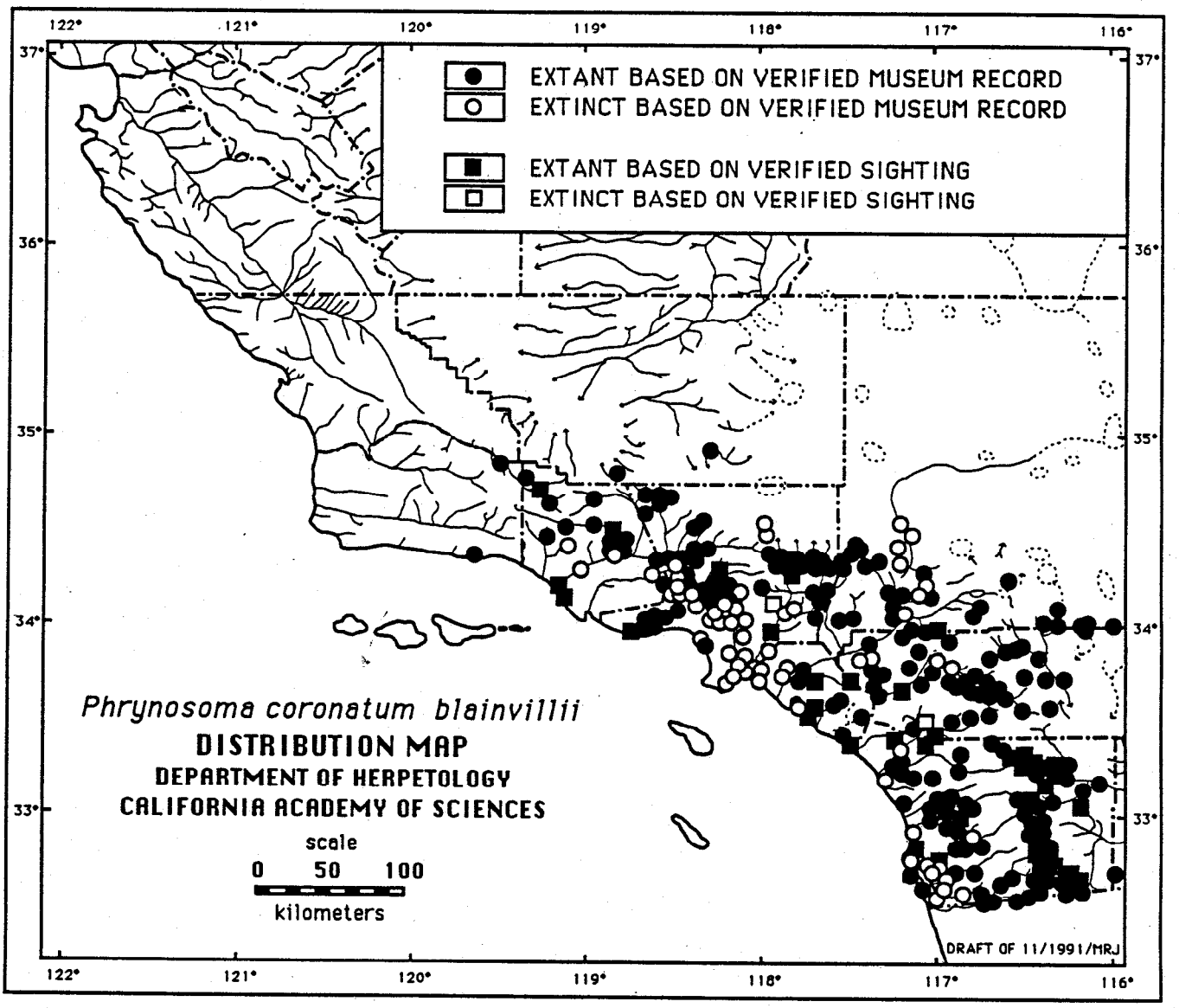

Figure 34. Historic and current distribution of the San Diego horned lizard (*Phrynosoma coronatum blainvillii*) in southern California based on 610 locations from 1054 museum records and 109 records from other sources.

During the warmest part of the day, *P. c. blainvillii* covers itself with loose soil by literally "swimming" into the substrate (Stebbins 1954b). San Diego horned lizards often display high site fidelity because effective temperature regulation requires familiarity with their surroundings (Heath 1965). In the later afternoon, individuals re-emerge from the substrate and resume full activities. The sequence of morning behavior is repeated in reversed order prior to when individuals rebury themselves in the substrate for the night. San Diego horned lizards do not voluntarily expose themselves to temperatures over 40°C for extended periods (Cowles and Bogert 1944, Brattstrom 1965; contra to Hager 1992), the condition that probably limits the distribution of this taxon primarily to areas west of the deserts in southern California (Heath 1965).

San Diego horned lizards are oviparous and lay one clutch of 6-17 (average = 11-12) eggs each year from May through early July (Stebbins 1954b, Howard 1974, Goldberg 1983); no data exist suggesting that this taxon can produce more than one clutch per year. Incubation requires approximately 2 months and hatchlings first appear in late July and early August (Shaw 1952, Howard 1974, Hager 1992). Male and female *P. c. blainvillii* require 2 to 3 years to reach the minimum size for sexual maturity (ca. 73 mm SVL for males, ca. 76 mm SVL for females; Stebbins 1954b, Howard 1974; Pianka and Parker 1975, Goldberg 1983). Data on longevity in the wild are lacking, but adults are thought to be long-lived (> 8 yr: see Baur 1986). No data are available on density or colonization abilities. Hager (1992) presented limited information on the home range and movement ecology for *P. c. blainvillii* in western San Bernardino and Riverside counties, but resightings are so few that home ranges are likely to be severely underestimated and interpretation of the significance of movement patterns is equivocal.

San Diego horned lizards have an insectivorous diet that consists mostly of native harvester ants *(Pogonmyrmex* spp.: Ingles 1929, Pianka and Parker 1975) and do not appear to eat exotic Argentine ants (pers. observ.; see also Montanucci 1989) that have been introduced to the western United States and have replaced native ants over much of central and southern California (Ward 1987). Ants can make up over 90% of the diet items of *P. c. blainvillii* (Pianka and Parker 1975), but the diet of this taxon may vary considerably with locality since it is an opportunistic feeder that will eat other insects (especially termites, beetles, flies, wasps, and grasshoppers) when the latter are abundant (Stebbins 1954b, Miller and Stebbins 1964). Known predators of *P. c. blainvillii* include the Southern Pacific rattlesnake *(Crotalus viridis helleri),* striped racer *(Masticophis lateralis),* burrowing owl *(Athene cunicularia),* greater roadrunner *(Geococcyx californianus),* loggerhead shrike, American kestrel *(Falco sparverius),* prairie falcon *(Falco mexicanus),* badger *(Taxidea taxus),* and gray fox *(Urocyon cinereoargenteus;* Bryant 1916, Von Bloeker 1942, Klauber 1972, Eakle 1984), but a variety of other predators probably take San Diego horned lizards. The defense this taxon typically uses against an approaching predator is to depend on its cryptic appearance by remaining motionless and to make a rapid run for the nearest cover only if disturbed or touched (pers. observ.). Captured lizards will puff themselves up with air, presumably to appear larger and less wieldy to a predator (see Tollestrup 1981), and may squirt blood from a sinus located in the eyelid of each eye if roughly handled (Bryant 1911, Burleson 1942).

Habitat: The San Diego horned lizard is found in a wide variety of habitats including coastal sage, annual grassland, chaparral, oak woodland, riparian woodland, and coniferous forest (Grinnell and Grinnell 1907, Klauber 1939, Stebbins 1954b). The key elements of such habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low, but relatively dense shrubs for refuge (pers. observ.). Historically, the San Diego horned lizard was most abundant in riparian and coastal sage habitats on the old alluvial fans of the southern California coastal plain (Grinnell and Grinnell 1907, Bryant 1911, Van Denburgh

1922a). In the foothill and mountain habitats covered with dense brush or other vegetation, San Diego horned lizards are largely restricted to areas with pockets of open microhabitat, a habitat structure that can be created by natural events such as fire and floods or human-created disturbances such as livestock grazing, fire breaks, and roads. Juvenile and adult *P. c. blainvillii* utilize the same general habitat, but oviposition and hibernation sites are unknown. This taxon is unable to survive in habitats altered through urbanization, agriculture, off-road vehicle use, or flood control structures (Grinnell and Grinnell 1907, Goldberg 1983, Jennings 1987c; pers. observ.).

Status: Threatened; the relatively specialized diet and habitat requirements, a high degree of site fidelity, and a defensive behavior based on crypsis make the San Diego horned lizard vulnerable. San Diego horned lizards seem to have disappeared from about 45% of its range in southern California; few populations are extant on the coastal plain where it was once common (Stewart in Bury 1972a; Hayes and Guyer 1981). This taxon was heavily exploited for the curio trade at the turn of the century (Tower 1902, Klauber 1939, Jennings 1987c), and later, by biological supply companies and the pet trade before commercial collecting was banned in 1981 (B. Brattstrom, J. Copp, and D. Morafka, pers. comm.). These factors, coupled with extensive habitat loss from agriculture and urbanization, have been the main reasons cited for the decline of this taxon (e.g., Jennings 1987c). Most surviving populations currently inhabit upland sites with limited optimal habitat (S. Goldberg and B. McGurty, pers. comm.). Many such sites occur on U. S. Forest Service lands that are marginally suitable. Under these conditions, populations of the San Diego horned lizard have become increasingly fragmented and have sustained the added stress of a combination of other factors that include fires, off-road vehicles, livestock grazing, pets (especially domestic cats), and various types of development. Perhaps the most insidious threat to the San Diego horned lizard is the progressive elimination of its food base by exotic ants that have invaded upland habitats. Argentine ants build nests in disturbed soils (such as around building foundations, roads, and landfills) and expand into adjacent areas, eliminating native ant colonies (Ward 1987; see also Nagano et al. 1981), as development continues. The defensive behavior of initially remaining immobile rather than fleeing makes San Diego horned lizards particularly vulnerable to capture by humans and domestic pets (Hayes and Guyer 1981), and to being killed by approaching vehicles. San Diego horned lizards do poorly in captivity without special care (Montanucci 1989), so captives have a low survivorship and few individuals, if any, are returned to the wild (B. McGurty, pers. comm.).

Management Recommendations: Comprehensive surveys that identify the best remaining habitat and largest extant populations of this taxon are needed in order to determine which areas should be protected from human disturbance as well as the many other factors that negatively affect San Diego horned lizards. Limited surveys and studies of the San Diego horned lizard are currently underway (Brattstrom 1990), but data are lacking to provide an understanding of the completion level of those surveys or the significance of the results (see Hager 1992). Existing surveys notwithstanding, much more extensivesurveys and studies of this taxon are needed. In particular, a more precise understanding of the negative effects of exotic organisms (especially ants and domestic cats) on horned lizard populations is urgently needed. Additionally, an understanding of the susceptibility of San Diego horned lizards to land-use practices potentially detrimental to its survival, such as livestock grazing, off-road vehicle use, and prescribed burning, is needed for management purposes. Proper management of this taxon also requires detailed studies of its movement ecology and colonization abilities. Although systematic revision of this taxon and its relatives based on morphology is currently underway, parallel studies using novel biochemical techniques are also needed to clarify the systematic status of *P. c. blainvillii.* In the absence of data from such studies, the vulnerability of San Diego horned lizards indicates that maximizing isolation from all aforementioned potentially negative

impacts is the best management option. That approach may be relaxed as new data from these studies becomes available.

CALIFORNIA HORNED LIZARD
Phrynosoma coronatum frontale Van Denburgh 1894

Description: A large (65-105 mm SVL), dorsoventrally flattened lizard with five (four large, lateral, sometimes curved, and one moderate-sized, median) backwardly projecting head spines; a large shelf above each eye terminating a backwardly projecting, spine-like, scale (postrictal); small, pointed rugose scales on the forehead (frontals); and two parallel rows of pointed scales fringing each side the side of the body (Reeve 1952, Jennings 1988c). No stripes radiate from the eyes (Stebbins 1985). The dorsal color is highly variable, but typically gray, tan, reddish-brown, or whitish, and usually resembles the prevailing soil color (Jennings 1988c). The venter is yellow to white with discrete, dark spots. The iris is black (pers. observ.).

Taxonomic Remarks: See taxonomic remarks under the *P. c. blainvillii* account. Characterization of genetic variation throughout the geographic range of *P. c. frontale* has never been attempted, and no other genetic data are available for this taxon.

Distribution: This California endemic originally had a spotty distribution from Kennett (now under Lake Shasta, Shasta County) southward along the edges of the Sacramento Valley into much of the South Coast Ranges, San Joaquin Valley, and Sierra Nevada foothills to northern Los Angeles, Santa Barbara and Ventura counties; California (Jennings 1988c; Figure 35). A disjunct locality at Grasshopper Flat near Medicine Lake (Siskiyou County) has been recorded (Banta 1962) as have several fine-scaled populations in the Shandon-Cuyama Valley region, Santa Barbara and San Luis Obispo counties, which have been mistakenly identified in Stebbins (1985) as *P. platyrhinos calidiarum* (S. Sweet, pers. comm.; pers. observ.). *Phrynosoma c. frontale* intergrades with *P. c. blainvillii* in southern Kern County and much of northern Santa Barbara, Ventura, and Los Angeles counties. The known elevational range for this taxon extends from near sea level at Monterey, Pacific Grove, and Seaside (Monterey County: Reeve 1952) to ca. 1980 m at Breckenridge on Breckenridge Mountain (Kern County: Van Denburgh 1922a).

Life History: Based on limited data, California horned lizards appear to have a life history very similar to the related San Diego horned lizard (see *P. c. blainvillii* account for comparison). *Phrynosoma c. frontale* have been observed to be active between April and October with activity being more conspicuous in April and May (Banta and Morafka 1968, Tollestrup 1981). Captive California horned lizards have been observed to copulate in late April and early May (Banta and Morafka 1968) while courtship activities have been noted in wild California horned lizards during April (Tollestrup 1981). Hatchlings first appear in July and August (Banta and Morafka 1968). Longevity in the wild is unknown, but captive *P. c. frontale* have been-maintained for over 8 years (Baur 1986). California horned lizards are recorded as preying on beetles and ants (Grinnell and Storer 1924), but probably take many other insects which ate seasonally abundant (Stebbins 1954b). Blunt-nosed leopard lizards *(Gambelia silus)* have been observed preying on California horned lizards (Montanucci 1965) at some sites, but not others (Tollestrup 1979). At sites where leopard lizards are not known predators, *P. c. frontale* may display aggressively at the latter and can displace it from basking sites (Tollestrup 1981). As for *P. c. blainvillii*, ejection of blood from its eyes is reported (Bryant 1911, Van Denburgh 1922a), probably as a defensive mechanism against potential predators.

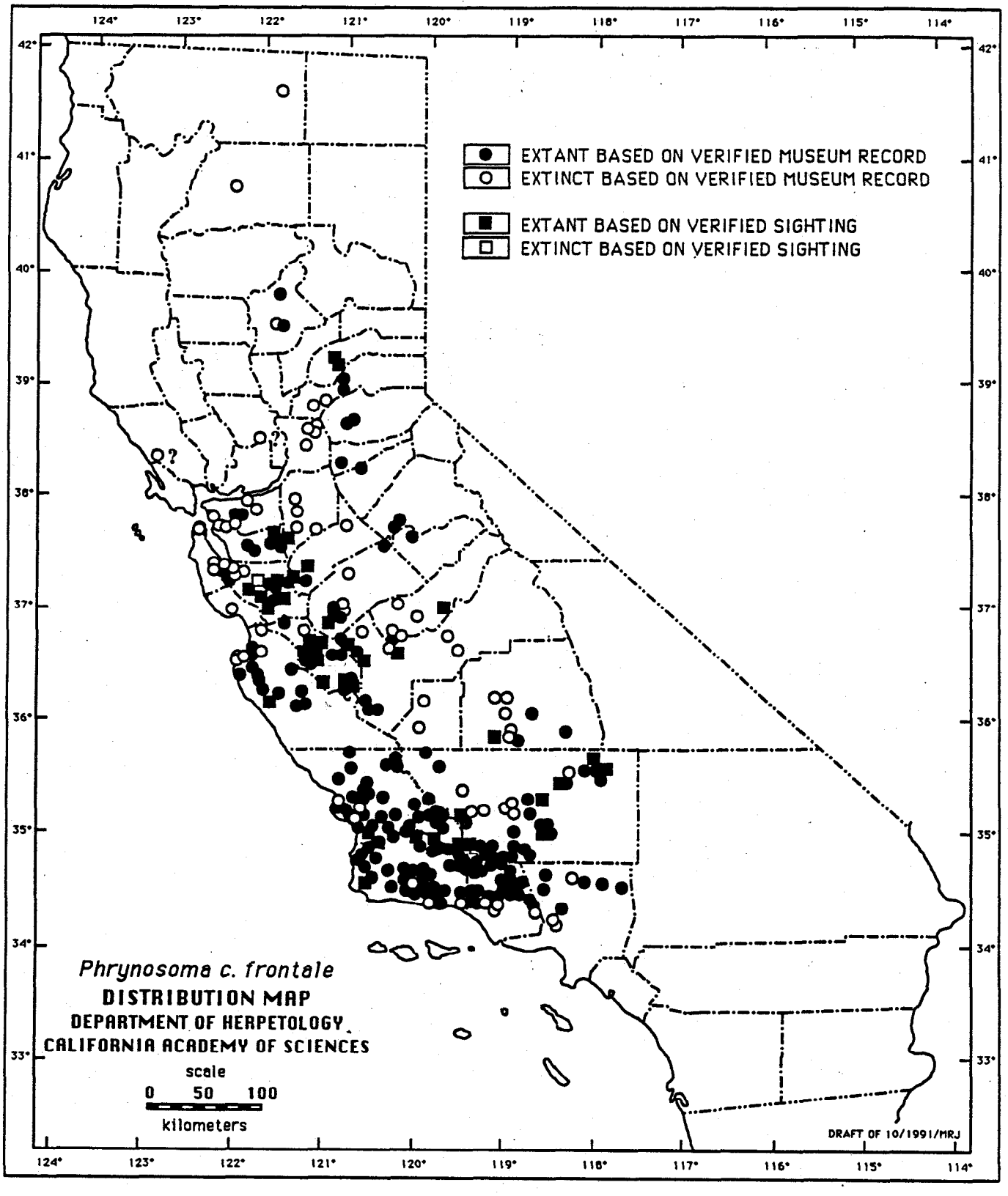

Figure 35. Historic and current distribution of the California horned lizard (*Phrynosoma coronatum frontale*) in California based on 640 locations from 979 museum records and 118 records from other sources.

Habitat: The California horned lizard seems to occur in several habitat types, ranging from areas with an exposed gravelly-sandy substrate containing scattered shrubs (e.g., California buckwheat; pers. observ.), to clearings in riparian woodlands (Stebbins 1954b), to dry uniform chamise chaparral (Banta and Morafka 1968) to annual grassland with scattered perennial seepweed *(Suaeda fruticosa:* Tollestrup 1981) or saltbush *(Atriplex polycarpa:* see Montanucci 1968; Tollestrup 1981) Montanucci (1968) indicates that *P. c. frontale* reaches it maximum abundance in sandy loam areas and on alkali flats, the latter often dominated by iodine bush *(Allenrolfea occidentalis).* The California horned lizard could apparently survive in vineyards, at least in the manner in which these were tended historically, because the typically sandy soil was suitable, the substrate was infrequently disturbed (Montanucci 1968), and probably because horned lizards could take refuge in the areas around the trunks of the perennial vines (see also *P. c. blainvillii* account). However, this is probably not the case today given the manner in which vineyards are currently tended because *P. c. frontale* is virtually never observed under such conditions. Historically, this taxon was identified as most abundant in relict lake sand dunes and old alluvial fans bordering the San Joaquin Valley (Bryant 1911, Van Denburgh 1922a). Zeiner et al. (1988) report that coast horned lizards utilize small mammal burrows or burrowed into loose soils under surface objects during extended periods of inactivity or hibernation, but data on over-wintering sites are fragmentary, and the general characteristics of overwintering sites are not well understood. Data on oviposition sites are unavailable.

Status: Threatened; *P. c. frontale* has disappeared from approximately 35% of its range in central and northern California and extant populations are becoming increasingly fragmented with continued development of the region. In the Central Valley, the conversion of a large percentage of the historical habitat of the California horned lizard from relict lake sand dunes and alluvial fans to agriculture (see Grinnell and Storer 1924), and to a lesser extent other development such as pipelines, canals, and roads, has resulted in the disappearance of this taxon from many areas. This activity continues and has been significantly extended into the surrounding foothills over the last 20 years as technological advances have allowed farmers to cultivate crops such as wheat *(Triticum aestivum),* grapes *(Vitis* spp.), and fruit orchards on increasingly steeper slopes previously only used for livestock grazing. Because the California horned lizard is probably long-lived, individuals may continue to be observed for some years along the fringes of agricultural developments. However, this lizard seems inevitably to disappear after several generations if the edge habitat is altered, or its food resources are reduced due to pesticides or habitat takeover by Argentine ants. Today, *P. c. frontale* remains abundant only in localized areas along the South Coast Ranges (e.g., Pinnacles National Monument, San Benito County), and in isolated sections of natural habitat remaining on the valley floor (e.g., Pixley Vernal Pools Preserve, Tulare County). The California horned lizard continues to be threatened by development in other parts of its range, especially near fast-growing hubs such as Bakersfield, Fresno, Modesto, and Sacramento. As more people move into the Sierra Nevada foothills below 1200 m, a trend that has been more pronounced in the last 15 years as more individuals have attempted to find a rural setting in which to settle, *P. c. frontale,* which has already relatively scattered populations in this region, can be expected to be more impacted there. The negative effects of human disturbance are not limited to the immediate vicinity of land disturbance or human habitation, sometimes effects are manifest at considerable distances (e.g., domestic cats have been observed to eliminate horned lizards within a several km^2 area from a cat's home base [G. Hanley, pers. comm.]).

Management Recommendations: Management recommendations for this taxon are parallel to those for *P. c. blainvillii* (see the previous species account). Comprehensive surveys of historical localities in the northern and Sierran slope portions of the range of this taxon urgently need to be conducted in April and May over several years to determine what

populations are still extant. Greater effort needs to be directed at preservation of remaining native plant community fragments, especially in the San Joaquin drainage basin, that contain habitat that has never undergone significant substrate disturbance.

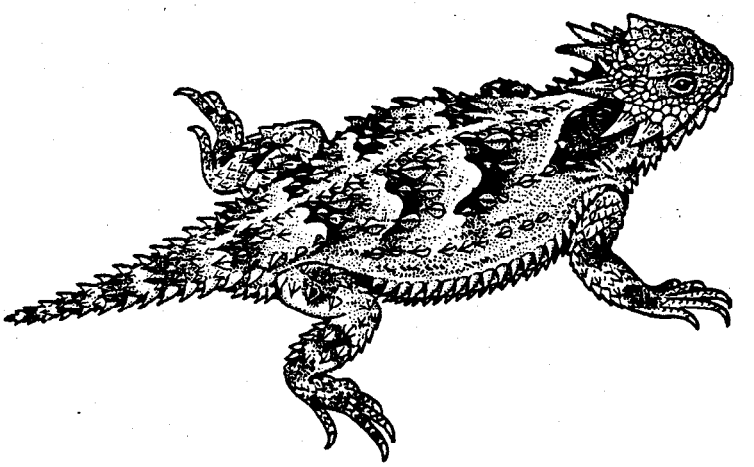

Plate 11. Adult coast horned lizard (*Phrynosoma coronatum*) [from Stebbins 1954b].

FLAT-TAILED HORNED LIZARD
Phrynosoma mcallii (Hallowell 1852)

Description: A moderated-sized (50.0-82.0 mm SVL), gray, tan, reddish-brown, or whitish horned lizard with a narrow middorsal stripe from the head to the base of the tail and a prominently dorsoventrally flattened tail (Funk 1981). The two largest (occipital) head spines are very long (3-4 times longer than their basal width) and do not contact each other at the base. Three shorter, lateral (temporal) spines are present on each side of the head. The undersurfaces are white without any markings or spots whatsoever. The iris color has not been described.

Taxonomic Remarks: The flat-tailed horned lizard is morphologically distinctive, it has not been confused with any other species of horned lizard, and it has not been partitioned infraspecifically (Funk 1981). No attempts have been made to characterize genetic variation across the geographic range of *P. mcallii.* An understanding of that variation is needed to determine whether a geographic pattern to genetic variation exists in this species.

Distribution: *Phrynosoma mcallii* occurs throughout most of the Colorado Desert, it extends from the north end of the Coachella Valley (Riverside County), California southward into northeastern Baja California, Mexico (Klauber 1932b), and eastward through southwestern tip of Arizona into Sonora, Mexico (Funk 1981). Its known elevational range extends from 52 m below sea level at Frink, Imperial County, California to ca. 300 m on Superstition Mountain (Imperial County: Funk 1981). In California, its range extends from central Riverside County southeast through most of Imperial County to the Mexican border (Figure 36). Flat-tailed horned lizards also enter extreme eastern San Diego County (Klauber 1932b).

Life History: *Phrynosoma mcallii* is a distinctive lizard with behavioral, morphological, and physiological features that allow it to survive in hot, dry environments with a sandy substrate. Its concealed tympanum; markedly dorso-ventrally flattened tail; distinctively pointed and sharply keeled scales just below its knees and just above its heels; and pale, reflective coloration are all features that facilitate its existence in hot, dry, sandy environments (Klauber 1939, Norris 1949; see also Stebbins 1944). *Phrynosoma mcallii* adults are obligate hibernators that. overwinter at 2.5-20 cm of depth in loose sand (Cowles 1941, Mayhew 1965b, Muth and Fisher 1992). While overwintering, flat tailed horned lizards have the ability to metabolize at a low rate during intervals when the temperature of the substrate in which they are located is relatively high. This feature of their physiology appears to be the result of overwintering sites often attaining high temperatures, and minimizes the probability that *P. mcallii* will deplete its stored energy reserves before spring emergence (Mayhew 1965b). Adult flat-tailed horned lizards emerge from overwintering sites relatively late in the spring season (April: Howard 1974; but see also Muth and Fisher 1992 who found lizards emerging in February and March in Imperial County); they emerge when substrate temperatures at a depth of 5 cm reach their voluntary minimum, which is relatively high (29.3°C: Cowles and Bogert 1044, Muth and Fisher 1992). Flat-tailed horned lizards display several behavioral and physiological traits that allow them to cope with the high temperatures regularly attained by the sandy substrate in which they live. They voluntarily maintain a higher body temperature when active (average = 37.8°C; n = 473) than most lizards (Mayhew in Pianka and Parker 1975; see also Brattstrom 1965), they orient relative to both the sun and the substrate depending on the temperature variation of each (Cowles and Bogert 1944, Heath 1965), and when sand surface temperatures reach or exceed 41°C, they avoid overheating by submerging themselves into the cooler subsurface sand by wriggling violently (Klauber 1930, Norris 1949). Female flat-tailed horned lizards lay clutches of 3-10 eggs in May (Norris 1949, Stebbins 1954b, Howard 1974), and may deposit a second clutch in favorable years

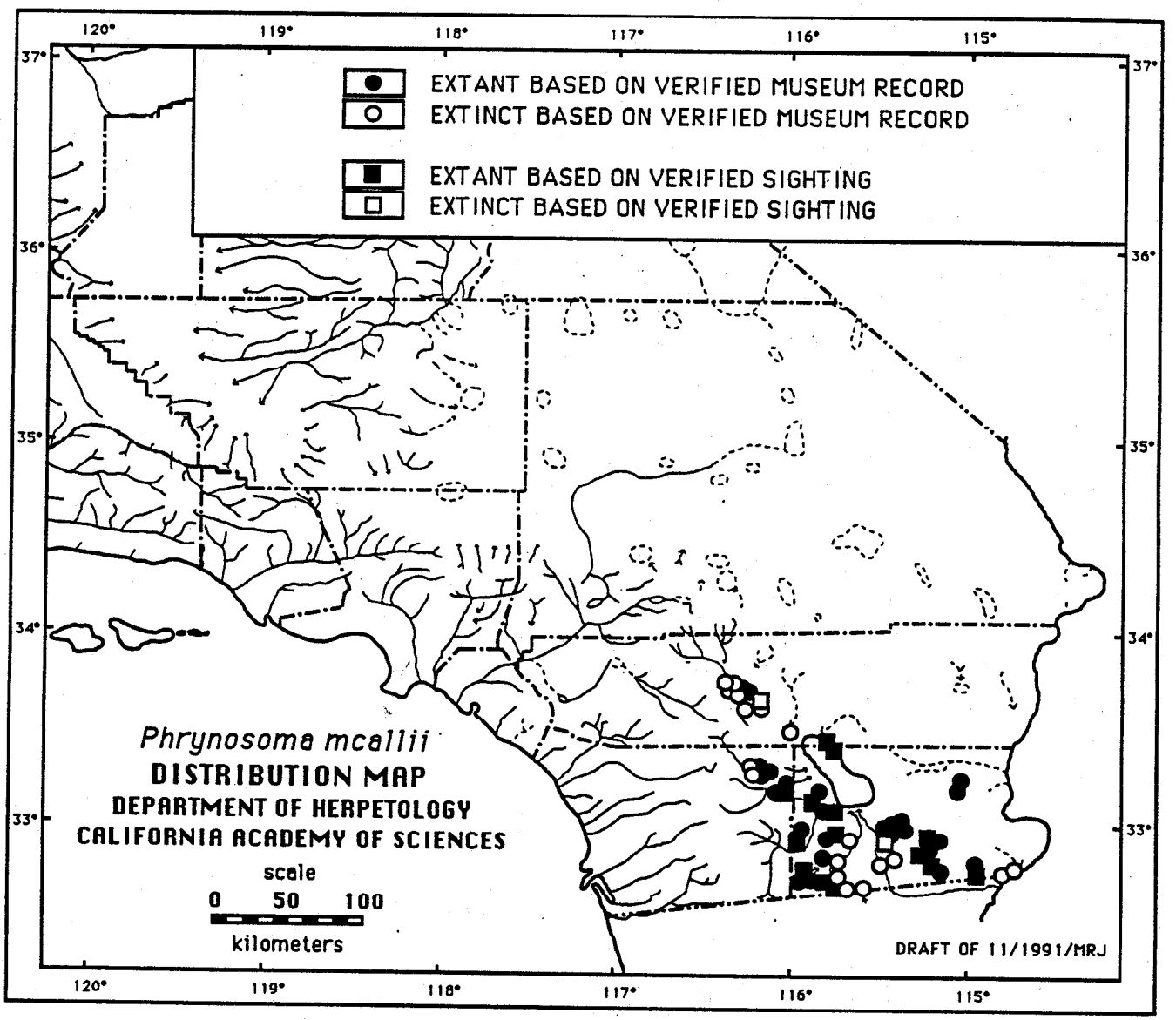

Figure 36. Historic and current distribution of the flat-tailed horned lizard (*Phrynosoma mcallii*) in southern California based on 149 locations from 200 museum records and 38 records from other sources.

(Turner and Medica 1982). Adults do not aestivate (Muth and Fisher 1992); the interpretation that adults aestivate (Howard 1974) was based on a biased sample from museums with no post-July collections of adults. The earliest clutches hatch in July, and hatchlings (34-38 mm SVL) emerge through September (Howard 1974, Turner and Medica 1982, Muth and Fisher 1992). Juveniles from early clutches can grow rapidly, reaching 54-64 mm SVL by October, and may reproduce in their first season after hibernation, where juveniles from late clutches likely have to wait until their second season to reproduce (Howard 1974, Muth and Fisher 1992). Females are probably not sexually mature until around 12 months of age (Muth and Fisher 1992; *contra* the Turner and Medica (1982) finding of 20 months of age). Longevity for the flat-tailed horned lizard is unknown. *Phrynosoma mcallii* is a dietary specialist that consumes mostly ants (Norris. 1949, Pianka and Parker 1975; Turner and Medica 1982). In the one study where ants were identified, the majority (> 80%) of ants consumed were three species of harvesters *(Veromessor pergandei, Pogonomyrmex californicus*, and *P. magnacanthus)* and *Conomyrma* sp. (Turner and Medica 1982). Juveniles of *P. mcallii* are known to be preyed upon by sidewinders *(Crotalus cerastes:* Funk 1965), while all age classes are subject to predation by round-tailed ground squirrels *(Spermophilus tereticaudus),* loggerhead shrikes, American kestrels, common ravens *(Corvus corax),* coyotes, and kit foxes *(Vulpes macrotis:* Muth and Fisher 1992, Duncan et al. 1994). Flat-tailed horned lizards are also killed by off-road vehicles and automobiles on paved roads (Muth and Fisher 1992; pers. observ.). *Phrynosoma mcallii* typically escapes its predators by initially fleeing a short distance, invariably diving into the sand, and subsequently remaining immobile (Klauber 1939, Norris 1949). According to Turner and Medica (1982), adult males occupied home ranges averaging nearly 1,287 m^2, whereas females occupied home ranges averaging less than half that size (509 m^2). More recently, estimates obtained with radio telemetry indicate home ranges over an order of magnitude larger (averaging 17,894 m^2 for adult males and 19,703 m^2 for females; Muth and Fisher 1992). The large discrepancy probably results from the fact that the Turner and Medica (1982) data seriously underestimate home range size because of the much lower number of captures.

Habitat: *Phrynosoma mcallii* is a specialized sand-dweller that has not been observed outside of areas with a shifting sand substrate (Norris 1949), areas in which it is known to forage (Turner and Medica 1982), and overwinter (Mayhew 1965b). It requires fine, wind-blown (aeolian) sand deposits and has been recorded in several vegetative associations where such a substrate is present, including those where creosote bush, burro weed *(Franseria dumosa),* bur-sage *(Ambrosia dumosa),* and indigobush *(Psorothamnus emoryi)* are abundant (Norris 1949, Turner and Medica 1982, Muth and Fisher 1992). It seems to be more abundant in associations where plants large enough to form nuclei for sand accumulations are present (Norris 1949), and a strong, positive correlation ($r = 0.93$) between the abundance of *P. mcallii* and the total density of perennial plants has been identified (Turner and Medica 1982). Muth and Fisher (1992) related the preference of flat-tailed horned lizard for bur-sage and indigobush to the fact that both species are low growing, densely branched shrubs with multiple branching at the crown, a growth habit that permits it to accumulate more sand at the base than co-occurring single-stemmed species, and provide more shade than other co-occurring multi-stemmed species (e.g., creosote bush). These relationships may be a function of vegetation being important for oviposition sites, which have never been identified, but are likely to be located next to clumps of vegetation because the vegetation tend to stabilize shifting sand, which may be important to the stability of a nest site. High lizard abundance has also been generally associated with high abundances of harvester ants (Turner and Medica 1982).

Status: Threatened; historically, this lizard was never a common species (Klauber 1939, Norris 1949), but the observations of Wilbur W. Mayhew in the early 1960s first gave rise

to concerns that this species might be declining. Stewart (1971) and others repeating Mayhew's earlier concern regarding the status of *P. mcallii* because of increased use and development of desert areas in Riverside and Imperial counties in the late 1960s and early 1970s led to the Office of Endangered Species (United States Fish and Wildlife Service) designating *P. mcallii* as a species that should be reviewed (Turner et al. 1980; see also Johnson and Spicer 1985). This action ultimately led to the Bureau of Land Management supporting investigations of the status of *P. mcallii* in California (Turner and Medica 1982; see also Turner et al. 1980 and Rado 1981). Based on their surveys, Turner and Medica (1982) concluded that *P. mcallii* was not endangered, but they noted that, "While *P. mcalli[i]* still exists comfortably in parts of its geographic range, it is rapidly disappearing in others. For example, areas developed in Riverside County and in the south-central portion of Imperial County are no longer inhabited by *P. mcalli[i]....Perhaps* the most dramatic change in apparent abundance of *P. mcalli[i]* has occurred along the 11-km stretch of California Highway 78 west of the Algodones Dunes....over 500 *P. mcalli[i]* were captured or observed dead along this road between 1961 and 1964. But our research in 1978 and 1979 showed *P. mcalli[i]* to be uncommon in this area." Turner and Medica (1982) also indicated that an exhaustive analysis of how present and projected land used in southeastern California showed that about 52% of the estimated geographic range of *P. mcallii* in California (ca. 7,000 km^2) was within areas subjected to one or more use-oriented activities (e.g., agriculture; sand and gravel quarries; off-road-vehicle "parks"; approved oil, gas, and geothermal leases). On 20 January 1986, Barbara A. Carlson and Wilbur W. Mayhew submitted a well-supported petition to the California Fish and Game Commission to have *P. mcallii* listed as Endangered (see Carlson and Mayhew 1986). The significant data in that petition consisted of a resampling of sites that Turner and Medica (1982) had discussed; the data presented by Carlson and Mayhew indicate a significant reduction in the relative abundances of *P. mcallii* from the data presented by Turner and Medica (1982). As required by Section 2074.6 of the Fish and Game Code, Betsy C. Bolster and Kimberly A. Nicol (California Fish and Game staff) rewrote the Carlson-Mayhew document as a status report and suggested that *P. mcallii* be listed as Threatened (see Bolster and Nicol 1989). Based on aerial photographs, our current assessment is that about 70% of the range of *P. mcallii* is impacted by one or more of the uses discussed by Rado (1981), and that flat-tailed horned lizards have been eliminated entirely from roughly 30% of this historic range. These data coupled with the trends indicated by the aforementioned reports strongly justify listing this species as Threatened. The defensive behavior of *P. mcallii* making it particular susceptible to injury by off-road vehicles (Muth and Fisher 1992; see also Collins 1988) and the fact that off-road vehicle use continues at high levels over much of the region where this taxon occurs (Bury and Luckenbach 1983, Turner et al. 1984) make *P. mcallii* especially susceptible to mortality from this source, whether it be accidental or the result of clandestine activity. The new home range data of Muth and Fisher (1992) also indicate that *P. mcallii* may be much more susceptible to habitat disturbance than previously thought.

Management Recommendations: While the life history of *P. mcallii* is understood in a general way, understanding of its movement ecology, its recolonization potential, and the variation in its nesting sites are essential to future management recommendations. Current understanding of the population dynamics and recolonization potential of *P. mcallii* is too poor to ignore taking significant action now. Two-year life history studies by Muth and Fisher (1992) have assisted in understanding part of the aforementioned aspects of the life history of *P. mcallii,* but they need to be continued for at least another 10 years to determine long-term trends for this taxon. In addition, surveys discussed by Carlson and Mayhew (1986) on the permanent plots established by Turner and Medica (1982) need to be continued on a yearly basis and their geographic scope extended. The recent petition to list this species as threatened was rejected by the Commission based on insufficient

information (Muth and Fisher 1992). Efforts should be made to regularly collect the data upon which a sufficient-data Commission decision can be based. A more precise understanding of how this species responds to off-road vehicles is especially needed. The dynamics of aeolian sand habitats and adjacent habitats needs to be better understood so that these areas can be appropriately managed to ensure the survival of the flat-tailed horned lizards.

COLORADO DESERT FRINGE-TOED LIZARD
Uma notata notata Baird 1858

Description: A moderate-sized (69.0-121 mm SVL), pale-colored lizard with a dorsal reticulum of black-bordered pale spots with red centers (ocelli: Norris 1958, Stebbins 1985). Ocelli tend to form broken lines that extend the length of the body. Undersurfaces are white except for "chevron-like" diagonal dark lines on the throat, dark bars on the tail, and a single dark spot or bar on each side of the belly (Stebbins 1954b). The side of the belly around each dark spot or bar has a permanent orange or pinkish stripe, colors which may be more vivid during the breeding season (Norris 1958). The iris is black.

Taxonomic Remarks: The taxonomic status of *Uma notata notata* is controversial. Heifetz (1941) differentiated this taxon morphologically from the remaining two of the three members of the genus *Uma* in California *(U. inornata* and *U. scoparia)* based on characters that seem to be variable at a population level (Norris 1958, Mayhew 1964a). These data lent support to the earlier suggestion that all three California taxa represent one species (Stebbins 1954b). Based on behavioral data, Carpenter (1963) regarded two of the three taxa, *U. notata* and *U. inornata*, as subspecies of the former, but accorded *U. scoparia* specific rank. This pattern of allocation creates a historical unit, the *U. notata* and *U. inornata* cluster, that is nonsense (a paraphyletic group) based on genetic data (Adest 1977). The low level of geneticdifferentiation between the three California taxa (Adest 1977) seems to support the suggestion that all three taxa should be considered one species (e.g., Collins 1990). However, the genetic comparison was based on a small number of allozymes and only one sample of each of the three currently recognized members of the genus *Uma* in California. Moreover, morphological and genetic analyses have not been coupled, so it is impossible make a sound systematic determination with such non-parallel data. Comprehensive assessment of genetic variation across the range of *U. notata* and potentially conspecific populations now recognized under other names is needed. Such an assessment should be coupled to a morphological analysis of those same populations. This analysis is of some significance because the potentially conspecific population system currently recognized under the name *U. inornata* is presently listed as being Federally Endangered.

Distribution: This taxon is thought to be distributed from northeast of Borrego Springs (northeast San Diego County) westward to the Colorado River and southward into Baja California (Mexico) at a latitude roughly due west of the mouth of the Colorado River. Heifetz (1941) allocated populations of *Uma* in the Gila drainage (Arizona) to this taxon, but Norris (1958) restricted *U. n. notata* to populations west of the Colorado River. Its known elevational ranges extends from below sea level at -74 m (at the edge of the Salton Sea, Imperial County: Norris 1958) to ca. 180 m (northeast of Borrego Springs, San Diego County). In California, its range extends from northeastern San Diego County through the southern two-thirds of Imperial County to the Colorado River (Pough 1977: Figure 37). We caution that because of the difficulties with this taxon noted above, the distribution we provide here is based entirely on the most recent assessment by previous workers. Verification of the distribution of this taxon will require the systematic analysis we have indicated.

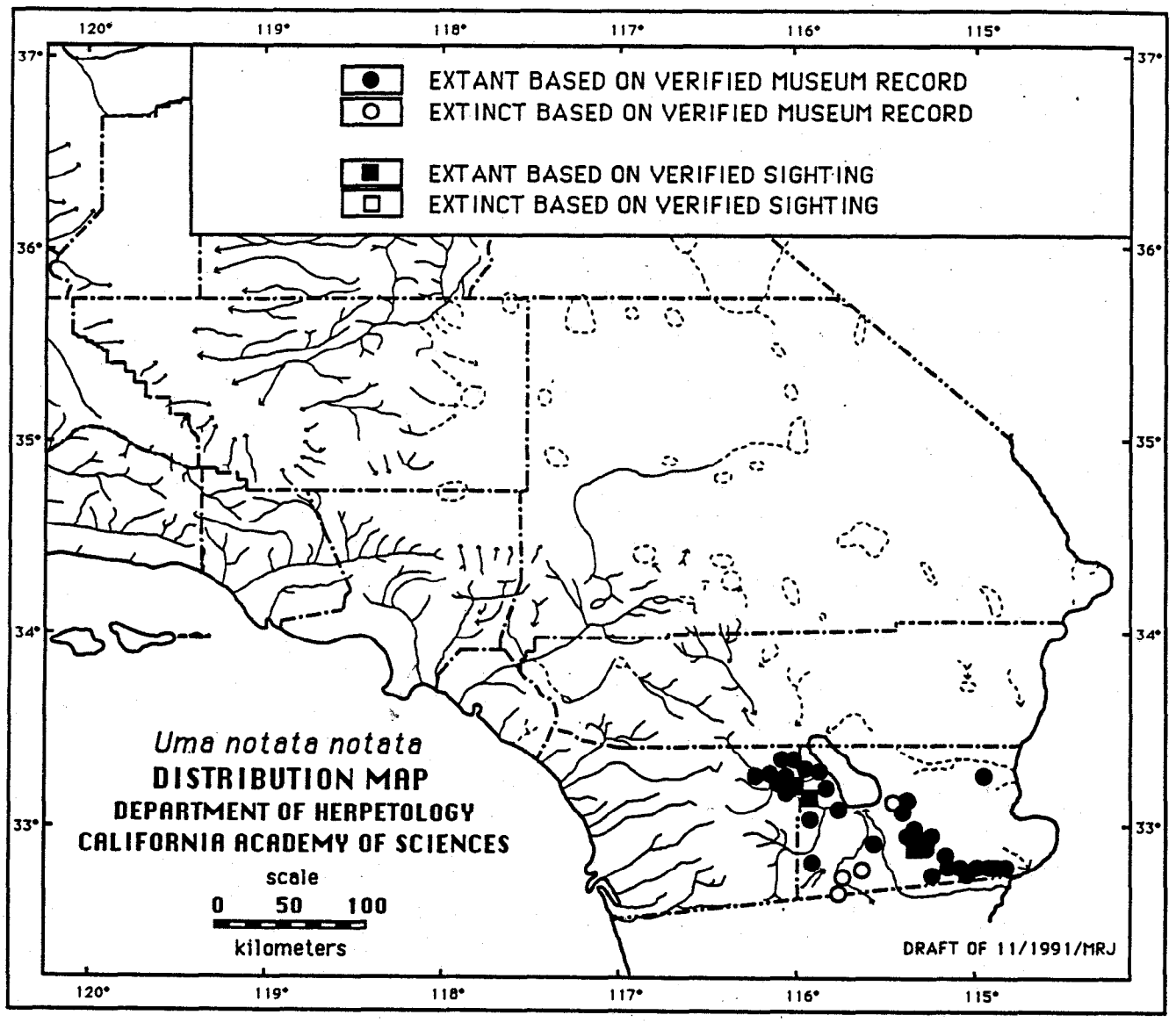

Figure 37. Historic and current distribution of the Colorado Desert fringe-toed lizard (*Uma notata notata*) in southern California based on 143 locations from 451 museum records and 7 records from other sources.

Life History: *Uma n. notata* is a distinctive lizard that is behavioral, morphologically, and physiologically specialized for living in hot, dry, sandy habitats. Its dorso-ventrally flattened body shape, concealed eardrum (tympanum), fringed toes, distinctive pointed and keeled scales below the knee and above the heel, nasal valves, and pale dorsal coloration are all features that facilitate its survival as a sand-dwelling lizard (Stebbins 1944, Norris 1958, Pough 1970; see also Stebbins 1948). Experiments have shown that the fringed toes, the namesake from which the genus to which *Uma* derives its common name, significantly assist movement on shifting sand (Carothers 1986). Adults of *U. n. notata* overwinter at moderate depths (ca. 30 cm) in sand (Cowles 1941), but smaller individuals may remain active throughout the year (Deavers 1972). Colorado Desert fringe-toed lizards do not emerge until substrate temperatures reach at least 26°C (Cowles and Bogert 1944), which typically results in their emerging for overwintering sites in late March or early April. *Uma n. notata* displays several behavioral and physiological traits that allow them to cope with the high temperatures regularly attained by the sandy substrate in which they live. They voluntarily maintain a higher body temperature when active (39.9°C) than most lizards (Deavers 1972); they orient relative to both the sun and the substrate depending on the temperature variation of each (Cowles and Bogert 1944); when sand surface temperatures reach or exceed 43°C, they submerge themselves into the cooler subsurface sand by wriggling violently to avoid overheating (Stebbins 1944, Norris 1958); and they exhibit other physiological features that allow them to cope with this extreme environment (Pough 1969a, Deavers 1972). In addition, *U. n. notata* displays coupled behavioral and morphological features that assist in undersand breathing (Pough 1969b). Adults probably typically mate in May, and females typically deposit clutches containing two eggs from late May to early August (Mayhew 1966). Females may lay more than one clutch per year, but adults are sensitive to food levels and will not reproduce if they do not obtain adequate food (Mayhew 1966). Since insect productivity is directly related to annual rainfall, lizards probably have a significantly depressed reproductive output in years with low rainfall. The known predators of *U. n. notata* are badgers, glossy snakes *(Arizona elegans)*, sidewinders, coachwhips, loggerhead shrikes, roadrunners, and coyotes (Stebbins 1944). *Uma n. notata* employs an escape behavior similar to its thermoregulatory behavior, it initially flees from a predator to a reasonably safe distance and then buries itself in the sand (Stebbins 1944).

Habitat: *Uma n. notata* is a habitat specialist that is totally restricted to habitats of aeolian sand (Norris 1958). Aeolian sand in which *U. n. notata* can be found has a grain size typically no coarser than 0.375 mm in diameter (averages 0.205 mm in diameter). As with *U. inornata* (Turner et al. 1984), increased sand penetrability (i.e., how easy the sand is to burrow into), is probably an important factor constraining the local distribution of *U. n. notata* The dominant plant in the associations in which *U. n. notata* is found include the following perennial shrubs: burro weed, creosote bush, croton *(Croton wigginsii)*, desert buckwheat *(Eriogonum deserticola)*, honey mesquite *(Prosopis glandulosa)*, mormon tea *(Ephedra californica)*, and the composite *(Helianthus tephrodes)*, none of which occur in very high density, giving the habitat an open sparse appearance (Stebbins 1944, Norris 1958, Mayhew 1966). Burrowing in sand on the lee side of desert shrubs has been noted by several authors (Stebbins 1944, Norris 1958), a selection that may be influenced by the differences in penetrability and grain size of the sand in those locations (see Turner et al. 1984). The location of oviposition sites is unknown, but they may be located at the base of perennial plants (see the flat-tailed horned lizard *(Phrynosoma mcallii)* account).

Status: Special Concern; although this species has a reasonably broad range in California, it is vulnerable because of its specialization for fragile sandy habitats that have been heavily impacted by off-road vehicles in the last 20 years (Busack and Bury 1974, Bury and Luckenbach 1983, Luckenbach and Bury 1983, Maes 1990). Although probably not as vulnerable as *P. mcallii*, most of the comments made under the status section for that

species also apply to *U. n. notata.* The escape behavior of *U. n. notata* makes its vulnerable to injury from off-road vehicles, which continue to be used at high levels over the range of *U. n. notata* (Maes 1990, King and Robbins 1991b). As demonstrated for *U. inornata*, the surface stabilization and sand depletion that occur as a result of the placement of windbreaks (e.g., rows of salt cedar: Turner et al. 1984) and probably other structures, an increasing phenomenon over the range of *U. n. notata*, threatens to continue to decrease the amount of habitat available for this taxon.

Management Recommendations: Much of the ecology of *U. n. notata* is reasonably well-known, but several key aspects are not. In particular, the location of oviposition sites and the variation in their location, the movement and recolonization abilities of this taxon, and a better understanding of variation in habitat suitability with the vegetation association and the specific species consumed in the diet. Additionally, regular annual surveys conducted at fixed locations and at identical diel and seasonal intervals are needed to track long-term trends in this species (see Maes 1990). Sweeps surveys to estimate sand lizard track densities (see England and Nelson 1977) need further evaluation as a survey method. Long-term data are particularly important to couple to any measurements of habitat change for management purposes. Emphasis on preservation of large, unobstructed expanses of aeolian sand habitat is needed. The dynamics and variation in the natural maintenance of such habitats is poorly understood, and urgently needs study before definitive management recommendations regarding the size of areas needed for long-term persistence of this taxon.

MOJAVE FRINGE-TOED LIZARD
Uma scoparia Cope 1894

Description: A moderate-sized (69.0-112.0 mm SVL), pale-colored lizard with a dorsal reticulum of black-bordered spots with red centers (ocelli: Norris 1958, Stebbins 1985). Ocelli are irregularly arranged over the back. Undersurfaces are white except for crescent-shaped dark marking on the throat, dark bars on the tail, and a single, prominent dark spot on each side of the belly (Norris 1958). During breeding, a yellow-green ventral wash develops that becomes pink on the side of the body (Stebbins 1985). The iris is black.

Taxonomic Remarks: Remarks made regarding the taxonomic status of *Uma notata notata* generally also apply to *Uma scoparia.* It needs emphasis that determination of the systematic status of *U. scoparia* cannot be made without a comprehensive assessment of genetic variation across its range coupled to a morphological analysis of those same populations.

Distribution: The known distribution of this near-endemic to California extends from extreme southern Inyo County (Norris 1958) through most of San Bernardino County and barely into the northeast comer of Los Angeles County southward and eastward through the eastern half of Riverside County to the vicinity of Blythe (Figure 38). A single record exists for Parker, Yuma County, Arizona (Pough 1974). Its known elevational range extends from below sea level to ca. 1000 m in the vicinity of Kelso (San Bernardino County).

Life History: Many of the generalized comments that apply to the genus made in the *U. n. notata* account also apply to this species. *Uma scoparia* is sand-dwelling specialist that inhabits similar environments utilized by *U. notata* (Stebbins 1944, Norris 1958). Lizards emerge from hibernation sites in late March or early April (Mayhew 1964b). Adults begin to exhibit breeding colors during April and breeding continues through July (Norris 1958). Males actively defend territories against other rival males in addition to courting females. Females also maintain territories, but they do not show any aggression against other individuals (Kauffman 1982). Home ranges for adult males are estimated to average 0.10 ha, while home ranges for adult females averaged 0.034 ha and overlapped the territories of adult males (Kauffman 1982). Females deposit from 2-5 (average = 2-3) eggs in sandy hills or hummocks during the months of May through July (Stebbins 1954b, Kauffman 1982). Some adult females produce more than one clutch of eggs a year. Hatchlings first appear by September (Miller and Stebbins 1964), and grow rapidly over the next 2 years. Most males and females teach sexual maturity (70 mm and 65-70 mm SVL, respectively) two summers after hatching. Juveniles do not defend territories until they become subadults. Juveniles eat largely arthropods and only a small amount of plant material; in contrast, adult *U. scoparia* consumed more plant material than arthropods (Minnich and Shoemaker 1970, 1972). Foods consumed by these opportunistic feeders include dried seeds, grasses, ants, beetles, scorpions (Scorpionida), and occasionally conspecifics (Miller and Stebbins 1964, Minnich and Shoemaker 1970, 1972). Both juveniles and adults have daily activity patterns that are temperature dependent. From April to May, lizards are active during the mid-day. From May to September, they move about in the mornings and late afternoons, but retreat underground when temperatures are high (Miller and Stebbins 1964). Hibernation occurs from November to February (Mayhew 1964b). Known predators are the same animals listed for *U. n. notata* (see previous account), plus the burrowing owl (Miller and Stebbins 1964) and leopard lizard *(Crotaphytus wislizenii:* Gracie and Murphy 1986).

Habitat: The habitat characteristics of *U. scoparia* are essentially identical to those for *U. n. notata* except that some of the vegetation associates will differ because the range of the

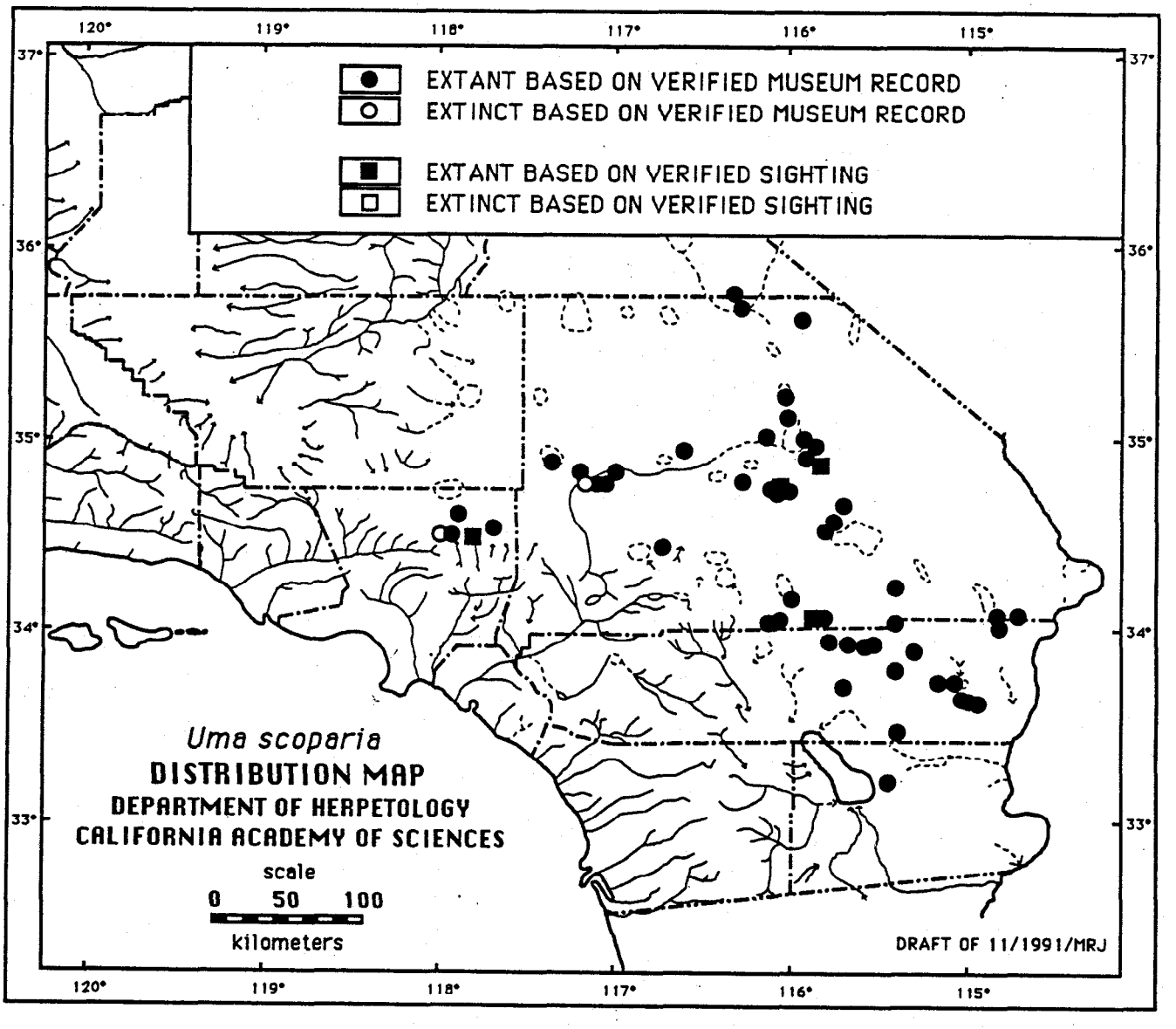

Figure 38. Historic and current distribution of the Mojave Desert fringe-toed lizard (*Uma scoparia*) in southern California based on 140 locations from 599 museum records and 8 records from other sources.

former is largely the Mojave desert region in California. The habitat section of the *U. n. notata* account should be referred to. Throughout most of its range, *U. scoparia* is found in creosote bush scrub (Kauffman 1982).

Status: Special Concern; most of the comments made for *U. n. notata* also apply to this species, although the importance of major impacts differ somewhat. Off-road vehicles seems to be the more important impact over most of the range of *U. scoparia,* whereas the influence of development is currently really significant in the western Mojave desert Several towns in the western Mojave (e.g., Hesperia, Lancaster, Palmdale, and Victorville) have sustained extraordinary levels of growth (up to over an order of magnitude) over the last 15 years. This level of growth has not only fragmented desert habitat, but markedly increased the local use of adjacent desert areas. The increase in landfills associated with such growth has resulted in a marked increase in selected generalized predators (e.g., common ravens; see King and Robbins 1991b and Camp et al. 1993), which are implicated in recruitment declines in other species such as desert tortoises (U.S. Fish and Wildlife Service 1990). Such predators may have similar negative effects on the Mojave fringe-toed lizard (King and Robbins 1991b).

Management Recommendations: Most of the comments made for *U. n. notata,* except that regarding oviposition sites, also apply to this species. The ability of fragments of sandy desert habitat to sustain populations of the Mojave fringe-toed lizard over the long-term needs to be determined. It is unclear what sort of use and what intensity of use desert habitats can sustain and still maintain Mojave fringe-toed lizards; Additionally, it needs to be determined whether the generalized predators currently on the increase have any significant effect on the recruitment or survivorship of Mojave fringe-toed lizards.

SANDSTONE NIGHT LIZARD
Xantusia henshawi gracilis Grismer and Galvan 1986

Description: A medium-sized (50-70 mm SVL), narrow-waisted, soft-skinned lizard with fine, granular scales; a flattened head; an enlarged temporal scale; gular folds; lidless eyes; and vertical elliptical pupils (Grismer and Galvan 1986). The dorsoventrally flattened, slender body is covered with a dense pattern of reduced dark brown spots on a light colored background (Grismer and Galvan 1986). The venter is white with minute amounts of black peppering present only on forepart of the body (Grismer and Galvan 1986). The iris is dark brown with dense iridiophores split by a vertical eye stripe (pers. observ.).

Taxonomic Remarks: This recently described night lizard is considered morphologically (Grismer and Galvan 1986) and biochemically distinct (Bezy and Sites 1987) from the granite night lizard *(X. h. henshawi).* Analysis of genetic variation across its highly restricted known geographic range has not yet been attempted.

Distribution: The known range of this California endemic is confined to the Truckhaven Rocks, a 1.3-km wide x 3-km long outcrop in the eastern part of Anza-Borrego State Park (Figure 39). The known elevational range of the sandstone night lizard extends from 240 m to 305 m.

Life History: Virtually nothing is known of sandstone night lizard life history. The morphology of *X. h. gracilis* is thought to facilitate survival in sandstone and mudstone habitat, a rocky substrate that undergoes constant local erosion (Grismer and Galvan 1986). These authors speculate that it may be excluded by other saxicolous lizards (e.g.

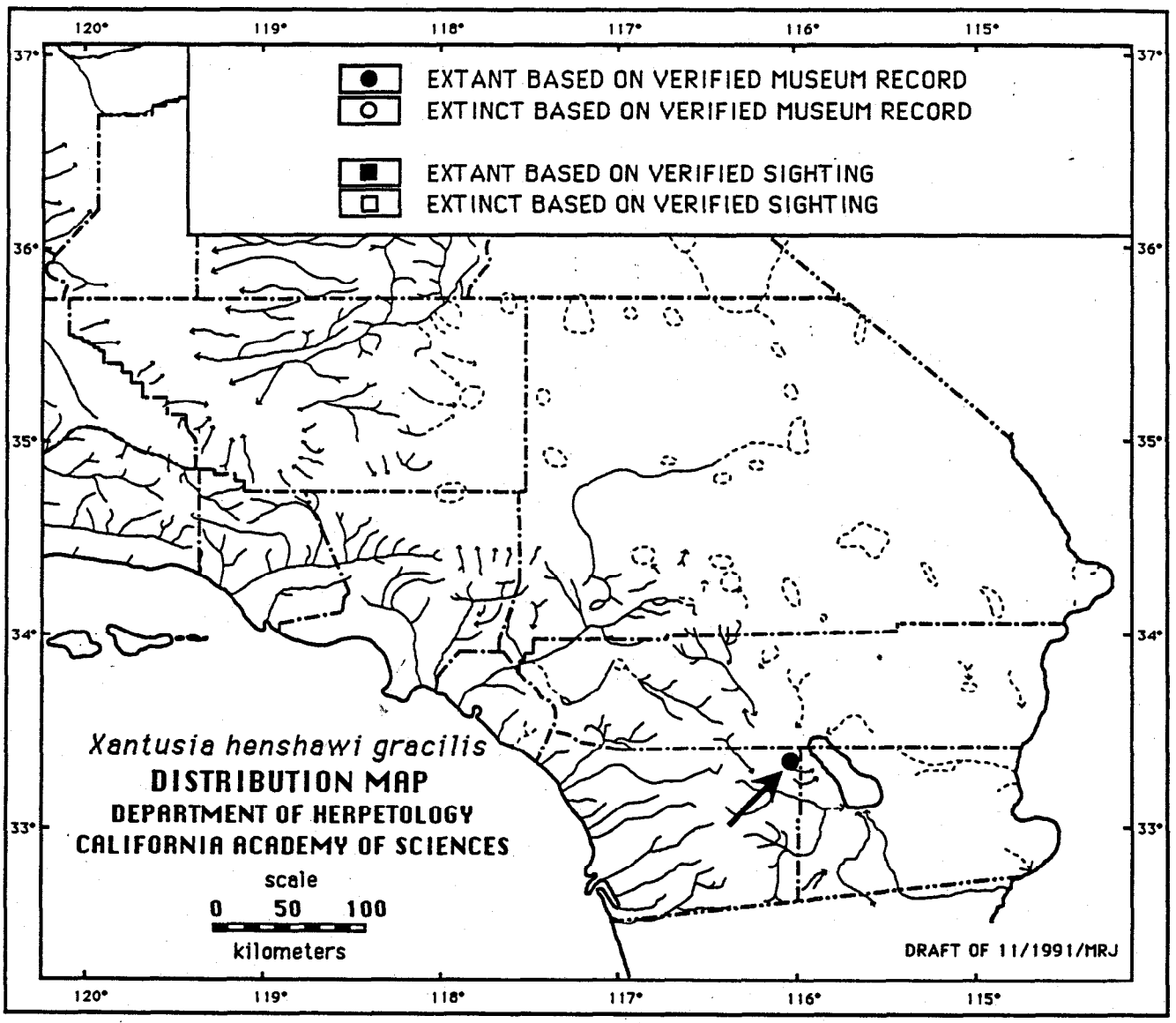

Figure 39. Historic and current distribution of the sandstone night lizard (*Xantusia henshawi gracilis*) in southern California based on 1 location from 28 museum records.

Phyllodactylus xanti) that occur in less erosive, rocky habitats, but the other saxicolous species may simply do poorly in that habitat type whether or not *X. h. gracilis* is present.

If similar in life history to the related granite night lizard *(X. h. henshawi)*, it bears one or two live young annually (Brattstrom 1951, Lee 1975), it has a low metabolic rate (Mautz 1979), it is active over a relatively low range of temperatures (Lee 1975), it has an insectivorous diet (Brattstrom 1952), and it is probably relatively sedentary (see summary in Bezy 1988). Based on four captive specimens, *X. h. gracilis* may be more nocturnal than the relatively diurnal or crepuscular *X. h. henshawi* (compare Grismer and Galvan 1986, with Lee 1974, and Mautz and Case 1974).

Habitat: The sandstone night lizard is entirely confined to a substrate of eroded sandstone and mudstone (or siltstone) in Truckhaven Rocks (Grismer and Galvan 1986). It is found in fissures or under slabs of exfoliating sandstone and rodent burrows in compacted sandstone and mudstone. This taxon seems to be locally abundant rather than evenly distributed within its habitat (Grismer and Galvan 1986). The physical characteristics of the refuge sites it prefers have not been examined.

Status: Special Concern; because of its highly restricted geographic range, this taxon is susceptible to local-scale catastrophic effects. Proximity to an access road and the relatively fragile nature of its sandstone or mudstone substrate makes this lizard vulnerable to illegal collection and habitat destruction.

Management Recommendations: Human access to the sandstone habitats where these lizards are found should be restricted. Specifically, the access road to the Truckhaven Rocks and adjacent calcite mine area should be closed and the nearby parking should be relocated further from the habitat this lizard occupies. Limiting access should simplify enforcement for Anza-Borrego State Park personnel. Further, field surveys for other possible populations of this taxon should be conducted in habitat identified as potentially suitable in the southern part of the Santa Rosa Mountains. The basic life history of this taxon needs study.

SIERRA NIGHT LIZARD
Xantusia vigilis sierrae Bezy 1967

Description: A small (40-51 mm SVL), slim velvet-skinned lizard with fine, granular scales; gular folds; lidless eyes; and vertical elliptical pupils (Stebbins 1985). A broad, postorbital light stripe is present on either side of the head; 40 to 44 scale rows are present across the back; the spotting on the back forms an interconnected, dark network; and 10 to 12 femoral pores are present on the hindlimbs (Bezy 1967a, 1967b, 1982). The head tends to be longer and broader than in other desert night lizards in California (Bezy 1967b). The iris is dark brown with fine iridophores split by a vertical eye stripe (pers. observ.).

Taxonomic Remarks: A rock-dwelling night lizard that is morphologically differentiated from *Xantusia v. vigilis* typically found in yucca *(Yucca* spp.) woodlands (Bezy 1967a, 1982).

Distribution: This California endemic is found only on the western edge of the Greenhorn Mountains within a few dozen kilometer radius of Granite Station, Kern County (Figure 40). The known elevational range of this taxon falls between 450 m and 500 m. *Xantusia v. sierrae* may intergrade with *X. v. vigilis* in the Greenhorn Mountains along the eastern edge of its range (Bezy 1967a; B. Bezy, pers. comm.).

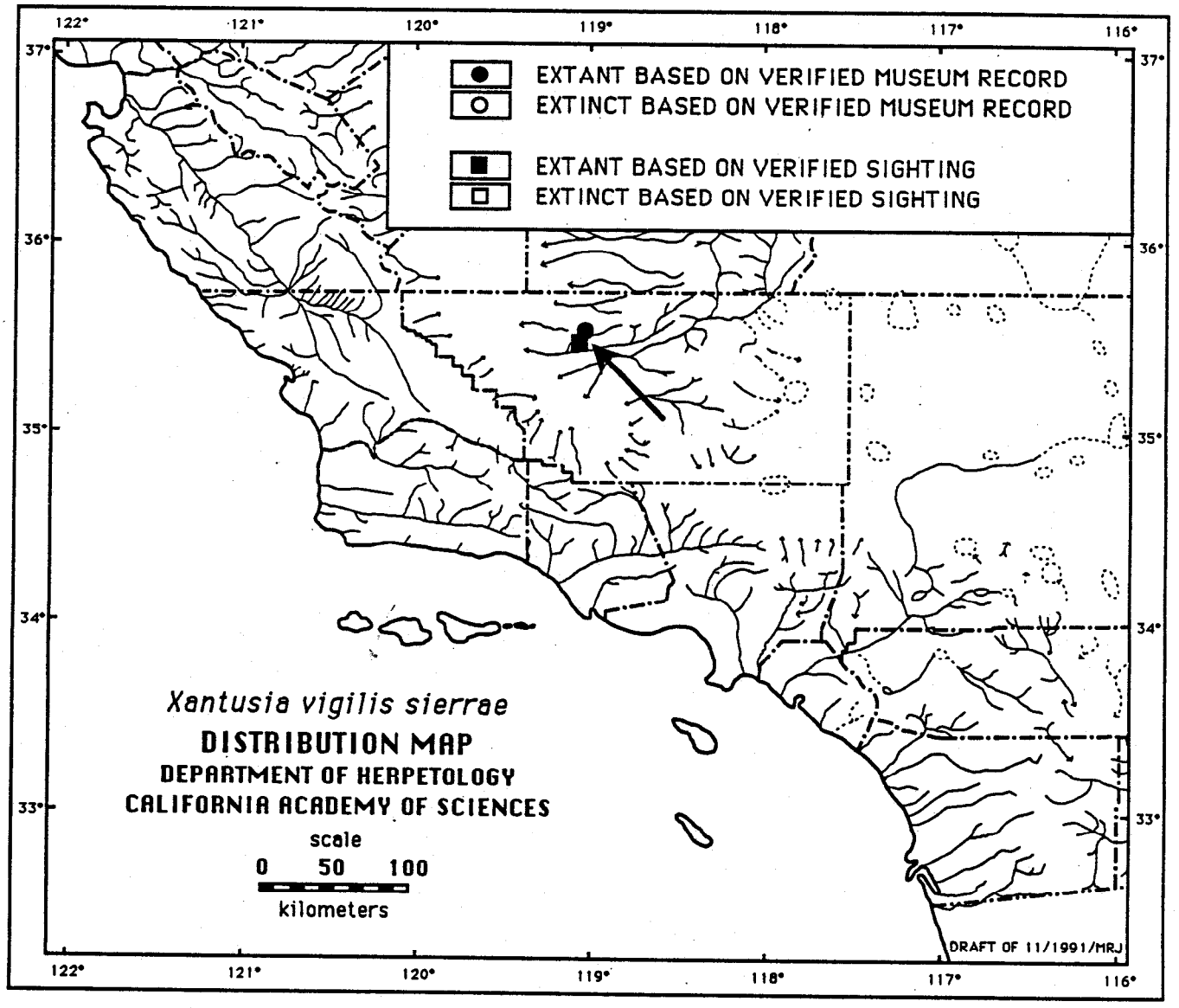

Figure 40. Historic and current distribution of the Sierra night lizard (*Xantusia vigilis sierrae*) in southern California based on 9 locations from 82 museum records and 4 records from other sources.

Life History: *Xantusia v. sierrae* exhibits a morphology somewhat convergent with the granite night lizard, a highly specialized rock-crevice dweller (Bezy 1988), but virtually nothing is known of its life history. If the life history of the Sierra night lizard is similar to that of other night lizards on mainland California; Sierra night lizards are sedentary, they exhibit a low metabolic rate, they are active over a low range of temperatures, they grow slowly for their size (2-3 years to reach sexual maturity), they bear live young, and they are probably long-lived (see Miller 1951; Brattstrom 1951, 1965; Zweifel and Lowe 1966; Bezy 1988; Mautz 1979). If reproduction and diet in the Sierra night lizard is similar to the related *X. v. vigilis*, it likely bears one or two young annually (see Miller 1954, Zweifel and Lowe 1966), and have an ant-dominated insectivorous diet (see Brattstrom 1952). If similar to the granite night lizard in its pattern of activity, the Sierra night lizard is probably largely diurnal and crepuscular (see Mautz and Case 1974; see also Bezy 1988).

Habitat: All Sierra night lizards have been found under exfoliating granite caps and flakes in outcrops of Cretaceous age. *Xantusia v. sierrae* seems to prefer larger (8-15 cm thick, 61-92 cm long) horizontal caps rather than thinner spalls or flakes, which are numerous on vertical surfaces (Bezy 1967a). Outcrops are often represented by small groups of boulders within areas of clay soils having an open grassland or oak woodland vegetation. For reasons that are unclear, but perhaps related to predator access, single boulders or isolated groups of two to three boulders appear to harbor more Sierra night lizards than larger piles of boulders (Bezy 1967a). Woody plant dominants associated with outcrops where Sierra night lizards have been found include blue oak, elderberry *(Sambucus mexicana)* and California buckeye *(Aesculus californica).*

Status: Special Concern; because of its tiny geographic range, this taxon is highly susceptible to even local-scale catastrophic effects. The preferred habitat of the Sierran night lizard is easily destroyed by humans prying off caps or flakes in an effort to obtain the lizards (Zeiner et al. 1988; see also Klauber 1926). Since the natural formation time for caps or flakes is much longer than that needed to destroy them, much of this sort of activity could eliminate the preferred habitat of this taxon rather rapidly. Increased development of the foothill area where this taxon occurs for homes and ranchettes has the potential to seriously negatively impact this species. If the Sierra night lizard is really localized in the smaller, more isolated groups of boulders within a grassland matrix, then existing lizard populations risk becoming increasingly isolated with current patterns of development and thus, are even more susceptible to local-scale catastrophic events.

Management Recommendations: A thorough survey of likely habitat for this lizard needs to be undertaken to determine its current distribution and the amount of suitable habitat still intact. An ecological study of this lizard is also needed to understand its movements and natural population fluctuations. Because the entire range of this taxon is currently under private ownership, efforts should be made to explore the possibility of purchasing and preserving a major portion of the granite rock outcrops in the vicinity of Granite Station for this taxon.

Plate 12. Adult desert night lizard (*Xantusia vigilis*) [from Stebbins 1954b].

SNAKES

BAJA CALIFORNIA RAT SNAKE
Elaphe rosaliae (Mocquard 1899)

Description: A large (85-150 cm TL), slender colubrid snake with a long head, large eyes, and smooth scales, the latter of which each contain two apical pits (Price 1990a, 1990b). The dorsum is uniform olive or reddish brown without dark markings on a cream-colored background (Ottley and Jacobsen 1983). Yellowish or greenish coloration extends from the lower sides of the body to the venter (Price 1990b). The iris is yellow-green (Ottley and Jacobsen 1983).

Taxonomic Remarks: Dowling and Price (1988) have placed this snake in its own genus *(Bogertophis)* based on immunological data, hut complications with the data set and the mode of analysis indicate that it is best to regard this species as a member of the rat snake genus, *Elaphe,* until further data become available (L. Grismer and John Wright, pers. comm.). No attempts have been made to characterize genetic variation across the geographic range of *E. rosaliae.* An understanding of that variation is needed to determine whether genetically differentiated populations exist within *E. rosaliae.* The difficulty with obtaining the requisite material for such a study make it likely that novel techniques, such as extracting DNA from preserved specimens, will he needed to address this problem.

Distribution: The Baja California rat snake ranges from extreme southern Imperial County southward into Baja California to Cabo San Lucas (Price 1990a). Over at least the northern half of its range, it is known from widely disjunct locations (Ottley and Jacobsen 1983, Price 1990b). Its known elevational range extends from near sea level to ca. 300 m. In the United States, *E. rosaliae* is known from only one road-killed specimen [SDSNH 64416] taken 26 May 1984 on Interstate Highway 8, 3.84 km east of Mountain Spring (Imperial County), California (Figure 41). Although Stebbins (1985) and others believe this locality to be genuine (L. Grismer and G. Pregill, pers. comm.), some have questioned the validity of this record (S. Barry, J. Copp. and C. Fagan, pers. comm.).

Life History: The life history of *E. rosaliae* is virtually unknown (Price 1990b). The species seems to be nocturnal or crepuscular and may be surface active during daylight hours under suitable conditions (Ottley and Jacobsen 1983). Nothing is known about reproduction or growth except that clutches with an unspecified number of eggs have been laid in captivity (Price: 1990b). The few data on diet and behavior are based on captive specimens and are difficult to interpret in the absence of data on this snake under field conditions. If similar to other rat snakes, it Climbs easily (Wright and Wright 1957) and adults are probably long-lived (see Bowler 1977). No data on movement, colonization abilities, or the potential predators of this taxon exist.

Habitat: *Elaphe rosdiae* is largely confined to mesic and dry desert habitats (rocky arroyos and washes) in the immediate vicinity of small springs (Ottley and Jacobsen 1983, Stebbins 1985) but individuals have also been observed on hillsides and dry mesas away from water sources (L. Grismer, pers. comm.). The habitat components critical to this snake have not been identified precisely, but it may require some of kind of shrub or tree with a moderately dense crown in which to take refuge because it has been taken in native fan palms *(Washingtonia* spp.), date palms *(Phoenix dactylifera),* mesquite, palo blanco *(Lysiloma candida),* palo verde, and creosote hush associations in the past (Price 1990b). The locations of oviposition sites are unknown.

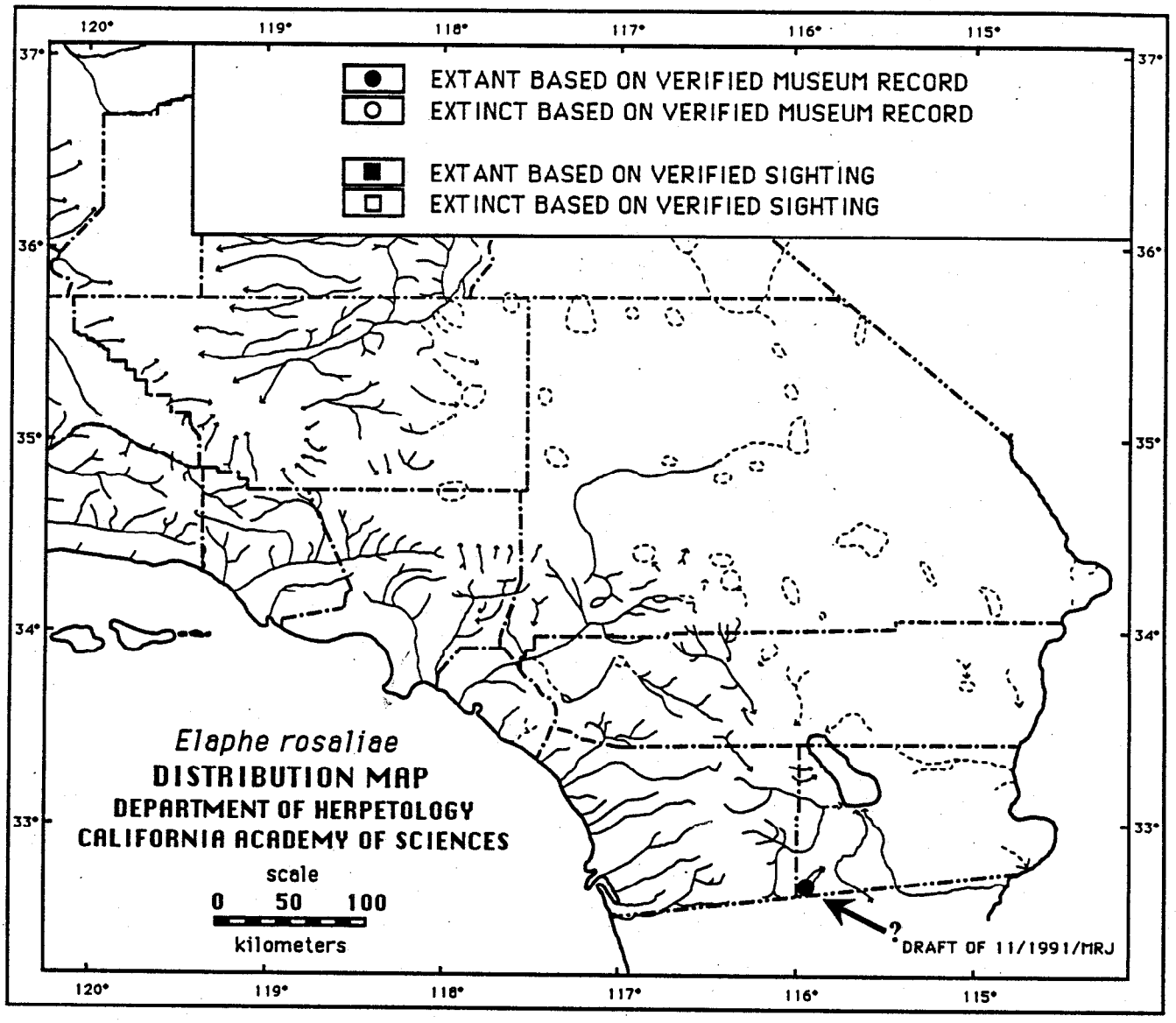

Figure 41. Historic and current distribution of the Baja California rat snake (*Elaphe rosaliae*) in southern California based on 1 location from 1 museum record.

Status: Special Concern; this snake is an infrequently observed species avidly sought after by amateur, scientific, and professional collectors alike. Because of the uncertain status of the single record from California, it should remain protected until further information regarding its distribution within the state becomes available.

Management Recommendations: Intensive surveys of habitats with shrubs or trees having a moderately significant crown in Imperial and San Diego counties are needed to determine whether this snake is really part of the herpetofauna of California. If populations are discovered, the local habitat needs to be protected from modification and potential collecting, and some kind of monitoring for this taxon should be initiated.

RED DIAMOND RATTLESNAKE
Crotalus ruber ruber Cope 1892

Description: A large (75-163 cm), heavy-bodied rattlesnake with a tan, pink, brick-red, or reddish-colored dorsal color, and obscure, usually light-edged brick or pinkish diamond-shaped blotches (Klauber 1937, Gloyd 1940, Stebbins 1985). The tail base is prominently "coontail" marked with broadly spaced, but relatively narrow, distinct black rings contrasting with the rest of the body color (pers. observ.). The belly is white to pale yellow, and the undersurface of the tail is pinkish buff (Wright and Wright 1957; pers. observ.). The iris is brown (Wright and Wright 1957).

Taxonomic Remarks: This morphologically distinctive rattlesnake has rarely been confused since Cope (1892) described it. No attempts have been made to characterize genetic variation across the geographic range of *Crotalus ruber ruber*. An understanding of that variation is needed to determine whether genetically differentiated populations exist within *C. r. ruber*. The difficulty with obtaining the requisite material for such a study make it likely that novel techniques, such as extracting DNA from preserved material, will be necessary to address this problem.

Distribution: The known range of *Crotalus r. ruber* extends from near Pioneertown and Morongo Valley (San Bernardino County) southward on both sides (coastal and desert slopes) of the Peninsular Ranges (including the Santa Ana Mountains: Peguegnat 1951) to Loreto, Baja California, Mexico (Stebbins 1985). Its known elevational range extends from near sea level to about 1520 m (slopes of Palomar Mountain), although *C. r. ruber* is most frequently encountered below 1200 m (Klauber 1972). In California, the red diamond rattlesnake ranges southward from San Bernardino County to the Mexican border (Figure 42).

Life History: Despite its size and proximity to one of the largest urban sprawls in the world, red diamond rattlesnakes are among the more poorly known species of rattlesnakes. No intensivestudy of the life history of this species has even been undertaken; all of what is known of the life history of this species is based on scattered bits of information from various sources. Behaviorally, *C. r. ruber* is a retiring, secretive species with a reputation for being more docile than other rattlesnake species found in California (Klauber 1972). Sixteen-year census records from San Diego County (Klauber 1939) show that at least some red diamond rattlesnakes are active year-round, although a peak in the numbers of this species observed occurs in April and May, probably because movements associated with mating activities make these snakes more conspicuous at that time. Mating may take place as early as March (Perkins 1938). Females carry developing young for ca. 140-150 days (Wright and Wright 1957). Three to 20 young 300-350 mm TL are born live typically between late July and September (Klauber 1937, Wright and Wright 1957). Nothing is known about the rate of growth or the age at which red diamond rattlesnakes become

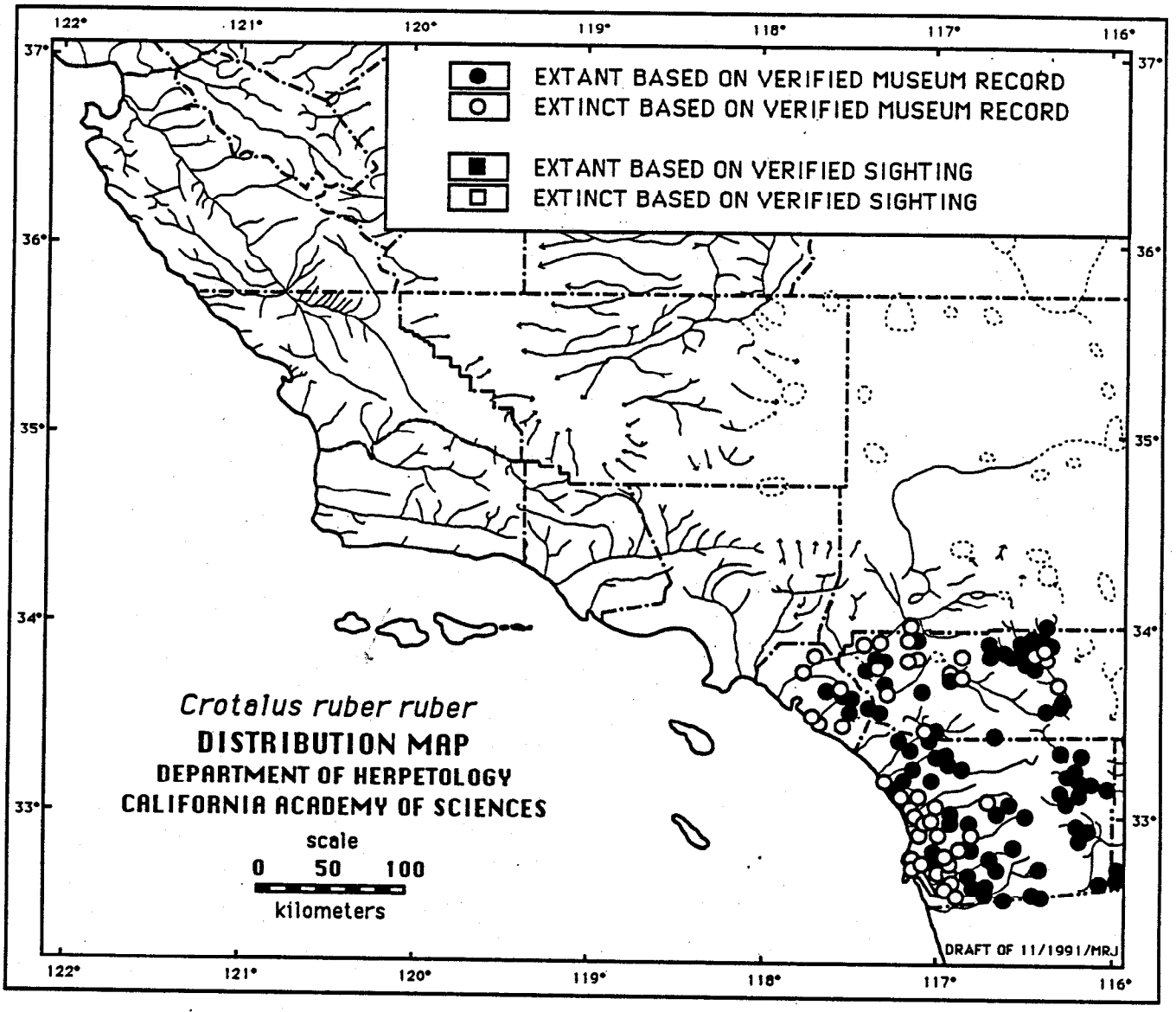

Figure 42. Historic and current distribution of the red-diamond rattlesnake (*Crotalus ruber ruber*) in southern California based on 345 locations from 577 museum records and 18 records from other sources.

sexually mature, but 733 mm TL is the size of the smallest gravid female Klauber (1937) found. Nothing is known about longevity in wild *C. r. ruber*, but a captive lived over 14 years (Bowler 1977), so the species may be relatively long-lived. Red diamond rattlesnakes eat mostly squirrels (e.g., white-tailed antelope ground squirrels, California ground squirrels) and rabbits (e.g., desert cottontails, brush rabbits *[S. bachmani])* as adults, but lizards (e.g., western whiptails *[Cnemidophorus tigris])* are also significant in the diet of juveniles (Tevis 1943, Klauber 1972). Although *C. r. ruber* frequently takes live prey, it may also eat relatively fresh carrion (Cunningham 1959a, Patten and Banta 1980). Red-tailed hawks *(Buteo jamaicensis)* are known predators of red diamond rattlesnakes (Huey in Klauber 1972). No data on the movement ecology or the colonization abilities of *C. r. ruber* exist.

Habitat: Although red diamond rattlesnakes are recorded from a number of vegetative associations, they seem to occur more frequently in habitats with heavy brush associated with large rocks or boulders (Klauber 1972). *Crotalus r. ruber* is frequently observed in chamise- and red shank-dominated associations, probably because these associations best fulfill the aforementioned structural habitat requirements. Such associations likely provide better refuges or food resources for red diamond rattlesnakes than other habitats, but how this is facilitated is not well understood. Red diamond rattlesnakes are also found in coastal sage scrub and desert slope scrub associations.

Status: Special Concern; this taxon has a relatively restricted range in California, and a significant portion of the habitat that was historically prime red diamond rattlesnake habitat has been developed over the last 20 years. Particularly significant has been the rate of development in northern San Diego County and southwestern Riverside County during the 1970s and 1980s. A combination of urban development and the trend toward increasing drip irrigation of orchards, such as avocados, on steeper, rocky slopes has significantly intruded into the habitat that *C. r. ruber* historically used. Systematic evaluation of habitat loss has not been quantified in detail, but we estimate that this snake has lost at least 20% of the suitable habitat within its range due to these types of development. Moreover, the general negative regard humans have for rattlesnakes has probably accelerated the local extirpation of this relatively shy, retiring species where development is occurring, especially since adult snakes over 1.3 m (TL) have become increasingly rare since the early 1960s (J. Copp and D. Morafka, pers. comm.).

Management Recommendations: A better understanding of the life history of this poorly known rattlesnake is needed before more refined management recommendations can be made. It is unlikely that such an understanding will be obtained without resorting to telemetry because field survey efforts without telemetry are likely to be extremely time costly. Especially needed is a better understanding of the habitat parameters critical to red diamond rattlesnakes, and how these are important to its ecology. Until more detailed habitat data become available, shrubby vegetative associations in areas with large rocks or boulders should be routinely surveyed for this taxon at appropriate diel and seasonal intervals and assessments of the quality of the habitat for this species should be done on a case-by-case basis. Efforts to protect and minimize disturbance to areas that are identified as likely containing high densities of this snake should be implemented.

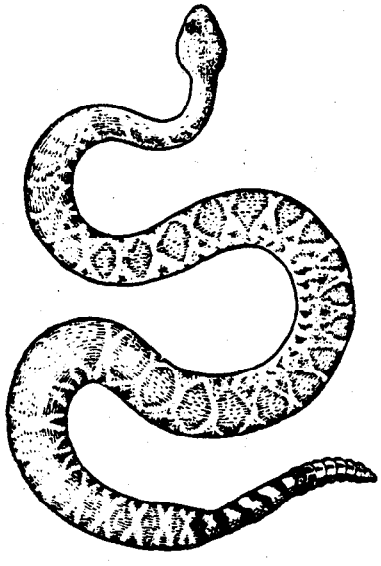

Plate 13. Adult red diamond rattlesnake (*Crotalus ruber ruber*) [from Stebbins 1954b].

SAN BERNARDINO MOUNTAIN KINGSNAKE
Lampropeltis zonata parvirubra Zweifel 1952

Description: A medium-sized (55-111 cm TL) snake with a distinctive sequence of red, black, and white rings (tricolor dyads: Savage and Slowinski 1990; these are similar, but yet different from the triads of Zweifel 1952b) in which relatively narrow white rings are always bordered by black rings, and red coloration, which can occur as rings or bands, borders alternate black rings (Zweifel 1952b; pers. observ.). The number of tricolor dyads on the body (except the tail) ranges from 35 to 48, and between 4% and 100% of the red rings between body dyads are complete (Zweifel 1952b). The snout is jet black and the iris is very dark brown (B. McGurty, pers. comm.).

Taxonomic Remarks: This taxon has not been reexamined since Zweifel (1952b) described the races of *Lampropeltis zonata.* Diagnosis of *L. z. parvirubra* is problematic because allocation of individuals to this taxon requires using a combination of several characters simultaneously that individually overlap considerably in variation with other races of *L. zonata*. Biochemical analyses coupled to more extensive morphological analyses are needed to better understand the systematic status of this taxon. Since individuals of *L. z. parvirubra* are difficult to obtain (captive snakes notwithstanding), novel techniques such as DNA extraction from preserved specimens will almost certainly be needed to help resolve this problem. Interpretation of this taxon as a full species (Collins 1991) is unjustified and awaits the aforementioned analyses.

Distribution: This California endemic is restricted to the San Gabriel, San Bernardino, and San Jacinto mountains of southern California (Figure 43). The known elevational range of this taxon extends from ca. 370 m (Eaton Canyon, Los Angeles County) to ca. 2470 m (Mount San Jacinto, Riverside County: Zweifel 1952b).

Life History: *Lampropeltis z. parvirubra* is an infrequently observed, secretive, cryptozooic snake, the life history of which, as a result, is virtually unknown. Its life history is probably similar to what is known for *L. z. pulchra*, the other race of mountain kingsnake in southern California, and the account for *L. z. pulchra* should be referred to in order to gain a general idea of the life history of this taxon. Cunningham (1959a) reported on a female *L. z. parvirubra* from Skyforest (San Bernardino County) that laid 3 eggs on July 18, and Zweifel (1952b) mentioned that 8 young were hatched from a female *L. z. parvirubra* from Seven Oaks (San Bernardino County) at the San Diego Zoo, but the latter observation did not indicate the original clutch size, so it is unclear whether the latter was the same as the number of young that hatched. The San Bernardino mountain kingsnake may be primarily saurophagous (Newton and Smith 1975); DeLisle in McGurty (1988) indicates that 7 specimens of *L. z. parvirubra* had eaten sagebrush lizards *(Sceloporus graciosus)* and 3 others had taken western skinks (see also Cunningham 1959a). Cunningham (1955) found an individual in the decaying cavity of a black oak, suggesting that this taxon will climb when the appropriate habitat structure is available. No data are available on longevity, but Bowler (1977) reported on a captive individual nearly 12 years old. No data exist on the movement ecology or colonization abilities of this taxon.

Habitat: *Lampropeltis z. parvirubra* occurs in well-illuminated canyons with rocky outcrops or rocky talus in association with bigcone spruce *(Psuedotsuga macrocarpa)* and various canyon chaparral species at lower elevations, and with black oak, incense cedar, Jeffrey pine, and ponderosa pine at higher elevations (Zweifel 1952b, Cunningham 1955, Newton and Smith 1975). The rocky outcrops or talus likely provide hibernation and refuge sites as well as the food resources for this probably largely lizard-eating snake (see *L. z. pulchra* account). Where oviposition sites are generally located is not known, but

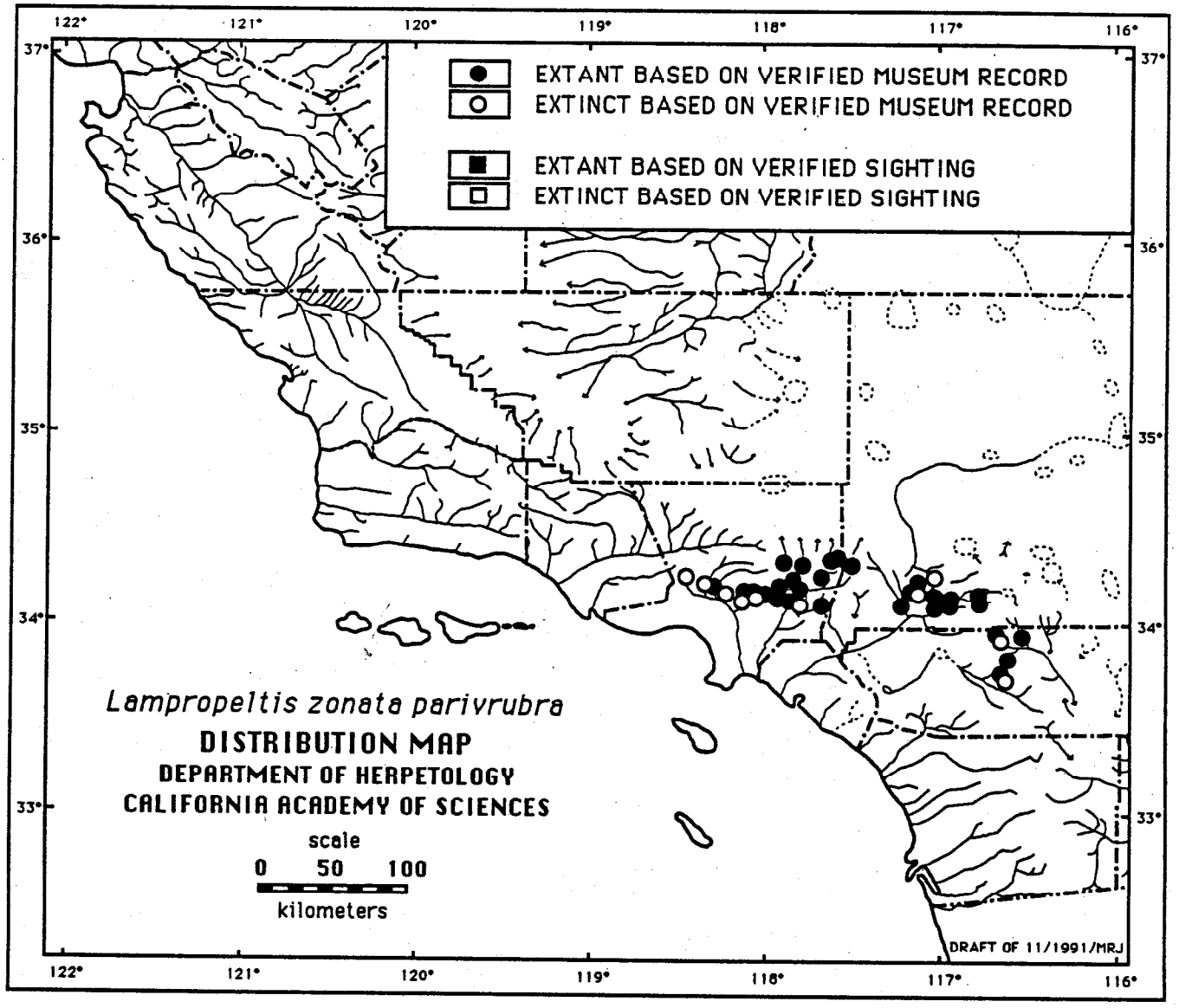

Figure 43. Historic and current distribution of the San Bernardino mountain kingsnake (*Lampropeltis zonata parvirubra*) in southern California based on 88 locations from 131 museum records.

rocky outcrops and talus areas may also provide suitable oviposition sites. Basic understanding of habitat utilization patterns are lacking.

Status: Special Concern; this taxon continues to be highly prized among collectors (S. Barry, R. Fisher, and B. McGurty, pers. comm.), despite regulations limiting collecting and laws preventing the sale of native reptiles in the state (Nicola 1981; California Fish and Game Commission 1990). Over 10 years ago, this taxon brought prices as high as $250.00 a specimen and the current black market trade of this taxon continues with high demand (especially in Europe) bringing much inflated prices (B. McGurty, pers. comm.; see also Newton and Smith 1975). One of the reasons this taxon is in high demand is because collectors are desirous of having examples of each of the various color morphs known from southern California (e.g., the "San Gabriel phase", the "San Jacinto phase", etc.: S. Barry, J. Brode, and John Wright, pers. comm.). Moreover, sharply increased public use levels of the Angeles (San Gabriel Mountains) and San Bernardino (San Bernardino Mountains and Mount San Jacinto) National Forests over the past 25 years have undoubtedly put increased collecting pressure on this species (Newton and Smith 1975).

Management Recommendations: Better systematic characterization of this taxon is needed, an issue that, as suggested previously, will require a considerable investment because novel biochemical techniques will almost certainly be needed. This species is sufficiently cryptozooic and secretive that the best and least costly way to gain some understanding of its life history and habitat utilization patterns is to employ telemetry. Perhaps once telemetry has adequately characterized this species behavior can field surveys be effectively done, but we believe that attempts to field survey this taxon without the assistance of a telemetric study will be very time costly and probably produce only limited data.

SAN DIEGO MOUNTAIN KINGSNAKE
Lampropeltis zonata pulchra Zweifel 1952

Description: A medium-sized (53-108 cm TL) snake with a distinctive sequence of red, black, and white rings (tricolor dyads: Savage and Slowinski 1990; these are similar, but yet different from the triads of Zweifel 1952b) in which relatively narrow white rings are always bordered by black rings, and red coloration, which can occur as rings or bands, borders alternate black rings (Zweifel 1952b; pers. observ.). Occasional aberrant patterns can be found in which rings are lacking (see Figure 2 in McGurty 1988). The number of tricolor dyads on the body (except the tail) ranges from 27 to 38, and between 15% and 100% of the red rings between body dyads are complete (Zweifel 1952b). The snout is jet black and the iris is very dark brown (B. McGurty, pers. comm.).

Taxonomic Remarks: The taxonomic remarks made for *Lampropeltis zonata parvirubra* also apply to this taxon.

Distribution: This California endemic occurs in the Santa Monica Mountains (Los Angeles County); Santa Ana Mountains (Grange and Riverside Counties); Santa Rosa Mountains (Riverside County); and Corte Madera, Cuyamaca, Hot Springs, Laguna, and Palomar Mountains (San Diego County: McGurty 1988;. Figure 44). Its elevation range extends from near sea level to ca. 1800 m (Palomar Mountain, San Diego County). Two early specimens (SDSNH 9930, USNM 13889) and three post-1960 records (B. McGurty, pers. comm.) from western San Diego County suggest the possibility of native populations of this taxon near the coast; However, the latter records have remained unverified and the

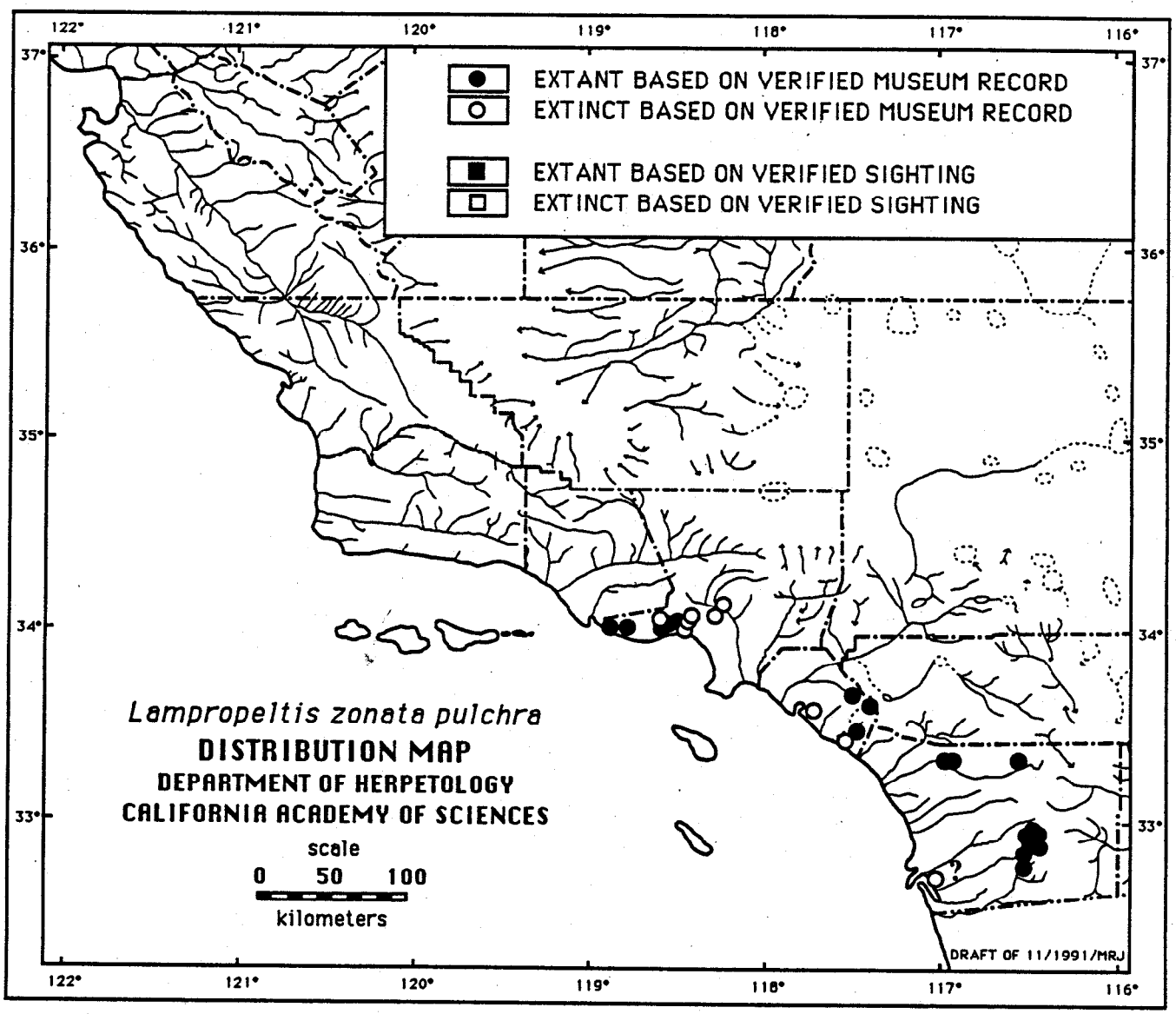

Figure 44. Historic and current distribution of the San Diego mountain kingsnake (*Lampropeltis zonata pulchra*) in southern California based on 48 locations from 73 museum records and 1 record from another source.

former may represent mislabeled specimens or escaped or released pets (B. McGurty, pers. comm.).

Life History: *Lampropeltis z. pulchra* is an infrequently observed, secretive, cryptozooic snake, the life history of which is still only partly understood. The San Diego mountain kingsnake typically emerges from overwintering sites in March and may remain near-surface active through November, but it is particularly conspicuous near the surface from roughly mid-March to mid-May (Klauber 1931, McGurty 1988), during which time it is active during the warmer daylight hours (pers. observ.). Later in the season, it may be active after dark, which is probably related to the fact that, like most snakes, it has a relatively low temperature preferendum and a relatively low critical thermal maximum (42.5°C: data provided for *L. zonata*, subspecies not specified; Brattstrom 1965). Based on wild-caught captive individuals, mating probably takes place in May and eggs are usually laid in June or early July (McGurty 1988; pers. observ.). Females lay 4-9 moderate-sized (averages 36 mm long x 16 mm wide), bone white, leathery-shelled eggs that if similar to eggs incubated in captivity, require at least 2 months to develop before hatching (McGurty 1988). Hatchlings are usually first observed between late August and early October (pers. observ.). The time required to reach reproductive maturity in the field is unknown, but captive *L. z. pulchra* required 4-5 years to reach sexual maturity (McGurty 1988). If captive longevity records for other races of this species are any indication (see Bowler 1977), San Diego mountain kingsnakes may be relatively long-lived. Indications exist that *L. z. pulchra* may be highly philopatric, consistently using local patches of suitable habitat (McGurty 1988), but the movement patterns of this taxon are largely unknown. This taxon is also probably primarily saurophagous, and only western fence lizards and western skinks have been recorded as having been eaten by San Diego mountain kingsnakes, but prey similar to other subspecies of *L. zonata* are probably also taken (Newton and Smith 1975, McGurty 1988).

Habitat: In the interior mountain ranges, *Lampropeltis z. pulchra* occurs primarily in associations of ponderosa, Jeffrey, and Coulter pine, and black oak, and is infrequently found below the coniferous forest associations (Zweifel 1952b, McGurty 1988; pers. observ.). At lower elevations and in coastal ranges, it occurs below the edge of mixed oak-coniferous forest in riparian woodlands, usually in canyon bottoms, that have western sycamore *(Platanus racemosa),* Fremont's cottonwood, coast live oak, willows, wild rose *(Rosa* spp.), and blackberries. It may be found in narrow riparian woodlands in association with chaparral and coastal sage vegetation types (pers. observ.; see McGurty 1988). Rocks or rocky outcrops appear to be an important element of *L. z. pulchra* habitat (McGurty 1988), probably because they provide suitable refuge sites and they harbor the necessary food resources. Such locations may also provide overwintering sites.

Status: Special Concern; this snake continues to be highly prized among collectors (S. Barry, R. Fisher, and B. McGurty, pers. comm.) despite prohibitions on collecting or selling it in California (Nicola 1981, California Fish and Game Commission 1990). The only individuals that can be possessed are those that were in possession of their owners prior to when the prohibition on collection regulations were implemented. Currently, this taxon is mentioned for sale in some reptile fancier lists at $250.00 per snake (pers. observ.); such a demand undoubtedly fuels a black market trade for this taxon among collectors. In addition, McGurty (1988) provided data for a single locality in San Diego County suggesting a local decline in *L. z. pulchra* that he attributes to overcollecting of this taxon. Since no obvious habitat change has occurred at this site (B. McGurty, pers. comm.), the interpretation McGurty provided may be correct. McGurty (1988) also cites the destruction of local habitat by overzealous collectors (the dismantling of outcrops and the shredding of logs and stumps), especially in San Diego County, as reasons for this taxon's decline (see also Newton and Smith 1975). Rock-chipping for this taxon as well

as for selected lizards was a problem that was recognized over 15 years ago, and continues to be a problem in certain local areas despite the fact that altering habitat in this way is prohibited under current regulations by both State and Federal land management and resource agencies. Illegal fuelwood harvesting also adds to the problem of habitat alteration (McGurty 1988).

Management Recommendations: All the comments made under the *L. z. parvirubra* account also apply here. In addition, systematic monitoring of habitat is needed to ensure that clandestine alteration (rock-chipping and removal of wood) is minimized. It is imperative to couple a systematic program of public education to make monitoring effective.

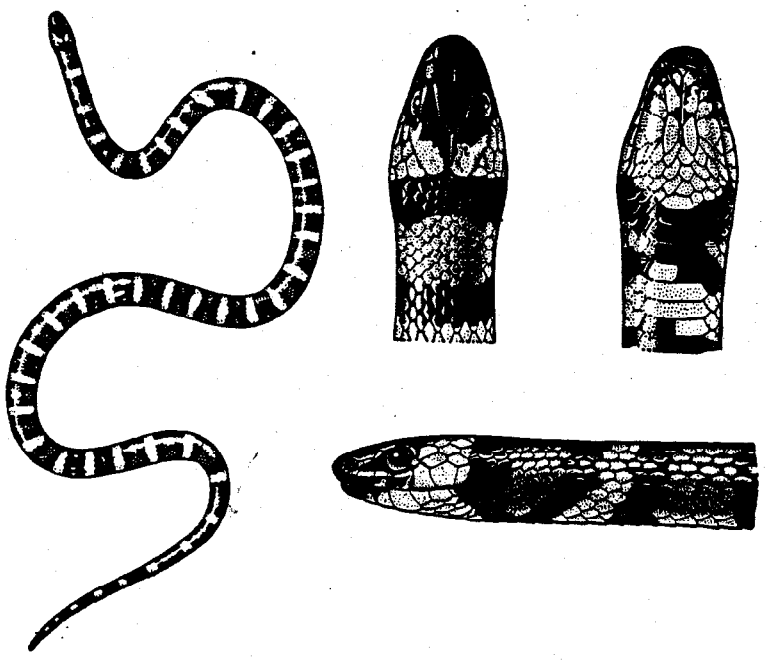

Plate 14. Adult California kingsnake (*Lampropeltis zonata*) [from Stebbins 1954b].

SAN JOAQUIN COACHWHIP
Masticophis flagellum ruddocki Brattstrom and Warren 1953

Description: The San Joaquin coachwhip is a large-sized (90-155 cm SVL), smooth-scaled, large-eyed, slender snake with a buffy citrine, tan-yellow, or olive brown dorsal color without lengthwise stripes (Brattstrom and Warren 1953). The ventral color is straw yellow that acquires a pinkish or orangish cast under the tail and the top of the head is light brown (pers. observ.). The iris color has not been described.

Taxonomic Remarks: Brattstrom and Warren (1953) described this taxon on the basis of the general buffy citrine to olive dorsal color, an absence of dark neck bands, and a lower subcaudal scale count. Verification of the validity of this taxon on any other grounds has never been attempted (see Wilson 1970). Genetic variation within *Masticophis flagellum ruddocki* has not been examined and should be studied to evaluate the distinctiveness of this taxon. The difficulty in obtaining material for such study may require novel techniques, such as extracting DNA from preserved material. *Masticophis f. ruddocki* apparently intergrades with *M. f. piceus* in the lower Kern Canyon-Caliente-Tehachapi region of eastern Kern County (Brattstrom and Warren 1953; R. Hansen, pers. comm.).

Distribution: The known range of this California endemic extends from 13 km west of Arbuckle (Colusa County; SDSNH 26084] in the Sacramento Valley southward to the Grapevine in the Kern County portion of the San Joaquin Valley and westward into the inner South Coast Ranges (Figure 45). An isolated population occurs in the Sutter Buttes (Hayes and Cliff 1982). The known elevational range of the San Joaquin whipsnake extends from near ca. 20 m to around 900 m in the Temblor Range (Kern County: pers. observ.).

Life History: The life history of this taxon is virtually unknown. The summary presented here is based largely on *M. f. piceus* from the nearby desert areas of California. *Masticophis f. ruddcocki* is a swift (see Mosauer 1935), diurnal snake that maintains a high activity level when on the surface (Sullivan 1981). If similar to other *M. flagellum* subspecies, it voluntarily maintains a higher active body temperature than most other snakes (Cowles and Bogert 1944, Brattstrom 1965, Hammerson 1977) and will not emerge from burrow retreats either on a daily or seasonal basis until near-surface temperatures reach ca. 28°C (see discussion in Hammerson 1989). As a result, emergence tends to be relatively late in the season (usually April-early May) and later in the morning (ca. 1000-1100 hr), although some evidence exists that smaller (younger) individuals emerge earlier in the day and the season than larger (older) snakes. Emergence is preceded by a warming interval during which only the head and neck are extruded from the burrow (Hammerson 1977; pers. observ.). *Masticophis f. ruddocki* are typically active during the warmest part of the day; only later during the season (see Banta and Morafka 1968), when midday temperatures become intolerably warm does *M. f. ruddocki* become bimodal in its surface activity. Mating is thought to occur in May and oviposition probably occurs in June or early July. Oviposition sites have not been found, but are probably situated in the wall of a rodent burrow (see Wright and Wright 1957); clutch size probably ranges from 4 to 20 (see Stebbins 1985). Adults may disappear seasonally as early as the first part of August (pers. observ.), perhaps in response to a late-summer decline in food resources. *Masticophis f. ruddocki* seems to primarily eat lizards and rob the nests of birds and mammals, but it may also eat carrion (see Cowles 1946 and Cunningham 1959a); blunt-nosed leopard lizards (Montanucci 1965, Tollestrup 1979), western whiptails (R. Hansen, pers. comm.), side-blotched lizards *(Uta stansburiana:* pers. observ.), San Joaquin antelope ground squirrels *(Ammospermophilus nelsoni:* S. Sweet, pers. comm.) are known prey. Individual *M. f. ruddocki* probably have a relatively large home range (R.

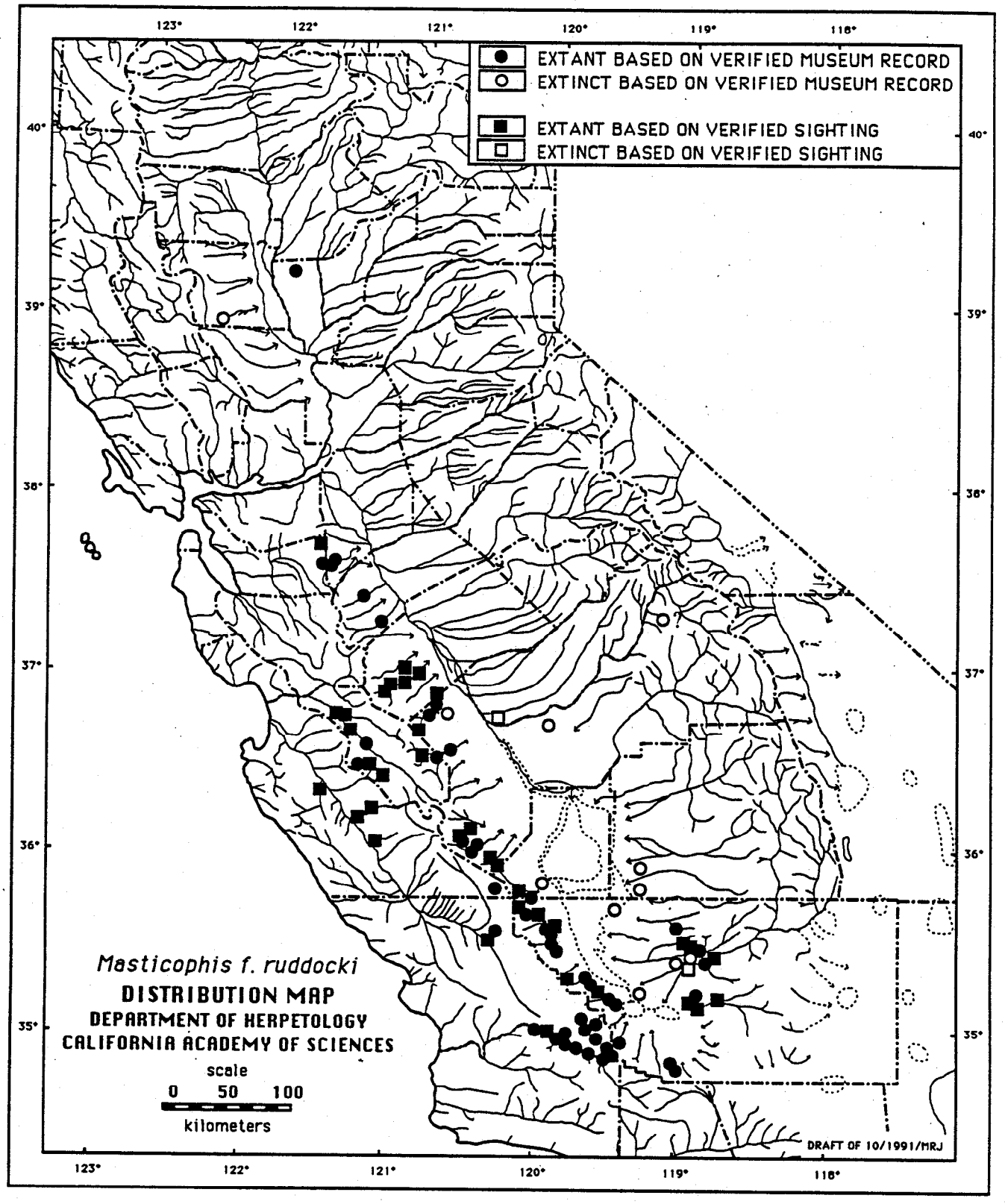

Figure 45. Historic and current distribution of the San Joaquin coachwhip (*Masticophis flagellum ruddocki*) in central and northern California based on 186 locations from 102 museum records and 98 records from other sources.

Hansen, pers. comm.), but movement data for this taxon are lacking. Subterranean overwintering sites are probably located in a burrow system (see Cowles 1941).

Habitat: *Masticophis f. ruddocki* occurs in open, dry, vegetative associations with little or no tree cover (Morafka and Banta 1976). In the western San Joaquin Valley, it occurs in valley grassland and saltbush scrub associations (Montanucci 1965, Banta and Morafka 1968, Tollestrup 1979, Sullivan 1981; pers. observ.) and is known to climb bushes such as *Atriplex* for viewing prey and potential predators (see Cunningham 1955). *Masticophis f. ruddocki* probably requires one or more mammal associates because it uses burrows for refuge and probably for oviposition sites, and may sometimes be dependent on mammals for food. Although this snake probably has a high degree of dependence on mammals, the species it may be dependent upon and the nature of such relationships are vague.

Status: Threatened; beyond simply having a relatively restricted geographic range, much of the area within the historic range of *M. f. ruddocki* has undergone extensive land use changes over the last 15 years. Most significant is the first-time conversion of large areas of valley grassland or shadscale scrub association to row crop agriculture in the San Joaquin Valley, particularly cotton *(Gossypium* sp.), grapes, kiwi fruit *(Actinidia chinensis)*, and various vegetables. This type of conversion not only eliminates the food base that *M. f. ruddocki* typically depends upon, but it eliminates the burrow mammal associates that this taxon needs for the creation of refuge sites. Further, urban development has also expanded in selected areas in the inner Coast Ranges where this species was historically common. Land-use conversion coupled with 4 years of drought (1986-1990) that have reduced the available lizard food base for *M. f. ruddocki* in many areas may have also contributed significantly to the depletion and fragmentation of populations of this taxon.

Management Recommendations: The life history of *M. f. ruddocki* needs intensive study to better establish its habitat utilization patterns, its dependence on mammal associates, and the patch sizes of habitat it needs to maintain populations over the long-term. Until the life history is better understood (especially of size of home ranges and long-term patterns of movement), the largest open habitat patches of suitable habitat in valley grassland, saltbush, and shadscale scrub associations should be protected or preserved to ensure this taxon's survival. A few large segments of protected habitat in which *M. f. ruddocki* occurs currently exist (e.g., The Nature Conservancy's Carrizo Plain Preserve), but at the rate that land-use conversion has eliminated this taxon's habitat in the San Joaquin Valley and inner Coast Ranges over the past 15 years, more large segments are needed in order to preserve even a small remnant of the historical habitat for this taxon.

SANTA CRUZ GOPHER SNAKE
Pituophis melanoleucus pumilus Klauber 1946

Description: A medium-sized (70-110 cm), yellow or cream-colored snake with black, brown, or reddish dorsal blotches, and smaller secondary dorsal blotches (Klauber 1946). Undersurfaces are nacreous white or cream often becoming somewhat yellow on the throat and ventral surfaces of the neck and tail with three rows of dark spots along the sides of the body. The iris is dark brown (pers. observ.).

Taxonomic Remarks: *Pituophis melanoleucus pumilus* is a dwarf subspecies of gopher snake that can be distinguished from other subspecies of *P. melanoleucus* in California based on the presence of $\geq$ 29 dorsal scales rows at the mid-body. It is thought to be most closely related to one of the two adjacent mainland forms, *P. m. annectens* and *P. m. catenifer* (Klauber 1946). Although it is considered a valid taxon (Sweet and Parker 1990),

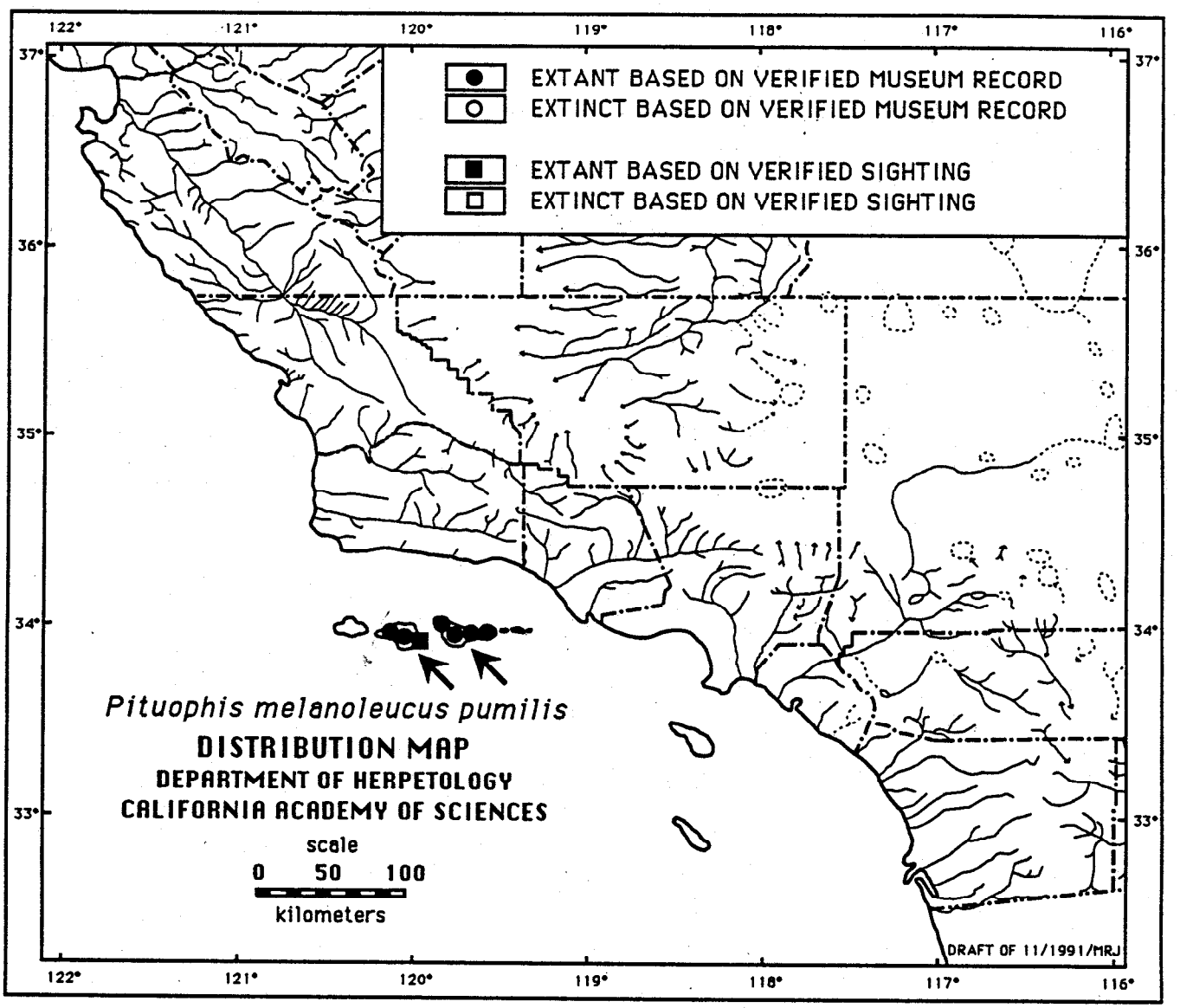

Figure 46. Historic and current distribution of the Santa Cruz gopher snake (*Pituophis melanoleucus pumilis*) in southern California based on 26 locations from 39 museum records and 6 records from other sources.

verification of the validity of this taxon on other than morphological grounds has not been addressed (see Collins, ms). Genetic variation within *P. m. pumilus* has not been examined and should be studied to evaluate its distinctiveness. The scientific name of this taxon is often incorrectly spelled as *"P. m. pumilis"* in the literature (e.g., see Stebbins 1985 and Collins, ms).

Distribution: This California endemic has only been recorded on Santa Cruz and Santa Rosa (Orr 1968) islands off the coast of southern California (Wilcox 1980; Figure 46). The statement by Stebbins (1985) of this taxon occurring on San Miguel Island is based on an unverified sight record (P. Collins, pers. comm.). The known elevational range extends from near sea level to 640 m (on Santa Cruz Island).

Life History: Allowing for its smaller body size and the depauperate island fauna where it occurs (see Wenner and Johnson 1980), this island-dwelling gopher snake has a life history that is anticipated to be similar to gopher snakes found on the adjacent mainland (e.g., see Fitch 1949). In spring, juveniles and adults emerge from rodent burrows or rock fissures, where they hibernate during the colder months of fall and winter (P. Collins, pers. comm.). Adults probably reproduce in May with females depositing clutches from late June through July and hatchlings emerging in September and October (Van Denburgh 1898, Stebbins 1985; P. Collins, pers. comm.); the reproductive ecology of this taxon is currently being studied (R. Fisher, pers. comm.). Santa Cruz gopher snakes are probably surface active during the day whenever temperatures are high enough to elicit movement (see Rüthling 1915). Because the island fauna is depauperate, the prey base available to gopher snakes is limited. Potential prey are limited to southern alligator lizards *(Elgaria multicarinata),* western fence lizards, side-blotched lizards, deer mice *(Peromyscus maniculatus),* western harvest mice *(Reithrodontomys megalotis),* and a variety of land birds (Diamond and Jones 1980, Wenner and Johnson 1980, Laughrin 1982). Of these, adult Santa Cruz gopher snakes probably consume mice, adult lizards, and the eggs or nestlings of the birds that are small enough to eat, whereas juvenile gopher snakes probably take juvenile lizards, mouse pups, and possibly insects (e.g., Jerusalem crickets, *Stenopelmatus* sp.; Laughrin 1982). Island foxes *(Urocyon littoralis:* Laughrin 1977) occasionally eat *Pituophis m. pumilus* as do feral pigs *(Sus scrofa),* red-tailed hawks, and common ravens (Laughrin 1982; P. Collins, pers. comm.). A captive-born snake lived for 16.5 years in captivity (P. Collins, pers. comm.). Data are lacking on the growth or movement ecology of this taxon.

Habitat: *Pituophis m. pumilus,* like its mainland congeners, is a habitat generalist. It can be found in all vegetation associations on the two islands, but it is most common in open areas such as grasslands, dry streambeds, and oak and chaparral woodlands (Laughrin 1982). No data are available on either overwintering or oviposition sites.

Status: Special Concern; introduced ungulates, which destroy and modify the vegetative cover, and feral pigs, which eat snakes, continue to threaten the Santa Cruz gopher snake on both islands on which the latter occurs. Gopher snakes are rare on Santa Rosa Island, yet are still relatively common on Santa Cruz Island for reasons not well-understood (Laughrin 1982; Collins, ms.; P. Collins and R. Fisher, pers. comm.).

Management Recommendations: Exclusion fencing needs to continue as long as feral livestock threatened the native fauna (and flora) on any of the Channel Islands. Particular effort should be made to remove wild pigs from islands on which this taxon occurs because of the greater degree of destruction wild pigs can inflict on snake populations and habitat. Even after threat from the feral fauna has been alleviated, Santa Cruz gopher snake populations need study to gain a better understanding the natural history of these island populations. Emphasis should also be placed on reevaluating its taxonomic status via

genetic and morphometric techniques. Much basic data, including that on distribution, habitat affinities, abundance, reproductive biology, food habits, and factors affecting mortality are needed to improve management guidelines for this taxon.

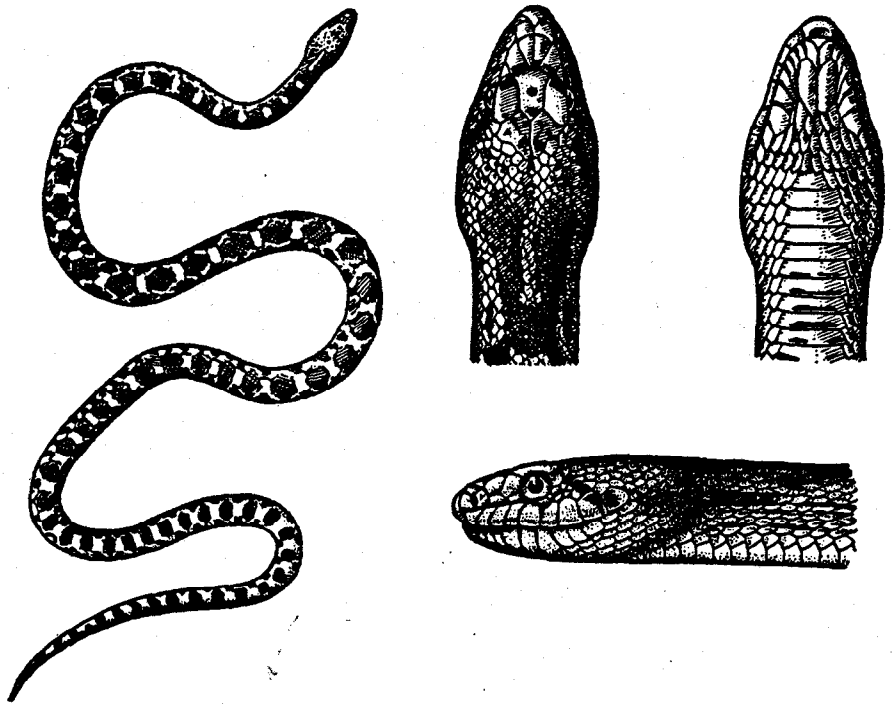

Plate 15. Adult gopher snake (*Pituophis melanoleucus*) [from Stebbins 1954b].

COAST PATCH-NOSED SNAKE
Salvadora hexalepis virgultea Bogert 1935

Description: A medium-sized (55-115 cm TL), slender snake with a yellow or beige, dark-bordered middorsal stripe one full scale row and the two half-scale rows on either side wide; and a broad, patch-like rostral scale (Bogert 1935, 1945; Stebbins 1985). Sides of the body are often dark brown, a color which covers all but the lowermost 1 or 2 dorsal scale rows. Undersurfaces are cream to white, but often washed with pink or orangish on the posterior belly and undersurface of the tail. The iris is black with a buffy-colored ring around the pupil (Wright and Wright 1957).

Taxonomic Remarks: Bogert (1935) defined this form as a subspecies of *Salvadora hexalepis* based on morphology. Alternative data sets have never been examined to affirm the validity of this taxon. Genetic data are needed both to affirm its validity and to identify potential variation across its geographic range. Potential difficulties with obtaining material for such a study, may require considering using novel techniques, such as extracting DNA from preserved material.

Distribution: The known range of this taxon is thought to extend from near Creston (San Luis Obispo County; UCSB 13697), California southward into Baja California (Figure 47). Its known elevation range extends from sea level to around 2130 m.

Life History: The life history of *S. h. virgultea* is among the most poorly known of the regularly surface-active snakes that occur in California. The limited number of records of this species may be largely a function of its bimodal activity period (peak in late morning and secondarily in late afternoon) less frequented by collectors or observers (S. Sweet, pers. comm.) coupled with a relatively cryptic appearance that results from lower light levels during the active period (pers. observ.). During the rest of the daylight hours, *S. h. virgultea* apparently remains immobile on the surface (S. Sweet, pers. comm.). *Salvadora h. virgultea* is an active, relatively swift-moving snake (see Mosauer 1935) that probably maintains a relatively high body temperature (see Brattstrom 1965, Cunningham 1966b, and Jacobson and Whitford 1971). Indications exist that its peak emergence interval corresponds roughly to the emergence interval of what is probably a major prey item, lizards of the genus *Cnemidophorus* (Cunningham 1959a; Jacobson and Whitford 1971; S. Sweet, pers. comm.), The modified rostral scale of this taxon and its congeners is thought to be a modification to aid unearthing reptile egg prey (Bogert 1939, Shaw and Campbell 1974), but whether coast patch-nosed snakes prey extensively on such eggs is not known. *Salvadora h. virgultea* is recorded as emerging from overwintering sites in March and disappearing to overwintering sites in October (Klauber 1939). but these census data probably conceal significant differences in seasonal patterns of activity between juveniles and adults. Additionally, a number of observations exist of juveniles emerging on warm days during the winter months (S. Sweet, pers. comm.). Although this taxon is presumed to lay eggs like other member of its genus, its eggs have never been described (Wright and Wright 1957). Other than the fact that it is a facile climber (Grinnell and Grinnell 1907), its movement ecology is unknown.

Habitat: Several authors have commented on this species association with brushy or shrubby vegetation, such as chaparral (Klauber 1924, Bogert 1935, Perkins 1938). If the assessment that *S. h. virgultea* adjusts its activity around that of its whiptail lizard prey, the link to shrubby associations may simply be a function that being the preferred habitat of its prey. Whatever the link, coast patch-nosed snakes seem to require at least a low shrub structure of minimum density since they are not found in habitats lacking this structural component. Coast patch-nosed snakes are presumed to take refuge and perhaps overwinter

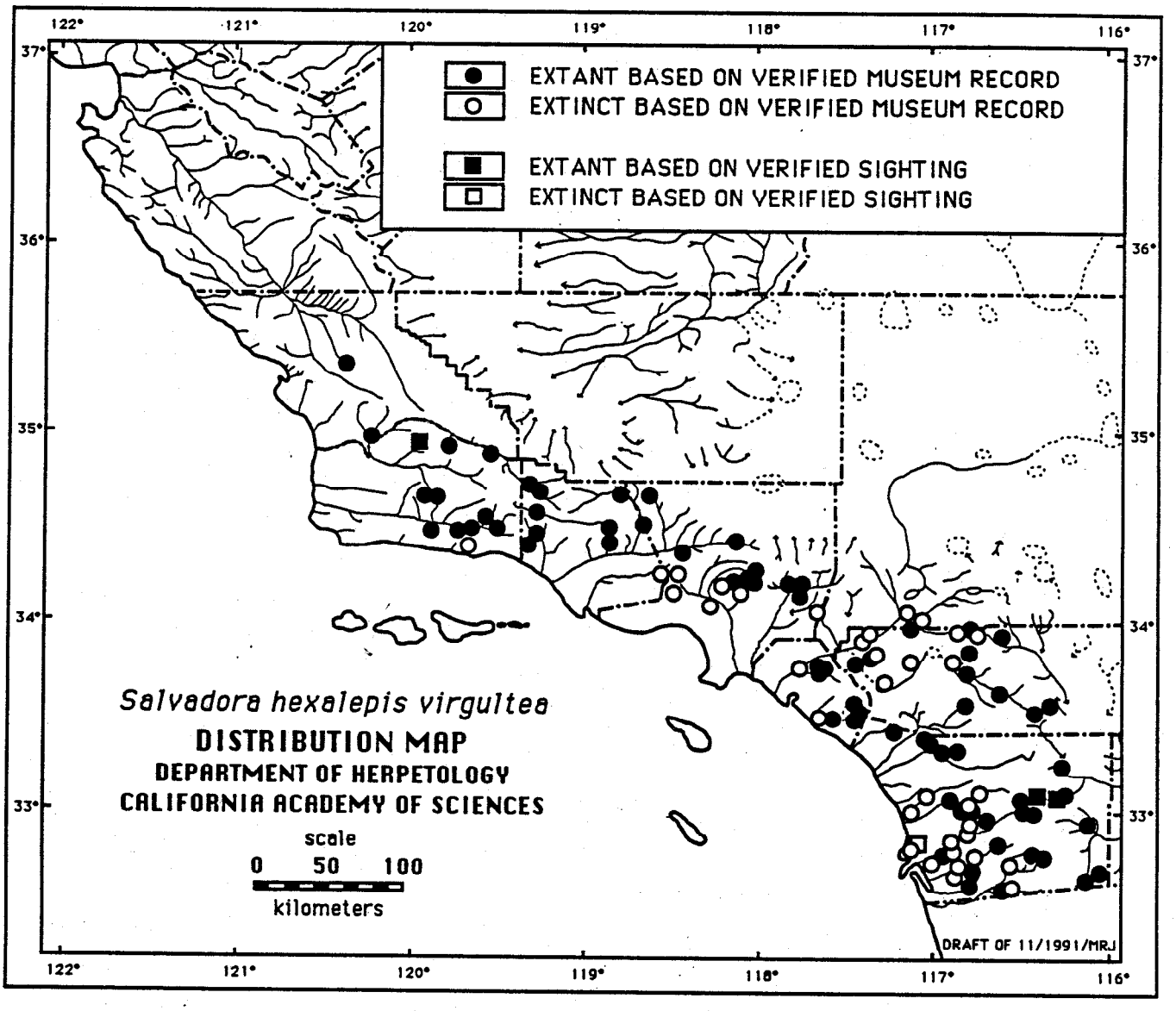

Figure 47. Historic and current distribution of the coast patch-nosed snake (*Salvadora hexalepis virgultea*) in southern California based on 168 locations from 198 museum records and 10 records from other sources.

in burrows or woodrat nests, so the presence of one or more burrow- or refuge-creating mammals may be necessary for this snake to be present.

Status: Special Concern; although available data indicate that the coast patch-nosed snake may have always been an uncommon taxon, the data may be strongly biased because the interval over which time this snake is active is infrequently sampled. Regardless of the bias, extensive areas in coastal southern California with a shrubby habitat structure have been converted through various land uses to habitats largely unsuitable to this species. Extensive conversion of chaparral to grassland began over 30 years ago in coastal southern California, largely to create grazing land for livestock, but later, also for fire control. Beginning at the same time and particularly in the last 20 years, large foothill tracts of shrub-dominated vegetation associations on the coastal slope have been converted to urban development and to a lesser extent, drip-irrigated orchards and row crops. It is conservatively estimated that at least 20% of the habitat historically available to this species is no longer suitable, but the actual figure maybe much higher.

Management Recommendations: Intensive life history study of this snake is needed, especially to better understand its pattern of activity and habitat use, and identify the habitat components that are critical to its survival. Based on the latter, surveys of existing habitat should be made that incorporate ground-truthing against aerial photointerpretation, and existing aerial surveys should be compared with historical aerial photographs to assist estimating the degree of habitat loss and where and how habitat has changed. Until more detailed habitat data become available, shrubby vegetative associations should be routinely surveyed for this taxon at appropriate diel and seasonal intervals and assessments of the quality of the habitat for this species should be done on a site-by-site basis.

TWO-STRIPED GARTER SNAKE
Thamnophis hammondii (Kennicott 1860)

Description: A medium-sized (60-101 cm TL), garter snake with a variable dorsal coloration of olive, brown, or brownish gray, and a single yellow-orange lateral stripe on each side of the body (Fitch 1940, Fox 1951, Larson 1984). These lateral stripes may be lacking on melanistic individuals, which are common in the northern third of the range of this species (Bellemin and Stewart 1977, Larson 1984). A nuchal spot may be present on the back of the neck when the middorsal stripe is absent (Stebbins 1985). The iris is a light tan color (pers. observ.).

Taxonomic Remarks: *Thamnophis hammondii* was recently removed from the *T. couchii* complex (Fox and Dessauer 1965, Rossman 1979, Lawson and Dessauer 1979, Fitch 1984) and elevated to species rank (Rossman and Stewart 1987; but see also Fitch 1940). Field observations indicating that *T. hammondii* is ecologically distinct from coexisting populations of *T. atratus, T. elegans,* and *T. sirtalis* along the central California coast support this conclusion (Fox 1951, Bellemin and Stewart 1977, Rossman and Stewart 1987, Boundy 1990). Some of these taxa have historically been confused with *T. hammondii* (e.g., Larson 1984). Lawson and Dessauer (1979) provide some genetic data on this taxon, but genetic variation across the seven populations sampled cannot be interpreted because the data are lumped. Even if the data had not been lumped, the small sample sizes make it unlikely that one could identify a geographic pattern. Recently, Boundy (1990) suggested that *T. hammondii* be split into two subspecies in California based on his morphometric analyses. This conclusion does not seem justified based on his small sample size of snakes from the northern half of their range. Moreover, the recent conclusions of McGuire and Grismer (1993) from their morphomettic analysis of several newly discovered populations of *T. digueti* indicates that *T. digueti* simply represents *T.*

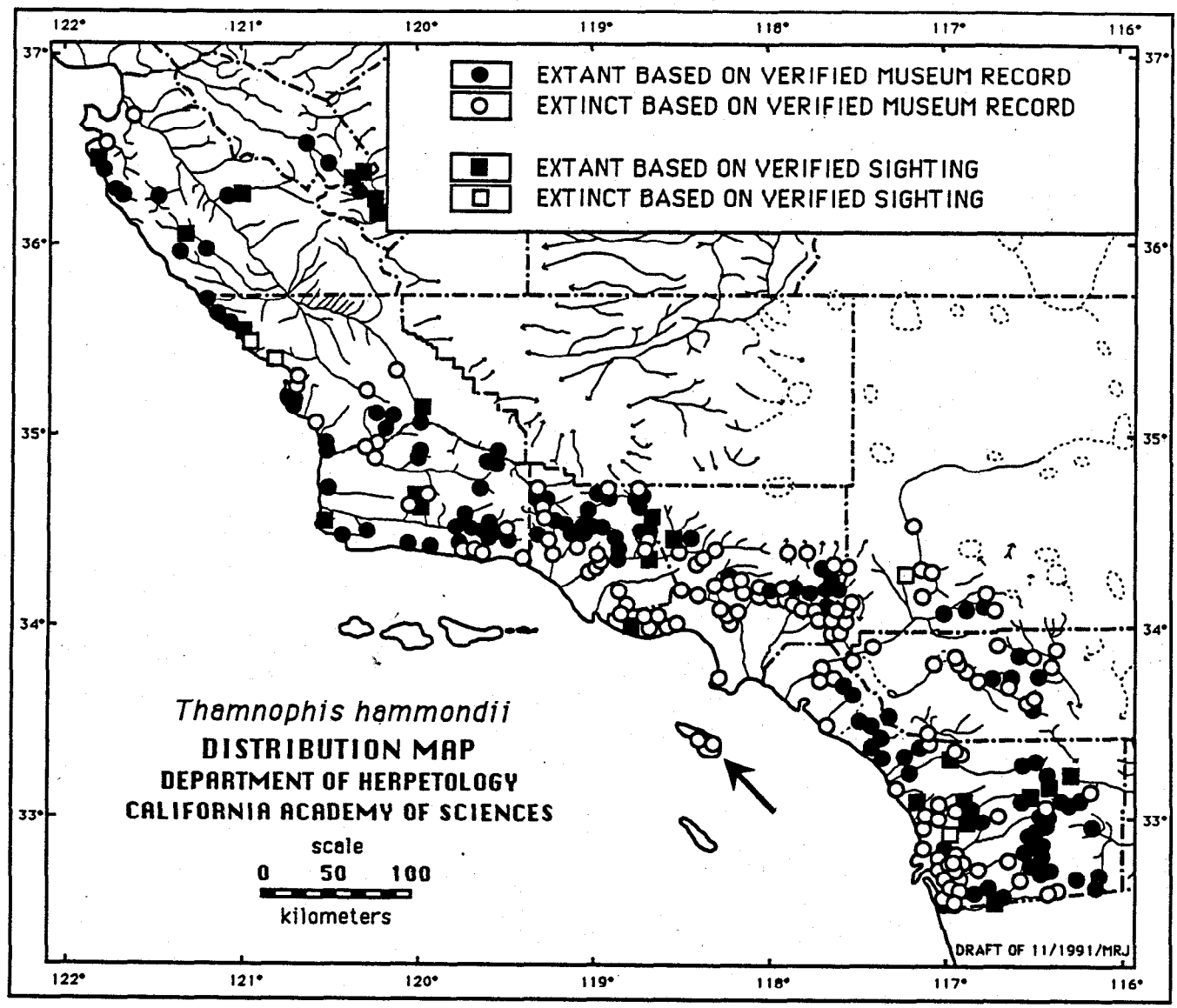

Figure 48. Historic and current distribution of the two-striped garter snake (*Thamnophis hammondii*) in central and southern California based on 509 locations from 1260 museum records and 100 records from other sources.

hammondii in central and southern Baja California, Mexico. More comprehensive genetic and morphometric data are needed to identify potential variation across the geographic range of this taxon.

Distribution: The known range of *T. hammondii* extends through the South Coast and Peninsular ranges west of the San Joaquin Valley and deserts from the vicinity of Salinas (Monterey County: Boundy 1990) and Cantua Creek (Fresno County: Ely 1992), south to La Presa, Baja California, Mexico (McGuire and Grismer 1993). The known elevational range of *T. hammondii* extends from sea level to around 2450 m at Tahquitz Valley on Mt. San Jacinto (Riverside County: Atsatt 1913). In California, *T. hammondii* occurs throughout most of the South Coast and Transverse ranges from Salinas Valley and the southeastern slope of the Diablo Range, south to the Mexican border (Figure 48). This species is also present on Santa Catalina Island (Los Angeles County), California (Brown 1980) and occurs in several perennial, desert slope streams (e.g., Mojave River [San Bernardino County], Whitewater River [Riverside County], and San Felipe Creek [San Diego County]; Perkins 1938, Fitch 1940, Stebbins 1985, Boundy 1990).

Life History: Despite the fact that *T. hammondii* was historically a relatively common snake, its life history is poorly known. In part, this is because this taxon has never been subject to intensive ecological study. *Thamnophis hammondii* is a highly aquatic snake; it is rarely found far from water, which it freely enters to forage or escape predators (Fitch 1940, 1941; Stebbins 1985). Individuals have also been recorded to climb trees or vegetation > 3 m above the surface of the water (Cunningham 1955), but the frequency of this behavior is unknown. Juveniles and adults emerge from hibernation in the spring although they may sometimes be observed foraging on warm winter days (Rüthling 1915, Rathbun et al. 1993). Two-striped garter snakes may have a lower thermal preferendum (18.6-31.8°C [average 22.6°C]: Cunningham 1966b) than measured for other garter snake species (see Brattstrom 1965), but the temperature data are difficult to interpret because the temporal and behavioral context of when temperatures were taken is frequently lacking. *Thamnophis hammondii* is often observed basking during the early morning and afternoon before foraging for prey (pers. observ.). Two-striped garter snakes mate in the spring (March) and bear from 1-25 live young during the fall (Bogert 1930; Cunningham 1959a; G. Stewart, pers. comm.). Neonates have been observed from late August through November (Rathbun et al. 1993). Evidence suggests that females can store sperm for up to 53 months (Stewart 1972), although they probably mate each year. Juveniles and adults feed primarily on fish *(Cottus* sp. and *Eucyclogobius newberryi:* Rathbun et al. 1993; *Gasterosteus aculeatus:* Bell and Haglund 1978, Bell 1982, Rathbun et al. 1993; *Oncorhynchus mykiss:* Fitch 1941), fish eggs (Fitch 1940), and the tadpoles and metamorphs of anurans; *Bufo microscaphus californicus, B. boreas halophilus, Pseudacris cadaverina, P. regilla, Rana aurora draytonii, R. boylii,* and *R. muscosa* have been recorded as prey (Grinnell and Grinnell 1907, Klauber 1931, Fitch 1940, Cunningham 1959a; G. Stewart, pers. comm.; pers. observ.). *Thamnophis hammondii* will prey on bullfrog metamorphs and larvae when other food resources are rare or absent (pers. observ.), which suggests that the life stages of bullfrogs are differentially avoided. Earthworms and larval California newts *(Taricha torosa)* may also be eaten (Fitch 1940, Von Bloeker 1942, Stebbins 1985). The two-striped garter snake probably does not reach sexual maturity until 2 or 3 years of age (pers. observ.). *Thamnophis hammondii* has been maintained in captivity for 7-10 years (Bowler 1977; G. Stewart, pers. comm.), but longevity in the field is unknown. Potential predators include: hawks, shrikes, herons, raccoons, coyotes, and probably introduced exotics such as largemouth bass, catfish, and feral pigs (see Springer 1977 and Schwalbe and Rosen 1988). Bullfrogs are known to eat all life stages of *T. hammondii (S.* Sweet, pers. comm.). Some data are available on the movement ecology of *T. hammondii.* Adult snakes display use of different areas and habitats in summer versus winter (Rathbun et al. 1993). During summer, snakes utilized

streamside sites and had home ranges that varied from approximately 80 m^2 to over 5,000 m^2 (mean = ca. 1500 m^2; n = 7). During winter, they occupied coastal sage scrub and grassland locations in uplands adjacent riparian areas, and had home ranges that varied from approximately 50 m^2 to nearly 9,000 m^2 (mean = ca. 3400 m^2; n = 3). Many aspects of the movement ecology of *T. hammondii,* especially with respect to their colonization abilities, are poorly understood.

Habitat: *Thamnophis hammondii* commonly inhabits perennial and intermittent streams having rocky beds bordered by willow thickets or other dense vegetation (Grinnell and Grinnell 1907; Fitch 1940, Fitch 1941). Two-striped garter snakes also inhabit large sandy riverbeds, such as the Santa Clara River (Ventura County), if a strip of riparian vegetation is present along the stream course (pers. observ.). This taxon also utilizes stock ponds and other artificially-created aquatic habitats (e.g., Lake Hemet [Riverside County]) if a dense riparian border of emergent vegetation and amphibian and fish prey are present. If flooding, overgrazing, burning, or mechanical alteration removes dense riparian vegetation, *T. hammondii* is infrequently found in such habitats (pers. observ.). Limited data indicate that small mammal burrows are used as overwintering sites (Rathbun et al. 1993). Data are lacking on the microhabitats required for bearing young.

Status: Threatened; *T. hammondii* has disappeared from approximately 40% of its historic range on the California mainland during the past century, and most of this has occurred since 1945. It can now be considered common only in eastern San Diego County. Much of this decline is attributed to habitat destruction from urbanization, large reservoirs, and the cement lining of stream channels in southern California for flood control. During the past decade, however, *T. hammondii* has also disappeared from numerous localities in Ventura, Santa Barbara, and San Luis Obispo counties where habitat was once considered to be relatively secure from development (S. Sweet and D. Holland, pers. comm.). The reasons for the rapid decline in the northern part of the range of *T. hammondii* are probably due to a combination of factors, which include: habitat modification resulting from livestock grazing; predation by introduced fishes, bullfrogs, and feral pigs; and loss of the prey food base, particularly amphibians (see accounts on *Rana aurora draytonii, R. boylii,* and *R. muscosa* for pertinent comments, as well as the information presented in Jennings et al. 1992 for *T. elegans)* and fishes, recently exacerbated by the severe drought that occurred over much of southern California between 1986 and 1990. A significant portion of the riparian habitat that still harbors *T. hammondii* is degraded, and could rapidly become unsuitable if present trends towards drier climatic conditions for southern California continue; those conditions are exacerbated by current levels of livestock grazing. Additionally, many areas in the Angeles, Cleveland, Los Padres, and San Bernardino National Forests have sustained significant increases in recreational use since 1970; such trends increase the probability of human contact and the frequency of incidental take contributes to depleting local populations. Hikers, fishermen, and off-road vehicle enthusiasts who mistakenly believe that garter snakes consume large numbers of trout often kill *T. hammondii* (Fitch 1940, Fitch 1941; G. Stewart, pers. comm.; pers. observ.; see also Von Bloeker 1942).

On Santa Catalina Island, individuals from a small melanistic population consisting of < 30 snakes that inhabited a 2.9-km section of stream and a 4-ha reservoir in Cottonwood Canyon has not been seen since 1977 (Brown 1980; G. Stewart, pers. comm.), although a single pregnant female was collected in nearby Middle Canyon on 12 May 1985 (SBMNH 1181). The decline of this isolated population is attributed to the filling of the reservoir with alluvium during the 1982 floods coupled with later drought, predation by feral pigs and introduced bullfrogs, and loss of vegetative cover due to overgrazing. This population of *T. hammondii* should be listed as Endangered.

Management Recommendations: Detailed field surveys to determine the presence of extant populations of *T. hammondii* in southern California are urgently needed to assess the quality of habitat and the numbers of garter snakes remaining in this region. Studies on the ecology of this taxon are especially needed to determine the importance of various food resources for recruitment and reproduction, as well as to indicate the seasonal movements and colonization abilities of garter snakes in natural and human-modified habitats. Land-use managers should consider limiting public access to riparian habitats which harbor significant populations of *T. hammondii*.

SOUTH COAST GARTER SNAKE
Thamnophis sirtalis sp.

Taxonomic Remarks: Recent comparison of *Thamnophis sirtalis* from southern California with individuals from populations north of the Tehachapi Mountains and Carpinteria (Santa Barbara County) indicate that individuals from southern California represent a distinct taxon (J. Boundy and S. Sweet, pers. comm.). Description of this taxon is pending (J. Boundy, pers. comm.).

Distribution: This California endemic is known only from scattered localities along the southern California coastal plain; apparently from the Santa Clara River Valley (Ventura County: SDSNH 4376; UCSB uncat.; S. Sweet, pers. comm.), south to the vicinity of San Pasqual (San Diego County: Klauber 1929; Figure 49). Verified sightings and museum specimens indicate that this taxon historically occurred from near sea level (Ballona Creek and Playa del Rey Marsh, Los Angeles County: Von Bloeker 1942) to ca. 832 m (Lake Henshaw, San Diego County: R. Fisher, pers. comm.).

Life History: Little is known about the life history of this taxon. Because *T. sirtalis* is found over most of North America in a wide variety of habitats except for far northern latitudes and southwestern deserts (Fitch 1981), the 14 known subspecies exhibit a wide variation in habits and life history traits (see Fitch 1965 for a summary). The few data on the South Coast garter snake are interpreted in the context of similarities to other *T. sirtalis* taxa.

The South Coast garter snake is live-bearing, it breeds in the spring and gives birth to 12-20 young during August (Cunningham 1959a), although the birthing interval probably extends from late summer to early fall. If the pattern of growth is similar to other *T. sirtalis*, juvenile snakes typically mature after 2-3 years for males and females, respectively. Other California *T. sirtalis* are known to feed principally on amphibians *(Pseudacris regilla:* Fitch 1941, Cunningham 1959a, White and Kolb 1974; *Bufo boreas:* Fitch 1941; 1949), although fish, small mammals, and insects are also taken (Cunningham 1959a, Fitch 1949, White and Kolb 1974). Thus, the South Coast garter snake may have a similar diet, as small fishes, tadpoles, and insects have been identified as prey items (Grinnell and Grinnell 1907). Snakes are active during the spring through fall (March-October), although occasional individuals can be found abroad during the cold winter months (December-January) on exceptionally warm days (Rüthling 1915). The South Coast garter snake was historically reported as locally common (Grinnell and Grinnell 1907, Bogert 1930, Von Bloeker 1942), but is unknown if overwintering aggregations existed as reported elsewhere (Gregory 1982). *Thamnophis sirtalis* has survived in captivity for over 10 years (Bowler 1977), but longevity of the South Coast garter snake in the field is unknown. Potential predators include kingsnakes, hawks, shrikes, herons, raccoons, coyotes, and probably introduced exotics such as largemouth bass, catfish, and bullfrogs (see Fitch 1965 and Schwalbe and Rosen 1988). Data on movement ecology and colonization abilities are lacking.

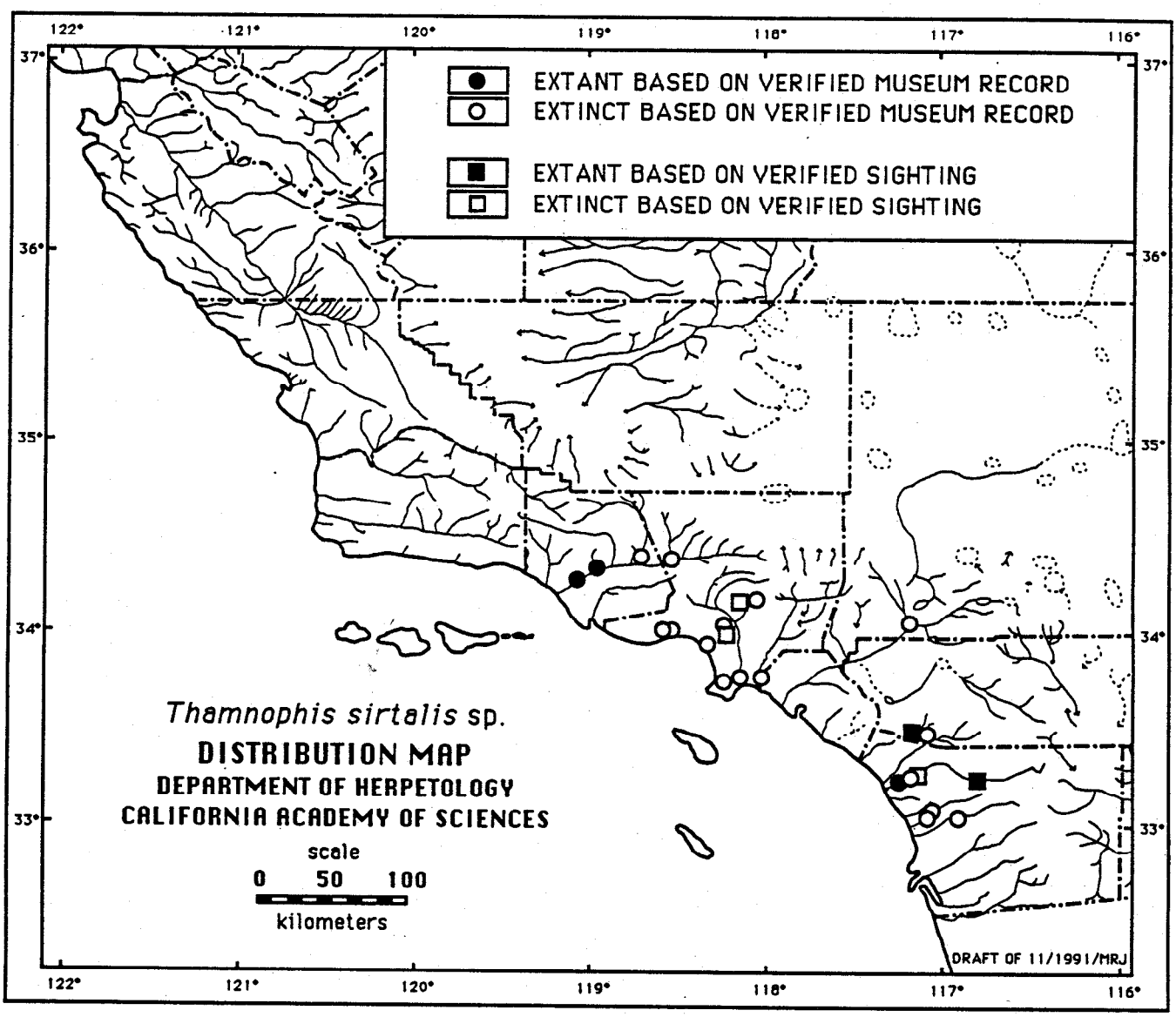

Figure 49. Historic and current distribution of the South Coast garter snake (*Thamnophis sirtalis* sp.) in southern California based on 23 locations from 81 museum records and 7 records from other sources.

Habitat: The South Coast garter snake appears restricted to marsh and upland habitats near permanent water that have good strips of riparian vegetation (Grinnell and Grinnell 1907; S. Sweet, pers. comm.), probably because such sites provide the right combination of prey and refuge sites. Historical records of this taxon also exist for meadow-like habitats adjacent to marshlands (Van Bloeker 1942). Data are lacking on the microhabitats required for bearing young.

Status: Endangered; of the 24 known historic localities for this taxon, 18 (75%) no longer support snakes. Extensive urbanization and flood control projects have destroyed most sites; some more isolated locations, such as in the Santa Monica Mountains, appear to have lost snakes following heavy floods or extended droughts (DeLisle et al. 1986). Habitat loss through agriculture, urbanization, and flood control projects, as well as the presence of many introduced aquatic predators threatens the six remaining localities where this snake still exists. This taxon can be notorious difficult to find in some areas (Klauber 1929; S. Sweet, pers. comm.).

Management Recommendations: Thorough monitoring to determine where this taxon remains in riparian habitats in southern California are urgently needed to evaluate the quality of habitat and the number of snakes that remain. Baseline monitoring should be conducted over several years to ensure that local populations have not been missed, and also extended to identify population trends. Studies on the ecology of this snake are also needed to identify the importance of various prey resources for recruitment and reproduction, and the seasonal movement patterns and the colonization abilities of snakes in remnant habitats.

Discussion

General aspects of the 48 taxa reviewed are summarized in Tables 3, 4, and 5. Of the 48 taxa recommended for state-level status, anurans (frogs and toads) are the numerically best represented group with 14, followed by lizards (12), salamanders (11), snakes (9), and turtles (2). These groups are not equally represented in the California fauna, so the proportion of taxa recommended for listing is a function of the total number taxa in each group in California less the number already listed (at State or Federal levels) provides a better indication of the relative impacts on each group. Based on the latter, turtles have the greatest proportion of taxa being recommended for listing (100%), followed by anurans (70%), salamanders (46%), lizards (35%), and snakes (22%).

An uneven distribution exists in the the number of taxa being recommended for listing at different levels among amphibian and reptile groups (Table 6). In the most critical category (Endangered), anurans and turtles are overrepresented; whereas salamanders, lizards, and snakes are underrepresented (see Table 3). Conversely, in the least critical category (Species of Special Concern), anurans and turtles are underrepresented, whereas salamanders, lizards, and snakes are over-represented (see Table 5). Despite bias because of greater confidence in the data available for the more visible groups (anurans, lizards, and turtles) when compared to the less visible ones (salamanders and snakes), this analysis allows a conclusion that turtles or anurans are more imperilled than lizards, salamanders, or snakes. That conclusion is not likely related to taxonomic group *per se* because some taxa deviate from the modal critical category their taxonomic group exhibits (e.g., *Thamnophis hammondii* among snakes, *Ambystoma californiense* among salamanders).

Partitioning taxa into aquatic and terrestrial categories indicates a more generalized explanation: Taxa with aquatic life stages are more imperilled than those with an exclusively terrestrial life history (Table 6). Among the 20 taxa with at least one aquatic life stage, 13 (60%) are proposed for listing in the most critical category (Endangered), whereas only 2 of the 28 taxa (7%) with a terrestrial life history is proposed for the same category. This comparison may be more extreme than this somewhat arbitrary analysis indicates because one of the two "terrestrial" taxa proposed for Endangered status may be highly dependent on local hydrology for its survival (see species account for the Breckenridge Mountain slender salamander). In contrast, only 6 of the 20 (30%) taxa with at least one aquatic life stage are proposed for allocation to the least critical category (Species of Special Concern), whereas 19 of the 28 taxa (68%) with a terrestrial life history are proposed for that same category. This pattern should not be surprising. Today, most aquatic habitats in California are rarer (i.e., smaller in area) than most terrestrial habitats, a difference often reflected on a scale of one or more orders of magnitude. Overall rarity of aquatic habitats now seen in California is couched in a long history of change in which xerification or loss of aquatic habitat has been and continues to be the dominant pattern (see Anderson and Ohmart 1982, 1985; Anonymous 1991; Brady et al. 1985; L. Bryant 1985; Buckhouse et al. 1985; Ferren and Gevirtz 1990; Harris et al. 1985; Heede 1985; Jones 1988b; Kauffman and Krueger 1984; Kauffman et al. 1983; Marlow and Pogacnik 1985; Ohmart et al. 1988; Szaro and Debano 1985). The large number of critically imperilled taxa associated with aquatic habitats simply underscores the alarming, but long-standing pattern of degradation and reduction of aquatic habitats in California, a pattern that 4 years of recent drought has severely exacerbated.

Degradation and reduction of aquatic habitats in California is a statewide phenomenon, but several regions of the State deserve mention because the current species composition reflects acute degradation and habitat loss. In southern California (south of the Santa Clara River), the aquatic amphibian and reptile fauna is severely depleted; four taxa *(Bufo alvarius, Kinosternon sonoriense, Rana boylii,* and *R. yavapaiensis)* may be extinct and

Table 3. Summary of third category amphibian and reptile species in California for which State listing as Endangered is recommended.

Common Name	Scientific Name	Geographic Range*						Vulnerable Aspects											Current Major Impacts								
		Endemic To California?**	Very Small Range	Small Range	Moderate-Sized Range	Moderately Broad Range	Broad Range	Vernal Pool Habitat Specialist	Breeding Habitat Limited	Refuge Habitat Limited	Habitat Restricted	Old-Growth Specialist	Stream Habitat Specialist	Sandy Habitat Specialist	Dietary Specialist	Seasonal Movements Between Habitats	Large Home Range	Behaviorally Vulnerable	Exotic Predators	Overcollecting Or Black Market Trade	Land Use Conversion	Modification Of Hydrology	Modification Of Seep Hydrology	Removal Of Old-Growth Forest	Removal Of Live Or Dead Oak Tree Material	Off-Road Vehicles	Unidentified, But Causing Widespread Declines
Breckenridge Mtn. slender salamander	*Batrachoseps* sp.	Y	X	--	--	--	--	--	X	X	X	--	--	--	--	--	--	--	--	?	X	--	X	--	X	--	--
Colorado River toad	*Bufo alvarius*	N	--	X	x	--	--	--	?	?	X	--	X	--	--	--	--	--	X	--	X	X	--	--	--	--	--
Yosemite toad	*Bufo canorus*	Y	--	--	X	--	--	--	X	X	X	--	--	--	--	X	--	?	--	--	--	X	--	--	--	--	X
Arroyo toad	*Bufo microscaphus californicus*	N	--	X	x	--	--	--	X	X	X	--	X	--	--	X	--	X	X	--	X	X	--	--	--	X	--
California red-legged frog***	*Rana aurora draytonii*	N	--	x	--	X	--	--	X	X	X	--	--	--	--	--	--	X	X	--	X	X	--	--	--	X	--
Foothill yellow-legged frog***	*Rana boylii*	N	--	--	x	X	--	--	X	--	X	--	X	--	--	--	--	X	X	--	X	X	--	--	--	?	--
Cascade frog***	*Rana cascadae*	N	--	X	--	x	--	--	X	X	X	--	--	--	--	--	--	?	X	--	--	X	--	--	--	--	X
Mountain yellow-legged frog***	*Rana muscosa*	N	--	--	X	--	--	--	X	X	X	--	--	--	--	--	--	?	X	--	--	X	--	--	--	--	X
Northern leopard frog	*Rana pipiens*	N	--	X	--	--	x	--	X	X	X	--	--	--	--	--	?	--	--	--	X	X	--	--	--	--	X
Spotted frog	*Rana pretiosa*	N	--	X	--	--	x	--	X	X	X	--	--	--	--	--	--	X	X	--	X	X	--	--	--	--	--
Lowland leopard frog	*Rana yavapaiensis*	N	--	X	--	x	--	--	X	X	X	--	--	--	--	--	--	--	X	--	X	X	--	--	--	--	--
Western pond turtle***	*Clemmys marmorata*	N	--	--	--	x	X	--	X	X	X	--	--	--	--	?	?	X	X	X	X	X	--	--	--	--	--
Sonoran mud turtle	*Kinosternon sonoriense sonoriense*	N	--	X	--	x	--	--	?	X	X	--	X	--	X	?	?	--	X	--	--	X	--	--	--	--	--
Two-striped garter snake***	*Thamnophis hammondii*	N	--	x	X	--	--	--	--	--	X	--	X	--	X	--	--	--	X	--	X	X	--	--	--	X	--
South Coast garter snake	*Thamnophis sirtalis* sp.	Y	--	X	--	--	--	--	--	X	X	--	--	--	--	--	--	--	X	--	X	X	--	--	--	X	--

*A lower case "x" identifies the size of the geographic range of the taxon outside California.
**Y = Yes; N = No.
***This taxon has also been proposed for Threatened or Special Concern status in parts of its geographic range (see Tables 4 and 5).

Table 4. Summary of third category amphibian and reptile species in California for which State listing as Threatened is recommended.

Common Name	Scientific Name	Geographic Range*						Vulnerable Aspects											Current Major Impacts								
		Endemic To California?**	Very Small Range	Small Range	Moderate-Sized Range	Moderately Broad Range	Broad Range	Vernal Pool Habitat Specialist	Breeding Habitat Limited	Refuge Habitat Limited	Habitat Restricted	Old-Growth Specialist	Stream Habitat Specialist	Sandy Habitat Specialist	Dietary Specialist	Seasonal Movements Between Habitats	Large Home Range	Behaviorally Vulnerable	Exotic Predators	Overcollecting Or Black Market Trade	Land Use Conversion	Modification Of Hydrology	Modification Of Seep Hydrology	Removal Of Old-Growth Forest	Removal Of Live Or Dead Oak Tree Material	Off-Road Vehicles	Unidentified, But Causing Widespread Declines
California tiger salamander	*Ambystoma californiense*	Y	--	--	X	--	--	X	X	X	X	--	--	--	--	X	--	X	X	--	X	X	--	--	--	--	--
Inyo Mountains salamander	*Batrachoseps campi*	Y	--	X	--	--	--	--	X	X	X	--	--	--	--	--	--	--	--	--	--	X	X	--	--	?	--
Southern seep salamander	*Rhyacotriton variegatus*	N	--	--	B	--	--	--	X	X	X	X	--	--	--	--	--	?	--	--	--	X	X	X	--	--	--
Tailed frog***	*Ascaphus truei*	N	--	--	X	x	--	--	X	?	X	X	X	--	--	?	--	X	--	--	--	X	--	X	--	--	--
California red-legged frog***	*Rana aurora draytonii*	N	--	x	--	X	--	--	X	X	X	--	--	--	--	--	--	X	X	--	X	X	--	--	--	X	--
Foothill yellow-legged frog***	*Rana boylii*	N	--	--	x	X	--	--	X	--	X	--	X	--	--	--	--	X	X	--	X	X	--	--	--	?	--
Mountain yellow-legged frog***	*Rana muscosa*	N	x	--	X	--	--	--	X	X	X	--	--	--	--	--	--	?	X	--	--	X	--	--	--	--	X
Western spadefoot	*Scaphiopus hammondii*	N	--	x	--	X	--	X	X	X	X	--	--	--	--	X	--	X	X	--	X	X	--	--	--	--	--
Western pond turtle***	*Clemmys marmorata*	N	--	--	--	x	X	--	X	X	X	--	--	--	--	?	?	X	X	X	X	X	--	--	--	--	--
Belding's orange-throated whiptail	*Cnemidophorus hyperythrus beldingi*	N	--	--	X	x	--	--	?	--	X	--	--	--	X	--	--	--	--	--	X	--	--	--	--	?	--
Panamint alligator lizard	*Elgaria panamintina*	Y	--	X	--	--	--	--	X	X	X	--	X	--	--	--	--	--	--	--	--	X	X	--	--	?	--
San Diego horned lizard	*Phrynosoma coronatum blainvillii*	N	--	x	X	--	--	--	--	--	--	--	--	--	X	--	?	X	X	--	X	--	--	--	--	X	--
California horned lizard	*Phrynosoma coronatum frontale*	Y	--	--	X	--	--	--	--	--	--	--	--	--	X	--	?	X	X	--	X	--	--	--	--	X	--
Flat-tailed horned lizard	*Phrynosoma mcallii*	N	--	X	x	--	--	--	?	--	X	--	--	X	X	--	X	X	--	--	X	--	--	--	--	X	--
San Joaquin coachwhip	*Masticophis flagellum ruddocki*	Y	--	--	X	--	--	--	--	--	X	--	--	--	--	--	?	--	--	--	X	--	--	--	--	X	--
Two-striped garter snake***	*Thamnophis hammondii*	N	--	x	X	--	--	--	--	--	X	--	X	--	X	--	--	--	X	--	X	X	--	--	--	X	--

*A lower case "x" identifies the size of the geographic range of the taxon outside California; a "B" is used where the size of the geographic range inside California is subequal to that outside California.

**Y = Yes; N = No.

***This taxon has also been proposed for Special Concern or Endangered status in parts of its geographic range (see Tables 3 and 5).

Table 5. Summary of third category amphibian and reptile species in California for which Special Concern status is recommended.

Common Name	Scientific Name	Geographic Range*						Vulnerable Aspects											Current Major Impacts								
		Endemic To California?**	Very Small Range	Small Range	Moderate-Sized Range	Moderately Broad Range	Broad Range	Vernal Pool Habitat Specialist	Breeding Habitat Limited	Refuge Habitat Limited	Habitat Restricted	Old-Growth Specialist	Stream Habitat Specialist	Sandy Habitat Specialist	Dietary Specialist	Seasonal Movements Between Habitats	Large Home Range	Behaviorally Vulnerable	Exotic Predators	Overcollecting Or Black Market Trade	Land Use Conversion	Modification Of Hydrology	Modification Of Seep Hydrology	Removal Of Old-Growth Forest	Removal Of Live Or Dead Oak Tree Material	Off-Road Vehicles	Unidentified, But Causing Widespread Declines
Relictual slender salamander	*Batrachoseps relictus*	Y	--	X	--	--	--	--	--	--	?	--	--	--	--	--	--	--	--	--	--	--	X	--	X	--	--
Yellow-blotched salamander	*Ensatina eschscholtzii croceater*	Y	--	X	--	--	--	--	--	?	?	--	--	--	--	--	--	--	--	--	?	--	--	--	X	--	--
Large-blotched salamander	*Ensatina eschscholtzii klauberi*	Y	--	X	--	--	--	--	--	?	?	--	--	--	--	--	--	--	--	--	X	--	--	--	X	--	--
Mount Lyell salamander	*Hydromantes platycephalus*	Y	--	--	X	--	--	--	--	?	?	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
Owens Valley web-toed salamander	*Hydromantes* sp.	Y	--	X	--	--	--	--	--	?	?	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--	--
Del Norte salamander	*Plethodon elongatus elongatus*	N	--	X	x	--	--	--	--	?	--	X	--	--	--	--	--	--	--	--	--	--	--	X	--	--	--
Coast Range newt***	*Taricha torosa torosa*	Y	--	--	X	--	--	--	?	--	--	--	--	--	--	--	--	--	--	?	X	X	--	--	--	--	--
Tailed frog****	*Ascaphus truei*	N	--	X	x	--	--	--	X	?	X	X	X	--	--	?	--	X	--	--	--	X	--	X	--	--	--
Northern red-legged frog	*Rana aurora aurora*	N	--	--	X	--	x	--	X	X	X	--	--	--	--	--	--	X	X	--	X	X	--	--	--	--	--
Foothill yellow-legged frog****	*Rana boylii*	N	--	--	x	X	--	--	X	--	X	--	X	--	--	--	--	X	X	--	X	X	--	--	--	?	--
Cascade frog****	*Rana cascadae*	N	--	X	--	x	--	--	X	X	X	--	--	--	--	--	--	?	X	--	--	X	--	--	--	--	X
Couch's spadefoot	*Scaphiopus couchii*	N	X	--	--	--	x	X	X	--	--	--	--	--	?	--	--	X	--	--	?	--	--	--	--	X	--
California legless lizard	*Anniella pulchra*	N	--	--	X	x	--	--	?	X	X	--	--	--	--	--	--	--	X	--	X	--	--	--	--	?	--
Coronado skink	*Eumeces skiltonianus interparietalis*	N	--	B	--	--	--	--	?	?	X	--	--	--	--	--	--	--	?	--	X	--	--	--	X	--	--
Banded Gila monster	*Heloderma suspectum cinctum*	N	--	X	--	x	--	--	--	--	--	--	--	--	--	X	X	--	--	X	X	--	--	--	--	?	--

*A lower case "x" identifies the size of the geographic range of the taxon outside California; a "B" is used where the size of the geographic range within California is subequal to that outside California.
**Y = Yes; N = No.
***Only for a portion of its geographic range (see species accounts for details).
****This taxon has also been proposed for Threatened or Endangered status in parts of its geographic range (see Tables 3 and 4).

Table 5. Summary of third category amphibian and reptile species in California for which Special Concern status is recommended (continued).

Common Name	Scientific Name	Geographic Range*						Vulnerable Aspects											Current Major Impacts								
		Endemic To California?**	Very Small Range	Small Range	Moderate-Sized Range	Moderately Broad Range	Broad Range	Vernal Pool Habitat Specialist	Breeding Habitat Limited	Refuge Habitat Limited	Habitat Restricted	Old Growth Specialist	Stream Habitat Specialist	Sandy Habitat Specialist	Dietary Specialist	Seasonal Movements Between Habitats	Large Home Range	Behaviorally Vulnerable	Exotic Predators	Overcollecting Or Black Market Trade	Land Use Conversion	Modification Of Hydrology	Modification Of Seep Hydrology	Removal Of Old-Growth Forest	Removal Of Live Or Dead Oak Tree Material	Off-Road Vehicles	Unidentified, But Causing Widespread Declines
Colorado Desert fringe-toed lizard	*Uma notata notata*	N	--	X	x	--	--	--	--	--	X	--	--	X	--	--	--	?	--	--	X	--	--	--	--	X	--
Mojave fringe-toed lizard	*Uma scoparia*	N	x	X	--	--	--	--	--	--	X	--	--	X	--	--	--	?	--	--	X	--	--	--	--	X	--
Sandstone night lizard	*Xantusia henshawi gracilis*	Y	X	--	--	--	--	--	X	X	X	--	--	--	--	--	--	--	--	?	--	--	--	--	--	--	--
Sierra night lizard	*Xantusia vigilis sierrae*	Y	X	--	--	--	--	--	X	X	X	--	--	--	--	--	--	--	--	?	?	--	--	--	--	--	--
Baja California rat snake	*Elaphe rosaliae*	N	X	--	--	x	--	--	--	--	X	--	--	--	--	--	?	--	--	X	--	--	--	--	--	--	--
Red diamond rattlesnake	*Crotalus ruber ruber*	N	--	X	x	--	--	--	--	--	X	--	--	--	--	--	?	--	--	--	X	--	--	--	--	--	--
San Bernardino mountain kingsnake	*Lampropeltis zonata parvirubra*	Y	--	X	--	--	--	--	--	X	X	--	--	--	--	--	--	--	--	X	X	--	--	--	X	--	--
San Diego mountain kingsnake	*Lampropeltis zonata pulchra*	Y	--	X	--	--	--	--	--	X	X	--	--	--	--	--	--	--	--	X	X	--	--	--	X	--	--
Santa Cruz gopher snake	*Pituophis melanoleucus pumilus*	Y	X	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	X	--	--	--	--	--	--	--	--
Coast patch-nosed snake	*Salvadora hexalepis virgultea*	N	--	x	X	--	--	--	--	--	?	--	--	--	?	--	--	X	--	--	X	--	--	--	--	--	--

*A lower case "x" identifies the size of the geographic range of the taxon outside California.
**Y = Yes; N = No.

Table 6. Taxonomic and ecological groupings of amphibian and reptile taxa across recommended listing categories.

Group	Total[a] (N)	Endangered (E) (N_e)	%E (N_e/N) x 100	Threatened (T) (N_t)	%T (N_t/N) x 100	Special Concern (SC) (N_{sc})	%SC (N_{sc}/N) x 100
Amphibians	25	11	44	8	32	11	44
Anurans	14	10	71	5	36	4	40
Salamanders	11	1	9	3	27	7	63
Reptiles	23	3	13	8	35	13	57
Lizards	12	0	0	5	42	7	58
Snakes	9	2	22	2	22	6	67
Turtles	2	2	100	1	50	0	0
Aquatic Taxa[b]	20	13	65	9	45	6	30
Terrestrial Taxa[b]	28	2	7	7	25	19	68

[a] Total indicated the total number of taxa recommended for listing in the indicated group. The sum of the totals for each listing category sometimes do not match the total in each group because some taxa are listed in more than one category.

[b] Taxa were placed in the aquatic grouping if one or more life stages of that taxon was dependent on significant accumulations of free water. Thus, all anurans, the two turtles, *Ambystoma californiense*, *Rhyacotriton variegatus*, *Taricha torosa*, and *Thamnophis hammondii* were placed in the aquatic group, and all plethodontid salamanders, lizards, and snakes were placed in the terrestrial group.

fragmented populations are all that remain of seven others *(B. microscaphus californicus, Clemmys marmorata, R. aurora draytonii, R. muscosa, Scaphiopus hammondii, Thamnophis hammondii,* and *T. sirtalis sp.).* Even taxa that were generally historically abundant (e.g., *Taricha torosa torosa)* are now observed in limited numbers. In the San Joaquin Valley, three aquatic taxa *(C. marmorata; R. a. draytonii,* and *R. boylii)* have highly fragmented distributions restricted to segments of the bordering foothills, and two others *(Ambystoma californiense* and *S. hammondii)* remain largely in the less-disturbed rainpool habitats that have become increasingly isolated along the edges of the valley. In northeastern California, two frogs *(R. pipiens* and *R. pretiosa),* if present, are extremely rare. Finally, aquatic taxa from high elevations along the Cascade-Sierra axis *(B. canorus, R. cascadae,* and *R. muscosa)* have displayed apparent widespread reductions in geographic range that are especially alarming.

Aquatic habitats in California dominate the picture of species in severe decline, but several taxa associated with specialized and often rather fragile terrestrial or terrestrial-aquatic interface habitats also deserve special mention. Four taxa often, and, for some, uniformly, associated with deposits of wind-blown sand *(Anniella pulchra, Phrynosoma mcallii, Uma notata notata,* and *U. scoparia)* are at varying degrees of risk because of alterations to this habitat type. Three taxa *(Ascaphus truei, Plethodon elongatus,* and *Rhyacotriton variegatus)* closely associated with old-growth coniferous forests are increasingly at risk due to the removal of this habitat type at rates faster than it can renew itself. Finally, two taxa often associated with saltbush scrub or annual grassland associations *(Masticophis flagellum ruddocki* and *P. coronatum frontale)* are at risk because these habitat types are now greatly reduced and fragmented.

Recommendations

Patterns revealed in this analysis led to making the following recommendations. The facts that such a large number of amphibian and reptile taxa (48) deserve some kind of listing, and that proposed listings are exclusively upgrades (no downgrades[3]) is reflective of a grave situation with far-reaching environmental consequences. Because issues raised in the proposed listing of many taxa are complex and linked, ranking the recommendations associated with such listings was difficult. Nevertheless, some recommendations are more encompassing; these (hereafter "primary") are provided first. Linkage between primary and most subsequent recommendations is complex enough to prevent logically ranking recommendations in a more refined way. As a consequence, grouped primary and secondary recommendations are numbered solely because presentation must be sequential. This numbering should not be interpreted as an importance ranking. Finally, some of the recommendations made here have appeared in individual species accounts in a taxon-specific context; these recommendations reappear here in a generalized context since they may apply not only to more than one taxon, but to other taxa not discussed here in future situations.

Primary Recommendations:

1) Funding - As treated here, funding refers to any monies available to address amphibian and reptile taxa that are listed, candidates or potential candidates for listing, or the problems associated with such taxa. Current levels of funding are conservatively

[3]At this writing, no data addressing any of the taxa the State of California lists as Endangered or Threatened has indicated that a downgrade in status was justified. Such evaluations were outside the purview of this report (see page 8).

estimated at two orders of magnitude or more below the level needed to reverse existing trends. As a consequence, two issues are evident: a) existing agency machinery is highly unlikely to be able to generate funding at the level needed to reverse existing trends; and b) because of the great cost, generation of funding levels necessary to reverse existing trends must be broad-based, and thus draw on agency-, public-, and private-sector funding. The latter result is unlikely to be achieved without radical changes in current attitudes towards land use and land ownership. In particular, private ownership of land now allows landowners enough latitude to engage in short- or long-term abuse of land incompatible with the survival of most amphibians and reptiles. Moreover, the full realization of changes to achieve this kind of funding base are unlikely to be implemented without a significant transitory period, especially in the context of the current weak economic situation. Details of the pertinent arguments related to the current funding base are addressed in Appendix I.

2) Education - Education of the public at all levels as to the significance of amphibians and reptiles is essential for several interrelated reasons. First, recognition that the failure of selected amphibians and reptiles to maintain populations is not simply a detriment to those species, it is indicative of a decline in environmental quality that increasingly affects humans in a negative manner, so humans should recognize it as such. Second, amphibians and reptiles are an essential part of the natural heritage of California, having evolved in tandem with the diverse physical and biotic environments found in the state. Nonetheless, a remarkable amount of disinformation exists about the native California herpetofauna. This is in part a consequence of the fact that some exotics are so well established (e.g., bullfrogs) that many people perceive those species to be native and are ignorant of the problems exotics create. Third, understanding of the significance of amphibians and reptiles must be broad-based if the funding needed to maintain programs addressing their study, their survival, and education of the public about them is to continue (see also Gibbons 1988 for pertinent comments). Broad-based means that concerted educational efforts should provide age-appropriate information to individuals ranging from pre-school to adults. Scattered evidence indicates that serious deficiencies in the latter area are a major reason that much of the public is ignorant regarding amphibians and reptiles. The connection between declines among amphibians and reptiles and various aspects of environmental quality are not perceived or poorly understood by many people. Thus, the public is refractory to providing or supporting the funding needed to address these species. Education must provide the primary vehicle for changes in attitude in land use from one of ownership incompatible with sensitive taxon survival to one of stewardship compatible with sensitive taxon survival. Fourth, education related to sensitive taxa has tended to have a narrow focus, addressing mostly biological assessments to which technological solutions most strongly influenced by economic concerns are applied (see especially Kellert 1985). Aesthetic, educational, historical, and recreational values of sensitive species are often ignored (Kellert 1985, Rolston 1981). Education should provide exposure to the full range of values these taxa provide.

Secondary Recommendations:

1) Protection of aquatic systems - The gravity of the situation facing the aquatic species treated here indicates that a much more concerted effort should be directed at aquatic systems. Especially needed are efforts in the areas of: a) modification of aquatic habitat structure, b) water quality, and c) exotic biota. To be effective, these efforts must be integrated, not independent.

Perhaps the most pervasive problem concerning aquatic systems is their continued modification with still only limited attention to the natural or historical dynamics of these systems with regard to sediment distribution and vegetation structure (see Harris et al.

1985, Heede 1985, Platts et al. 1985, Schultze and Wilcox 1985, Stabler 1985). Future engineering solutions should focus on integrating into existing hydrological patterns without significantly modifying them or working towards restoring the historicalpatterns, rather than attempting solutions that force changes upon existing patterns. Further, the inability of many aquatic systems to support the imperilled aquatic amphibians and reptiles we discuss is often testimony either to the inadequacy of current local, regional, and state water quality standards; or their enforcement; or both. Finally, exotic biota that threaten, or that are suspected of threatening much of the native aquatic biota continue to expand their range in California. Limiting the expansion of exotics requires efforts on several fronts including: a) development of species-specific control measures that will not affect non-target species; b) education that emphasizes the overwhelming discrepancy between the many disadvantages exotics have versus the very limited advantages, if any, they provide; and c) reducing the translocation and future importation of exotics into California to the maximum extent possible. Special attention should be devoted to bullfrogs, which are one of the foremost among problem exotics that influence amphibians and reptiles (see Schwalbe and Rosen 1988). Bullfrogs should be deleted from the CDFG list of game species, the bag limits on them should be removed, and programs directed at the selective removal and elimination of bullfrogs should be encouraged. The latter measures should be coupled to a broad-based education program that details bullfrog identification procedures and life history characteristics and contrasts them to those of the native frogs. Equal effort should be devoted to the eliminating the translocation of exotic fishes, regardless of their game species status. Particularly, efforts should be made to reduce or even eliminate the translocation of mosquitofish, which continues to occur for claimed public health reasons that frequently lack a scientific basis. Studies are needed to determine the level at which mosquitofish exert their negative effects. Alternatives to using exotics should be developed in conjunction with agencies that have historically promoted the translocation of exotic fishes.

Perhaps most significantly, special efforts should be directed at the protection of entire hydrographic basins or drainages, or at measures that will ultimately lead to protection of entire drainages. Failure to at least initiate measures that will lead to protection of entire drainages guarantees that the current patterns of degradation will eliminate most of the remaining populations of imperilled aquatic species within the next two decades.

2) Systematic studies - Many of the taxa discussed herein lack systematic study on them adequate to understand the historical units that may be contained within them. Several currently recognized taxa (e.g., California newt) almost undoubtedly represent more than one taxon. For taxa such as the fringe-toed lizards *(Uma* spp.), systematic study is imperative because it remains vague whether the Federally listed *U. inornata* is conspecific with the two *Uma* taxa we discuss. For fringe-toed lizards as with other taxa, understanding precisely what populations comprise discrete taxonomic units is tantamount to listing or otherwise addressing imperilled populations. If the taxonomic units that may be imperilled are not precisely defined, what populations require protection or directed management efforts will remain vague.

3) Movement studies - The species accounts cumulatively reflect the fact that movement ecology is the least understood aspect of life histories (see the life history section of the respective accounts). As treated here, movement ecology is a broad heading that encompasses the diel, seasonal, inter-seasonal, and inter-generational movements that individuals or populations of a species makes. They include, but are not limited to, movements between foraging and refuge sites, overwintering and summering sites, and breeding and non-breeding sites. Movement data are sparse largely because they are time costly to obtain. Ironically, movement data are among the most crucial to obtain to formulate management recommendations because they allow precise identification of

habitats that a species uses, sometimes only temporarily, but which are essential to its survival. The thorough telemetry study of Muth and Fisher (1992) that showed that the home ranges of *Phrynosoma mcallii* were up to over an order of magnitude larger than had been identified in previous studies elegantly demonstrates that the quality of movement data obtained is related to the effort expended. Perhapsthe most significant finding of the latter study was that the number of points needed to confidently establish the size of the home range is several times as many as was previously believed to be adequate. This study alone makes the quality of existing movement data on most species suspect (e.g., the recent studies of Hager (1992) and Rowland (1992), and older studies of Bostic (1964), Kauffman (1982), and Turner and Medica (1982)). Inter-seasonal *(fide* Muth and Fisher 1992) and inter-generational movement data are lacking for all taxa we discuss, and even rudimentary movement data are available for only a few taxa. Efforts to obtain significant movement data on all taxa treated here should be a primary focus of future work

4) Treatment of taxa potentially extirpated within the state - Several of the taxa reviewed here have some probability of having been extirpated within California (e.g., Colorado River toad, lowland leopard frog, and Sonoran mud turtle). It needs emphasis, however, that no taxon for which this condition is suspect has been surveyed enough to be confident of this assertion. Assertions of extirpation are necessarily based on negative evidence. The accumulation of such evidence only increases confidence in the assertion that extirpation has occurred. As a consequence, concluding that extirpation has occurred should be treated conservatively in the extreme. Guidelines need to be established to determine just how extirpation should be evaluated, if at all. Because extirpation is based on negative evidence, it absolutely should not be used as the basis for delisting taxa.

5) Attention to complex, synergistic, or additive environmental effects. The rapid pace of change in current local, regional, or global environments has resulted in new or previously unrecognized complex impacts on their contained species. While only a few of these novel effects are mentioned here, a general awareness should exist that the likelihood of novel effects is increased at the current rapid pace of often complex changes. One symptom of a potentially serious, but as of yet undetermined, effect is the apparent decline of high elevation populations of amphibians as the result of an unidentified impact that may be atmospheric in nature. Recent surveys and studies attempting to show that acidification is the cause of such declines have failed to reveal data in support of this hypothesis in California (Landers et al. 1987; Bradford et al. 1991, 1992, 1994). In the absence of evidence for acidification, increased levels of ambient mid-range (UV-B) ultraviolet radiation (Blumthaler and Ambach 1990) as a consequence of the widely publicized pattern of depletion of stratospheric ozone (Watson et al. 1988) is a potentially grave atmospheric effect that should be addressed (see Blaustein et al. 1994). Even if no direct effect of UV-B is found in California, indirect effects should be considered because supratypical UV-B levels are thought to be capable of depressing immune system function, which could increase the susceptibility of organisms to pathogens or parasites (see Carey 1993).

Numerous other complex effects are possible; only a few more important ones will be mentioned. First, recent climatic trends perhaps indicative of global warming resulted in severe drought in California over the interval 1986-1990 (see especially Knox 1991). Terrestrial plethodontid salamanders (e.g., *Batrachoseps* spp., *Ensatina eschscholtzii*, and *Hydromantes* spp.), which are dependent on soil moisture to maintain activity (Cohen 1952), may have had their activity altered or their survivorship influenced in unknown ways by the severe drought. If a major underlying theme can be attributed to the general pattern of habitat change in California even before the 1986-1990 drought, it was increased xerification on local and regional scales. Human diversion and use of water initiated or assisted, often imperceptibly on a short time-scale, the drying of many previously more mesic habitats. Drought accentuated the process of xerification, which became apparent in

places where previously it had been barely perceptible. Drought-accentuated xerification may influence some aquatic amphibians (e.g., *Rana boylii* and *R. cascadae)* that have apparently disappeared from the southern portions of their geographic ranges in California. Understanding of how local xerification may haveinfluenced both aquatic and terrestrial amphibians needs study. Second, a frequently unrecognized, but potentially important influence, on amphibian and reptile populations is the temporary or permanent change in the concentration of predators as the result of human activity. For example, local increases in common raven *(Corvus corax)* populations associated with excessive depredation of young desert tortoises in the Mojave Desert has been linked to local increases in alternative food resources (garbage dumps and landfills) as a consequence of local increases in the human population (U.S. Fish and Wildlife Service 1990; but see also Camp et al. 1993). Similar human-induced concentrations of generalized predators (e.g., American crows *[C. brachyrhynchos]*, common ravens, Virginia opossums *[Didelphis virginiana]*, and raccoons) that increase predation over historic background levels may be occurring elsewhere and may be responsible for declines now observed in several of the species discussed herein. Moreover, such effects are likely additive to or synergistic with the problems posed by exotics. Such human-induced effects should be watched for, and steps should be taken to discourage them, wherever possible. Third, ways in which other elements of the native fauna may benefit native amphibians and reptiles are often unrecognized or need study. For example, dam-constructing beaver create slackwater habitat that benefit a number of taxa including amphibians (e.g., *Rana aurora aurora)*, and removal of beaver has been linked to unfavorable erosional downcutting in some stream systems (Apple 1985, Parker et al. 1985). Care should be taken however, to differentiate between native and introduced populations of beaver in California since the latter may have undetermined undesirable impacts. Furthermore, the often limited burrowing capabilities of amphibians and reptiles may be the cause of their frequent association with burrowing mammals (besides the latter simply being prey items in the case of snakes). Determination of how dependent on burrowing mammals many amphibians and reptiles are for refuge sites needs study. Fourth, more subtle human-induced changes in habitats often go unrecognized for years. One example of this is the increase and proliferation in campsites in wilderness areas over the past 20 years (see Cole 1993). The effects local habitat degradation caused by these impacts has on amphibian and reptile populations is unknown. Yet, these effects need to be quantified because they may be more insidious as negative long-term trends will be more difficult to identify than for other factors.

6) Livestock management and grazing - Problems that result from grazing practices and livestock management undoubtedly rank among the most important in California; the effects are often cumulative over many years and are amplified by interactions with other factors. While the impacts of grazing have focused appropriately on riparian and aquatic systems (Buckhouse et al. 1981, L. Bryant 1985, Jones 1988b, Kauffman and Krueger 1984, Kauffman et al. 1983, Marlow and Pogacnik 1985, Siekert et al. 1985, Szaro et al. 1985), impacts to the terrestrial herpetofauna are also recognized (Jones 1979). Perhaps the greatest problem with grazing and livestock management is that, in California, much of it occurs on private land, where non-abusive management practices must be largely voluntarily applied by landowners. As a result, most landowners implement management practices that are economically the most favorable in the short-term, practices which are invariably the least favorable to the amphibian and reptile fauna in the long-term (e.g., see species account for the California red-legged frog). Recent economic hardship assisted by the severity of multi-year drought conditions has worsened this pattern. In particular, drought conditions have accentuated the cumulative effects of many years of abusive grazing practices. Significant reversal of the existing patterns of livestock management on private land require a broad-based education effort (see #2 primary recommendation) that emphasizes the greater long-term gain of applying beneficent grazing practices over practices that result in only short-term gain, but cumulative loss. This must be coupled to

encouraging practices that allow recovery of rangelands (e.g., partial riparian exclosures (Szaro et al. 1985) and timing of grazing (Marlow and Pogacnik 1985)).

7) Patterns of timber harvest - Although problems associated with timber harvest relate largely to the coniferous forests of coastal and montane California, some also apply to the diverse oak woodlands in lowland and submontane areas of the state. Education and programs that encourage some diversity of downed woody material (in particular, that ensure a continuous supply of that material of different ages), that help maintain a significant broad-leaf (especially oak) litter layer, that help maintain significant riparian corridors, and that limit the size of tree patches harvested should be promoted. These measures help provide nest and refuge sites for, encourage the food base for, or reduce hydrological and other impacts to, amphibians and reptiles that occupy timbered areas (Bury 1983; Bury and Corn 1988a, 1988b; M. Bryant 1985; Murphy and Hall 1981; Newbold et al. 1980; Raphael 1987; Welsh and Lind 1988; Welsh 1990).

8) Long-term studies - Long-term studies are costly, but are the only way to identify population trends that may signal deteriorating environmental conditions (Morrison 1988), and are the only way to obtain demographic information on amphibian and reptile taxa that are long-lived (e.g., *Clemmys marmorata).* These demographic data are essential to their effective management. Long-term is a taxon-relative designation. To be useful, a long-term study should at least exceed the average longevity of adults of a taxon. Where the average longevity is not known, it should extend over a period long enough that confidence is high that at least 80% of the adult population has turned over (i.e., replaced itself). In the absence of long-term data, deteriorating environmental conditions will be manifest in a frequently abrupt manner. Intermittent surveys over long time intervals will often reveal only absences of taxa once present, and an inability to refine management alternatives for long-lived species will persist.

9) Loss of biological information - Under current State and Federal statutes, development and other land use changes require that biological assessments be undertaken only when one or more listed species are suspected of being at risk. Although generalized biological inventories are often undertaken, neither vouchers nor photographs of amphibian and reptile species identified to be present are taken for historical record. As a result, if the development or land use change takes place, nothing is available to voucher the historical biological composition of a given site. The biological composition of a given site, including its amphibian and reptile fauna, is as much a part of the heritage of California as its archaeological heritage. Under Sections 106 and 110 of the National Historic Preservation Act, Federal agencies and, by default, State agencies must require a pre-development survey for archaeological sites. Where archaeological remains are found, but the site is of too minor archaeological significance to be secured in permanence, qualified professionals salvage the remains. A parallel, state-level statute should be instituted to "salvage" biological data in the form of some kind of vouchering for sites that ultimately undergo development. Such vouchers, including materials secured for frozen tissue collections, should be deposited in one of the four major, in-state repositories designed for that purpose (i.e., CAS, LACM, MVZ, SDSNH; Table 1). Cost of the biological survey as well as the maintenance cost of vouchers in the repository institution should simply be a part of the cost of development of a site.

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Plate 16. Larval and adult California red-legged frog (*Rana aurora draytonii*) [from Stebbins 1951].

Literature Cited

Adams, L. 1938. The Mount Lyell salamander. Yosemite Nature Notes 17(10):138-139.

Adams, L. 1942. The natural history and classification of the Mount Lyell salamander, *Hydromantes platycephalus.* University of California Publications in Zoology 46(2):179-204.

Adams, M. J. 1993. Summer nests of the tailed frog *(Ascaphus truei)* from the Oregon Coast Range. Northwestern Naturalist 74(1):15-18.

Adest, G. A. 1977. Genetic relationships in the genus *Uma* (Iguanidae). Copeia 1977(1): 47-52.

Altig, R. G., and E. D. Brodie, Jr. 1972. Laboratory behavior of *Ascaphus truei* tadpoles. Journal of Herpetology 6(1):21-24.

Altig, R. G., and P. C. Dumas. 1971. *Rana cascadae.* Catalogue of American Amphibians and Reptiles:105.1-105.2.

Anderson, B. W., and R. D. Ohmart. 1982. Revegetation for wildlife enhancement along the lower Colorado River. Final report prepared for the United States Department of the Interior, Bureau of Reclamation, Yuma, Arizona, under Contract (7-09-30-V0009).

Anderson, B. W., and R. D. Ohmart. 1985. Managing riparian vegetation and wildlife along the Colorado River: Synthesis of data, predictive models, and management. pp. 123-127. In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120,

Anderson, J. D. 1968. *Rhyacotriton,* and *R. olympicus.* Catalogue of American Amphibians and Reptiles:68.1-68.2.

Anderson, P. R. 1968. The reproductive and developmental history of the California tiger salamander. MA Thesis, Fresno State College, Fresno, California.

Anonymous. 1991. Landmarks: California: Multiple partners to save Sacramento River natural area. Natural Conservancy, July/August 1991:29-30.

Apple, L. L. 1985. Riparian habitat restoration and beavers. pp. 489-490 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Armberger, L. P. 1948. Gila monster swallows quail eggs whole. Herpetologica 4(6):209-210.

Arnold, S. J., and T. Halliday. 1986. Life history notes: *Hyla regilla,* predation. Herpetological Review 17(2):44.

Atsatt, S. R. 1913. The reptiles of the San Jacinto area of southern California. University of California Publications in Zoology 12(3):31-50.

Atsatt, S. R. 1952. Observations on the life history of the lizards *Sceloporus graciosus vandenburghianus* and *Gerrhonotus multicarinatus webbi.* Copeia 1952(4):276.

Aubry, K. B., L. L. C. Jones, and P. A. Hall. 1988. Use of woody debris by plethodontid salamanders in Douglas-fir forests in Washington. pp. 32-27 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Austin, C. C., and H. B. Shaffer. 1992. Short-, medium-, and long-term repeatability of locomotor performance in the tiger salamander *Ambystoma californiense.* Functional Ecology 6(2):145-153.

Awbrey, F. T. 1972. "Mating call" of a *Bufo boreas* male. Copeia 1972(3):579-581.

Badaracco, R. 1960. Amphibians and reptiles of Lassen Volcanic National Park. Lassen Volcanic National Park, Mineral, California.

Baird, S. F. 1854. Descriptions of new genera and species of North American frogs. Proceedings of the Academy of Natural Sciences of Philadelphia 7(2):59-62.

Baldwin, K. S., and R. A. Stanford. 1987. Life history notes: *Ambystoma tigrinum californiense,* predation. Herpetological Review 18(2):33.

Ballinger, R. E., and C. O. McKinney. 1966. Developmental temperature tolerance of certain anuran species. Journal of Experimental Zoology 161(1):21-28.

Banks, L. W. 1994. A new craze hops into the drug culture. Los Angeles Times 113(137):E1, col. 4; E3, cols. 1-3. [Tuesday, 19 April 1994].

Banta, B. H. 1962. A notable range extension for the California horned lizard. The Wasmann Journal of Biology 20(1):137-138.

Banta, B. H. 1963a. On the occurrence of *Clemmys marmorata* (Reptilia, Testudinata) in western Nevada. The Wasmann Journal of Biology 21(1):75-77.

Banta, B. H. 1963b. Remarks on the natural history of *Gerrhonotus panamintinus* Stebbins. Occasional Papers of the California Academy of Sciences (36):1-12.

Banta, B. H., and A. E. Leviton. 1961. A note on the mating behavior of the Panamint alligator lizard, *Gerrhonotus panamintinus.* Herpetologica 17(3):204-206.

Banta, B. H., and D. J. Morafka. 1968. An annotated check list of the recent amphibians and reptiles of the Pinnacles National Monument and Bear Valley, San Benito and Monterey counties, Californa, with some ecological observations. The Wasmann Journal of Biology 26(2):161-183.

Barrett, S. L., and J. A. Humphrey. 1986. Agonistic interactions between *Gopherus agassizii* (Testudinidae) and *Heloderma suspectum* (Helodermatidae). The Southwestern Naturalist 31(2):261-263.

Barry, S. J., and H. B. Shaffer. 1994. The status of the California tiger salamander *(Ambystoma californiense)* at Lagunita: A 50-year update. Journal of Herpetology 28(2):159-164.

Basalingappa, S. 1970. The differential occurrence of fat in the various castes and undifferentiated instars of the termite *Odontotermes ossmuthi*--the result of discriminate feeding. The Journal of Animal Morphology and Physiology 17(1&2):106-110.

Baur, B. E. 1986. Longevity of horned lizards of the genus *Phrynosoma.* Bulletin of the Maryland Herpetological Society 22(3):149-151.

Beck, D. D. 1990. Ecology and behavior of the Gila monster in southwestern Utah. Journal of Herpetology 24(1):54-68.

Bell, M. A. 1982. Melanism in a high elevation population of *Gasterosteus aculeatus.* Copeia 1982(4):829-835.

Bell, M. A., and T. R. Haglund. 1978. Selective predation of threespine sticklebacks *(Gasterosteus aculeatus)* by garter snakes. Evolution 32(2):304-319.

Bellemin, J. M., and G. R. Stewart. 1977. Diagnostic characters and color convergence of the garter snakes *Thamnophis elegans terrestris* and *Thamnophis couchii atratus* along the central California coast. Bulletin of the Southern California Academy of Sciences 76(2): 73-84.

Bently, P. J. 1966. Adaptations of amphibians to arid environments. Science 152(3722): 619-623.

Berry, K. H. (editor). 1984. The status report of the desert tortoise *(Gopherus agassizii)* in the United States. Report to the U.S. Fish and Wildlife Service from the Desert Tortoise Council on Purchase Order (11310-0083-81).

Bezy, R. L. 1967a A new night lizard *(Xantusia vigilis sierrae)* from the southern Sierra Nevada in California. Journal of the Arizona Academy of Science 4(3):163-167.

Bezy, R. L. 1967b. Variation, distribution, and taxonomic status of the Arizona night lizard *(Xantusia arizonae).* Copeia 1967(3):653-661.

Bezy, R. L. 1982. *Xantusia vigilis.* Catalogue of American Amphibians and Reptiles: 302.1-302.4.

Bezy, R. L. 1988. The natural history of the night lizards, family Xantusiidae. pp. 1-12 In: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society, Special Publication (4).

Bezy, R. L., and J. W. Sites, Jr. 1987. A preliminary study of allozyme evolution in the lizard family Xantusiidae. Herpetologica 43(3):280-292.

Bezy, R., and J. Wright. 1971. Karyotypic variation and relationships of the California legless lizard, *Anniella pulchra* Gray (Reptilia: Anniellidae). Herpetological Review 3(4): 71-72.

Bezy, R., G. C. Gorman, Y. J. Kim, and J. W. Wright. 1977. Chromosomal and genetic divergence in the fossorial lizards of the family Anniellidae. Systematic Zoology 26(1): 57-71.

Bicket, J. C. 1982. Geographic distribution: *Heloderma suspectum cinctum.* Herpetological Review 13(4):131.

Bishop, S. C. 1943. Handbook of salamanders: The salamanders of the United States, of Canada, and of lower California. Comstock Publishing Company, Inc., Ithaca, New York.

Black, G. F. 1980. Status of the desert pupfish, *Cyprinodon macularius* (Baird and Girard), in California. California Department of Fish and Game, Inland Fisheries Endangered Species Program, Special Publication (80-1):1-42.

Blair, W. F., and D. I. Pettus. 1954. The mating call and its significance in the Colorado River toad *(Bufo alvarius* Girard). The Texas Journal of Science 6(1):72-77.

Blaustein, A. R., and R. K. O'Hara. 1987. Aggregation behavior in *Rana cascadae* tadpoles: Association preferences among wild aggregations and responses to non-kin. Animal Behavior 35(5):1549-1555.

Blaustein, A. R., P. D. Hoffman, D. G. Hokit, J. M. Kiesecker, S. C. Walls, and J. B. Hays. 1994. UV repair and resistance to solar UV-B in amphibian eggs: A link to population declines? Proceedings of the National Academy of Sciences 91(5):1791-1795.

Block, W. M., M. L. Morrison, J. C. Slaymaker, and G. Jongejan. 1988. Design considerations for the study of amphibians, reptiles, and small mammals in California's oak woodlands: Temporal and spatial patterns. pp. 247-253. In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Blumthaler, M., and W. Ambach. 1990. Indication of increasing solar ultraviolet-B radiation flux in alpine regions. Science 248(4952):206-208.

Bogert, C. M. 1930. An annotated list of the amphibians and reptiles of Los Angeles County, California. Bulletin of the Southern California Academy of Sciences 29(1):3-14.

Bogert, C. M. 1935. *Salvadora grahamiae virgultea,* a new subspecies of the patch-nosed snake. Bulletin of the Southern California Academy of Sciences 34(1):88-94.

Bogert, C. M. 1939. A study of the genus *Salvadora,* the patch-nosed snakes. Publication in Biological Sciences, University of California at Los Angeles 1(10):177-236.

Bogert, C. M. 1945. Two additional races of the patch-nosed snake, *Salvadora hexalepis.* American Museum Novitates (1285):1-14.

Bogert, C. M., and R. Martín del Campo. 1956. The Gila monster and its allies. The relationships and behavior of the lizards of the family Helodermatidae. Bulletin of the American Museum of Natural History 109(1):1-238.

Bohn, C. C., and J. C. Buckhouse. 1986. Effects of grazing management on streambanks. Transactions of the North American Wildlife and Natural Resource Conference 51:265-271.

Bolster, B., and K. Nicol. 1989. The status of the flat-tailed horned lizard *(Phrynosoma mcallii)* in California. Final report presented California Fish and Game Commission.

California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Bostic, D. L. 1964. The ecology and behavior of *Cnemidophous hyperythrus beldingi* Cope (Sauria: Teiidae). MA Thesis, San Diego State University, San Diego, California.

Bostic, D. L. 1965a. The home range of the teiid lizard, *Cnemidophorus hyperythrus beldingi.* The Southwestern Naturalist 10(2):278-281.

Bostic, D. L. 1965b. Parasites of the teiid lizard, *Cnemidophorus hyperythrus beldingi.* The Southwestern Naturalist 10(4):278-281.

Bostic, D. L. 1966a. Thermoregulation and hibernation of the lizard, *Cnemidophorus hyperythrus beldingi* (Sauria: Teiidae). The Southwestern Naturalist 11(2):275-289.

Bostic, D. L. 1966b. Food and feeding behavior of the teiid lizard, *Cnemidophorus hyperythrus beldingi.* Herpetologica 22(1):23-31.

Bostic, D. L. 1966c. A preliminary report of reproduction in the teiid lizard, *Cnemidophorus hyperythrus beldingi.* Herpetologica 22(2):81-90.

Boundy, J. 1990. Biogeography and variation in southern populations of the garter snake *Thamnophis atratus*, with a synopsis of the *T. couchii* complex. MA Thesis, San Jose State University, San Jose, California.

Bowler, J. K. 1977. Longevity of reptiles and amphibians in North American collections. Society for the Study of Amphibians and Reptiles, Miscellaneous Publications, Herpetological Circular (6):1-32.

Bradford, D. F. 1983. Winterkill, oxygen relations, and energy metabolism of a submerged dormant amphibian, *Rana muscosa.* Ecology 64(5):1171-1183.

Bradford, D. F. 1984. Temperature modulation in a high elevation amphibian, *Rana muscosa.* Copeia 1984(4):966-976.

Bradford, D. F. 1989. Allotopic distribution of native frogs and introduced fishes in the high Sierra Nevada lakes of California: Implication of the negative effects of fish introductions. Copeia 1989(3):775-778.

Bradford, D. F. 1991. Mass mortality and extinction in a high elevation population of *Rana muscosa.* Journal of Herpetology 25(2):174-177.

Bradford, D. F., C. Swanson, and M. S. Gordon. 1991. Acid deposition in the Sierra Nevada, California: Effects of low pH and inorganic aluminum on two declining species of amphibians [abstract]. American Zoologist 31(5):114A.

Bradford, D. F., C. Swanson, and M. S. Gordon. 1992. Effects of low pH and aluminum on two declining species of amphibians in the Sierra Nevada, California. Journal of Herpetology 26(4):369-377.

Bradford, D. F., D. M. Graber, and F. Tabatabai. 1993. Isolation of remaining populations of the native frog, *Rana muscosa*, by introduced fishes in Sequoia and Kings Canyon National Parks, California. Conservation Biology 7(4):882-888.

Bradford, D. F., D. M. Graber, and F. Tabatabai. (In press). Population declines of the native frog *Rana muscosa* in Sequoia and Kings Canyon National Parks, California. The Southwestern Naturalist.

Bradford, D. F., M. S. Gordon, D. F. Johnson, R. D. Andrews, and W. B. Jennings. 1994. Acidic deposition as an unlikely cause for amphibian population declines in the Sierra Nevada, California. Biological Conservation 69(2):155-161.

Bradley, W. G., and J. E. Deacon. 1966. Distribution of the Gila monster in the northern Mojave Desert. Copeia 1966(2):365-366.

Brady, W., D. R. Patton, and J. Paxson. 1985. The development of southwestern riparian gallery forest. pp. 39-43 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Brame, A. H., Jr. 1956. The number of eggs laid by the California newt. Herpetologica 12(4):325.

Brame, A. H., Jr. 1968. The number of egg masses and eggs laid by the California newt, *Taricha torosa.* Journal of Herpetology 2(3/4):169-170.

Brame, A. H., Jr., and K. F. Murray. 1968. Three new slender salamanders *(Batrachoseps)* with a discussion of relationships and speciation within the genus. Bulletin of the Los Angeles County Museum of Natural History (4):1-35.

Brattstrom, B. H. 1951. The number of young of *Xantusia.* Herpetologica 7(3):143-144.

Brattstrom, B. H. 1952. The food of night lizards, genus *Xantusia.* Copeia 1952(3):168-172.

Brattstrom, B. H. 1962. Thermal control of aggregative behavior in tadpoles. Herpetologica 18(1):38-46.

Brattstrom, B. H. 1963. A preliminary review of the thermal requirements of amphibians. Ecology 44(2):238-255.

Brattstrom, B. H. 1965. Body temperatures of reptiles. The American Midland Naturalist 73(2):376-422.

Brattstrom, B. H. 1988. Habitat destruction in California with special reference to *Clemmys marmorata:* A perpesctive [sic]. pp. 13-24 In: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society, Special Publication (4).

Brattstrom, B. H. 1990. Status survey of the orange-throated whiptail *(Cnemidophorus hyperythrus beldingi)* and the San Diego horned lizard *(Phrynosoma coronatum blainvillii).* Progress report for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under Contract (FG 8597).

Brattstrom, B. H., and M. Bondello. 1979. The effect of ORV sounds on the emergence of Couch's spadefoot toad, *Scaphiopus couchi.* Report prepared for the California Desert

Plan Program, United States Department of the Interior, Bureau of Land Management, Riverside, California, under Contract (CA-060-CT7-2327).

Brattstrom, B. H., and D. F. Messer. 1988. Current status of the southwestern pond turtle, *Clemmys marmorata pallida,* in southern California. Final report for the California Department of Fish and Game, Inland Fisheries Branch, Rancho Cordova, California, under Contract (C-2044).

Brattstrom, B. H., and J. W. Warren. 1953. A new subspecies of racer, *Masticophis flagellum,* from the San Joaquin Valley of California. Herpetologica 9(4): 177-179.

Briggs, J. L. 1976. Breeding biology of the Cascade frog, *Rana cascadae.* Herpetological Review 7(2):75.

Briggs, J. L. 1987. Breeding biology of the Cascade frog, with comparisons to *R. aurora* and *R. pretiosa.* Copeia 1987(1):241-245.

Briggs, J. L., and R. M. Storm. 1970. Growth and population structure of the Cascade frog, *Rana cascadae* Slater. Herpetologica 26(3):283-300.

Brodie, E. D., Jr. 1969. Geographic variation and systematics of the western *Plethodon.* PhD Dissertation, Oregon State University, Corvallis, Oregon.

Brodie, E. D., Jr. 1970. Western salamanders of the genus *Plethodon:* Systematics and geographic variation. Herpetologica 26(4):468-516.

Brodie, E. D., Jr. 1977. Salamander antipredator postures. Copeia 1977(3):523-535.

Brodie, E. D., Jr., and R. M. Storm. 1971. *Plethodon elongatus.* Catalogue of American Amphibians and Reptiles:102.1-102.2.

Brodie, E. D., Jr., J. L. Hensel, Jr., and J. A. Johnson. 1974. Toxicity of the urodele amphibians *Taricha, Notophthalmus, Cynops,* and *Paramesotriton* (Salamandridae). Copeia 1974(2):506-511.

Brown, G. W., and J. T. Krygier. 1970. Effects of clear-cutting on stream temperature. Water Resources Research 6(4):1131-1139.

Brown, H. A. 1966. Temperature adaptation and evolutionary divergence in allopatric populations of the spadefoot toad, *Scaphiopus hammondii.* PhD Dissertation, University of California, Riverside, California.

Brown, H. A. 1967. Embryonic temperature adaptations and genetic compatibility of two allopatric populations of the spadefoot toad, *Scaphiopus hammondii.* Evolution 21(4): 742-761.

Brown, H. A. 1969. The heat resistance of some anuran tadpoles (Hylidae and Pelobatidae). Copeia 1969(1):138-147.

Brown, H. A. 1975a. Temperature and development of the tailed frog, *Ascaphus truei.* Comparative Biochemistry and Physiology 50A(2A):397-405.

Brown, H. A. 1975b. Reproduction and development of the red-legged frog, *Rana aurora,* in northwestern Washington. Northwest Science 49(4):241-252.

Brown, H. A. 1976. The status of California and Arizona populations of the western spadefoot toads (genus *Scaphiopus).* Contributions in Science of the Natural History Museum of Los Angeles County (286):1-15.

Brown, H. A. 1977. Oxygen consumption of a large, cold-adapted frog egg *(Ascaphus truei*, Amphibia: Ascaphidae). Canadian Journal of Zoology 55(2):343-348.

Brown, H. A. 1989. Developmental anatomy of the tailed frog *(Ascaphus truei):* A primitive frog with large eggs and slow development. Journal of Zoology (London) 217(4):525-537.

Brown, H. A. 1990. Morphological variation and age-class determination in overwintering tadpoles of the tailed frog, *Ascaphus truei.* Journal of Zoology (London) 220(2):171-184.

Brown, S. C., and P. S. Brown. 1980. Water balance in the California newt, *Taricha torosa.* American Journal of Physiology 238(1):R113-118.

Brown, T. W. 1980. Present status of the garter snake on Santa Catalina Island. pp. 585-595 In: D. M. Power (editor), The California Islands: Proceedings of a multidisciplinary symposium. Santa Barbara Museum of Natural History, Santa Barbara, California.

Bryant, H. C. 1911. The horned lizards of California and Nevada of the genera *Phrynosoma* and *Anota.* University of California Publications in Zoology 9(1):1-84.

Bryant, H. C. 1916. Habits and food of the roadrunner in California. University of California Publications in Zoology 17(5):21-58.

Bryant, H. C. 1917. The leopard frog in California. California Fish and Game 3(2):91.

Bryant, L. D. 1985. Livestock management in the riparian ecosystem. pp. 285-289 In: R. R. Johnson, C. D. Ziebell; D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Bryant, M. D. 1985. Changes 30 years after logging in large woody debris, and its use by salmonids. pp. 329-334 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Buckhouse, J. C., J. Skvolin, and R. Knight. 1981. Streambank erosion and ungulate grazing relationships. Journal of Range Management 34(4):339-340.

Buchwald, H. D., L. Durham, H. G. Fischer, R. Harada, H. S. Mosher, C. Y. Yao, and F. A. Fuhrman. 1964. Identity of tarichatoxin and tetrodotoxin. Science 143(3605):474-475.

Burgess, R. C., Jr. 1950. Development of spade-foot toad larvae under laboratory conditions. Copeia 1950(1):49-51.

Burleson, G. L. 1942. The source of blood ejected from the eye by horned toads. Copeia 1942(4):246-248.

Burrage, B. R. 1965. Notes on the eggs and young of the lizards *Gerrhonotus multicarinatus webbi* and *G. m. nanus.* Copeia 1965(4):512.

Burt, C. E. 1931. An interpretation of certain experimental and observational data on the limbless lizard, *Anniella pulchra* Gray. Copeia 1931(3):105-106.

Bury, R. B. 1968. The distribution of *Ascaphus truei* in California. Herpetologica 24(1): 39-46.

Bury, R. B. 1970. Food similarities in the tailed frog, *Ascaphus truei,* and the Olympic salamander, *Rhyacotriton olympicus.* Copeia 1970(1):170-171.

Bury, R. B. 1972a. Status report on California's threatened amphibians and reptiles. California Department of Fish and Game, Inland Fisheries Administrative Report (72-2):1-31.

Bury, R. B. 1972b. Habits and home range of the Pacific pond turtle, *Clemmys marmorata.* PhD Dissertation, University of California, Berkeley, California.

Bury, R. B. 1973a. Western *Plethodon:* Systematics and biogeographic relationships of the *elongatus* group. HISS News-Journal 1(2):56-57.

Bury, R. B. 1973b. The Cascade frog, *Rana cascadae,* in the north Coast Range of California. Northwest Science 47(4):228-229.

Bury, R. B. 1983. Differences in amphibian populations in logged and old-growth redwood forest. Northwest Science 57(3):167-178.

Bury, R. B. 1985. Status report: *Anniella pulchra nigra* Fischer, black legless lizard (Anniellidae: Sauria) in central California. Final report for the U.S. Fish and Wildlife Service, Office of Endangered Species, Portland, Oregon.

Bury, R. B. 1986. Feeding ecology of the turtle, *Clemmys marmorata.* Journal of Herpetology 20(4):515-521.

Bury, R. B., and T. G. Balgooyen. 1976. Temperature selectivity in the legless lizard, *Anniella pulchra.* Copeia 1976(1):152-155.

Bury, R. B., and P. S. Corn. 1988a. Douglas-fir forests in the Oregon and Washington Cascades: Relation of the herpetofauna to stand age and moisture. pp. 11-22 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Bury, R. B., and P. S. Corn. 1988b. Responses of aquatic and streamside amphibians to timber harvest: A review. pp. 165-181 In: K. J. Raedake (editor), Streamside management: Riparian wildlife and forestry interactions. Institute of Forest Resources, University of Washington, Contribution (59).

Bury, R. B., and C. R. Johnson. 1965. Note on the food of *Plethodon elongatus* in California. Herpetologica 21(1):67-68.

Bury, R. B., and M. Martin. 1967. The food of the salamander, *Rhyacotriton olympicus.* Copeia 1967(2):487.

Bury, R. B., and R. A. Luckenbach. 1976. Introduced amphibians and reptiles in California. Biological Conservation 10(1):1-14.

Bury, R. B., and R. A. Luckenbach. 1983. Vehicular recreation in arid land dunes: Biotic responses and management alternatives. pp. 207-221 In: R. H. Webb and H. G. Wilshire (editors), Environmental effects of off-road vehicles: Impacts and management in arid regions. Springer-Verlag, New York, New York.

Bury, R. B., and G. R. Stewart. 1973. California protects its herpetofauna. HISS News-Journal 1(2):43-48.

Bury, R. B., G. M. Fellers, and S. B. Ruth. 1969. First records of *Plethodon dunni* in California, and new distributional data on *Ascaphus truei, Rhyacotriton olympicus,* and *Hydromantes shastae.* Journal of Herpetology 3(3/4):157-161.

Busack, S. D., and R. B. Bury. 1974. Some effects of off-road vehicles and sheep grazing on lizard populations in the Mojave desert. Biological Conservation 6(3):179-183.

Buskirk, J. R. 1992. An overview of the western pond turtle, *Clemmys marmorata.* pp. 16-23 In: K. R. Beaman, F. Caporaso, S. McKeown, and M. Graff (editors), Proceedings of the first international symposium on turtles and tortoises: Conservation and captive husbandry. California Turtle and Tortoise Club, Van Nuys, California.

Calef, G. W. 1973a. Spatial distribution and "effective" breeding population of red-legged frogs *(Rana aurora)* in Marion Lake, British Columbia. The Canadian Field-Naturalist 87(3):279-284.

Calef, G. W. 1973b. Natural mortality of tadpoles in a population of *Rana aurora.* Ecology 54(4):741-758.

California Department of Fish and Game. 1987. 1986 Annual report on the status of California's threatened and endangered plants and animals. California Department of Fish and Game, Sacramento, California.

California Department of Fish and Game. 1988. 1987 Annual report on the status of California's state listed threatened and endangered plants and animals. California Department of Fish and Game, Sacramento, California.

California Department of Fish and Game. 1989. 1988 Annual report on the status of California's state listed threatened and endangered plants and animals. California Department of Fish and Gape, Sacramento, California.

California Department of Fish and Game. 1990. 1989 Annual report on the status of California's state listed threatened and endangered plants and animals. California Department of Fish and Game, Sacramento, California.

California Department of Fish and Game. 1991. 1990 Annual report on the status of California's state listed threatened and endangered plants and animals. California Department of Fish and Game, Sacramento, California.

California Department of Forestry and Fire Protection. 1988. California's forests and rangelands: Growing conflict over changing uses. Forest and Rangeland Resources Assessment Program (FRRAP), California Department of Forestry and Fire Protection, Sacramento, California.

California Fish and Game Commission. 1990. Orders, rules, and regulations for 1990. State of California, Sacramento, California.

Camp, C. L. 1915. *Batrachoseps major* and *Bufo cognatus californicus*, new Amphibia from southern California. University of California Publications in Zoology 12(12):327-334.

Camp, C. L. 1916a. *Spelerpes platycephalus*, a new alpine salamander from the Yosemite National Park, California. University of California Publications in Zoology 17(3):11-14.

Camp, C. L. 1916b. Description of *Bufo canorus*, a new toad from the Yosemite National Park, California. University of California Publications in Zoology 17(6):59-62.

Camp, C. L. 1917. Notes on the systematic status of the toads and frogs of California. University of California Publications in Zoology 17(9):115-125.

Camp, R. J., R. L. Knight, H. A. L. Knight, M. W. Sherman, and J. Y. Kawashima. 1993. Food habits of nesting common ravens in the eastern Mojave Desert. The Southwestern Naturalist 38(2):163-165.

Campbell, J. A., and W. W. Lamar. 1989. The venomous reptiles of Latin America. Cornell University Press, Ithaca, New York.

Carey, C. 1993. Hypothesis concerning the causes of the disappearance of boreal toads from the mountains of Colorado. Conservation Biology 7(2):355-362.

Carlson, B. A., and W. W. Mayhew. 1986. Status of the flat-tailed horned lizard *(Phrynosoma mcallii)* in California. Report for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under Contract (C-1355).

Carothers, J. H. 1986. An experimental confirmation of morphological adaptation: Toe fringes in the sand-dwelling lizard *Uma scoparia.* Evolution 40(4):871-874.

Carpenter, C. C. 1963. Patterns of behavior in three forms of the fringe-toed lizards *(Uma*, Iguanidae). Copeia 1963(2):406-412.

Case, S. M. 1976. Evolutionary studies in selected North American frogs of the genus *Rana* (Amphibia, Anura). PhD Dissertation; University of California, Berkeley, California.

Case, S. M. 1978a. Electrophoretic variation in two species of ranid frogs, *Rana boylei* and *R. muscosa.* Copeia 1978(2):311-320.

Case, S. M. 1978b. Biochemical systematics of members of the genus *Rana* native to western North America. Systematic Zoology 27(3):299-311.

Childs, H. E., Jr. 1953. Selection by predation on albino and normal spadefoot toads. Evolution 7(3):228-233.

Clarkson, R. W., and J. C. Rorabaugh. 1989. Status of leopard frogs *(Rana pipiens* complex: Ranidae) in Arizona and California. The Southwestern Naturalist 34(4):531-538.

Claussen, D. L. 1973a. The thermal relations of the tailed frog, *Ascaphus truei,* and the Pacific treefrog, *Hyla regilla.* Comparative Biochemistry and Physiology 44A(1A):137-153.

Claussen, D. L. 1973b. The water relations of the tailed frog, *Ascaphus truei,* and the Pacific treefrog, *Hyla regilla.* Comparative Biochemistry and Physiology 44A(1A):155-171.

Coe, W. R., and B. W. Kunkel. 1906. Studies of the California limbless lizard *Anniella.* Transactions of the Connecticut Academy of Arts and Sciences 12(3):349-403.

Cohen, N. W. 1952. Comparative rates of dehydration and hydration in some California salamanders. Ecology 33(4):462-479.

Cole, C. J. 1962. Notes on the distribution and food habits of *Bufo alvarius* at the eastern edge of its range. Herpetologica 18(3):172-175.

Cole, D. N. 1993. Campsites in three western wildernesses: Proliferation and changes in condition over 12 to 16 years. United States Department of Agriculture, Forest Service, Research Paper INT-463.

Collins, A. 1988. Natural history of the desert horned lizard, *Phrynosoma platyrhinos,* in the central Mojave Desert. pp. 29-37 In: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society, Special Publication (4).

Collins, J. P., and M. A. Lewis. 1979. Overwintering tadpoles and breeding season variation in the *Rana pipiens* complex in Arizona. The Southwestern Naturalist 24(2):371-373.

Collins, J. P., T. R. Jones, and H. J. Beina. 1988. Conserving genetically distinctive populations: The case of the Huachuca tiger salamander *(Ambystoma tigrinum stebbinsi* Lowe). pp. 45-53 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Collins, J. T. 1990. Standard common and current scientific names for North American amphibians and reptiles. Society for the Study of Amphibians and Reptiles, Herpetological Circular (19):1-41.

Collins, J. T. 1991. Viewpoint: A new taxonomic arrangement for some North American amphibians and reptiles. Herpetological Review 22(2):42-43.

Collins, P. W. ms. A range extension and analysis of the taxonomic affinities of the gopher snakes *(Pituophis melanoleucus pumilus)* on Santa Rosa Island, Santa Barbara Co., California. Unpublished manuscript, Santa Barbara Museum of Natural History, Santa Barbara, California.

Cooper, J. G. 1861. New California animals. Proceedings of the California Academy of Sciences, 1st series, 1(2):118-123.

Cooper, J. G. 1869. The naturalist in California., No. II. The American Naturalist 3(9): 470-481.

Cooper, J. G. 1870. The fauna of California, its geographic distribution. Proceedings of the California Academy of Sciences, 1st series, 4(2):61-81.

Cooper, C. F., H. N. Coulombe, R. L. Hayes, and P. H. Zedler. 1973. The Santa Margarita Ecological Reserve and regional environmental studies. Center for Regional Environmental Studies, San Diego State University, San Diego, California.

Cope, E. D. 1892. A critical review of the characters and variations of the snakes of North America. Proceedings of the United States National Museum 14(882):589-694.

Cordone, A. J., and D. E. Kelly. 1961. The influence of inorganic sediment on the aquatic life of streams. California Fish and Game 47(2):189-228.

Corn, P. S., and R. B. Bury. 1989. Logging in western Oregon. Responses of headwater habitats and stream amphibians. Forest Ecology and Management 29(1-2):39-57.

Corn, P. S., and J. C. Fogleman. 1984. Extinction of montane populations of the northern leopard frog *(Rana pipiens)* in Colorado. Journal of Herpetology 18(2):147-152.

Corn, P. S., and L. J. Livo. 1989. Leopard frog and wood frog reproduction in Colorado and Wyoming. The Northwestern Naturalist 70(1):1-9.

Cory, B. L. 1962a. Life-history and behavior differences between ranids in isolated populations in the Sierra Nevada [abstract]. American Zoologist 2(4):515.

Cory, B. L. 1962b. Patterns of geographic variation in Sierra Nevada ranids [abstract]. American Zoologist 2(3):401.

Cory, B. L. 1963. Effects of introduced trout on the evolution of native frogs in the high Sierra Nevada Mountains. p. 172 In: J. A. Moore (editor), Proceedings of the XVI International Congress of Zoology: Contributed Papers, Volume 2.

Cory, L., P. Fjeld, and W. Serat. 1970. Distribution patterns of DDT residues in the Sierra Nevada Mountains. Pesticides Monitoring Journal 3(4):204-211.

Cowan, I. M. 1941. Longevity of the red-legged frog. Copeia 1941(1):48.

Cowles R. B. 1941. Observation on the winter activity of desert reptiles. Ecology 22(2): 125-140.

Cowles, R. B. 1946. Carrion eating by a snake. Herpetologica 3(4):121-122.

Cowles, R. B., and C. M. Bogert. 1944. A preliminary study of the thermal requirements of desert reptiles. Bulletin of the American Museum of Natural History 83(5):261-296.

Cunningham, J. D. 1955. Arboreal habits of certain reptiles and amphibians in southern California. Herpetologica 11(3):217-220.

Cunningham, J. D. 1956. Food habits of the San Diego alligator lizard. Herpetologica 12(3):225-230.

Cunningham, J. D. 1959a. Reproduction and food of some California snakes. Herpetologica 15(1):17-19.

Cunningham, J. D. 1959b. Notes on *Anniella.* Herpetologica 15(1):19-20.

Cunningham, J. D. 1962. Observations on the natural history of the California toad, *Bufo californicus* Camp. Herpetologica 17(4):255-260.

Cunningham, J. D. 1963. Additional observations on the ecology of the Yosemite toad, *Bufo canorus.* Herpetologica 19(1):56-61.

Cunningham, J. D. 1966a. Thermal relations of the. alligator lizard *Gerrhonotus muticarinatus webbi.* Herpetologica 22(1):1-7.

Cunningham, J. D. 1966b. Additional observations on the body temperatures of reptiles. Herpetologica 22(3):184-189.

Daugherty, C. H. 1980. Population ecology and genetics of *Ascaphus truei:* An examination of gene flow and natural selection. PhD Dissertation, University of Montana, Missoula, Montana.

Daugherty, C. H., and A. L. Sheldon. 1982a. Age determination, growth and life history of a Montana population of the tailed frog *(Ascaphus truei).* Hetpetologica 38(4):461-468.

Daugherty, C. H., and A. L. Sheldon. 1982b. Age-specific movement patterns of the frog *Ascaphus truei,* Herpetologica 38(4):468-474.

Deavers, D. R. 1972. Water and electrolyte metabolism in the arenicolous lizard *Uma notata notata.* Copeia 1972(1):109-122.

DeLisle, H. F. 1979. Gila monster *(Heloderma suspectum)* found in California. Herpetology 10(1):5-7.

DeLisle, H. F. 1983. Banner year for California Gilas. Herpetology 13(1):11.

DeLisle, H. F. 1985. The biology of the Gila monster *(Heloderma suspectum* Cope). Herpetology 15(3):1-28.

DeLisle, H., G. Cantu, J. Feldner, P. O'Connor, M. Peterson, and P. Brown. 1986. The distribution and present status of the herpetofauna of the Santa Monica Mountains of Los Angeles and Ventura Counties, California. Southwestern Herpetologists Society, Special Publication (2):1-94.

de Vlaming, V. L., and R. B. Bury. 1970. Thermal selection in tadpoles of the tailed frog, *Ascaphus truei.* Journal of Herpetology 4(3/4):179-189.

Diamond, J. M., and H. L. Jones. 1980. Breeding land birds of the Channel Islands. pp. 597-612 In: D. M. Power (editor), The California islands: Proceedings of a multidisciplinary symposium, Santa Barbara Museum of Natural History, Santa Barbara, California.

Dickman, M. 1968. The effect of grazing by tadpoles on the structure of a periphyton community. Ecology 49(6):1188-1190.

Dill, W. A. 1944. The fishery of the lower Colorado, River. California Fish and Game 30(3):109-211.

Diller, L. V., and R. L. Wallace. 1994. Distribution and habitat of *Plethodon elongatus* on managed, young growth forests in north coastal California. Journal of Herpetology 28(3): 310-318.

Dimmitt, M. A. 1975. Terrestrial ecology of spadefoot toads *(Scaphiopus):* Emergence cues, nutrition, and burrowing habits. PhD Dissertation, University of California, Riverside, California.

Dimmitt, M. A. 1977. Distribution of Couch's spadefoot toad in California (preliminary report). Unpublished report filed with the United States Bureau of Land Management, Riverside District Office, under C-062, 6500, and 1792 Sundesert, 10 May 1977.

Dimmitt, M. A., and R. Ruibal. 1980a. Environmental correlates of emergence in spadefoot toads *(Scaphiopus).* Journal of Herpetology 14(1):21-29.

Dimmitt, M. A., and R. Ruibal. 1980b. Exploitation of food resources by spadefoot toads *(Scaphiopus).* Copeia 1980(4):854-862.

Dixon, J. R. 1975. Geographic distribution: *Gerrhonotus panamintinus.* Herpetological Review 6(2):45.

Dodd, C. K., Jr. 1981. A review of the status of the desert tortoise. Proceedings of the Desert Tortoise Council 6:96-102.

Dodd, C. K., Jr. 1986. Desert and gopher tortoises: Perspectives on conservation approaches. pp. 54-72 In: D. R. Jackson and R. J. Bryant (editors), The gopher tortoise and its community. Proceedings of the Annual Meeting of the Gopher Tortoise Council (5).

Dole, J. W. 1965a. Summer movements of adult leopard frogs, *Rana pipiens* Schreber, in northern Michigan. Ecology 46(3):236-255.

Dole, J. W. 1965b. Spatial relations in natural populations of the leopard frogs, *Rana pipiens* Schreber, in northern Michigan. American Midland Naturalist 74(2):464-478.

Dole, J. W. 1967. The role of substrate moisture and dew in the water economy of leopard frogs, *Rana pipiens.* Copeia 1967(1):141-148.

Dole, J. W. 1971. Dispersal of recently metamorphosed leopard frogs, *Rana pipiens.* Copeia 1971(2):221-228.

Dowling, H. G., and R. M. Price. 1988. A proposed new genus for *Elaphe subocularis* and *E. rosaliae.* The Snake 20(1):52-63.

Dumas, P. C. 1966. Studies of the *Rana* species complex in the Pacific Northwest. Copeia 1966(1):60-74.

Duncan, R. B., T. C. Esque, and K. L. Echols. 1994. Life history notes: *Phrynosoma mcallii*, predation. Herpetological Review 25(2):68.

Dunlap, D. G. 1955. Inter- and intraspecific variation in Oregon frogs of the genus *Rana*. American Midland Naturalist 54(2):314-331.

Dunlap, D. G. 1977. Wood and western spotted frogs (Amphibia, Anura, Ranidae) in the Big Horn Mountains of Wyoming. Journal of Herpetology 11(1):85-87.

Dunlap, D. G. 1978. Hemoglobin phenotypes in the frogs *Rana pipiens, Rana blairi*, their hybrids and a backcross. Comparative Biochemistry and Physiology 62B(2):167-173.

Dunlap, D. G., and K. C. Kruse. 1976. Frogs of the *Rana pipiens* complex in the northern and central plains states. The Southwestern Naturalist 20(4):559-571.

Dunn, E. R. 1926. The salamanders of the family Plethodontidae. Smith College Anniversary Series, Northampton, Massachusetts.

Dunn, E. R. 1940. The races of *Ambystoma tigrinum.* Copeia 1940(3):154-162.

Eakle, W. L. 1984. Observations of nesting falcons in the Los Padres National Forest. Raptor Research 18(1):31-33.

Ely, E. 1992. Geographic distribution: *Thamnophis hammondii.* Herpetological Review 23(4):124-125.

Emery, A. R., A. H. Berst, and K. Kodaira. 1972. Under-ice observations of wintering sites of leopard frogs. Copeia 1972(1):123-126.

England, A. S., and S. G. Nelson. 1977. Status of the Coachella Valley fringe-toed lizard *(Uma inornata).* California Department of Fish and Game, Inland Fisheries Administrative Report (77-1):1-29.

Erspamer, V., T. Vitali, M. Roseghini, and J. M. Cei. 1967. Five-methoxy- and 5-hydroxy-indolealkylamines in the skin of *Bufo alvarius.* Biochemical Pharmacology 16: 1149-1164.

Espinosa, F. A., Jr., J. E. Deacon, and A. Simmons. 1970. An economic and biostatistical analysis of the bait fish industry in the lower Colorado River. A Special Publication of the University of Nevada, Las Vegas:1-87.

Evenden, F. G., Jr. 1948. Food habits of *Triturus granulosus* in western Oregon. Copeia 1948(3):269-220.

Everest, F. H., J. R. Sedell, N. B. Armantrout, T. E. Nickelson, S. M. Keller, J. M. Johnston, W. D. Parante, and G. N. Haugen. 1985. Salmonids. pp. 199-230 In: E. R. Brown (technical editor), Management of wildlife and fish habitats in forests of western Oregon and Washington. Part 1--Chapter narratives. United States Department of Agriculture, Forest Service, Pacific Northwest Region, Portland, Oregon. Publication (R6-F&WL-192-1985).

Faber, P. A., E. Keller, A. Sands, and B. M. Massey. 1989. The ecology of riparian habitats of the southern California coastal region: A community profile. United States Fish and Wildlife Service Biological Report 85(7.27):1-152.

Fast, P. G. 1964. Insect lipids: A review. Memoirs of the Entomological Society of Canada (37):1-50.

Feaver, P. E. 1971. Breeding pool selection and larval mortality of three California amphibians: *Ambystoma tigrinum californiense* Gray, *Hyla regilla* Baird and Girard, and *Scaphiopus hammondii* Girard. MA Thesis, Fresno State College, Fresno, California.

Feder, J. H. 1977. Genetic variation and biochemical systematics in western *Bufo*. MA Thesis, University of California, Berkeley, California.

Feder, J. H., G. Z. Wurst, and D. B. Wake. 1978. Genetic variation, in western salamanders of the genus *Plethodon*, and the status of *Plethodon gordoni*. Herpetologica 34(1):64-69.

Feldman, M. 1982. Notes on reproduction in *Clemmys marmorata*. Herpetological Review 13(1):10-11.

Fellers, G. M., and C. A. Drost. 1993. Disappearance of the Cascades frog *Rana cascadae* at the southern end of its range, California, USA. Biological Conservation 65(2):177-181.

Ferren, W. R., Jr., and E. M. Gevirtz. 1990. Restoration and creation of vernal pools: Cookbook recipes or complex science? pp. 147-178 In: D. H. Ikeda and R. A. Schlising (editors), Vernal pools plants: Their habitat and biology. Studies from the Herbarium of California State University, Chico (8).

Feuer, R. C. 1980. Underwater traps for aquatic turtles. Herpetological Review 11(4):107-108.

Fitch, H. S. 1935. Natural history of the alligator lizards. Transactions of the Academy of Science of Saint Louis 29(1):3-38.

Fitch, H. S. 1936. Amphibians and reptiles of the Rogue River Basin, Oregon. American Midland Naturalist 17(3):634-652.

Fitch, H. S. 1938. *Rana boylii* in Oregon. Copeia 1938(3):148.

Fitch, H. S. 1940. A biogeographical study of the *ordinoides* artenkries of garter snakes (genus *Thamnophis)*. University of California Publications in Zoology 44(1):1-150.

Fitch, H. S. 1941. The feeding habits of California garter snakes. California Fish and Game 27(2):1-32.

Fitch, H. S. 1949. Study of snake populations in central California. The American Midland Naturalist 41(3):513-579.

Fitch, H. S. 1965. An ecological study of the garter snake, *Thamnophis sirtalis*. University of Kansas Publications, Museum of Natural History 15(10):493-564.

Fitch, H. S. 1981. *Thamnophis sirtalis*. Catalogue of American Amphibians and Reptiles: 270.1-270.4.

Fitch, H. S. 1984. *Thamnophis couchii*. Catalogue of American Amphibians and Reptiles: 351.1-351.3.

Ford, R. S. 1981. Geographic distribution: *Heloderma suspectum cinctum.* Herpetological Review 12(2):64.

Fouquette, M. J., Jr. 1968. Remarks on the type specimen of *Bufo alvarius* Girard. The Great Basin Naturalist 28(2):70-72.

Fouquette, M. J., Jr. 1970. *Bufo alvarius.* Catalogue of American Amphibians and Reptiles:93.1-93.4.

Fowlie, W. J. 1973. Occurrence of the western skink, *Eumeces skiltonianus* along the Mojave River, Victorville, San Bernardino County, California. Herpeton, Journal of the Southwestern Herpetologists Society 7(1):1-3.

Fox, L. 1988. California redwood lands. Unpublished maps. Humboldt State University, Arcata, California.

Fox, W. 1951. Relationships among the garter snakes of the *Thamnophis elegans* rassenkreis. University of California Publications in Zoology 50(5):485-530.

Fox, W., and H. C. Dessauer. 1965. Collection of garter snakes for blood studies. American Philosphical Society Yearbook for 1964:263-266.

Fritschen, L. J., C. H. Driver, C. C. Avery, J. Buffo, and R. Kinerson. 1971. Dispersion of air tracers into and within a forested area: 3. Research and Development Technical Report ECOM-68-G8-3, United States Army Electronics Command, Atmospheric Sciences Laboratory, Fort Huachuca, Arizona.

Frost, D. R. (editor). 1985. Amphibians species of the world: A taxonomic and geographical reference. Allen Press, and the Association of Systematics Collections, Lawrence, Kansas.

Frost, D. R., and D. M. Hillis. 1990. Species in concept and practice: Herpetological applications. Herpetologica 46(1):87-104.

Frost, J. S., and J. E. Platz. 1983. Comparative assessment of modes of reproduction isolation among four species of leopard frogs *(Rana pipiens* complex). Evolution 73(1): 66-78.

Funk, R. S. 1965. Food of *Crotalus cerastes laterorepens* in Yuma County, Arizona. Herpetologica 21(1):15-17.

Funk, R. S. 1966. Notes about *Heloderma suspectum* along the western extremity of its range. Herpetologica 22(4):254-258.

Funk, R. S. 1974. Geographic distribution: *Kinosternon sonoriense.* Herpetological Review 5(1):20.

Funk, R. S. 1981. *Phrynosoma mcallii.* Catalogue of American Amphibians and Reptiles: 281.1-281.2.

Fusari, M. H. 1984. Temperature responses of standard, aerobic metabolism by the California legless lizard, *Anniella pulchra.* Comparative Biochemistry and Physiology 77A(1):97-101.

Gaige, H. T. 1920. Observations upon the habits of *Ascaphus truei* Stejneger. Occasional Papers of the Museum of Zoology, University of Michigan (84):1-9.

Gallagher, L. 1994. Smoking toad. New York Times Magazine [Sunday, 5 June 1994]:48-49.

Gans, C., W. K. Morgan, and E. S. Allen. 1992. Surface locomotion of the elongate and limbless lizard *Anniella pulchra* (Anguidae). Herpetologica 48(2):246-262.

Gates, G. O. 1957. A study of the herpetofauna in the vicinity of Wickenburg, Maricopa County, Arizona. Transactions of the Kansas Academy of Sciences 60(4):403-418.

Gauthier, J. A. 1982. Fossil xenosaurid and anguid lizards from the early Eocene Wasatch Formation, southeast Wyoming, and a revision of the Anguioidea. Contributions to Geology, University of Wyoming 21(1):7-54.

Gehlbach, F. R. 1967. *Ambystoma tigrinum.* Catalogue of American Amphibians and Reptiles:52.1-52.4.

Gibbons, J. W. 1988. The management of amphibians, reptiles, and small mammals in North America: The need for an environmental attitude adjustment. pp. 4-10 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Gillis, J. E. 1979. Adaptive differences in the water economics of two species of leopard frogs from eastern Colorado (Amphibia, Anura, Ranidae). Journal of Herpetology 13(4): 445-450.

Giuliani, D. 1977. Inventory of habitat and potential habitat for *Batrachoseps* sp. Report for the United States Department of the Interior, Bureau of Land Management, Bakersfield District Office, California, under Contract (CA-010-PH6-805).

Glaser, H. R. S. 1970. The distribution of amphibians and reptiles in Riverside County, California. Riverside Museum Press, Natural History Series (1):3-40.

Gloyd, H. K. 1940. The rattlesnakes, genera *Sistrurus* and *Crotalus.* Special Publication of the Chicago Academy of Sciences (4):1-266.

Goldberg, S. R. 1972. Reproduction in the southern alligator lizard *Gerrhonotus multicarinatus.* Herpetologica 28(3):267-273.

Goldberg, S. R. 1983. Reproduction of the coast horned lizard, *Phrynosoma coronatum,* in southern California. The Southwestern Naturalist 28(4):478-479.

Goldberg, S. R., and C. M. Miller. 1985. Reproduction of the silvery legless lizard, *Anniella pulchra pulchra* (Anniellidae) in southern California. The Southwestern Naturalist 30(4):617-619.

Good, D. A. 1987a. An allozyme analysis of anguid subfamilial relationships (Lacertilia: Anguidae). Copeia 1987(3):696-701.

Good, D. A. 1987b. A phyologenetic analysis of cranial osteology in the Gerrhonotine lizards. Journal of Herpetology 21(4):285-297.

Good, D. A. 1988. Allozyme variation and phylogenetic relationships among the species of *Elgaria* (Squamata: Anguidae). Herpetologica 44(2):154-162.

Good, D. A. 1989. Hybridization and cryptic species in *Dicamptodon* (Caudata: Dicamptodontidae). Evolution 43(4):728-744.

Good, D. A., and D. B. Wake. 1992. Geographic variation and speciation in the torrent [sic] salamanders of the genus *Rhyacotriton* (Caudata: Rhyacotritonidae). University of California Publications in Zoology 126:1-91.

Good, D. A., G. Z. Wurst, and D. B. Wake. 1987. Patterns of geographic variation in allozymes of the Olympic salamander, *Rhyacotriton olympicus* (Caudata: Dicamptodontidae). Fieldiana Zoology, new series (32):1-15.

Got-man, J. 1956. Reproduction in plethodont salamanders of the genus *Hydromantes.* Herpetologica 12(4):249-259.

Gorman, J. 1957. Recent collections of the California limbless lizard, *Anniella pulchra.* Copeia 1957(2):148-150.

Gorman, J. 1988. The effects of the evolution and ecology of *Hydromantes* on their conservation. pp. 39-42 In: H.F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the Conference on California Herpetology. Southwestern Herpetologists Society, Special Publication (4).

Gosner, K. L. 1960. A simplified table for staging anuran embryos and larvae with notes on identification. Herpetologica 16(3):183-190.

Gracie, A. E., and R. W. Murphy. 1986. Life history notes: *Gambelia wislizenii,* food. Herpetological Review 17(2):47.

Gradwell, N. 1973. On the functional morphology of suction and gill irrigation in the tadpole of *Ascaphus* and notes on hibernation. Herpetologica 29(1):84-93.

Gray, J. R. A., and J. M. Edington. 1969. Effect of woodland clearance on stream temperature. Journal of the Fisheries Research Board of Canada 26(2):399-403.

Green, D. M. 1985a. Differentiation in heterochromatin amount between subspecies of the red-legged frog, *Rana aurora.* Copeia 1985(4):1071-1074.

Green, D. M. 1985b. Biochemical identification of red-legged frogs, *Rana aurora draytonii* (Ranidae), at Duckwater, Nevada. The Southwestern Naturalist 30(4):614-616.

Green, D. M. 1986a. Systematics and evolution of western North American frogs allied to *Rana aurora* and *Rana boylii:* Karyologic evidence. Systematic Zoology 35(3):273-282.

Green, D. M. 1986b. Systematics and evolution of western North American frogs allied to *Rana aurora* and *Rana boylii:* Electrophoretic evidence. Systematic Zoology 35(3):283-296.

Green, D. M., C. H. Daugherty, and J. P. Bogart. 1980. Karyology and systematic relationships of the tailed frog *Ascaphus truei*. Herpetologica 36(4):340-352.

Gregory, P. T. 1979. Predator avoidance behavior of the red-legged frog *(Rana aurora)*. Herpetologica 35(2):175-184.

Gregory, P. T. 1982. Reptilian hibernation. pp. 53-154 In: C. Gans and F. H. Pough (editors), Biology of the Reptilia. Volume 13. Academic Press, New York, New York

Grinnell, J., and C. L. Camp. 1917. A distributional list of the amphibians and reptiles of California University of California Publications in Zoology 17(10):127-208.

Grinnell, J., and H. W. Grinnell. 1907. Reptiles of Los Angeles County. California. Throop Institute Bulletin (35):1-64.

Grinnell, J., and T. I. Storer. 1924. Animal life in the Yosemite. University of California Press, Berkeley.

Grinnell, J., J. Dixon, and J. M. Linsdale. 1930. Vertebrate natural history of a section of northern California through the Lassen Park region. University of California Publications in Zoology 35:1-594.

Grismer, L. L., and M. A. Galvan. 1986. A new night lizard *(Xantusia henshawi)* from a sandstone habitat. in San Diego County, California. Transactions of the San Diego Society of Natural History 21(10):155-165.

Groeneveld, D. P., and T. E. Griepentrog. 1985 Interdependence of ground water, riparian vegetation, and streambank stability: A case study. pp. 44-48 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture; Forest Service, General Technical Report RM-120.

Haertel, J. D., A. Owczarak, and R. M. Storm. 1974. A comparative study of the chromosomes from five species of the genus *Rana* (Amphihia: Salientia). Copeia 1974(1):109-114.

Hager, S. B. 1992. Surface activity, movement, and home range of the San Diego horned lizard, *Phrynosoma coronatum blainvillii*. MA Thesis, California State University, Fullerton, California.

Hammerson, G. A. 1977. Head body temperature differences monitored by telemetry in the snake *Masticophis flagellum piceus*. Comparative Biochemistry and Physiology 57(4A): 399-402.

Hammerson, G. A. 1982. Amphibians and reptiles in Colorado. Colorado Division of Wildlife, Denver, Colorado.

Hammerson, G. A. 1989. Effects of weather and feeding on body temperature and activity in the snake *Masticophis flagellum*. Journal of Thermal Biology 14(4):219-224.

Hanson, J. A., and J. L. Vial. 1956. Defensive behavior and effect of skin toxins in *Bufo alvarius*. Herpetologica 12(2):141-149.

Hanson, K., J. Snyder, and L. Kats. 1994. Natural history notes: *Taricha torosa*--diet. Herpetological Review 25(2):62.

Harris, R. R., R. J. Risser, and C. A. Fox. 1985. A method for evaluating streamflow discharge-plant species occurrence patterns on headwater streams. pp. 87-90 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Hattori, E. 1982. The archeology of Falcon Hill, Winnemucca Lake, Washoe County, Nevada. Nevada State Museum Anthropological Paper (18):1-208.

Hawkins, C. P., L. J. Gottschalk, and S. S. Brown. 1988. Densities and habitat of tailed frog tadpoles in small streams near Mt. St. Helens following the 1980 eruption. Journal of the North American Benthological Society 7(3):246-252.

Hayes, M. P., and F. S. Cliff. 1982. A checklist of the herpetofauna of Butte County, the Butte Sink, and Sutter Buttes, California. Herpetological Review 13(3):85-87.

Hayes, M. P., and C. Guyer. 1981. The herpetofauna of Ballona. pp. H-1 to H-80 In:R. W. Schreiber (editor), The biota of the Ballona region, Los Angeles County. Supplement I, Marina Del Rey/Ballona Local Coastal Plan, Los Angeles County Natural History Museum Foundation, Los Angeles, California.

Hayes, M. P., and M. R. Jennings. 1986. Decline of ranid frog species in western North America: Are bullfrogs *(Rana catesbeiuna)* responsible? Journal of Herpetology 20(4): 490-509.

Hayes, M. P., and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog *(Rana aurora draytonii)* and the foothill yellow-legged frog *(Rana boylii):* Implications for management. pp. 144-158 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Hayes, M. P., and D. M. Kremples. 1986. Vocal sac variation among frogs of the genus *Rana* from western North America. Copeia 1986(4):927-936.

Hayes, M. P., and M. M. Miyamoto. 1984. Biochemical, behavioral and body size differences between the red-legged frogs, *Rana aurora aurora* and *Rana aurora draytonii.* Copeia 1984(4):1018-1022.

Hayes, M. P., and M. R. Tennant. 1986. Diet and feeding behavior of the California red-legged frog, *Rana aurora draytonii* (Ranidae). The Southwestern Naturalist 30(4):601-605.

Hayes, M. P., and J. Warner. 1985. Life history notes: *Rana catesbeiana,* food. Herpetological Review 16(4):109.

Heath, J. E. 1965. Temperature regulation and diurnal activity in horned lizards. University of California Publications in Zoology 64(3):97-136.

Hedgecock, D. 1977. Genetic variation in two widespread species of salamanders, *Taricha torosa* and *Taricha granulosa.* Biochemical Genetics 14(7/8):561-576.

Hedgecock, D. 1978. Population subdivision and genetic divergence in the red-bellied newt, *Taricha rivularis.* Evolution 32(2):271-286.

Hedgecock, D., and F. J. Ayala. 1974. Evolutionary divergence in the genus *Taricha* (Salamandridae). Copeia 1974(3):738-747.

Heede, B. H. 1985. Interactions between streamside vegetation and stream dynamics. pp. 54-58 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Heifetz, W. 1941. A review of the lizard genus *Uma.* Copeia 1941(2):99-111.

Hemphill, D. V. 1952. The vertebrate fauna of the boreal areas of the southern Yolla Bolly Mountains, California. PhD Dissertation, Oregon State College, Corvallis, Oregon.

Hensley, M. M. 1949. Mammal diet of *Heloderma.* Herpetologica 5(6):152.

Herrington, R. E. 1988. Talus use by amphibians and reptiles in the Pacific Northwest. pp. 216-221 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Highton, R., and A. Larson. 1979. The genetic relationships of the salamanders of the genus *Plethodon.* Systematic Zoology 28(4):579-599.

Hillis, D. M. 1988. Systematics of the *Rana pipiens* complex: Puzzle and paradigm. Annual Review of Ecology and Systematics 19:39-63.

Hillis, D. M., J. S. Frost, and D. A. Wright. 1983. Phylogeny and biogeography of the *Rana pipiens* complex: A biochemical evaluation. Systematic Zoology 32(2):132-143.

Hillman, S. S. 1976. Cardiovascular correlates of maximal oxygen consumption rates in anuran amphibians. Journal of Comparative Physiology 109B(2):199-207.

Hillman, S. S. 1980. Physiological correlates of differential dehydration tolerance in anuran amphibians. Copeia 1980(1):125-129.

Hine, R. L., B. L. Les, and B. F. Hellmich. 1981. Leopard frog populations and mortality in Wisconsin, 1974-1976. Wisconsin Department of Natural Resources, Technical Bulletin (122):1-39.

Holland, D. C. 1985a. An ecological and quantitative study of the western pond turtle *(Clemmys marmorata)* in San Luis Obispo County, California. MA Thesis, Fresno State University, Fresno, California.

Holland, D. C. 1985b. Life history notes: *Clemmys marmorata,* feeding. Herpetological Review 16(4):112-113.

Holland, D. C. 1991a. A synopsis of the ecology and status of the western pond turtle *(Clemmys marmorata)* in 1991. Report prepared for the United States Fish and Wildlife Service, National Ecology Research Center, San Simeon Field. Station, San Simeon, California.

Holland, D. C. 1991b. Status and reproductive dynamics of a population of western pond turtles *(Clemmys marmorata)* in Klickitat County, Washington in 1991. Report prepared for the Washington Department of Wildlife, Olympia, Washington.

Holland, D. C. 1992. Level and pattern in morphological variation: A phylogeographic study of the western pond turtle *(Clemmys marmorata).* PhD Dissertation, University of Southwestern Louisiana, Lafayette, Louisiana.

Holland, D. C., M. P. Hayes, and E. McMillan. 1990. Late summer movement and mass mortality in the California tiger salamander *(Ambystoma californiense).* The Southwestern Naturalist 35(2):217-220.

Honegger, R. E. 1975. Red data book. III. Amphibia/Reptilia. Revised edition. International Union for the Conservation of Nature and Natural Resources, Morges, Switzerland. Status sheet for *Anniella pulchra nigra* Fischer 1885.

Houser, H., Jr., and D. A. Sutton. 1969. Morphologic and karyotypic differentiations of the California frogs *Rana muscosa* and *Rana boylii*. Copeia 1969(1):184-188.

Howard, C. W. 1974. Comparative reproductive ecology of horned lizards (genus *Phrynosoma)* in southwestern United States and northern Mexico. Journal of the Arizona Academy of Science 9(3):108-116.

Hubbard, M. E. 1903. Correlated protective devices in some California salamanders. University of California Publications in Zoology 1(4):157-170.

Hubbs, C., and N. E. Armstrong. 1961. Minimum developmental temperature tolerance of two anurans, *Scaphiopus couchi* and *Microhyla olivacea.* The Texas Journal of Science 13(3):358-362.

Hulse, A. C. 1974a. Food habits and feeding behavior in *Kinosternon sonoriense* (Chelonia; Kinosternidae). Journal of Herpetology 8(3):195-199.

Hulse, A. C. 1974b. An autecological study of *Kinosternon sonoriense* LeConte. PhD Dissertation, Arizona State University, Tempe, Arizona.

Hulse, A. C. 1976. Growth and morphometrics in *Kinosternon sonoriense* (Chelonia: Kinosternidae). Journal of Herpetology 10(4):341-348.

Hulse, A. C. 1982. Reproduction and population structure in the turtle, *Kinosternon sonoriense*. The Southwestern Naturalist 27(4):447-456.

Hunt, L. E. 1983. A nomenclatural rearrangement of the genus *Anniella* (Sauria: Anniellidae). Copeia 1983(1):79-89.

Hunt, L. E. 1984. Morphological variation in the fossorial lizard *Anniella.* MA Thesis, University of Kansas, Lawrence, Kansas.

Hupf, T. H. 1977. Natural histories of two species of leopard frogs, *Rana blairi* and *Rana pipiens*, in a zone of sympatry in northeastern Nebraska. MS Thesis, University of Nebraska, Lincoln, Nebraska.

Ingles, L. G. 1929. The seasonal and associated distribution of the fauna of the upper Santa Ana River Wash. Journal of Entomology and Zoology (Pomona College) 21(1,2):1-96.

Iverson, J. B. 1976. *Kinosternon sonoriense.* Catalogue of American Amphibians and Reptiles:176.1-176.2.

Iverson, J. B. 1978. Distributional problems of the genus *Kinosternon* in the American southwest. Copeia 1978(3):476-479.

Iverson, J. B. 1979. Another inexpensive turtle trap. Herpetological Review 10(2):55.

Iverson, J. B. 1981. Biosystematics of the *Kinosternon hirtipes* species group (Testudines: Kinosternidae). Tulane Studies in Zoology and Botany 23(1):1-74.

Jacobson, E. R., and W. G. Whitford. 1971. Physiological responses to temperature in the patch-nosed snake, *Salvadora hexalepis.* Herpetologica 27(3):289-295.

Jain, S. K. (editor). 1976. Vernal pools: Their ecology and conservation. A symposium sponsored by the Institute of Ecology, University of California, Davis, May 1 and 2, 1976. University of California at Davis, Publication of the Institute of Ecology (9):1-93.

Jain, S., and P. Moyle (editors). 1984. Vernal pools and intermittent streams. A symposium sponsored by the Institute of Ecology, University of California, Davis, May 9 and 10, 1981. University of California at Davis, Publication of the Institute of Ecology (28):1-280.

Jennings, M. R. 1983. An annotated check list of the amphibians and reptiles of California. California Fish and Game, 69(3):151-171.

Jennings, M. R. 1984a. Geographic distribution: *Rana muscosa.* Herpetological Review 15(2):52.

Jennings, M. R. 1984b. Longevity records for lizards of the family Helodermatidae. Bulletin of the Maryland Herpetological Society 20(1):22-23.

Jennings, M. R. 1987a. Annotated check list of the amphibians and reptiles of California, second revised edition. Southwestern Herpetologists Society, Special Publication (3):1-48.

Jennings, M. R. 1987b. Status of the western painted turtle *(Chrysemys picta bellii)* in Arizona. Journal of the Arizona-Nevada Academy of Science 22(2):129-133.

Jennings, M. R. 1987c. Impact of the curio trade for San Diego horned lizards *(Phrynosoma coronatum blainvillii)* in the Los Angeles Basin, California: 1885-1930. Journal of Herpetology 21(4):356-358.

Jennings, M. R. 1988a. Origin of the population of *Rana aurora draytonii* on Santa Cruz Island, California. Herpetological Review 19(4):76.

Jennings, M. R. 1988b. Natural history and decline of native ranids in California. pp. 61-72 In: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society, Special Publication (4).

Jennings, M. R. 1988c. *Phrynosoma coronatum.* Catalogue of American Amphibians and Reptiles:428.1-428.5.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of the California red-legged frog *(Rana aurora draytonii):* The inducement for bullfrog *(Rana catesbeiana)* introduction. Herpetologica 41(1):94-103.

Jennings, M. R., and M. P. Hayes. 1989. Final report of the status of the California red-legged frog *(Rana aurora draytonii)* in the Pescadero Marsh Natural Preserve. Report for the California Department of Parks and Recreation, Sacramento, California, under Contract (4-823-9018).

Jennings, M. R., and M. P. Hayes. 1994. Decline of native ranid frogs in the desert southwest. pp. 183-211 In: P. R. Brown and J. W. Wright (editors), Herpetology of the North American Deserts: Proceedings of a Symposium. Southwestern Herpetologists Society, Special Publication (5).

Jennings, W. B., D. F. Bradford, and D. F. Johnson. 1992. Dependence of the garter snake *Thamnophis elegans* on amphibians in the Sierra Nevada of California. Journal of Herpetology 26(4):503-505.

Johnson, L. G. 1975. Frog conservation. Bioscience 25(4):232.

Johnson, T. B., and R. B. Spicer. 1985. Status report; *Phrynosoma mcallii* (Hallowell 1852). Report for the United States Department of the Interior, Fish and Wildlife Service, Albuquerque, New Mexico, under Contract (14-16-002-81-224).

Jones, K. B. 1979. Effects of overgrazing on the lizards of five upper and lower Sonoran habitat types. Cal-Neva Wildlife Transactions 1979:88-101.

Jones, K. B. 1983. Movement patterns and foraging ecology of Gila monsters *(Heloderma suspectum* Cope) in northwestern Arizona. Herpetologica 39(3):247-253.

Jones, K. B. 1988a. Distribution and habitat associations of herpetofauna in Arizona: Comparisons by habitat type. pp. 109-128 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Jones, K. B. 1988b. Comparison of herpetofaunas of a natural and altered riparian ecosystem. pp. 222-227 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Jones, T. R. 1989. The evolution of macrogeographic and microgeographic variation in the tiger salamander *Ambystoma tigrinum* (Green). PhD Dissertation, Arizona State University, Tempe, Arizona.

Jones and Stokes. 1988. Plant communities and special-status plants and animals of the Kellogg Creek Watershed, Contra Costa County, California: Results of field inventories and habitat evaluations. Report prepared for the Los Vaqueros Project, Concord, California, by Jones and Stokes Associates, Inc., Sacramento, California.

Kagarise Sherman, C. 1980. A comparison of the natural history and mating system of two anurans: Yosemite toads *(Bufo canorus)* and black toads *(Bufo exsul).* PhD Dissertation, The University of Michigan, Ann Arbor, Michigan.

Kagarise Sherman, C., and M. L. Morton. 1984. The toad that stays on its toes. Natural History 93(3):73-78.

Kagarise Sherman, C., and M. L. Morton. 1993. Population declines of Yosemite toads in the eastern Sierra Nevada of California. Journal of Herpetology 27(2):186-198.

Kamel, S., and R. E. Gatten, Jr. 1983. Aerobic and anaerobic activity metabolism of limbless and fossorial reptiles. Physiological Zoology 56(3):419-429.

Karasov, W. H., and R. A. Anderson. 1984. Interhabitat differences in energy acquisition and expenditure in a lizard. Ecology 65(1):235-247.

Karlstrom, E. L. 1962. The toad genus *Bufo* in the Sierra Nevada of California. University of California Publications in Zoology 62(1):1-104.

Karlstrom, E. L., and R. L. Livezey. 1955. The eggs and larvae of the Yosemite toad *Bufo canorus* Camp. Herpetologica 11(4):221-227.

Kats, L. B., S. A. Elliott, and J. Curt-ens. 1992. Intraspecific oophagy in stream-breeding California newts *(Taricha torosa).* Herpetological Review 23(1):7-8.

Kats, L. B., J. A. Breeding, K. M. Hanson, and P. Smith. 1994. Ontogenetic changes in California newts *(Taricha torosa)* in response to chemical cues from conspecific predators. Journal of the North American Benthological Society 13(2):321-325.

Kauffman, J. B., and W. C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications: A review. Journal of Range Management 37(5): 430-437.

Kauffman, J. B., W. C. Krueger, and M. Varva. 1983. Impacts of cattle on streambanks in northeastern Oregon. Journal of Range Management 36(6):683-685.

Kauffman, J. S. 1982. Patterns of habitat resource utilization in a population of *Uma scoparia,* the Mojave fringe-toed lizard. MS Thesis, University of Illinois, Chicago, Illinois.

Kellert, S. R. 1985. Social and perceptual factors in endangered species management. The Journal of Wildlife Management 49(2):528-536.

King, T., and M. Robbins. 1991a. A status survey of *Kinosternon sonoriense* and *Bufo alvarius* along the California side of the lower Colorado River basin. Unpublished report prepared for the California Department of Fish and Game, Inland Fisheries Division, Region 5.

King, T., and M. Robbins. 1991b. A distribution survey of the Mojave and Colorado Desert fringe-toed lizards, *Uma scoparia* and *Uma notata* in California. Unpublished report prepared for the California Department of Fish and Game, Inland Fisheries Division, Region 5.

Kinsbury, B. A. 1994. Thermal constraints and eurythermy in the lizard *Elgaria multicarinata*. Herpetologica 50(3):266-273.

Klauber, L. M. 1924. Notes on the distribution of snakes in San Diego County, California. Bulletin of the Zoological Society of San Diego (1):1-23.

Klauber, L. M. 1926. Field notes on *Xantusia henshawi*. Copeia (152):115-117.

Klauber, L. M. 1929. Range extensions in California. Copeia (170):15-22.

Klauber, L. M. 1931. A statistical survey of the snakes of the southern border of California. Bulletin of the Zoological Society of San Diego (8):1-93.

Klauber, L. M. 1932a. Notes on the silvery footless lizard, *Anniella pulchra*. Copeia 1932(1):4-6.

Klauber, L. M. 1932b. The flat-tailed horned toad in lower California. Copeia 1932(2): 100.

Klauber, L. M. 1934. An annotated list of the amphibians and reptiles of the southern border of California. Bulletin of the Zoological Society of San Diego (11):1-28.

Klauber, L. M. 1936. The horned toads of the *coronatum* group. Copeia 1936(2):103-110.

Klauber, L. M. 1937. A statistical study of the rattlesnakes. IV. The growth of the rattlesnake. Occasional Papers of the San Diego Society of Natural History (3):1-56.

Klauber, L. M. 1939. Studies of reptiles life in the arid southwest. Part I, Night collecting on the desert with ecological statistics; Part II, Speculations on protective coloration and protective reflectivity; Part III, Notes on some lizards of the southwestern United States. Bulletin of the Zoological Society of San Diego (14):1-100.

Klauber, L. M. 1940. Notes from a herpetological diary, II. Notes on the genus *Anniella*. Copeia 1940(1):15-16.

Klauber, L. M. 1946. A new gopher snake *(Pituophis)* from Santa Cruz Island, California. Transactions of the San Diego Society of Natural History 11(2):41-48.

Klauber, L. M. 1972. Rattlesnakes: Their habits, life histories and influence on mankind. Second edition. University of California Press, Berkeley, Los Angeles, and London.

Kloot, P. M. 1983. The role of common iceplant *(Mesembryanthemum crystallinum)* in the deterioration of medic pasture. Australian Journal of Ecology 8(3):301-306.

Knox, J. B. (editor). 1991. Global climate change and California: Potential impacts and responses. University of California Press, Berkeley.

Kruse, K. C., and D. G. Dunlap. 1976. Serum albumins and hybridization in two species of the *Rana pipiens* complex in the north central United States. Copeia 1976(2):394-396.

Kupferberg, S. J. 1993. Bullfrogs *(Rana catesbeiana)* invade a northern California river: A plague or species coexistence [abstract]? Bulletin of the Ecological Society of America, Program and Abstracts Supplement to 74(4):319-320.

Kupferberg, S. J. 1994. Exotic larval bullfrogs *(Rana catesbeiana)* as prey for native garter snakes: Functional and conservation implications. Herpetological Review 25(3):95-97.

Landreth, H. F., and D. E. Ferguson. 1967. Movements and orientation of the tailed frog, *Ascaphus truei.* Herpetologica 23(2):81-93.

Landsberg, M. 1990. Legislators toady to chickens, marmots. Los Angeles Times 109(98): A25, cols. 1-3. [Sunday, 11 March 1990].

Langton, T. E. S. (editor). 1989. Amphibians and roads. Proceedings of the Toad Tunnel Conference, Rendsburg, Federal Republic of Germany, 7-8 January 1989, ACO Polymer Products, Ltd., Hitchin Road, Shefford, Bedfordshire, SG17 5JS, England.

LaRivers, I. 1942. Some new amphibians and reptiles records from Nevada. Journal of Entomology and Zoology 34(3):53-68.

LaRivers, I. 1962. Fishes and fisheries of Nevada. Nevada State Fish and Game Commission, Carson City, Nevada.

Larson, N. M. 1984. Geographic variation in the two-striped garter snake, *Thamnophis hammondii.* MS Thesis, California State Polytechnic University, Pomona, California.

Laughrin, L. 1977. The island fox; a field study of its behavior and ecology. PhD Dissertation, University of California, Santa Barbara, California.

Laughrin, L. 1982. The vertebrates of Santa Cruz Island; review, current status, and management recommendations. Report prepared for The Nature Conservancy.

Lawson, R., and H. C. Dessauer. 1979. Biochemical genetics and systematics of garter snakes of the *Thamnophis elegans-couchii-ordinoides* complex. Occasional Papers of the Museum of Zoology, Louisiana State University (56):1-24.

Leavitt, P. 1989. Nationline: Toad lickers beware. USA Today (Final Edition):3A. [Thursday, 10 August 1989].

Lee, J. C. 1974. The diel activity cycle of the lizard, *Xantusia henshawi.* Copeia 1974(4): 934-940.

Lee, J. C. 1975. The autecology of *Xantusia henshawi henshawi* (Sauria: Xantusiidae). Transactions of the San Diego Society of Natural History 17(19):259-278.

Leviton, A. E., R. H. Gibbs, Jr., E. Heal, and C. E. Dawson. 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. Copeia, 1985(3):802-832.

Licht, L. E. 1969a. Unusual aspects of anuran sexual behavior as seen in the red-legged frog, *Rana aurora aurora.* Canadian Journal of Zoology 47(4):505-509.

Licht, L. E. 1969b. Comparative breeding biology of the red-legged frog *(Rana aurora aurora)* and the western spotted frog *(Rana pretiosa pretiosa)* in southwestern British Columbia. Canadian Journal of Zoology 47(6):1287-1299.

Licht, L. E. 1971. Breeding habits and embryonic thermal requirements of the frog, *Rana aurora aurora* and *Rana pretiosa pretiosa,* in the Pacific Northwest. Ecology 52(1):116 124.

Licht, L. E. 1974. Survival of embryos, tadpoles, and adults of *the* frogs *Rana aurora aurora* and *Rana pretiosa pretiosa* sympatric in southwestern British Columbia. Canadian Journal of Zoology 52(5):613-627.

Licht, L. E. 1986a. Food and feeding behavior of sympatric red-legged frogs, *Rana aurora,* and spotted frogs, *Rana pretiosa,* in southwestern British Columbia. The Canadian Field-Naturalist 100(1):22-31.

Licht, L. E. 1986b. Comparative escape behavior of sympatric *Rana aurora* and *Rana pretiosa.* The American Midland Naturalist 115(2):239-247.

Lind, A. J. 1990. Ontogenetic changes in the foraging behavior, habitat use and food habits of the western aquatic garter snake, *Thamnophis couchii,* at Hurdygurdy Creek, Del Norte County, California. MA Thesis, Humboldt State University, Arcata, California.

Linsdale, J. M. 1932. Amphibians and reptiles from Lower California. University of California Publications in Zoology 38(6):345-386.

Linsdale, J. M. 1940. Amphibians and reptiles in Nevada. Proceeding of the American Academy of Arts and Sciences 73(8):197-257.

Linzey, D. W. 1967. Food of the leopard frog, *Rana p. pipiens,* in central New York. Herpetologica 23(1):11-17.

Liss, W. J., and G. L. Larson. 1991. Ecological effects of stocked trout on North Cascades naturally fishless lakes. Park Science 11(3):22-23.

Livezey, R. L. 1959. The egg mass and larvae of *Plethodon elongatus* Van Denburgh. Herpetologica 15(1):41-42.

Livezey, R. L., and A. H. Wright. 1945. Descriptions of four salientian eggs. The American Midland Naturalist 34(2):701-706.

Lockington, W. N. 1880. List of Californian reptiles and Batrachia collected by Mr. Dunn and Mr. W. J. Fisher in 1876. The American Naturalist 14(4):295-296.

Long, M. L. 1970. Food habits of *Rana muscosa* (Anura: Ranidae), Herpeton, Journal of the Southwestern Herpetologists Society 5(1):1-8.

Loomis, R. B. 1965. The yellow-legged frog, *Rana boylii,* from the Sierra San Pedro Mártir, Baja California Norte, Mexico. Herpetologica 21(1):78-80.

Lowe, C. H. 1985. Amphibians and reptiles in Southwest riparian ecosystems. pp. 339-341 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. Rocky Mountain Range and Experiment Station, Fort Collins, Colorado,

United States Department of Agriculture, Forest Service General Technical Report RM-120.

Lowe, C. H., C. R. Schwalbe, and T. B. Johnson. 1986. The venomous reptiles of Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

Luckenbach, R. A. 1982. Ecology and management of the desert tortoise *(Gopherus agassizii)* in California. pp. 1-37 In: R. B. Bury (editor), North American tortoises: Conservation and ecology. U.S. Fish and Wildlife Service, Wildlife Research Report (12).

Luckenbach, R. A., and R. B. Bury. 1983. Effects of off-road vehicles on the biota of the Algodones dunes, Imperial County, California. Journal of Applied Ecology 20(1):265-286.

Lynch, J. D. 1978. The distribution of leopard frogs *(Rana blairi* and *Rana pipiens)* (Amphibia, Anura, Ranidae) in Nebraska. Journal of Herpetology 12(2):157-162.

Macey, J. R., and T. J. Papenfuss. 1991a. Amphibians. pp. 277-290 In: C. A. Hall, Jr. (editor), Natural history of the White-Inyo Range, eastern California. California Natural History Guides (55). University of California Press, Berkeley, Los Angeles, and Oxford.

Macey, J. R., and T. J. Papenfuss. 1991b. Reptiles. pp. 291-360 In: C. A. Hall, Jr. (editor), Natural history of the White-Inyo Range, eastern California. California Natural History Guides (55). University of California Press, Berkeley, Los Angeles, and Oxford.

Mader, D. R. 1988. Herpetological medicine: Off-feed animals. The Vivarium 1(1):31-34.

Maes, H. H. 1990. Study of the population densities of the Colorado Desert fringe-toed lizard *(Uma notata)* in the Algodones Dunes of Imperial County, California. Final report for the United States Department of the Interior, Bureau of Land Management, El Centro Area Office, under Contract (CA950-CTO-032).

Mahoney, D. L., and D. C. Erman. 1984. The role of streamside bufferstrips in the ecology of the aquatic biota. pp. 169-176 In: R. E. Warner and K. M. Hendrix (editors), California riparian systems: Ecology, conservation, and productive management. University of California Press, Berkeley, Los Angeles, and London.

Mahrdt, C. R. 1975. The occurrence of *Ensatina eschscholtzii eschscholtzii* in Baja California, Mexico. Journal of Herpetology 9(2):240-242.

Mallette, R. D., and S. J. Nicola (editors). 1980. At the crossroads; a report on the status of California's endangered and rare fish and wildlife. State of California Resources Agency, Fiih and Game Commission and Department of Fish and Game, Sacramento, California.

Marlow, C. B., and T. M. Pogacnik. 1985. Time of grazing and cattle-induced damage to streambanks. pp. 279-284 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Marlow, R. W., J. M. Brode, and D. B. Wake. 1979. A new salamander, genus *Batrachoseps,* from the Inyo Mountains of California, with a discussion of relationships in

the genus. Contributions in Science of the Natural History Museum of Los Angeles County (308):1-17.

Marr, J. C. 1943. Range extension for *Rana boylii boylii.* Copeia 1943(1):56.

Mautz, W. J. 1979. The metabolism of the reclusive lizards, the Xantusiidae. Copeia 1979(4):577-584.

Mautz, W. J., and T. J. Case. 1974. A diurnal activity cycle in the granite night lizard, *Xantusia henshawi.* Copeia 1974(1):243-251.

Mayhew, W. W. 1962. *Scaphiopus couchi* in California's Colorado Desert. Herpetologica 18(3):153-161.

Mayhew, W. W. 1964a. Taxonomic status of California populations of the lizard genus *Uma.* Herpetologica 20(3):170-183.

Mayhew, W. W. 1964b. Photoperiodic responses in three species of the lizard genus *Uma.* Herpetologica 20(2):95-113.

Mayhew, W. W. 1965a. Adaptations of the amphibian, *Scaphiopus couchi,* to desert conditions. The American Midland Naturalist 74(1):95-109.

Mayhew, W. W. 1965b. Hibernation in the horned lizard, *Phrynosoma m'calli.* Comparative Biochemistry and Physiology 16(1):103-119.

Mayhew, W. W. 1966. Reproduction in the arenicolous lizard *Uma notata.* Ecology 47(1): 9-18.

Mayhew, W. W. 1968. Biology of desert amphibians and reptiles. pp. 195-356 In: G. W. Brown, Jr. (editor), Desert Biology. Volume I. Academic Press, New York, New York.

McAllister, K. R., and W. Leonard. 1990. 1989 progress report - Past distribution and current status of the spotted frog in western Washington. Washington Department of Wildlife, Wildlife Management, Nongame program, Olympia, Washington.

McAllister, K. R., and W. Leonard. 1991. 1990 progress report - Past distribution and current status of the spotted frog in western Washington. Washington Department of Wildlife, Wildlife Management, Nongame program, Olympia, Washington.

McAllister, K. P., W. P. Leonard, and R. M. Storm. 1993. Spotted frog *(Rana pretiosa)* surveys m the Puget Trough of Washington, 1989-1991. Northwestern Naturalist 74(1): 10-15.

McClanahan, L., Jr. 1967. Adaptations of the spadefoot toad, *Scaphiopus couchi,* to desert environments. Comparative Biochemistry and Physiology 20(1):73-99.

McClanahan, L., Jr. 1972. Changes in body fluids of burrowed spadefoot toads as a function of soil water potential. Copeia 1972(2):209-216.

McFarland, W. N. 1955. Upper lethal temperatures in the salamander *Taricha torosa* as a function of acclimation. Copeia 1955(3):191-194.

McGuire, J. A., and L. L. Grismer. 1992. The taxonomy and biogeography of *Thamnophis hammondii* and *T. digueti* (Reptilia: Squamata: Colubridae) in Baja California, Mexico. Herpetologica 49(3):354-365.

McGurty, B. M. 1980. Preliminary review of the status of the San Diego horned lizard, *Phrynosoma coronatum blainvillei*, and the orange-throated whiptail, *Cnemidophorus hyperythrus beldingi*. Report for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under Contract.

McGurty, B. M. 1988. Natural history of the California mountain kingsnake *Lampropeltis zonata*. pp. 73-88 In: H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the conference on California herpetology. Southwestern Herpetologists Society, Special Publication (4).

Meams, E. A. 1907. Mammals of the Mexican boundary of the United States. A descriptive catalogue of the species of mammals occurring in that region; with a general summary of the natural history, and a list of trees. Part I. Families Didelphiidae to Muridae. United States National Museum Bulletin (56):1-530.

Merrell, D. J. 1977. Life history of the leopard frog, *Rana pipiens* in Minnesota. Occasional Papers of the Bell Museum of Natural History, University of Minnesota (15): 1-23.

Metter, D. E. 1963. Stomach contents of Idaho larval *Dicamptodon*. Copeia 1963(2):435-436.

Metter, D. E. 1964a. A morphological and ecological comparison of two populations of the tailed frog *Ascaphus truei* Stejneger. Copeia 1964(1):181-195.

Metter, D. E. 1964b. On breeding and sperm retention in *Ascaphus*. Copeia 1964(4):710-711.

Metter, D. E. 1966. Some temperature and salinity tolerances of *Ascaphus trui* [sic] Stejneger. Journal of the Idaho Academy of Sciences 4:44-47.

Metter, D. E. 1967. Variation in the ribbed frog *Ascaphus truei* Stejneger. Copeia 1967(3): 634-649.

Metter, D. E. 1968a. *Ascuphus truei*. Catalogue of American Amphibians and Reptiles: 69.1-69.2.

Metter, D. E. 1968b. The influence of floods on population structure of *Ascaphus truei* Stejneger. Journal of Herpetology 1(1-4):105-106.

Metter, D. E., and R. J. Pauken. 1969. An analysis of the reduction of gene flow in *Ascaphus truei* in the northwest U.S. since the Pleistocene. Copeia 1969(2):301-307.

Miller, A. H., and R. C. Stebbins. 1964. The lives of desert animals in Joshua Tree National Monument. University of California Press, Berkeley, Los Angeles, and London.

Miller, C. M. 1943. An intergradient population connecting *Anniella pulchra pulchra* and *Anniella pulchra nigra*. Copeia 1943(1):2-6.

Miller, C. M. 1944. Ecologic relations and adaptations of the limbless lizards of the genus *Anniella.* Ecological Monographs 14(3):271-289.

Miller, L., and A. H. Miller. 1936. The northward occurrence of *Bufo californicus* in California. Copeia 1936(3):176.

Miller, M. R. 1951. Some aspects of the life history of yucca night lizard, *Xantusia vigilis.* Copeia 1951(2):114-120.

Miller, M. R. 1954. Further observations on reproduction in the lizard *Xantusia vigilis.* Copeia 1954(1):38-40.

Miller, M. R., and M. E. Robbins. 1954. The reproductive cycle in *Taricha torosa (Triturus torosus).* Journal of Experimental Zoology 125(3):415-445.

Minnich, J. E., and V. H. Shoemaker. 1970. Water turnover in the Mohave sand lizard, *Uma scoparia* [abstract]. American Zoologist 10(4):517.

Minnich, J. E., and V. H. Shoemaker. 1972. Water and electrolyte turnover in a field population of the Mohave sand lizard, *Uma scoparia.* Copeia 1972(4):650-659.

Mittleman, M. B., and G. S. Myers. 1949. Geographical variation in the ribbed frog *Ascaphus truei.* Proceedings of the Biological Society of Washington 62(13):57-68.

Montanucci, R. R. 1965. Observations on the San Joaquin leopard lizard, *Crotaphytus wislizenii silus* Stejneger. Herpetologica 21(4):270-283.

Montanucci, R. R. 1968. Notes on the distribution and ecology of some lizards in the San Joaquin Valley, California. Herpetologica 24(4):316-320.

Montanucci, R. R. 1989. Maintenance and propagation of horned lizards *(Phrynosoma)* in captivity. Bulletin of the Chicago Herpetological Society 24(12):22-238.

Moore, R. D. 1929. *Canis latrans lestes* Merriam feeding on tadpoles and frogs. Journal of Mammalogy 10(3):255.

Morafka, D. J., and B. H. Banta. 1976. Ecological relationships of the recent herpetofauna of Pinnacles National Monument, Monterey and San Benito Counties, California. The Wassman Journal of Biology 34(2):304-324.

Morey, S. R., and D. A. Guinn. 1992. Activity patterns, food habits, and changing abundance in a community of vernal pool amphibians. pp. 149-158 In: D. F. Williams, S. Byrne, and T. A. Rado (editors), Endangered and sensitive species of the San Joaquin Valley, California: Their biology, management, and conservation. The California Energy Commission, Sacramento, California, and the Western Section of The Wildlife Society.

Morris, R. L., and W. W. Tanner. 1969. The ecology of the western spotted frog, *Rana pretiosa pretiosa* Baird and Girard: A life history study. The Great Basin Naturalist 29(2): 45-81.

Morrison, M. L. 1988. The design and importance of long-term ecological studies: Analysis of vertebrates in the Inyo-White Mountains, California. pp. 267-275 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on

the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Morton, M. L. 1981. Seasonal changes in total body lipid and liver weight in the Yosemite toad. Copeia 1981(1):234-238.

Morton, M. L., and N. L. Sokolski. 1978. Sympatry in *Bufo boreas* and *Bufo canorus* and additional evidence of natural hybridization. Bulletin of the Southern California Academy of Sciences 77(2):52-55.

Mosauer, W. 1935. How fast can snakes travel? Copeia 1935(1):6-9.

Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana,* on the native frogs of the San Joaquin Valley, California. Copeia 1973(1):18-22.

Moyle, P. B., J. E. Williams, and E. D. Wikramanayake. 1989. Fish species of special concern of California. California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Mulder, B. S., B. B. Schultz, and P. W. Sherman. 1978. Predation on vertebrates by Clark's nutcrackers. The Condor 80(4):449-451.

Mullally, D. P. 1953. Observations on the ecology of the toad *Bufo canorus.* Copeia 1953(3):182-183.

Mullally, D. P. 1956. The relationships of the Yosemite and western toads. Herpetologica 12(2):133-135.

Mullally, D. P. 1959. Notes on the natural history of *Rana muscosa* Camp in the San Bernardino Mountains. Herpetologica 15(2):78-80.

Mullally, D. P., and J. D. Cunningham. 1956a. Aspects of the thermal ecology of the Yosemite toad. Herpetologica 12(1):57-67.

Mullally, D. P., and J. D. Cunningham. 1956b. Ecological relations of *Rana muscosa* at high elevations in the Sierra Nevada. Herpetologica 12(3):189-198.

Mullally, D. P., and D. H. Powell. 1958. The Yosemite toad: Northern range extension and possible hybridization with the western toad. Herpetologica 14(1):31-33.

Mullen, D. A. 1989. Geographic distribution: *Anniella p. pulchra.* Herpetological Review 20(1):12.

Mullen, D. A., and R. C. Stebbins. 1978. An addition to the amphibian fauna of California. The Great Basin Naturalist 38(4):429-437.

Murphy, M. L., and D. J. Hall. 1981. Varied effects of clear cut logging on predators and their habitat in small streams of the Cascade Mountains, Oregon. Canadian Journal of Fisheries and Aquatic Sciences 38(2):137-145.

Murphy, R. W. 1983. Paleobiogeography and genetic differentiation of the Baja California herpetofauna. Occasional Papers of the California Academy of Sciences (137):1-48.

Murphy, R. W., and H. M. Smith. 1985. Conservation of the name *Anniella pulchra* for the California legless lizard. Herpetological Review 16(3):68.

Murphy, R. W., and H. M. Smith. 1991. Case 2552. *Anniella pulchra* Gray, 1852 (Reptilia, Squamata): Proposed designation of a neotype. Bulletin of Zoological Nomenclature 48(4):316-318.

Murphy, R. W., W. E. Cooper, Jr., and W. S. Richardson. 1983. Phylogenetic relationships of the North American five-lined skinks, genus *Eumeces* (Sauria: Scincidae). Herpetologica 39(3):200-211.

Murray, K. F. 1955. Herpetological collections from Baja California. Herpetologica 11(1): 33-48.

Muth, A., and M. Fisher. 1992. Development of baseline data and procedures for monitoring populations of the flat-tailed horned lizard, *Phrynosoma mcallii.* Final draft report for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under Contract (FG9268 AM.2).

Myers, G. S. 1930a. Notes on some amphibians in western North America. Proceedings of the Biological Society of Washington 43(9):55-64.

Myers, G. S. 1930b. The status of the southern California toad, *Bufo californicus* Camp. Proceedings of the Biological Society of Washington 43(11):73-78.

Myers, G. S. 1931. *Ascaphus truei* in Humboldt County, California, with a note on the habits of the tadpole. Copeia 1931(2):56-57.

Myers, G. S. 1944. California records of the western spade-foot toad. Copeia 1944(1):58.

Myers, G. S. ms. Amphibians and reptiles of the urban area of Palo Alto and Stanford, California. Unpublished manuscript in the Smithsonian Institution Archives, Record Unit 7317, George Sprague Myers Papers, 1903-1986, and undated, Box 45, File 2.

Nagano, C. D., C. L. Hogue, R. R. Snelling, and J. P. Donahoue. 1981. The insects and related terrestrial arthropods of Ballona. pp. E-1 to E-89 In: R. W. Schreiber (editor), The biota of the Ballona region, Los Angeles County. Supplement I, Marina Del Rey/Ballona Local Coastal Plan, Los Angeles County Natural History Museum Foundation, Los Angeles, California.

Newbold, J. D., D. C. Erman, and K. B. Roby. 1980. Effects of logging on macroinvertebrates in streams with and without buffer strips. Canadian Journal of Fisheries and Aquatic Sciences 37(7):1076-1085.

Newton, M. S., and R. Smith. 1975. The snake that lost its habitat. Natural History 84(6): 72-77.

Nicola, S. J. 1981. Statement to the Fish and Game Commission on the commercial collecting of native reptiles and amphibians. California Department of Fish and Game, Inland Fisheries Endangered Species Program, Special Publication (81-2):1-7.

Noble, G. K., and L. R. Aronson. 1942. The sexual behavior of Anura. 1. The normal mating pattern of *Rana pipiens.* Bulletin of the American Museum of Natural History 80(5):127-142.

Noble, G. K., and P. G. Putnam. 1931. Observations on the life history of *Ascaphus truei* Stejneger. Copeia 1931(3):97-101.

Noble, G. K., and L. B. Richards. 1932. Experiments on the egg-laying of salamanders. American Museum Novitates (513):1-25.

Norris, K. S. 1949. Observations on the habits of the horned lizard *Phrynosoma m'callii.* Copeia 1949(3):176-180.

Norris, K. S. 1958. The evolution and systematics of the iguanid genus *Uma* and its relation to the evolution of other North American desert reptiles. Bulletin of the American Museum of Natural History 114(3):253-326.

Nussbaum, R. A. 1969. A nest site of the Olympic salamander, *Rhyacotriton olympicus* (Gaige). Herpetologica 25(4):277-278.

Nussbaum, R. A., and C. K. Tait. 1977. Aspects of the life history and ecology of the Olympic salamander, *Rhyacotriton olympicus* (Gaige). The American Midland Naturalist 98(1):176-199.

Nussbaum, R. A., and E. D. Brodie, Jr. 1981. *Taricha torosa.* Catalogue of American Amphibians and Reptiles:273.1-273.4.

Nussbaum, R. A., E. D. Brodie, Jr., and R. M. Storm. 1983. Amphibians and reptiles of the Pacific Northwest. University of Idaho Press, Moscow, Idaho.

O'Hara, R. K. 1981. Habitat selection behavior in three species of anuran larvae: Environmental cues, ontogeny and adaptive significance. PhD Dissertation, Oregon State University, Corvallis, Oregon.

O'Hara, R. K., and A. R. Blaustein. 1985. *Rana cascadae* tadpoles aggregate with siblings: An experimental field study. Oecologia 67(1):44-51.

Ohmart, R. D., B. W. Anderson, and W. C. Hunter. 1988. The ecology of the lower Colorado River from Davis Dam to the Mexico-United States International Boundary: A community profile. United States Fish and Wildlife Service, Biological Report 85(7.19): 1-296.

Orr, P. C. 1968. Prehistory of Santa Rosa Island. Santa Barbara Museum of Natural History, Santa Barbara, California.

Ottley, J. R., and E. E. Jacobsen. 1983. Pattern and coloration of juvenile *Elaphe rosaliae* with notes on natural history. Journal of Herpetology 17(2):189-191.

Pace, A. M. 1974. Systematic and biological studies of the leopard frogs *(Rana pipiens* complex) of the United States. Miscellaneous Publications of the Museum of Zoology, University of Michigan (184):1-140.

Papenfuss, T., and J. R. Macey. 1986. A review of the population status of the Inyo Mountains salamander *(Batrachoseps campi).* Final report for the United States Fish and Wildlife Service, Endangered Species Office, Sacramento, California, under order (10188-5671-5).

Parker, M., F. J. Wood, Jr., B. H. Smith., and R. G. Elder. 1985. Erosional downcutting in lower order riparian ecosystems: Have historical changes been caused by removal of beaver? pp. 34-38 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Patten, M. A., and S. J. Myers. 1992. Geographic distribution: *Bufo microscaphus californicus.* Herpetological Review 23(4):124.

Patten, R. B., and B. H. Banta. 1980. A rattlesnake, *Crotalus ruber,* feeds on a road-killed animal. Journal of Herpetology 14(1):111-112.

Peguegnat, W. E. 1951. The biota of the Santa Ana Mountains. Journal of Entomology and Zoology (Pomona) 42(3/4):1-84.

Perkins, C. B. 1938. The snakes of San Diego County with descriptions and key. Bulletin of the Zoological Society of San Diego (13):1-66.

Pianka, E. R., and W. S. Parker. 1975. Ecology of horned lizards: A review with special reference to *Phrynosoma platyrhinos.* Copeia 1975(1):141-162.

Platts, W. S., K. A. Gebhardt, and W. L. Jackson. 1985. The effects of large storm events on Basin-Range riparian stream habitats. pp. 30-34 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Platz, J. E. 1976. Biochemical and morphological variation of leopard frogs in Arizona. Copeia 1976(4):660-672.

Platz, J. E. 1988. *Rana yavapaiensis.* Catalogue of American Amphibians and Reptiles: 418.1-418.2.

Platz, J. E., and A. L. Platz. 1973. *Rana pipiens* complex: Hemoglobin phenotypes of sympatric and allopatric populations in Arizona. Science 179(4080):1334-1336.

Platz, J. E., and J. S. Frost. 1984. *Rana yavapaiensis,* a new species of leopard frog *(Rana pipiens* complex). Copeia 1984(4):940-948.

Platz, J. E., R. W. Clarkson, J. C. Rorabaugh, and D. M. Hillis. 1990. *Rana berlandieri:* Recently introduced populations in Arizona and southeastern California. Copeia 1990(2): 324-333.

Porter, K. R., and W. F. Porter: 1967. Venom comparisons and relationships of twenty species of New World toads (genus *Bufo).* Copeia 1967(2):298-307.

Porzer, L. M. 1982. Movements, behavior, and body temperatures of the Gila monster *(Heloderma suspectum* Cope) in the vicinity of Queen Creek, Arizona. MS Thesis, Arizona State University, Tempe, Arizona.

Pough, F. H. 1969a. Physiological aspects of the burrowing of sand lizards *(Uma:* Iguanidae) and other lizards. Comparative Biochemistry and Physiology 31(6):869-884.

Pough, F. H. 1969b. The morphology of undersand respiration in reptiles. Herpetologica 25(3):216-223.

Pough, F. H. 1970. The burrowing ecology of the sand lizard, *Uma notata.* Copeia 1970(1):145-157.

Pough, F. H. 1974. *Uma scoparia.* Catalogue of American Amphibians and Reptiles: 155.1-155.2.

Pough, F. H. 1977. *Uma notata.* Catalogue of American Amphibians and Reptiles:197.1-197.2.

Powell, J. A. 1978. Endangered habitats for insects: California coastal sand dunes. Atala 6(1-2):41-55.

Power, M. E. 1990. Effects of fish in river food webs. Science 250(4982):811-814.

Price, A. H., and B. K. Sullivan. 1988. *Bufo microscaphus.* Catalogue of American Amphibians and Reptiles:415.1-415.3.

Price, R. M. 1990a. *Bogertophis.* Catalogue of American Amphibians and Reptiles:497.1-497.2.

Price, R. M. 1990b. *Bogertophis rosaliae.* Catalogue of American Amphibians and Reptiles:498.1-498.3.

Punzo, F. 1982. Clutch and egg size in several species of lizards from the desert southwest. Journal of Herpetology 16(4):414-417.

Rado, T. A. 1981. Analysis of actual and potential loss of flat-tailed horned lizard *(Phrynosoma mcallii)* habitat. Draft report for the Department of the Interior, Bureau of Land Management, California State Office, Sacramento, California.

Raphael, M. G. 1987. Wildlife-tanoak associations in Douglas-fir forests of northwestern California. pp. 183-199 In: T. R. Plumb and N. H. Pillsbury (editors), Proceeding of the Symposium on multiple-use management of California's hardwood resources. United States Department of Agriculture, Forest Service, General Technical Report PSW-100.

Raphael, M. G. 1988. Long-term trends in abundance of amphibians, reptiles, and mammals in Douglas-fir forests of northwestern California. pp. 23-31 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Rathbun, G. B., N. Siepel, and D. C. Holland. 1992. Nesting behavior and movements of western pond turtles *(Clemmys marmorata).* The Southwestern Naturalist 37(3):319-324.

Rathbun, G. B., M. R. Jennings, T. G. Murphey, and N. R. Siepel. 1993. Status and ecology of sensitive aquatic vertebrates in lower San Simeon and Pica Creeks, San Luis Obispo County, California. Unpublished Report, National Ecology Research Center, Piedras Blancas Research Station, San Simeon, California, under Cooperative Agreement (14-16-0009-91-1909).

Ray, G. C. 1958. Vital limits and rates of desiccation in salamanders. Ecology 39(1):75-83.

Reeve, W. L. 1952. Taxonomy and distribution of the horned lizard genus *Phrynosoma.* University of Kansas Science Bulletin 34(14):817-960.

Reiner , R. J. 1992. The Nature Conservancy--preserving natural diversity in the San Joaquin Valley. pp. 207-217 In: D. F. Williams, S. Byrne, and T. A. Rado (editors), Endangered and sensitive species of the San Joaquin Valley, California: Their biology, management, and conservation. The California Energy Commission, Sacramento, California, and the Western Section of The Wildlife Society.

Remsen, J. V., Jr. 1978. Bird species of special concern in California; an annotated list of declining or vulnerable bird species. California Department of Fish and Game, Wildlife Management Branch Administrative Report (78-1):1-54.

Reynolds, J. B. 1983. Electrofishing. pp. 147-163 In: L. A. Nielsen and D. L. Johnson (editors), Fisheries techniques. American Fisheries Society, Bethesda, Maryland.

Richards, B. 1994. Toad-smoking gains on toad-licking among drug users; toxic, hallucinogenic venom, squeezed, dried and puffed, has others turned off. The Wall Street Journal 223(45):A1, col. 4; A8, cols. 5-6. [Monday, 7 March 1994].

Ricker, W. E., and E. B. S. Logier. 1935. Notes on the occurrence of the ribbed toad *(Ascaphus truei* Stejneger) in Canada. Copeia 1935(1):46.

Riemer, W. J. 1958. Variation and systematic relationships within the salamander genus *Taricha.* University of California Publications in Zoology 56(3):301-390.

Ritter, W. E. 1897. Life history and habits of the Pacific Coast newt *(Diemyctylus torosus* Esch.). Proceedings of the California Academy of Sciences, 3rd Series 1(2):73-114.

Rittschof, D. 1975. Some aspects of the natural history and ecology of the leopard frog, *Rana pipiens.* PhD Dissertation, University of Michigan, Ann Arbor, Michigan.

Rivers, J. J. 1902. Silvery footless lizard or snake. Bulletin of the Southern California Academy of Sciences 1(3):27.

Rodgers, T. L., and V. H. Memmler. 1943. Growth in the western blue-tailed skink. Transactions of the San Diego Society of Natural History 10(3):61-68.

Rolston, Holmes, III. 1981. Values in natures. Environmental Ethics 3: 113-128.

Rosen, P. C. 1987. Variation of female reproduction among populations of Sonoran mud turtles *(Kinosternon sonoriense).* MS Thesis, Arizona State University, Tempe, Arizona.

Rossman, D. A. 1979. Morphological evidence for taxonomic partitioning of the *Thamnophis elegans* complex (Serpentes, Colubridae). Occasional Papers of the Museum of Zoology, Louisiana State University (55):1-12.

Rossman, D. A., and G. R. Stewart. 1987. Taxonomic reevaluation of *Thamnophis couchii* (Serpentes: Colubridae). Occasional Papers of the Museum of Zoology, Louisiana State University (63):1-25.

Rowland, S. D. 1992. Activity, behavior, ecology, and home range of the orange-throated whiptail, *Cnemidophorus hyperythrus beldingi* Cope. MA Thesis, California State University, Fullerton, California.

Ruibal, R. 1959. Ecology of a brackish water population of *Rana pipiens.* Copeia 1959(4): 315-322.

Ruibal, R., L. Tevis, Jr., and V. Roig. 1969. The terrestrial ecology of the spadefoot toad *Scaphiopus hammondii.* Copeia 1969(3):571-584.

Rüthling, P. D. R. 1915. Hibernation of reptiles in southern California. Copeia (19):10-11.

Ruthven, A. G. 1907. A collection of reptiles and amphibians from southern New Mexico and Arizona. Bulletin of the American Museum of Natural History 23(23):483-604.

Salt, G. S. 1952. The bell toad, *Ascaphus truei,* in Mendocino County, California. Copeia 1952(3):193-194.

Sanders, R. M. 1950. A herpetological survey of Ventura County, California. MS Thesis, Stanford University, Stanford, California.

Savage, J. M. 1960. Evolution of a peninsular herpetofauna. Systematic Zoology 9(3-4): 184-211.

Savage, J. M. 1967, Evolution of the insular herpetofaunas. pp. 219-227 In: R. N. Philbrick (editor), Proceedings of the symposium on the biology of the California Islands. Santa Barbara Botanic Garden, Santa Barbara, California.

Savage, J. M., and F. W. Schuierer. 1961. The eggs of toads of the *Bufo boreas* group with descriptions of the eggs of *Bufo exsul* and *Bufo nelsoni.* Bulletin of the Southern California Academy of Sciences 60(2):93-99.

Savage, J. M., and J. B. Slowinski. 1990. A simple consistent terminology for the basic colour patterns of the venomous coral snakes and their mimics. The Herpetological Journal 1(11):530-532.

Schultze, R. F., and G., I. Wilcox. 1985. Emergency measures for streambank stabilization: An evaluation. pp. 59-61 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Schwalbe, C. R., and P. C. Rosen. 1988. Preliminary report on effect of bullfrogs on wetland herpetofaunas in southeastern Arizona. pp 166-173 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Scott, N. J., Jr., and R. D. Jennings. 1989. Our enigmatic leopard frogs. New Mexico Wildlife 34(2):6-9.

Seeliger, L. M. 1945. Variation in the Pacific mud turtle. Copeia 1945(3):150-159.

Semlitsch, R. D. 1983. Burrowing ability and behavior of salamanders of the genus *Ambystoma.* Canadian Journal of Zoology 61(3):616-620.

Seymour, R. S. 1973. Energy metabolism of dormant spadefoot toads *(Scaphiopus).* Copeia 1973(3):435-445.

Shaffer, H. B., and R. Fisher. 1991. Final report to the California Department of Fish and Game; California tiger salamander surveys, 1990--Contract (FG 9422). California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Shaffer, H. B., C. C. Austin, and R. B. Huey. 1991. The consequences of metamorphosis on salamander *(Ambystoma)* locomotor performance. Physiological Zoology 64(1):212-231.

Shaffer, H. B., and S. Stanley. 1992. Final report to California Department of Fish and Game; California tiger salamander surveys, 1991--Contract (FG 9422). California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California.

Shaffer, H. B., C. Austin, and R. Fisher. 1989. The impact of the proposed Route 84 alignment on the California tiger salamander. Unpublished report for Caltrans.

Shaffer, H. B., R. N. Fisher, and S. E. Stanley. 1993. Status report: The California tiger salamander *(Ambystoma californiense).* Final report to the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, California, under Contracts (FG 9422 and FG 1383).

Shaw, C. E. 1948. A note on the food habits of *Heloderma suspectum* Cope. Herpetologica 4(4):145.

Shaw, C. E. 1952. Notes on the eggs and young of some United States and Mexican lizards, I. Herpetologica 8(3):71-79

Shaw, C. E., and S. Campbell. 1974. Snakes of the American West. Alfred A. Knopf, New York, New York.

Shoemaker, V. H., L. McClanahan, Jr., and R. Ruibal. 1969. Seasonal changes in body fluids in a field population of spadefoot toads. Copeia 1969(3):585-591.

Siekert, R. E., Q. D. Skinner, M. A. Smith, J. L. Dodd, and J. D. Rodgers. 1985. Channel response of an ephemeral stream in Wyoming to selected grazing treatments. pp. 276-278 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflictinguses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Slater, J. R. 1931. The mating of *Ascaphus truei* Stejneger. Copeia 1931(2):62-63.

Slater, J. R. 1934. Notes on northwestern amphibians. Copeia 1934(3):140-141.

Slater, J. R. 1939a. Description and life history of a new *Rana* from Washington. Herpetologica 1(6):145-149.

Slater, J. R. 1939b. *Clemmys marmorata* in the state of Washington. Occasional Papers of the Department of Biology, University of Puget Sound (5):32.

Slater, J. R. 1962. Variations and new range of *Clemmys marmorata*. Occasional Papers of the Department of Biology, University of Puget Sound (20):204-205.

Slevin, J. R. 1928. The amphibians of western North America; an account of the species known to inhabit California, Alaska, British Columbia, Washington, Oregon, Idaho, Utah, Nevada, Arizona, Sonora, and Lower California. Occasional Papers of the California Academy of Sciences (16):1-152.

Slevin, J. R. 1930. Further notes on the genus *Ensatina* in California. Copeia 1930(3):77-78.

Smith, R E. 1941. Mating behavior in *Triturus torosus* and related newts. Copeia 1941(4): 255-262.

Smith, H. M. 1946. Handbook of lizards: Lizards of the United States and of Canada. Comstock Publishing Company, Ithaca, New York.

Springer, M. D. 1977. Ecologic and economic aspects of wild hogs in Texas. pp. 37-46 In: G. W. Wood (editor), Research and management of wild hog populations: Proceedings of a symposium. Belle W. Baruch Forest Science Institute, Clemson University, Clemson, South Carolina.

Stabler, D. F. 1985. Increasing summer flow in small streams through management of riparian areas and adjacent vegetation: A synthesis. pp. 206-210 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Stebbins, R. C. 1944. Some aspects of the ecology of the iguanid genus *Uma.* Ecological Monographs 14(3):313-332.

Stebbins, R. C. 1947. Tail and foot action in the locomotion of *Hydromantes platycephalus.* Copeia 1947(1):1-5.

Stebbins, R. C. 1948. Nasal structures in lizards with reference to olfaction and conditioning of inspired air. American Journal of Anatomy 83(2):183-222.

Stebbins, R. C. 1949. Speciation in salamanders of the plethodontid genus *Ensatina.* University of California Publications in Zoology 48(6):377-526.

Stebbins, R. C. 1951. Amphibians of western North America. University of California Press, Berkeley, California.

Stebbins, R. C. 1954a. Natural history of the salamanders of the plethodontid genus *Ensatina.* University of California Publications in Zoology 54(2):47-124.

Stebbins, R. C. 1954b. Amphibians and reptiles of western North America. McGraw-Hill Book Company, New York, New York.

Stebbins, R. C. 1955. Southern occurrence of the Olympic salamander, *Rhyacotriton olympicus.* Herpetologica 11(3):238-239.

Stebbins, R. C. 1958. A new alligator lizard from the Panamint Mountains, Inyo County, California. American Museum Novitates (1883):1-27.

Stebbins, R. C. 1966. A field guide to western reptiles and amphibians. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R. C. 1972. Amphibians and reptiles of California. California Natural History Guides (31). University of California Press, Berkeley, Los Angeles, and London.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Second edition, revised. Houghton Mifflin Company, Boston, Massachusetts.

Stebbins, R. C., and C. H. Lowe. 1951. Subspecific differentiation in the Olympic salamander *Rhyacotriton olympicus.* University of California Publications in Zoology 50(4):465-484.

Stewart, G. R. 1971. Rare, endangered, and depleted amphibians and reptiles in California. Herpetology 5(2):29-35.

Stewart, G. R. 1972. An unusual record of sperm storage in a female garter snake (genus *Thamnophis).* Herpetology 28(4):346-347.

Stone, R. D. 1990. California's endemic vernal pool plants: Some factors influencing their rarity and endangerment. pp. 89-107 In: D. H. Ikeda and R. A. Schlising (editors) Vernal pools plants: Their habitat and biology. Studies from the Herbarium of California State University, Chico (8).

Storer, T. I. 1923. Coastal range of yellow-legged frog in California. Copeia (114):8.

Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-342.

Storer, T. I. 1929. Notes on the genus *Ensatina* in California, with description of a new species the Sierra Nevada. University of California Publications in Zoology 30(16): 443-452.

Storer, T. I. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, *Clemmys marmorata.* University of California Publications in Zoology 35(5):429-441.

Storm, R. M. 1960. Notes on the breeding biology of the red-legged frog *(Rana aurora aurora).* Herpetologica 16(4):251-259.

Sullivan, B. K. 1981. Distribution and relative abundance of snakes along a transect in California. Journal of Herpetology 15(2):247-248.

Sullivan, B. K. 1992. Calling behavior of the southwestern toad*(Bufo microscaphus).* Herpetologica 48(4):383-389.

Sweet, S. S. 1983. Mechanics of a natural extinction event: *Rana boylii* in southern California [abstract]. Program of the 26th Annual Meeting of the Society for the Study of Amphibians and Reptiles and 31st Annual Meeting of the Herpetologist's League at the University of Utah [August 7-12]:93.

Sweet, S. S. 1991. Ecology and status of the arroyo toad*(Bufo microscaphus californicus)* on the Los Padres National Forest of southern California, with management recommendations. Report to United States Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California, under Contract.

Sweet, S. S. 1993. Second report on the biology and status of the arroyo toad *(Bufo microscaphus californicus)* on the Los Padres National Forest of southern California. Report to United States Department of Agriculture, Forest Service, Los Padres National Forest, Goleta, California, under Contract.

Sweet, S. S., and W. S. Parker. 1990. *Pituophis melanoleucus.* Catalogue of American Amphibians and Reptiles:474.1-474.8.

Swenson, E. A., and C. L. Mullins. 1985. Revegetating riparian trees in southwesten floodplains. pp. 135-138 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Swingle, H. S., and E. V. Smith. 1940. Experiments on the stocking of fish ponds. Transactions of the North American Wildlife Conference 5:267-276.

Sype, W. E. 1975. Breeding habits, embryonic thermal requirements and embryonic and larval development of the Cascade frog, *Rana cascadae* Slater. PhD Dissertation, Orego State University, Corvallis, Oregon.

Szaro, R. C., and L. F. DeBano. 1985. The effects of streamflow modification on the development of a riparian ecosystem. pp. 211-215 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Szaro, R. C., S. C. Belfit, J. K. Aitkin, and J. N. Rinne. 1985. Impact of grazing on a riparian garter snake. pp. 359-363 In: R. R. Johnson, C. D. Ziebell, D. R. Patton, P. F. Ffolliott, and R. H. Hamre (technical coordinators), Riparian ecosystems and their management: Reconciling conflicting uses. United States Department of Agriculture, Forest Service, General Technical Report RM-120.

Tanner, W. W. 1943. Notes on the life history of *Eumeces skiltonianus skiltonianus.* The Great Basin Naturalist 4(3-4):81-88.

Tanner, W. W. 1957. A taxonomic and ecological study of the western skink *(Eumeces skiltonianus).* The Great Basin Naturalist 17(3-4):59-94.

Tanner, W. W. 1988. *Eumeces skiltonianus.* Catalogue of American Amphibians and Reptiles:447.1-447.4.

Tevis, L., Jr. 1943. Field notes on a red rattlesnake in Lower California. Copeia 1943(4): 242-245.

Tevis, L., Jr. 1944. Herpetological notes from Lower California. Copeia 1944(1):6-18.

Thorson, T. B. 1955. The relationship of water economy to terrestrialism in amphibians. Ecology 43(1):100-116.

Thorson, T. B. 1956. Adjustment of water loss in response to desiccation in amphibians. Copeia 1956(4):230-237.

Tinkham, E. R. 1951. On the recognition of two Lower California horned lizards. Herpetologica 7(4):169-172.

Tinkham, E. R. 1962. Notes on the occurrence of *Scaphiopus couchi* in California. Herpetologica 18(3):204.

Tinkham, E. R. 1971. The biology of the Gila monster. pp. 387-413 In: W. Bucherl and E. E. Buckley (editors), Venomous animals and their venoms. Volume 2: Venomous vertebrates. Academic Press, New York.

Tollestrup, K. 1979. The ecology, social structure and foraging behavior of two closely related species of leopard lizards, *Gambelia silus* and *Gambelia wislizenii*. PhD Dissertation, University of California, Berkeley, California.

Tollestrup, K. 1981. The social behavior and displays of two species of horned lizards, *Phrynosoma platyrhinos* and *Phrynosoma coronatum*. Herpetologica 37(3):130-141.

Tower, G. H. 1902. The traffic in souvenir toads. Sunset 9(1):18-19.

Turner, F. B. 1958. Life history of the western spotted frog in Yellowstone National Park. Herpetologica 14(2):96-100.

Turner, F. B. 1959a. Pigmentation of the western spotted frog, *Rana pretiosa pretiosa*, in Yellowstone Park, Wyoming. The American Midland Naturalist 61(1):162-176.

Turner, F. B. 1959b. Analysis of the feeding habits of *Rana p. pretiosa* in Yellowstone Park. The American Midland Naturalist 61(2):403-413.

Turner, F. B. 1960. Population structure and dynamics of the western spotted frog, *Rana p. pretiosa* Baird & Girard, in Yellowstone Park, Wyoming. Ecological Monographs 30(3):251-278.

Turner, F. B., and P. C. Dumas. 1972. *Rana pretiosa*. Catalogue of American Amphibians and Reptiles:119.1-119.4.

Turner, F. B., and P. A. Medica. 1982. The distribution and abundance of the flat-tailed horned lizard *(Phrynosoma mcallii)*. Copeia 1982(4):815-823.

Turner, F. B., D. C. Weaver, and J. C. Rorabaugh. 1984. Effects of reduction in windblown sand on the abundance of the fringe-toed lizard *(Uma inornata)* in the Coachella Valley, California. Copeia 1984(2):815-823.

Turner, F. B., J. C. Rorabaugh, E. C. Nelson, and M. C. Jorgensen. 1980. A survey of the occurrence and abundance of the flat-tailed horned lizard *(Phrynosoma mcallii)* in California. Report for the United States Department of the Interior, Bureau of Land Management, Riverside, California, under Contract (YA-512-CT8-58).

Twedt, B. 1993. A comparative ecology of *Rana aurora* Baird and Girard and *Rana catesbeiana* Shaw at Freshwater Lagoon, Humboldt County, California. MA Thesis, Humboldt State University, Arcata, California.

Twitty, V. C. 1941. Data on the life history of *Ambystoma tigrinum californiense* Gray. Copeia 1941(1):1-4.

Twitty, V. C. 1942. The species of California *Triturus.* Copeia 1942(2):65-76.

Twitty, V. C. 1959. Migration and speciation in newts. Science 130(3391):1735-1743.

Twitty, V. C., D. Grant, and O. Anderson. 1967a. Home range in relation to homing in the newt *Taricha rivularis* (Amphibia: Caudata). Copeia 1967(3):649-653.

Twitty, V., D. Grant, and O. Anderson. 1967b. Amphibian orientation: An unexpected observation. Science 155(3760):352-353.

U.S. Department of Commerce. 1990. United States census records, U.S. Department of Commerce, Bureau of the Census, Washington, D.C.

U.S. Fish and Wildlife Service. 1990. Determination of threatened status for the Mojave populations of the desert tortoise. Federal Register, 55(63):12178-12191.

U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; animal candidate review for listing as endangered or threatened species, proposed rule. Federal Register 56(225):58804-58836.

Van Denburgh, J. 1898. Herpetological notes. Proceedings of the American Philosophical Society 37(157):139-141.

Van Denburgh, J. 1922a. The reptiles of western North America; an account of the species known to inhabit California and Oregon, Washington, Idaho, Utah, Nevada, Arizona, British Columbia, Sonora, and Lower California. Volume I. Lizards. Occasional Papers of the California Academy of Sciences (10):1-611.

Van Denburgh, J. 1922b. Thereptiles of western North America; an account of the species known to inhabit California and Oregon, Washington, Idaho, Utah, Nevada, Arizona, British Columbia, Sonora and Lower California. Volume II. Snakes and turtles. Occasional Papers of the California Academy of Sciences (10):615-1028.

Vaughn, S. L. 1987. Update of the desert tortoise *(Gopherus agassizii)* study in the Pichaco Mountains, Arizona. Proceedings of the Desert Tortoise Council 9:60-61.

Vitt, L. J., and R. D. Ohmart. 1978. Herpetofauna of the lower Colorado River: Davis Dam to the Mexican border. Proceedings of the Western Foundation of Vertebrate Zoology 2(2):35-72.

Vitt, L. J., J. D. Congdon, and N. A. Dickson. 1977. Adaptive strategies and energetics of tail autotomy in lizards. Ecology 58(2):326-337.

Vivrette, N. J., and C. H. Muller. 1977. Mechanism of invasion and dominance of coastal grassland by *Mesembryanthemum crystallinum.* Ecological Monographs 47(3):301-318.

Voigt, W. G. 1989. Field survey report search for the California tiger salamander *(Ambystoma tigrinum californiense)* at the Black Diamond Estates Project Site, Antioch, California. Draft Environmental Impact Report submitted by the City of Antioch, Contra Costa County, California.

Von Bloeker, J. C., Jr. 1942. Fauna and flora of the El Segundo sand dunes: 13. Amphibians and reptiles of the dunes. Bulletin of the Southern California Academy of Sciences 41(1):29-38.

Voris, H. K., and J. P. Bacon, Jr. 1966. Differential predation on tadpoles. Copeia 1966(3):594-598.

Waddick, J. W., and H. M. Smith. 1974. The significance of scale characters in evaluation of the lizard genera *Gerrhonotus, Elgaria,* and *Barisia.* The Great Basin Naturalist 34(4): 257-266.

Wake, D. B., and K. P. Yanev. 1986. Geographic variation in allozymes in a "ring species," the plethodontid salamander *Ensatina eschscholtzii* of western North America. Evolution 40(4):702-715.

Wake, D. B., L. R. Maxson, and G. Z. Wurst. 1978. Genetic differentiation, albumin evolution, and their biogeographic implications in plethodontid salamanders of California and southern Europe. Evolution 32(3):465-696.

Wake, D. B., K. P. Yanev, and C. W. Brown. 1986. Infraspecific sympatry in a "ring species," the plethodontid salamander *Ensatina eschscholtzii* in southern California. Evolution 40(4):866-868.

Walker, J. M., and H. L. Taylor. 1968. Geographic variation in the teid lizard *Cnemidophorus hyperythrus.* I. The *caeruleus*-like subspecies. The American Midland Naturalist 80(1):1-27.

Ward, P. S. 1987. Distribution of the introduced Argentine ant *(Iridomyrmex humilis)* in natural habitats of the lower Sacramento Valley and its effects on the indigenous ant fauna Hilgardia 55(2):1-16.

Wasserman, A. O. 1970. *Scaphiopus couchii.* Catalogue of American Amphibians and Reptiles:85.1-85.4.

Watson, R. T., M. J. Prather, and M. J. Kurylo. 1988. Present state of knowledge of the upper atmosphere 1988: An assessment report. NASA Reference Publication (1208), Washington, D. C.

Welsh, H. H., Jr. 1985. Geographic distribution: *Ascaphus truei.* Herpetological Review 16(2):59.

Welsh, H. H., Jr. 1988. An ecogeographic analysis of the herpetofauna of the Sierra San Pedro Mártir region, Baja California: With a contribution to the biogeography of Baja California herpetofauna. Proceedings of the California Academy of Sciences, 4th series, 46(1):1-72.

Welsh, H. H., Jr. 1990. Relictual amphibians and old-growth forests. Conservation Biology 4(3):309-319.

Welsh, H. H., Jr. 1993. A hierarchial analysis of the niche relationships of four amphibians from forested habitats in northwestern California. PhD Dissertation, University of California, Berkeley, California.

Welsh, H. H., Jr., and A. J. Lind. 1988. Old growth forests and the distribution of the terrestrial herpetofauna. pp. 439-458 In: R. C. Szaro, K. E. Severson, and D. R. Patton (technical coordinators), Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, General Technical Report RM-166.

Welsh, H. H., Jr., and A. J. Lind. 1991. The structure of the herpetofaunal assemblage in the douglas-fir/hardwood forests of northwestern California and southwestern Oregon. pp. 394-413 In: L. F. Ruggiero, K. B. Aubry, A. B. Carey, and M. H. Huff (technical coordinators), Wildlife and vegetation of unmanaged douglas-fir forests. United States Department of Agriculture, Forest Service, General Technical Report PNW-285.

Welsh, H. H., Jr., and A. J. Lind. 1992. Population ecology of two relictual salamanders from the Klamath Mountains of northwestern California. pp. 419-437 In: D. McCullough and R. Barrett (editors), Wildlife 2001: Populations. Elsevier Science Publications, Limited, London, England.

Wenner, A. M., and D. L. Johnson. 1980. Land vertebrates on the California Channel Islands: Sweepstakes or bridges? pp. 497-530 In: D. M. Power (editor), The California islands: Proceedings of a multidisciplinary symposium. Santa Barbara Museum of Natural History, Santa Barbara, California.

Wemz, J. G. 1969. Spring mating of *Ascaphus.* Journal of Herpetology 3(3/4):167-169.

Wharton, J. C. 1989. Ecological and life history aspects of the San Francisco garter snake *(Thamnophis sirtalis tetrataenia).* MA Thesis, San Francisco State University, San Francisco, California.

Whitaker, J. O., Jr., D. Rubin, and J. R. Munsee. 1977. Observations on food habits of four species of spadefoot toads, genus *Scaphiopus.* Herpetologica 33(4):468-475.

White, M., and J. A. Kolb. 1974. A preliminary study of *Thamnophis* near Sagehen Creek, California. Copeia 1974(1):126-136.

Whitford, W. G., and V. H. Hutchinson. 1966. Cutaneous and pulmonary gas exchange in ambystomatid salamanders. Copeia 1966(3):573-577.

Wiens, J. A. 1970. Effects of early experience on substrate pattern selection in *Rana aurora* tadpoles. Copeia 1970(3):543-548.

Wilcox, B. A. 1980. Species number, stability, and equilibrium status of reptile faunas on the California Islands. pp. 551-564 In: D. M. Power (editor), The California Islands: Proceedings of a multidisciplinary symposium. Santa Barbara Museum of Natural History, Santa Barbara, California.

Williams, D. F. 1986. Mammalian species of special concern in California. California Department of Fish and Game, Wildlife Management Division Administrative Report (86-1):1-112.

Wilson, L. D. 1970. The coachwhip snake, *Masticophis flagellum* (Shaw): Taxonomy and distribution. Tulane Studies in Zoology and Botany 16(2):31-99.

Wollmuth, L. P., L. I. Crawshaw, R. B. Forbes, and D. A. Grahn. 1987. Temperature selection during development in a montane anuran species, *Rana cascadae*. Physiological Zoology 60(4):472-480.

Woodbury, A. M. 1931. A descriptive catalogue of the reptiles of Utah. Bulletin of the University of Utah, Biological Series (21):1-129.

Woodward, B. D. 1982. Sexual selection and nonrandom mating patterns in desert anurans *(Bufo woodhousei, Scaphiopus couchi, S. multiplicatus* and *S. bombifrons).* Copeia 1982(2):351-355.

Wright, A. H., and A. A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Third edition. Comstock Publishing Company, Ithaca, New York.

Wright, A. H., and A. A. Wright. 1957. Handbook of snakes of the United States and Canada. Volume II. Comstock Publishing Associates, Ithaca, New York.

Wright, J. W. 1966. Predation on the Colorado River toad, *Bufo alvarius.* Hetpetologica 22(2):127-128.

Yanev, K. P. 1978. Evolutionary studies of the plethodontid salamander genus *Batrachoseps.* PhD Dissertation, University of California, Berkeley, California.

Yanev, K. P. 1980. Biogeography and distribution of three parapatric salamander species in coastal and borderland California. pp. 531-550 In: D. M. Power (editor), The California islands: Proceedings of a multidisciplinary symposium, Santa Barbara Museum of Natural History, Santa Barbara, California.

Yanev, K. P., and D. B. Wake. 1981. Genie differentiation in a relict desert salamander, *Batrachoseps campi.* Herpetologica 37(1):16-28.

Yarrow, H. C. 1882. Check list of North American Reptilia and Batrachia with catalogue of specimens in U.S. National Museum. United States National Museum Bulletin (24):1-249.

Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Mayer (compiling editors). 1988. California's wildlife. Volume I. Amphibians and reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California.

Zweifel, R. G. 1952a. Notes on the lizards of the Coronados Islands, Baja California. Herpetologica 8(2):9-11.

Zweifel, R. G. 1952b. Pattern variation and evolution of the mountain kingsnake, *Lampropeltis zonata*. Copeia 1952(3):152-168.

Zweifel, R. G. 1955. Ecology, distribution, and systematics of frogs of the *Rana boylei* group. University of California Publications in, Zoology 54(4):207-292.

Zweifel, R. G. 1968. Reproductive biology of anurans of the arid southwest, with emphasis on adaptations of embryos to temperature. Bulletin of the American Museum of Natural History 140(1):1-64.

Zweifel, R. G. 1977. Upper thermal tolerances of anuran embryos in relation to stage of development and breeding habits. American Museum Novitates (2617):1-21.

Zweifel, R. G., and C. H. Lowe. 1966. The ecology of a population of *Xantusia vigilis,* the desert night lizard. American Museum Novitates (2247):1-57.

APPENDIX I

The budget of the California Department of Fish and Game (CDFG) As Applied to Amphibians and Reptiles

Constraints on the non-game portion of the budget applied directly or indirectly to amphibians and reptiles (in the sense treated in the discussion) are a function of the total CDFG budget. However, interpretation from budget changes is difficult because non-game monies applied to these taxa do not represent a tracked budget category (Appendix Table I) and are drawn from different budget categories (J. Brode and B. Bolster, pers. comm.). Moreover, non-parallel shifts have occurred in the amounts applied to amphibians and reptiles among different budget categories (J. Brode and B. Bolster, pers. comm.). Nevertheless, several considerations based on an understanding of the total budget and changes in tracked budget categories are possible.

First, although the total CDFG budget has increased roughly six-fold since 1970 (see Appendix Table 1), many indications exist that the funding base is deteriorating. These include the fact that since 1978 the total CDFG budget has represented a declining fraction of the total state budget, and has not kept pace with inflation.

Second, except for a decrease in the total CDFG budget between the years 1977-78 and 1978-79, the total budget increased by absolute amounts varying from $76,000 (between 1986-87 and 1987-88) to $16.7 million (between 1984-85 and 1985-86) through 1990 (Appendix Table 1). Most alarming is the fact that for the most recent budget year (1990-1991), the total CDFG budget has decreased by $109,000 over the previous fiscal year.

Third, the Nongame Inland Fisheries budget, which historically contributed the largest segment of amphibian and reptile monies, increased from a small fraction of the total budget (0.17%) in 1970-1971 to fluctuating around 1.0% of total budget in the late 1970s and early 1980s (peaking at 1.3% in 1985-86). In 1990-91, this budget dropped to an all-time low of 0.07% of the total budget and the decrease of $803,000 over the previous fiscal year was the largest ever. It needs emphasis that this only partly reflects what has occurred in the most recent years with nongame monies applied to amphibians and reptiles. Since 1986, two additional budget categories (Nongame Heritage and Total Nongame Monies Spent; see Appendix Table I) have been tracked from which significant monies have been applied to these groups. The Total Nongame Monies Spent category is further complicated because it represents CDFG budget monies combined with monies from outside the total CDFG budget, thus this category cannot be treated as a fraction of the total budget. Nevertheless, the data indicate consistent annual declines in the Total Nongame Monies Spent category since 1987-88 with the greatest decline (2.5 million dollars) occurring between the two most recent fiscal years for which data exist (Appendix Table 1). The Nongame Heritage category did increase in 1990-1, but by an amount ($692,000) more than exceeded by the decrease in the Nongame Inland Fisheries budget.

Although factors contributing to the deteriorating budgetary situation are complex and are beyond the scope of this report to unravel, a number of significant factors contribute. These include:

a) The annual CDFG budget, like the state and federal budgets, is based in part on projections of growth. Expectations of increased income levels exist whether or not growth occurs. Lack of growth contraindicating annual projections have contributed to a funding shortfall and resulted in deficit spending.

Appendix Table I. The annual budget of the California Department of Fish and Game 1970-1991. Data in dollar amounts were extracted from the official Governor's Budget Reports (1973-1993). All figures are based on actual monies spent. The Nongame Inland Fisheries budget is shown separately because it includes expenditures on amphibian and reptiles as well as nongame fishes. Annual totals exclude administrative expenses.

ITEM	1970-71	(%)	1971-72	(%)	1972-73	(%)	1973-74	(%)
Total Budget	21,631,707	(100.00)	23,147,296	(100.00)	25,513,307	(100.00)	28,434,562	(100.00)
Enforcement	6,563,560	(30.34)	6,723,301	(29.05)	7,407,526	(29.03)	8,204,202	(28.85)
Wildlife Management	4,169,987	(19.28)	4,466,447	(19.30)	4,841,465	(18.98)	5,288,030	(18.60)
Inland Fisheries	4,396,463	(20.32)	4,892,026	(21.13)	5,422,149	(21.25)	6,292,484	(22.13)
Anadromous Fisheries	2,494,079	(11.53)	2,816,195	(12.17)	3,112,160	(12.20)	3,336,579	(11.73)
Marine Resources	2,485,855	(11.49)	2,756,481	(11.91)	3,004,266	(11.76)	3,261,501	(11.47)
Environmental Services	1,521,763	(7.03)	1,492,846	(6.45)	1,725,741	(6.76)	2,051,766	(7.22)
Administration	(1,915,470)	(-----)	(1,919,455)	(-----)	(2,066,599)	(-----)	(2,221,057)	(-----)
Nongame Heritage	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Total Nongame Monies Spent	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Nongame Inland Fisheries	36,807	(0.17)	110,166	(0.48)	156,505	(0.61)	190,387	(0.91)

ITEM	1974-75	(%)	1975-76	(%)	1976-77	(%)	1977-78	(%)
Total Budget	32,796,462	(100.00)	36,098,138	(100.00)	39,009,722	(100.00)	43,566,205	(100.00)
Enforcement	9,746,528	(29.72)	10,291,408	(28.51)	11,235,154	(28.80)	13,915,804	(31.94)
Wildlife Management	5,695,628	(17.37)	6,965,253	(19.30)	7,305,207	(18.73)	7,372,003	(16.92)
Inland Fisheries	6,871,652	(20.95)	7,452,483	(20.65)	8,484,157	(21.75)	9,232,987	(21.19)
Anadromous Fisheries	4,340,203	(13.23)	4,396,488	(12.18)	5,040,603	(12.92)	5,083,662	(11.67)
Marine Resources	3,744,456	(11.42)	4,311,351	(11.94)	4,371,450	(11.21)	4,619,431	(10.60)
Environmental Services	2,397,995	(7.31)	2,681,155	(7.43)	2,573,151	(6.60)	3,342,318	(7.67)
Administration	(2,714,019)	(-----)	(2,875,165)	(-----)	(3,068,482)	(-----)	(3,301,561)	(-----)
Nongame Heritage	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Total Nongame Monies Spent	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Nongame Inland Fisheries	299,629	(0.91)	313,693	(0.87)	405,778	(1.04)	479,329	(1.10)

Appendix Table I. The annual budget of the California Department of Fish and Game 1970-1991 (continued). Data in dollar amounts were extracted from the official Governor's Budget Reports (1973-1993). All figures are based on actual monies spent. The Nongame Inland Fisheries budget is shown separately because it includes expenditures on amphibian and reptiles as well as nongame fishes. Annual totals exclude administrative expenses.

ITEM	1978-79	(%)	1979-80	(%)	1980-81	(%)	1981-82	(%)
Total Budget	43,480,197	(100.00)	50,220,500	(100.00)	60,194,000	(100.00)	65,788,000	(100.00)
Enforcement	13,960,639	(32.11)	15,415,782	(30.70)	19,089,000	(31.71)	20,078,000	(30.52)
Wildlife Management	7,552,850	(17.37)	9,021,127	(17.96)	10,893,000	(18.10)	11,621,000	(17.66)
Inland Fisheries	8,883,956	(20.43)	9,356,608	(18.63)	10,600,000	(17.61)	12,232,000	(18.59)
Anadromous Fisheries	5,170,479	(11.89)	7,485,578	(14.91)	8,851,000	(14.70)	12,032,000	(18.29)
Marine Resources	4,763,001	(10.95)	5,079,053	(10.11)	5,972,000	(9.92)	4,807,000	(7.31)
Environmental Services	3,149,272	(7.24)	3,862,352	(7.69)	4,789,000	(7.96)	5,018,000	(7.63)
Administration	(3,480,727)	(-----)	(3,680,248)	(-----)	(2,104,000)	(-----)	(8,700,000)	(-----)
Nongame Heritage	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Total Nongame Monies Spent	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Nongame Inland Fisheries	487,320	(1.12)	506,364	(1.01)	545,364	(0.91)	394,000	(0.60)

ITEM	1982-83	(%)	1983-84	(%)	1984-85	(%)	1985-86	(%)
Total Budget	66,980,000	(100.00)	71,156,000	(100.00)	82,490,000	(100.00)	99,251,000	(100.00)
Enforcement	20,592,000	(30.74)	20,985,000	(29.49)	25,065,000	(30.39)	25,908,000	(26.10)
Wildlife Management	12,329,000	(18.41)	12,596,000	(17.70)	16,378,000	(19.85)	25,434,000	(25.63)
Inland Fisheries	11,983,000	(17.89)	13,782,000	(19.37)	13,966,000	(16.93)	13,740,000	(13.84)
Anadromous Fisheries	11,993,000	(17.91)	12,943,000	(18.19)	15,290,000	(18.54)	21,847,000	(22.01)
Marine Resources	5,231,000	(7.81)	5,442,000	(7.65)	6,245,000	(7.57)	6,712,000	(6.76)
Environmental Services	4,852,000	(7.24)	5,408,000	(7.60)	5,546,000	(6.72)	5,610,000	(5.65)
Administration	(8,960,000)	(-----)	(11,298,000)	(-----)	(11,310,000)	(-----)	(12,852,000)	(-----)
Nongame Heritage	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Total Nongame Monies Spent	-----	(-----)	-----	(-----)	-----	(-----)	-----	(-----)
Nongame Inland Fisheries	631,000	(0.94)	447,000	(0.63)	450,000	(0.55)	1,268,000	(1.28)

Appendix Table I. The annual budget of the California Department of Fish and Game 1970-1991 (continued). Data in dollar amounts were extracted from the official Governor's Budget Reports (1973-1993). All figures are based on actual monies spent. The Nongame Inland Fisheries budget is shown separately because it includes expenditures on amphibian and reptiles as well as nongame fishes. Annual totals exclude administrative expenses.

ITEM	1986-87	(%)	1987-88	(%)	1988-89	(%)	1989-90	(%)
Total Budget	103,244,000	(100.00)	103,320,000	(100.00)	113,106,000	(100.00)	118,798,000	(100.00)
Enforcement	26,746,000	(25.91)	29,864,000	(28.90)	26,989,000	(23.86)	28,614,000	(24.09)
Wildlife Management	16,482,000	(15.96)	14,783,000	(14.31)	16,783,000	(14.84)	19,469,000	(16.39)
Inland Fisheries	17,587,000	(17.03)	19,764,000	(19.13)	22,726,000	(20.09)	23,330,000	(19.64)
Anadromous Fisheries	19,806,000	(19.18)	14,388,000	(13.93)	15,611,000	(13.80)	17,791,000	(14.98)
Marine Resources	7,171,000	(6.95)	8,167,000	(7.90)	7,804,000	(6.90)	9,886,000	(8.32)
Environmental Services	8,772,000	(8.50)	8,789,000	(8.51)	7,246,000	(6.41)	7,756,000	(6.53)
Administration	(15,462,000)	(-----)	(18,947,000)	(-----)	(21,425,000)	(-----)	(22,283,000)	(-----)
Nongame Heritage	6,680,000	(6.47)	7,565,000	(7.32)	11,239,000	(9.94)	8,118,000	(6.83)
Total Nongame Monies Spent	(10,401,000)	(-----)	(17,596,000)	(-----)	(16,488,000)	(-----)	(15,570,000)	(-----)
Nongame Inland Fisheries	484,000	(0.47)	423,000	(0.41)	590,000	(0.52)	882,000	(0.74)

ITEM	1990-91	(%)
Total Budget	118,689,000	(100.00)
Enforcement	29,602,000	(24.94)
Wildlife Management	16,086,000	(13.55)
Inland Fisheries	17,487,000	(14.73)
Anadromous Fisheries	23,953,000	(20.18)
Marine Resources	9,579,000	(8.07)
Environmental Services	10,226,000	(8.62)
Administration	(22,669,000)	(-----)
Nongame Heritage	8,810,000	(7.42)
Total Nongame Monies Spent	(13,061,000)	(-----)
Nongame Inland Fisheries	79,000	(0.07)

b) Total nongame monies available is partly dependent on voluntary contributions, such as the check-off system on the state-tax form and personalized license plate monies. The increasingly severe economic climate, exacerbated by multi-year drought, has led to a decline in voluntary contributions. Moreover, competition resulting from an increase in the number of voluntary check-off items on the state tax form has resulted in a greater partitioning of voluntary contributions from a largely unchanging base. Finally, a decline in confidence in governmental agencies has assisted in curtailing contributions.

c) Total nongame monies available is partly dependent on a funding base linked to game species, largely from monies that result from licensing for hunting and fishing. Changes in this funding base in the last 10 years have declined for two key reasons: A change in attitude about the environment has resulted in a decline in numbers of individuals that hunt or fish, and declines in populations of game species has resulted in hunters or fishermen decreasing their level of these activities within the state, with avid sportsmen increasingly leaving the state to hunt or fish.

d) Total non-game monies available is partly dependent on a funding base linked, like the total CDFG budget, to the state general fund, also a declining funding base. Environmental deterioration in California, exacerbated by the recent, severe multi-year drought, increasingly contributes to a demographic transition in which a greater number of individuals of moderate-to-high income levels leave the state than enter it. Such a transition is helping to slowly erode the state income tax base. Environmental deterioration also contributes to numerous obvious and subtle hidden costs that increasingly burden the general fund from different directions, leaving an ever-smaller segment for CDFG, and consequently, the non-game contribution.

The current economic crisis in California will undoubtedly slow any attempts at reversal of the deteriorating budgetary situation. Yet, several recommendations can be made that will ultimately achieve a reversal, benefiting the entire budgetary base for CDFG, and as a consequence, the non-game segment applied to amphibians and reptiles. These are:

a) Eliminate the pattern of annual budget estimation based on projections of growth, and as a result the anticipation of increased funding that leads to deficit spending. The realization must be arrived at that an adequate level of environmental quality and the general of quality of life in California requires a population cap. As a consequence, the state funding base can not longer be expected to increase as a function of the population. If any increases in the CDFG budget occur, they will have to result from funding innovations that are largely population-independent.

b) To the greatest extent possible, the nongame portion of the CDFG budget, and perhaps the entire budget, should be decoupled from the vagaries of the political and social climate. It should be recognized that the health of humans and game and non-game species alike are inextricably linked to environmental quality. This linkage should be reflected in a budget that represents a significant, but fixed proportion of the state budget, whatever that might be. Such an emphasis would reflect the responsibility of the entire human population of the state for maintenance of environmental quality. Voluntary contributions and license-generated funding should ultimately be viewed as supplemental, and should add to, rather than be necessary to fill out, various segments of the CDFG budget.

c) Game species should not be favored over non-game species within the new budget construct. Based on numbers alone, although awareness continues to increase, nongame species are currently highly de-emphasized. If emphasis on a taxon occurs, it should reflect environmental sensitivity or the degree to which that taxon controls greater energy

flow in an ecosystem or is a keystone taxon. Ultimately, the artificial dichotomy of game and nongame species should be eliminated.

d) Novel sources of funding should be linked to CDFG's responsibility in the management of all animal taxa, such as the potentially significant funding that could be generated as the result of recouping lost biological data (see secondary recommendation #9 in discussion).

Implementation of the aforementioned reforms will, no doubt, result in a long, likely tortuous transitory period. Yet, if implemented, they will result in significantly decrease costs that are currently the result of ignorance of the linkage between environmental quality, human welfare, and the array of other species (both game and nongame). Among the most important is that currently, a full one quarter of the CDFG budget is allocated to enforcement. If the human population of the state takes greater responsibility by paying for a significant, but fixed CDFG budget, the enforcement segment of the budget, as awareness increases, will be guaranteed to decrease to a much lower level. Many other positive feedbacks of this effect are possible.

APPENDIX II

The working list of taxa submitted with the questionnaire (see Appendix III). This list includes all taxa suggested as possible candidates for special status or potential listing as threatened or endangered.

List of Species for Consideration as Special Concern

Species are listed according to Jennings (1987. Special Publication, Southwestern Herpetologists Society (3):1-48). Species currently listed as being of "Special Concern" by the State of California are denoted by an asterisk (*).

Ambystomatidae:

____1) California tiger salamander	*Ambystoma californiense**

Dicamptodontidae:

____2) Pacific giant salamander	*Dicamptodon ensatus*
____3) Olympic salamander	*Rhyacotriton olympicus variegatus*

Salamandridae:

____4) Red-bellied newt	*Taricha rivularis*

Plethodontidae:

____5) Inyo Mountains salamander	*Batrachoseps campi**
____6) Channel Islands slender salamander	*Batrachoseps pacificus pacificus**
____7) Relictual slender salamander	*Batrachoseps pacificus relictus*
____8) Breckenridge Mt. slender salamander	*Batrachoseps* sp.
____9) Fairview slender salamander	*Batrachoseps* sp.
___10) Guadalupe slender salamander	*Batrachoseps* sp.
___11) Hell Hollow slender salamander	*Batrachoseps* sp.
___12) Kern Plateau slender salamander	*Batrachoseps* sp.
___13) San Gabriel slender salamander	*Batrachoseps* sp.
___14) Yellow-blotched salamander	*Ensatina eschscholtzii croceater**
___15) Large-blotched salamander	*Ensatina eschscholtzii klauberi*
___16) Mount Lyell salamander	*Hydromantes platycephalus**
___17) Owens Valley web-toed salamander	*Hydromantes* sp.
___18) Dunn's salamander	*Plethodon dunni**
___19) Del Norte salamander	*Plethodon elongatus elongatus**

Ascaphidae:

___20) Tailed frog	*Ascaphus truei*

Pelobatidae:

___21) Couch's spadefoot	*Scaphiopus couchii*
___22) Western spadefoot	*Scaphiopus hammondii**
___23) Great Basin spadefoot	*Scaphiopus intermontanus*

Bufonidae:

___24) Colorado River toad	*Bufo alvarius**
___25) Yosemite toad	*Bufo canorus**
___26) Great Plains toad	*Bufo cognatus*
___27) Arizona toad	*Bufo microscaphus microscaphus**
___28) Arroyo toad	*Bufo microscaphus californicus**
___29) Red-spotted toad	*Bufo punctatus*

Appendix II. List of Species for Consideration as Special Concern (continued).

Hylidae:

___30) California treefrog	*Pseudacris (=Hyla) cadaverina**

Ranidae:

___31) Northern red-legged frog	*Rana aurora aurora**
___32) California red-legged frog	*Rana aurora draytonii**
___33) Foothill yellow-legged frog	*Rana boylii**
___34) Cascade frog	*Rana cascadae*
___35) Mountain yellow-legged frog	*Rana muscosa*
___36) Northern leopard frog	*Rana pipiens*
___37) Spotted frog	*Rana pretiosa**
___38) Lowland leopard frog	*Rana yavapaiensis*

Kinosternidae:

___39) Sonoran mud turtle	*Kinosternon sonoriense sonoriense*

Emydidae:

___40) Southwestern pond turtle	*Clemmys marmorata pallida**

Testudinidae:

___41) Desert tortoise	*Xerobates (=Gopherus) agassizii**

Gekkonidae:

___42) Peninsular leaf-toed gecko	*Phyllodactylus xanti nocticolus**

Iguanidae:

___43) Baja collared lizard	*Crotaphytus insularis vestigium*
___44) Long-nosed rock lizard	*Petrosarus mearnsi mearnsi*
___45) San Diego horned lizard	*Phrynosoma coronatum blainvillii**
___46) California horned lizard	*Phrynosoma coronatum frontale*
___47) Pigmy short-horned lizard	*Phrynosoma douglassii douglassii*
___48) Flat-tailed horned lizard	*Phrynosoma mcallii**
___49) Western chuckwalla	*Sauromalus obesus obesus**
___50) Yellow-backed spiny lizard	*Sceloporus magister uniformis*
___51) Granite spiny lizard	*Sceloporus orcutti*
___52) Colorado Desert fringe-toed lizard	*Uma notata notata**
___53) Mojave fringe-toed lizard	*Uma scoparia*

Xantusiidae:

___54) Granite night lizard	*Xantusia henshawi henshawi**
___55) Sandstone night lizard	*Xantusia henshawi gracilis**
___56) Sierra night lizard	*Xantusia vigilis sierrae**

Teiidae:

___57) Belding's orange-throated whiptail	*Cnemidophorus hyperythrus beldingi**

Anguidae:

___58) Panamint alligator lizard	*Elgaria panamintina**

Anniellidae:

___59) Silvery legless lizard	*Anniella pulchra pulchra**
___60) Black legless lizard	*Anniella pulchra nigra**

Appendix II. List of Species for Consideration as Special Concern (continued).

Helodermatidae:	
___61) Banded Gila monster	*Heloderma suspectum cinctum**
Leptotyphlopidae:	
___62) Southwestern blind snake	*Leptotyphlops humilis humilis*
Boidae:	
___63) Desert rosy boa	*Lichanura trivirgata gracia**
___64) Coastal rosy boa	*Lichanura trivirgata roseofusca**
Colubridae:	
___65) Sharp-tailed snake	*Contia tenuis*
___66) Baja California rat snake	*Elaphe rosaliae*
___67) Sierra mountain kingsnake	*Lampropeltis zonata multicincta**
___68) Coast mountain kingsnake	*Lampropeltis zonata multifasciata**
___69) San Bernardino mountain kingsnake	*Lampropeltis zonata parvirubra**
___70) San Diego mountain kingsnake	*Lampropeltis zonata pulchra**
___71) St. Helena mountain kingsnake	*Lampropeltis zonata zonata**
___72) San Joaquin whipsnake	*Masticophis flagellum ruddocki**
___73) Santa Cruz gopher snake	*Pituophis melanoleucus pumilus**
___74) Coast patch-nosed snake	*Salvadora hexalepis virgultea*
___75) Hammond's two-striped garter snake	*Thamnophis hammondii hammondii*
___76) South Coast garter snake	*Thamnophis sirtalis* sp.
___77) Sonoran lyre snake	*Trimorphodon biscutatus lambda*
___78) California lyre snake	*Trimorphodon biscutatus vandenburgi**
Viperidae:	
___79) Western diamondback	*Crotalus atrox*
___80) Red diamond rattlesnake	*Crotalus ruber ruber*

APPENDIX III

Copy of Cover Letter and Questionnaire:

10 October 1988

Dear :

We are currently reviewing the status of third category amphibian and reptile taxa (i.e., species of special concern) for the State of California. As one who has either, or both of, current or past field experience with one or more of the taxa being considered, we would like the benefit of your ideas and opinions. We cannot overemphasize that our ability to refine the quality of this review will remain limited without input from you; being among a handful of people with direct experience with, or knowledge of, each of these species. These last two decades have seen significant advances in increasing environmental awareness, yet the understanding of many California amphibians and reptiles, particularly with respect to their basic ecology and their importance in local communities and ecosystems, remains limited. With widespread habitat modification, your contribution to the understanding of these species, in particular where that contribution could benefit management, is urgent. It is especially so if we are to have some expectation that most species will be present for future generations to appreciate and study. We firmly believe that we can increase the objectivity of our recommendations and information by distilling information from a maximum number of sources, so we encourage you to take the time to respond carefully to this questionnaire as promptly as your schedule will allow.

Find enclosed a preliminary list of species under consideration [see Appendix II]. We emphasize the preliminary nature of this list because data collected in this review are likely to change list composition and one of the objectives of this review is to provide recommendations for changes in status of respective taxa. The array of possible recommendations for changes in status within the scope of our review are: 1) no change from a species' current status, 2) an upgrade from no listing to special concern or from special concern to either threatened or endangered, and 3) a downgrade either from special concern to no listing or from threatened or endangered to special concern. It is because of the aforementioned changes in status that the list contains a number of species that are not special concern according to the current state listing. The preliminary list does not include currently listed threatened or endangered species since we anticipate few or no downgrades to a special concern status. Still, for the sake of completeness, we consider downgrades possible and you should refer to the most current state listing of threatened and endangered species if presenting data supporting a downgrade. We also welcome suggestions of additional species that based on the data you have, you feel should be listed.

In reviewing the status of third category amphibian and reptile taxa for California, we have several objectives. These objectives are: 1) to identify and characterize the range of extant populations of each taxon; 2) to provide some indication of whether the current range differs significantly from the historic range; 3) to suggest the reasons for change, if any, between the current and historic ranges; 4) to provide some indication of the habitat variables crucial to each taxon; 5) to suggest how management should be implemented to the greatest benefit of each taxon; 6) to indicate gaps in knowledge for each taxon in each of the categories indicated previously; and 7) to recommend a status change as discussed above. The questions we ask are directed at addressing these objectives.

Appendix III (continued)

We realize that some of you may have concerns as to the release of data that might be used by individuals to collect animals from extant populations of reviewed taxa or as to the release of data not yet published. We wish to provide assurances that the details of any data released to us in confidence will not be revealed, but that we will be making interpretations, drawing conclusions, and making summary recommendations based, in part, on these data. Because one of the purposes behind this review is to help fill gaps in the data possessed by the California Department of Fish and Game-The Nature Conservancy Natural Heritage Data Base for California, we will be sending information to the Data Base from those contributions that are willing to have their data released through us. If you do not wish us to release your information to the Data Base, we would hope that you will provide it to them yourself, preferably as soon as possible. Regulatory agencies often query the Data Base for listed species that occur within large-scale development projects. If the Data Base lacks such information for special concern amphibians and reptiles, a greater probability will exist that even more of the remaining habitat for such species will be eliminated. Thus, it is important that the Data Base be provided with current information.

We want to thank you in advance for taking the time to response to this questionnaire. Only with your contributions can this review be truly realized. Please return your questionnaire to Mark Jennings at the Davis address. We look forward to hearing from you soon.

Sincerely,

Mark R. Jennings
Research Associate
California Academy of Sciences
1830 Sharon Ave
Davis, CA 95616-9420
Telephone: (916) 753-2727

Marc P. Haves
Department of Biology
P.O. Box 249118
University of Miami
Coral Gables, FL 33124-9118
Telephone: (305) 665-2291
(305) 667-2761

Encl: questionnaire

Appendix. III (continued).

QUESTIONNAIRE

AMPHIBIAN AND REPTILE SPECIES
OF SPECIAL CONCERN IN CALIFORNIA

1) Verify that your name and address as indicated in our cover letter to you is correct. In addition, please provide us with the nine-digit zip code for your area (if you have not already done so and one exists), your phone number(s) (include your area code), and some minimum series of hours during the week at which time it would be convenient for us to contact you should the need arise. It is essential that we have this information in order to help organize the array of information provided by the many contributors in a sensible fashion. It will be particularly important where we need to have you elaborate on the data you provide or follow-up on sources of information.

2) Check off and number the taxa on which you will be providing data on the enclosed list. If you have reason to include taxa not on that list, please add them. However, **please restrict your list to taxa that you feel should have special concern status,** whether or not these taxa currently have that status. **Please also restrict your list to taxa with which either you have had direct field experience or your own experience indicates that said taxa have disappeared at localities where evidence of their historical occurrence exists.** In the event you feel the data you have to provide is too voluminous to handle in the questionnaire format we have provided, and you would be willing to arrange a meeting with us to discuss those data, please indicate so and we will contact you.

3) For each taxon you have listed, list any localities for which you are providing data alphabetically by county and locality specifics. **Please be as specific as you can;** we will do randomized update checks of some localities in the course of fieldwork associated with this review. For each locality, wherever possible, provide the time of day and time interval (search effort) involved in the sighting, any specific sampling methods that may have been used (if applicable), the number of individuals observed or captured, whether individuals of the observed taxon were adults, juveniles, or some other life stage (if this could be distinguished), and a statement of condition of the habitat relative to said taxon. If a locality or localities were visited in a haphazard fashion not linked to any particular sampling regime, state so. Finally, indicate for each sighting whether museum specimens, photographs, or other individuals that were with you at the time of the sighting are available to corroborate the record. We do not include this to discourage listing of sight records you may have, rather it is simply better if the records you provide have some way in which they can be corroborated.

4) Available evidence indicates that some taxa for which you will be reporting data have gone locally extinct. Since one important objective of our review is to establish historical trends, we are particularly interested in you indicating whether or not a particular record or sighting is **the most recent one** you know of or have for a particular locality. Please be as specific as possible with dates; day, month, and year is best, when available.

Appendix III (continued)

5) If the data you report is suggestive of decline for a particular taxon, please indicate what is (are) the likely factor(s) causal in decline. **Please be as specific as possible.** If you indicate that habitat alteration appears to be causal, specify what type of habitat alteration (e.g., removal of riparian vegetation). Further, if a specific type of removal of riparian vegetation was done, state so. Also try to focus, if possible, on the aspect of alteration that may be negatively affecting the taxa you discuss. If data, from whatever source or aspect or aspect exist to support your contention, provide the support or state the source. We are equally interested how habitat alteration may be physiologically as well as ecologically stressing said taxa, so your suggestions and opinions are also important. **Remember, if no data are available at whatever level, state so, but we still want your suggestions as to the most likely factors that may be negatively affecting the taxa you discuss.**

6) For each taxon you discuss, indicate the elements of habitat variation that appear to be crucial to its survival. Partition habitat elements into those important for mating, nesting or oviposition, hibernation, and refuges for developmental stages, juveniles, or adults, if these differ or are applicable in each case. If data are unavailable to understand either the elements of habitat variation crucial to a taxon's survival or to allow the partition of those elements with respect to the aspects of the life history listed above, state so. Please indicate the data source for the information you state, whether it be your own opinions, observations, systematically collected data, or literature. If the latter, please indicate one or two of the **most recent** references that apply.

7) Most of you reporting data have some kind of local or regional domain in which you may come into contact with individuals knowledgeable about amphibians and reptiles that are, or should be, of special concern or reports (i.e., the so-called "gray literature" including county surveys, environmental impact statements, biological surveys of military bases, national, state, and regional parks or monuments, and other regional reports) that may contain information important to our review. Please list for us any such individuals or reports as you may know of and provide us with a minimum of information as to how we might contact these individuals or gain access to the reports or records. We have some knowledge of such data, but nevertheless, it is best to treat us as naive with respect to the aforementioned information. That will insure we miss fewer potential sources of data that should have been examined. Again, if you feel the information you have to provide is too voluminous, state so and we will contact you regarding this information.

8) Although we have asked you to indicate above if no data exist in certain areas for discussed taxa, we feel the gaps in data may exceed the areas we have indicated. If you have any particular strong feelings as to gaps in data for certain taxa that were not covered by our inquiry, or broader studies that include these taxa that are imperative to be done to better understand them, please elaborate on these gaps and needed studies here.

9) Please recommend a status change according to the categories provided in our cover letter for each taxon you discussed. Also provide some indication of how strongly you feel about your recommendation based on available data.

10) We are attempting to be as thorough as possible, but we, may have omitted covering areas that are important to this review. Thus, we ask you to please indicate to us any areas that we have overlooked that you feel are important. Do not hesitate to provide any strongly held opinions about what we should add, delete, or change, or in general, as to what this review should provide.

APPENDIX IV

Individuals Who Were Mailed Questionnaires:

Benjamin H. Banta, James E. Berrian, Sean J. Barry, Harold E. Basey, Elinor S. Benes, Kristen H. Berry, Robert L. Bezy, Charles M. Bogert, Raymond J. Bogiatto, Michael C. Bondello, Jeffrey Boundy, David F. Bradford, Arden H. Brame, Jr. II, Bayard H. Brattstrom, John M. Brode, Edmund D. Brodie, Jr., Charles W. Brown, Charles J. Brown, Jr., R. Bruce Bury, Janalee P. Caldwell, Mark L. Caywood, Henry E. Childs, Jr., Frank S. Cliff, Arthur L. Cohen, Nathan W. Cohen, James P. Collins, Paul W. Collins, Lawrence Cory, Harold F. DeLisle, Mark A. Dimmitt, James R. Dixon, C. Kenneth Dodd, Jr., James W. Dole, Stan Elam, F. Edward Ely, Richard E. Etheridge, Colin D. S. Fagan, Gary M. Fellers, Timothy J. Ford, Martin J. Fouquette, Jr., Thomas H. Fritts, Anthony J. Gaudin, Derham Giuliani, Stephen R. Goldberg, Ronald Gonzales, David A. Good, David M. Graber, Joe Gorman, Harry W. Greene, L. Lee Grismer, Donald E. Hahn, George H. Hanley, George E. Hansen, Robert W. Hansen, Lester E. Harris, Jr., David M. Hillis, Dan C. Holland, Warren J. Houck, Jeffrey M. Howland, Arthur C. Hulse, Donald Hunsaker II, Lawrence E. Hunt, John B. Iverson, David L. Jameson, Cynthia Kagarise Sherman, John P. Karges, Roger Lederer, Robert L. Livezey, Michael C. Long, Roger A. Luckenbach, David L. Martin, Paul E. Maslin, Wilbur W. Mayhew, Samuel M. McGinnis, Brian M. McGurty, Joseph C. Medeiros, Philip A. Medica, Richard R. Montanucci, David J. Morafka, Steven R. Morey, Martin L. Morton, Robert W. Murphy, Thomas F. Newman, Velma Nile, Kenneth S. Norris, Ronald A. Nussbaum, Richard O'Grady, Robert D. Ohmart, John R. Ottley, Theodore J. Papenfuss, James E. Platz, Edwin P. Pister, Gregory K. Pregill, Theodore A. Rado, Martin G. Raphael, Thomas L. Rodgers, Aryan I. Roest, Douglas A. Rossman, Martin B. Ruggles, Rudolfo Ruibal, Stephen B. Ruth, Robert B. Sanders, Alan A. Schoenherr, Cecil R. Schwalbe, Norman J. Scott, Jr., H. Bradley Shaffer, Wade C. Sherbrooke, Robert C. Stebbins, Glenn R. Stewart, Brian K. Sullivan, Samuel S. Sweet, Lloyd P. Tevis, Jr., Kristine Tollstrup, Walter Tordoff III, Frederick B. Turner, Velma J. Vance, Jens V. Vindum, Laurie J. Vitt, David B. Wake, Hartwell H. Welsh, Jr., Daniel C. Wilhoft, J. W. (Jay) Wright, John W. Wright, R. Peter Yingling, Gary Zahm, and Richard G. Zweifel.

Other Individuals Who Were Contacted For Information:

Kevin S. Baldwin, Gerald Barden, Richard D. Beland, Gary Bell, Albin R. Bills, Peter Bloom, Norris Bloomfield, Betsy C. Bolster, William L. Brisby, Philip R. Brown, Slader G. Buck, Robin A. Butler, Sheila Byrne, Beverly Clark, Joseph F. Copp, Stephen P. Corn, James Cornett, Kenneth S. Croker, William R. Dawson, James E. Deacon, Al Denmston, William A. Dill, Mark Dodero, George Drewry, Wade L. Eakle, Todd C. Esque, Roger Farschon, Sheri Fedorchak, Robert N. Fisher, William E. Frost, Michael M. Fuller, Robyn Garcia, Richard E. Genelly, John D. Goodman, David M. Graber, Michael P. Hamilton, Thomas E. Harvey, Charles P. Hawkins, John Hendrickson, Arthur C. Hulse, Randy D. Jennings, Mark C. Jorgensen, Ernest L. Karlstrom, Steve Klett, F. Thomas Knefler, Mike Krause, Pete N. Lahanas, Robert C. Lewis, Eric Lichtwardt, Leslie E. Long, William E. Loudermilk, Charles H. Lowe, Jr., Greg Martinsen, William J. Mautz, Michael E. McCain, Clinton W. McCarthy, Alan M. McCready, Roy W. McDiarmid, Darline A. McGriff, Pat McMonagle, William L. Minckley, Peter B. Moyle, Stephen J. Myers, Kimberly A. Nicol, Mary E. Rasmussen, Galen B. Rathbun, Stephen M. Reilly, James C. Rorabaugh, Philip C. Rosen, Ronald Ruppert, Nancy H. Sandburg, Georgina M. Sato, Nancy Sirski, Joseph P. Skorupa, Todd M. Steiner, Jerry J. Smith, Michael J. Sredl, George Sturdinski, Camm C. Swift, Thomas L. Taylor, Brian K. Twedt, Robert Van De Hoek, Jared Verner, Elden H. Vestal, Dana L. Waters, William O. Wirtz II, Annemarie Woessner, Karen Worcester, Ronald J. Woychak, and Richard L. Zembal.

APPENDIX V

Definitions of "Endangered" and "Threatened" Species Based on the 1991 Fish and Game Code of the State of California

CHAPTER 1.5. ENDANGERED SPECIES

Section 2062. "Endangered species" defined.

"Endangered species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease. Any species determined by the commission as "endangered" on or before January 1, 1985, is an "endangered species."

Section 2067. "Threatened species" defined.

"Threatened species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as "rare" on or before January 1, 1985, is a "threatened species."

SJM BIOLOGICAL CONSULTANTS

12 January 2011 SJMBC.812

Jeff Crain
BonTerra Consulting
151 Kalmus Drive, Suite E-200
Costa Mesa, CA 92626
(714) 444-9199

SUBJECT: Results of a habitat assessment and trapping survey for three target sensitive small mammals, including: the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR); the federally endangered Stephens' kangaroo rat (*Dipodomys stephensi*) (SKR); and the California sensitive (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM), along the proposed alignments for the SCE Lakeview Substation and Transmission Line Project, in the Lakeview area of Riverside County, California (Figures 1 and 2).

Dear Mr. Crain:

This report presents the results of the field investigation described above. The purpose of the habitat assessment and subsequent trapping survey was (a) to confirm the presence/absence of the three species in the proposed project area, and if one or more of these species is present, (b) to assess if the project would result in any impacts to the species.

INTRODUCTION

Project Area

The proposed project area is divided into two sections for the purposes of this report. The **North Section** includes lands located to the north of Ramona Expressway, and encompasses the California Departments of Parks and Recreation Lake Perris Recreation Area (LPRA) and the adjacent California Department of Fish and Game San Jacinto Wildlife Area (SJWA), as well as a small area beyond the northern end of the SJWA. The **South Section** includes lands southward of the Ramona Expressway, and encompasses various cultivated and otherwise disturbed lands, portions of the community of Lakeview, and a short stretch of the channelized San Jacinto River (Figure 2).

Habitat conditions in the **South Section** vary greatly. An expansive deep-sandy cultivated field extends in a long gentle slope from the Ramona Expressway down to the flat lands to the east. The proposed SCE telecommunications project alignment will follow the existing power line that occurs at the edge of this sandy field along Pozos Avenue (see Map 1A in the Edison J025 Field Map Book). This sandy habitat generally ends where the slope reaches the level bottom lands, where soils then become heavier and in some places turn to clays toward the east. Vegetation was essentially absent in the sandy field during the habitat assessment and trapping effort, due to intensive disking. Very small patches of disturbed annual grassland vegetation only occurred at small locations along Pozos Avenue, where vegetation had not been recently disturbed by disking. The sandy field is generally very suitable for and could theoretically be occupied by LAPM, a species which often occur in association with sandy wash systems. However, the long history of intensive disking of this area undoubtedly has eliminated this small pocket mouse in most locations. The edges of this field also could be occupied by SKR, and theoretically by SBKR if the latter species was resident in the area; but again intensive disking appears to have eliminated most or all small mammal activity in this stretch of the alignment.

The flat lands below the sandy fields extend eastward out to and beyond the heavily channelized San Jacinto River, and most of these lands were or recently had been cultivated. During the rainy season many of these lowlands – and especially those toward the San Jacinto River - are very wet and often exhibit pools of water amidst impassable muddy substrates. These lowlands exhibit soils that are generally unsuitable for all of the target species. Farther east beyond the River and associated cultivated fields the alignment traverses some lands that are close to existing private home sites and existing paved roads or well maintained roads. The lands on the east side of the San Jacinto River have been continuously cultivated or otherwise heavily disturbed for many years and any populations of the target species that historically occupied this area would have been eliminated by such disturbances.

In summary, the habitats with the highest potential for the target species occur on the westerly side of the San Jacinto River, and particularly the westerly sandy field and its immediately adjacent habitats.

Habitat conditions in the **North Section** include relatively undisturbed patches of sage scrub and chaparral vegetation, cultivated fields, disturbed annual grasslands, and otherwise disturbed lands. Soils in a great majority of this general area are loamy and suitable for SKR and LAPM. However, sandy soils typically occupied by SBKR are very rare in this section. Most of this area is maintained, and in some cases managed, as recreation/wildlife land for the benefit of wildlife and outdoor enthusiasts. Thus, substrate disturbances are generally limited or are designed to benefit wildlife species.

Stephens' kangaroo rats and Los Angeles pocket mice are known to occur in the general area of the project, as well as within portions of the actual proposed alignments in both the North and South Sections (e.g. Dudek and Associates 2003; Montgomery 2002, 1994; O'Farrell and Uptain 1989; Vergne 2010). San Bernardino kangaroo rats are known to occur outside of the project area, along the San Jacinto River at locations approximately six miles to the east of the project area and beyond (e.g. Montgomery 2010; Vergne 2010). The North Section occurs within the

LPRA/SJWA Core SKR Preserve, while the South Section occurs within the SKR Habitat Conservation Plan Fee Area. (RCHCA 1995).

Proposed Project

In the **South Section**, the proposed project will construct new powerlines to connect from the Proposed Substation to the Valley-Moval 115 kV Subtransmission Line as well as install fiber optic telecommunication lines both underground and overhead (on existing pole)s. In the **North Section**, the project will string fiber optic telecommunication lines on existing power poles that are presently located immediately adjacent to existing dirt roads.

Background on SKR, SBKR and LAPM

SBKR

The SBKR is known to occur in the upper (easterly) sections of the San Jacinto River system. (e.g. see McKernan 1997). The SBKR was emergency listed in 1998 (USFWS 1998a), and then confirmed as "endangered" later that year, by the U.S. Fish and Wildlife Service (USFWS 1998b). A 2011 court decision overturned a 2008 revised Critical Habitat (CR) designation for this species, thereby returning it to its original 2002 version (USFWS 2002). This final Critical Habitat includes portions of Cajon Wash and Lytle Creek alluvial systems, a major part of the eastern portion of Santa Ana River, and the eastern sections of the San Jacinto River up to the area of Hemet. However, the current SCE project area occurs entirely outside of CR for this species.

San Bernardino kangaroo rats are known to prefer habitats characterized by fine sandy soils, alluvial fan sage scrub vegetation, a relatively high percentage of bare (unvegetated or with minimal herb cover) ground and relatively low substrate disturbance by humans. Habitats exhibiting large-grain sandy or loamy soils, sage scrub and/or disturbed annual grassland or even chamise-chaparral vegetation types, a relatively high cover of herbaceous vegetation, and high human disturbance also occasionally harbor this species, but typically only when such conditions occur in close proximity to the more classical preferred habitat types described above (McKernan 1997; S.J. Montgomery, personal observation). Dangers to the long-term survival of this kangaroo rat include a variety of intensive human related disturbances and activities (e.g. sand/gravel mining, dam development and water diversion, housing developments, and agricultural developments) that have greatly reduced the overall area of habitat available to and occupied by this species (USFWS 1998a,b). Habitats suitable for SBKR are very rare in the project area, and no individuals of this species have been captured in proximity to any of the project alignments.

SKR

The Stephens' kangaroo rat is known to occur widely in Riverside County, in a few localities in southwestern San Bernardino County, and at several localities in San Diego County (Montgomery 1991; Montgomery et al. 1996/1997; O'Farrell and Uptain 1989; O'Farrell 1987, O'Farrell et al. 1986; Ogden 1998; SJM Biological Consultants 2003; Thomas 1975, 1973;

USFWS 1997). The SKR is known to occur widely at Perris Lake State Recreation Area and San Jacinto Wildlife Area, and would be expected to occur in nearby lands that have not been heavily and completely disturbed by cultivation or other substrate disrupting activities.

General natural history features and habitat requirements of SKR are fairly well known (O'Farrell 1987, 1990). Habitats occupied by SKR characteristically occur on level to gently sloping terrain, although the species has occasionally been found on relatively steep slopes (e.g. Montgomery 1990; M.J. O'Farrell, pers. comm.). Soils in habitats harboring SKR are typically loamy in nature, while soils dominated by clay or sand very rarely contain this species (Price and Endo 1989; S.J. Montgomery, pers. observ.; O'Farrell 1987; O'Farrell and Uptain 1989).

Stephens' kangaroo rats typically occupy lands described as disturbed annual grassland and characterized by a relatively sparse cover of both shrubs and herbaceous vegetation. Although resident SKR have occasionally been found in relatively dense stands of sage scrub in Riverside County (S.J. Montgomery, pers. observ.), such occurrences are by far the exception to the rule. Occupied habitats commonly exhibit an abundance of bare soil during much of the year. Nonetheless, spring/early-summer flushes of forb (e.g. *Erodium sp.*) growth often temporarily reduce the amount of visible exposed ground. This phase of the yearly cycle of vegetation growth is subsequently transformed by the desiccating forces of the summer season, which cause non-grass herbaceous vegetation (i.e. forbs) to dry up and disarticulate, again revealing the bare ground that is so characteristic of occupied SKR habitat. Reflecting this preference for open ground, a high ratio of forbs to grasses increases the suitability of a grassland for SKR.

Stephens' kangaroo rats are capable of occupying small patches of favorable habitat amidst otherwise unsuitable (e.g. dense grassy) habitats. They also readily use narrow strips of open habitat to move between larger blocks of suitable habitat (S. Montgomery, pers. observ; O'Farrell 1990; Price and Kelly 1992).

As mentioned above, an SKR Habitat Conservation Plan (HCP) was prepared by the Riverside County Habitat Conservation Agency in 1995 (RCHCA 1995). This plan established a number of SKR preserves throughout the species' range in the County, most of which encompass portions of existing public conservation lands such as the PLRA and SJWA. Within the boundaries of the current proposed SCE project, the South Section falls outside of the LPRA and SJWA core SKR preserve but within the SKR Plan Fee Area. The North Section occurs within the LPRA/SJWA core SKR preserve.

For lands that will be developed within the SKR HCP Fee Area, a $900/acre fee typically must be paid to the RCHCA. However, for public utility projects that will only minimally (and largely temporarily) disturb the substrate, and where most or all disturbed substrates can be restored to their original condition, the fee is not required (see Section 10 of Ordinance 663 of the SKR HCP).

LAPM

The LAPM is a California Department of Fish and Game Special Concern Species (CSC), but is not presently listed as endangered or threatened by either the CDFG or U.S. Fish and Wildlife

Service. The species' sensitive status reflects the fact that its populations are declining in distribution and size, which increases their vulnerability to extinction. The goal of the CSC designation is to alert the biological community to a species' declining status and, hopefully, to halt or reverse its decline by addressing the factors responsible for the decline early enough to secure its continued existence.

The range of this species extends from "the Los Angeles Basin, from approximately Burbank and San Fernando in the northwest, to San Bernardino on the northeast, and Cabazon, Hemet and Aguanga on the east and southeast. Its range in the southwest is not clear but probably lies somewhere near the Hollywood Hills" (Williams 1986). Examples of noteworthy LAPM populations that have been confirmed in recent years include the following locations: (a) Lake Perris State Recreation Area and nearby lands (e.g. Dudek 2003; Montgomery 2003); (b) the outflow fan of Massacre Canyon, along the northern edge of the San Jacinto River floodplain just east of Sanderson Avenue (Montgomery 1994); (c) farther east (upstream) from Massacre Canyon in and adjacent to the San Jacinto River floodplain, at the Gilman Springs Bridge and beyond to the area of Soboba Indian Reservation (Montgomery 2002; Montgomery 2010); (d) to the south in the area of Skunk Hollow east of Murrieta Hot Springs (Montgomery 1994); (e) Double Butte County Park to the east of Sun City (Montgomery and Davenport 2005); (f) Aguanga and Vail Lake areas (Dudek and Associates 2003); (g) San Gorgonio Pass area and San Timoteo Canyon (Dudek and Associates 2003; CNDDB records); (h) Santa Ana River Wash west of Alabama Street near Redlands (Montgomery 2009); and (i) Fontana near Etiwanda Avenue and 6th Street (Montgomery 2010). Populations are known from a number of other locations in the County but most of these appear to be limited in size. In general, although the LAPM exhibits a fairly widespread distribution, sizable populations appear to be rare. As a result, this pocket mouse may warrant formal listing as rare or endangered by state of federal conservation agencies.

Habitat conditions at sites harboring this species typical consist of alluvial systems exhibiting fine sandy soils, or areas immediately adjacent to such habitats (Dudek and Associates 2003; Montgomery 1994, 2002). Nonetheless, LAPM also have been captured a considerable distance from distinctly sandy soil habitats, occasionally in sandy loam soils, such as at the San Jacinto Wildlife Area and at March Air Force Base (S Montgomery, pers. observ.). The primary vegetation communities in which LAPM have been found include Riversidean alluvial fan sage scrub, disturbed (non-native) annual grassland and Riversidean sage scrub; however, chamise and red shank chaparral associations also are used by this pocket mouse. Volume II-B of the Riverside County Multiple Species Habitat Conservation Plan contains a thorough treatment of habitat requirements and related information for the LAPM (Dudek and Associates 2003).

METHODS

Habitat Assessment

A habitat assessment for the three target species was conducted along the entire alignment, including both South and North Sections of the project area, on 14-15 and 17 August 2010. The project area and specific alignments were checked for potential or definite signs of kangaroo rats (burrows, scat, tracks) and little pocket mice (diminutive burrows in light soils). Areas with a potential for

the target species were noted on field maps and slated for subsequent final follow up field checks and, where required, live-trapping.

The North Section was considered occupied by both SKR and LAPM in most areas. Furthermore, SKR take is generally not allowed in SKR Core Preserves, and the proposed project was not slated to disturb off-road habitats in this area. Thus, trapping was not considered necessary to the north of Ramona Expressway. In contrast, the non-preserve lands southward of Ramona Expressway did exhibit some habitat areas suitable for and apparently occupied by SKR and LAPM. Therefore, trapping was considered necessary in certain suitable locations to confirm the presence/absence of SKR and LAPM.

Trapping Survey

A trapping program was conducted between 19 and 28-30 October 2010. Large-sized (12") collapsible Sherman live-traps were set out in the late afternoon in each segment and baited with a mixture of millet and sunflower seeds. A long single more or less continuous trap line was set out in suitable habitat areas along and in close proximity to Pozos Avenue and associated roads (see Figure 3). Traps were checked early each subsequent morning. All trapped animals were identified to species and released at the point of capture. A total of 425 trap-nights was accrued during the 4-night survey. Trapping was conducted by Stephen J. Montgomery and Dr. Phil Brylski (USFWS permit TE745541-10 and TE148555-0, respectively, as well as CDFG MOU).

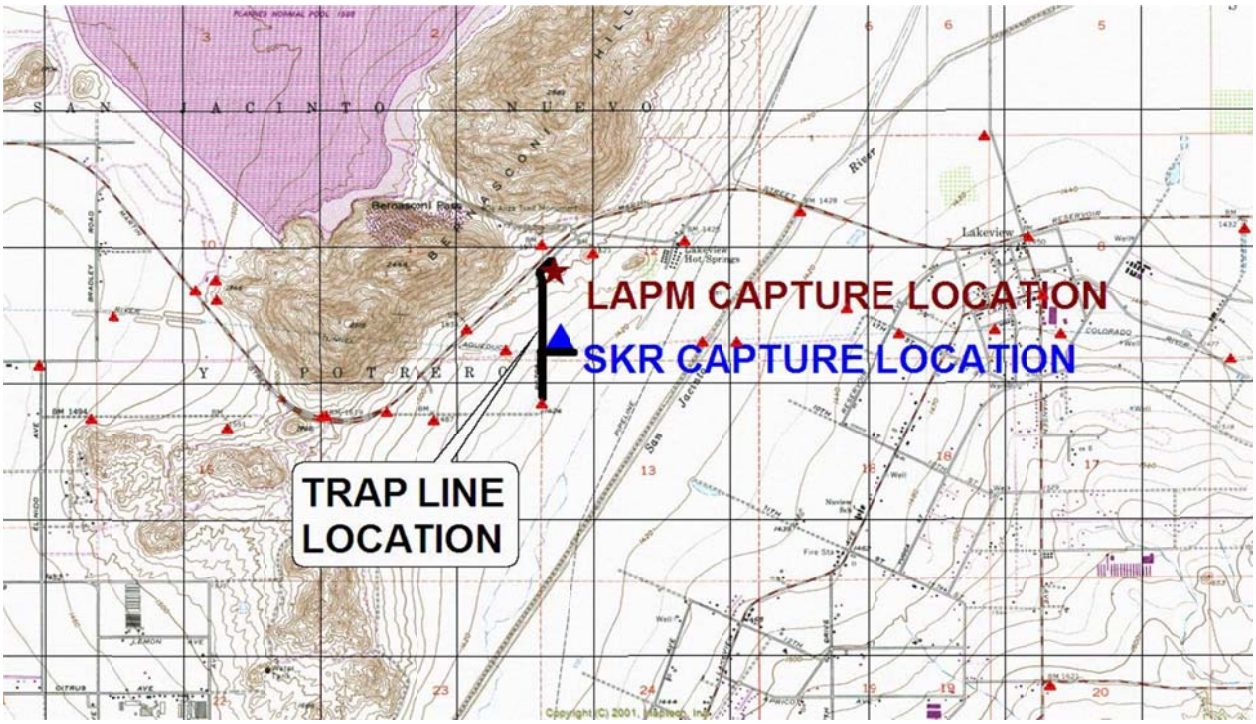

Figure 3. General location of the trap line for the survey for LAPM, SKR and SBKR

RESULTS, EXPECTED IMPACTS and RECOMMENDATIONS

Habitat Assessment

Weather conditions during the habitat assessment included warm to hot air temperatures (75-100F), clear skies and low to moderate wind speeds (0-8mph).

The habitat assessment confirmed the presence of numerous areas of habitat suitable for SKR and LAPM, primarily in the North Section but also in certain areas of the South Section. Areas with some potential for SBKR also were noted. However, sizable blocks of sandy alluvial and alluvial fan sage scrub habitat that typically harbor SBKR were not present in the project area. Thus, it appeared very unlikely that SBKR would be present in the project area; also, no previous field trapping studies in this area had yielded SBKR.

It was determined that no trapping was required in the **North Section** of the project area (northward of Ramona Expressway), for the following reasons. Numerous field trapping surveys in the past 20 years have confirmed the presence of both SKR and LAPM in this area; thus, these two species should be assumed to be present in most/all of this section of the project area. Trapping surveys in this area would only serve to confirm various occupied locations for both species. Furthermore, no take of SKR can occur in the LPRE/SJWA SKR Preserve, and take of LAPM in this Preserve area would require excessive mitigation actions. The proposed project in the North Section will only involve the stringing of fiber optic telecommunication lines on existing poles using vehicles, and these vehicles will remain on existing roads and not disturb adjacent habitats. Following this procedure, minimal mitigation actions would be required in this part of the project area. Nonetheless, a biological monitor would still need to be present for all activities performed in this portion of the project area. A final set of mitigation procedures will be developed for the project, once specific construction methods are finalized.

Proposed project actions in the South Section will include the construction of power poles, which will necessitate disturbances to the substrates at selected pole sites. Such disturbances will definitely or potentially result in the “take” of resident SKR or LAPM at these locations. Some areas proposed for pole installations occur largely in locations that appear to lack LAPM but harbor SKR. The trapping survey confirmed the location of SKR and the location of at least some LAPM in most of the South Section of the project area.

Trapping Survey in the South Section

Weather conditions during the trapping survey included moderate to mild air temperatures (50-65F), 0-100% cloud cover, and low wind speeds (0-3/7). A light drizzle fell during trap pickup on 30 October 2010 (Table 1).

Eight SKR and one LAPM were captured during the trapping survey (Table 2; Figure 3). Two additional species were recorded, including 37 captures of San Diego pocket mice (*Chaetodipus fallax fallax*) and 76 captures deer mice (*Peromyscus maniculatus*) (Table 2). No SBKR were

captured during the trapping survey, and as stated above no evidence of this species was noted during the habitat assessment. Thus, the SBKR appears to be absent in the project area.

The sole LAPM captured during the trapping survey occurred in a narrow patch of relatively undisturbed annual grassland habitat adjacent to the paved frontage road just eastward of Ramona Expressway (Figure 3, Appendix A Photograph). Traps set in other nearby patches of similarly neglected habitat did not yield LAPM; however, individuals of this species may have been present but inactive above ground. This species typically retreats to underground burrows during the fall months (in September or later) and may not reemerge until the spring (e.g. March-April). Due to the late date of the trapping survey during which most LAPM may have been below ground and therefore undetectable, it is recommended that an additional 5-night protocol trapping survey be conducted in appropriate sandy habitats in the South Section in spring 2011 (e.g. from approximately 1 April on) to confirm the results of the fall 2010 trapping effort.

The 8 SKR individuals were captured in a patch of very open minimally disturbed sandy loam habitat at the bottom of the sandy slope at the junction of "unnamed street" and Pozos Avenue (Figure 3; see Page 1A, Edison J025 Field Map Book). Minimal signs of kangaroo rats were observed adjacent to "unnamed street" (an eastward extension of Pozos Avenue) in the flat lowlands near the western end of the alignment shown in Map 2A (Edison J025 Field Map Book), but no captures of kangaroo rats were recorded at this location. Soils here are very fine grained and often saturated during rainy periods.

Vehicular travel and power line installation activities in the **South Section** of the project alignment would very likely negatively affect any Los Angeles pocket mice or SKR inhabiting the particular locations disturbed during project activities. The soils in the westerly portions of this section are soft and vulnerable to collapsing from vehicular or even human weight. LAPM burrows are typically very shallow and particularly vulnerable to crushing.

The LAPM is a covered species in the Riverside County Multi-species Habitat Conservation Plan (Dudek 2003). Project sites harboring this species must (a) preserve 90% of the habitat found to be occupied by this species within the project site, or (b) offset any take at the project site by preserving an equal amount of occupied LAPM habitat at an alternative site that is deemed suitable and acceptable to the RCHCA. Thus, it is recommended that all possible impacts to this species be entirely avoided by avoiding substrate disturbances in habitat areas confirmed as occupied by this species. **A follow up trapping survey in potentially suitable habitats will need to be conducted in spring 2011 in order to finalize the locations occupied by this species. Furthermore, since the distribution of LAPM can be expected to change over time, the results of this trapping survey will only be valid during the 2011 season. Specific guidance for minimizing impacts to LAPM habitat can be provided by a permitted biologist familiar with LAPM natural history and occupied locations in the project area.**

Impacts to SKR in the areas confirmed as occupied by this species (Figure 3) can be largely avoided during construction by (a) limiting the footprint of any ground disturbance, and (b) by relocating pole sites away from occupied habitats. Finally, if it is impossible to avoid certain occupied SKR habitat sites, the following procedures can be followed to minimize take and habitat disturbance of this endangered species.

- Approximately one week prior to pole construction, erect an SKR-impenetrable fence around the proposed pole site, including the entire area that will be disturbed by the pole installation process (details of this fencing and installation will be provided by the project SKR biologist familiar with this mitigation methodology)
- Trap the area inside the fencing until all SKR resident inside the fenced area are captured
- Relocate captured SKR to presently unoccupied but suitable loamy soil habitat in the immediate vicinity of the capture site. The relocation site also will be fenced and a set of artificial burrows will be installed inside the "relocation site" to provide immediate shelter for relocated animals. At least two artificial burrows will be installed for each relocated animal.
- The area disturbed by the pole installation will be rehabilitated to its pre-construction condition, following the directions of the project SKR biologist. A series of artificial burrows will be installed in the restored habitat to serve as habitat for any SKR attempting to recolonize this area. Following completion of the restoration of the original disturbance site, the fencing will be removed from the relocation site, allowing relocated animals to return to their original home site.

Please contact me if you have any questions regarding this report or the associated field effort.

Sincerely,

Stephen J. Montgomery
USFWS Permit TE745541-10

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LITERATURE CITED

Dudek and Associates, Inc. (Dudek). 2003. Western Riverside County Multiple Species Habitat Conservation Plan (Prepared for the Riverside County Integrated Project). Encinitas, CA.

McKernan, R.L. 1997. The status and known distribution of the San Bernardino kangaroo rat (*Dipodomys merriami parvus*): field surveys conducted between 1987 and 1996. Prepared for the U.S. Fish and Wildlife Service, Carlsbad, CA.

Montgomery, S.J. 2010. Results of trapping surveys for San Bernardino kangaroo rats (*Dipodomys merriami parvus*) and Los Angeles pocket mice (*Perognathus longimembris brevinasus*) at the Horseshow Grand Fee to Trust Project Site in Riverside County, California. Prepared for Entrix Corporation and the Bureau of Indian Affairs.

Montgomery, S.J. 2009. San Bernardino kangaroo rat percent area occupied (PAO) survey of the Santa Ana River Wooly Star Preserve Area, May 2009. Prepared for U.S. Army Corps of Engineers, Los Angeles, CA.

Montgomery, S.J. 2003. Presence/absence trapping survey of Stephens' kangaroo rats at an approximately ½-acre site adjacent to the headquarters at Lake Perris State Recreation Area, Riverside County, California. Prepared for Geary Hund, Resource Ecologist, Lake Perris State Recreation Area, Perris, CA.

Montgomery, S.J. 2002. Results of a field assessment for the federally endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*) (SBKR) and the California Department of Fish and Game (CDFG) Species of Special Concern (CSC) Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)(LAPM) for the Caltrans Highway 79/Gilman Springs Road San Jacinto River Bridge Painting Project. Prepared for Chambers Group, Redlands, CA.

Montgomery, S.J. 1994. Trapping and habitat assessment survey for Stephens' kangaroo rats, San Bernardino kangaroo rats and Los Angeles pocket mice, along State Highway 79 between Beaumont and the area of Gilman Springs Road, Riverside County, California. Prepared for Dames and Moore, Santa Ana, CA.

Montgomery, S.J. 1991. Unpublished results of a preliminary trapping survey for Stephens' kangaroo rats on the Guejito Ranch property east of Escondido, San Diego County, California. Prepared for Pacific Southwest Biological Services. National City, CA.

Montgomery, S.J. 1990. Trapping and habitat mapping survey for Stephens' kangaroo rats on the 235-acre Norco Hills Specific Plan, Tentative Tract 25779. Prepared for Windward Development Co. Newport Beach, CA.

Montgomery, S.J., J. Sawasaki, and D. Mitchell. 1996/97. Survey report and addendum for Stephens' kangaroo rat on Marine Corps Base, Camp Pendleton, California. Prepared by Tetra Tech, Inc. San Bernardino, CA.

O'Farrell, M.J. 1990. Stephens' kangaroo rat: natural history, distribution, and current status. Pp 78-84, In P.J. Brant and J. Remington (eds.), Memoirs of the Natural History Foundation of Orange County; Vol. 3, Publ. By Nat. Hist. Found. of Orange County.

O'Farrell, M.J. and C. Uptain. 1989. Assessment of population and habitat status of the Stephens' kangaroo rat (*Dipodomys stephensi*). Calif. Dept. of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section report (July 1989).

O'Farrell, M.J. 1987. Distribution and aspects of the natural history of Stephens' kangaroo rat (*Dipodomys stephensi*) on the Warner Ranch, San Diego County, California. The Wasmann Journ. 45:34-48.

O'Farrell, M.J., S.M. Juarez, and C.E. Uptain. 1986. A new addition to the known range of Stephens' kangaroo rat (*Dipodomys stephensi*) in San Diego County. Calif. Fish and Game 72:187-189.

Ogden (Ogden Environmental and Energy Services). 1998. Stephens' kangaroo rat study for the Ramona Airport Expansion Project, Ramona, California. Prepared for KEA Environmental and County of San Diego Dept. Public Works. San Diego, CA.

Price, M.V. and P.R. Endo. 1989. Estimating the distribution and abundance of a cryptic species, *Dipodomys stephensi* (Rodentia: Heteromyidae), and implications for management. Conserv. Biol. 3:293-301.

Price, M.V. and P. Kelly. 1992. Monthly and lifetime movement distances of Stephens' kangaroo rat (Dipodomys stephensi Merriami). Final Report, Submitted to Riverside County Habitat Conservation Agency (15 January 1992).

RCHCA (Riverside County Habitat Conservation Agency). 1995. Habitat Conservation Plan for the Stephens' kangaroo rat in Western Riverside County, California. (Vol. 1)

SJM Biological Consultants. 2003. Base-wide survey for Stephens' kangaroo rats (Dipodomys stephensi) on Fallbrook Naval Weapons Station, Fallbrook California. Prepared for Robert Knight, Conservation Program Manager, Naval Weapons Station Seal Beach, Detachment Fallbrook, Fallbrook, CA.

SJM Biological Consultants. 2000. 1999-2000 Stephens' kangaroo rat survey on the Lockheed Potrero Creek Property, Beaumont, California. Prepared for Douglas Wood Associates, Newport Beach, CA.

Thomas, J.R. 1975. Distribution, population densities and home range requirements of the Stephens' kangaroo rat (*Dipodomys stephensi*). Unpubl. M.A. Thesis, Calif. State Polytechnic Univ. Pomona, Calif. 64pp.

Thomas, J.R. 1973. Stephens' kangaroo rat survey 1972-73. Calif. Dept. Fish and Game, Special Wildlife Investigations, Job II-54.6. (Final Report)

USFWS (U.S. Fish and Wildlife Service). 2002. Final Designation of Critical Habitat for the San Bernardino Kangaroo. Federal Register 67 (78):19812-19845.

USFWS (U.S. Fish and Wildlife Service. 1998a. Emergency rule to list the San Bernardino kangaroo rat, San Bernardino and Riverside Counties, as endangered. Fed. Regist. 63:3835-38431.

USFWS (U.S. Fish and Wildlife Service. 1998b. Final rule to list the San Bernardino kangaroo rat as endangered. Fed. Regist. 63:51005-51017.

Vergne, P.J. 2010. Personal communication regarding the results of recent trapping surveys for LAPM and SBKR in the SCE project area.

Williams, D.F. 1986. Mammalian species of special concern. Calif. Dept. Fish and Game, Wildlife Manag. Div. Administ. Report 86-1 (June 1986).

Table 1. Weather conditions during the 2010 Lakeview SBKR/SKR/LAPM trapping survey.

Date (2010)	Time	Cloud Cover (%)	Air Temp (°F)	Wind Speed (mph)
19 Oct	1800	100	65	2-7
20 Oct	0630	100	57	0-2
28 Oct	0645	0	51	0
29 Oct	0700	0	53	0
30 Oct	0700	100/light drizzle	50	3

Table 2. Summary of Trap Data, 2010 Lakeview SBKR/SKR/LAPM trapping survey.

	Species			
Date Traps Checked	**SKR**	**LAPM**	**CHFA**	**PEMA**
20 Oct	4AF, 3AM, 1SAM	1AF	11	21
28 Oct			4	13
29 Oct			13	26
30 Oct			9	16
Total	**8**	**1**	**37**	**76**

SKR, Stephens' kangaroo rat (*Dipodomys stephensi*)
LAPM, Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
CHFA, northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)
PEMA, deer mouse (*Peromyscus maniculatus*)
A = adult, SA = subadult
F = female, M = male

APPENDIX A

PHOTOGRAPHS OF THE SOUTH SECTION OF THE PROJECT AREA

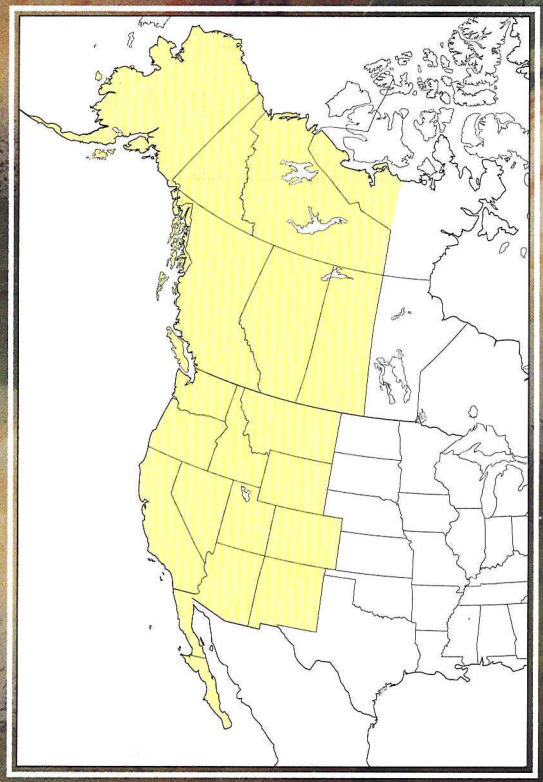
South Section - Location of single LAPM capture in field edge disturbed annual grassland vegetation, immediately eastward of Ramona Expressway

South Section - Sandy fields east of Ramona Expressway that lead down hill (eastward) into the lowlands that exhibit heavier/clay soils, and then farther toward the San Jacinto River in the distance.

SKR and LAPM habitat in the North Section

SKR and LAPM habitat in the North Section

SKR and LAPM habitat in the North Section



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To the late

Raymond B. Cowles,

mentor and friend

SOIL SURVEY OF

Orange County and Western Part of Riverside County, California

United States Department of Agriculture
Soil Conservation Service and Forest Service
in cooperation with
University of California
Agricultural Experiment Station

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1959–73. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1974. This survey was made cooperatively by the Soil Conservation Service and Forest Service and the University of California Agricultural Experiment Station with financial assistance from the County of Orange. It is part of the technical assistance furnished to the Orange County, Riverside-Corona, and Elsinore-Murrieta-Anza Resource Conservation Districts.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms and ranches; in selecting sites for roads, ponds, buildings, and other structures; and in judging the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of the survey area are shown on the detailed map at the back of this publication. This map consists of many sheets made from aerial photographs. Each sheet is numbered to correspond with a number on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

Individual colored maps showing the relative suitability or degree of limitation of soils for many specific purposes can be developed by using the soil map and the information in the text. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussion of the capability unit and the range sites.

Game managers, sportsmen, and others can find information about soils and wildlife in the section "Wildlife Habitat."

Ranchers and others can find, under "Range," groupings of the soils according to their suitability for range, and the names of many of the plants that grow on each range site.

Community planners and others can read about soil properties that affect the choice of sites for dwellings, industrial buildings, and for recreation areas in the section "Engineering."

Engineers and builders can find, under "Engineering," tables that contain test data, estimates of soil properties, and information about soil features that affect engineering practices.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Orange County and Western Part of Riverside County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the information about the area given in the section "Environmental Factors Affecting Soil Use."

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Location of Orange County and the Western Part of Riverside County in California.

SOIL SURVEY OF ORANGE COUNTY AND WESTERN PART OF RIVERSIDE COUNTY, CALIFORNIA

BY JOHN K. WACHTELL

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

ORANGE COUNTY AND THE WESTERN PART OF RIVERSIDE COUNTY are along the Southern California Coast, between Los Angeles County to the north and San Diego County to the south (see facing page). Parts of San Bernardino County and the east boundary line of the Cleveland National Forest in Western Riverside County are the eastern inland boundary. The survey area extends approximately 37 miles along the coast and reaches an average of about 20 to 22 miles inland. It covers an area of about 907 square miles, or 580,994 acres. Approximately 226 square miles, or 144,387 acres, of the Cleveland National Forest, also called the Trabuco Ranger District, Cleveland National Forest, is within the survey area. This district is in the Santa Ana Mountains adjacent to the eastern part of Orange County and the western part of Riverside County.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in the survey area, where they are, and how they can be used. The soil scientists went into the area knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons in a soil. It extends from the surface down into the parent material that has not been changed by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Capistrano and Yorba, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Capistrano sandy loam, 2 to 9 percent slopes, is one of several phases in the Capistrano series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show brushlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen on an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Only one such kind of mapping unit, a soil complex, is shown on the soil map of the survey area.

A soil complex consists of two or more soils, so intricately intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. Generally, the name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Bosanko-Balcom complex, 15 to 30 percent slopes, is an example.

In most areas surveyed there are places where the soil material is so rocky, shallow, or severely eroded

that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called miscellaneous areas and are given descriptive names. Riverwash is an example in the survey area.

While a soil survey is in progress, samples of soils are taken for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all soils.

Soil scientists observe how soils behave when used as a growing medium for native and cultivated plants, and as material for structures, foundations for structures, or covering for structures. They relate this behavior to properties of the soils. For example, they observe that filter fields for onsite disposal of sewage fail on a given kind of soil, and they relate this to the slow permeability of the soil or its high water table. They see that streets, road pavements, and foundations for houses are cracked on a named kind of soil and they relate this failure to the high shrink-swell potential of the soil material. Thus, observations and knowledge of soil properties are used with available research data to predict limitations or suitability of soils for present and potential uses.

After data have been collected and tested for the key, or benchmark, soils in a survey area, the soil scientists set up trial groups of soils. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others. They then adjust the groups according to the results of their studies and consultation. Thus, the groups that finally evolve reflect up-to-date knowledge of the soils and their behavior under current methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Orange County and the Western Part of Riverside County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in an area, who want to compare different parts of an area, or who want to know the location of large tracts that are suitable for a certain kind of land use. Such a map is a useful general guide in managing a watershed, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not a suitable map for planning the management of a farm or field; or for selecting the exact location of a road, building, or similar structure, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in this survey have been grouped into five general kinds of landscapes for interpretive purposes. Each group and the soil associations in that group are described on the following pages. The terms for texture used in the title for several of the associations refer to the texture of the surface layer. For example, in the title of association 1, the words, "silt loams to clays" refer to the texture of the surface layer.

Somewhat Excessively Drained to Poorly Drained, Nearly Level to Moderately Sloping Soils on Alluvial Fans and Flood Plains and in Basins of the Coastal Plains

The four soil associations in this group make up about 39 percent of the survey area. They are on alluvial fans, on flood plains, and in small basins. The soils are somewhat excessively drained to poorly drained loamy sands to clays that formed mostly in mixed alluvium, dominantly from sedimentary rock sources.

Elevation ranges from near sea level to 1,500 feet. The average annual rainfall is 12 to 18 inches, and the average annual air temperature is 59 to 62° F. The frost-free season is 270 to 355 days.

These associations are used extensively for truck crops, specialty crops, and field crops. They are also used extensively for urban purposes.

1. Chino-Omni association

Nearly level, somewhat poorly drained and poorly drained, calcareous silt loams to clays on alluvial fans and flood plains and in basins

This association is mainly in an area about 6 to 9 miles inland from the seacoast, northeast of Costa Mesa. A smaller area is about halfway between Huntington Beach and Sunset Beach. Another small area is on the southwest side of Buena Park. These areas are mainly basins at the lower ends of the flood plains. The soils formed in very deep alluvium. Slopes are 0 to 2 percent. The plant cover is annual grasses, forbs, mustard, and salt-tolerant plants that require moisture. Elevations range from near sea level to 200 feet. The average annual rainfall is 12 to 15 inches, the average air temperature is about 61° F., and the frost-free season is 280 to 350 days.

This association occupies 5 percent of the survey area. It is about 55 percent Chino soils; 35 percent Omni soils; and 10 percent Bolsa, Mocho, and Sorrento soils and Tidal flats.

Chino soils are more than 60 inches deep and are somewhat poorly drained. Most of these soils now have altered drainage, and the water table is deeper than 5 feet. They have a gray silty clay loam surface layer underlain by gray and grayish brown silty clay loam that has some light brownish gray mottles. The underlying material is light gray silty clay loam and sandy clay loam. These soils are moderately alkaline and calcareous throughout.

Omni soils are more than 60 inches deep, are calcareous clay throughout, and are poorly drained. Most of these soils also have altered drainage and a water table deeper than 5 feet, and the saline-alkali salts has been reduced from moderate to slight or none.

They have a gray surface layer underlain by a light gray subsoil with olive brown mottles. The substratum is dark gray and mottled.

These soils are commonly used for celery, tomatoes, and barley. Many areas are now urbanized.

2. *Hueneme-Bolsa association*

Nearly level, poorly drained and somewhat poorly drained, calcareous fine sandy loams, silt loams, and silty clay loams on alluvial fans and flood plains

This association is mainly on flood plains. It extends from Seal Beach southeast to the Santa Ana River and about 10 to 12 miles inland from the coast. The soils formed in very deep alluvium. Slopes are 0 to 2 percent. The plant cover is annual grasses and forbs, mustard, and plants that require moisture. Elevation ranges from 5 to 350 feet. The average annual rainfall is 12 to 15 inches, and the average annual air temperature is 61 to 62° F. The frost-free season is 300 to 350 days.

This association occupies 11 percent of the survey area. It is about 45 percent Hueneme soils; 40 percent Bolsa soils; and 15 percent Chino, Omni, and San Emigdio soils and Tidal flats.

Hueneme soils are more than 60 inches deep and are poorly drained. Most of these soils have altered drainage and a water table deeper than 5 feet. They have a light brownish gray fine sandy loam surface layer underlain by light gray loamy sand. The underlying material is light brownish gray silt loam, loamy fine sand, fine sandy loam, and silty clay loam. Most of this material is mottled. The soils are moderately alkaline and calcareous throughout.

Bolsa soils are more than 60 inches deep and somewhat poorly drained. Most of these soils have altered drainage and a water table deeper than 5 feet. They have a light brownish gray silt loam or silty clay loam surface layer underlain by light brownish gray silt loam and silty clay loam that is mottled in places. They are moderately alkaline throughout and calcareous to a depth of 40 inches or more.

This association is commonly used for truck crops, field crops, and urban development.

3. *Metz-San Emigdio association*

Nearly level, somewhat excessively drained and well drained, calcareous loamy sands and fine sandy loams on alluvial fans and flood plains

This association is mainly on the upper flood plains from the Santa Ana Canyon area west to near Buena Park and Stanton, and southwest to near Garden Grove and the northern part of Santa Ana. Smaller areas also occur on the flood plains near Tustin southeast of Borrego Canyon. The soils formed in very deep alluvium. Slopes are 0 to 9 percent. The plant cover is annual grasses and forbs. Elevation ranges from 10 to 1,500 feet. The average annual rainfall is 12 to 18 inches, the average annual air temperature is about 62° F., and the frost-free season is 270 to 350 days.

This association occupies 14 percent of the survey area. It is about 45 percent Metz soils; about 40 percent San Emigdio soils; and 15 percent Capistrano, Corralitos, Hueneme, Mocho, and Soboba soils and Riverwash.

Metz soils are more than 60 inches deep and are somewhat excessively drained. They have a pale brown loamy sand surface layer underlain by stratified brown, pale brown, and very pale brown loamy sands and sandy loams. They are moderately alkaline and generally calcareous throughout.

San Emigdio soils are more than 60 inches deep and are well drained. They have a light brownish gray fine sandy loam surface layer. The underlying material is stratified, very pale brown, light gray, and pale brown gravelly loamy coarse sand to very fine sandy loam. These soils are moderately alkaline and calcareous throughout.

This association is used for strawberries, citrus, row crops, field crops, and urban development.

4. *Sorrento-Mocho association*

Nearly level to moderately sloping, well drained sandy loams, loams, or clay loams on alluvial fans and flood plains

This association is mainly on the upper flood plains and on alluvial fans near the foothills. Slopes are 0 to 9 percent. The plant cover is annual grasses and forbs and in some areas a few sycamore trees. Elevation ranges from 50 to 700 feet. The average annual rainfall is 12 to 16 inches, and the average annual air temperature is 59 to 62° F. The frost-free season is 270 to 355 days.

This association occupies 9 percent of the survey area. It is about 55 percent Sorrento soils; 35 percent Mocho soils; and 10 percent Bolsa, Botella, Chino, and San Emigdio soils.

Sorrento soils are more than 60 inches deep and are well drained. They have a grayish brown sandy loam, loam, or clay loam surface layer underlain by grayish brown, light brownish gray, and pale brown silty clay loam. They are neutral at the surface and become moderately alkaline and calcareous with increasing depth.

Mocho soils are more than 60 inches deep and are well drained. They have a brown and grayish brown sandy loam or loam surface layer underlain by light brownish gray, brown, and pale brown stratified fine sandy loam, light silty clay loam, and heavy loam. They are moderately alkaline and calcareous throughout.

This association is used for a variety of irrigated crops, for citrus, and urban development.

Moderately Well Drained, Nearly Level to Moderately Steep Soils of the Coastal Terraces

The one soil association in this group makes up about 10 percent of the survey area. It is on terraces, older alluvial fans, and remnants in the coastal foothills. The soils are moderately well drained sandy loams that have a well defined subsoil that developed from sandy sediments.

Elevation ranges from 50 to 1,500 feet. The average annual rainfall is 12 to 20 inches, and the average annual air temperature is about 62° F. The frost-free season is 270 to 350 days.

This association is used mainly for pasture, range, barley, and urban development.

5. *Myford association*

Nearly level to moderately steep, moderately well drained sandy loams that have a strongly developed subsoil; on terraces

This association is mainly along the coastline up to 5 miles inland and along lower edges of the foothills. The soils formed in sandy sediments mostly on marine terraces. They are also on older alluvial fans and terrace remnants in the foothills. Slopes are 0 to 30 percent. The plant cover generally is annual grasses and forbs and in some areas scattered brush. Elevation ranges from 50 to 1,500 feet. The average annual rainfall is 12 to 20 inches and the average annual air temperature is about 62° F. The frost-free season is 270 to 350 days.

This association occupies 10 percent of the survey area. It is about 80 percent Myford soils and 20 percent Capistrano, Chesterton, Marina, and Yorba soils.

Myford soils are moderately well drained. The surface layer is pale brown and pinkish gray sandy loam. The subsoil is brown and light brown sandy clay and sandy clay loam. The substratum is very pale brown sandy loam to a depth of more than 60 inches.

These soils are used mostly for pasture, range, and urban development.

Somewhat Excessively Drained and Well Drained, Strongly Sloping to Very Steep Soils of the Coastal Foothills

The two soil associations in this group make up about 25 percent of the survey area. They are in sedimentary deposits of the coastal foothills.

Elevation ranges from 100 to 4,000 feet. The average annual rainfall is 12 to 25 inches, and the average annual air temperature is 59 to 62° F. The frost-free season is 200 to 350 days.

These associations are used mainly for pasture and range. The better sites are in barley or irrigated citrus. Some areas are used for urban development.

6. *Alo-Bosanko association*

Strongly sloping to steep, well drained clays on coastal foothills

This association is northeast of the coastal terraces in the San Clemente to Corona Del Mar areas to the Santa Ana Mountains; northeast of the flood plains and terraces of the El Toro to the Orange cities area; and north of flood plains and terraces in the Anaheim to Buena Park areas to the Los Angeles and San Bernardino County lines. The soils formed in material weathered from calcareous sandstone and shale. Slopes are 9 to 50 percent. The plant cover consists of annual grasses, mustard, and other forbs. Elevation ranges from 200 to 2,500 feet. The average annual rainfall is 12 to 20 inches, and the average annual air temperature is 59 to 62°F. The frost-free season is 300 to 350 days.

This association occupies 10 percent of the survey area. It is about 55 percent Alo soils; 25 percent Bosanko soils; and 20 percent the Alo variant and Anaheim, Balcom, Calleguas, and San Andreas soils.

Alo soils are well drained. They have a dark grayish brown clay surface layer. At a depth of 24 to 40 inches is weathered shale or sandstone, or both. Bosanko soils also are well drained. They have a dark gray clay surface layer. At a depth of 22 to 38 inches is weathered shale or sandstone or both.

This association is used mostly for barley, pasture, and range. Citrus is grown on some of the better sites. Some areas are used for urban development.

7. *Cieneba-Anaheim-Soper association*

Strongly sloping to very steep, somewhat excessively drained and well drained sandy loams, loams, clay loams, gravelly loams, and cobbly loams on coastal foothills

This association is in the foothills between Corona Del Mar and San Clemente east and northeast to the Santa Ana Mountains, east and northeast of the terraces and flood plains from El Toro to Tustin and Orange, and northeast and north of the terraces and flood plains near Anaheim to Buena Park to the Los Angeles and San Bernardino County lines. The soils formed in material weathered from sandstone, shale, and conglomerate. Slopes are 9 to 75 percent. The plant cover is brush and annual grasses and forbs. Elevation ranges from 100 to 4,000 feet. The average annual air temperature is 59 to 62° F., and the frost-free season is 200 to 350 days.

This association occupies 15 percent of the survey area. It is about 40 percent Cieneba soils; 30 percent Anaheim soils; 15 percent Soper soils; and 15 percent Alo, Balcom, Calleguas, Gabino, Nacimiento, San Andreas, and Yorba soils.

Cieneba soils are somewhat excessively drained. They have a light brownish gray and pale brown sandy loam surface layer 5 to 19 inches thick underlain by soft sandstone.

Anaheim soils are well drained and have a grayish brown loam or clay loam surface layer 20 to 36 inches thick. The underlying material is weathered sandstone or shale or both.

Soper soils are well drained and typically have a brown loam, gravelly loam, or cobbly loam surface layer and a reddish brown gravelly clay loam subsoil. At a depth of 20 to 32 inches is weathered conglomerate or sandstone or both.

This association is used mainly for range. Some areas are used for urban development.

Somewhat Excessively Drained and Well Drained, Strongly Sloping to Very Steep Soils of the Santa Ana Mountains

The one association in this group makes up about 25 percent of the survey area. It is in the mountains, on uplands. The soils are somewhat excessively drained and well drained sandy loams and silt loams that formed in material weathered mostly from granitic, metabasic, and metasedimentary rocks.

Elevation ranges from 1,000 to 4,000 feet. The average annual precipitation, mainly rainfall, is 16 to 25 inches, and the average annual air temperature is about 59°F. The frost-free season is 210 to 300 days.

This association is used mainly for wildlife habitat,

watershed, and recreation and to a limited extent for range.

8. *Friant-Cieneba-Exchequer association*

Strongly sloping to very steep, somewhat excessively drained and well drained fine sandy loams, sandy loams, and gravelly silt loams on mountains

This association consists of soils that formed in material weathered from granitic, metabasic, and metasedimentary rock. Slopes are 9 to 75 percent. The plant cover is mainly brush. Elevation ranges from 1,000 to 4,000 feet. The average annual precipitation, mostly rainfall, is 14 to 25 inches, the average annual air temperature is about 59 to 62°F., and the frost-free season is 200 to 340 days.

This association occupies 25 percent of the survey area. It is about 40 percent Friant soils; about 35 percent Cieneba soils; about 15 percent Exchequer soils; and 10 percent Blasingame, Escondido, Laughlin, Tollhouse, and Vista soils.

Friant soils are somewhat excessively drained. They have a brown fine sandy loam surface layer 9 to 18 inches thick. They are underlain by fractured hard metasedimentary rock.

Cieneba soils are somewhat excessively drained. They have a light brownish gray and pale brown sandy loam surface layer 5 to 19 inches thick. They are underlain by weathered granodiorite. In places rock outcrop and large boulders cover more than 50 percent of the surface area.

Exchequer soils are well drained to somewhat excessively drained. They have a reddish brown gravelly silt loam surface layer 8 to 18 inches thick. They are underlain by fractured metabasic rock. About 10 percent of the surface area is low rock outcrop.

Well Drained, Gently Sloping to Strongly Sloping Soils on Terraces and Alluvial Fans in the Santa Ana Mountains

The one association in this group makes up about 1 percent of the survey area. It is on terraces and alluvial fans and in small narrow valleys on the east side of the Santa Ana Mountains. The soils are well drained sandy loams, gravelly fine sandy loams, or fine sandy loams that formed in alluvium derived mostly from granite.

Elevation ranges from 700 to 1,500 feet. The average annual rainfall is 12 to 16 inches, and the average annual air temperature is about 63°F. The frost-free season is 250 to 280 days.

This association is used for citrus, wildlife habitat, and watershed and to a limited extent for pasture or range.

9. *Ramona-Hanford association*

Gently sloping to strongly sloping, well drained fine sandy loams, gravelly fine sandy loams, and sandy loams on terraces and alluvial fans

This association consists of soils that formed in alluvium derived mostly from granite. Slopes are 2 to 15 percent. The plant cover is mainly brush or light brush, annual grasses, and forbs. Elevation ranges from 700 to 1,500 feet. The average annual rainfall is 12 to 16 inches, and the average annual air temperature is about 63° F. The frost-free season is 250 to 280 days.

This association occupies 1 percent of the survey area. It is about 45 percent Ramona soils; 35 percent Hanford soils; and 20 percent Corralitos, Modjeska, Soboba, and Yorba soils and Riverwash.

Ramona soils are well drained. They have a brown fine sandy loam or gravelly fine sandy loam surface layer. The subsoil is brown sandy clay loam. The substratum to a depth of 60 inches or more is brown fine sandy loam. Hanford soils are well drained. The surface layer is grayish brown sandy loam. The underlying material to a depth of 60 inches and more is pale brown and grayish brown sandy loam and a few strata of gravel and loamy sand.

This association is used for citrus and to a limited extent for pasture or range.

Descriptions of the Soils

This section describes in detail the soils of Orange County and Western Part of Riverside County and their use. Each soil series is described in detail, and then, briefly, the mapping units in that series. Unless it is specifically mentioned otherwise, it is to be assumed that what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface downward to rock or other underlying material. Each series contains two descriptions of this profile. The first is brief and in terms familiar to the layman; the second is more detailed and is for those who need to make thorough and precise studies of soils. Color terms are for dry soil unless otherwise stated. The profile described in the soil series is representative of mapping units in that series. If a given mapping unit has a profile in some ways different from the one described in the series, these differences are either stated in the description of the mapping unit, or they are apparent in the name of the mapping unit. The description of each mapping unit contains suggestions on how the soil is used.

As mentioned in the section "How This Survey Was Made," not all mapping units are members of a soil series. Beaches, for example, does not belong to a soil series, but nevertheless, it is listed in alphabetic order with the soil series.

Preceding the name of each mapping unit is a numerical symbol. This symbol identifies the mapping unit on the detailed soil map. At the end of each description of a mapping unit is the capability unit to which the soil is assigned, the range site, and the Storie index rating.

In the locations of the typical profiles, some sections are designated "by private survey." According to the geological survey topographic maps, the top edge of these sections is to the northwest, not to the north.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used

TABLE 1.—*Acreage and proportionate extent of the soils*

Map symbol	Soil name	Acres	Percent
100	Alo clay, 9 to 15 percent slopes	5,445	0.9
101	Alo clay, 15 to 30 percent slopes	10,930	1.9
102	Alo clay, 30 to 50 percent slopes	10,530	1.8
103	Alo Variant clay, 9 to 15 percent slopes	240	(1)
104	Alo Variant clay, 15 to 30 percent slopes	1,165	0.2
105	Alo Variant clay, 30 to 50 percent slopes	620	0.1
106	Anaheim loam, 15 to 30 percent slopes	1,490	0.3
107	Anaheim loam, 30 to 50 percent slopes	2,605	0.4
108	Anaheim clay loam, 15 to 30 percent slopes	2,655	0.5
109	Anaheim clay loam, 30 to 50 percent slopes	5,955	1.0
110	Anaheim clay loam, 50 to 75 percent slopes	2,980	0.5
111	Balcom clay loam, 9 to 15 percent slopes	830	0.1
112	Balcom clay loam, 15 to 30 percent slopes	2,475	0.4
113	Balcom clay loam, 30 to 50 percent slopes	3,080	0.5
114	Balcom-Rock outcrop complex, 15 to 50 percent slopes	710	0.1
115	Beaches	3,530	0.6
116	Blasingame loam, 9 to 30 percent slopes	1,490	0.3
117	Blasingame stony loam, 9 to 30 percent slopes	1,045	0.2
118	Blasingame stony loam, 30 to 65 percent slopes	5,090	0.9
119	Blasingame-Rock outcrop complex, 9 to 30 percent slopes	510	0.1
120	Blasingame-Vista complex, 9 to 15 percent slopes	485	0.1
121	Blasingame-Vista complex, 15 to 30 percent slopes	985	0.2
122	Bolsa silt loam	920	0.2
123	Bolsa silt loam, drained	13,520	2.3
124	Bolsa silty clay loam	1,015	0.2
125	Bolsa silty clay loam, drained	4,685	0.8
126	Bosanko clay, 9 to 15 percent slopes	1,555	0.3
127	Bosanko clay, 15 to 30 percent slopes	4,720	0.8
128	Bosanko clay, 30 to 50 percent slopes	3,855	0.7
129	Bosanko-Balcom complex, 15 to 30 percent slopes	2,425	0.4
130	Bosanko-Balcom complex, 30 to 50 percent slopes	680	0.1
131	Botella loam, 2 to 9 percent slopes	1,405	0.2
132	Botella clay loam, 2 to 9 percent slopes	1,675	0.3
133	Botella clay loam, 9 to 15 percent slopes	1,510	0.3
134	Calleguas clay loam, 50 to 75 percent slopes, eroded	34,505	5.9
135	Capistrano sandy loam, 2 to 9 percent slopes	5,510	0.9
136	Capistrano sandy loam, 9 to 15 percent slopes	2,075	0.4
137	Chesterton loamy sand, 2 to 15 percent slopes	400	0.1
138	Chesterton loamy sand, 15 to 30 percent slopes	125	(1)
139	Chino silty clay loam	1,795	0.3
140	Chino silty clay loam, drained	10,015	1.7
141	Cieneba sandy loam, 15 to 30 percent slopes	2,785	0.5
142	Cieneba sandy loam, 30 to 75 percent slopes, eroded	40,525	7.0
143	Cieneba-Blasingame-Rock outcrop complex, 9 to 30 percent slopes	3,490	0.6
144	Cieneba-Rock outcrop complex, 9 to 30 percent slopes	1,600	0.3
145	Cieneba-Rock outcrop complex, 30 to 75 percent slopes	37,461	6.4
146	Corralitos loamy sand	2,770	0.5
147	Corralitos loamy sand, moderately fine substratum	480	0.1
148	Cropley clay, 0 to 2 percent slopes	1,005	0.2
149	Cropley clay, 2 to 9 percent slopes	3,485	0.6
150	Escondido very fine sandy loam, 9 to 15 percent slopes	415	0.1
151	Escondido very fine sandy loam, 15 to 30 percent slopes	950	0.2
152	Exchequer-Rock outcrop complex, 30 to 75 percent slopes	19,270	3.3
153	Friant fine sandy loam, 30 to 70 percent slopes	49,740	8.6
154	Gabino gravelly clay loam, 15 to 50 percent slopes	4,655	0.8
155	Garretson gravelly very fine sandy loam, 2 to 9 percent slopes	90	(1)
156	Hanford sandy loam, 2 to 9 percent slopes	520	0.1
157	Hueneme fine sandy loam	495	0.1
158	Hueneme fine sandy loam, drained	23,705	4.1
159	Las Posas gravelly loam, 15 to 50 percent slopes	970	0.2
160	Laughlin gravelly loam, 30 to 50 percent slopes	2,145	0.4
161	Marina loamy sand, 0 to 2 percent slopes	565	0.1
162	Marina loamy sand, 2 to 9 percent slopes	4,000	0.7
163	Metz loamy sand	20,755	3.6
164	Metz loamy sand, moderately fine substratum	9,310	1.6
165	Mocho sandy loam, 0 to 2 percent slopes	1,090	0.2
166	Mocho loam, 0 to 2 percent slopes	12,375	2.1
167	Mocho loam, 2 to 9 percent slopes	2,415	0.4
168	Modjeska gravelly loam, 0 to 2 percent slopes	2,380	0.4
169	Modjeska gravelly loam, 2 to 9 percent slopes	2,395	0.4
170	Modjeska gravelly loam, 9 to 15 percent slopes	635	0.1
171	Modjeska gravelly loam, 15 to 30 percent slopes	785	0.1
172	Myford sandy loam, 0 to 2 percent slopes	4,405	0.8
173	Myford sandy loam, 2 to 9 percent slopes	20,910	3.6
174	Myford sandy loam, 2 to 9 percent slopes, eroded	2,285	0.4

TABLE 1.—*Acreage and proportionate extent of the soils*—Continued

Map symbol	Soil name	Acres	Percent
175	Myford sandy loam, 9 to 15 percent slopes	6,180	1.1
176	Myford sandy loam, 15 to 30 percent slopes	2,140	0.4
177	Myford sandy loam, 9 to 30 percent slopes, eroded	4,420	0.8
178	Myford sandy loam, thick surface, 0 to 2 percent slopes	3,775	0.6
179	Myford sandy loam, thick surface, 2 to 9 percent slopes	2,960	0.5
180	Nacimiento clay loam, 15 to 30 percent slopes	630	0.1
181	Nacimiento clay loam, 30 to 50 percent slopes	670	0.1
182	Omni silt loam, drained	1,320	0.2
183	Omni clay	190	(1)
184	Omni clay, drained	7,105	1.2
185	Pits	1,890	0.3
186	Ramona fine sandy loam, 2 to 9 percent slopes	455	0.1
187	Ramona gravelly fine sandy loam, 9 to 15 percent slopes	355	0.1
188	Rincon clay loam, 2 to 9 percent slopes	700	0.1
189	Rincon clay loam, 9 to 15 percent slopes	310	0.1
190	Rincon clay loam, 15 to 30 percent slopes	280	(1)
191	Riverwash	6,165	1.1
192	Rock outcrop-Cieneba complex, 30 to 75 percent slopes	17,938	3.1
193	San Andreas sandy loam, 15 to 30 percent slopes	1,205	0.2
194	San Emigdio fine sandy loam, 0 to 2 percent slopes	15,775	2.7
195	San Emigdio fine sandy loam, 2 to 9 percent slopes	1,000	0.2
196	San Emigdio fine sandy loam, moderately fine substratum, 0 to 2 percent slopes	7,420	1.3
197	Soboba gravelly loamy sand, 0 to 5 percent slopes	2,520	0.4
198	Soboba cobbly loamy sand, 0 to 15 percent slopes	4,540	0.8
199	Soper loam, 15 to 30 percent slopes	735	0.1
200	Soper loam, 30 to 50 percent slopes	1,405	0.2
201	Soper gravelly loam, 15 to 30 percent slopes	1,045	0.2
202	Soper gravelly loam, 30 to 50 percent slopes	3,445	0.6
203	Soper cobbly loam, 15 to 50 percent slopes	1,170	0.2
204	Soper-Rock outcrop complex, 30 to 75 percent slopes	1,590	0.3
205	Sorrento sandy loam, 0 to 2 percent slopes	785	0.1
206	Sorrento loam, 0 to 2 percent slopes	6,275	1.1
207	Sorrento loam, 2 to 9 percent slopes	4,960	0.8
208	Sorrento clay loam, 0 to 2 percent slopes	7,095	1.2
209	Sorrento clay loam, 2 to 9 percent slopes	3,080	0.5
210	Thapto-Histic Fluvaquents	310	0.1
211	Tidal flats	3,045	0.5
212	Tollhouse-Rock outcrop complex, 30 to 75 percent slopes	2,280	0.4
213	Vista coarse sandy loam, 9 to 15 percent slopes	245	(1)
214	Vista coarse sandy loam, 15 to 30 percent slopes	215	(1)
215	Vista coarse sandy loam, 30 to 65 percent slopes	440	0.1
216	Vista-Rock outcrop complex, 9 to 30 percent slopes	935	0.2
217	Xeralfic Arents, loamy, 2 to 9 percent slopes	735	0.1
218	Xeralfic Arents, loamy, 9 to 15 percent slopes	820	0.1
219	Xerorthents loamy, cut and fill areas, 9 to 15 percent slopes	1,095	0.2
220	Xerorthents loamy, cut and fill areas, 15 to 30 percent slopes	1,915	0.3
221	Yorba gravelly sandy loam, 2 to 9 percent slopes	1,480	0.3
222	Yorba gravelly sandy loam, 9 to 15 percent slopes	880	0.1
223	Yorba gravelly sandy loam, 15 to 30 percent slopes	550	0.1
224	Yorba cobbly sandy loam, 9 to 30 percent slopes	1,160	0.2
225	Yorba cobbly sandy loam, 9 to 30 percent slopes, eroded	1,690	0.3
226	Yorba cobbly sandy loam, 30 to 50 percent slopes	2,169	0.4
	Water	1,406	0.2
	Total	580,994	100.0

[1] Less than 0.1 percent.

in describing the soils can be found in the Glossary. More detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (*12*).[1]

Alo Series

The Alo series consists of well drained soils in the foothills. These soils formed in material weathered from calcareous sandstone and shale. Slopes are 9 to 50 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is annual grasses, mustard, and other forbs. Precipitation is 12 to 20 inches. The average annual air temperature is 59 to 62° F. The frost-free season is 300 to 350 days.

In a typical profile the surface layer is dark grayish brown clay 25 inches thick. Soft lime masses occur below a depth of 15 inches. The underlying material is light yellowish brown lime coated weathered shale.

The soil is slightly acid to moderately alkaline. It is slowly permeable.

Alo soils are used for range, dryland barley, dryland pasture, irrigated citrus, and urban development.

Typical profile of Alo clay, 9 to 15 percent slopes, in Orange County, University of California Irvine property, about 2,000 feet east-southeast of the intersection

[1] Italic numbers in parentheses refer to Literature Cited, p. 147.

of McArthur Boulevard and Bonta Canyon Drive, S¼-E¼ sec. 90 (by private survey), T. 6 S., R. 9 W., SBB&M.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong coarse granular structure; hard, firm, very sticky and very plastic; common very fine roots; common very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

A12—2 to 15 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; strong very coarse prismatic structure; extremely hard, firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; neutral; clear smooth boundary.

A13ca—15 to 25 inches; dark grayish brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; common small few medium intersecting slickensides; cracks ½ inch wide to 25 inches from surface; strongly effervescent; medium sized rounded soft masses of lime; moderately alkaline; clear wavy boundary.

Cr1—25 to 41 inches; light yellowish brown (2.5Y 6/4) weathered shale, light olive brown (2.5Y 5/4) moist; massive; very hard; very few fine roots along fractures; lime occurs on fractures; strongly effervescent; shale is slightly acid; clear wavy boundary.

Cr2—41 to 59 inches; mixed yellow (2.5Y 7/6), light yellowish brown (2.5Y 6/4), and light gray (10YR 7/2) weathered interbedded shale and sandstone; olive yellow (2.5Y 6/6), light olive brown (2.5Y 5/4), and light brownish gray (10YR 6/2) moist; few lime coatings on shale fractures; slightly acid.

Depth to weathered sandstone or shale, or both, is 24 to 40 inches.

The A horizon ranges from very dark grayish brown to brown in 10YR hue. Texture is heavy clay loam or clay. Structure ranges from granular in the upper few inches to prismatic or angular blocky. Reaction ranges from slightly acid to moderately alkaline. Thickness ranges from 14 to 25 inches.

Color and texture of the Aca horizon are about the same as in the A horizon. Structure is prismatic or angular blocky. Dry consistence is very hard or extremely hard. Carbonate content ranges from strongly effervescent to violently effervescent. Lime ranges from few to many medium to large soft masses. Thickness ranges from 10 to 15 inches.

The Cr horizon can be easily cut with hand tools.

Cracks more than ½ inch wide occur to a depth of 20 inches or more during the dry season.

100—Alo clay, 9 to 15 percent slopes. This strongly sloping soil generally occurs on ridges and toe slopes in the foothills. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Bosanko clay, 9 to 15 percent slopes; 5 percent Anaheim clay loam; and 3 percent Balcom clay loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 3.5 to 7.0 inches. The effective rooting depth is 25 to 40 inches.

Present land use is citrus, dryland barley, pasture, range, and urban development. Capability unit IIIe–5 (19); Clayey range site; Storie index 33.

101—Alo clay, 15 to 30 percent slopes. This moderately steep soil generally occurs on broad ridgetops in the foothills. The profile is similar to the one described as typical of the series, but it is slightly shallower.

About 5 percent of this mapping unit is included areas of Bosanko clay, 15 to 30 percent slopes; 5 percent Anaheim clay loam, 15 to 30 percent slopes; 3 percent Balcom clay loam, 15 to 30 percent slopes; and 2 percent gravelly soils on some ridgetops.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.5 to 6.0 inches. The effective rooting depth is 24 to 36 inches.

Present land use is dryland barley, pasture, range, and urban development. Capability unit IVe–5 (19); Clayey range site; Storie index 23.

102—Alo clay, 30 to 50 percent slopes. This steep soil generally occurs on side slopes in the foothills. The profile is similar to the one described as typical of the series, but it is somewhat shallower.

About 5 percent of this mapping unit is included areas of Anaheim clay loam, 30 to 50 percent slopes; 5 percent Calleguas clay loam, 50 to 75 percent slopes, eroded; 2 percent Balcom clay loam, 30 to 50 percent slopes; and 2 percent Bosanko clay, 30 to 50 percent slopes.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.5 to 5.5 inches. The effective rooting depth is 24 to 32 inches.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 12.

Alo Variant

The Alo variant consists of well drained soils on uplands. These soils formed in material weathered from calcareous sandstone and shale. Slopes are 9 to 50 percent. Elevation ranges from 200 to 700 feet. The vegetation is annual grasses, mustard, and other forbs. Precipitation is 12 to 16 inches, mean annual air temperature is 59 to 62° F., and the frost-free season is 280 to 350 days.

In a typical profile the upper 26 inches is reddish brown light clay. The next 14 inches is reddish brown calcareous light clay with 10 to 20 percent lime threads and soft lime masses. The underlying material is fractured weathered soft sandstone and shale to a depth of 66 inches or more; the upper 8 inches is coated with lime threads and soft lime masses.

The soil is slightly acid in the upper part, moderately alkaline in the next layer and in the upper part of the weathered bedrock, and neutral and noncalcareous in the underlying sandstone and shale. It is slowly permeable.

The Alo variant is used for citrus, dryland barley, range, dryland pasture, and urban development.

Typical profile of Alo variant clay, 9 to 15 percent slopes, in NW¼SE¼ sec. 29, T. 6 S., R. 7 W. SBB&M; about 150 feet south of the Veeh Ranch lemon orchard, 350 feet elevation, on a south-facing slope:

A11—0 to 2 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/3) moist; strong medium subangular blocky structure; hard, firm, very sticky and plastic; common very fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.

A12—2 to 6 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky and very plastic; many very fine roots; many very fine tubular pores; common slickensides; slightly acid; clear wavy boundary.

A13—6 to 18 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/3) moist; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine and fine roots; few very fine and fine tubular pores; common intersecting slickensides; slightly acid; clear wavy boundary.

A14—18 to 26 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/3) moist; strong coarse angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; common intersecting slickensides; neutral; clear wavy boundary.

A15ca—26 to 34 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/4) moist; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; few slickensides; violently effervescent; 10 percent very fine lime threads; moderately alkaline; clear wavy boundary.

A16ca—34 to 40 inches; reddish brown (5YR 4/3) light clay, dark reddish brown (5YR 3/4) moist; strong medium and coarse angular blocky structure; very hard, very firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; few slickensides; violently effervescent; 20 percent very fine lime threads and medium irregularly shaped soft lime masses; moderately alkaline; abrupt smooth boundary.

Cr1—40 to 48 inches; fractured weathered sandstone; few very fine roots on fractures; many very fine and fine interstitial pores; violently effervescent; lime threads and soft masses mostly on 50 percent of the fractures; few pockets of A horizon material; moderately alkaline; gradual wavy boundary.

Cr2—48 to 54 inches; fractured weathered sandstone; neutral; abrupt wavy boundary.

Cr3—54 to 66 inches; weathered soft interbedded sandstone and shale.

The A horizon ranges from dark reddish gray to reddish brown or brown in 5YR and 7.5YR hue. Texture is heavy clay loam or clay. Structure ranges from granular or subangular blocky in the upper few inches to angular blocky or prismatic, or both, in the lower parts. Dry consistence ranges from hard to extremely hard. Reaction ranges from slightly acid to moderately alkaline.

The lower Aca or ACca horizon is moderately alkaline, is calcareous, and contains segregated lime. Thickness ranges from 24 to 40 inches.

The Cr horizon is weathered sandstone and shale. It is moderately alkaline. It commonly has segregated lime in the upper few inches, but is neutral and lacks lime in lower parts.

When dry, the soil has cracks more than ½ inch wide to a depth of more than 25 inches.

103—Alo variant clay, 9 to 15 percent slopes. This strongly sloping soil generally occurs on the gentler side slopes in the foothills. It has the profile described as typical of the series.

About 3 percent of this mapping unit is included areas of Yorba gravelly sandy loam, 9 to 15 percent slopes; 3 percent Myford sandy loam, 9 to 15 percent slopes; 5 percent Bosanko clay, 9 to 15 percent slopes; and 10 percent soils that are calcareous throughout but are otherwise similar to this Alo variant clay.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 3.0 to 7.0 inches. The effective rooting depth is 26 to 40 inches.

Present land use is citrus, pasture, range, and urban development. Capability unit IIIe-5 (19); Clayey range site; Storie index 36.

104—Alo variant clay, 15 to 30 percent slopes. This moderately steep soil generally occurs on broad ridgetops in the foothills. The profile is similar to the one described as typical of the series, but it is slightly shallower.

About 3 percent of this mapping unit is included areas of Myford sandy loam; 2 percent Anaheim clay loam, 15 to 30 percent slopes; 5 percent Bosanko clay, 15 to 30 percent slopes; and 20 percent soils that are calcareous throughout but are otherwise similar to this Alo variant clay.

If the soil is bare, runoff is rapid and the erosion hazard high. Available water capacity is 4.0 to 6.0 inches. The effective rooting depth is 26 to 36 inches.

Present land use is citrus, pasture, range, and urban development. Capability unit IVe-5 (19); Clayey range site; Storie index 25.

105—Alo variant clay, 30 to 50 percent slopes. This steep soil generally occurs as irregularly shaped areas 20 to 100 acres in size. The profile is similar to the one described as typical of the series, but it is slightly shallower.

About 5 percent of this mapping unit is included areas of Bosanko clay, 30 to 50 percent slopes; 5 percent Calleguas clay loam, 50 to 75 percent slopes; and

20 percent soils that are calcareous throughout but are otherwise similar to this Alo variant clay.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.0 to 5.0 inches. The effective rooting depth is 24 to 32 inches.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 13.

Anaheim Series

The Anaheim series consists of well drained soils on foothills. These soils formed in material weathered from soft sandstone or shale. Slopes are 15 to 75 percent. Elevation ranges from 100 to 2,500 feet. The vegetation is sage, flattop buckwheat, sumac, other brush, mustard, and live oak and an undercover of annual grasses in some areas. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62°F. The frost-free season is 300 to 350 days.

Typically, the surface layer is grayish brown clay loam 26 inches thick. The underlying material is weathered fractured sandstone or shale. The soil is slightly acid and mildly alkaline.

Anaheim soils are used for dryland pasture, range, field crops, and watershed.

Typical profile of Anaheim clay loam, 15 to 30 percent slopes, on the north side of a truck trail, about 300 feet east of a power pole and 3,000 feet north of Blue Mud Canyon, Chino Hills, Rancho Santa Ana, Orange County, NE¼NW¼ sec. 20 (projected), T. 3 S., R. 1 W., SBB&M.

A11—0 to 9 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; slightly acid; clear smooth boundary.

A12—9 to 17 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

A13—17 to 26 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine and fine tubular pores; mildly alkaline; abrupt wavy boundary.

Cr—26 to 54 inches; weathered fractured fine grained sandstone and shale coated with lime on the upper 6 inches of fractures.

The color of the A horizon ranges from brown to dark grayish brown in 10YR or 2.5Y hue. Texture is loam or clay loam. Thickness ranges from 20 to 36 inches. In places vertical cracks up to ¼ inch wide occur to a depth of 20 inches or more, but slickensides are absent.

The color of the Cr horizon ranges from light yellowish brown, light olive brown, very pale brown, light brownish gray to pale yellow in 10YR to 2.5Y hue. Depth to bedrock is 20 to 36 inches.

Reaction is neutral to moderately alkaline. The soil is calcareous in some parts.

106—Anaheim loam, 15 to 30 percent slopes. This moderately steep soil has a profile similar to the one described as typical of the series, but the texture is loam throughout.

About 7 percent of this mapping unit is included areas of Anaheim clay loam, 15 to 30 percent slopes; 5 percent Nacimiento clay loam, 15 to 30 percent slopes; 3 percent Cieneba sandy loam, 15 to 30 percent slopes; and 10 percent less sloping or steeper Anaheim soils.

If the soil is bare, runoff is rapid and the erosion hazard is high. Permeability is moderate. Available water capacity is 3.5 to 6.0 inches. The effective rooting depth is 24 to 36 inches.

Present land use is dryland pasture, range, and watershed. Capability unit IVe–1 (19); Loamy range site; Storie index 39.

107—Anaheim loam, 30 to 50 percent slopes. This steep soil commonly occurs on or near the top of broad rounded ridgetops. It has a profile similar to the one described as typical of the series, but the texture is loam.

About 7 percent of this mapping unit is included areas of Anaheim clay loam, 30 to 50 percent slopes; 4 percent Nacimiento clay loam, 30 to 50 percent slopes; 4 percent Cieneba sandy loam, 30 to 75 percent slopes; 10 percent less sloping or steeper Anaheim soils.

If the soil is bare, runoff is rapid and the erosion hazard is high. Permeability is moderate. Available water capacity is 3.5 to 6.0 inches. The effective rooting depth is 24 to 36 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit VIe–1 (19); Loamy range site; Storie index 21.

108—Anaheim clay loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on broad ridgetops and north-facing side slopes. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Alo clay; 5 percent Anaheim loam; 5 percent Nacimiento clay loam; 2 percent Cieneba sandy loam; and 3 percent Balcom clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Permeability is moderately slow. Available water capacity is 4.0 to 7.0 inches. The effective rooting depth is 24 to 40 inches.

Present land use is pasture and range. Capability unit IVe–1 (19); Clayey range site; Storie index 33.

109—Anaheim clay loam, 30 to 50 percent slopes. This steep soil generally has north-facing slopes.

About 5 percent of this mapping unit is included areas of Alo clay; 5 percent Anaheim loam; 5 percent Nacimiento clay loam; 2 percent Cieneba sandy loam; and 3 percent Calleguas clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Permeability is moderately slow. Available water capacity is 4.0 to 7.0 inches. The effective rooting depth is 24 to 36 inches.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 18.

110—Anaheim clay loam, 50 to 75 percent slopes. This very steep soil generally has north-facing slopes. It has a profile similar to the one described as typical

of the series, but it is 4 to 6 inches shallower over bedrock.

About 3 percent of this mapping unit is included areas of Cieneba sandy loam and 5 percent Calleguas clay loam.

If the soil is bare, runoff is very rapid and the erosion hazard is very high. Permeability is moderately slow. Available water capacity is 3.5 to 5.5 inches. The effective rooting depth is 20 to 30 inches.

Present land use is range and watershed. Capability unit VIIe–1 (19); Clayey range site; Storie index 8.

Balcom Series

The Balcom series consists of well drained soils on uplands. These soils formed in material weathered from soft fine grained sandstone, calcareous soft shale, and marl. Slopes are 9 to 50 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is annual grasses and forbs, mostly mustard, and some brush on the more eroded slopes. Precipitation is 14 to 20 inches, mean annual air temperature is 59 to 62° F., and the frost-free season is 300 to 350 days.

In a typical profile the upper 30 inches is grayish brown light clay loam. The underlying material is weathered fine grained sandstone and some calcareous shale coated with lime. It easily crushes to light gray, calcareous fine sandy loam in the upper 12 inches. Below this to a depth of 53 inches and more it is pale olive fractured soft bedrock.

The soil is moderately alkaline and calcareous throughout. It is moderately slowly permeable.

Balcom soils are used for dryland barley, dryland pasture, range, and urban development.

Typical profile of Balcom clay loam, 30 to 50 percent slopes, about 1,200 feet east of Oso Creek, Rancho Mission Viejo; SW¼NW¼, sec. 30, T. 6 S., R. 7 W., SBB&M.

A11—0 to 3 inches; grayish brown (10YR 5/2) light clay loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; violently effervescent; disseminated lime; moderately alkaline; clear smooth boundary.

A12—3 to 19 inches; grayish brown (10YR 5/2) light clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; violently effervescent; disseminated lime; moderately alkaline; clear wavy boundary.

A13ca—19 to 30 inches; grayish brown (10YR 5/2) light clay loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; violently effervescent; disseminated lime and lime coatings on some cobbles; moderately alkaline; abrupt wavy boundary.

Cr1—30 to 42 inches; light gray (10YR 7/1) weathered sandstone crushing to fine sandy loam, light brownish gray (10YR 6/2) moist; massive; hard, firm, slightly sticky and nonplastic; violently effervescent; some white slightly hard fine grained limestone; moderately alkaline; clear wavy boundary.

Cr2—42 to 53 inches; pale olive (5Y 6/3) fractured fine grained sandstone and calcareous shale; many lime coatings on rock fractures.

The A horizon ranges from light gray to light brownish gray, grayish brown, or pale brown in 2.5Y or 10YR hue. Texture is loam or clay loam. Small fragments of marl-like materials occur throughout the profile; the content is less than 15 percent. Structure ranges from granular to weak subangular blocky or the soil is massive. Dry consistence ranges from soft to slightly hard. The soil ranges from slightly calcareous to violently calcareous. Thickness ranges from 24 to 36 inches.

The C horizon ranges from white to light gray and gray to pale olive in 2.5Y, 5Y, or 10YR hue. Generally some of these colors are mixed. The bedrock is weathered lime coated sandstone, calcareous shale, or marl.

111—Balcom clay loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on hill ridgetops and some concave side slopes. The profile is similar to the one described as typical of the series, but it is 2 to 6 inches thicker.

About 5 percent of this mapping unit is included areas of Bosanko clay, 9 to 15 percent slopes; 4 percent Calleguas clay loam; 4 percent San Andreas sandy loam; and some soils, similar to this Balcom soil, that have a dark gray surface layer.

If the soil is bare, runoff is medium and the erosion hazard is high. Available water capacity is 4 to 6 inches. The effective rooting depth is 26 to 36 inches.

Present land use is urban development, dryland barley, and dryland pasture. Capability unit IIIe–1 (19); Clayey range site; Storie index 48.

112—Balcom clay loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on hill ridgetops. The profile is similar to the one described as typical of the series, but it is 2 to 6 inches thicker.

About 5 percent of this mapping unit is included areas of Bosanko clay, 15 to 30 percent slopes; 4 percent Calleguas clay loam; 4 percent Cieneba sandy loam, 15 to 30 percent slopes; and some soils, similar to the Balcom soil, that have a dark gray surface layer.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 4 to 6 inches. The effective rooting depth is 26 to 36 inches.

Present land use is urban development, dryland barley, and dry pasture. Capability unit IVe–1 (19); Clayey range site; Storie index 37.

113—Balcom clay loam, 30 to 50 percent slopes. This steep soil generally occurs as irregular and oblong areas of 40 to 100 acres. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Bosanko clay, 30 to 50 percent slopes; 4 percent Calleguas clay loam; 3 percent Cieneba sandy loam, 30 to 75 percent slopes; and some soils, similar

to the Balcom soil, that have a dark gray surface layer.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.5 to 5.0 inches. The effective rooting depth is 24 to 30 inches.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 18.

114—Balcom-Rock outcrop complex, 15 to 50 percent slopes. This moderately steep to steep mapping unit occurs as somewhat oblong areas of 5 to 100 acres. The Balcom soil has a profile similar to the one described as typical of the series, but the soil depth is about 4 inches less. Rock outcrop occupies 10 to 20 percent of the surface area.

About 5 percent of this mapping unit is included areas of Cieneba sandy loam and 10 percent Calleguas clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.5 to 5.0 inches. The effective rooting depth is 24 to 30 inches.

Present land use is range and watershed. Capability unit VIs–1 (19); Clayey range site; Storie index 18.

Beaches

115—Beaches consists of sandy, gravelly, or cobbly coastal shores that are washed and rewashed by tidal and wave action. These areas may be partly covered with water during high tides or stormy periods. They support little or no vegetation and have no agricultural value. Some are excellent recreational areas.

Runoff is very slow, and the erosion hazard is high.

Present land use is recreation and urban development. Capability unit VIIIw–1 (19); range site not assigned; Storie index less than 10 (nonagricultural).

Blasingame Series

The Blasingame series consists of well drained soils in the mountains. These soils formed in material weathered from metamorphic or granitic rocks. Slopes are 9 to 65 percent. Elevation ranges from 1,000 to 3,500 feet. The vegetation is chiefly brush; some areas have scattered oaks and annual grasses. Precipitation is 18 to 25 inches, and the mean annual air temperature is 58 to 61° F. The frost-free season is 225 to 300 days.

In a typical profile the surface layer is brown loam 6 inches thick. The subsoil is yellowish red clay loam about 20 inches thick. The substratum to a depth of 50 inches is reddish yellow weathered andesite bedrock. It grades to unweathered rock within several feet.

The soil is slightly acid in the surface layer and medium acid in the subsoil. It is moderately slowly permeable.

Blasingame soils are used for range, watershed, and wildlife.

Typical profile of Blasingame loam, 9 to 30 percent slopes, in Orange County, along Santiago Truck Trail about ½ mile east of Morrow Trail, NW¼SW¼ sec. 35, T. 5 S., R. 7 W.

A11—0 to 1 inch; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine, fine, and few medium and coarse tubular pores; slightly acid; abrupt smooth boundary.

A12—1 to 6 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine and medium tubular pores; slightly acid; clear wavy boundary.

B1—6 to 8 inches; reddish brown (5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine, fine, medium and common coarse roots; common very fine, fine, and medium tubular pores; common thin clay films as bridges and lining pores; slightly acid; abrupt wavy boundary.

B21t—8 to 17 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/8) moist; strong medium and coarse angular blocky structure; very hard, firm, very sticky and very plastic; few very fine, fine, medium and coarse roots; few very fine and fine tubular pores; many moderately thick clay films on peds; medium acid; gradual wavy boundary.

B22t—17 to 26 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/8) moist; moderate medium and coarse angular and subangular blocky structure; very hard, firm, sticky and plastic; few very fine, fine, medium, and coarse roots; few very fine and fine tubular pores; many moderately thick clay films on peds; medium acid; abrupt wavy boundary.

Cr—26 to 50 inches; yellow, reddish yellow, red, and black weathered metamorphic rock; crushes easily; few clay film coatings on upper fractures.

The A horizon ranges from reddish brown to brown and yellowish brown in 10YR, 7.5YR, and 5YR hue. Texture is sandy loam or loam, with or without stones. Structure ranges from granular to subangular blocky. In places the soil is massive. Dry consistence ranges from slightly hard to hard. Reaction ranges from neutral to slightly acid. Thickness ranges from 3 to 11 inches.

The B1 horizon is 0 to 4 inches thick. The B2t horizon ranges from reddish brown to brown and yellowish red in 7.5YR and 5YR hue. Texture is sandy clay loam or clay loam with or without stones. Structure ranges from fine to coarse. Dry consistence ranges from hard to very hard. Thickness ranges from 17 to 21 inches.

The Cr horizon is weathered andesite, weathered metamorphic rock, or decomposed granitic rock.

116—Blasingame loam, 9 to 30 percent slopes. This strongly sloping to moderately steep soil generally occurs on the gentler, somewhat rolling lower mountain

ridgetops. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Blasingame stony loam, 9 to 30 percent slopes; 5 percent Las Posas gravelly loam, 15 to 50 percent slopes; 5 percent Vista coarse sandy loam; and 5 percent Ramona fine sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate to high. Available water capacity is 3.5 to 6.5 inches. The effective rooting depth is 24 to 36 inches.

Present land use is range, watershed, and wildlife. Capability unit IVe–1 (19); Loamy range site; Storie index 39.

117—Blasingame stony loam, 9 to 30 percent slopes. This strongly sloping to moderately steep soil generally occurs on the gentler, lower mountain ridgetops. The profile is similar to the one described as typical of the series, but it is stony throughout.

About 5 percent of this mapping unit is included areas of Blasingame loam, 9 to 30 percent slopes; 5 percent Las Posas gravelly loam, 15 to 50 percent slopes; and 5 percent Friant fine sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate to high. Available water capacity is 3.0 to 5.0 inches. The effective rooting depth is 24 to 32 inches.

Present land use is range, watershed, and wildlife. Capability unit VIs–1 (19); Loamy range site; Storie index 27.

118—Blasingame stony loam, 30 to 65 percent slopes. This steep to very steep soil generally occurs on lower mountainsides. The profile is similar to the one described as typical of the series, but it is stony throughout and is slightly shallower.

About 5 percent of this mapping unit is included areas of Exchequer-Rock outcrop complex and 5 percent Friant fine sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate to high. Available water capacity is 2.5 to 4.5 inches. The effective rooting depth is 20 to 32 inches.

Present land use is range, watershed, and wildlife. Capability unit VIIs–1 (19); Loamy range site; Storie index 11.

119—Blasingame-Rock outcrop complex, 9 to 30 percent slopes. This rolling complex occurs on lower mountain ridgetops. The Blasingame soil has a profile similar to the one described as typical of the series, but it is slightly shallower. About 20 to 35 percent of the surface is large granitic boulders or Rock outcrop, or both.

About 10 percent of this complex is included areas of Vista-Rock outcrop complex; 5 percent Cieneba-Rock outcrop, 9 to 30 percent slopes; and 10 percent less sloping or steeper Blasingame-Rock outcrop.

If the soil is bare, runoff is medium to rapid and the erosion hazard is high. Available water capacity is 3.0 to 5.0 inches. The effective rooting depth is 24 to 32 inches.

Present land use is range and watershed. Capability unit for VIs–1 (19); Loamy-Rock outcrop complex range site; Storie index 20.

120—Blasingame-Vista complex, 9 to 15 percent slopes. This strongly sloping mapping unit is about 50 percent Blasingame loam, 9 to 15 percent slopes, and 40 percent Vista coarse sandy loam, 9 to 15 percent slopes. The Blasingame loam is on north- and east-facing slopes and in swales. Vista coarse sandy loam is on ridgetops and south- and west-facing slopes.

About 6 percent of this complex is included areas of Cieneba sandy loam, 4 percent Las Posas gravelly loam, and 5 percent less sloping or steeper soils.

Both soils have the profiles described as typical of the respective series. The Blasingame soil has an effective rooting depth of 24 to 36 inches and an available water capacity of 3.5 to 6.5 inches. The Vista soil has an effective rooting depth of 30 to 40 inches and an available water capacity of 3.0 to 5.0 inches. Runoff is medium on both soils, and the erosion hazard is moderate to high.

This unit is used for range and watershed. Capability unit IVe–1 (19); Loamy range site; Storie index 51 (according to the proportion of dominant soils).

121—Blasingame-Vista complex, 15 to 30 percent slopes. This moderately steep mapping unit is about 50 percent Blasingame loam and 40 percent Vista coarse sandy loam. The Blasingame loam is on north- and east-facing side slopes and in swales. The Vista coarse sandy loam is on ridgetops and south- and west-facing side slopes.

About 5 percent of this mapping unit is included areas of Cieneba sandy loam, about 5 percent Las Posas gravelly loam, and 10 percent less sloping or steeper soils.

Both soils have the profiles described as typical of the respective series. The Blasingame soil has an effective rooting depth of 24 to 32 inches and an available water capacity of 3.5 to 6.0 inches. The Vista soil has an effective rooting depth of 24 to 40 inches and an available water capacity of 2.5 to 5.0 inches. On both soils, runoff is medium and the erosion hazard is moderate to high.

Present land use is range and watershed. Capability unit VIe–1 (19); Loamy range site; Storie index 36 (according to the proportion of dominant soils).

Bolsa Series

The Bolsa series consists of somewhat poorly drained soils on alluvial fans. These soils formed in mixed alluvium. Slopes are 0 to 2 percent. Elevation ranges from 5 to 300 feet. The vegetation is annual grasses and forbs. Precipitation is 12 to 15 inches, and the mean annual air temperature is about 62° F. The frost-free season is 300 to 350 days.

Typically, the surface layer is light brownish gray silt loam 12 inches thick. The upper 17 inches of underlying material is light brownish gray silt loam with some very faint mottles. It is light brownish gray silty clay loam with common reddish yellow mottles to a depth of 65 inches or more.

The soil is moderately alkaline throughout and calcareous to a depth of 49 inches. It is moderately slowly permeable.

Bolsa soils are used for row crops, field crops, and urban development.

Typical profile of Bolsa silt loam, in Huntington Beach, SE¼SE¼ sec. 12, T. 6 S., R. 7 W. Orange

County, northwest corner of Magnolia and Atlanta Avenues:

Ap1—0 to 6 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

Ap2—6 to 12 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common medium roots; common very fine tubular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

C1—12 to 18 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; few very faint mottles; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common medium roots; common very fine tubular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

C2—18 to 29 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common medium roots; common very fine tubular pores; strongly effervescent; moderately alkaline; abrupt smooth boundary.

C3—29 to 39 inches; light brownish gray (10YR 6/2) light silty clay loam, dark grayish brown (10YR 4/2) moist; few fine prominent reddish yellow (7.5YR 6/6) mottles, strong brown (7.5YR 5/6) moist; weak fine and medium prismatic structure; very hard, firm, sticky and plastic; few fine and common medium roots; common very fine tubular pores; salts in fine threads; strongly effervescent; moderately alkaline; clear smooth boundary.

C4—39 to 49 inches; light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; common fine prominent reddish yellow (7.5YR 6/6) mottles, strong brown (7.5YR 5/6) moist; weak fine and medium prismatic structure; very hard, firm, sticky and plastic; few fine roots; common very fine and fine tubular pores; salts in fine threads; strongly effervescent; moderately alkaline; clear smooth boundary.

C5—49 to 55 inches; light brownish gray (2.5Y 6/2) and dark gray (2.5Y 4/0) heavy silty clay loam, high in organic matter; dark grayish brown (2.5Y 4/2) and dark gray (2.5Y 4/0) moist; common fine prominent reddish yellow (7.5Y 6/6) mottles, strong brown (7.5Y 5/6) moist; weak coarse prismatic structure; very hard, very firm, very sticky and plastic; few fine and medium roots; many very fine and fine tubular pores; moderately alkaline; clear smooth boundary.

C6—55 to 69 inches; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; many fine prominent brownish yellow (10YR 6/6) mottles, yellowish brown (10YR 5/6) moist; massive, with thin strata; hard, firm, sticky and plastic; common very fine pores; salts in fine threads; moderately alkaline.

The A horizon ranges from light brownish gray to grayish brown in 10YR hue. Texture ranges from sandy loam, silt loam, and loam to silty clay loam. Thickness ranges from 10 to 20 inches.

The C horizon ranges from light gray, light brownish gray, pale brown, and grayish brown to dark gray in 10YR and 2.5Y hue. Texture, which is variable because of stratification, ranges from loamy sand to heavy silty clay loam.

The soils are calcareous to a depth of 40 inches or more. Natural drainage is somewhat poor. Many areas, however, are now drained and the water table is below 60 inches.

122—Bolsa silt loam. This nearly level soil generally occurs on large alluvial fans.

About 10 percent of this mapping unit is included areas of Chino silty clay loam; 10 percent Hueneme fine sandy loam; 2 percent Omni silt loam, drained; 3 percent Tidal flats; and 10 percent soils that have a sandy loam overwash but are otherwise similar to this Bolsa soil.

Runoff is very slow, and the erosion hazard is slight. A seasonal water table is at a depth of 36 to 72 inches. Available water capacity is 11.5 to 12.5 inches. The effective rooting depth is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit IIw–2 (19); range site not assigned; Storie index 76.

123—Bolsa silt loam, drained. This nearly level soil generally occurs on large alluvial fans. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Chino silty clay; 10 percent Hueneme fine sandy loam; 2 percent Metz loamy sand; 2 percent San Emigdio fine sandy loam; 1 percent Omni silt loam, drained; and 2 percent soils that have a sandy loam overwash but are otherwise similar to this Bolsa soil.

If the soil is bare, runoff is slow and the erosion hazard is slight. The effective rooting depth is 60 inches or more. The available water capacity is 11.5 to 12.5 inches.

Present land use is row crops, field crops, and urban development. Capability unit I (19); range site not assigned; Storie index 85.

124—Bolsa silty clay loam. This nearly level soil generally occurs on large alluvial fans. The profile is similar to the one described as typical of the series, but the texture is silty clay loam.

About 5 percent of this mapping unit is included

areas of Omni clay and 5 percent Chino silty clay loam.

Runoff is very slow, and the erosion hazard is none to slight. The water table is at a depth of 36 to 72 inches. Available water capacity is 11.5 to 12.5 inches. The effective rooting depth is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit IIw–2 (19); range site not assigned; Storie index 68.

125—Bolsa silty clay loam, drained. This nearly level soil generally occurs on large alluvial fans. The profile is similar to the one described as typical of the series, but the texture is silty clay loam.

About 10 percent of this mapping unit is included areas of Chino silty clay loam, 3 percent Hueneme fine sandy loam, and 3 percent Omni clay.

Runoff is slow, and the erosion hazard is slight. Available water capacity is 11.5 to 12.5 inches. The effective rooting depth is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit I (19); range site not assigned; Storie index 77.

Bosanko Series

The Bosanko series consists of well drained soils on foothills. These soils formed in material weathered from calcareous shale, sandstone, or weakly consolidated sediments. Slopes are 9 to 50 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is annual grasses, mustard, and other forbs. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 61° F. The frost-free season is 300 to 350 days.

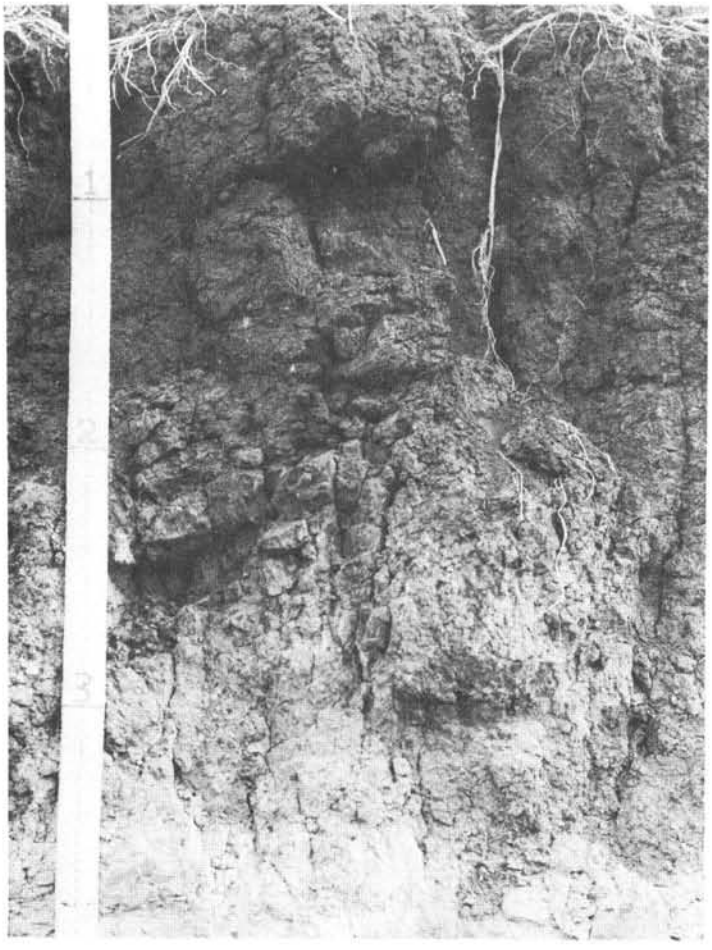

Figure 1.—**Profile of Bosanko clay, 9 to 15 percent slopes.**

Typically, the surface layer is dark gray clay 25 inches thick. The next layer is calcareous mixed dark gray clay and pale yellow weathered shale 12 inches thick. The bedrock is pale yellow and light brownish gray weathered shale (fig. 1).

The soil is mildly alkaline in the upper 12 inches and moderately alkaline below. It is slowly permeable.

Bosanko soils are used for dryland small grain, pasture, range, citrus, and urban development.

Typical profile of Bosanko clay, 9 to 15 percent slopes, NW¼SE¼ sec. 20, T. 6 S., R. 7 W., SBB&M; east of Oso Creek and about 1,600 feet southwest of Triangulation Point 1128:

Ap—0 to 2 inches; dark gray (10YR 4/1) clay, black (10YR 2/1) moist; strong fine and medium granular structure; very hard, firm, very sticky and very plastic; common very fine roots; many fine and medium interstitial pores; mildly alkaline; abrupt smooth boundary.

A12—2 to 12 inches; dark gray (10YR 4/1) clay, black (10YR 2/1) moist; strong very coarse prismatic structure; extremely hard, firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; mildly alkaline; gradual smooth boundary.

A13—12 to 25 inches; dark gray (10YR 4/1) clay, black (10YR 2/1) moist; moderate very coarse prismatic structure; extremely hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; common fine and medium intersecting slickensides; moderately alkaline; gradual wavy boundary.

ACca—25 to 37 inches; dark gray (10YR 4/1) clay and pale yellow (5Y 7/3) weathered shale, black (10YR 2/1) and olive (5Y 5/3) moist; moderate very coarse prismatic structure; very hard, firm, very sticky and very plastic; strongly effervescent; fine lime filaments and soft masses; moderately alkaline; clear smooth boundary.

Cr1—37 to 47 inches; pale yellow (5Y 7/3) weathered shale, olive (5Y 5/3) moist; very few very fine roots on fractures; lime coatings along fractures; common vertical and horizontal deposits of gypsum ¼ to 1 inch wide; moderately alkaline; gradual irregular boundary.

Cr2—47 to 79 inches; light brownish gray (2.5Y 6/2) weathered shale, grayish brown (2.5Y 5/2) moist; lime coatings along fractures; common vertical and horizontal deposits of gypsum ¼ to 1 inch wide; moderately alkaline.

The A horizon ranges from dark gray to gray in

10YR hue. Texture is clay, silty clay, or heavy clay loam. Structure ranges from granular in the upper few inches to prismatic or angular blocky. Dry consistence ranges from hard to extremely hard. Reaction is slightly acid to mildly alkaline in the A11 and A12 horizons and mildly alkaline to moderately alkaline in the A13. The A horizon is usually noncalcareous throughout. Thickness ranges from 14 to 25 inches.

The ACca horizon is generally two separate colors with about equal proportions of A and Cr materials. Texture is about the same as in the A horizon. In places the ACca contains segregated lime and is calcareous. Thickness ranges from 8 to 13 inches.

The Cr horizon is weathered shale or sandstone, or both, that can be easily cut with hand tools. Colors range from pale yellow, light brownish gray, and light gray to white in 5Y or 2.5Y hue. Lime coatings or some type of segregated lime generally occurs in the upper Cr horizon. Intersecting slickensides occur in the lower A horizon and in places in the ACca horizon.

When dry, the soil has cracks more than ½ inch wide to a depth of 20 inches to 36 inches.

126—Bosanko clay, 9 to 15 percent slopes. This strongly sloping soil generally occurs on broad hilltop ridges and on toe slopes. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Balcom clay loam, 9 to 15 percent slopes; 4 percent Alo clay, 9 to 15 percent slopes; and 10 percent soils that are similar to this Bosanko soil and are more than 40 inches deep.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 3.5 to 6.5 inches. The effective rooting depth is 26 to 38 inches.

Present land use is citrus, dryland barley, pasture, range, and urban development. Capability unit IIIe–5 (19); Clayey range site; Storie index 28.

127—Bosanko clay, 15 to 30 percent slopes. This moderately steep soil occurs on broad hilltop ridges. The profile is similar to the one described as typical of the series, but it is slightly shallower.

About 7 percent of this mapping unit is included areas of Balcom clay loam, 15 to 30 percent slopes; and 5 percent Alo clay, 15 to 30 percent slopes.

If the soil is bare, runoff is rapid and the erosion hazard is moderate. Available water capacity is 3.5 to 6.0 inches. The effective rooting depth is 26 to 36 inches.

Present land use is dryland barley, pasture, range, and urban development. Capability unit IVe–5 (19); Clayey range site; Storie index 21.

128—Bosanko clay, 30 to 50 percent slopes. This steep soil generally occurs on north-facing hillsides. The profile is similar to the one described as typical of the series, but it is slightly shallower.

About 7 percent of this mapping unit is included areas of Balcom clay loam, 30 to 50 percent slopes; and 5 percent Alo clay, 30 to 50 percent slopes.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 3.0 to 5.5 inches. The effective rooting depth is 22 to 32 inches.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 11.

129—Bosanko-Balcom complex, 15 to 30 percent slopes. This moderately steep mapping unit is about 45 percent Bosanko clay and about 45 percent Balcom clay loam. The Bosanko clay is on north- and east-facing side slopes and in swales. The Balcom clay loam is on hill ridgetops and on south- and west-facing side slopes.

About 3 percent of this unit is included areas of Alo clay, 15 to 30 percent slopes; 2 percent San Andreas sandy loam, 15 to 30 percent slopes; 5 percent Calleguas clay loam; and 10 percent less sloping or steeper soils.

Both soils have the profiles described as typical of the respective series. The Bosanko clay has an effective rooting depth of 26 to 36 inches and an available water capacity of 3.5 to 6.0 inches. The Balcom clay loam has an effective rooting depth of 26 to 36 inches and an available water capacity of 4.0 to 6.0 inches. Runoff is rapid, and the erosion hazard is moderate to high.

Present land use is dryland barley, pasture, and range. Capability unit IVe–5 (19); Clayey range site; Storie index 29 (according to the proportion of dominant soils).

130—Bosanko-Balcom complex, 30 to 50 percent slopes. This steep mapping unit is about 45 percent Bosanko clay and about 40 percent Balcom clay loam. The Bosanko clay is on north- and east-facing side slopes and in swales. The Balcom clay loam is on hill ridgetops and on south- and west-facing side slopes.

About 5 percent of this complex is included areas of Alo clay, 30 to 50 percent slopes; 3 percent Cieneba sandy loam; 7 percent Callaguas clay loam; and 10 percent less sloping or steeper soils.

Both soils have the profiles described as typical of the respective series. The Bosanko clay has an effective rooting depth of 22 to 32 inches and an available water capacity of 3.5 to 5.0 inches. The Balcom clay loam has an effective rooting depth of 24 to 30 inches and an available water capacity of 3.5 to 5.0 inches. Runoff is rapid, and the erosion hazard is high.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 13 (according to the proportion of dominant soils).

Botella Series

The Botella series consists of well drained soils on alluvial fans. These soils formed in sedimentary alluvium. Slopes are 2 to 15 percent. Elevation ranges from 25 to 1,500 feet. The vegetation is mainly annual grasses and forbs and some oak trees and brush. Precipitation is 12 to 20 inches, and the average annual air temperature is about 62° F. The frost-free season is 260 to 350 days.

Typically, the surface layer is grayish brown, slightly acid clay loam 8 inches thick. The subsoil is gray, neutral to mildly alkaline silty clay loam 27 inches thick. The substratum is gray and grayish brown, mildly alkaline or moderately alkaline clay loam to a depth of 66 inches or more.

The soil is moderately slowly permeable. Available water capacity is 9.5 to 11.5 inches. The effective rooting depth is 60 inches or more.

Botella soils are used for irrigated citrus, dryland small grain, pasture, and range.

Typical profile of Botella clay loam, 2 to 9 percent

slopes, in NW¼NE¼ sec. 6, T. 6 S., R. 7 W., SBB&M., Orange County, about 2 miles northeast of Highway 101 and ½ mile east of Oso Creek, in a small valley, on a 4 percent slope:

A1—0 to 8 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse and medium subangular blocky structure; hard, friable, very sticky and plastic; many very fine roots; common very fine tubular pores; slightly acid; clear smooth boundary.

B21t—8 to 24 inches; gray (10YR 5/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; continuous thin clay films on peds; neutral; clear smooth boundary.

B22t—24 to 35 inches; gray (10YR 5/1) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; many very fine tubular pores; continuous thin clay films on peds; mildly alkaline; slightly wavy boundary.

C1—35 to 50 inches; gray (10YR 5/1) clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; mildly alkaline; gradual wavy boundary.

C2—50 to 63 inches; gray (10YR 5/1) clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; moderately alkaline; gradual smooth boundary.

C3—63 to 66 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; moderately alkaline.

The A horizon ranges from grayish brown to dark grayish brown and gray to dark gray in 10YR hue. Texture is very fine sandy loam, loam, sandy clay loam, or clay loam. Structure varies from granular to subangular blocky. Dry consistence ranges from slightly hard to hard. Reaction ranges from slightly acid to neutral. Thickness ranges from 5 to 18 inches.

The B2t horizon ranges from gray to dark gray and grayish brown to dark grayish brown in 10YR and 2.5Y hue. Texture is sandy clay loam, clay loam, or silty clay loam. Structure is prismatic or subangular blocky. Dry consistence is hard or very hard. Reaction ranges from slightly acid to mildly alkaline. Thickness ranges from 11 to 30 inches.

The C horizon is sandy loam, fine sandy loam, sandy clay loam, or clay loam.

The Botella soils in this area have chroma somewhat higher in the mollic epipedon than is typical of the series as recognized elsewhere in California.

131—Botella loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on alluvial fans in long, narrow foothill valleys. It has a profile similar to the one described as typical of the series, but the surface layer is loam.

About 5 percent of this mapping unit is included areas where slopes at the lower ends of fans or valleys are 0 to 2 percent; 5 percent Capistrano sandy loam, 2 to 9 percent slopes; 5 percent Botella clay loam, 2 to 9 percent slopes; and 3 percent Sorrento sandy loam, 2 to 9 percent slopes.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is irrigated citrus, dryland small grain, pasture, and range. Capability unit IIe–1 (19); Loamy range site; Storie index 85.

132—Botella clay loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on alluvial fans in narrow foothill valleys. This soil has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas where slopes at the lower ends of fans or valleys are 0 to 2 percent; 5 percent Botella loam, 2 to 9 percent slopes; 5 percent Sorrento clay loam; and 3 percent Mocho loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is irrigated citrus, dryland small grain, pasture, and range. Capability unit IIe–1 (19); Clayey range site; Storie index 73.

133—Botella clay loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on alluvial fans in narrow foothill valleys.

About 3 percent of this mapping unit is included areas where slopes at the upper ends of fans or valleys are generally more than 15 percent; 5 percent Botella loam, 9 to 15 percent slopes; 3 percent Sorrento clay loam; and 3 percent Mocho loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is irrigated citrus, dryland small grain, pasture, and range. Capability unit IIIe–1 (19); Clayey range site; Storie index 69.

Calleguas Series

The Calleguas series consists of well drained soils on uplands. These soils formed in material weathered from lime coated shale or lime coated sandstone, or both. Slopes are 50 to 75 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is annual grasses and forbs, mostly mustard and brush. Precipitation is 13 to 20 inches, and the mean annual air temperature is about 61° F. The frost-free season is 300 to 350 days.

Typically, the soil is pale brown clay loam and shaly clay loam 15 inches thick. The underlying material is soft fractured shale with lime coatings. The soil is moderately alkaline and calcareous throughout. It is about 10 percent angular shale fragments to a depth of 11 inches and about 35 percent angular shale fragments from a depth of 11 to 15 inches.

The soil is moderately permeable. Available water

capacity is 1.5 to 3.5 inches. The effective rooting depth is 10 to 19 inches.

Calleguas soils are used for range, watershed, wildlife, and urban development.

Typical profile of Calleguas clay loam, 50 to 75 percent slopes, in Orange County, Irvine Ranch, along Buck Gully about ¼ mile northeast of Pacific Coast Highway, Corona Del Mar, NE¼SW¼ sec. 96 (by a private survey), T. 7 S., R. 9 W., SBB&M.

A11—0 to 7 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium granular structure; slightly hard, friable, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; about 10 percent angular shale fragments; strongly effervescent; disseminated lime; moderately alkaline; clear wavy boundary.

A12—7 to 11 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium granular structure; slightly hard, very friable, sticky and slightly plastic; many very fine roots; common very fine pores; about 10 percent angular shale fragments; violently effervescent; disseminated lime; moderately alkaline; abrupt wavy boundary.

A13—11 to 15 inches; pale brown (10YR 6/3) shaly clay loam, dark grayish brown (10YR 4/2) moist; weak fine and medium granular structure; slightly hard, very friable, sticky and plastic; many very fine roots; many very fine and few fine pores; about 35 percent angular shale fragments; violently effervescent; disseminated lime; moderately alkaline; abrupt wavy boundary.

Cr—15 to 42 inches; soft fractured shale with lime coatings on fractures.

The A horizon ranges from light brownish gray to pale brown and grayish brown in 10YR and 2.5Y hue. Texture is loam or clay loam. About 5 to 35 of the soil volume is small rock fragments. Structure is granular, or the soil is massive. Dry consistence is soft or slightly hard. Reaction is moderately alkaline. Carbonates are strongly effervescent to violently effervescent. Thickness ranges from 10 to 19 inches.

The Cr horizon is lime coated sandstone or calcareous shale, or both. It ranges from highly weathered to hard rock, but most of the material can be easily crushed.

134—Calleguas clay loam, 50 to 75 percent slopes, eroded. This very steep soil generally has south-facing slopes. It has the profile described as typical of the series. As much as 75 percent of the original surface layer has been lost in areas that have been cultivated, overgrazed, or burned because of sheet, rill, and gully erosion. Geologic erosion is active, and soil slipping is common. Many areas are a succession of short, vertical exposures or "cat steps."

About 5 percent of this mapping unit is included areas of Cieneba sandy loam; 5 percent Balcom clay loam; 3 percent Anaheim clay loam; and 10 percent less sloping or steeper Calleguas clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range, watershed, and urban development. Capability unit VIIe–1 (19); Shallow Clayey range site; Storie index 4.

Capistrano Series

The Capistrano series consists of well drained soils. These soils formed in granitic alluvium on alluvial fans and alluvial plains in small valleys of the Santa Ana Mountains and in sedimentary alluvium of the coastal foothills. Slopes are 2 to 15 percent. Elevation ranges from 25 to 2,500 feet. The vegetation is mostly grasses. There are a few oak trees in some areas. Precipitation is 14 to 25 inches, and the mean annual air temperature is about 60°F. The frost-free season is 240 to 340 days.

Typically, the surface layer is dark grayish brown sandy loam 27 inches thick. The underlying material is grayish brown sandy loam to a depth of 65 inches or more.

The soil is medium acid throughout. It is moderately rapidly permeable. The effective rooting depth is 60 inches or more. Available water capacity is 5.5 to 7.5 inches.

Capistrano soils are used for citrus, barley, pasture, range, wildlife, and recreation.

Typical profile of Capistrano sandy loam, 9 to 15 percent slopes, in Orange County, El Toro area, about 4,600 feet north-northeast of Trabuco Road and 200 feet northwest of Canada Road, Rancho Los Alisos; T. 5 S., R. 8 W., SBB&M.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; interstitial pores, medium acid; abrupt smooth boundary.

A12—5 to 16 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; common very fine interstitial pores; medium acid; gradual smooth boundary.

A13—16 to 27 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; common very fine interstitial pores; medium acid; gradual smooth boundary.

C—27 to 65 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; few very fine interstitial pores; medium acid.

The A horizon ranges from dark brown and brown to dark grayish brown in 10YR hue. Texture is fine sandy loam, sandy loam, or coarse sandy loam and may be gravelly. Structure is weak granular or subangular blocky, or the soil is massive. Thickness ranges from 20 to 40 inches. Reaction ranges from medium acid to neutral.

The C horizon ranges from brown and light yellowish brown to brownish yellow or grayish brown in 10YR hue and in places is mottled. Texture is sandy loam, coarse sandy loam, or fine sandy loam and may be gravelly. Reaction ranges from medium acid to mildly alkaline.

135—Capistrano sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil occurs mostly as long, narrow areas in small valleys.

About 7 percent of this mapping unit is included areas of a Capistrano soil that is gravelly; 2 percent Ramona fine sandy loam; 5 percent Hanford sandy loam; 5 percent Corralitos loamy sand; and 2 percent Myford sandy loam.

If the soil is bare, runoff is slow to medium and the erosion hazard is moderate.

Present land use is citrus, barley, pasture, range, wildlife, and recreation. Capability unit IIIe–1 (19); Loamy range site; Storie index 90.

136—Capistrano sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on small toe slope fans and in small, narrow foothill valleys. It has the profile described as typical of the series.

About 3 percent of this mapping unit is included areas of Capistrano soils where slopes at the upper ends of fans or valleys are generally more than 15 percent; 5 percent soils that have a sandy clay loam subsoil; 5 percent San Andreas sandy loam; and 3 percent Myford sandy loam, 9 to 15 percent slopes.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is irrigated citrus, dryland barley, pasture, and range. Capability unit IVe–1 (19); Loamy range site; Storie index 81.

Chesterton Series

The Chesterton series consists of moderately well drained soils. These soils formed in terracelike cappings over upland ridges. Slopes are 2 to 30 percent. Elevation ranges from 200 to 900 feet. The vegetation is annual grasses and forbs or native brush. Precipitation is 12 to 14 inches, and the mean annual air temperature is about 61°F. The frost-free season is 300 to 350 days.

Typically, the surface layer is pale brown loamy sand 15 inches thick. The subsurface layer is white leached loamy sand 1 inch thick. The subsoil is brown or grayish brown sandy clay, mottled with brownish yellow and yellowish red, 14 inches thick. The substratum is 2 inches of yellowish brown sandy loam that overlies a silica cemented hardpan.

The soil is strongly acid throughout. It is very slowly permeable. Available water capacity is 1.0 to 2.5 inches. The effective rooting depth is 20 to 40 inches.

Chesterton soils are used for range, watershed, and urban development.

Typical profile of Chesterton loamy sand, 2 to 15 percent slopes, about ½ mile north-northeast of the intersection of Vista Del Sol Road and Coast Highway 1, South Laguna, T. 8 S., R. 8 W., SBB&M.

A11—0 to 5 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and medium roots; many fine interstitial pores; very few fine tubular pores; strongly acid; gradual smooth boundary.

A12—5 to 12 inches; pale brown (10YR 6/3) loamy sand, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine, few fine and medium roots; many fine interstitial pores; strongly acid; gradual smooth boundary.

A13—12 to 15 inches; very pale brown (10YR 7/3) loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many fine interstitial pores; strongly acid; abrupt wavy boundary.

A2—15 to 16 inches; white (10YR 8/2) loamy sand, pale brown (10YR 6/3) moist; massive; hard, friable, slightly sticky and nonplastic; very few very fine roots; many fine interstitial pores; strongly acid; abrupt smooth boundary.

B21t—16 to 22 inches; brown (10YR 5/3) sandy clay with 30 percent brownish yellow (10YR 6/6) and 20 percent yellowish red (5YR 4/8) mottles, grayish brown (10YR 5/2) with yellowish brown (10YR 5/6) and yellowish red (5YR 4/6) mottles moist; strong coarse prismatic structure; extremely hard, firm, sticky and plastic; very few very fine exped roots; few fine interstitial pores; very few fine tubular pores; many moderately thick and thick clay films on peds and as bridges; strongly acid; gradual wavy boundary.

B22t—22 to 30 inches; grayish brown (10YR 5/2) sandy clay with 20 percent brownish yellow (10YR 6/6) and 10 percent yellowish red (5YR 4/8) mottles, dark grayish brown (10YR 4/2) with yellowish brown (10YR 5/6) and yellowish red (5YR 4/6) mottles moist; moderate coarse prismatic structure; extremely hard, firm, sticky and plastic; very few very fine exped roots; continuous thick clay films line few fine and large root channels; strongly acid; clear smooth boundary.

C1—30 to 32 inches; yellowish brown (10YR 5/6) coarse sandy loam, brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky, nonplastic; continuous thick clay films line few root channels and few fractures; strongly acid; abrupt smooth boundary.

C2m—32 inches; silica cemented hardpan; common medium and coarse horizontal roots along the upper boundary; very difficult to cut with hand tools.

The A1 horizon ranges from brown to very pale brown in 10YR hue. Texture is loamy sand or sandy loam. Dry consistence ranges from soft to hard. Reaction is strongly acid to medium acid. Thickness ranges from 10 to 19 inches. Some profiles lack the thin A2 horizon. There are no iron concretions in the A horizon. A few 1/8 to 1/2 inch in size occur at the surface in this area.

The B2t horizon is brown, grayish brown, or yellowish brown in 10YR or 7.5YR hue. In places it is mottled with brownish yellow, yellowish red, gray, or red. Texture is heavy clay loam or sandy clay. In places the prismatic structure parts to angular blocky. Reaction is strongly acid to medium acid. Thickness ranges from 10 to 18 inches.

The thin C1 horizon is discontinuous. Depth to the white to reddish brown Cm horizon is 20 to 37 inches.

The Chesterton soils in this area do not have the concretions typical of the series as recognized elsewhere in California.

137—Chesterton loamy sand, 2 to 15 percent slopes. This gently sloping to strongly sloping soil is generally on undulating terracelike cappings of hills within a few miles of the coast. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Chesterton soils, 0 to 2 percent slopes; 5 percent Marina loamy sand; 5 percent Myford sandy loam; and 5 percent soils that are 10 to 20 inches deep over a silica hardpan and do not have a sandy clay subsoil but are otherwise similar to this Chesterton soil.

If the soil is bare, runoff is medium and the erosion hazard is high.

Present land use is range, watershed, and urban development. Capability unit VIe–1 (19) ; Claypan range site; Storie index 21.

138—Chesterton loamy sand, 15 to 30 percent slopes. This moderately steep soil generally occurs at the edges of terracelike cappings on hills within a few miles of the coast.

About 10 percent of this mapping unit is included areas of less sloping or steeper soils; 4 percent Marina loamy sand; 4 percent Myford sandy loam; and 5 percent soils that are 10 to 20 inches deep over a silica hardpan and do not have a sandy clay subsoil but are otherwise similar to this Chesterton soil.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range, watershed, and some urban development. Capability unit VIe–1 (19) ; Claypan range site; Storie index 15.

Chino Series

The Chino series consists of somewhat poorly drained soils on alluvial fans. These soils formed in sedimentary alluvium. Slopes are 0 to 2 percent. Elevation ranges from 5 to 200 feet. The vegetation is annual grasses and forbs. Precipitation is 12 to 15 inches, and the mean annual air temperature is about 61° F. The frost-free season is 300 to 350 days.

Typically, the surface layer is gray silty clay loam 24 inches thick. The underlying material is grayish brown, gray, and light gray silty clay loam in places mottled with light brownish gray. It is 23 inches thick over light gray sandy clay loam, which extends to a depth of 60 inches or more.

The soil is moderately alkaline and calcareous throughout. It is moderately slowly permeable. Available water capacity is 9.5 to 13.0 inches.

Chino soils are used for row crops, field crops, and urban development.

Typical profile of Chino silty clay loam, on the Irvine Ranch, N1/4S1/4 sec. 45 (by private survey), in Orange County:

Ap1—0 to 3 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak fine granular structure; hard, friable, sticky and plastic; common very fine roots; common very fine and fine tubular pores; violently effervescent; disseminated lime throughout; moderately alkaline; abrupt smooth boundary.

Ap2—3 to 13 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; weak medium angular and subangular blocky structure; hard, friable, sticky and plastic; very few fine and common very fine roots; common very fine and fine tubular pores; violently effervescent; disseminated lime throughout; moderately alkaline; abrupt smooth boundary.

A13—13 to 24 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist, with light brownish gray (2.5Y 6/2) mottles, dark grayish brown (2.5Y 4/2) moist; weak medium angular and subangular blocky structure; hard, friable, sticky and plastic; very few fine and common very fine roots; very few medium and common very fine and fine tubular pores; violently effervescent; disseminated lime throughout; moderately alkaline; clear smooth boundary.

C1—24 to 29 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (2.5Y 3/2) moist, with light brownish gray (2.5Y 6/2) mottles, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; common very fine roots; few fine and common very fine tubular pores; violently effervescent; disseminated and medium sized filaments of lime throughout; moderately alkaline; clear smooth boundary.

C2—29 to 37 inches; gray (10YR 6/1) silty clay loam, dark gray (10YR 4/1) moist; massive; hard, friable, sticky and plastic; few very fine roots; common very fine and fine tubular pores; violently effervescent; disseminated lime throughout; moderately alkaline; abrupt smooth boundary.

C3—37 to 47 inches; light gray (10YR 7/1) silty clay loam, gray (10YR 5/1) moist; massive; hard, firm, sticky and plastic; very few very fine roots; common very fine tubular pores; violently effervescent; disseminated lime throughout; moderately alkaline; clear smooth boundary.

C4—47 to 60 inches; light gray (10YR 6/1 and 2.5Y 7/2) sandy clay loam, dark gray (10YR 4/1) and dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, sticky and plastic; common very fine and fine tubular pores; violently effervescent; disseminated lime; moderately alkaline.

The A horizon ranges from gray to grayish brown in 10YR hue. Texture is silt loam or silty clay loam. Thickness ranges from 10 to 25 inches.

The C horizon ranges from dark gray, gray, and light gray to light brownish gray in 10YR and 2.5Y hue. Texture is loam, silt loam, clay loam, sandy clay loam, or silty clay loam.

The soil is moderately alkaline and calcareous throughout and may be slightly saline-alkali. Natural drainage is somewhat poor, and the water table is within a depth of 40 inches. Many areas, however, have been drained and the water table is at a depth of 60 inches or more.

139—Chino silty clay loam. This nearly level soil generally occurs on large alluvial fans.

About 10 percent of this mapping unit is included areas of Bolsa silty clay loam; 5 percent Omni clay; and 2 percent Tidal flats.

Depth to a seasonal water table is 42 to 60 inches. Runoff is very slow, and the erosion hazard is none to slight. Drainage has not been altered. The effective rooting depth of most crops is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit IIw–2 (19); range site not assigned; Storie index 72.

140—Chino silty clay loam, drained. This nearly level soil generally occurs on large alluvial fans. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Bolsa silty clay loam, drained; 5 percent Omni clay; 2 percent Mocho loam; and 2 percent Sorrento clay loam.

If the soil is bare, runoff is slow and the erosion hazard is slight. This soil is drained, and the water table is more than 60 inches below the surface. The effective rooting depth is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit I (19); range site not assigned; Storie index 81.

Cieneba Series

The Cieneba series consists of somewhat excessively drained soils. These soils formed in material weathered from granitic rocks of the Santa Ana Mountains and from the sandstone of the coastal foothills. Slopes are 9 to 75 percent. Elevation ranges from 200 to 4,000 feet. The vegetation is mostly brush. Precipitation is 14 to 25 inches, and the mean average air temperature is 59 to 62° F. The frost-free season is 200 to 340 days.

Typically, the surface layer is light brownish gray and pale brown sandy loam 7 inches thick. The underlying material is weathered granodiorite.

The soil is medium acid throughout. It is moderately rapidly permeable.

Cieneba soils are used mainly for watershed and wildlife habitat and to a limited extent for range.

Typical profile of Cieneba sandy loam, in an area of Cieneba-Rock outcrop complex, 15 to 30 percent slopes, in the Trabuco Ranger District, Cleveland National Forest (North), Orange County, about 800 feet south of the junction of the Main Divide Road and Horsethief Trail, SW¼SW¼ sec. 36, T. 5 S., R. 6 W., SBB&M.

A11—0 to 1 inch; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; weak thin and medium platy structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; medium acid; clear smooth boundary.

A12—1 to 7 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and medium roots; few medium tubular pores, few fine and medium interstitial pores; medium acid; abrupt smooth boundary.

Cr—7 to 20 inches; yellow, light brownish gray, white, and black weathered granodiorite; massive; hard to very hard; few roots in upper few inches; medium acid; grades into hard granodiorite at an undetermined depth below 20 inches.

The A horizon ranges from grayish brown, light brownish gray, or pale brown to yellowish brown in 10YR hue. Texture is fine gravelly sandy loam, coarse sandy loam, or sandy loam. Structure is generally granular or the soil is massive except for a platy crust in some areas. Dry consistence ranges from soft to hard. Thickness ranges from 5 to 19 inches.

The Cr horizon is weathered granodiorite of the Santa Ana Mountains area and soft sandstone of other coastal foothill areas.

Reaction ranges from medium acid to neutral throughout.

141—Cieneba sandy loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on or near ridgetops. It is only 15 to 19 inches deep over weathered bedrock.

About 5 percent of this mapping unit is included areas of San Andreas sandy loam; 5 percent Anaheim loam; and 3 percent Soper gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 2.0 to 3.0 inches. The effective rooting depth is 15 to 19 inches, but some brush roots penetrate deeper into the weathered granite or along cracks in the sandstone.

Present land use is pasture, range, and urban development. Capability unit VIe–1 (19); Shallow Loamy range site; Storie index 23.

142—Cieneba sandy loam, 30 to 75 percent slopes, eroded. This steep to very steep soil has a profile similar to the one described as typical of the series, but it is

eroded. It is only 5 to 15 inches deep over bedrock. In many places it is cut by gullies and intermittent drainage channels. Geologic erosion is active, and small landslips are common. Surface cobbles and stones are numerous in some areas.

About 5 percent of this mapping unit is included areas of San Andreas sandy loam; 5 percent Soper cobbly loam; 5 percent Calleguas clay loam; 10 percent an uneroded Cieneba sandy loam in the coastal foothill area; 6 percent Vista coarse sandy loam; 4 percent Tollhouse-Rock outcrop complex; and 3 percent Blasingame loam, in the Santa Ana Mountain area.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 0.75 to 2.5 inches. The effective rooting depth is 5 to 15 inches.

Present land use is limited to range, watershed, and wildlife habitat. Capability unit VIIe–1 (19); Shallow Loamy range site; Storie index 7.

143—Cieneba-Blasingame-Rock outcrop complex, 9 to 30 percent slopes. This strongly sloping to moderately steep mapping unit is about 35 percent Cieneba sandy loam, 30 percent Blasingame loam, and 25 percent Rock outcrop and large boulders. The Cieneba soil and Rock outcrop generally occur on ridgetops and on south- and west-facing side slopes. The Blasingame soil and Rock outcrop generally occur on north- and east-facing side slopes. About 10 percent of this mapping unit is included areas of Vista coarse sandy loam.

In Cieneba sandy loam, available water capacity is 2.0 to 3.0 inches and the effective rooting depth is 15 to 19 inches. In Blasingame loam, available water capacity is 2.5 to 4.0 inches and the effective rooting depth is 20 to 30 inches. Rock outcrop is granodiorite outcrop or boulders.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is limited to range, wildlife habitat, and watershed. Capability unit VIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 17 (according to the proportion of dominant soils).

144—Cieneba-Rock outcrop complex, 9 to 30 percent slopes. This strongly sloping to moderately steep mapping unit commonly occurs on broad mountain ridgetops and side slopes in the Santa Ana Mountains. It is 30 percent granodiorite outcrop and boulders.

About 7 percent of this mapping unit is included areas of Vista coarse sandy loam; 4 percent Tollhouse soils; and 3 percent Blasingame loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The Cieneba soil has an available water capacity of 2.0 to 3.0 inches. For most plants it has an effective rooting depth of 15 to 19 inches. Some brush roots penetrate deeper into the weathered bedrock.

Present land use is limited to range, watershed, and wildlife habitat. Capability unit VIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 14.

145—Cieneba-Rock outcrop complex, 30 to 75 percent slopes. This steep to very steep mapping unit occurs on hillsides or mountainsides. In the Santa Ana Mountain area, it is about 30 percent granodiorite outcrop and boulders. In coastal foothill areas, it is 10 to 35 percent sandstone outcrop.

About 5 percent of this mapping unit is included areas of Vista coarse sandy loam; 5 percent Tollhouse soil in the Santa Ana Mountain area; 5 percent San Andreas sandy loam; and 5 percent Anaheim loam in the coastal foothills.

If the soil is bare, runoff is rapid and the erosion hazard is high. Cieneba sandy loam has an available water capacity of 0.75 to 2.5 inches. For most plants it has an effective rooting depth of 5 to 15 inches. Some brush roots penetrate deeper into the weathered bedrock.

Present land use is limited to range, watershed, and wildlife habitat. Capability unit, Cieneba soil, VIIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 4.

Corralitos Series

The Corralitos series consists of somewhat excessively drained soils on fans in long, narrow valleys. These soils formed in mixed coarse textured alluvium. Slopes are 0 to 5 percent. Elevation ranges from 50 to 1,500 feet. The vegetation is mainly annual grasses and forbs and some trees and brush generally near stream channels. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 230 to 300 days.

Typically, the surface layer is grayish brown loamy sand and loamy fine sand 9 inches thick. The underlying material is stratified light brownish gray and light gray loamy coarse sand, sand, and loamy fine sand to a depth of 60 inches or more.

The soil is medium acid throughout. It is rapidly permeable.

Corralitos soils are used for citrus, irrigated row crops, pasture, and range.

Typical profile of Corralitos loamy sand, on the Rancho Mission Viejo, Orange County, about 400 feet east of the Ortega Highway bridge (which is 2.4 miles east of San Juan Capistrano) and 100 feet north of the highway, SW¼NW¼ sec. 33, T. 7 S., R. 7 W., SBB&M.

A11—0 to 2 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few fine pores; medium acid; abrupt smooth boundary.

A12—2 to 9 inches; grayish brown (10YR 5/2) loamy fine sand, dark gray (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine pores; medium acid; clear smooth boundary.

C1—9 to 21 inches; light brownish gray (10YR 6/2) loamy coarse sand, dark gray (10YR 4/1) moist; single grained; loose, nonsticky and nonplastic; medium acid; gradual smooth boundary.

C2—21 to 32 inches; light gray (10YR 6/1) gray (10YR 5/1) and light brownish gray (10YR 6/2) sand, gray (10YR 5/1) and dark gray (10YR 4/1) moist; single grained; loose, nonsticky and nonplastic; medium acid; abrupt smooth boundary.

C3—32 to 35 inches; light brownish gray (10YR 6/2) loamy fine sand, dark gray (10YR

4/1) moist; massive; soft, very friable, nonsticky and nonplastic; medium acid; abrupt wavy boundary.

C4—35 to 60 inches; light brownish gray (10YR 6/2) sand, gray (10YR 5/1) moist; single grained; loose, nonsticky and nonplastic; medium acid.

The A horizon ranges from grayish brown to brown or pale brown to light brownish gray in 10YR hue. Texture is sand, loamy sand, or loamy fine sand. Structure may be granular, but in many places the soil is massive or single grained. Dry consistence ranges from loose to soft or slightly hard. Thickness ranges from 9 to 20 inches.

The C horizon ranges from pale brown, light brownish gray, and very pale brown to light gray in 10YR hue. Texture is generally sand, loamy sand, loamy coarse sand, or loamy fine sand. In places the soil is stratified. Reaction ranges from medium acid to neutral.

In some soils the underlying material is of contrasting texture. Color ranges from dark gray to light brownish gray. Texture is silt loam or silty clay loam. Thickness is 2 to 6 inches or more. Depth to such strata is generally 40 to 60 inches.

146—Corralitos loamy sand. This nearly level to gently sloping soil generally occurs as long narrow areas along stream channels. It has the profile described as typical of the series.

About 2 percent of this mapping unit is included areas of Capistrano sandy loam; 4 percent Metz loamy sand; 3 percent Soboba gravelly loamy sand, 0 to 5 percent slopes; 5 percent Riverwash; and 20 percent Corralitos soils that have a very fine sandy loam overwash 4 to 10 inches thick.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 4.0 to 5.5 inches. The effective rooting depth is 60 inches or more.

Present land use is irrigated row crops, citrus, pasture, and range. Capability unit IIIs–4 (19); Sandy range site; Storie index 68.

147—Corralitos loamy sand, moderately fine substratum. This nearly level to gently sloping soil generally occurs as long narrow areas along stream channels. The profile is similar to the one described as typical of the series, but there is a silt loam or silty clay loam layer 2 to 6 inches thick at a depth of 36 to 60 inches.

About 10 percent of this mapping unit is included areas of Corralitos loamy sand; 3 percent Corralitos soils that have a very fine sandy loam overwash; 2 percent Capistrano sandy loam; 2 percent Riverwash; and 5 percent Metz loamy sand, moderately fine substratum.

Permeability is rapid in the upper 40 inches and slow in the moderately fine underlying stratum. An intermittent water table is perched just above the finer textured stratum if rainfall is above normal or if the soils are overirrigated.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 5.5 to 6.0 inches. The effective rooting depth is 60 inches or more.

Present land use is irrigated row crops, citrus, pasture, and range. Capability unit IIs–4 (19); Sandy range site; Storie index 65.

Cropley Series

The Cropley series consists of well drained soils on fans and valley fill. These soils formed in fine textured alluvium derived from sedimentary rocks. Slopes are 0 to 9 percent. Elevation ranges from 50 to 1,000 feet. The vegetation is annual grasses and forbs. Precipitation is 10 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 280 to 340 days.

Typically, the surface layer is very dark gray clay 29 inches thick. The underlying material is dark gray clay to a depth of 60 inches or more. The soil is mildly alkaline in the surface layer and moderately alkaline and slightly calcareous in the subsurface layer. The underlying material is moderately alkaline, has segregated lime, and increases from slightly calcareous to violently calcareous with increasing depth.

The soil is slowly permeable. Available water capacity is 8.0 to 10.0 inches. The effective rooting depth is 60 inches or more.

Cropley soils are used for dryland small grain, pasture, range, citrus, and urban development.

Typical profile of Cropley clay, 2 to 9 percent slopes, in Oso Creek Valley, about 3.0 miles southeast of El Toro, Orange County, NW¼SW¼ sec. 20, T. 6 S., R. 7 W., SBB&M.

Ap—0 to 3 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; moderate fine and medium granular structure; hard, firm, very sticky and plastic; few very fine roots; few very fine and fine tubular pores; mildly alkaline; abrupt smooth boundary.

A12—3 to 15 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong very coarse prismatic structure parting to moderate medium and coarse angular blocky; extremely hard, firm, very sticky and plastic; common very fine and few fine roots; common very fine tubular pores; slightly effervescent; moderately alkaline; clear smooth boundary.

A13—15 to 29 inches; very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; moderate medium and coarse angular blocky structure; extremely hard, firm, very sticky and plastic; common very fine and few fine roots; common very fine tubular pores; few small slickensides; slightly effervescent; moderately alkaline; gradual smooth boundary.

C1—29 to 38 inches; dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse angular blocky structure; extremely hard, firm, very sticky and plastic; few very fine roots; few very fine tubular pores; common small intersecting slickensides; slightly effervescent; lime in filaments and soft masses; moderately alkaline; gradual smooth boundary.

C2—38 to 49 inches; dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; very hard, firm, very sticky and plastic; very few very fine and fine roots; common very fine tubular pores; common small intersecting slickensides; violently effervescent; lime in filaments and soft masses; moderately alkaline; gradual irregular boundary.

C3—49 to 65 inches; dark gray (10YR 4/1) clay, very dark grayish brown (10YR 3/2) moist; moderate medium angular blocky structure; very hard, firm, very sticky and plastic; very few very fine and fine roots; common very fine tubular pores; common small intersecting slickensides; violently effervescent; lime in filaments and soft masses; moderately alkaline.

The A horizon ranges from dark gray to very dark gray in 10YR hue. Texture is heavy clay loam, silty clay, or clay. Structure ranges from granular to subangular blocky in the upper few inches. Reaction is neutral to moderately alkaline. The upper few inches is noncalcareous. In places the lower part is calcareous. Thickness ranges from 20 to 35 inches.

The C horizon ranges from dark gray, dark grayish brown, brown to yellowish brown in 10YR and 2.5Y hue. Texture is clay, silty clay loam, or clay loam. Structure is typically angular blocky; in places this horizon is massive. Dry consistence is extremely hard to hard. The C horizon is calcareous with or without segregated lime.

Intersecting slickensides occur in some parts of the profile. When dry, the soil has cracks 1 to 2 inches wide to a depth of 20 inches or more.

148—Cropley clay, 0 to 2 percent slopes. This nearly level soil generally occurs as irregular, oblong areas.

About 10 percent of this mapping unit is included areas of a soil that is very dark grayish brown or dark grayish brown clay but is otherwise similar to this Cropley soil; 5 percent Omni clay, drained; 3 percent Chino silty clay loam, drained; and 5 percent Bosanko clay.

If the soil is bare, runoff is slow and the erosion hazard is slight.

Present land use is urban development and citrus. Capability unit IIs–5 (19); Clayey range site; Storie index 54.

149—Cropley clay, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs as irregular, oblong areas. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Cropley clay, 0 to 2 percent slopes; 10 percent a soil that is very dark grayish brown to dark grayish brown clay but is otherwise similar to this Cropley soil; 7 percent Bosanko clay; and 3 percent Botella clay loam, 2 to 9 percent slopes.

If the soil is bare, runoff is medium and the erosion hazard is slight.

Present land use is citrus, barley, pasture, range, and urban development. Capability unit IIe–5 (19); Clayey range site; Storie index 47.

Escondido Series

The Escondido series consists of well drained soils on uplands in the Santa Ana Mountains. These soils formed in material weathered from metamorphosed sandstone. Slopes are 9 to 30 percent. Elevation ranges from 1,000 to 3,500 feet. The vegetation is mostly an oak-grass type. Precipitation is 16 to 25 inches, and the mean annual air temperature is about 60° F. The frost-free season is 240 to 300 days.

In a typical profile the surface layer is brown, slightly acid and medium acid very fine sandy loam 16 inches thick. The subsoil is light yellowish brown, medium acid very fine sandy loam 13 inches thick. Slightly weathered metamorphic sandstone is at a depth of 29 inches.

The soil is moderately permeable. Available water capacity is 3.0 to 5.5 inches. The effective rooting depth is 24 to 35 inches.

Escondido soils are used for pasture, range, watershed, and wildlife.

Typical profile of Escondido very fine sandy loam, 9 to 15 percent slopes, in the Trabuco Ranger District, Cleveland National Forest (north), NW¼SW¼ sec. 18, T. 7 S., R. 5 W., SBB&M; about 50 feet west of the trail in Oak Flats:

O1—½ inch to 0; litter of oak leaves, grass stems, small twigs, and tree branches.

A11—0 to 3 inches; brown (10YR 5/3) very fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and fine tubular pores; 5 percent small angular pebbles; slightly acid; abrupt smooth boundary.

A12—3 to 16 inches; brown (10YR 5/3) very fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and medium tubular pores; 5 percent angular pebbles; medium acid; gradual wavy boundary.

B2—16 to 29 inches; light yellowish brown (10YR 6/4) very fine sandy loam, few fine faint pinkish mottles, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few medium and coarse, many very fine and fine roots; common very fine and fine tubular pores; 5 percent pebbles; medium acid; gradual wavy boundary.

R—29 to 34 inches; light yellowish brown (10YR 6/4) slightly weathered metamorphosed sandstone, dark yellowish brown (10YR 4/4) moist.

The A horizon ranges from brown to yellowish brown in 10YR and 7.5YR hue. Texture is fine sandy loam, very fine sandy loam, or silt loam. The soil may be massive in the lower part. Dry consistence is slightly

hard to hard. Thickness ranges from 12 to 18 inches.

The B horizon ranges from pale brown, brown, light yellowish brown, or yellowish brown, to strong brown in 10YR and 7.5YR hue. Texture is fine sandy loam, very fine sandy loam, or silt loam. Reaction ranges from medium acid to neutral. Thickness ranges from 12 to 17 inches.

There may be a discontinuous C horizon. The water table is commonly perched above the R horizon after prolonged rain or irrigation.

These soils occur at elevations up to 700 feet higher than recognized elsewhere in California because of the warmer climate on the south- and west-facing slopes of the Santa Ana Mountains.

150—Escondido very fine sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs as irregular, oblong areas. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of fine sandy loam, 3 percent Exchequer soils, 3 percent Blasingame loam, and 10 percent less sloping or steeper Escondido very fine sandy loam. A few low outcrops of rock occur in some areas.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is pasture, range, watershed, and wildlife. Capability unit IVe–1 (19); Loamy range site; Storie index 51.

151—Escondido very fine sandy loam, 15 to 30 percent slopes. This moderately steep soil generally occurs as irregular, oblong areas.

About 10 percent of this mapping unit is included areas of Friant fine sandy loam, 3 percent Exchequer soils, 3 percent Blasingame loam, and 15 percent less sloping or steeper Escondido very fine sandy loam. A few low outcrops of rock occur in some areas.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range, watershed, and wildlife. Capability unit VIe–1 (19); Loamy range site; Storie index 39.

Exchequer Series

The Exchequer series consists of well drained and somewhat excessively drained soils in the Santa Ana Mountains. These soils formed in material weathered from metabasic rock. Slopes are 30 to 75 percent. Elevation ranges from 1,000 to 4,000 feet. The vegetation is generally dense brush, but there is some annual grass. Precipitation is 16 to 25 inches, and the mean annual temperature is about 59° F. The frost-free season is 220 to 300 days.

In a typical profile the soil is reddish brown gravelly silt loam. Fractured metaandesite is at a depth of 18 inches. The soil is slightly acid throughout. Low rock outcrops cover about 10 percent of the surface area.

The soil is moderately permeable. Available water capacity is 1.0 to 3.0 inches. The effective rooting depth is 8 to 18 inches.

Exchequer soils are used for watershed and wildlife and to a limited extent for range.

Typical profile of Exchequer gravelly silt loam, in an area of Exchequer-Rock outcrop complex, 30 to 75 percent slopes, ¼ mile south of Bear Spring along Main Divide Truck Trail, SE¼NE¼ sec. 29, T. 5 S., R. 6 W., SBB&M., Orange County:

A11—0 to 3 inches; reddish brown (5YR 4/4) gravelly silt loam, dark reddish brown (5YR 3/4) moist; weak fine and medium granular structure; soft, friable, nonsticky and nonplastic; common fine and medium, many very fine roots; many very fine, fine, and medium tubular pores; 15 percent 1- to 3-inch and 5 percent 4-inch angular rock fragments; slightly acid; clear wavy boundary.

A12—3 to 9 inches; reddish brown (5YR 4/4) gravelly silt loam, dark reddish brown (5YR 3/2) moist; massive; soft, friable, nonsticky and nonplastic; many very fine, fine, medium, and coarse roots; many very fine and fine tubular pores; 20 percent 1- to 4-inch angular rock fragments; slightly acid; clear wavy boundary.

A13—9 to 18 inches; reddish brown (5YR 5/4) gravelly heavy silt loam, reddish brown (5YR 4/4) moist; massive; soft, friable, slightly sticky and plastic; few very fine and many fine and medium roots; many very fine tubular pores; 20 percent pebbles; slightly acid; abrupt broken boundary.

R—18 to 30 inches; fractured metaandesite; upper vertical fractures filled with soil material and few very fine and common medium and coarse roots.

The A horizon ranges from yellowish red to reddish brown or strong brown in 5YR or 7.5YR hue. Texture is gravelly loam, gravelly silt loam, or gravelly light clay loam. Reaction ranges from strongly acid to slightly acid. Structure typically ranges from weak granular to weak angular blocky. In places this horizon is massive. Thickness ranges from 8 to 18 inches.

These soils occur at elevations up to 2,000 feet higher than recognized elsewhere because of the warmer climate on the south- and west-facing slopes of the Santa Ana Mountains.

152—Exchequer-Rock outcrop complex, 30 to 75 percent slopes. This steep to very steep mapping unit occurs on mountainsides. It is about 10 percent low rock outcrops and about 65 percent Exchequer gravelly silt loam. The Exchequer soil has the profile described as typical of the series.

About 6 percent of this mapping unit is included areas of Friant fine sandy loam, 30 to 70 percent slopes; 3 percent Escondido very fine sandy loam; 3 percent Blasingame stony loam, 30 to 65 percent slopes; and 10 percent less sloping or steeper Exchequer-Rock outcrop complex.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is watershed, wildlife and, to a limited extent, range. Capability unit VIIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 8.

Friant Series

The Friant series consists of somewhat excessively drained soils in the mountains. These soils formed in material weathered from fine grained metasedimentary rock. Slopes are 30 to 70 percent. Elevation ranges from 1,000 to 4,000 feet. The vegetation is mostly California sagebrush, black sage, flattop, buckwheat, and other common brush plants. Precipitation is 16 to 25 inches, and the mean annual air temperature is about 60° F. The frost-free season is 210 to 280 days.

In a typical profile the soil is brown gravelly fine sandy loam 17 inches thick. Very dark gray, fractured, extremely hard metasedimentary rock extends to a depth of 34 inches or more. The soil is slightly acid. About 2 percent of the soil surface is large, low rock outcrops.

Permeability is moderately rapid. Available water capacity is 1.0 to 2.0 inches. The effective rooting depth is 9 to 18 inches.

These soils are used for watershed, wildlife and, to a limited extent, for range.

Typical profile of Friant fine sandy loam, 30 to 70 percent slopes, in the Trabuco Ranger District, Cleveland National Forest (north), SE¼NW¼ sec. 31, T. 5 S., R. 6 W., SBB&M, Orange County, about ½ mile south of "Old Camp" on the Santiago Truck Trail:

A11—0 to 4 inches; brown (10YR 5/3) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, nonsticky and nonplastic; common very fine, few fine and medium roots; very few fine tubular pores; about 25 percent angular pebbles; slightly acid; clear smooth boundary.

A12—4 to 17 inches; brown (10YR 5/3) gravelly fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and medium, few very fine roots; few fine and medium tubular pores; common very fine interstitial pores; about 25 percent angular pebbles; slightly acid; abrupt irregular boundary.

R—17 to 34 inches; very dark gray (10YR 3/1) and about 10 percent light yellowish brown (10YR 6/4) and strong brown (7.5YR 5/6) fractured metasedimentary rock.

The A horizon ranges from brown to dark brown in 10YR hue. Texture is very fine sandy loam or sandy loam and in places is gravelly. Reaction ranges from medium acid to neutral. Thickness ranges from 9 to 18 inches. The bedrock is fractured metamorphosed fine grained sandstone or schist.

These soils occur at elevations up to 500 feet higher than those observed elsewhere in California because of the warmer climate on the west- and south-facing slopes of the Santa Ana Mountains.

153—Friant fine sandy loam, 30 to 70 percent slopes. This steep to very steep soil generally occurs in the mountains. It has the profile described as typical of the series.

About 7 percent of this mapping unit is included areas of Escondido very fine sandy loam, 3 percent Exchequer-Rock outcrop complex, 3 percent Cieneba-Rock outcrop complex, and 10 percent less sloping or steeper Friant soils.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is watershed, wildlife, and range. Capability unit VIIe-1 (19); Shallow Loamy range site; Storie index 9.

Gabino Series

The Gabino series consists of moderately steep and steep, well drained soils on terraces. These soils formed in weakly consolidated conglomerate. Slopes are 15 to 50 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is mainly annual grasses and forbs, stipa, and scattered brush. Precipitation is 12 to 20 inches, and the mean annual temperature is 60 to 63° F. The frost-free season is 290 to 350 days.

In a typical profile the surface layer is brown gravelly clay loam 10 inches thick. The subsoil is reddish brown gravelly clay 28 inches thick. The substratum is weakly consolidated conglomerate. The surface layer is medium acid, and the subsoil ranges from slightly acid to mildly alkaline with increasing depth.

The soil is slowly permeable. Available water capacity is 3.0 to 6.0 inches. The effective rooting depth is 26 to 40 inches.

Gabino soils are used for dryland pasture, range, and watershed.

Typical profile of Gabino gravelly clay loam, 15 to 30 percent slopes, about 2,800 feet east of Gabino Canyon, Ranch Mission Viejo, Orange County, NW¼NE¼ sec. 33, T. 7 S., R. 6 W., SBB&M.

A11—0 to 5 inches; brown (10YR 5/3) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak coarse prismatic structure parting to weak medium subangular blocky; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; 2 to 3 percent cobbles, 15 percent pebbles; medium acid; clear smooth boundary.

A12—5 to 10 inches; brown (10YR 5/3) gravelly clay loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; common very fine tubular pores; 15 percent pebbles; medium acid; clear smooth boundary.

B21t—10 to 26 inches; reddish brown (5YR 4/3) gravelly clay, dark reddish brown (5YR 3/3) moist; strong coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; very few very fine roots; very few very fine pores; many moderately thick clay films on peds; 15 percent pebbles; slightly acid; diffuse smooth boundary.

B22t—26 to 38 inches; reddish brown (5YR 4/3) gravelly clay, dark reddish brown (5YR 3/3) moist; strong coarse prismatic structure; extremely hard, very firm,

very sticky and very plastic; very few very fine roots; very few very fine pores; many moderately thick clay films on peds; 15 percent pebbles; mildly alkaline; abrupt smooth boundary.

Cr—38 to 50 inches; weakly consolidated conglomerate; pebbles and cobbles composed of mixed rounded crystalline rocks, some strongly weathered.

The A horizon ranges from brown to dark grayish brown in 10YR and 7.5YR hue. Texture is gravelly loam, cobbly loam, gravelly clay loam, or cobbly clay loam. This horizon is 12 to 20 percent pebbles or cobbles, or both. The surface is as much as 50 percent pebbles and cobbles. Structure is granular, subangular blocky, or prismatic parting to subangular blocky. Consistence is slightly hard or hard. Reaction is medium acid or slightly acid. Thickness ranges from 6 to 12 inches.

The Bt horizon is dark reddish gray or reddish brown in 5YR hue. Texture is gravelly clay, cobbly clay, gravelly sandy clay, or cobbly sandy clay. Thickness ranges from 20 to 28 inches.

The Cr horizon is gravelly or cobbly, or both, weakly consolidated conglomerate. Fifty to sixty percent of the pebbles and cobbles throughout the soil is extremely hard metamorphic rock. The rest is generally weathered granitic rock.

154—Gabino gravelly clay loam, 15 to 50 percent slopes. This moderately steep soil generally occurs as irregularly shaped areas. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Soper cobbly loam, 15 to 50 percent slopes; 5 percent Yorba cobbly sandy loam; 5 percent Myford sandy loam; and 10 percent less sloping or steeper Gabino gravelly clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range, watershed, and wildlife. Capability unit VIs–1 (19); Clayey range site; Storie index 11.

Garretson Series

The Garretson series consists of well drained soils on alluvial fans. These soils formed in material weathered dominantly from metasedimentary rock. Slopes are 2 to 9 percent. Elevation ranges from 700 to 1,500 feet. The vegetation is annual grasses, forbs, chamise, and sumac. Precipitation is 12 to 16 inches, and the mean annual temperature is about 63° F. The frost-free season is 250 to 300 days.

In a typical profile the surface layer is yellowish brown, slightly acid gravelly very fine sandy loam and gravelly loam. It is about 30 inches thick. The underlying material is yellowish brown, mildly alkaline gravelly loam and clay loam to a depth of 60 inches or more.

Permeability is moderate. Available water capacity is 6.0 to 10.0 inches. The effective rooting depth is 60 inches or more.

Garretson soils are used for citrus, dryland pasture, and range.

Typical profile of Garretson gravelly very fine sandy loam, 2 to 9 percent slopes, 50 feet west of National Forest Boundary and 70 feet south of the north boundary of the Temescal Ranch, Riverside County, SE¼-SE¼ sec. 33, T. 4 S., R. 6 W., SBB&M.

A11—0 to 6 inches; yellowish brown (10YR 5/4) gravelly very fine sandy loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; common very fine interstitial pores; 25 percent angular pebbles; slightly acid; clear smooth boundary.

A12—6 to 30 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common fine and few medium tubular pores; 20 percent angular pebbles; slightly acid; gradual smooth boundary.

C1—30 to 36 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many fine and few medium tubular pores; 20 percent angular pebbles; mildly alkaline; gradual smooth boundary.

C2—36 to 40 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine tubular pores; 20 percent angular pebbles; mildly alkaline; gradual smooth boundary.

C3—40 to 54 inches; yellowish brown (10YR 5/4) gravelly light clay loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, sticky and plastic; few very fine roots; few fine tubular pores; 15 percent angular pebbles; mildly alkaline; gradual smooth boundary.

C4—54 to 60 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 20 percent angular pebbles; mildly alkaline.

The A horizon ranges from brown or dark yellowish brown to yellowish brown in 10YR hue. Reaction is slightly acid to neutral. Thickness ranges from 10 to 34 inches.

The C horizon ranges from pale brown or brown to yellowish brown in 10YR hue. Reaction ranges from slightly acid to mildly alkaline.

155—Garretson gravelly very fine sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on alluvial fans and in long narrow valleys. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included

areas of Corralitos loamy sand, 5 percent Hanford sandy loam, and 5 percent Soboba gravelly loamy sand. Also included are small areas where slopes are 0 to 2 percent and some where slopes are 9 to 15 percent.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate.

Present land use is citrus, dryland pasture, and range. Capability unit IIe–1 (19); Loamy range site; Storie index 72.

Hanford Series

The Hanford series consists of well drained soils on alluvial fans and alluvial plains. These soils formed in granitic alluvium. Slopes are 2 to 9 percent. Elevation ranges from 700 to 1,500 feet. The vegetation is annual grasses, forbs, and chamise. Precipitation is 12 to 16 inches, and the mean annual air temperature is about 63° F. The frost-free season is 250 to 280 days.

In a typical profile the surface layer is grayish brown slightly acid sandy loam 14 inches thick. The underlying material is pale brown, grayish brown, and very pale brown, neutral sandy loam and fine gravelly loamy sand to a depth of 60 inches or more.

Permeability is moderately rapid. Available water capacity is 7.0 to 9.0 inches. The effective rooting depth is 60 inches or more.

Hanford soils are used for citrus, olives, dryland pasture, and some urban development.

Typical profile of Hanford sandy loam, 2 to 9 percent slopes, about 50 feet southeast of the Ortega Highway and 50 feet southwest of the National Forest Boundary, Riverside County, SW¼SW¼ sec. 11 (projected) T. 6 S., R. 5 W., SBB&M.

Ap—0 to 4 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine tubular pores; few very fine interstitial pores; slightly acid; clear smooth boundary.

A12—4 to 14 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine tubular pores; few very fine interstitial pores; slightly acid; gradual smooth boundary.

C1—14 to 31 inches; pale brown (10YR 6/3) and grayish brown (10YR 5/2) sandy loam, brown (10YR 4/3) and very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine interstitial pores; few fine tubular pores; neutral; clear smooth boundary.

C2—31 to 48 inches; pale brown (10YR 6/3) and grayish brown (10YR 5/2) sandy loam, brown (10YR 5/3) and very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; neutral; gradual smooth boundary.

C3—48 to 60 inches; very pale brown (10YR 7/4), pale brown (10YR 6/3), and grayish brown (10YR 5/2) fine gravelly loamy sand, brown (10YR 5/3) and very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; 20 percent granitic pebbles; neutral.

The A horizon ranges from pale brown to grayish brown in 10YR hue. Texture is loamy fine sand, coarse sandy loam, or sandy loam. Reaction ranges from slightly acid to neutral. Thickness ranges from 8 to 30 inches.

The C horizon ranges from very pale brown, pale brown, or grayish brown, or a mixture of these colors in 10YR hue. Texture is sandy loam with strata of loamy sand or gravelly loamy sand common in the lower part. Reaction ranges from slightly acid to mildly alkaline.

156—Hanford sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on alluvial plains and fans and in long narrow valleys. It has the profile described as typical of the series.

Included with this soil in mapping are small areas of Corralitos loamy sand, Capistrano sandy loam, Garretson gravelly very fine sandy loam, and some areas of Hanford soils where slopes are 0 to 2 percent or 9 or 15 percent.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate.

This soil is used for citrus, olives, dryland pasture, and urban development. Capability unit IIe–1 (19); Sandy range site; Storie index 85.

Hueneme Series

The Hueneme series consists of poorly drained soils on alluvial fans and flood plains. These soils formed in mixed alluvium. Slopes are 0 to 2 percent. Elevation ranges from 5 to 350 feet. The vegetation is annual grasses, mustard, and plants that require moisture. Precipitation is 12 to 15 inches, and the mean annual air temperature is about 61° F. The frost-free season is 300 to 350 days.

In a typical profile the surface layer is light brownish gray fine sandy loam 27 inches thick. The underlying material is stratified light gray and light brownish gray loamy sand, silt loam, loamy fine sand, fine sandy loam, and silty clay loam. It extends to a depth of 60 inches or more. There are prominent or distinct mottles in most horizons.

The soil is moderately alkaline throughout and is calcareous in all but the loamy fine sand horizon. Permeability is moderately rapid.

Hueneme soils are used for row crops, field crops, and urban development.

Typical profile of Hueneme fine sandy loam, about 200 feet southeast from the corner of Magnolia Avenue and Atlanta Avenue, Huntington Beach, Orange County, NW¼NW¼ sec. 18 (projected) T. 6 S., R. 10 W., SBB&M.

Ap1—0 to 8 inches; light brownish gray (10YR

6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine roots; few very fine tubular pores; slightly effervescent; disseminated lime; moderately alkaline; abrupt smooth boundary.

Ap2—8 to 16 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; slightly effervescent; disseminated lime; moderate alkaline; clear wavy boundary.

A13—16 to 27 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; hard, friable, nonsticky and nonplastic; common very fine roots; few very fine and common fine tubular pores; slightly effervescent; disseminated lime; moderately alkaline; abrupt smooth boundary.

IIC1—27 to 32 inches; light gray (10YR 7/2) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine interstitial pores; very slightly effervescent; disseminated lime; moderately alkaline; some 4- to 6-inch diameter pockets of material from A horizon; clear smooth boundary.

IIIC2—32 to 35 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; common fine prominent brownish yellow (10YR 6/6) mottles, yellowish brown (10YR 5/6) moist; weak medium platy structure; slightly hard, firm, slightly sticky and slightly plastic; very few very fine roots; common very fine and fine tubular pores; strongly effervescent; disseminated lime; moderately alkaline; abrupt smooth boundary.

IVC3—35 to 42 inches; light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) loamy fine sand, grayish brown (10YR 5/2) and light yellowish brown (10YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; very few fine tubular pores; moderately alkaline; abrupt wavy boundary.

VC4—42 to 44 inches; light brownish gray (2.5Y 6/2) fine sandy loam, grayish brown (2.5Y 5/2) moist; common fine distinct light gray (10YR 7/1) and light yellowish brown (10YR 6/4) mottles, gray (10YR 6/1) and dark yellowish brown (10YR 4/4) moist; massive; weak medium bedding; soft, friable, nonsticky and nonplastic; few very fine and fine tubular pores; slightly effervescent; disseminated lime; moderately alkaline; abrupt wavy boundary.

VIC5—44 to 60 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; many medium distinct olive yellow (2.5Y 6/6) and brownish yellow (10YR 6/6) mottles, olive brown (2.5Y 4/4) and brownish yellow (10YR 6/6) moist; moderate coarse prismatic structure; hard, firm, sticky and plastic; common very fine and fine tubular pores; slightly effervescent; disseminated lime; moderately alkaline; few sea shells; some threadlike salts.

The A horizon ranges from light gray to light brownish gray to pale brown in 10YR and 2.5Y hue. Texture is sandy loam or fine sandy loam. Structure typically ranges from platy or granular to subangular blocky. In places this horizon is massive. Dry consistence ranges from soft to slightly hard or hard because of cultivation. Reaction is generally mildly alkaline, but may be strongly alkaline in saline-alkali areas. The soil ranges from slightly to violently calcareous. Thickness ranges from 10 to 20 inches.

In many places the C horizon contains thin strata of organic material.

157—Hueneme fine sandy loam. This nearly level soil generally occurs on large alluvial fans or flood plains.

About 5 percent of this mapping unit is included areas of Bolsa silt loam, 2 percent San Emigdio fine sandy loam, and 5 percent Hueneme fine sandy loam, drained.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 7.0 to 9.0 inches. The water table is at a depth of 40 to 60 inches. The effective rooting depth for most crops is more than 60 inches.

Present land use is row crops, field crops, and urban development. Capability unit IIw–2 (19); range site not assigned; Storie index 76.

158—Hueneme fine sandy loam, drained. This nearly level soil generally occurs on large alluvial fans or flood plains. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Bolsa silt loam, drained; 5 percent San Emigdio fine sandy loam, 0 to 2 percent slopes; and 5 percent Hueneme fine sandy loam.

Drainage has been altered by the lowering of the water table and by pumping wells or constructing flood control channels. The water table is now below 60 inches at all times.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 7.0 to 9.0 inches. The effective rooting depth is 60 inches or more.

Present land use is row crops, field crops, and urban development. Capability unit I (19); range site not assigned; Storie index 85.

Los Posas Series

The Las Posas series consists of well drained soils on uplands. These soils formed in material weathered from gabbro. Slopes are 15 to 50 percent. Elevation

ranges from 1,000 to 3,000 feet. The vegetation is chaparral and an understory of short grasses. Precipitation is 16 to 25 inches, and the mean annual air temperature is about 61° F. The frost-free season is 240 to 320 days.

In a typical profile the surface layer is reddish brown gravelly loam and loam 9 inches thick. The subsoil is dark red clay 18 inches thick. The substratum is yellowish red weathered gabbro to a depth of 44 inches or more.

The soil is neutral throughout. Permeability is moderately slow. Available water capacity is 3.0 to 6.5 inches. The effective rooting depth is 26 to 40 inches.

Las Posas soils are used for range, watershed, and wildlife.

Typical profile of Las Posas gravelly loam, 15 to 50 percent slopes, about ¾ mile east of Tenajo Truck Trail along Los Alamos Truck Trail, Riverside County, SW¼NW¼ sec. 23, T. 7 S., R. 5 W., SBB&M.

O1—¼ inch to 0; fine litter of partly decomposed leaves and twigs.

A1—0 to 5 inches; reddish brown (5YR 4/4) gravelly loam, dark reddish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; few fine and common very fine roots; few medium common very fine and fine tubular pores; 20 percent pebbles, 5 percent angular cobbles; 5 percent stones and cobbles on the surface; neutral; clear smooth boundary.

A3—5 to 9 inches; reddish brown (5YR 4/4) heavy loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and coarse roots; common very fine, fine, and medium tubular pores; many thin clay films on peds; 5 percent angular pebbles; neutral; abrupt smooth boundary.

B2t—9 to 27 inches; dark red (2.5YR 3/6) clay, dark red (2.5YR 3/6) moist; strong coarse angular blocky structure; very hard, firm, very sticky and plastic; few very fine and coarse roots; common very fine interstitial pores; continuous clay films on peds and in pores; 5 percent angular pebbles, few 3 to 4-inch unweathered rock fragments in upper part of this horizon; neutral; gradual wavy boundary.

Cr—27 to 44 inches; yellowish red (5YR 5/6) weathered gabbro, yellowish red (5YR 4/6) moist; very few very fine and medium roots; many thick clay films on fractures; neutral.

The A horizon ranges from dark brown to reddish brown in 5YR or 7.5Y hue. Texture is gravelly fine sandy loam, gravelly loam, loam, or gravelly clay loam. Structure ranges from granular to subangular blocky. Reaction is slightly acid to neutral. Thickness ranges from 8 to 16 inches.

The A3 horizon is generally slightly higher in clay and may be gravelly. Structure is subangular or angular blocky.

The B2t horizon ranges from dark red to dark reddish brown to reddish brown in 2.5YR hue. Texture is heavy clay loam or clay. Reaction ranges from slightly acid to mildly alkaline. Thickness ranges from 18 to 24 inches. Depth to weathered bedrock is 26 to 40 inches.

159—Las Posas gravelly loam, 15 to 50 percent slopes. This moderately steep to steep soil generally occurs on broad ridgetops and on side slopes. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Friant fine sandy loam, 5 percent Blasingame stony loam, 5 percent Cieneba sandy loam, and 10 percent less sloping or steeper Las Posas soil.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range, watershed, and wildlife. Capability unit VIIe-1 (19); Loamy range site; Storie index 13.

Laughlin Series

The Laughlin series consists of well drained soils on uplands. These soils formed in material weathered from metamorphic rock. Slopes are 30 to 50 percent. Elevation ranges from 3,000 to 5,500 feet. The vegetation is brush, some small areas of annual grasses, and some areas of semidense to open stands of Coulter pine and oak. Precipitation is 20 to 30 inches, and the mean annual air temperature is about 57° F. The frost-free season is 150 to 180 days.

In a typical profile the surface layer is brown gravelly loam and loam 10 inches thick. The subsoil is brown loam and yellowish brown gravelly clay loam 29 inches thick. Yellowish brown metamorphic bedrock is at a depth of 39 inches.

The soil is medium acid in the upper 3 inches of the surface layer and slightly acid below. It is moderately permeable. Available water capacity is 3.0 to 6.0 inches. The effective rooting depth is 24 to 40 inches for annual grasses, but brush and tree roots can easily penetrate the metamorphic rock along fractures.

Laughlin soils are used for watershed, wildlife, recreation and, to a limited extent, for livestock grazing.

Typical profile of Laughlin gravelly loam, 30 to 50 percent slopes, in the Trabuco Ranger District, Cleveland National Forest (north), Orange County, about ½ mile north-northwest of Santiago Peak along Main Divide Road, SE¼SE¼ sec. 19, T. 5 S., R. 6 W., SBB&M.

O1—½ inch to 0; partly decomposed grass stems, leaves, and roots; approximately 2 percent 3- to 10-inch and 5 percent ¼- to 3-inch angular rock fragments.

A11—0 to 3 inches; brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine and fine granular structure; soft, very friable, nonsticky and nonplastic; many very

fine roots; many very fine pores; about 5 percent cobbles and 15 percent angular pebbles; medium acid; clear smooth boundary.

A12—3 to 10 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine pores; about 2 percent cobbles and 5 percent angular pebbles; slightly acid; clear smooth boundary.

B21—10 to 23 inches; brown (10YR 5/3) heavy loam, dark brown (10YR 4/3) moist; weak very fine, fine, and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium common very fine and fine roots; common very fine, fine, and medium pores; about 10 percent angular pebbles; slightly acid; gradual smooth boundary.

B22—23 to 32 inches; yellowish brown (10YR 5/4) gravelly light clay loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, sticky and plastic; few coarse and common very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; 20 percent angular pebbles; slightly acid; gradual smooth boundary.

B23—32 to 39 inches; yellowish brown (10YR 5/4) gravelly light clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine and common medium roots; common very fine, fine and medium pores; about 35 percent angular pebbles; slightly acid; gradual smooth boundary.

R—39 to 50 inches; yellowish brown metamorphic bedrock.

The A horizon ranges from grayish brown or brown to dark yellowish brown in 10YR hue. Texture is gravelly fine sandy loam, gravelly loam, gravelly light clay loam, or loam. Thickness ranges from 8 to 11 inches. This horizon is 5 to 20 percent angular rock fragments.

The B horizon ranges from brown to yellowish brown to dark yellowish brown in 10YR hue. Texture is gravelly heavy loam, gravelly light clay loam, or loam. Thickness ranges from 16 to 29 inches. Reaction is slightly acid to medium acid.

This soil has a higher base saturation than is typical of Laughlin soils elsewhere in California.

160—Laughlin gravelly loam, 30 to 50 percent slopes. This steep soil generally occurs on north-facing mountainsides. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Exchequer-Rock outcrop complex, 2 percent Escondido very fine sandy loam, and 8 percent Friant fine sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

This soil is used for watershed, wildlife, recreation and, to a limited extent, for range. Capability unit VIIe–1 (20) ; Loamy range site; Storie index 19.

Marina Series

The Marina series consists of somewhat excessively drained soils on terraces near the coast. These soils formed in old eolian sands. Slopes are 0 to 9 percent. Elevation ranges from 50 to 600 feet. The vegetation is mainly annual grasses and forbs and some areas of scattered low brush. Precipitation is 12 to 15 inches, and the mean annual air temperature is about 61° F. The frost-free season is 320 to 365 days.

In a typical profile the surface layer is grayish brown, light brownish gray, and pale brown loamy sand 33 inches thick. The subsoil is light yellowish brown and light gray loamy sand 27 inches thick and less than 10 percent ⅛- to 1-inch wavy bands of dark brown sandy loam. The substratum is very pale brown sand and a few ¼- to ½-inch wavy bands of dark brown sandy loam.

The soil is medium acid throughout. It is moderately permeable. Available water capacity is 3.5 to 5.0 inches. The effective rooting depth is 60 inches or more.

Marina soils are used for barley, pasture, range, and urban development.

Typical profile of Marina loamy sand, 2 to 9 percent slopes, at the west end and on the east side of Scenic Drive, Dana Point, Orange County, NW¼SW¼ sec. 21, T. 8 S., R. 8 W., SBB&M.

A11—0 to 7 inches; grayish brown (10YR 5/2) loamy sand, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine tubular pores; many very fine interstitial pores; medium acid; diffuse wavy boundary.

A12—7 to 12 inches; light brownish gray (10YR 6/2) loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine tubular pores; many very fine interstitial pores; medium acid; diffuse wavy boundary.

A13—12 to 33 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine tubular pores; many very fine interstitial pores; medium acid; abrupt irregular boundary.

B2—33 to 56 inches; light yellowish brown (10YR 6/4) loamy sand, yellowish brown (10YR 5/4) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; common very fine tubular pores; many very fine interstitial

pores; six continuous distinct, wavy, dark brown (7.5YR 4/4) heavy sandy loam lamellae (two ⅛-inch; two ¼-inch, and two 1-inch thick bands); medium acid; gradual smooth boundary.

B3—56 to 60 inches; light gray (10YR 7/2) loamy sand, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; many very fine interstitial pores; several continuous distinct, wavy, ⅛- and ¼-inch thick dark brown (7.5YR 4/4) heavy sandy loam lamellae; medium acid; gradual smooth boundary.

C—60 to 80 inches; very pale brown (10YR 7/3) sand, pale brown (10YR 6/3) moist; massive; slightly hard, loose, nonsticky and nonplastic; many very fine interstitial pores; several ¼- to ½-inch thick, wavy, dark brown (10YR 4/3 and 7.5YR 4/4) sandy loam lamellae; medium acid.

The A horizon ranges from light brownish gray or pale brown to grayish brown or brown in 10YR hue. It ranges from single grain to massive. Texture is loamy sand or loamy fine sand. Dry consistence ranges from loose to slightly hard. Reaction ranges from slightly acid to medium acid. Thickness ranges from 10 to 33 inches.

The B horizon ranges from light yellowish brown to light gray to pale brown or light brown in 10YR and 7.5YR hue. It has dark brown to reddish brown clay bands in 7.5YR and 5YR hue. Texture is loamy sand or loamy fine sand and lamellae of sandy loam to heavy sandy loam. Lamellae are slightly firmer than matrix. Reaction ranges from medium acid to neutral. Thickness ranges from 20 to 27 inches. Lamellae are ⅛- to 1-inch thick.

161—Marina loamy sand, 0 to 2 percent slopes. This nearly level soil generally occurs on terraces near the coast.

About 5 percent of this mapping unit is included areas of soils that are sandy loam throughout but are otherwise similar to this Marina soil; 5 percent soils having a weakly cemented sandy substratum; and 3 percent Myford sandy loam, thick surface, 0 to 2 percent slopes.

If the soil is bare, runoff is slow and the erosion hazard is slight.

These soils are used for field crops, pasture, range, and urban development. Capability unit IIIs–4 (19); Sandy range site; Storie index 90.

162—Marina loamy sand, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on terraces near the coast. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of soils that are sandy loam throughout but are otherwise similar to this Marina soil; 5 percent soils having a weakly cemented sandy substratum; 3 percent Myford sandy loam, thick surface, 2 to 9 percent slopes; and 10 percent less sloping or steeper Marina loamy sand.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate.

These soils are used for field crops, pasture, range, and urban development. Capability unit IVs–4 (19); Sandy range site; Storie index 65.

Metz Series

The Metz series consists of somewhat excessively drained soils on flood plains and alluvial fans. These soils formed in mixed alluvium. Slopes are 0 to 5 percent. Elevation ranges from 25 to 1,500 feet. The vegetation is annual grasses and forbs. Precipitation is 12 to 18 inches, and the mean annual air temperature is about 62° F. The frost-free season is 270 to 350 days.

In a typical profile the surface layer is pale brown and brown loamy sand 17 inches thick. The underlying material is stratified pale brown and very pale brown loamy sand, sandy loam, and very fine sandy loam to a depth of 63 inches or more.

The soil is moderately alkaline and calcareous throughout. It is moderately permeable.

Metz soils are used for row crops, field crops, and urban development.

Typical profile of Metz loamy sand, on the Irvine Ranch, S¼N¼ sec. 106 (by private survey), Orange County, 500 feet northeast of Hines Nursery:

Ap1—0 to 3 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 5/3) moist; single grained; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine tubular pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

Ap2—3 to 10 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine roots; common very fine and many fine tubular pores; violently effervescent; moderately alkaline; clear smooth boundary.

A13—10 to 17 inches; brown (10YR 5/3) loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; violently effervescent; moderately alkaline; clear smooth boundary.

C1—17 to 20 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; few very fine tubular pores; violently effervescent; moderately alkaline; clear smooth boundary.

C2—20 to 33 inches; pale brown (10YR 6/3) light sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine and common fine tubular pores; violently effervescent; moderately alkaline; gradual wavy boundary.

C3—33 to 38 inches; very pale brown (10YR 7/3) loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and

nonplastic; few very fine and common fine tubular pores; violently effervescent; moderately alkaline; gradual smooth boundary.

C4—38 to 47 inches; very pale brown (10YR 7/3) loamy coarse sand, brown (10YR 5/3) moist; single grained; loose, nonsticky and nonplastic; few very fine and common fine tubular pores; 10 percent ½-inch and smaller pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC5—47 to 63 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and medium tubular pores; violently effervescent; moderately alkaline.

The A horizon ranges from light brownish gray to pale brown or brown in 10YR hue. Texture is loamy sand or light sandy loam. Thickness ranges from 10 to 20 inches. Reaction is neutral to moderately alkaline. In places this horizon is calcareous.

The C horizon ranges from light gray, light brownish gray, and pale brown to very pale brown in 10YR hue. Texture, which varies because of stratification, ranges from very fine sandy loam to sand. Reaction is neutral to moderately alkaline. Some horizons are calcareous. In some areas the C horizon is silt loam or silty clay loam below a depth of 40 inches.

163—Metz loamy sand. This nearly level to gently sloping soil generally occurs on large fans and on flood plains. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of San Emigdio fine sandy loam, 5 percent Hueneme fine sandy loam, 3 percent Corralitos loamy sand, 2 percent Riverwash, and 10 percent Metz loamy sand, moderately fine substratum.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 4.0 to 6.0 inches. The effective rooting depth is 60 inches or more.

This soil is used for row crops, field crops, and urban development. Capability unit IIIs–4 (19) ; Sandy range site; Storie index 80.

164—Metz loamy sand, moderately fine substratum. This nearly level to gently sloping soil generally occurs on large fans and on flood plains. It has a profile similar to the one described as typical of the series but generally has a 2- to 6-inch layer of dark gray to light brownish gray silty clay loam or silt loam 40 to 60 inches below the surface. In places the moderately fine textured material is mottled.

About 5 percent of the mapping unit is included areas of San Emigdio fine sandy loam, moderately fine substratum, 0 to 2 percent slopes; 3 percent Corralitos loamy sand; 5 percent Hueneme fine sandy loam; and 10 percent Metz loamy sand.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 5.0 to 6.0 inches. The effective rooting depth is 60 inches or more. The water table is intermittently perched above the moderately fine textured layer after above normal rainfall or after irrigation.

This soil is used for row crops, field crops, and urban development. Capability unit IIs–4 (19) ; Sandy range site; Storie index 72.

Mocho Series

The Mocho series consists of well drained soils on alluvial fans and flood plains. These soils formed in alluvium derived from sedimentary rocks. Slopes are 0 to 9 percent. Elevation ranges from 50 to 700 feet. The vegetation is annual grasses and forbs and some sycamore trees. Precipitation is 12 to 16 inches, and the mean annual air temperature is 59 to 62° F. The frost-free season is 270 to 340 days.

In a typical profile the surface layer is brown and grayish brown loam 31 inches thick. The next layers are light brownish gray, brown, and pale brown stratified fine sandy loam, silty clay loam, and loam to a depth of 61 inches or more.

The soil is moderately alkaline and calcareous throughout. It is moderately permeable. The effective rooting depth is 60 inches or more.

Mocho soils are used for irrigated crops, citrus, and urban development.

Typical profile of Mocho loam, 0 to 2 percent slopes, about 25 feet west of Grand Avenue and ¼ mile south of McFadden Avenue, Santa Ana, NE¼NE¼ sec. 19 (projected), T. 5 S., R. 9 W., SBB&M.

A11—0 to 2 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium and thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; very few very fine tubular pores; very slightly calcareous; moderately alkaline; abrupt smooth boundary.

A12—2 to 15 inches; grayish brown (10YR 5/2) heavy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular and angular blocky structure; hard, friable, sticky and plastic; common very fine roots in the upper 2 inches, very few very fine and common fine and medium roots below; common fine and medium and few coarse tubular pores; strongly calcareous; moderately alkaline; clear wavy boundary.

A13—15 to 31 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; very few fine and medium roots; many very fine, fine, medium, and coarse tubular pores; strongly calcareous; moderately alkaline; abrupt smooth boundary.

IIC1—31 to 45 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few very fine and common medium and coarse roots; common very fine and fine and many medium

and coarse tubular pores; strongly calcareous; moderately alkaline; abrupt smooth boundary.

IIC2—45 to 52 inches; brown (10YR 5/3) light silty clay loam, dark brown (10YR 3/3) moist; massive; slightly hard, firm, sticky and plastic; very few very fine, fine, medium, and coarse roots; common very fine, fine, medium, and coarse tubular pores; strongly calcareous; disseminated lime in some fine filaments; moderately alkaline; clear smooth boundary.

IIC3—52 to 61 inches; pale brown (10YR 6/3) heavy loam, brown (10YR 4/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; very few very fine and fine roots; common very fine, fine, medium, and coarse tubular pores; violently calcareous; disseminated lime in medium sized filaments and soft masses; moderately alkaline.

The A horizon ranges from brown to grayish brown or dark grayish brown in 10YR hue. Texture is sandy loam, loam, or clay loam. Structure ranges from granular or platy to angular and subangular blocky. This horizon is very slightly to strongly calcareous. Thickness ranges from 10 to 31 inches.

The C horizon ranges from light brownish gray to light grayish brown to brown or pale brown in 10YR or 2.5Y hue. There are few mottles below a depth of 40 inches. Texture is loam, fine sandy loam, or silty clay loam stratified with loamy sand, sandy loam, and silt. In a few places there is a buried A horizon. The C horizon is massive or has subangular blocky structure. Dry consistence ranges from slightly hard to dry.

165—Mocho sandy loam, 0 to 2 percent slopes. This nearly level soil generally occurs on alluvial fans or flood plains. It has a profile similar to the one described as typical of the series, but the surface layer is sandy loam 10 to 14 inches thick.

About 5 percent of this mapping unit is included areas of Mocho loam; 5 percent Sorrento sandy loam, 0 to 2 percent slopes; and 5 percent San Emigdio fine sandy loam, 0 to 2 percent slopes.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 9.5 to 12.0 inches.

Present land use is irrigated crops, citrus, and urban development. Capability unit I (19); Loamy range site; Storie index 95.

166—Mocho loam, 0 to 2 percent slopes. This nearly level soil generally occurs on fans or flood plains. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Mocho sandy loam; 5 percent Sorrento loam, 0 to 2 percent slopes; 3 percent Bolsa silt loam, drained; and 3 percent Chino silty clay loam, drained.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 9.5 to 12.0 inches.

Present land use is irrigated crops, citrus, and urban development. Capability unit I (19); Loamy range site; Storie index 100.

167—Mocho loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on fans or flood plains.

About 10 percent of this mapping unit is included areas of Mocho sandy loam; 5 percent Sorrento loam, 2 to 9 percent slopes; and 3 percent Botella loam, 2 to 9 percent slopes.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate. Available water capacity is 9.5 to 12.0 inches.

Present land use is irrigated crops, citrus, range, and urban development. Capability unit IIe–1 (19); Loamy range site; Storie index 90.

Modjeska Series

The Modjeska series consists of well drained soils on terraces. These soils formed in mixed alluvium. Slopes are 0 to 30 percent. Elevation ranges from 200 to 1,500 feet. The vegetation is annual grasses and forbs and some brush along terrace breaks. Precipitation is 14 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 280 to 330 days.

In a typical profile the surface layer and upper part of the subsoil are brown gravelly loam 14 inches thick. The rest of the subsoil is reddish brown and light brown very cobbly loam 49 inches thick. The substratum is light brown very gravelly loamy sand to a depth of 71 inches or more.

The soil is slightly acid throughout. It is moderately permeable. Available water capacity is 4.5 to 6.0 inches. The effective rooting depth is more than 60 inches.

Modjeska soils are used for citrus, dryland barley, dryland pasture, and urban development.

Typical profile of Modjeska gravelly loam, 2 to 9 percent slopes, 300 feet west of a private road and 0.9 mile north-northeast of triangulation point 1116, on the west side of Planto Traubuco, Rancho Mission Viejo, Orange County, NW¼NW¼ sec. 22, T. 6 S., R. 7 W., SBB&M.

Ap—0 to 5 inches; brown (10YR 5/3) gravelly loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine tubular pores; 20 percent pebbles; slightly acid; abrupt smooth boundary.

B1—5 to 14 inches; brown (7.5YR 5/2) gravelly loam, dark brown (7.5YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 20 percent pebbles; slightly acid; gradual smooth boundary.

B21t—14 to 28 inches; reddish brown (5YR 5/3) very cobbly loam, dark reddish brown (5YR 3/3) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; many fine interstitial pores; common thin clay films line the pores; many moderately thick clay films around cobbles and pebbles;

30 percent cobbles and 20 percent pebbles; slightly acid; gradual smooth boundary.

B22t—28 to 46 inches; reddish brown (5YR 5/3) very cobbly loam, dark reddish brown (5YR 3/3) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; many fine interstitial pores; many thin clay films as bridges; many moderately thick clay films around cobbles and pebbles; 35 percent cobbles and 25 percent pebbles; slightly acid; gradual smooth boundary.

B3—46 to 63 inches; light brown (7.5YR 6/4) very cobbly loam, brown (7.5YR 4/4) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 40 percent cobbles and 35 percent pebbles; slightly acid; clear smooth boundary.

C—63 to 71 inches; light brown (7.5YR 6/4) very gravelly loamy sand, brown (7.5YR 5/4) moist; single grained; loose, nonsticky and nonplastic; few very fine roots; 50 percent pebbles and 30 percent cobbles; slightly acid.

The A horizon ranges from brown to grayish brown in 7.5YR and 10YR hue. Texture is gravelly loam or gravelly very fine sandy loam. Structure ranges from granular to subangular blocky. Dry consistence ranges from slightly hard to hard. Thickness ranges from 3 to 11 inches.

The B2 horizon ranges from reddish brown to brown in 5YR and 7.5YR hue. Texture is very gravelly loam or very cobbly loam. Structure ranges from granular to subangular blocky. Dry consistence ranges from slightly hard to hard. Thickness ranges from 17 to 32 inches.

The C horizon is very pale brown, pale brown, light brown, yellowish brown, brown, or reddish brown in 5YR, 7.5YR, or 10YR hue. Texture is very gravelly or very cobbly loam or very gravelly or very cobbly loamy sand.

The profile is 35 to 50 percent or more coarse fragments.

168—Modjeska gravelly loam, 0 to 2 percent slopes. This nearly level soil generally occurs on broad terraces.

About 5 percent of this mapping unit is included areas of Myford sandy loam, thick surface, 0 to 2 percent slopes; 3 percent Myford sandy loam, 0 to 2 percent slopes; and 5 percent Yorba gravelly sandy loam.

If the soil is bare, runoff is slow and the erosion hazard is slight.

Present land use is urban development and citrus. Capability unit IIIs–4 (19); Loamy range site; Storie index 64.

169—Modjeska gravelly loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on broad terraces. It has the profile described as typical of the series.

About 4 percent of this mapping unit is included areas of Myford sandy loam, 2 to 9 percent slopes, eroded; 3 percent Myford sandy loam, 2 to 9 percent slopes; and 3 percent Yorba gravelly sandy loam, 2 to 9 percent slopes.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate.

Present land use is citrus, dryland barley, and dryland pasture. Capability unit IIIe–4 (19); Loamy range site; Storie index 58.

170—Modjeska gravelly loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on side slopes of terraces.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 9 to 15 percent slopes; and 5 percent Yorba gravelly sandy loam, 9 to 15 percent slopes.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is citrus, dryland barley, dryland pasture, and range. Capability unit IVe–1 (19); Loamy range site; Storie index 54.

171—Modjeska gravelly loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on side slopes of terraces.

About 3 percent of this mapping unit is included areas of Yorba gravelly sandy loam, 15 to 30 percent slopes; 3 percent Gabino gravelly clay loam, 15 to 50 percent slopes; and 2 percent Soper gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is citrus, dryland barley, dryland pasture, and range. Capability unit IVe–1 (19); Loamy range site; Storie index 42.

Myford Series

The Myford series consists of moderately well drained soils on marine terraces. These soils formed in sandy sediments. Slopes are 0 to 30 percent. Elevation ranges from 50 to 1,500 feet. The vegetation generally is annual grasses and forbs and scattered low growing brush. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 270 to 350 days.

In a typical profile (fig. 2) the surface layer is pale brown and pinkish gray, medium acid sandy loam 4 inches thick. The subsurface layer is pinkish gray, medium acid sandy loam 8 inches thick. The upper 6 inches of the subsoil is brown, medium acid sandy clay; the next 17 inches is brown, neutral and moderately alkaline sandy clay loam; and the lower 36 inches is light brown, calcareous sandy clay loam and sandy loam. The substratum is very pale brown slightly acid sandy loam to a depth of 79 inches or more.

The soil is very slowly permeable.

Myford soils are used for citrus, pasture, range, barley, and urban development.

Typical profile of Myford sandy loam, 2 to 9 percent slopes, about ½ mile east of the junction of the San Diego and the Santa Ana Freeway, Irvine Ranch, Orange County, E¼E¼ sec. 172 (projected from a private survey as shown on U.S.G.S. El Toro Quadrangle, topographic map), T. 6 S., R. 8 W., SBB&M.

A11—0 to 1 inch; pale brown (10YR 6/3) sandy

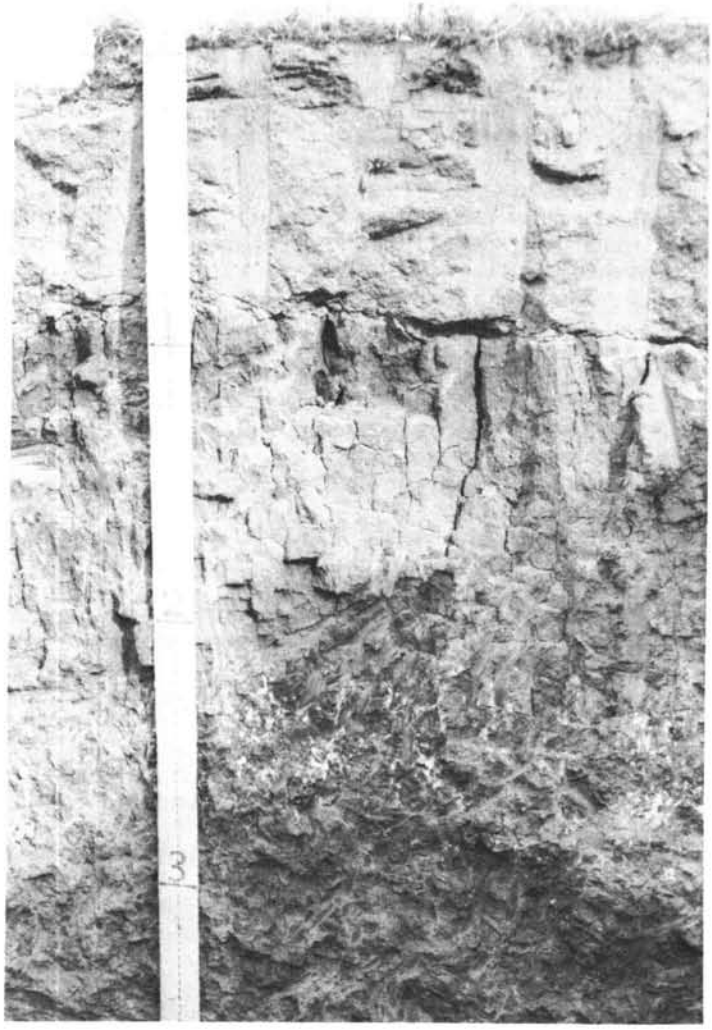

Figure 2.—**Profile of Myford sandy loam, 2 to 9 percent slopes.**

loam, brown (10YR 4/3) moist; weak medium platy structure; slightly hard, friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; medium acid; abrupt smooth boundary.

A12—1 to 4 inches; pinkish gray (7.5YR 6/2) sandy loam, brown (7.5YR 4/2) moist; weak medium platy structure; hard, friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; medium acid; clear smooth boundary.

A2—4 to 12 inches; pinkish gray (7.5YR 7/2) sandy loam, brown (7.5YR 4/2) moist; massive; hard, friable, nonsticky, nonplastic; common very fine roots; many very fine tubular pores; medium acid; abrupt smooth boundary.

B21t—12 to 18 inches; brown (7.5YR 4/2) sandy clay, dark brown (7.5YR 3/2) moist; strong very coarse prismatic structure; extremely hard, very firm, very sticky and very plastic; few very fine roots; common very fine pores; common moderately thick clay films on peds and in pores; medium acid; clear smooth boundary.

B22t—18 to 28 inches; brown (7.5YR 4/2) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate coarse prismatic structure parting to strong coarse angular blocky; extremely hard, very firm, very sticky and very plastic; few very fine roots; common very fine pores; few thin clay films line the pores; neutral; clear smooth boundary.

B31tca—28 to 35 inches; brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, sticky and plastic; few very fine roots; common very fine pores; few thin clay films line the pores; violently effervescent; lime in small masses; moderately alkaline; clear smooth boundary.

B32tca—35 to 41 inches; light brown (7.5YR 6/4) sandy clay loam, brown (7.5YR 4/2) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, slightly sticky and plastic; very few very fine roots; common very fine pores; common moderately thick clay films on peds and line the pores; slightly effervescent; lime in filaments; moderately alkaline; diffuse smooth boundary.

B33t—41 to 49 inches; light brown (7.5YR 6/4) light sandy clay loam, brown (7.5YR 4/2) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, slightly sticky and plastic; very few very fine roots; common very fine pores; common moderately thick clay films on peds and line the pores; moderately alkaline; diffuse smooth boundary.

B34t—49 to 61 inches; light brown (7.5YR 6/4) light sandy loam, brown (7.5YR 4/2) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, slightly sticky and plastic; very few very fine roots; many very fine pores; common moderately thick clay films on peds and line the pores; slightly acid; diffuse smooth boundary.

B35t—61 to 71 inches; light brown (7.5YR 6/4) light sandy clay loam, brown (7.5YR 4/2) moist; weak coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, slightly sticky and plastic; very few very fine roots; many very fine pores; common moderately thick clay films on peds and line the pores; slightly acid; clear wavy boundary.

C—71 to 79 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine pores; slightly acid.

The A horizon ranges from light brownish gray to pale brown or grayish brown to brown in 10YR hue and pinkish gray in 7.5YR hue. The A2 horizon is one value lighter than the A1 horizon. Texture is sandy loam or loam. In places the surface area is 5 percent pebbles or 1 percent cobbles, or both. Structure typically ranges from weak subangular blocky to weak platy. In places the A1 horizon is massive. Reaction ranges from medium acid to strongly acid. Thickness ranges from 5 to 30 inches.

The B2t horizon ranges from brown or light brown to yellowish brown in 7.5YR and 10YR hue. Texture is sandy clay or heavy clay loam in the upper part and sandy clay loam or clay loam in the lower part.

The water table is intermittently perched above the B2t horizon during some wet periods.

172—Myford sandy loam, 0 to 2 percent slopes. This nearly level soil generally occurs on broad terraces.

About 10 percent of this mapping unit is included areas of Myford sandy loam, thick surface, 0 to 2 percent slopes; 3 percent Capistrano sandy loam; 3 percent Chesterton loamy sand; 3 percent Yorba gravelly sandy loam; and 5 percent steeper Myford soils. Also included were areas where sheet erosion has been moderate.

If the soil is bare, runoff is slow and the erosion hazard is moderate. Available water capacity is 2.0 to 4.0 inches. The effective rooting depth is 12 to 19 inches for root-sensitive crops. For other crops it is 60 inches or more.

Present land use is citrus, pasture, range, barley, and urban development. Capability unit IVe–3 (19); Claypan range site; Storie index 51.

173—Myford sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on broad terraces. The profile of this soil is described as typical of the series.

About 10 percent of this mapping unit is included areas of Myford sandy loam, thick surface, 2 to 9 percent slopes; 3 percent Capistrano sandy loam; 3 percent Chesterton loamy sand, 2 to 15 percent slopes; 5 percent Yorba gravelly sandy loam, 2 to 9 percent slopes; and 7 percent steeper or gently sloping Myford soils. Also included were a few shallow gullies and areas affected by moderate sheet erosion.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 2.0 to 4.0 inches. The effective rooting depth is 60 inches or more.

Present land use is citrus, pasture, range, barley, and urban development. Capability unit IVe–3 (19); Claypan range site; Storie index 46.

174—Myford sandy loam, 2 to 9 percent slopes, eroded. This gently sloping to moderately sloping soil generally occurs on broad terraces. The profile is similar to the one described as typical of the series, but it is very shallow because of erosion. On about half the acreage, the subsoil is exposed or deep gullies have formed that prevent tillage.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 2 to 9 percent slopes; 3 percent Yorba gravelly sandy loam; and 5 percent less sloping or steeper Myford soils.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 1.5 to 3.5 inches. The effective rooting depth is 5 to 12 inches for root sensitive crops. For other crops it is 60 inches or more.

Present land use is range, barley, and urban development. Capability unit VIe–1 (19); Claypan range site; Storie index 19.

175—Myford sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on side slopes of terraces.

About 5 percent of this mapping unit is included areas of Myford sandy loam, eroded; 3 percent Capistrano sandy loam; 3 percent Yorba gravelly sandy loam, 9 to 15 percent slopes; less than 2 percent San Andreas sandy loam; and 5 percent less sloping or steeper Myford soils. Also included are a few shallow gullies and areas where sheet erosion has been moderate.

If the soil is bare, runoff is medium to rapid and the erosion hazard is moderate to high. Available water capacity is 2.0 to 4.0 inches. The effective rooting depth is 12 to 19 inches for root-sensitive crops. For other crops it is 60 inches or more.

Present land use is pasture, range, barley, and urban development. Capability unit IVe–3 (19); Claypan range site; Storie index 35.

176—Myford sandy loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on side slopes of terraces.

About 5 percent of this mapping unit is included areas of Myford sandy loam, eroded; 3 percent Yorba gravelly sandy loam, 15 to 30 percent slopes; 3 percent Cieneba sandy loam, 15 to 30 percent slopes; and 5 percent less sloping or steeper Myford soils. Also included are a few shallow gullies and areas where sheet erosion has been moderate.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 2.0 to 4.0 inches. The effective rooting depth is 12 to 19 inches for root sensitive crops. For other crops it is 60 inches or more.

Present land use is range, barley, and urban development. Capability unit VIe–1 (19); Claypan range site; Storie index 27.

177—Myford sandy loam, 9 to 30 percent slopes, eroded. This strongly sloping to moderately steep soil generally occurs on side slopes of terraces. The profile is similar to the one described as typical of the series, but is very shallow because of erosion. On as much as 50 percent of the acreage, the subsoil is exposed or deep gullies have formed that prevent tillage.

About 10 percent of this mapping unit is included areas of Myford sandy loam; 3 percent Yorba cobbly sandy loam, 9 to 30 percent slopes, eroded; and 4 percent Cieneba sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 1.5 to 3.5 inches. The effective rooting depth is 5 to 12 inches for root-sensitive crops. For other crops it is 60 inches or more.

Present land use is range, watershed, wildlife, and

urban development. Capability unit VIIe–1 (19); Claypan range site; Storie index 14.

178—Myford sandy loam, thick surface, 0 to 2 percent slopes. This nearly level soil generally occurs on broad terraces. The profile is similar to the one described as typical of the series, but the surface layer is about 10 inches thicker.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 0 to 2 percent slopes; 3 percent Capistrano sandy loam; 3 percent Chesterton loamy sand; 3 percent Yorba gravelly sandy loam; and 5 percent steeper sloping Myford soils.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 3.0 to 5.5 inches. The effective rooting depth is 20 to 30 inches for root-sensitive crops. For other crops it is 60 inches or more.

Present land use is citrus, pasture, range, barley, and urban development. Capability unit IIIs–3 (19); Claypan range site; Storie index 60.

179—Myford sandy loam, thick surface, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on broad terraces. The profile is similar to the one described as typical of the series, but the surface layer is about 10 inches thicker.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 2 to 9 percent slopes; 3 percent Capistrano sandy loam; 3 percent Chesterton loamy sand, 2 to 9 percent slopes; 3 percent Yorba gravelly sandy loam, 2 to 9 percent slopes; and 7 percent steeper or more gently sloping Myford soils.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 3.0 to 5.5 inches. The effective rooting depth is 20 to 30 inches for root-sensitive crops. For other crops it is 60 inches or more.

Present land use is citrus, pasture, range, barley, and urban development. Capability unit IIIe–3 (19); Claypan range site; Storie index 54.

Nacimiento Series

The Nacimiento series consists of well drained soils on foothills. These soils formed in material weathered from soft sandstone or shale, or both. Slopes are 15 to 50 percent. Elevation ranges from 100 to 2,500 feet. The vegetation is sagebrush and in some areas an undercover of annual grasses. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 300 to 350 days.

In a typical profile the surface layer is brown clay loam 28 inches thick. The underlying material is light yellowish brown and very pale brown shale or sandstone, or both.

The soil is moderately alkaline and calcareous throughout. Permeability is moderately slow. The effective rooting depth is 24 to 36 inches. Available water capacity is 4.0 to 7.0 inches.

Nacimiento soils are used for pasture, range, and watershed.

Typical profile of Nacimiento clay loam, 30 to 50 percent slopes, in Chino Hills, near a truck trail on a hill ridge, about 400 feet east of a power pole and about 1,000 feet north of Blue Mud Canyon, Rancho Santa Ana, Orange County, SW¼NW¼ sec. 20 (projected); T. 3 S., R. 8 W., SBB&M.

A11—0 to 14 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and plastic; many very fine and fine roots; many fine and medium tubular pores; strongly effervescent; disseminated lime; moderately alkaline; clear smooth boundary.

A12ca—14 to 28 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and plastic; many very fine and fine roots; strongly effervescent; disseminated lime and in filaments; moderately alkaline; clear wavy boundary.

Cr—28 to 40 inches; light yellowish brown (10YR 6/4) and very pale brown (10YR 7/3) weathered shale and sandstone, yellowish brown (10YR 5/4) and pale brown (10YR 6/3) moist; roots along some fractures; lime coats rock fragments which are calcareous throughout.

The A horizon ranges from brown to dark grayish brown in 10YR or 2.5Y hue. Texture is loam or clay loam. Thickness ranges from 24 to 36 inches. In places vertical cracks up to ¼ inch wide occur to a depth of 20 inches or more. This horizon is mildly alkaline to moderately alkaline and calcareous.

The Cr horizon ranges from light yellowish brown, light olive brown, very pale brown, light brownish gray to pale yellow in 10YR or 2.5Y hue. It is moderately alkaline and calcareous in some parts.

180—Nacimiento clay loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on hillsides.

About 10 percent of this mapping unit is included areas of Anaheim clay loam, 5 percent Alo clay, 2 percent Anaheim loam, 2 percent Cieneba sandy loam, and 2 percent Balcom clay loam.

If the soil is bare, runoff is medium to rapid and the erosion hazard is moderate to high.

Present land use is pasture, range, and watershed. Capability unit IVe–1 (19); Clayey range site; Storie index 39.

181—Nacimiento clay loam, 30 to 50 percent slopes. This steep soil generally occurs on hillsides. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Anaheim clay loam, 5 percent Alo clay, 2 percent Anaheim loam, 2 percent Cieneba sandy loam, and 2 percent Balcom clay loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is range and watershed. Capability unit VIe–1 (19); Clayey range site; Storie index 21.

Omni Series

The Omni series consists of poorly drained soils on flood plains and in basins. These soils formed in mixed alluvium. Slopes are 0 to 2 percent. Elevation ranges from 25 to 150 feet. The vegetation is annual grasses,

mustard, and plants that require moisture. Precipitation is 12 to 14 inches, and the mean annual air temperature is about 61°F. The frost-free season is 280 to 300 days.

In a typical profile the surface layer is gray clay 17 inches thick. The subsoil is light gray clay, with prominent olive brown mottles, 33 inches thick. Below this is a buried dark gray, mottled clay that extends to a depth of 60 inches or more.

The soil is moderately alkaline and calcareous throughout. It is slowly permeable.

Omni soils are used for row crops, field crops, and urban development.

Typical profile of Omni clay, in Orange County, Costa Mesa area, about 200 yards south of Sunflower Avenue, about 200 yards east of Bristol Street, and about 20 feet east of the Santa Ana Channel (flood control channel), T. 5 S., R. 10 W., SBB&M.

Ap—0 to 9 inches; gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; moderate very coarse prismatic structure, upper ½ inch is strong medium granular structure; very hard, firm, sticky and plastic; common very fine roots; very few very fine tubular pores; strongly effervescent; disseminated lime; moderately alkaline; clear smooth boundary.

A12—9 to 17 inches; gray (10YR 5/1) clay, very dark gray (10YR 3/1) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and plastic; very few very fine roots; very few very fine tubular pores; strongly effervescent; disseminated lime; moderately alkaline; clear smooth boundary.

B21cag—17 to 31 inches; light gray (10YR 6/1) clay, dark gray (10YR 4/1) moist, many medium prominent olive brown (2.5Y 4/4) mottles; moderate medium subangular blocky structure; very hard, firm, sticky and plastic; very few very fine roots; many very fine tubular pores; strongly effervescent; disseminated lime and medium lime concretions; moderately alkaline; gradual smooth boundary.

B22cag—31 to 50 inches; light gray (10YR 6/1) clay, dark gray (10YR 4/1) moist; many medium prominent olive brown (2.5Y 4/4) mottles; weak medium subangular blocky structure; very hard, firm, sticky and plastic; many very fine tubular pores; strongly effervescent; disseminated lime and medium lime concretions; moderately alkaline; gradual smooth boundary.

A1b—50 to 60 inches; dark gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; common fine prominent olive brown (2.5Y 4/4) mottles; massive; very hard, firm, sticky and plastic; common very fine tubular pores; strongly effervescent; disseminated lime and medium soft lime masses; moderately alkaline.

The A horizon ranges from very dark gray to gray in 10YR hue; a very thin film of gray (10YR 5/1) particles coats some of the darker surface peds. Texture is silt loam or clay. The upper one-half inch of this horizon generally has granular or fine blocky structure; the rest has weak to strong coarse or very coarse prismatic structure or weak to moderate coarse angular or subangular blocky structure. Reaction ranges from moderately alkaline to strongly alkaline. Thickness ranges from 12 to 20 inches.

The B horizon may be light gray, dark gray, very dark grayish brown, dark grayish brown, or grayish brown in 10YR hue. Part or all of this horizon has distinct or prominent mottles. Texture is heavy silty clay loam or clay. Reaction ranges from moderately alkaline to strongly alkaline.

In places there is a C horizon within 60 inches of the surface. A buried A horizon is common.

In undrained areas the water table is within a depth of 36 inches. Most areas now have altered drainage, however, and the water table is below 5 feet. Under natural conditions, most areas of this soil are moderately saline-alkali. Some are strongly saline-alkali. If drainage has been altered, the soil is generally no more than slightly saline-alkali.

182—Omni silt loam, drained. The profile of this nearly level soil is similar to the one described as typical of the series, but the surface layer is silt loam 10 to 14 inches thick.

About 7 percent of this mapping unit is included areas of Chino silty clay loam and 5 percent Bolsa silt loam.

The effective rooting depth is 60 inches or more. Available water capacity is 8.5 to 12.0 inches. Runoff is very slow, and the erosion hazard is none to slight.

Present land use is row crops, field crops, and urban development. Capability unit IIs–3 (19); range site not assigned; Storie index 50.

183—Omni clay. The profile of this nearly level soil is similar to the one described as typical of the series, but the water table is within a depth of 42 inches and the surface layer is strongly alkaline to moderately saline-alkali.

About 5 percent of this mapping unit is included areas of Chino silty clay loam and 5 percent Bolsa silty clay loam.

Runoff is very slow, and the erosion hazard is none to slight. The effective rooting depth is 40 to 60 inches. Available water capacity is 8.5 to 12.0 inches.

Present land use is field crops, duck ponds, and urban development. The high shrink-swell characteristics of this soil are problems in urban development. Capability unit IIIw–6 (19); range site not assigned; Storie index 17.

184—Omni clay, drained. This nearly level soil generally occurs in basins. It has the profile described as typical of the series. Because altered drainage has lowered the water table to a depth of 60 inches or more, some of the excess salts has been leached from the root zone, and the soil is generally only slightly saline-alkali.

About 5 percent of this mapping unit is included areas of Chino silty clay loam, drained; 3 percent Bolsa silty clay loam, drained; and 3 percent Cropley clay.

If the soil is bare, runoff is very slow and the erosion hazard is slight. The effective rooting depth is 60

inches or more. Available water capacity is 8.5 to 12.0 inches.

Present land use is irrigated row crops, field crops, and urban development. The high shrink-swell characteristics of this clay soil are problems in urban development. Capability unit IIs–5 (19); range site not assigned; Storie index 25.

Pits

185—Pits are open excavations from which soil and underlying material, mostly sand and gravel, have been removed for construction.

Present land use is construction material, idle land, or ground water recharge if these areas are in a streambed. Capability unit VIIIs–1 (19); range site not assigned; Storie index less than 10 (nonagricultural).

Ramona Series

The Ramona series consists of well drained soils on terraces and alluvial fans. These soils formed in granitic alluvium. Slopes are 2 to 15 percent. Elevation ranges from 1,000 to 3,000 feet. The vegetation is mostly brush and an understory of grasses. Precipitation is 16 to 20 inches, and the mean annual air temperature is about 60°F. The frost-free season is 240 to 320 days.

In a typical profile the surface layer is brown, slightly acid fine sand loam 8 inches thick. The subsoil is brown, slightly acid sandy clay loam 44 inches thick. The substratum is brown, neutral fine sandy loam to a depth of 69 inches or more.

The soil has moderately slow permeability. The effective rooting depth is 60 inches or more.

Ramona soils are used for range, watershed, and wildlife habitat.

Typical profile of Ramona fine sandy loam, 2 to 9 percent slopes, in the Cleveland National Forest, NE¼-SW¼ sec. 5 (projected), T. 7 S., R. 5 W., Riverside County, 1,000 feet south of Pigeon Spring on the Verdugo Truck Trail:

A11—0 to 2 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium, fine and very fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; many very fine tubular pores; slightly acid; abrupt smooth boundary.

A12—2 to 8 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine and fine tubular pores; slightly acid; clear smooth boundary.

B21t—8 to 26 inches; brown (7.5YR 4/4) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine and few fine medium and coarse roots; common very fine tubular pores; common thin clay films lining pores and as bridges holding coarser particles; slightly acid; gradual smooth boundary.

B22t—26 to 41 inches; brown (7.5YR 4/4) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate coarse angular blocky structure; very hard, firm, sticky and plastic; very few very fine and coarse roots; common very fine tubular pores; many thick clay films on peds; slightly acid; gradual smooth boundary.

B3t—41 to 52 inches; brown (7.5YR 4/4) sandy clay loam, dark brown (7.5YR 3/2) moist; moderate medium angular blocky structure; very hard, firm, sticky and slightly plastic; few very fine roots; common thin clay films on peds; slightly acid; clear smooth boundary.

C—52 to 69 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and medium roots in upper 10 inches; neutral.

The A horizon ranges from grayish brown to brown in 10YR and 7.5YR hue. Texture is coarse sandy loam, sandy loam, or fine sandy loam and in places is gravelly. Reaction ranges from slightly acid to neutral. Thickness ranges from 7 to 14 inches.

The Bt horizon ranges from brown to dark brown or yellowish brown in 10YR and 7.5YR hue. Texture is loam or sandy clay loam. Reaction ranges from slightly acid to mildly alkaline. Thickness ranges from 30 to 40 inches.

The C horizon is granitic alluvium of sandy loam or fine sandy loam texture. It extends to a depth of 60 inches or more.

186—Ramona fine sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs as long, narrow areas 5 to 50 acres in size. It has the profile described as typical of the series.

About 6 percent of this mapping unit is included areas of Blasingame loam; 3 percent soils that have a sandy loam subsoil but are otherwise similar to this Ramona soil; 3 percent Hanford sandy loam; and 3 percent Capistrano sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 8 to 10 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit IIIe–1 (19); Loamy range site; Storie index 76.

187—Ramona gravelly fine sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs as fan-shaped areas of 5 to 50 acres. The profile is similar to the one described as typical of the series, but the surface layer is gravelly fine sandy loam.

About 6 percent of this mapping unit is included areas of Blasingame loam; 3 percent soils that have a sandy loam subsoil but are otherwise similar to this Ramona soil; 3 percent Garretson gravelly very fine sandy loam; 3 percent Capistrano sandy loam; and 3 percent areas of Ramona gravelly fine sandy loam where slopes are 15 to 30 percent.

If the soil is bare, runoff is medium and the erosion hazard is high. Available water capacity is 6.0 to 9.0 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit IVe–1 (19); Loamy range site; Storie index 59.

Rincon Series

The Rincon series consists of well drained soils on terraces. These soils formed in semiconsolidated alluvium derived from sedimentary rocks. Slopes are 2 to 30 percent. Elevation ranges from 100 to 1,000 feet. The vegetation is annual grasses and forbs. Precipitation is 12 to 18 inches, and the mean annual air temperature is about 62°F. The frost-free season is 270 to 300 days.

In a typical profile the surface layer is dark grayish brown clay loam 11 inches thick. The subsoil is brown and yellowish brown heavy clay loam and loam 24 inches thick. The substratum is light yellowish brown loam that extends to a depth of 60 inches or more.

The soil is slightly acid in the upper 4 inches and moderately alkaline below. Lime occurs in the lower part of the subsoil and substratum. Permeability is slow. The effective rooting depth is 60 inches or more. Available water capacity is 9.0 to 11.0 inches.

Rincon soils are used for citrus, barley, range, and urban development.

Typical profile of Rincon clay loam, 2 to 9 percent slopes, in Brea, SE¼SW¼ sec. 7, T. 3 S., R. 9 W., Orange County, about 200 feet north and 20 feet west of the northwest corner of Kreamer and Birch:

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; hard, firm, sticky and plastic; common very fine roots; many fine tubular pores; slightly acid; clear smooth boundary.

A12—4 to 11 inches; dark grayish brown (10YR 4/2) clay loam, dark brown (10YR 3/3) moist; massive; hard, firm, sticky and plastic; common very fine roots; few fine tubular pores; moderately alkaline; clear smooth boundary.

B21t—11 to 23 inches; brown (10YR 4/3) heavy clay loam, dark brown (10YR 3/3) moist; moderate medium and coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine roots; few fine tubular pores; common thin clay films on peds; moderately alkaline; clear wavy boundary.

B22t—23 to 28 inches; yellowish brown (10YR 5/4) heavy clay loam, dark yellowish brown (10YR 4/4) moist; strong medium and coarse angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; very few very fine tubular pores; common thin clay films on peds; moderately alkaline; abrupt smooth boundary.

B3tca—28 to 35 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; very few very fine tubular pores; few thin clay films on peds; strongly effervescent; lime in fine filaments and in seams; moderately alkaline; clear wavy boundary.

C—35 to 60 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; very few very fine roots; very few very fine pores; slightly effervescent; lime in filaments in upper 12 inches; moderately alkaline.

The A horizon ranges from dark grayish brown to grayish brown in 10YR hue. Texture is loam, sandy clay loam, or clay loam. Reaction ranges from slightly acid to moderately alkaline. Thickness ranges from 6 to 14 inches.

The B2t horizon ranges from grayish brown and dark grayish brown to brown or yellowish brown in 10YR hue. Texture is heavy clay loam or clay. Reaction ranges from neutral to moderately alkaline. Thickness ranges from 16 to 20 inches.

The C horizon ranges from light gray or pale brown to light yellowish brown in 10YR hue. In many places it is stratified. Texture ranges from sandy loam to clay loam or loam. Reaction ranges from mildly alkaline to moderately alkaline. The soil is calcareous in some parts.

In places gravel occurs throughout the profile.

188—Rincon clay loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on broad terraces. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Alo clay, and 3 percent Yorba gravelly sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is citrus, barley, pasture, range, and urban development. Capability unit IIe–3 (19); Clayey range site; Storie index 65.

189—Rincon clay loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on terraces.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Alo clay, and 2 percent Yorba gravelly sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate.

Present land use is citrus, range, watershed, wildlife habitat, and urban development. Capability unit IIIe–3 (19); Clayey range site; Storie index 61.

190—Rincon clay loam, 15 to 30 percent slopes. This moderately steep soil generally occurs as long, narrow areas of 5 to 75 acres along drainageways.

About 10 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Alo clay, and 2 percent Yorba gravelly sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is citrus, pasture, range, and urban

development. Capability unit IVe–3 (19); Clayey range site; Storie index 47.

Riverwash

191—Riverwash consists of areas of unconsolidated alluvium, generally stratified and varying widely in texture, recently deposited by intermittent streams, and subject to frequent changes through stream overflow. These are sandy, gravelly, cobbly, and bouldery deposits that support little or no vegetation.

Runoff is generally rapid, and the erosion hazard is high. Deposition and removal of fresh alluvium are common.

Riverwash has little or no agricultural value. Present use is watercourses, ground water recharge, sand and gravel pits, and wildlife habitat. Capability unit VIIIw–1 (19); range site not assigned; Storie index 40 (nonagricultural).

Rock Outcrop

Rock outcrop consists of large exposures of sandstone or granite and boulders.

192—Rock outcrop-Cieneba complex, 30 to 75 percent slopes. This mapping unit is in mountains or on foothills. It is 50 percent or more Rock outcrop and boulders and 50 percent or less Cieneba soils. The soils are somewhat excessively drained. They formed in material weathered from granitic or sandstone rock. Elevation ranges from 200 to 4,500 feet. The vegetation is mainly sparse brush. Precipitation is 14 to 25 inches, and the mean average air temperature is 59 to 62°F. The frost-free season is 200 to 350 days.

About 5 percent of this mapping unit is included areas of Vista-Rock outcrop complex, 3 percent Tollhouse-Rock outcrop complex in the Santa Ana Mountains, 3 percent Anaheim loam, and 3 percent Soper cobbly loam in the coastal foothills.

If the soil is bare, runoff is rapid and the erosion hazard is high. Permeability is moderately rapid. Available water capacity is 0.8 to 2.5 inches. The effective rooting depth is 5 to 15 inches.

Present land use is watershed, wildlife habitat, and, to a limited extent, range. Capability unit VIIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 4.

San Andreas Series

The San Andreas series consists of well drained soils on foothills. These soils formed in material weathered from soft sandstone. Slopes are 15 to 30 percent. Elevation ranges from 200 to 2,500 feet. The vegetation is mainly brush and an understory of grasses. Precipitation is 14 to 20 inches, and the mean annual air temperature is about 61°F. The frost-free season is 270 to 350 days.

In a typical profile the surface layer is dark grayish brown, medium acid and slightly acid sandy loam 31 inches thick. The underlying material is soft sandstone to a depth of 50 inches.

The soil has moderately rapid permeability. Available water capacity is 2.5 to 5.5 inches. The effective rooting depth is 24 to 32 inches.

San Andreas soils are used for citrus, barley, pasture, range, watershed, and wildlife habitat.

Typical profile of San Andreas sandy loam, 15 to 30 percent slopes, about 1 mile southwest of Limestone Canyon, Irvine Ranch, Orange County, NE¼SW¼ sec. 117 (by private survey), T. 5 S., R. 8 W., SBB&M.

A11—0 to 4 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak very thick platy structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; medium acid; abrupt smooth boundary.

A12—4 to 15 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; medium acid; clear smooth boundary.

A13—15 to 31 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine, few fine tubular pores; slightly acid; abrupt wavy boundary.

Cr—31 to 50 inches; soft sandstone.

The A horizon ranges from grayish brown or brown to dark grayish brown in 10YR hue. Texture is loamy fine sand, sandy loam, or fine sandy loam. Structure ranges from granular or weak subangular blocky to platy. In places the soil is massive. Thickness ranges from 24 to 32 inches.

The Cr horizon ranges from soft to brittle sandstone that can easily be cut by hand tools. It is generally massive.

193—San Andreas sandy loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on north- and east-facing hillsides. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Cieneba sandy loam, 3 percent Anaheim loam, 3 percent Myford sandy loam, 2 percent Capistrano sandy loam, and 10 percent less sloping or steeper San Andreas sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

Present land use is citrus, dryfarmed barley, dryland pasture, range, watershed, and wildlife habitat. Capability unit VIe–1 (19); Loamy range site; Storie index 41.

San Emigdio Series

The San Emigdio series consists of well drained soils on flood plains and alluvial fans. These soils formed in mixed alluvium. Slopes are 0 to 9 percent. Elevation is 10 to 700 feet. The vegetation is annual grasses and forbs. Precipitation is 12 to 18 inches, and the mean annual air temperature is about 62°F. The average frost-free season is 270 to 350 days.

In a typical profile the surface layer is light brownish gray fine sandy loam 7 inches thick. The underlying

material to a depth of 61 inches or more is very pale brown, pale brown, light brownish gray, and light gray, stratified fine sandy loam, sandy loam, very fine sandy loam, and gravelly loamy coarse sand.

The soil is moderately alkaline and calcareous throughout. It is moderately rapidly permeable. The effective rooting depth is more than 60 inches.

These soils are used for citrus, row crops, field crops, and urban development.

Typical profile of San Emigdio fine sandy loam, 0 to 2 percent slopes, in Orange County on the Irvine Ranch, NW¼NW¼ sec. 142 (by private survey), T. 5 S., R. 8 W., SBB&M.

Ap—0 to 7 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; very few fine roots; very few fine tubular pores and many fine interstitial pores; 25 percent ⅛- to 3-inch rounded and angular pebbles on surface; slightly effervescent; moderately alkaline; abrupt smooth boundary.

C1—7 to 21 inches; very pale brown (10YR 7/3) fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine, fine, and medium roots; very few medium and few fine and common very fine tubular pores; violently effervescent; moderately alkaline; clear wavy boundary.

IIC2—21 to 26 inches; light gray (10YR 7/2) gravelly loamy coarse sand, brown (10YR 5/3) moist; single grained; loose, nonsticky and nonplastic; very few very fine, fine, and medium roots; few fine tubular pores and many interstitial pores; 15 percent pebbles and a few cobbles; slightly effervescent; moderately alkaline; abrupt smooth boundary.

IIIC3—26 to 34 inches; light gray (10YR 7/2) very fine sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few fine and medium roots; few fine and medium tubular pores and many very fine and fine interstitial pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

IIIC4—34 to 43 inches; light gray (10YR 7/2) coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; very few fine and and few very fine roots; few very fine and fine tubular pores and many medium interstitial pores; strongly effervescent; moderately alkaline; abrupt wavy boundary.

IIIC5—43 to 54 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 4/3) moist; massive; soft, friable, nonsticky and nonplastic; very few fine and few fine roots; common very fine tubular pores; 1 percent by volume 1-inch pebbles; strongly effervescent; moderately alkaline; abrupt wavy boundary.

IIIC6—54 to 61 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; very few very fine tubular pores and many medium interstitial pores; 25 percent by volume pebbles mostly 2 inches and larger; violently effervescent; moderately alkaline.

Color of the A horizon ranges from light brownish gray to pale brown in 10YR hue. Texture is sandy loam or fine sandy loam. Thickness ranges from 6 to 10 inches.

Color of the C horizon ranges from light gray, light brownish gray, pale brown, and very pale brown to grayish brown in 10YR hue. Texture is variable because of stratification and ranges from gravelly loamy coarse sand to very fine sandy loam.

In places the surface area is 2 to 3 percent pebbles. In other places the profile is 2 to 3 percent pebbles.

194—San Emigdio fine sandy loam, 0 to 2 percent slopes. This nearly level soil generally occupies alluvial fans on flood plains and along stream channels. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Metz loamy sand, 5 percent Hueneme fine sandy loam, 3 percent Mocho sandy loam, and 2 percent Soboba gravelly loam sand.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 7.0 to 9.0 inches.

This soil is used for citrus, row crops, field crops, and urban development. Capability unit I (19); Loamy range site; Storie index 95.

195—San Emigdio fine sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on alluvial fans along stream channels.

About 5 percent of the mapping unit is included areas of Sorrento sandy loam, 3 percent Mocho loam, and 5 percent Capistrano sandy loam.

If the soil is bare, runoff is slow and the erosion hazard is slight to moderate. Available water capacity is 7.0 to 9.0 inches.

This soil is used for citrus, row crops, and urban development. Capability unit IIe–1 (19); Loamy range site; Storie index 85.

196—San Emigdio fine sandy loam, moderately fine substratum, 0 to 2 percent slopes. This nearly level soil is generally on alluvial fans on flood plains and along stream channels. It has a profile similar to the one described as typical of the series, but a layer of dark gray silty clay loam or silt loam occurs 40 to 60 inches below the surface. This layer is 2 to 6 inches thick.

About 5 percent of this mapping unit is included areas of Metz loamy sand, 5 percent Hueneme fine sandy loam, and 2 percent Sorrento sandy loam.

Permeability is moderately slow in the underlying material. The water table is intermittently perched just above the underlying material. Available water capacity is 7.0 to 10.0 inches. Runoff is slow, and the erosion hazard is slight.

This soil is used for row crops, field crops, and urban

development. Capability unit I (19) ; Loamy range site; Storie index 81.

Soboba Series

The Soboba series consists of excessively drained soils on flood plains and alluvial fans. These soils formed in mixed alluvium. Slopes are 0 to 15 percent. Elevation ranges from 50 to 2,500 feet. The vegetation is annual grasses, forbs, cactus, brush, and some trees. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62°F. The frost-free season is 250 to 300 days.

In a typical profile the surface layer is light brownish gray and pale brown gravelly loamy sand to a depth of 10 inches. The underlying material is light gray very gravelly sand to a depth of 60 inches or more. Thin intermittent bands of sandy loam occur between depths of 12 and 30 inches.

The soil is slightly acid throughout. It is very rapidly permeable. The effective rooting depth is 60 inches or more. Available water capacity is 2.0 to 3.0 inches.

Soboba soils are used for citrus, pasture, range, and wildlife habitat.

Typical profile of Soboba gravelly loam, 0 to 5 percent slopes, in Orange County, Rancho Mission Viejo, about 1,100 feet north-northwest of point where Riverside, San Diego, and Orange county lines meet, in La Paz Canyon, SW¼SE¼ sec. 33, T. 7 S., R. 6 W., SBB&M.

A1—0 to 10 inches; light brownish gray (10YR 6/2) and pale brown (10YR 6/3) gravelly loamy sand, dark grayish brown (10YR 4/2) and brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; common very fine roots; many fine, medium and coarse interstitial pores; 25 percent pebbles and 5 percent cobbles; slightly acid; clear wavy boundary.

C1—10 to 40 inches; light gray (10YR 7/2), light brownish gray (10YR 6/2) and pale brown (10YR 6/3) very gravelly sand, dark grayish brown (10YR 4/2) and brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; few very fine, common medium roots; many fine, medium and coarse interstitial pores; two thin intermittent bands of sandy loam occur at about 12 and 30 inches; 50 percent pebbles and 10 percent cobbles; slightly acid; diffuse wavy boundary.

C2—40 to 60 inches; light gray (10YR 7/2), light brownish gray (10YR 6/2), and pale brown (10YR 6/3) very gravelly sand, dark grayish brown (10YR 4/2) and brown (10YR 4/3) moist; single grained; loose, nonsticky and nonplastic; few very fine and medium roots; many fine, medium and coarse interstitial pores; 40 percent pebbles and 20 percent cobbles; slightly acid.

The A1 horizon ranges from light brownish gray to pale brown to brown in 10YR and 2.5Y hue. Texture ranges from gravelly to cobbly sand to very fine sandy loam or gravelly loamy sand. Reaction ranges from slightly acid to mildly alkaline. Thickness ranges from 0 to 15 inches.

The C horizon ranges from light gray and light brownish gray to gray and from grayish brown or pale brown to brown in 10YR or 2.5Y hue. This horizon is stratified. It is 35 to 60 percent pebbles and cobbles. Texture ranges from very gravelly or very cobbly sand to coarse sandy loam. Reaction ranges from slightly acid to mildly alkaline.

197—Soboba gravelly loamy sand, 0 to 5 percent slopes. This nearly level to gently sloping soil generally occurs as long, narrow areas along stream channels. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of a soil that is dominantly very gravelly sandy loam throughout but is otherwise similar to this Soboba soil; 5 percent Corralitos loamy sand; 7 percent Riverwash; and 5 percent Soboba soils that have a gravelly very fine sandy loam overwash.

If the soil is bare, runoff is slow and the erosion hazard is slight.

Present land use is citrus, pasture, range, and wildlife habitat. Capability unit VIs–1 (19) ; Sandy range site; Storie index 30.

198—Soboba cobbly loamy sand, 0 to 15 percent slopes. This nearly level to strongly sloping soil generally occurs as long, narrow areas along stream channels. The profile is similar to the one described as typical of the series, but the surface layer is cobbly loamy sand.

About 10 percent of this mapping unit is included areas of a soil that is dominantly very gravelly sandy loam throughout but is otherwise similar to this Soboba soil; 5 percent Corralitos loamy sand; 5 percent Riverwash; 5 percent steeper Soboba soils; and 10 percent Soboba soils that have a stony loamy sand surface layer.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate.

Present land use is pasture, range, and wildlife habitat. Capability unit VIs–1 (19) ; Sandy range site; Storie index 29.

Soper Series

The Soper series consists of well drained soils on foothills. These soils formed in weakly consolidated sandstone and conglomerate. Slopes are 15 to 75 percent. Elevation is 200 to 2,500 feet. The vegetation is sage, cactus, and brush and in some areas an understory of annual grasses and forbs. Precipitation is 14 to 20 inches, and the mean annual air temperature is about 62°F. The average frost-free season is 270 to 350 days.

In a typical profile the surface layer is brown, slightly acid gravelly loam 8 inches thick. The subsoil is reddish brown and yellowish red, neutral gravelly clay loam and gravelly loam 21 inches thick. The underlying material is weathered conglomerate. The soil is moderately slowly permeable.

Soper soils are used for pasture, range, watershed, and wildlife habitat.

Typical profile of Soper gravelly loam, 30 to 50 per-

cent slopes, in Orange County, Irvine Ranch, about 100 yards north of the Highland canal, NE¼NE¼ sec. 82 (by private survey), T. 5 S., R 8 W., SBB&M.

A1—0 to 8 inches; brown (10YR 4/3) gravelly loam, dark brown (7.5YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and common very fine roots; common very fine tubular pores; 12 percent pebbles and cobbles; slightly acid; abrupt smooth boundary.

B21t—8 to 11 inches; reddish brown (5YR 4/4) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; very few fine and common very fine roots; common very fine and very few fine tubular pores; common moderately thick clay films line pores and are on peds; 25 percent pebbles and cobbles; neutral; clear smooth boundary.

B22t—11 to 21 inches; reddish brown (5YR 4/4) gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and very few fine roots; few very fine tubular pores; many moderately thick clay films line pores and are on peds; 30 percent pebbles and cobbles; neutral; clear smooth boundary.

B3t—21 to 29 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; weak medium and coarse angular blocky structure; hard, firm, slightly sticky and plastic; very few fine roots; few very fine tubular pores; few moderately thick clay films line pores and are on peds; 30 percent pebbles and cobbles; neutral; clear wavy boundary.

Cr—29 to 62 inches; weathered weakly consolidated conglomerate; very few very fine roots; very few very fine tubular pores; few thin clay films on rocks in upper part.

Color of the A horizon ranges from grayish brown and brown to dark grayish brown in 10YR hue. The texture is sandy loam or loam and is gravelly or cobbly in some areas. Reaction is neutral to slightly acid. Thickness ranges from 8 to 12 inches.

Color of the B2t horizon ranges from brown to reddish brown in 10YR, 7.5YR, and 5YR hue. The texture is sandy clay loam or clay loam and is gravelly or cobbly in some areas. Reaction ranges from slightly acid to mildly alkaline. Thickness ranges from 12 to 20 inches.

Color of the Cr horizon varies. It is typically very pale brown and reddish brown. This horizon is consolidated conglomerate and sandstone and a few pockets of shale.

199—Soper loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on rolling hills. It has a profile similar to the one described as typical of the series, but it is nongravelly and noncobbly throughout. It is also slightly deeper.

About 5 percent of this mapping unit is included areas of Anaheim loam, 5 percent Alo clay, 2 percent Balcom clay loam, 3 percent Cieneba sandy loam, and less sloping or steeper Soper loams.

If the soil is bare, runoff is medium and the erosion hazard is high. Available water capacity is 3.5 to 5.5 inches. The effective rooting depth is 24 to 36 inches.

Present land use is pasture, range, wildlife habitat, and watershed. Capability unit IVe–1 (19); Loamy range site; Storie index 45.

200—Soper loam, 30 to 50 percent slopes. This steep soil generally occurs on hillsides. It has a profile similar to the one described as typical of the series, but it is nongravelly and noncobbly throughout.

About 5 percent of this mapping unit is included areas of Alo clay, 30 to 50 percent slopes; 5 percent Anaheim loam, 30 to 50 percent slopes; 3 percent Cieneba sandy loam, 30 to 75 percent slopes; 10 percent low sloping or steeper Soper loams; and 10 percent severely eroded areas.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 20 to 32 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit VIe–1 (19); Loamy range site; Storie index 21.

201—Soper gravelly loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on rolling hills. It has a profile similar to the one described as typical of the series, but it is somewhat deeper.

About 3 percent of this mapping unit is included areas of Anaheim loam, 2 percent Anaheim clay loam, 3 percent Cieneba sandy loam, and 7 percent less sloping or steeper Soper gravelly loams.

If the soil is bare, runoff is medium and the erosion hazard is high. Available water capacity is 3.0 to 5.5 inches. The effective rooting depth is 24 to 36 inches.

Present land use is pasture, range, watershed, and wildlife habitat. Capability unit VIe–1 (19); Loamy range site; Storie index 36.

202—Soper gravelly loam, 30 to 50 percent slopes. This steep soil generally occurs on hillsides. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Yorba gravelly sandy loam, 2 percent Gabino gravelly clay loam, 5 percent Soper cobbly loam, 5 percent less sloping or steeper Soper gravelly loams, 2 percent Cieneba-Rock outcrop complex, and 2 percent Cieneba sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 20 to 32 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit VIIe–1 (19); Loamy range site; Storie index 17.

203—Soper cobbly loam, 15 to 50 percent slopes. This moderately steep to steep soil generally occurs on hillsides. It has a profile similar to the one described as typical of the series, but the surface layer is cobbly loam.

About 5 percent of this mapping unit is included areas of Yorba cobbly sandy loam, 3 percent Gabino gravelly clay loam, 5 percent Soper gravelly loam, 2 percent Cieneba-Rock outcrop complex, and 2 percent Cieneba sandy loam.

If the soil is bare, runoff is medium to rapid and the

erosion hazard is high. Available water capacity is 3.0 to 4.0 inches. The effective rooting depth is 20 to 32 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit VIIs–1 (19); Loamy range site; Storie index 18.

204—Soper-Rock outcrop complex, 30 to 75 percent slopes. This mapping unit commonly occurs on hillsides and ridges. It is 10 to 15 percent Rock outcrop. The Soper soil has a profile similar to the one described as typical of the series, but it is severely eroded and therefore shallower.

About 3 percent of this mapping unit is included areas of Anaheim loam, 5 percent Cieneba sandy loam, and 20 percent Soper cobbly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 2.5 to 3.5 inches. The effective rooting depth is 20 to 24 inches.

Present land use is range, watershed, and wildlife habitat. Capability unit VIIs–1 (19); Shallow Loamy-Rock outcrop complex range site; Storie index 7.

Sorrento Series

The Sorrento series consists of well drained soils on alluvial fans and flood plains. These soils formed in alluvium derived from sedimentary rocks. Slopes are 0 to 9 percent. Elevation ranges from 50 to 700 feet. The vegetation is annual grasses and forbs and some sycamore trees. Precipitation is 12 to 16 inches, and the annual air temperature is 59 to 62°F. The frost-free season is 270 to 355 days.

In a typical profile, the surface layer is grayish brown loam 12 inches thick. The underlying material is grayish brown, light brownish gray, and pale brown silty clay loam to a depth of 62 inches and light brownish gray sandy loam to a depth of 72 inches or more.

The soil is neutral in the upper 6 inches and becomes moderately alkaline and calcareous below. It is moderately permeable. The effective rooting depth is 60 inches or more.

Sorrento soils are used for irrigated crops, citrus, and urban development.

Typical profile of Sorrento loam, 0 to 2 percent slopes, about 500 feet northeast of the corner of Irvine Boulevard and the road to El Toro Marine Firing Range, SW¼SW¼ sec. 120 (by private survey), T. 5 S., R. 8 W., SBB&M.

Ap1—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; neutral; abrupt smooth boundary.

Ap2—6 to 12 inches; grayish brown (10YR 5/2) heavy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; few very fine and fine tubular pores; mildly alkaline; clear wavy boundary.

C1—12 to 21 inches; grayish brown (10YR 5/2) light silty clay loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and plastic; many very fine roots; few very fine tubular pores; moderately alkaline; clear wavy boundary.

C2—21 to 27 inches; grayish brown (10YR 5/2) light silty clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; moderately alkaline; gradual wavy boundary.

C3—27 to 37 inches; grayish brown (10YR 5/2) light silty clay loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine tubular pores; moderately alkaline; gradual wavy boundary.

C4ca—37 to 49 inches; light brownish gray (10YR 6/2) light silty clay loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; disseminated lime and common fine filaments and fine soft masses of lime; moderately alkaline; violently effervescent; abrupt wavy boundary.

C5ca—49 to 62 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure; hard, friable, slightly sticky and plastic; few very fine roots; common fine filaments of lime; moderately alkaline; violently effervescent; abrupt smooth boundary.

IIC6—62 to 72 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; very few very fine roots; few fine tubular pores; moderately alkaline and violently effervescent.

The A horizon ranges from dark grayish brown or grayish brown to brown in 10YR hue. Texture is sandy loam, loam, or clay loam. Reaction ranges from slightly acid to moderately alkaline. In places the soil is noncalcareous. Thickness ranges from 10 to 20 inches.

The C horizon ranges from grayish brown to light yellowish brown in 10YR or 2.5Y hue. Texture is loam, silt loam, or silty clay loam. This horizon is calcareous, at least in some parts above 40 inches.

In places the surface area is 2 to 3 percent gravel. In other places the profile is 2 to 3 percent gravel.

205—Sorrento sandy loam, 0 to 2 percent slopes. This nearly level soil generally occurs on alluvial fans and flood plains. It has the profile similar to the one described as typical of the series, but the surface layer is 10 to 14 inches of sandy loam.

About 10 percent of this mapping unit is included areas of Sorrento loam, 0 to 2 percent slopes; 5 percent

Mocho sandy loam, 0 to 2 percent slopes; 5 percent San Emigdido fine sandy loam, 0 to 2 percent slopes; and 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soil.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 10.0 to 13.0 inches.

Present land use is irrigated row crops, citrus, and urban development. Capability unit I (19); Loamy range site; Storie index 95.

206—Sorrento loam, 0 to 2 percent slopes. This nearly level soil generally occurs on alluvial fans and flood plains and in small valleys. It has the profile described as typical of the series.

About 10 percent of this mapping unit is included areas of Sorrento clay loam; 3 percent Sorrento sandy loam; 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soil; 5 percent Mocho loam, 0 to 2 percent slopes; and 3 percent Bolsa silt loam, drained.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 10.0 to 13.0 inches.

Present land use is irrigated row crops, citrus, and urban development. Capability unit I (19); Loamy range site; Storie index 100.

207—Sorrento loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on upper valley fans and along stream channels.

About 10 percent of this mapping unit is included areas of Sorrento clay loam; 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soil; 5 percent Mocho loam, 2 to 9 percent slopes; 3 percent Botella loam, 2 to 9 percent slopes; and 3 percent areas of Sorrento loam where the slopes are somewhat steeper than 9 percent.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate. Available water capacity is 10.0 to 13.0 inches.

Present land use is irrigated crops, citrus, range, and urban development. Capability unit IIe–1 (19); Loamy range site; Storie index 90.

208—Sorrento clay loam, 0 to 2 percent slopes. This nearly level soil generally occurs on alluvial fans and flood plains. It has a profile similar to the one described as typical of the series, but the surface layer is 10 to 14 inches of clay loam.

About 10 percent of this mapping unit is included areas of Sorrento loam, 0 to 2 percent slopes; 5 percent Mocho loam, 0 to 2 percent slopes; 3 percent Bolsa silty clay loam, drained; 3 percent Chino silty clay loam, drained; and 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soil.

If the soil is bare, runoff is slow and the erosion hazard is slight. Available water capacity is 11.0 to 13.0 inches.

Present land use is irrigated crops, citrus, and urban development. Capability unit I (19); Clayey range site; Storie index 85.

209—Sorrento clay loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on upper valley fans and along stream channels in 10- to 100-acre areas. It has a profile similar to the one described as typical of the series, but the surface layer is 10 to 14 inches of clay loam.

About 10 percent of this mapping unit is included areas of Sorrento loam, 2 to 9 percent slopes; 5 percent soils that are noncalcareous throughout but are otherwise similar to this Sorrento soil; 5 percent Mocho loam, 2 to 9 percent slopes; 3 percent Botella clay loam, 2 to 9 percent slopes; and 3 percent areas of this Sorrento soil where slopes are somewhat steeper than 9 percent.

If the soil is bare, runoff is slow to medium and the erosion hazard is slight to moderate. Available water capacity is 11.0 to 13.0 inches.

Present land use is irrigated crops, citrus, and urban development. Capability unit IIe–1 (19); Clayey range site; Storie index 76.

Thapto-Histic Fluvaquents

Thapto-Histic Fluvaquents consists of poorly drained soils in coastal basins. These soils formed in mixed mineral alluvium and organic deposits. Slopes are 0 to 2 percent. Elevation ranges from 5 to 50 feet. The vegetation is saline-alkali tolerant grasses and forbs that require moisture. Precipitation is 10 to 14 inches, and the mean annual air temperature is about 62°F. The frost-free season is 300 to 350 days.

In a typical profile the surface layer is 9 inches of very dark gray clay loam and 12 inches of dark gray silty clay. The underlying layers are 35 inches of black peat and 12 inches or more of light gray silty clay loam with many fine distinct light yellowish brown mottles.

The soil is medium acid to strongly acid in the peat layers and moderately alkaline in the mineral layers. The 21- to 50-inch zone has some white salts. Permeability is slow. The effective rooting depth is only 24 to 40 inches because of the water table. Available water capacity is 6.0 to 10.0 inches.

These soils are used for row crops, field crops, and duck ponds.

Reference profile of Thapto-Histic Fluvaquents, in Orange County, Irvine Range, about ¼ mile southwest of Lane Road, NE¼NE¼ sec. 59 (by private survey), T. 6 S., R. 9 W., SBB&M.

Ap1—0 to 3 inches; very dark gray (2.5Y 3/0) clay loam, black (2.5Y 2/0) moist; moderate medium and fine granular structure; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; estimated 10 to 20 percent organic matter; slightly effervescent; moderately alkaline; abrupt smooth boundary.

Ap2—3 to 9 inches; very dark gray (2.5Y 3/0) heavy clay loam, black (2.5Y 2/0) moist; moderate fine and medium granular structure; hard, firm, sticky and very plastic; common very fine and fine roots; few very fine and fine tubular pores; estimated 10 to 20 percent organic matter; slightly effervescent; moderately alkaline; clear wavy boundary.

A13—9 to 14 inches; dark gray (2.5Y 4/0) silty clay, black (2.5Y 2/0) moist; moderate fine and medium granular structure;

very hard, firm, sticky and very plastic; common very fine and few fine roots; few very fine and fine tubular pores; estimated 10 to 20 percent organic matter; slightly effervescent; moderately alkaline; clear smooth boundary.

A14—14 to 21 inches; dark gray (2.5Y 4/0) silty clay, black (2.5Y 2/0) moist; weak fine and medium granular structure; hard, firm, sticky and plastic; common very fine roots; few very fine tubular pores; estimated 10 to 20 percent organic matter; strongly effervescent; moderately alkaline; clear wavy boundary.

Oa1b—21 to 27 inches; black (2.5Y 2/0) rubbed and unrubbed sapric material, black (2.5Y 2/0) dry; 5 percent fibers, none rubbed; moderate fine granular structure; very hard, nonsticky and nonplastic; some white salts; medium acid; clear wavy boundary.

Oa2b—27 to 32 inches; black (2.5Y 2/0) rubbed and unrubbed sapric material, black (2.5Y 2/0) dry; 10 percent fibers, less than 5 percent rubbed; massive; very hard, nonsticky and nonplastic; some white salts; strongly acid; clear wavy boundary.

Oa3b—32 to 39 inches; black (10YR 2/1) rubbed and unrubbed sapric material, very dark brown (10YR 2/2) dry; 30 percent fibers, less than 10 percent rubbed; massive; extremely hard, nonsticky and nonplastic; some white salts; strongly acid; gradual smooth boundary.

Oa4b—39 to 50 inches; black (10YR 2/1) rubbed and unrubbed sapric material with many fine faint dark gray (10YR 4/1) unrubbed mottles; very dark gray (10YR 3/1) with many fine prominent gray (10YR 6/1) mottles dry; 30 percent fibers, less than 10 percent rubbed; massive; very hard, nonsticky and nonplastic; some white salts; strongly acid; clear wavy boundary.

Oa5b—50 to 56 inches; black (10YR 2/1) rubbed and unrubbed sapric material with many fine faint dark gray (10YR 4/1) mottles unrubbed, very dark brown (10YR 2/2) with many fine prominent gray (10YR 6/1) mottles dry; 40 percent fibers, less than 10 percent rubbed; massive; extremely hard, nonsticky and nonplastic; strongly acid; abrupt smooth boundary.

IIC—56 to 68 inches; light gray (10YR 7/1) silty clay loam with many fine distinct light yellowish brown (2.5Y 6/4) mottles, gray (10YR 5/1) with light olive brown (2.5Y 5/4) mottles moist; massive; slightly hard, firm, sticky and slightly plastic; 10 percent partly decomposed roots in upper 6 inches; slightly acid.

The A horizon ranges from black to dark gray in 2.5Y and 10YR hue. Texture is silt loam or clay loam. This horizon is slightly to strongly effervescent. Thickness ranges from 16 to 24 inches.

The O horizon ranges from black and very dark gray to very dark brown in 2.5Y and 10YR hue. In places it is intermixed with the C mineral horizon.

The C horizon ranges from light gray to dark gray in 2.5Y and 10YR hue. Texture is silt loam, silty clay loam, or silty clay.

These soils are typically slightly saline-alkali. In a few areas they are moderately saline-alkali.

210—Thapto-Histic Fluvaquents. This nearly level soil generally occurs in basins. The profile described as a reference for the subgroup is in this map unit. Slopes are less than 2 percent.

About 5 percent of this unit is included areas of Chino silty clay loam, 3 percent Bolsa silt loam, 3 percent Bolsa silty clay loam, and 2 percent Omni clay. Also included are some areas where the slopes are 5 percent.

If the soil is bare, runoff is slow and the erosion hazard is slight.

This soil is used for row crops and field crops. Capability unit IIIw–6 (19); range site not assigned; Storie index 22.

Tidal Flats

211—Tidal flats are nearly level areas adjacent to bays and lagoons along the coast. Periodically they are covered by tidal overflow. Some of the higher areas are covered only during very high tides. Tidal flats are stratified clayey to sandy deposits. They are poorly drained and are high in salts. The vegetation varies from none in the low areas to sparse, salt-tolerant plants in the higher areas.

Runoff generally ponds. Deposition from surrounding areas is a hazard.

Present land use is recreation and wildlife habitat. Some areas have been dredged or filled and converted to beaches for urban use. Capability unit VIIIw–1 (19); range site not assigned; Storie index less than 10 (nonagricultural).

Tollhouse Series

The Tollhouse series consists of excessively drained soils in the mountains. These soils formed in material weathered from granodiorite. Slopes are 30 to 75 percent. Elevation ranges from 3,000 to 5,500 feet. The vegetation is brush and an understory of annual grasses and forbs and in some areas thin stands of oaks or Coulter pines. Precipitation is 20 to 30 inches, and the mean annual air temperature is about 57°F. The frost-free season is 150 to 180 days.

In a typical profile the surface layer is very dark grayish brown and brown, slightly acid coarse sandy loam 8 inches thick. The underlying material is light yellowish brown weathered granodiorite to a depth of 28 inches or more that grades to unweathered rock. About 10 percent of the surface area is Rock outcrop.

Permeability is rapid. Available water capacity is 1 to 2 inches. The effective rooting depth is 7 to 18 inches for annual grasses and forbs. Brush and trees can easily penetrate the weathered granodiorite along fractures.

Tollhouse soils are used for wildlife habitat, recreation, and watershed and, to a limited extent, for range.

Typical profile of Tollhouse coarse sandy loam, in an area of Tollhouse-Rock outcrop complex, 30 to 75 percent slopes, in the Trabuco Ranger District, Cleveland National Forest (north), NE¼NW¼ sec. 27, T. 5 S., R. 6 W., Riverside County, about 1 mile down Indian Road from Main Divide Road:

O1—¼ inch to 0; partly decomposed grass, brush, and leaves; many small gravel-size (mostly ¼") granitic rock fragments.

A11—0 to 2 inches; very dark grayish brown (10YR 3/2) coarse sandy loam, very dark gray (10YR 3/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and medium roots; many very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

A12—2 to 8 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and common medium and coarse roots; many very fine and fine tubular pores; slightly acid; gradual wavy boundary.

Cr—8 to 28 inches; light yellowish brown (10YR 6/4) weathered granodiorite, easily cut with a spade.

The A horizon ranges from very dark grayish brown to grayish brown or brown in 10YR hue. The texture is sandy loam or coarse sandy loam. The thickness ranges from 7 to 18 inches. This horizon is slightly acid to medium acid.

The Cr horizon ranges from brown to light yellowish brown in 10YR hue. Reaction ranges from slightly acid to medium acid. Depth to unweathered rock is several feet.

212—Tollhouse-Rock outcrop complex, 30 to 75 percent slopes. This steep to very steep complex generally occurs on mountain ridges and north-facing mountainsides. The Tollhouse soil has the profile described as typical of the series. Large boulders or Rock outcrop occupies 10 to 30 percent of the surface area.

About 6 percent of the complex is included areas of Cieneba-Rock outcrop complex, 4 percent Cieneba sandy loam, and 3 percent Vista coarse sandy loam.

If the soil is bare, runoff is rapid and the erosion hazard is high.

This complex is used for wildlife habitat, recreation, watershed and, to a limited extent, for range. Capability unit VIIs-1 (20); Shallow Loamy-Rock outcrop complex range site; Storie index 5.

Vista Series

The Vista series consists of well drained soils in the mountains. These soils formed in material weathered from granitic rock. Slopes are 9 to 65 percent. Elevation is 1,000 to 4,000 feet. The vegetation is mostly brush, some California oaks, and in some areas an understory of annual grasses. Precipitation is 16 to 22 inches, and the mean annual air temperature is about 60°F. The frost-free season is 240 to 320 days.

In a typical profile the surface layer is grayish brown and brown coarse sandy loam 19 inches thick. The subsoil is pale brown and light yellowish brown coarse sandy loam 20 inches thick. The substratum is brownish yellow, weathered granitic rock.

The soil is slightly acid to neutral. It is moderately rapidly permeable.

Vista soils are used for pasture, range, watershed, and wildlife habitat.

Typical profile of Vista coarse sandy loam, 15 to 30 percent slopes, in the Cleveland National Forest (north), NE¼NE¼ sec. 23, T. 6 S., R. 6 W., Orange County:

A11—0 to 2 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; few very fine tubular pores; neutral; abrupt smooth boundary.

A12—2 to 10 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; slightly hard, friable, nonsticky and nonplastic; common fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

A13—10 to 19 inches; brown (10YR 5/3) coarse sandy loam, dark brown (10YR 4/3) moist; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; slightly acid; gradual smooth boundary.

B21—19 to 31 inches; pale brown (10YR 6/3) coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; very few very fine and fine roots; common very fine, fine, and coarse tubular pores; slightly acid; gradual wavy boundary.

B22—31 to 39 inches; light yellowish brown (10YR 6/4) coarse sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; very few very fine roots and common medium roots; common fine and medium tubular pores; slightly acid; abrupt wavy boundary.

Cr—39 to 55 inches; brownish yellow (10YR 6/6) weathered granitic rock, yellowish brown (10YR 5/6) moist; massive; hard, friable, nonsticky and nonplastic; few fine and medium roots in upper few inches along fractures; very few fine and medium tubular pores in upper few inches; slightly acid.

Color of the A horizon ranges from dark grayish brown and grayish brown to brown in 10YR hue. Texture is coarse sandy loam or sandy loam. Thickness ranges from 10 to 20 inches.

Color of the B horizon ranges from brown and pale brown to light yellowish brown in 10YR hue. Texture

is coarse sandy loam or sandy loam. Reaction ranges from neutral to slightly acid. Thickness ranges from 10 to 20 inches.

The weathered granitic rock grades to hard rock with increasing depth.

213—Vista coarse sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on broad hilltops.

About 5 percent of this mapping unit is included areas of Vista-Rock outcrop complex, 5 percent Cieneba sandy loam, 5 percent Blasingame loam, 2 percent Ramona fine sandy loam, and 2 percent Capistrano sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate. Available water capacity is 3.0 to 5.0 inches. The effective rooting depth is 30 to 40 inches.

This soil is used for pasture, range, watershed, and wildlife habitat. Capability unit IVe–1 (19); Loamy range site; Storie index 51.

214—Vista coarse sandy loam, 15 to 30 percent slopes. This moderately steep soil commonly occurs on hilltops. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Vista-Rock outcrop complex, 5 percent Cieneba sandy loam, 5 percent Blasingame loam, 3 percent Escondido very fine sandy loams, and 2 percent Ramona fine sandy loam.

If the soil is bare, runoff is medium and the erosion hazard is high. Available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 40 inches.

This soil is used for pasture, range, watershed, and wildlife habitat. Capability unit VIe–1 (19); Loamy range site; Storie index 36.

215—Vista coarse sandy loam, 30 to 65 percent slopes. This steep to very steep soil generally occurs on side slopes.

About 10 percent of this mapping unit is included areas of Cieneba sandy loam, 5 percent Blasingame loam, and 10 percent Vista-Rock outcrop complex.

If the soil is bare, runoff is rapid to very rapid and the erosion hazard is high to very high. Available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 36 inches.

This soil is used for watershed and wildlife habitat. Capability unit VIIe–1 (19); Loamy range site; Storie index 15.

216—Vista-Rock outcrop complex, 9 to 30 percent slopes. This strongly sloping to moderately steep mapping unit generally occurs as oblong areas 10 to 200 acres in size. About 10 percent of the surface area is Rock outcrop and 10 to 20 percent is large boulders.

About 5 percent of this mapping unit is included areas of Vista coarse sandy loam, 5 percent Cieneba-Rock outcrop complex, 5 percent Blasingame-Rock outcrop complex, 2 percent Ramona fine sandy loam, and 2 percent San Emigdio fine sandy loam.

If the soil is bare, surface runoff is medium and the erosion hazard is moderate. Available water capacity is 2.5 to 5.0 inches. The effective rooting depth is 24 to 36 inches.

This soil is used for range, watershed, and wildlife habitat. Capability unit VIs–1 (19); Loamy-Rock outcrop complex range site; Storie index 19.

Xeralfic Arents, Loamy

Xeralfic Arents, loamy, are moderately well drained or well drained soils. About 85 percent of the acreage is cut and fill land, and 15 percent undisturbed soil. Cut and fill land is the result of mechanical manipulation of terrace areas, usually of Myford and Yorba soils or other similar soils, for urban use. The building pads are nearly level. Elevation ranges from 50 to 1,500 feet. Precipitation is 12 to 16 inches, and the mean annual air temperature is about 61° F. The frost-free season is 300 to 350 days.

The texture of Xeralfic Arents, loamy, is generally sandy clay loam when reshaping is completed. Colors vary in 5YR, 7.5YR, and 10YR hue. Most characteristics of the undisturbed soil have been altered because of mechanical mixing. Few remnants of former argillic horizons remain, and they are not continuous.

Reaction ranges from slightly acid to moderately alkaline. Permeability is slow to very slow depending on compaction and mixing during construction. The shrink-swell hazard is moderate to high.

217—Xeralfic Arents, loamy, 2 to 9 percent slopes. The slope of these areas was determined from the undisturbed landscape. Present land use is primarily apartment houses, single family houses, shopping centers, and some industrial buildings.

Runoff is rapid, and the erosion hazard is high. Capability unit and range site not assigned; Storie index less than 10 (nonagricultural).

218—Xeralfic Arents, loamy, 9 to 15 percent slopes. The slope of these areas was determined from the undisturbed landscape. Present land use is primarily single family houses.

Runoff is rapid, and the erosion hazard is high. Capability unit and range site not assigned; Storie index less than 10 (nonagricultural).

Xerorthents Loamy, Cut and Fill Areas

Xerorthents loamy, cut and fill areas, are moderately well drained or well drained. About 95 percent of the acreage is cut and fill land, and 5 percent undisturbed soil. Cut and fill land is the result of mechanical manipulation of upland areas, generally Alo, Alo variant, Anaheim Balcom, Bosanko soils, or other similar soils, for urban use. The building pads are nearly level. Elevation ranges from 200 to 1,500 feet. Precipitation is 12 to 16 inches, and the mean annual air temperature is about 61° F. The frost-free season is 270 to 350 days.

The texture is loam, clay loam, or clay mixed with 70 to 85 percent crushed soft shale or sandstone, or both. Colors vary in the 7.5YR, 10YR, and 2.5Y hue. Reaction ranges from mildly alkaline to moderately alkaline. Most areas are calcareous throughout.

Permeability is moderately slow to slow depending on compaction during construction. The shrink-swell hazard is moderate. Depth to hard bedrock ranges from 10 to 60 inches.

219—Xerorthents loamy, cut and fill areas, 9 to 15 percent slopes. The slope of these areas was determined from the undisturbed landscape. Present land use is apartment houses and single family houses.

Runoff is rapid, and the erosion hazard is high.

Capability unit and range site not assigned; Storie index less than 10 (nonagricultural).

220—Xerorthents loamy, cut and fill areas, 15 to 30 percent slopes. The slope of these areas was determined from the undisturbed landscape (fig. 3). Present land use is primarily single family houses.

Runoff is rapid, and the erosion hazard is high. Capability unit and range site not assigned; Storie index less than 10 (nonagricultural).

Yorba Series

The Yorba series consists of well drained soils on terraces. These soils formed in gravelly sandy sediment. Slopes are 2 to 50 percent. Elevation ranges from 100 to 2,500 feet. The vegetation is annual grasses and forbs and some sagebrush and cactus. Precipitation is 12 to 20 inches, and the mean annual air temperature is about 62° F. The frost-free season is 300 to 350 days.

In a typical profile the surface layer is pinkish gray and brown gravelly sandy loam 11 inches thick. The subsoil is red, very gravelly sandy clay loam and sandy loam to a depth of 63 inches or more.

The soil is slightly acid throughout. It is slowly permeable.

Yorba soils are used for pasture, range, watershed, wildlife, and urban development.

Typical profile of Yorba gravelly sandy loam, 2 to 9 percent slopes, on the Irvine Ranch, NE¼NE¼ sec. 18 (by private survey), T. 4 S., R. 8 W., Orange County, rifle range area near Irvine Park and Santiago Creek:

A11—0 to 3 inches; pinkish gray (7.5YR 6/2) gravelly sandy loam, brown (7.5YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; 15 percent pebbles and cobbles; slightly acid; abrupt smooth boundary.

A12—3 to 11 inches; brown (7.5YR 5/2) gravelly sandy loam, brown (7.5YR 4/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; many very fine tubular pores; 15 percent pebbles and cobbles; slightly acid; abrupt smooth boundary.

B21t—11 to 25 inches; red (2.5YR 5/6) very gravelly sandy clay loam, dark red (2.5YR 3/6) moist; weak medium angular blocky structure; very hard, firm, sticky and very plastic; very few very

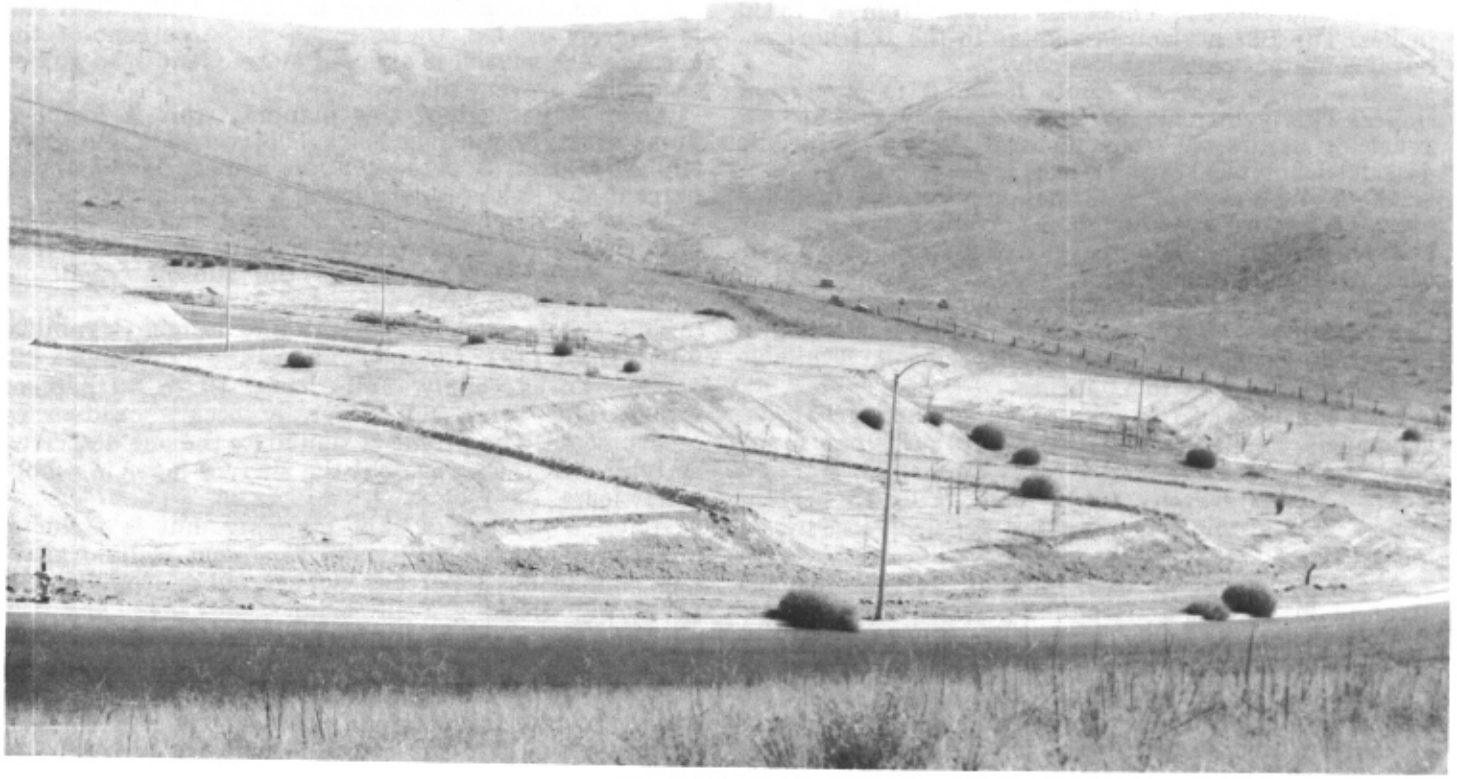

Figure 3.—**Xerothents loamy, cut and fill areas, 15 to 30 percent slopes.**

fine roots; common very fine tubular pores; many moderately thick clay films on peds and as bridges; 50 percent pebbles and cobbles; slightly acid; diffuse boundary.

B22t—25 to 40 inches; red (2.5YR 5/6) very gravelly sandy clay loam, dark red (2.5YR 3/6) moist; weak medium angular blocky structure; very hard, firm, sticky and very plastic; very few very fine roots; common very fine tubular pores and common fine interstitial pores; many moderately thick clay films on peds and as bridges; 50 percent pebbles and cobbles; slightly acid; gradual smooth boundary.

B3t—40 to 63 inches; red (2.5YR 5/6) very gravelly sandy loam, dark red (2.5YR 3/6) moist; massive; hard, friable, sticky and slightly plastic; very few very fine roots; many very fine and fine interstitial pores; common thin clay bridges; 60 percent pebbles and cobbles; slightly acid.

The A horizon ranges from pinkish gray, brown, and dark grayish brown to light brownish gray in 7.5YR and 10YR hue. Texture is gravelly or cobbly sandy loam or loam. Reaction ranges from medium acid to slightly acid. This horizon is 5 to 25 percent pebbles and cobbles. Thickness ranges from 9 to 18 inches.

The B2t horizon ranges from brown, dark brown, and yellowish red to red in 2.5YR, 5YR and 7.5YR hue. Texture is generally very gravelly or cobbly sandy clay loam or clay loam. Reaction ranges from medium acid to moderately alkaline. This horizon is 35 to 65 percent pebbles and cobbles. Thickness ranges from 18 to 30 inches. The B3t horizon is similar to the B2t horizon, but it contains somewhat less clay.

221—Yorba gravelly sandy loam, 2 to 9 percent slopes. This gently sloping to moderately sloping soil generally occurs on broad terraces. It has the profile described as typical of the series.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 3 percent Soper gravelly loam, 5 percent Gabino gravelly clay loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is medium and the erosion hazard is moderate. The effective rooting depth is 9 to 18 inches. Few roots penetrate the subsoil. Available water capacity is 4.0 to 5.0 inches.

This soil is used for pasture, range, and urban development. Capability unit IVe–3 (19); Claypan range site; Storie index 41.

222—Yorba gravelly sandy loam, 9 to 15 percent slopes. This strongly sloping soil generally occurs on terraces.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Gabino gravelly clay loam, 3 percent Soper gravelly loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The effective rooting depth is 9 to 18 inches. Few roots penetrate the subsoil. Available water capacity is 4.0 to 5.0 inches.

This soil is used for pasture, range, watershed, and urban development. Capability unit IVe–3 (19); Claypan range site; Storie index 39.

223—Yorba gravelly sandy loam, 15 to 30 percent slopes. This moderately steep soil generally occurs on terrace escarpments.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Gabino gravelly clay loam, 3 percent Soper gravelly loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The effective rooting depth is 9 to 18 inches. Few roots penetrate the subsoil. Available water capacity is 4.0 to 5.0 inches.

This soil is used for range and watershed. Capability unit VIe–1 (19); Claypan range site; Storie index 28.

224—Yorba cobbly sandy loam, 9 to 30 percent slopes. This strongly sloping to moderately steep soil generally occurs on terrace escarpments. The profile is similar to the one described as typical of the series, but the surface layer is cobbly sandy loam.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Gabino gravelly clay loam, 3 percent Soper cobbly loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The effective rooting depth is 9 to 18 inches. Few roots penetrate the subsoil. Available water capacity is 4.0 to 5.0 inches.

This soil is used for pasture and range. Capability unit VIs–1 (19); Claypan range site; Storie index 28.

225—Yorba cobbly sandy loam, 9 to 30 percent slopes, eroded. This strongly sloping to moderately steep soil generally occurs on concave terraces. The profile is similar to the one described as typical of the series, but the surface layer is cobbly sandy loam and is severely eroded. On as much as 50 percent of the acreage, the subsoil is exposed or frequent deep gullies occur that prevent tillage.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Gabino gravelly clay loam, 3 percent Soper cobbly loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The effective rooting depth is 5 to 9 inches. Few roots penetrate the subsoil. Available water capacity is 3.0 to 4.0 inches.

This soil is used for pasture and range. Capability unit VIIs–1 (19); Claypan range site; Storie index 12.

226—Yorba cobbly sandy loam, 30 to 50 percent slopes. This steep soil generally occurs on terrace escarpments. The profile is similar to the one described as typical of the series, but the surface layer is cobbly sandy loam.

About 5 percent of this mapping unit is included areas of Myford sandy loam, 5 percent Gabino gravelly clay loam, 3 percent Soper cobbly loam, and 2 percent Modjeska gravelly loam.

If the soil is bare, runoff is rapid and the erosion hazard is high. The effective rooting depth is 9 to 18 inches. Few roots penetrate the subsoil. Available water capacity is 4.0 to 5.0 inches.

This soil is used for range, watershed, and wildlife habitat. Capability unit VIIs–1 (19); Claypan range site; Storie index 14.

Use and Management of the Soils

In this section the capability classification system used by the Soil Conservation Service is described. The capability units are explained, and management is suggested for the soils in each capability unit. Estimated acre yields of the major crops are listed for those soils in the counties used for crops. The management required to obtain those yields is described, and the Storie index is explained. Also on the pages that follow is information on range sites, wildlife habitat, and engineering.

Capability Grouping

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations when used for field crops, the risk of damage when they are so used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, for forest trees, for engineering, or for other unrelated soil uses.

In the capability system, all kinds of soils are grouped at three levels: the capability class, the subclass, and the unit. These groups are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use.

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices, or both.

Class III soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife. (None in this survey area)

Class VI soils have severe limitations that make them generally unsuited to cultivation and that limit their use largely to pasture or range, woodland, or wildlife.

Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.

Class VIII soils and landforms have limitations that preclude their use for commercial production of crops and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils.

Capability units in California in classes I through IV are given Arabic numbers that suggest the chief kind of limitation responsible for placement of the soil in the capability class and subclass. For this reason, some of the units within the subclasses are not numbered consecutively, and their symbols are a partial key to some of the soil features. Except for class I, the numbers that designate units within the classes and subclasses are:

0. A problem or limitation caused by sand and gravel in the substratum, which limits root penetration.
1. An actual or potential erosion hazard.
2. A problem or limitation of wetness caused by poor drainage or flooding.
3. A problem or limitation caused by slow or very slow permeability of the subsoil or substratum.
4. A problem or limitation caused by coarse soil texture or excessive gravel.
5. A problem or limitation caused by a fine textured or very fine textured surface soil.
6. A problem or limitation caused by salts or alkali.
7. A problem or limitation caused by cobbles, stones, or rocks.
8. A problem or limitation caused by nearly impervious bedrock or a hardpan within the effective rooting depth.
9. A problem or limitation caused by low fertility or by toxicity. (None in this survey area)

Soils in classes V through VIII are given the nonconnotative number 1. Where these soils are used for

range, they are discussed in more detail under the heading "Range."

Land Resource Areas

The Orange County and Western Part of Riverside County survey area is divided into two land resource areas based on soil, climate, topography, vegetation, and land use. These areas are designated nationally as 19 and 20. The major land resource area, 19, consists of all areas except those above 3,000 feet on north- and east-facing slopes in the Santa Ana Mountains. Only two series, Laughlin and Tollhouse, have the characteristic that would place them in resource area 20. Other soils in the Santa Ana Mountains at elevations above 3,000 feet are generally on west- and south-facing slopes, which have the warmer climatic conditions of resource area 19.

Soils in these two resource areas may be similar and have the same capability unit symbol, but management needs may differ. These differences result from climate, vegetation, and kinds of crops that can be grown. For these reasons, capability unit symbols are followed by numbers 19 or 20 to identify the two resource areas. For example, soils in capability units VIIe–1 (19) and VIIe–1 (20) may be similar, but there is a brush cover in resource area 19 and a grass cover with light stands of pines or oaks in resource area 20.

Resource area 19

This area consists of a narrow strip of beaches and tidal flats along the coast and a gently sloping alluvial flood plain, in the northwestern part of Orange County, which extends from the beaches and tidal flats to the vicinity of Fullerton to Orange and Tustin and in a small southward loop below El Toro Marine Corps Air Station to about the intersection of the San Diego and Santa Ana freeways. Also included are rolling foothills and terraces that are adjacent to the flood plain in the northern part of the county and to the coast in the southern part and extend north along the Santa Ana Mountains. Also in area 19 are the Santa Ana Mountains, except for a few north- and east-facing slopes above 3,000 feet, and some valleys and terraces on the east side of the Santa Ana Mountains in Riverside County.

The elevation range is sea level to about 3,000 feet. Many south- and west-facing slopes in the Santa Ana Mountains that range to about 4,000 feet, however, have a warm enough climate to be included in resource area 19. Rainfall ranges from 10 inches along the coast to 25 inches inland and occurs mainly between November and March. The frost-free season is 200 to 350 days. Frosts are light and infrequent.

The land capability classification for the soils in area 19 is based on the assumption that water is available for irrigation. The generally mild climate favors the development of intensive agriculture, including highly specialized row and field crops, citrus, and avocados. Soil erosion, water runoff, and irrigation management are the major problems.

Resource area 20

In resource area 20 are areas in the Santa Ana Mountains that are above 3,000 feet elevation. Santiago Peak, the highest elevation, is 5,687 feet above sea level. Topography is dominantly steep and very steep. Many of the south- and west-facing slopes that range to 4,000 feet have a warm enough climate to be included in resource area 19.

Precipitation, including some light snowfall, ranges from 20 to 30 inches. Most of the precipitation occurs between November and March.

The land capability classification for the soils in area 20 is based on their suitability for nonirrigated farming. Most of the acreage is used for range, watershed, wildlife habitat, and recreation. The major problems are runoff and erosion.

Management by Capability Units

Utilization of crop residue, minimum tillage, cover crops, and fertilization is common management in the survey area.

Disking or plowing under the tree prunings, tomato and bean vines, sugar beet tops, and other crop residue provides organic matter and reduces soil loss through erosion. Additions of organic matter increase fertility, aeration, and moisture penetration and maintain or improve soil structure.

Minimum tillage helps in maintaining soil structure and reducing compaction by influencing air and water movement through the soil. Chemical weed control reduces the amount of tillage needed. Proper timing of tillage is important. All tilling should be done when moisture conditions are such that compaction and pulverization can be kept to a minimum. Well designed access roads that minimize travel on the soil help in reducing compaction.

Cover crops are effective in improving and protecting cropland and orchards during winter. When utilized as green manure, they also add organic matter. Ryegrass, barley, and volunteer forbs and grasses improve water intake and thus protect the soil against water erosion and soil blowing.

Fertilization is generally needed to maintain or increase soil productivity. The kinds and amounts of fertilizer vary according to the crop. All crops but forage legumes respond to nitrogen. Legumes, truck crops, and field crops respond to phosphorus. Some crops are deficient in zinc and other microelements. Citrus and avocados on Balcom, Metz, Mocho, Nacimiento, San Emidgio, and other highly calcareous soils are subject to chlorosis.

It is assumed that irrigation water is available, or can be made available, for all arable soils in the area.

In the following pages the capability units in the survey area are described and the use and management of the soils is suggested. The names of the soil series represented are mentioned in the description of each unit, but this does not mean that all soils of a given series are in the unit.

CAPABILITY UNIT I (19)

This unit consists of sandy loams, loams, silt loams, silty clay loams, and clay loams on fans and flood plains. These are soils of the Bolsa, Chino, Hueneme, Mocho, San Emigdio, and Sorrento series. They formed in alluvium dominantly from sedimentary sources. Most are well drained. In some, drainage has been

improved and the water table is no longer a concern to management. Slopes are 0 to 2 percent. The annual rainfall is 12 to 18 inches, and the frost-free season is 270 to 355 days. Permeability is moderately rapid to moderately slow. Runoff is slow, and the erosion hazard is slight. Roots and water easily penetrate these soils to a depth of 60 inches or more. Available water capacity is 7.0 to 13.0 inches.

These soils are suited to a wide variety of irrigated row crops, specialty crops, and field crops. Strawberries are grown on San Emigdio soils, where they are less prone to disease, have less fruit rot, and are easier to harvest than on the finer textured soils.

These soils can usually be leveled without exposing unfavorable underlying materials. Soil fertility, structure, and tilth can be maintained or improved by growing green manure crops, planting annual winter cover crops in groves or orchards, returning all crop residue to the soil, and applying livestock manure. Fertilizer should be applied according to the needs of each crop and the kinds of soil.

CAPABILITY UNIT IIe-1 (19)

This unit consists of sandy loams to clay loams on alluvial fans and narrow valley fills. These are soils of the Botella, Garretson, Hanford, Mocho, San Emigdio, and Sorrento series. They are well drained. Slopes are 2 to 9 percent. The annual rainfall is 12 to 20 inches, and the frost-free season is 250 to 355 days. Permeability is moderately rapid to moderately slow. Runoff is slow to medium, and the erosion hazard is slight to moderate. Roots and water easily penetrate these soils to a depth of 60 inches or more. Available water capacity is 6.0 to 13.0 inches.

These soils are suited to a wide variety of irrigated row crops, field crops, citrus, and avocados.

The risk of erosion is the main limitation. Sheet erosion can be controlled by tilling across the slope or on the contour and by preserving good soil structure and tilth through the use of crop residue or green manure crops. It can also be controlled by keeping cover crops on the soils during the rainy season.

Irrigation water can be applied by contour furrows, sprinklers, or drip systems. The irrigation system should provide for control of water and erosion and for disposal of tail water. These soils can usually be leveled without exposing unfavorable underlying materials.

CAPABILITY UNIT IIe-3 (19)

The one soil in this unit is Rincon clay loam, 2 to 9 percent slopes. It has a surface layer of clay loam and a slowly permeable, heavy clay loam subsoil. It formed on terraces in alluvium derived from sedimentary rocks. It is well drained. The annual rainfall is 12 to 18 inches, and the frost-free season is 270 to 300 days. Runoff is medium, and the erosion hazard is moderate. Root penetration into the subsoil is somewhat impeded, but roots commonly extend to a depth of 60 inches or more. Available water capacity in the root zone is 9.0 to 11.0 inches.

This soil is suited to many irrigated row crops, irrigated field crops, citrus, and dryland barley. It is not well suited to avocados.

Sprinklers, drip systems, or furrows on the contour are satisfactory in irrigating. Runoff should be controlled. Erosion is a problem during the rainy season unless the soil surface is protected.

Organic matter supplied through the use of green manure crops, crop residue, or livestock manure is beneficial. Annual winter cover crops and minimum tillage improve water penetration and reduce erosion in citrus groves.

CAPABILITY UNIT IIe-5 (19)

The one soil in this unit, Cropley clay, 2 to 9 percent slopes, is on alluvial fans. It formed in alluvium derived from sedimentary rocks. It is clay throughout and cracks when dry. It is well drained. The annual rainfall is 10 to 20 inches, and the frost-free season is 280 to 340 days. Permeability is slow. Runoff is medium, and the erosion hazard is slight. Roots can penetrate to a depth of 60 inches or more. Available water capacity is 8.0 to 10.0 inches.

This soil is suited to many irrigated row crops, field crops, citrus, and dryland barley.

Growing green manure crops, utilizing crop residue, and applying livestock manure improve soil tilth and increase the supply of organic matter.

Erosion is a serious problem during the rainy season unless the soil surface is protected. Adequate provisions to control irrigation runoff are also needed.

This soil is difficult to work and should be worked within only a narrow range of moisture content. If cultivated when dry, it breaks into large hard clods. If cultivated when wet, the soil structure is easily damaged.

CAPABILITY UNIT IIw-2 (19)

This unit consists of fine sandy loams, silt loams, and silty clay loams on alluvial fans and flood plains. These are soils of the Bolsa, Chino, and Hueneme series. They formed from mixed but dominantly sedimentary sources. They are somewhat poorly drained or poorly drained and have a water table at a depth of 40 to 60 inches. Slopes are 0 to 2 percent. The annual rainfall is 12 to 15 inches, and the frost-free season is 300 to 350 days. Permeability is moderately rapid or moderately slow. Runoff is very slow or slow, and the erosion hazard is none to slight. Roots easily penetrate these soils to a depth of 40 to 60 inches, depending on the depth of the water table. Available water capacity in a drained soil is 7.0 to 9.0 inches.

These soils are suited to a wide variety of irrigated row crops and field crops. Strawberries are usually not grown on the soils in this area because they are more prone to disease and fruit rot. Also, they are more difficult to harvest than on coarser textured, somewhat excessively drained soils. Citrus and avocados are not suited because of the high water table.

These soils can usually be leveled without exposing unfavorable underlying material. Open ditches or tile drains help maintain the water table at a uniform depth. Disposal of excess surface water reduces ponding.

Growing green manure crops, returning all crop residue to the soil, and applying livestock manure maintain or improve soil fertility, structure, and tilth.

CAPABILITY UNIT IIs-3 (19)

The one soil in this unit, Omni silt loam, drained, is on flood plains and in basins. It formed in mixed alluvium. It has altered drainage, and the water table is lowered to 60 inches or more. The surface layer is 10 to 14 inches thick over clay, which extends to a depth of 60 inches or more. Slopes are 0 to 2 percent. The annual rainfall is 12 to 14 inches, and the frost-free season is 280 to 300 days. Permeability is slow. Runoff is very slow, and the erosion hazard is none to slight. Roots can penetrate, but not easily, to a depth of 60 inches or more in the clay underlying material. Available water capacity is 8.5 to 12.0 inches.

The soil is suited to a wide variety of row crops, field crops, and dryland barley. It is not suited to citrus, avocados, or many other tree crops.

Skillful irrigation management is needed to prevent the surface layer from becoming too saturated and to avoid a perched water table above the clay layer. Irrigation systems should provide for disposal of excess tail water to prevent ponding.

Growing green manure crops, returning all crop residue to the soil, and applying livestock manure maintain or improve soil fertility, structure, and tilth.

CAPABILITY UNIT IIs-4 (19)

This unit consists of soils of the Corralitos and Metz series. These soils have a loamy sand surface layer, stratified sand to very fine sandy loam underlying layers, and at a depth between 40 and 60 inches a silt loam or silty clay loam layer 2 to 6 inches thick. The soils are somewhat excessively drained. Slopes are 0 to 2 percent. The annual rainfall is 12 to 20 inches, and the frost-free season is 230 to 350 days. Permeability is moderate to slow in the substratum. Runoff is slow, and the erosion hazard is slight. Available water capacity in the 60-inch root zone is 5.0 to 6.0 inches.

These soils are suited to irrigated row crops, strawberries, field crops, and citrus.

These soils can be irrigated with little risk of damage from erosion. Because of the coarse texture and the droughtiness, frequent, light irrigation is needed. Leveling for irrigation is not a problem if the cuts leave adequate root space above the moderately fine substratum.

Organic matter is rapidly depleted in these soils. It can be supplied by growing green manure crops, returning crop residue to the soil, and applying livestock manure.

CAPABILITY UNIT IIs-5 (19)

This unit consists of soils of the Cropley and Omni series on fans and in basins. These soils formed in alluvium. Both are clay throughout. The Cropley soil is well drained. The Omni soil has altered drainage and a water table at a depth of 60 inches or lower. Slopes are 0 to 2 percent. The shrink-swell potential is high. The annual rainfall is 10 to 20 inches, and the frost-free season is 280 to 340 days. Permeability is slow. Runoff is very slow to slow, and the erosion hazard is none to slight. Available water capacity is 8.0 to 12.0 inches.

These soils are suited to irrigated row crops, field crops, and dryland barley.

Growing green manure crops, utilizing all crop residue, and applying livestock manure improve soil tilth and increase the supply of organic matter. Erosion is no problem, but adequate control for irrigation runoff is needed.

These soils are difficult to work and can be worked within only a narrow range of moisture content. If they are cultivated when dry, large hard clods form. If they are cultivated when wet, the soil structure is easily damaged.

CAPABILITY UNIT IIIe-1 (19)

This unit consists of fine sandy loams, sandy loams, and clay loams. These are soils of the Balcom, Botella, Capistrano, and Ramona series. Balcom soils formed in weathered calcareous sandstone or shale. Botella and Capistrano soils formed in alluvium on fans and flood plains, mostly in small valleys. Ramona soils formed in granitic alluvium on terraces. Slopes are 2 to 15 percent. These soils are well drained. The annual rainfall is 12 to 25 inches, and the frost-free season is 240 to 350 days. Runoff is slow to medium, and the erosion hazard is moderate to high. Roots can penetrate to a depth of 26 to 36 inches in Balcom soils and to a depth of 60 inches or more in the other soils. Available water capacity is 4.0 to 6.0 inches in Balcom soils and 5.5 to 11.5 in the others.

These soils are suited to row crops, field crops, and citrus. Capistrano soils are also suited to avocados. Balcom soils are moderately high in lime, which can cause iron chlorosis in some crops.

Sprinklers, drip systems, and furrows on the contour are most satisfactory in irrigating. Erosion is the major problem. Tillage across the slope or on the contour reduces runoff and the risk of erosion.

Stubble mulching and returning all crop residue reduce runoff, maintain soil tilth, and improve water intake. Annual winter cover crops and minimum tillage improve water intake and reduce the risk of erosion in citrus and avocado groves.

CAPABILITY UNIT IIIe-3 (19)

This unit consists of soils in the Myford and Rincon series. These soils formed on terraces. Slopes are 2 to 15 percent.

Myford soils have a sandy loam surface layer and a sandy clay or sandy clay loam subsoil. They are moderately well drained, have a 20- to 30-inch effective rooting depth, and have an available water capacity of 3.0 to 5.5 inches. Permeability is very slow in the subsoil, and a perched water table is likely to form after excessive irrigation or rainfall.

Rincon soils have a clay loam surface layer and a clay loam or clay subsoil that is slowly permeable. They are well drained. Roots commonly extend to a depth of 60 inches or more, and the available water capacity is 9.0 to 11.0 inches.

The annual rainfall is 12 to 20 inches, and the frost-free season is 270 to 350 days. Runoff is slow to medium, and the erosion hazard is slight to moderate.

Myford soils are best suited to irrigated pasture and dryland grazing. Rincon soils are suited to citrus and to many row and field crops.

Sprinklers, drip systems, and furrows on the contour are satisfactory in irrigating. Overirrigation and the resulting perched water table should be avoided. Con-

trolling runoff is needed. Erosion is a problem, especially during the rainy season, unless the soil is protected by a plant cover. Tillage should be across the slopes or on the contour. Land leveling should be avoided because deep cuts expose the clayey subsoil.

Additions of organic matter improve soil structure and tilth. Annual winter cover crops and minimum tillage improve water penetration and reduce the risk of erosion in citrus groves.

CAPABILITY UNIT IIIe-4 (19)

The one soil in this unit is Modjeska gravelly loam, 2 to 9 percent slopes. This well drained soil is on terraces. It formed in alluvium from mixed sources. The annual rainfall is 14 to 20 inches, and the frost-free season is 280 to 330 days. Permeability is moderate. Roots easily penetrate to a depth of 60 inches or more, even though the subsoil is very cobbly. Available water capacity is 4.5 to 6.0 inches.

This soil is suited to citrus, avocados, barley, pasture, and shallowly cultivated row and field crops.

Sprinklers and drip systems are most satisfactory in irrigating. Frequent, light irrigation is needed. Land leveling is impractical because the subsoil is very cobbly. Erosion is a problem especially during the rainy season. Tillage should be across the slopes or on the contour.

Additions of organic matter improve soil structure and tilth. Annual winter cover crops and minimum tillage improve water penetration and reduce the risk of erosion in citrus and avocado groves.

CAPABILITY UNIT IIIe-5 (19)

This unit consists of clays on foothills. These are soils of the Alo, Alo variant, and Bosanko series. They formed in weathered calcareous sandstone and shale. They are well drained. Slopes range from 9 to 15 percent. The annual rainfall is 12 to 20 inches, and the frost-free season is 280 to 350 days. Permeability is slow. Runoff is medium, and the erosion hazard is moderate. Roots can penetrate to a depth of 24 to 40 inches. Available water capacity is 3.0 to 7.0 inches.

These soils are suited to row crops planted on the contour and to dryland barley. They are moderately well suited to citrus.

Sprinklers, drip systems, and furrows on the contour are satisfactory in irrigating. Slow water intake, water runoff, and erosion are problems on these soils. Tillage should be done when soil moisture conditions are optimum to avoid puddling or the formation of large hard clods.

Addition of organic matter improves soil structure and tilth. Stubble mulching reduces the risk of erosion on barley fields. Annual winter cover crops and minimum tillage improve water penetration and reduce the erosion hazard in citrus groves.

CAPABILITY UNIT IIIw-6 (19)

In this unit are soils of the Omni series and Thapto-Histic Fluvaquents. These soils are on flood plains and in basins. Slopes are 0 to 2 percent. Omni soils are clay throughout. Thapto-Histic Fluvaquents are mainly clay loam and silty clay over peat. All are poorly drained and have a water table at a depth of 24 to 40 inches. All are moderately affected by salts. The annual rainfall is 12 to 14 inches, and the frost-free season is 280 to 350 days. Permeability is slow. Runoff is very slow to slow, and the erosion hazard is none to slight. Roots can easily penetrate as far down as the water table. In drained areas the available water capacity is 6.0 to 12.0 inches.

These soils are suited to moderately salt tolerant row crops and field crops. They are not suited to deep rooted crops and citrus or avocado trees. In places open ditches and tile drains are needed to lower the water table.

Erosion is no problem. Occasional overflow and ponding are hazards. Water disposal systems are needed in some areas. Irrigation should be regulated to supply enough water for crops and to avoid raising the water table. Occasional excessive irrigation is needed to leach excess salts from the root zone.

Growing green manure crops, returning all crop residue to the soil, and applying livestock manure help to maintain soil tilth and structure.

CAPABILITY UNIT IIIs-3 (19)

The one soil in this unit, Myford sandy loam, thick surface, is on terraces. It formed in alluvium. The subsoil is a very slowly permeable, dense sandy clay. Slopes are 0 to 2 percent. This soil is moderately well drained. The annual rainfall is 12 to 20 inches, and the frost-free season is 270 to 350 days. Runoff is slow, and the erosion hazard is slight. Roots can easily penetrate the 20- to 30-inch surface layer, but few roots extend into the subsoil. Available water capacity is 3.0 to 5.5 inches in the 20- to 30-inch effective rooting depth.

This soil is best suited to irrigated pasture, dryland pasture, and barley. Good irrigation management is important. Irrigation water must be applied carefully to avoid saturating the soil above the clayey subsoil. Land smoothing should be done carefully to avoid exposing the clayey subsoil.

Growing green manure crops, returning all crop residue to the soil, and applying livestock manure maintain or improve the soil tilth, structure, and fertility.

CAPABILITY UNIT IIIs-4 (19)

This unit consists of loamy sands and gravelly loams of the Corralitos, Marina, Metz, and Modjeska series. Corralitos and Metz soils formed in alluvium on flood plains and fans in small valleys. Marina and Modjeska soils formed on terraces. These soils are somewhat excessively drained and well drained. Slopes are 0 to 5 percent. The annual rainfall is 12 to 20 inches, and the frost-free season is 230 to 365 days. Permeability is rapid to moderate. Runoff is slow, and the erosion hazard is slight. Roots penetrate to a depth of 60 inches or more. Available water capacity is 3.5 to 6.0 inches.

These soils are suited to irrigated row crops, field crops, citrus, and avocados. Most of the strawberries grown in this area are on Corralitos and Metz soils.

Proper irrigation management is essential. Frequent irrigation is needed because of the low water capacity and the rapid intake. Land leveling can be done on Corralitos, Metz, and Marina soils without exposing unfavorable materials. The subsoils of Modjeska soils are too cobbly for leveling.

Growing green manure crops, using all crop residue,

and applying livestock manure help to maintain soil tilth and structure.

CAPABILITY UNIT IVe-1 (19)

This unit consists of well drained sandy loams, loams, and clay loams on uplands and terraces. These are soils of the Anaheim, Balcom, Blasingame, Capistrano, Soper, Escondido, Nacimiento, Ramona, Modjeska, and Vista series. Some are gravelly. Anaheim, Balcom, Nacimiento, Blasingame, Escondido, Soper, and Vista soils formed in weathered sandstone or shale, granitic conglomerates, or metamorphosed sandstone on foothills. Capistrano and Ramona soils formed in granitic alluvium on terraces and fans. Slopes are 9 to 30 percent. The annual rainfall is 12 to 25 inches, and the frost-free season is 225 to 350 days. Permeability is moderately rapid to moderately slow. Runoff is medium to rapid, and the erosion hazard is moderate to high. Roots can penetrate to a depth of 24 to 40 inches in the upland soils and to a depth of 60 inches or more in the terrace soils. Available water capacity is 3.0 to 10.0 inches.

These soils are suited to citrus and irrigated row crops planted on the contour and to barley. Anaheim loam and Vista soils are suited to avocados. Balcom soils are moderately high in lime, which can cause iron chlorosis in some crops. Currently most of the acreage is not used for cultivated crops. It is used mainly for grazing.

Sprinklers and drip systems are most satisfactory in irrigating. Erosion is the major problem. Tillage should be on the contour to reduce runoff and the risk of erosion.

Returning all crop residue and stubble to the soils reduces runoff, maintains soil tilth, and improves water intake. Annual winter cover crops and minimum tillage improve water intake and reduce the risk of erosion in citrus and avocado groves.

CAPABILITY UNIT IVe-3 (19)

This unit consists of sandy loams, gravelly sandy loams, and clay loams on terraces. These are soils of the Myford, Rincon, and Yorba series. Myford soils have a very slowly permeable subsoil and are moderately well drained. Rincon and Yorba soils have a slowly permeable subsoil and are well drained. Slopes are 0 to 30 percent. The annual rainfall is 12 to 20 inches, and the frost-free season is 270 to 350 days. Runoff is medium to rapid, and the erosion hazard is moderate to high. Roots in the Myford and Yorba soils easily extend from 9 to 19 inches, but few roots extend into the subsoil. Available water capacity is 2.0 to 5.0 inches. Roots in the Rincon soils commonly extend from 40 to 60 inches or more, even though the subsoil impedes root growth. Available water capacity is 9.0 to 11.0 inches.

Myford and Yorba soils are best suited to irrigated pasture or dryland grazing. Rincon soils are suited to citrus, irrigated row crops, and barley planted on the contour.

Sprinklers and drip systems are most satisfactory in irrigating. Overirrigation is likely to cause a perched water table. Runoff should be controlled. Erosion is a problem, especially during the rainy season unless the soil is protected by a plant cover. Tillage should be on the contour.

Additions of organic matter maintain or improve soil structure and tilth. Annual cover crops and minimum tillage improve water penetration and reduce the risk of erosion in citrus groves.

CAPABILITY UNIT IVe-5 (19)

The soils in this unit are clays that formed on foothills in material weathered from calcareous sandstone and shale. These are soils of the Alo and Bosanko series and the Alo variant. They are well drained. Slopes are 15 to 30 percent. The average annual rainfall is 12 to 20 inches, and the average annual growing season is 280 to 350 days. Permeability is slow. Runoff is rapid, and the erosion hazard is moderate to high. The effective rooting depth is 24 to 36 inches. Available water capacity is 3.5 to 6.0 inches. Also in this unit are areas of the moderately slowly permeable, well drained Balcom clay loam, which is mapped with Bosanko clay.

These soils are suited to citrus and grain and, to a limited extent, to row crops planted on the contour.

Sprinklers or drip systems are most efficient in irrigating. Contour furrows can be used if properly managed. The intake rate is slow after the soil has been watered. All tillage should be on the contour to reduce the risk of erosion. It can be performed within only a narrow range of moisture content. If the soil is dry when tilled, large clods form; if wet, the surface compacts and seals over.

Additions of organic matter improve soil structure and tilth. Stubble mulching reduces the risk of erosion. Annual winter cover crops and minimum tillage improve water penetration and reduce the risk of erosion in orchards.

CAPABILITY UNIT IVs-4 (19)

The one soil in this unit, Marina loamy sand, 2 to 9 percent slopes, formed on terraces near the coast in old eolian sands. It is somewhat excessively drained. The annual rainfall is 12 to 15 inches, and the frost-free season is 320 to 365 days. Permeability is moderate. Runoff is slow to medium, and the erosion hazard is slight to moderate. Roots penetrate to a depth of 60 inches or more. Available water capacity is 3.5 to 5.0 inches.

This soil is suited to irrigated row crops, citrus, and avocados. Most of the acreage, however, is now under urban development.

Sprinklers and drip systems are most satisfactory in irrigating. Frequent, light irrigations are required because of the low available water capacity. Tillage should be across the slope or on the contour.

Additions of organic matter maintain or improve soil structure and tilth. Annual winter cover crops and minimum tillage improve water penetration and reduce the risk of erosion in citrus and avocado groves.

CAPABILITY UNIT VIe-1 (19)

This unit consists of loamy sands and clays on terraces and uplands. These are soils of the Alo, Anaheim, Balcom, Blasingame, Bosanko, Chesterton, Cieneba, Escondido, Myford, Nacimiento, San Andreas, Soper, Vista, and Yorba series and the Alo variant. These

soils are moderately well drained and well drained. Slopes are 2 to 50 percent. The annual rainfall is 12 to 25 inches, and the frost-free season is 200 to 350 days. Permeability is very slow to moderately rapid. Runoff is medium to rapid, and the erosion hazard is moderate to high. Roots can penetrate from 10 to 40 inches. Available water capacity is 1.0 to 7.0 inches.

These soils are suited to range, watershed, and wildlife habitat. All but Chesterton, Cieneba, Myford, and Yorba soils are moderately suited to citrus. Cieneba, San Andreas, and Vista soils are suited to avocados.

Sprinklers and drip systems are most satisfactory in irrigating groves. Runoff and erosion are major problems. Cover crops and nontillage are the most suitable methods of erosion and runoff control in citrus or avocado groves.

Proper range management is needed to increase the quality and quantity of desirable plants for forage, to provide cover for erosion control, and to reduce runoff. Seeding of burned areas with suitable grasses and legumes may be necessary to replace the vegetation needed for erosion control and grazing.

CAPABILITY UNIT VIs-1 (19)

This unit consists of sandy loams, loamy sands, loams, and clay loams. These are soils of the Balcom, Blasingame, Cieneba, Gabino, Soboba, Vista, and Yorba series. Soboba soils, on alluvial fans and flood plains, are excessively drained. Yorba soils, on terraces, are well drained. The rest, on uplands, are well drained or somewhat excessively drained. They formed in material weathered from sandstone, shale, granite, or metamorphic rock conglomerate. Some soils in this unit are mapped with Rock outcrop. Some are stony or cobbly. Slopes are 0 to 50 percent. The annual rainfall is 12 to 25 inches, and the frost-free season is 200 to 350 days. Permeability is moderately rapid to slow on the uplands and terraces and very rapid on the fans and flood plains. Soboba soils have an available water capacity of 2.0 to 3.0 inches in the 60-inch root zone. Yorba soils have an effective rooting depth of 9 to 18 inches for many plant roots and an available water capacity of 4.0 to 5.0 inches. The remaining soils have an effective rooting depth of 15 to 40 inches and an available water capacity of 2.0 to 6.0 inches. Runoff is slow to medium on Soboba soils, and the erosion hazard is slight to moderate. On the other soils runoff is medium to rapid, and the erosion hazard is high.

All but Yorba soils are suited to citrus. Cieneba, Soboba, and Vista soils are suited to avocados. All are suited to and used as range, watershed, and wildlife habitat. The Rock outcrop, stones, and cobbles associated with these soils somewhat limit the use of normal farm machinery.

Sprinklers or drip systems are the most satisfactory in irrigating citrus or avocados. Cover crops and no tillage in the citrus and avocado groves reduce runoff and the risk of erosion.

Proper range management is needed to maintain an adequate vegetative cover, to increase the quantity of forage, and to reduce the erosion hazard. These soils can be seeded to suitable annual grasses and forbs.

CAPABILITY UNIT VIIe-1 (19)

This unit consists of sandy loams, loams, and clay loams of the Anaheim, Calleguas, Cieneba, Friant, Las Posas, Myford, Soper, and Vista series. Myford soils are on terraces. The rest are on uplands. The upland soils are somewhat excessively drained or well drained; Myford soils are moderately well drained. Slopes are 15 to 75 percent on the upland soils and 9 to 30 percent on Myford soils. The annual rainfall is 12 to 25 inches, and the frost-free season is 200 to 350 days. Runoff is rapid to very rapid, and the erosion hazard is high to very high. Roots penetrate from 5 to 40 inches. Available water capacity is 0.75 to 6.5 inches.

These soils are suited to range, wildlife, watershed, and recreation. Runoff and erosion are the main hazards.

Proper grazing is needed to increase the quantity of desirable plants and usable forage. Maintaining an adequate cover of plants also helps to control erosion and runoff. Seeding burned areas should be done only for erosion control.

CAPABILITY UNIT VIIe-1 (20)

The only soil in this unit is Laughlin gravelly loam, 30 to 50 percent slopes. This well drained soil formed in material weathered from metamorphic rock. It is in mountainous areas. The annual precipitation, including a few light snowfalls, is 20 to 30 inches. The frost-free season is 150 to 180 days. Roots can easily penetrate from 24 to 40 inches. Available water capacity is 3.0 to 6.0 inches.

This soil is suited to grazing, wildlife, recreation, and watershed. Runoff and erosion are the main hazards.

Proper grazing is needed to increase the quality and quantity of desirable plants for forage. It also provides cover for erosion control and reduces runoff.

Seeding burned areas with suitable annual grasses and legumes helps in erosion control.

CAPABILITY UNIT VIIs-1 (19)

This unit consists of sandy loams and loams of the Blasingame, Cieneba, Exchequer, Soper, and Yorba series. These are well drained and somewhat excessively drained soils. Yorba soils are on terraces, and the other soils are on mountains or foothills. Slopes are 9 to 30 percent on Yorba soils and are 15 to 75 percent on the upland soils. Some of these soils are mapped with Rock outcrop. Some are stony or cobbly. The Rock outcrop, stones, or cobbles cover 10 to 50 percent of the surface area. The annual precipitation is 12 to 25 inches, and the frost-free season is 200 to 350 days. Roots can penetrate easily from 5 to 32 inches. Available water capacity is 0.75 to 4.5 inches. Runoff is rapid, and the erosion hazard is high.

These soils are suited to range, wildlife, watershed, and recreation. Erosion and surface rocks, stones, and cobbles are the main hazards.

Proper grazing is needed to maintain the forage and reduce the erosion hazard. The rocks, stones, and slopes preclude the use of any equipment. Seeding is of value only for erosion control. It is not economically feasible to improve the grazing capacity of these soils.

CAPABILITY UNIT VIIs-1 (20)

Only Tollhouse-Rock outcrop complex, 30 to 75 percent slopes, is in this unit. It is on uplands. The surface area is about 10 percent Rock outcrop. The Tollhouse

soil formed in material weathered from granodiorite. It is excessively drained. It is coarse sandy loam throughout. The annual precipitation, including a few light snowfalls, is 20 to 30 inches, and the frost-free season is 150 to 180 days. Roots can easily penetrate from 7 to 18 inches. Some tree and brush roots extend much deeper into the weathered granodiorite. Available water capacity is 1.0 to 2.0 inches.

This unit is suited to wildlife habitat, watershed, recreation, and limited grazing. Runoff and erosion are the main hazards.

Controlling grazing helps to maintain an adequate plant cover for control of runoff and erosion. Seeding in burned areas should be done only for erosion control.

CAPABILITY UNIT VIIIw-1 (19)

This unit consists of Beaches, Riverwash, and Tidal flats. Beaches are sandy, gravelly, or cobbly coastal shores. Tidal flats are nearly level, poorly drained, stratified clayey to sandy deposits that are adjacent to bays and lagoons along the coast and are high in salts. Both are subject to tidal action and may be at least partly inundated by high tides. Riverwash consists of sandy, gravelly, cobbly, stony, and bouldery deposits, along stream channels, that are subject to stream overflow.

Areas in this unit support little or no vegetation. They are suited to wildlife and recreation but have little or no agricultural value. Riverwash is a valuable source of sand and gravel for construction material.

Soil removal or deposition is a hazard during floods and storms. Protecting existing vegetation in these areas, maintaining dikes on Beaches, and protecting and realigning stream channels in areas of Riverwash reduce the removal and deposition hazards.

CAPABILITY UNIT VIIIs-1 (19)

This unit consists of Pits, open excavations from which soil and underlying material, generally sand or gravel, have been removed. The remaining material generally has low fertility and supports little or no vegetation. It has no agricultural value. The water that collects in Pits recharges the ground water.

Major problems are runoff and erosion and flooding in stream channel areas. Pits can be protected by use of mulches; fertilized plant cover, diversion ditches; and in stream channel areas, streambank protection or channel realignment.

Storie Index [2]

The soil mapping units of the area are rated according to the Storie index (*10, 11*). This index expresses numerically the relative degree of suitability of a soil for general intensive farming. The rating is based on soil properties and characteristics only. Other factors that might determine the desirability of growing certain plants in a given locality, such as availability of water for irrigation, climate, and distance from markets, are not considered. Therefore, the index should not be considered as a direct indicator of land value. Where economic factors are known to the user, however, the index provides additional objective information for land tract value comparisons.

[2] Prepared by GORDON L. HUNTINGTON, lecturer and soil specialist, University of California, Davis.

Four general factors are considered in the index rating. The factors are (A) the characteristics of the soil profile and soil depth; (B) the texture of the surface soil; (C) the dominant slope of the soil; and (X) other factors more readily subject to management or modification. In Orange County the X factors include drainage, salinity, alkalinity, general nutrient level of the soil, and erosion. For some soils more than one X factor may be involved.

Each of the four general factors is evaluated on the basis of 100 percent. A rating of 100 percent expresses the most favorable or ideal condition for crop production; lower percentage ratings express less favorable conditions for crop production. Factor ratings are selected from tables prepared from data and observations that have related soil properties to plant growth and crop yield (*9*).

The index rating for a soil is obtained by multiplying the three factors, A, B, and C with one or more X factors; thus, any factor may dominate or control the final rating. For example, Omni silt loam, drained, has a deep, slowly permeable profile, warranting a rating of 70 percent for factor A; a readily workable surface texture, warranting a rating of 100 percent for factor B; and a smooth, nearly level surface, justifying a rating of 100 percent for factor C. This soil is moderately well drained and slightly saline-alkali affected, which warrants respective ratings of 90 and 80 percent or a combined rating of 72 percent for factor X. Multiplying these four factors gives an index rating, rounded to the nearest whole number, of 50 percent for this Omni soil. If the saline-alkali problem is corrected, the Storie index should be reevaluated by assigning a value of 90 to the X factor to reflect the changed condition, assuming that the soil remains moderately well drained.

Soil complexes mapped in this area, for example, Blasingame-Vista complex, are rated according to the appropriate factors for the dominant soils in each unit. Thus, the index ratings reflect the proportions of the dominant soils in a complex or the proportions of different soils in a tract or field. The latter is done by an acreage-weighted averaging of the Storie index values of the different soils in a tract or field.

Soils are graded according to their suitability for general intensive farming as shown by their Storie index ratings. The following tabulation shows the six grades and the range in index ratings:

	Index rating
Grade 1	80 to 100
Grade 2	60 to 79
Grade 3	40 to 59
Grade 4	20 to 39
Grade 5	10 to 19
Grade 6	Less than 10

Soils in grade 1 are excellent and are very well suited to general intensive farming. Grade 2 soils are good and are well suited to general farming, but are not so desirable as soils in grade 1. Grade 3 soils are only fairly well suited, grade 4 soils are poorly suited, and grade 5 soils are very poorly suited. In grade 6 are soils and miscellaneous areas that are not suited to farming.

Estimated Yields and Crop Management[3]

This section describes management that is necessary to obtain the yields shown in table 2. Management and estimated yields are based on observations made by the Soil Conservation Service and the University of California Agricultural Extension Service, and from the Agricultural Commissioner's Annual report for Orange County. They are also based on current technology and plant varieties. New developments in plant breeding, insect and disease control, irrigation methods, and other forms of management will eventually require revision of suggested practices and predicted yields.

The estimates shown in table 2 are averages that can be expected over a period of years. In any given year, yields may be considerably higher or lower than the average. If little or no information was available on yields of a given crop on a particular soil, estimates were made by comparing this soil with similar soils for which yield information was available. No estimates are given for miscellaneous areas, or for soils not considered suitable, or generally not used for any crops listed. Table 2 shows only the crops that are most extensively grown or that are highest in cash value.

On the following pages, the general management needed for each crop listed in table 2 is described.

All requirements for plant nutrients are for the elemental form; for example, pounds per acre of the element phosphorus. The gross irrigation use is the total annual plant need per acre less the average effective precipitation. Yearly and seasonal climatic variations greatly affect total water requirements and irrigation frequencies of listed crops.

It is assumed that the yields listed in table 2 were obtained under the optimum level of management. The optimum or best level of management known is that level which, according to experience, field trials, and research findings, would give the highest possible returns, and is within the capabilities of most farmers and ranchers in the survey area. This includes planting the best adapted and most desirable crop varieties and tilling, planting, fertilizing, pruning, thinning, irrigating, and harvesting at proper times and in adequate amounts. Specific recommendations on the kind and amount of fertilizer to apply, irrigation water management, suitable varieties, herbicide and insecticide use, and other production information can be obtained from the local Soil Conservation Service or the Agricultural Extension Service.

Asparagus

Asparagus can be planted by direct seeding or crown transplanting (fig. 4). Rows are spaced 5 feet apart. The variety now used is UC 72. Planting is in March or April and harvesting is from February to July. Harvest is by hand every 1 to 3 days, depending on weather. Medium textured to fine textured soils are preferable. About 2 to 3 acre-feet of water are applied. From 400 to 800 cubic feet of chicken manure is applied either before or after harvest. An additional 200 to 250 pounds of nitrogen is water run for sidedressings during fern growth. In fall or winter, the fern is cut and incorporated into the beds. A herbicide is applied before harvest to control weeds.

Avocados

Three varieties of avocado are presently used in commercial plantings, the Hass, the Fuerete, and the Bacon. The Hass variety consistently produces larger quantities of high quality fruit that is picked from April to August but is the least tolerant of low temperatures. The Fuerete produces high quality fruit that is picked from November to April but has an erratic bearing habit, partly because it requires cross pollination. The Bacon produces lower quality fruit that is picked from November to February and is often used in areas of cold climate because of its tolerance. It is also used as windbreaks because of its tall, upright growth.

A typical Hass-Fuerete planting is 124 trees per acre on a 16 by 22 foot area. Every other tree will be pulled 8 years after planting.

Most widely used rootstocks are of Mexican varieties, such as Topa Topa, Ganter, Mexicola, and others. Rootstocks that are tolerant of avocado root rot fungus (*Phytophthora cinnamomi*) are being investigated. Rootstocks of the Guatemalan variety are not suited to most soils in Orange County because of their susceptibility to chlorosis. Soils that are somewhat poorly drained or slowly or very slowly permeable in the subsoil should be avoided because the fungus-causing root rot is associated with wetness. There is no cure after the trees are infected.

Production of fruit generally starts during the fourth year after field planting, and peak production occurs between the 10th and 18th year of age. Orchard life expectancy (between 15 and 40 years) is determined more by risk of root rot disease than by all other factors combined. Because of the shallow rooting characteristic of the avocado, there is no cultivation, thus permitting the fallen leaves to form a mulch under the trees.

Irrigation water 2½ to 3½ feet deep, containing less than 75 to 100 parts per million (ppm) chloride, 50 percent exchangeable sodium, and 800 or 900 ppm total dissolved salts is used annually.

Furrows, sprinklers, and drip systems are the methods of irrigation. Leaching is required occasionally to remove salts from the root zone.

Nitrogen fertilization is required at the rate of 100 to 200 pounds per acre per year, applied in January or February for all varieties except Hass. For Hass, it is applied half in January and February and half in June. Zinc foliar sprays are sometimes required for soils that are deficient in zinc.

Insect and mite control is maintained by biological methods. No insecticides are applied.

Annual leaf analysis and tensiometers are the modern techniques for soil moisture and nutrition level control.

Celery

Celery is transplanted from August to April, and it is harvested by hand once over from November to June. Fieldwork includes disking the previous crop, subsoiling twice, plowing, landplaning, pre-irrigation,

[3] HAROLD W. OTTO and T. A. HALES, farm advisors, Cooperative Extension Service, University of California, provided technical information.

TABLE 2.—*Yields per acre of principal crops*

[Estimates are only soils that are widely used for crops listed. Absence of data indicates crops not significant]

Soil name and map symbol	Oranges, Valencia	Avocados	Asparagus	Celery	Strawberries	Sweet corn	Tomatoes
	50-lb box	*Ton*	*Ton*	*Ton*	*Ton*	*Ton*	*Ton*
Alo:							
100	400						
101	350						
Alo Variant:							
103	400						
104	350						
Bolsa:							
122, 124				27		4.5	22
123, 125				30		5.0	26
Bosanko:							
126	400						
127, 129	350						
Botella:							
131	500	3.0		30		5.5	24
132	500	3.0		30		5.5	26
133	500	3.0					
Capistrano:							
135	500	3.0				5.5	26
136	500	3.0					
Chino:							
139				27		5.0	22
140			3.0	30		5.5	26
Corralitos:							
146, 147	450	2.5			23	4.5	20
Cropley:							
148, 149	400			27		5.0	24
Garretson:							
155	450	2.5					
Hanford:							
156	400	2.5					
Hueneme:							
157				25		4.5	22
158				27		5.0	24
Metz:							
163, 164	450	2.5			23	4.5	20
Mocho:							
165	600	3.0	2.5	30		5.0	24
166, 167	600	3.0	3.0	30		5.0	24
Modjeska:							
168, 169, 170	500	3.0					
171	450	2.5					
Myford:							
172, 173, 174	300						
178, 179	350						
Omni:							
182				27		5.0	26
183				25		4.5	22
184				27		5.0	24
Rincon:							
188, 189	500	2.5					
190	450						

TABLE 2.—*Yields per acre of principal crops*—Continued

Soil name and map symbol	Oranges, Valencia	Avocados	Asparagus	Celery	Strawberries	Sweet corn	Tomatoes
	50-lb box	*Ton*	*Ton*	*Ton*	*Ton*	*Ton*	*Ton*
San Andreas:							
193	350	2.5	----	----	----	----	----
San Emigdio:							
194, 195	600	3.0	3.0	24	26	5.0	24
196	550	----	----	24	23	5.0	24
Soboba:							
197	350	2.5	----	----	----	----	----
Sorrento:							
205, 206, 207, 208, 209	700	3.0	3.0	30	----	5.5	26
Thapto-Histic Fluvaquents:							
210	----	----	----	27	----	5.0	22

disking twice, renovation, furrowing out, and a second pre-irrigation just before transplanting. Medium textured to fine textured soils are preferred so that a relatively high moisture content can be maintained throughout the growing season and the occurrence of blackheart can be prevented. Varieties grown in the survey area are Utah 52–70—R–Strain and Calmario.

Six hundred cubic feet of chicken manure are applied before planting. About 110 pounds of phosphorus and 210 pounds of potassium are sidedressed in two applications, and 200 to 500 pounds of nitrogen are sidedressed in two applications. A herbicide is applied for weed control before or after transplanting. Single-hand hoeing is common. From 2 to 5 acre-feet of water is used in 8 to 15 applications. The amount used depends on the temperature.

About 375 flats, 100 plants per flat, are transplanted per acre. Rows are 24 to 26 inches apart. Celery is commonly sprayed for worms, leafhoppers, and Septoria blight. The 1-month rest period, in July, when no celery is left standing prevents western celery mosaic virus.

Oranges

Commercial production of citrus depends on proper site and variety selection. In Orange County, almost all oranges are Valencia. Site selection is not so critical as it is for avocados since the Valencia orange tolerates fine textured soils, for example, Alo soils, and is less sensitive to cold temperatures.

The number of trees planted per acre varies, but generally Valencia oranges are on 18- by 22-foot spacing with 110 trees per acre. Volunteer cover crops on hillside orchards are controlled by mowing.

Rootstock and scion selection are preventive measures for disease control. Rootstock varieties are selected for vigorous growth, cold resistance when mature, and some tolerance to nematodes and to brown rot gumosis and tristeza (quick decline). Such diseases as exocortis, a virus disease, are avoided by selection of virus free budwood.

Weeds are controlled by herbicides. Nitrogen fertilization, both soil and foliar applications, is required at the rate of 100 to 150 pounds per acre per year. Zinc and manganese sprays are also required in most areas on a regular basis. Occasionally there are potassium, magnesium, copper, and iron deficiencies.

Irrigation water is applied through furrows, sprinklers, and more recently, drip systems. Chlorosis (iron deficiency) on soils with a high lime content can be diminished by careful water management to prevent overirrigation. Generally, the more successful growers use the modern techniques, annual leaf analysis and tensiometers, in controlling levels of soil moisture and nutrition. About 3 acre-feet of water is applied per year.

Another modern technique used for pest management in citrus culture is called integrated pest control, where natural or imported pest predators are permitted to control insect pests. Conventional pest control has included chemical and oil spray applications for brown-soft scale, black scale, citrus thrips, citrus red mites, aphids, and mealybugs.

Strawberries

Preplant soil leveling and fumigation, transplanting, fertilization, irrigation, mulching, pruning, and weed control are needed for strawberries. Management varies with summer and winter plantings.

Land preparation consists of leveling to zero grade and forming furrows. Then the field is fumigated with methyl bromide-chloropicrin gas under sealed plastic tarping for 24 to 48 hours. Beds and furrows are then formed on 42- to 44-inch centers with 6-inch deep furrows (fig. 5).

Transplanting dates for summer plantings are through August; winter plantings are from October 20 to November 10. Plant densities for the 42- to 44-inch beds are nearly 23,000 plants per acre for summer plantings and 35,000 to 50,000 for winter plantings. The transplants are grown and imported from northern California nurseries. The varieties are Tioga and Tufts.

Harvesting of the winter planting can begin as early as the end of February. The advantage of early harvest of the winter planting is gained through the

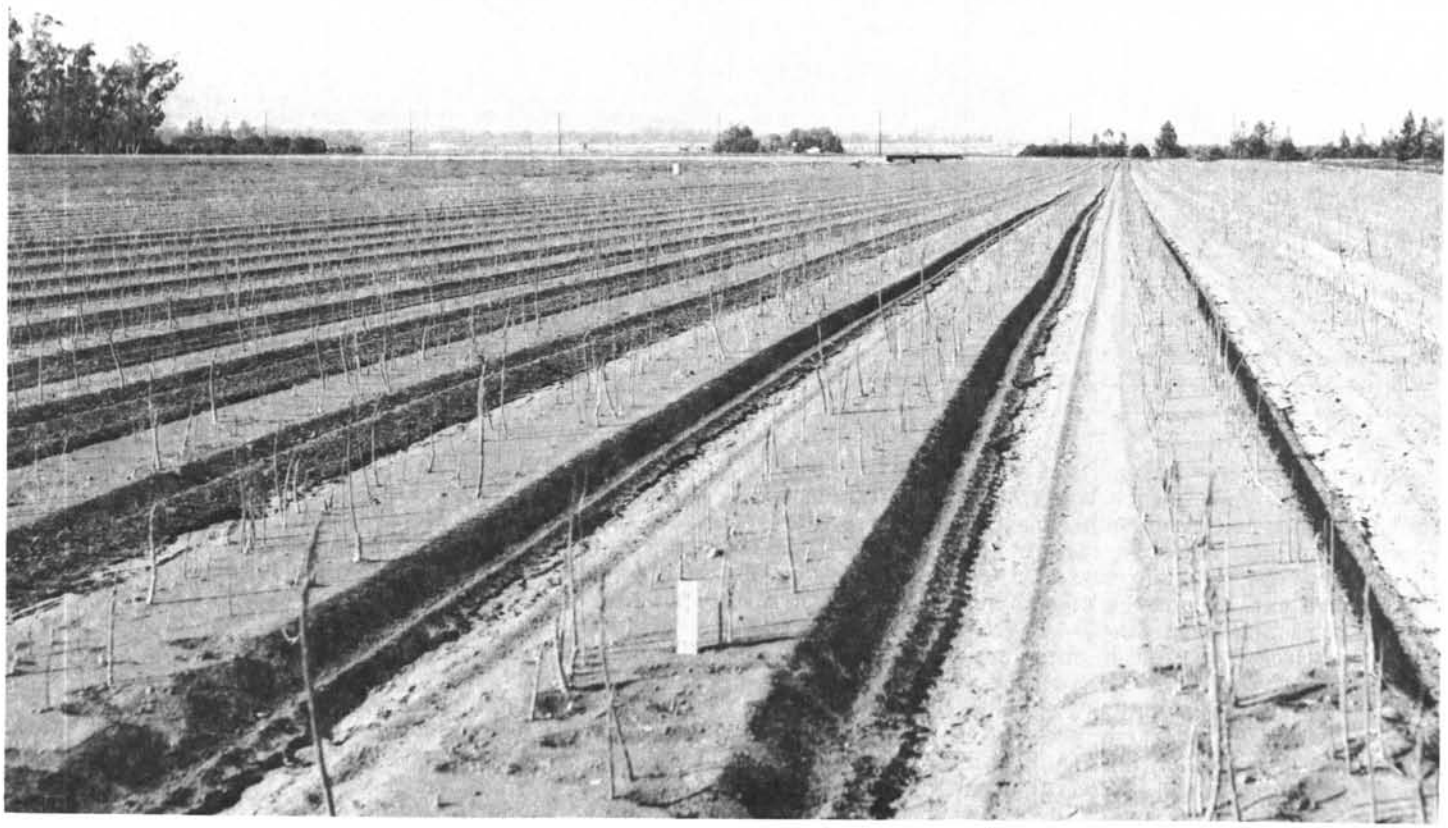

Figure 4.—**Asparagus on Mocho sandy loam, 0 to 2 percent slopes.**

sacrifice of maximum total yield. Harvesting of some summer plantings will begin late in March.

Irrigation consists of sprinkling during the plant establishment periods and furrows after the application of plastic mulch in January. Frequency of irrigation during the harvesting season varies from 4 to 7 days. Total water used is 4 to 5 feet. Nitrogen is applied at the rate of 150 to 250 pounds per acre as preplant placement, as topdressing, or in irrigation water. Mites are controlled by spraying.

Sweet corn

Sweet corn is planted from about February 1 to August 1 and is harvested by hand or machine from July to October. Cultural practices include disking, plowing, disking twice, and pre-irrigation. Soils that range from sandy loam to clay are used for sweet corn. Ten pounds of seed per acre are planted in rows spaced 32 inches apart. Jubilee is the main variety in Orange County. Bonanza, another variety, is planted in areas where sugarcane mosaic disease is a problem.

About 22 to 32 pounds of phosphorus and 15 to 20 pounds of nitrogen generally are banded below the seed at planting. Then 100 pounds of nitrogen are sidedressed when plants are 1 foot tall. An additional 60 to 120 pounds of nitrogen is applied in water after plants begin to tassel.

About 2 acre-feet of water is applied in at least 3 or 4 irrigations. A herbicide can be used for weed control. Earworms are controlled by a pesticide spray every 2 or 3 days from the start of silking, for a total of five to seven sprayings.

Tomatoes

Tomatoes are normally seeded from February 1 to May. They are planted at the rate of ½- or ¾-pound of seed per acre. Canning tomatoes are harvested once by machine between July and October. Tomatoes grown for fresh market may be planted slightly earlier than those grown for processing and are transplanted under hot caps.

Cultivation consists of disking the previous crop, plowing, applying 300 to 400 cubic feet of chicken manure, disking twice, landplaning, disking again, spring tooth harrowing, cultipacking, forming beds, and cultivating beds. Varieties are strains of VF145, Cal J, VF315, VF134, and for fresh market, the H11 variety.

Medium textured to fine textured soils are preferred for tomatoes. Rows are spaced 5 feet apart. For can-

Figure 5.—**Strawberries on San Emigdio fine sandy loam, 0 to 2 percent slopes.**

ning tomatoes clumps of two to four plants are spaced 9 inches apart in the row. For fresh market tomatoes single plants are spaced 11 to 18 inches apart in the row, and stakes are placed between every other plant.

At thinning time, canning tomatoes are sidedressed with 100 pounds of nitrogen. Staked tomatoes receive 250 to 400 pounds of nitrogen applied throughout the season. From 2 to 3 acre-feet of water is applied in 3 to 7 applications depending on the soil and temperature.

Weeds are controlled with herbicides at planting time and then by cultivation and hand hoeing during the growing season. Worms and mites are controlled by spraying.

Range[4]

About 45 percent of the survey area, or 263,000 acres, is rangeland and wildland. This land has not been developed and is not used for agriculture. It has a native or natural plant cover. It is useful for livestock grazing, wildlife habitat, watershed protection, and outdoor recreation. The natural plant cover is dominated by a mixture of grasses, grasses and brush, brush, grasses and trees, or brush and trees.

This acreage does not include the poorly drained soils near the coast. The poorly drained soils are considered wetland, not rangeland.

Range sites

Range sites are kinds of rangeland that differ in the production of significantly different kinds or amounts of vegetation and in their capability to maintain a dynamic equilibrium with their environment unless they are seriously disturbed by overgrazing, fire, insects, or other damage. This grouping is useful for livestock management, brush management, and outdoor recreation management.

The rangeland of the survey area has been classified as eight range sites: Clayey, Shallow Clayey, Claypan, Loamy, Loamy-Rock outcrop complex, Shallow Loamy, Shallow Loamy-Rock outcrop complex, and Sandy.

For forage and wildlife habitat, plants can be classified as preferred, desirable, and undesirable. The preferred plants are the most palatable and nutritious. The desirable plants are somewhat less palatable but are readily grazed when high value plants are not available.

Animals graze selectively seeking the preferred plants. If grazing is not carefully regulated, the preferred plants are weakened or eliminated because they are not allowed to produce seed. Desirable plants then increase. If overgrazing continues, desirable plants are

[4] Prepared by IRVIN L. SEALANDER, range conservationist, Soil Conservation Service.

thinned out or eliminated and undesirable plants take their place or the soil is left bare. Similarly, preferred and desirable browse shrubs are thinned out or eliminated by heavy grazing, frequently with damage from wildfire.

The original vegetation was a mixture of perennial and annual plants. Now, most of the important herbaceous forage is introduced annuals from the Mediterranean region of Europe. These annuals grow during cool weather. They use the available soil moisture, produce seed, and mature before the moisture evaporates. They furnish highly nutritious forage in winter and spring when they are green and growing, but their nutritional value is low when they are mature.

Many species of the native shrubs are food plants for wildlife and livestock. Their principal growth also is in winter and spring, but they retain their nutritive value in summer and fall to a greater degree than the annuals.

Not considered in estimating the range site potential for kind or amount of vegetation is the influence of fire, which is a significant factor in the establishment and continuation of brush cover, particularly that of the chaparral plant community (*6*). This area has a continuous history of recurring wildfires. Most of the native brushy species generally regenerate from sprouts or seed and so continue to be dominated with brush cover. Field investigation indicates that chaparral matures in 50 to 75 years and tends to thin out unless it is reburned. Improving the range site potential in chaparral plant communities would require brush management and brush control.

Fire-induced chaparral is prevalent on most of the Loamy and Shallow Loamy sites, including the Rock-outcrop complexes. The Sandy, Claypan, and Shallow Clayey sites frequently have open to dense cover. The Clayey site is predominantly grass.

On the following pages each range site is described, the forage plants are named, and the total annual yield of herbage and of forage available to livestock is estimated for favorable and unfavorable years. The production for forage is not to be interpreted as usable forage. The estimates show the total yield in air-dry weight for sites that have not been treated with fertilizer. They are based on a limited number of plot clippings and on general knowledge of the sites. Extreme variations in weather can cause even greater annual fluctuations in yields.

CLAYEY RANGE SITE

Soils of the Alo, Balcom, Botella, Bosanko, Alo variant, Cropley, Gabino, Anaheim, Nacimiento, Rincon, and Sorrento series are in this site. The topography is nearly level or gently sloping to steep and in some areas very steep. Slopes are mainly 9 to 50 percent but range from 0 to 75 percent. Elevation is 25 to 2,500 feet. The mean annual precipitation is 10 to 20 inches.

These are clays and clay loams. Some are cobbly or stony. Rock outcrop occurs in some areas of Balcom soils. The soils are mostly 20 to 40 inches deep over sandstone and shale. A few are more than 60 inches deep. All are well drained. Available water capacity is 3.0 to 7.0 inches on upland soils and 8.0 to 13.0 inches on alluvial soils. The subsoil is slowly to moderately permeable. Runoff is slow to very rapid, and the erosion hazard is slight to very high, depending on slope.

This site has an open cover of grass. Some areas have scattered oak trees or shrubs. If the site is producing at potential, about 70 percent of the plant cover is wild oats, soft chess, burclover, filaree, and other preferred plants, including needlegrass and other remnant perennial grasses. Approximately 20 percent is ripgut brome, foxtail barley, and other desirable plants, and 10 percent is nitgrass, wild mustard, fiddleneck, and other undesirable plants. When the soil is moist late in spring, annual weeds make up more than 10 percent of the plant cover.

The estimated total annual yield is 2,400 pounds per acre in favorable years and 1,000 pounds per acre in unfavorable years. The estimated total annual yield available to livestock and wildlife is 2,000 pounds per acre in favorable years and 900 pounds per acre in unfavorable years. Because rock crops out on 10 to 20 percent of the surface area in the Balcom-Rock outcrop complex, yields are correspondingly lower.

Soils of this site are well suited to seeding with adapted annual grasses and legumes on slopes where a seedbed can be prepared. Seeding can increase in depleted areas two to four times. Fertilization can double production in years of high rainfall, but does not significantly increase production in years of low rainfall.

SHALLOW CLAYEY RANGE SITE

Soils of the Calleguas series are in this site. The topography is very steep. Slopes are 50 to 75 percent. Elevation ranges from 200 to 2,500 feet. The mean annual precipitation is 13 to 20 inches.

These are eroded clay loams on uplands. They are 10 to 19 inches deep over weathered lime-coated shale and sandstone. They are well drained. Available water capacity is 1.5 to 3.5 inches. The subsoil is moderately permeable. Runoff is rapid, and the erosion hazard is high.

The plant cover is open brush and an understory of grass. If this site is producing at potential, about 70 percent of the plant cover is wild oats, soft chess, burclover, filaree, and other preferred plants. Approximately 20 percent is foxtail barley, ripgut brome, and other desirable plants; and 10 percent is red brome, nitgrass, shrubs, and other undesirable plants. California sagebrush, California buckwheat, black sage, and ceanothus are the dominant shrubs.

The estimated total annual yield is 400 pounds per acre in favorable years and 50 pounds in unfavorable years. The estimated annual yield available to livestock is 150 pounds per acre in favorable years. No yields can be estimated in unfavorable years.

CLAYPAN RANGE SITE

Soils of the Chesterton, Myford, and Yorba series are in this site. The topography is nearly level and gently sloping to strongly sloping and steep. Slopes are mainly 0 to 15 percent but range to 50 percent. Elevation is 50 to 2,500 feet. The mean annual precipitation is 12 to 20 inches.

These soils are sandy loams and loamy sands. Some are gravelly or cobbly and have a sandy clay or very gravelly sandy clay loam subsoil. These soils are 5 to 30 inches deep over the very slowly or slowly permeable

subsoil. They are moderately well drained and well drained. Available water capacity is 1.0 to 5.5 inches. Runoff is slow to rapid, and the erosion hazard is slight to severe.

This site has an open cover of grass and scattered California buckwheat and California sagebrush. If it is producing at potential, about 70 percent of the plant cover is a mixture of wild oats, soft chess, filaree, burclover, and other preferred plants, including needlegrass and other remnant perennial grasses. Approximately 20 percent is ripgut brome, foxtail fescues, and other desirable plants; and not more than 10 percent is red brome, nitgrass, California sagebrush, California buckwheat, or other undesirable plants.

The estimated total annual yield is 1,500 pounds per acre in favorable years and 400 pounds per acre in unfavorable years. The estimated total annual yield available to livestock and wildlife is 1,300 pounds per acre in favorable years and 350 pounds per acre in unfavorable years.

All soils but mapping units 177, 225, and 226 are well suited to brush management and to seeding with adapted annual grasses and legumes. These practices increase production two to four times in depleted areas. Fertilization doubles production in years of high rainfall but does not significantly increase production in years of low rainfall.

LOAMY RANGE SITE

Soils of the Blasingame, Botella, Capistrano, Escondido, Anaheim, Las Posas, Laughlin, Mocho, Modjeska, Ramona, San Andreas, Soper, Sorrento, and Vista series are in this site. Nondeveloped and noncultivated Garretson and San Emigdio soils are also included. The topography is nearly level to very steep. Slopes are mainly 15 to 50 percent, but some are 0 to 75 percent. Elevation is 25 to 3,500 feet except for Laughlin gravelly loam where the elevation is 3,000 to 5,500 feet.

These are loams, sandy loams, very fine sandy loams, fine sandy loams, and coarse sandy loams. Some are gravelly, cobbly, or stony. Some are 20 to 40 inches deep over bedrock. Some, on alluvial fans and flood plains, are more than 60 inches deep in alluvium. All are well drained or moderately well drained. Available water capacity is 2.5 to 6.5 inches or 4.5 to 13.0 inches, depending on depth. Permeability is moderately slow to moderately rapid. Runoff is slow to very rapid, and the erosion hazard is slight to very high.

This site has a grass-brush or grass cover. If it is producing at potential, about 50 percent of the cover is ceanothus, California sagebrush, scrub oak, laurel sumac, sugar bush, chamise, California buckwheat, and other brushy plants; and 40 percent is soft chess, wild oats, filaree, needlegrass, and other preferred plants. No more than 10 percent is ripgut brome, red brome, foxtail fescue, nitgrass, annual weeds, and other desirable and undesirable plants.

At higher elevations the plant cover on Laughlin soils is an open to moderately dense stand of pines and oaks intermingled with open areas of grass and brush.

The estimated total annual yield is 1,800 pounds per acre in favorable years and 600 pounds per acre in unfavorable years. The estimated total annual yield available to livestock and wildlife is 1,200 pounds per acre in favorable years and 350 pounds per acre in unfavorable years.

On all soils but mapping units 110, 118, 159, 160, 202, 203, and 215, production is increased two to four times if brush is removed. Fertilization can increase production but generally not enough to justify the cost.

LOAMY-ROCK OUTCROP COMPLEX RANGE SITE

Soils of the Blasingame and Vista series intermingled with Rock outcrop are in this site. This site is similar to the Loamy range site, but 20 to 35 percent of the surface is covered with Rock outcrop or large boulders, slopes are 9 to 30 percent, runoff is rapid, and the erosion hazard is high.

The potential annual yield is 20 to 35 percent less than that on the Loamy range site because of the rock outcrops and boulders.

SHALLOW LOAMY RANGE SITE

Soils of the Cieneba, Exchequer, Friant, and Tollhouse series are in this site. Also included are some eroded Soper soils. The topography generally is steep to very steep. Slopes range from 9 to 75 percent. On only 5 percent of the site are slopes less than 30 percent. Elevation is mostly 200 to 4,000 feet. In a few places it is 5,000 feet.

These are sandy loams, gravelly silt loams, loams, and coarse sandy loams that are mostly 5 to 19 inches deep over fractured or weathered bedrock. Some are gravelly or stony. All are well drained to excessively drained. The subsoil is moderately to rapidly permeable. Available water capacity is 0.75 to 3.0 inches. Runoff is rapid, and the erosion hazard is high.

This site has a brush cover of chamise, California buckwheat, and California sagebrush along with small amounts of laurel sumac, sugar bush, ceanothus, and other species of chaparral. The herbaceous ground cover is generally sparse. If this site is producing at potential, approximately 70 percent of the understory is soft chess, wild oats, filaree, and other preferred plants. Approximately 20 percent is red brome, nitgrass, or undesirable plants.

The estimated total annual yield of air-dry forage ranges from 300 pounds per acre in favorable years to 100 pounds per acre in unfavorable years. The estimated annual yield available to livestock and wildlife ranges from 150 pounds per acre in favorable years. No yield can be estimated in unfavorable years.

SHALLOW LOAMY-ROCK OUTCROP COMPLEX RANGE SITE

Soils of the Cieneba, Exchequer, and Tollhouse series are in this site. Some eroded Soper soils intermingled with Rock outcrop are also included. This site is similar to the Shallow Loamy range site, but the surface area is 10 to 50 percent of Rock outcrop or large boulders.

The potential annual yield is 10 to 50 percent less than that of the Shallow Loamy range site because of the Rock outcrop and boulders.

SANDY RANGE SITE

Soils of the Corralitos, Hanford, Marina, Metz, and Soboba series are in this site. The topography is nearly level to strongly sloping. Slopes range from 0 to 15 percent. Elevation is 25 to 2,500 feet.

These are loamy sands or sandy loams on alluvial fans, flood plains, and terraces. They are more than 60 inches deep over stratified or sandy sediments. They are well drained to excessively drained and are moderately to very rapidly permeable. Runoff is slow to medium, and the erosion hazard is slight to moderate. Available water capacity is 2.0 to 9.0 inches.

Loamy sands that have a moderately fine substratum make up about 2 percent of this site. An intermittent water table is perched just above the substratum during some periods of above normal rainfall.

This site has an open cover of brush and a sparse to moderately dense understory of herbaceous plants. Trees and shrubs are abundant on some valley bottoms and flood plains. The brush cover is dense in some upland areas near the coast. If this site is producing at potential, approximately 50 percent of the plant cover is a mixture of soft chess, wild oats, filaree, and other preferred plants. No more than 20 percent is ripgut brome, red brome, nitgrass, and other desirable and undesirable plants. Approximately 30 percent is California sagebrush, sawtooth goldenbush, California buckwheat, and other shrubs.

The estimated total annual yield is 1,500 pounds per acre in favorable years and 300 pounds per acre in unfavorable years. The estimated total annual yield available to livestock and wildlife is 1,000 pounds per acre in favorable years and 225 pounds per acre in unfavorable years.

The soils of this site are suited to brush management and to seeding with adapted annual grasses and legumes. These practices can increase yields two to three times.

Wildlife Habitat [5]

Fish and wildlife provide opportunities for recreation and increase the quality of life in the survey area. They directly and indirectly affect the economy. They help in the natural control of insect pests, eliminate noxious weeds, and have a valuable role in outdoor recreation for birdwatchers, naturalists, and hunters. The habitat in the survey area is well suited to a variety of wildlife. The various kinds of wildlife are mentioned under the description of each habitat type.

Warmwater fish, such as black bass, catfish, and sunfish, inhabit the lakes and ponds in the survey area. Coldwater fish, such as trout, are stocked on a seasonal basis in some streams and larger lakes. Wildlife of particular interest are waterfowl and shore birds associated with the coastal wetlands (Type 18-Regularly Flooded Salt Marshes) (*8*). Seal Beach National Wildlife Refuge on Anaheim Bay, Upper Newport Bay, and Bolsa Chica marsh on Bolsa Bay, mapped as Tidal flats, are the prime areas where the vegetation, the soil, and the water are beneficial for wildlife. These areas are of high value to many birds, mammals, and marine vertebrates and invertebrates.

With other factors, such as climate, soils directly influence the kind and amount of vegetation and the amount of water available for the growth of habitat plantings. In this way soils indirectly influence the kinds and numbers of wildlife that can use an area.

[5] Prepared by RICHARD D. MCCABE, biologist, Soil Conservation Service.

The ratings for habitat elements and habitat types, which appear in table 3, mainly take into account soil characteristics and their potential for producing these habitat elements and types. The ratings do not account for closely related factors, such as the local climate, present use of soils, present distribution of wildlife and people, or land areas not classified as soils. For this reason, selection of a site for development of wildlife habitat often requires onsite investigation.

Many wildlife species, such as wetland wildlife, upland game birds, and song birds, require access to more than one habitat type. Most wildlife do well where habitat is interspersed and where the topography varies and provides edge effects and conditions that satisfy the various inherent needs of each species. Wetland wildlife requirements include a mixture of very shallow and deep water areas, some with open water and some with emergent and submergent vegetation.

Inventories and habitat considerations for the many reptiles, amphibians, bats, insects, and fish found in the survey area are not included. This omission does not imply that these more obscure forms of animal life are any less important than those which are included.

The major wildlife habitat types and representative kinds of permanent and transient wildlife species and major vegetation indigenous to the area are as follows:

Openland (farmland) habitat, cultivated cropland and irrigated pasture, is used by California quail, mourning dove, ring-necked pheasant, migratory waterfowl, band-tailed pigeon, raccoon, fox, and California mule deer. Irrigated citrus and avocado orchards have potential to attract many species of nongame birds as well as California quail and deer.

Woodland habitat is open to dense live oak intermingled with grassland and chaparral at lower elevations. Sycamore, cottonwood, alder, and live oak grow on many canyon bottoms.

At the higher elevations, oak is intermingled with conifers, mainly ponderosa pine and Jeffrey pine. This habitat is used by mourning dove, California quail, band-tailed pigeon, striped skunk, bobcat, California mule deer, coyote, badger, long-tailed weasel, and the mountain lion.

Wetland habitat has been mostly destroyed by urban and other developments. Continued destruction will reduce or eliminate wildlife, many of which are rare or endangered species.

This habitat includes the Type 18-Regularly Flooded Coastal Salt Marshes as well as the manmade freshwater impoundments and some rivers and streams. These wetlands produce plants of value to waterfowl and shore birds, for example, rushes, sedges, bulrushes, spartina, salicornia, and pondweed. Wildlife associated with these wetlands are migratory and resident ducks, migratory geese, shore birds, small nongame marsh birds, beaver, raccoon, and striped skunks. California legislation recognizes endangered and rare species, which include the lightfooted clapper rail, the beldings savannah sparrow, the black rail, the California least tern, and the brown pelican. There is a binding interrelationship between the rare and endangered species (*3, 4*) and the deteriorating Type 18 wetland.

Rangeland habitat is generally the unimproved pas-

ture and grassland often associated and intermingled with open or closed stands of chaparral (*6*), coastal sage scrub brush (*6*), and a few trees. Wildlife includes California quail, mourning dove, California mule deer, bobcat, mountain lion, coyote, and ground squirrel. Range site descriptions, located in local Soil Conservation Service offices, describe the soil, its location, and the relative production of grasses, forbs, and shrubs that influence the production of wildlife on range.

The suitability of a named soil to produce a given habitat type is shown in table 3.

Good habitat is easily improved, maintained, or created. There are few or no soil limitations in habitat management and satisfactory results can be expected. The soils are essentially well suited to the element of wildlife habitat.

Fair habitat can be improved, maintained, or created, but moderate soil limitations affect habitat management or development. A moderate intensity of management and fairly frequent attention may be required to ensure satisfactory results, even though the soil is suited to the element of wildlife habitat.

Poor habitat can be improved, maintained, or created, but soil limitations are severe. Habitat management may be difficult and expensive and requires intensive effort. Results are questionable because the soil is generally poorly suited to the element of wildlife habitat.

Very poor habitat is either impractical or impossible to attempt to improve, maintain, or create under the present soil conditions. Unsatisfactory results are probable because the soil is not suited to the element of wildlife habitat.

The wildlife habitat elements shown in table 3 are defined as follows:

Grain and seed crops are domestic grains, such as oats, barley, milo, Japanese millet, or other seed producing annuals, that provide food for wildlife.

Domestic grasses and legumes planted for wildlife cover and food are fescue, orchard grass, and annual and perennial ryegrass. The legumes are lana vetch, alfalfa, trefoil, and clover.

Wild herbaceous plants are native or naturally established dryland grasses and forbs that provide food and cover for wildlife. Burclover, dove weed, lupine, deervetch, wild oats, soft chess, and filaree are examples.

Hardwood trees include riparian vegetation and nonconiferous trees and associated woody understory plants that provide food or cover for wildlife. Examples are willow, alder, sycamore, elderberry, and oak trees.

Coniferous trees are cone-bearing trees, such as bigcone spruce, ponderosa pine, and Jeffrey pine.

Shrubs are woody plants that produce browse and mast (fruits and nuts) used by wildlife. Examples are chamise, manzanita, toyon, poison oak, ceanothus, scrub oak, California sagebrush, California buckwheat, sumac, encelia, and sawtooth goldenbush.

Wetland plants are domestic and wild annual and perennial herbaceous plants that provide food and cover. Examples are cattail, dock, sedges, plantain, saltgrass, smartweed, watergrass, Japanese millet, alkali bulrush, hardstem bulrush, spartina, salicornia, sea blite, and iodinebush.

Shallow water developments are low diked areas or naturally wet basins that provide shallow water, generally less than 5 feet deep, used by waterfowl. Examples are brackish and salt water marshes, wildlife watering developments, and ponds. Natural or manmade shallow water areas also provide habitat for fish and many wildlife species other than waterfowl. The suitability of soils for ponding water behind dams or levees is considered under the heading "Engineering."

Engineering

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this information are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers and ranchers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock that is within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar

TABLE 3.—*Wildlife habitat*

[See text for definitions of "good," "fair," "poor," and "very poor."

Soil name and map symbol	Potential for habitat elements				
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants
Alo:					
100	Fair	Good	Poor		
101	Fair	Good	Poor		
102	Poor	Fair	Poor		
Alo Variant:					
103	Fair	Good	Poor		
104	Fair	Good	Poor		
105	Poor	Fair	Poor		
Anaheim:					
106, 108	Fair	Good	Poor		
107, 109	Poor	Fair	Poor		
110	Very poor	Very poor	Poor		
Balcom:					
111, 112	Fair	Good	Fair		
113	Poor	Fair	Fair		
[1] 114:					
Balcom part	Poor	Fair	Fair		
Rock outcrop part.					
Beaches:					
115.					
Blasingame:					
116	Fair	Good	Good	Good	Good
117	Poor	Poor	Good		
118	Very poor	Very poor	Good		
[1] 119:					
Blasingame part	Poor	Poor	Good	Good	Good
Rock outcrop part.					
Blasingame:					
[1] 120:					
Blasingame part	Fair	Good	Good		
Vista part	Fair	Good	Fair		
[1] 121:					
Blasingame part	Poor	Fair	Good		
Vista part	Poor	Fair	Fair		
Bolsa:					
122, 123, 124, 125	Good	Good	Good		
Bosanko:					
126	Fair	Good	Poor		
127	Fair	Good	Poor		
128	Poor	Fair	Poor		
[1] 129:					
Bosanko part	Fair	Good	Poor		
Balcom part	Fair	Good	Fair		
[1] 130:					
Bosanko part	Poor	Fair	Poor		
Balcom part	Poor	Fair	Fair		
Botella:					
131, 132	Good	Good	Good		
133	Fair	Good	Good		
Calleguas:					
134	Very poor	Very poor	Fair		
Capistrano:					
135, 136	Fair	Good	Good		

potentials

Absence of an entry indicates the soil was not rated]

Potential for habitat elements—Cont.			Potential as habitat for—			
Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Poor	Very poor	Very poor	Very poor		Very poor	Poor.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Good	Very poor	Very poor	Good	Good	Very poor	Good.
Good	Very poor	Very poor	Fair		Very poor	Good.
Good	Very poor	Very poor	Poor		Very poor	Good.
Good	Very poor	Very poor	Poor	Good	Very poor	Good.
Good	Very poor	Very poor	Fair		Very poor	Good.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Good	Very poor	Very poor	Fair		Very poor	Good.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Good	Good	Fair	Good		Fair	Good.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Poor	Very poor	Very poor	Fair		Very poor	Poor.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Good	Poor	Very poor	Good		Very poor	Good.
Good	Very poor	Very poor	Good		Very poor	Good.
Fair	Very poor	Very poor	Very poor		Very poor	Fair.
Good	Very poor	Very poor	Fair		Very poor	Fair.

TABLE 3.—*Wildlife habitat*

Soil name and map symbol	Potential for habitat elements				
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants
Chesterton:					
137	Poor	Fair	Fair		
138	Poor	Fair	Fair		
Chino:					
139, 140	Good	Good	Good		
Cieneba:					
141	Poor	Fair	Poor		
142	Very poor	Very poor	Poor		
[1] 143:					
Cieneba part	Poor	Poor	Poor		
Blasingame part	Poor	Poor	Good	Good	Good
Rock outcrop part.					
[1] 144:					
Cieneba part	Poor	Poor	Poor		
Rock outcrop part.					
[1] 145:					
Cieneba part	Very poor	Very poor	Poor		
Rock outcrop part.					
Corralitos:					
146	Fair	Fair	Fair		
147	Good	Good	Good		
Cropley:					
148	Good	Good	Poor		
149	Good	Good	Poor		
Escondido:					
150	Fair	Good	Good		
151	Poor	Fair	Good		
Exchequer:					
[1] 152:					
Exchequer part	Very poor	Very poor	Poor	Very poor	
Rock outcrop part.					
Friant:					
153	Very poor	Very poor	Fair		
Gabino:					
154	Poor	Poor	Fair		
Garretson:					
155	Good	Good	Good		
Hanford:					
156	Good	Good	Good		
Hueneme:					
157	Good	Good	Good		
158	Good	Good	Good		
Las Posas:					
159	Very poor	Very poor	Fair		
Laughlin:					
160	Very poor	Very poor	Good		
Marina:					
161	Fair	Fair	Fair		
162	Poor	Poor	Fair		
Metz:					
163	Fair	Fair	Good		
164	Good	Good	Good		

potentials—Continued

Potential for habitat elements—Cont.			Potential as habitat for—			
Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Fair Fair	Very poor Very poor	Very poor Very poor	Poor Poor		Very poor Very poor	Fair. Fair.
Good	Good	Good	Good		Good	Good.
Poor Poor	Very poor Very poor	Very poor Very poor	Poor Very poor		Very poor Very poor	Poor. Poor.
Poor Good	Very poor Very poor	Very poor Very poor	Poor Poor	 Good	Very poor Very poor	Poor. Good.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Poor	Very poor	Very poor	Very poor		Very poor	Poor.
Fair Fair	Very poor Poor	Very poor Very poor	Fair Good		Very poor Very poor	Fair. Fair.
Poor Poor	Poor Poor	Fair Very poor	Good Good		Poor Very poor	Poor. Poor.
Good Good	Very poor Very poor	Very poor Very poor	Good Fair		Very poor Very poor	Good. Good.
Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor.
Poor	Very poor	Very poor	Very poor		Very poor	Poor.
Fair	Very poor	Very poor	Poor		Very poor	Fair.
Good	Poor	Poor	Good		Poor	Good.
Good	Poor	Very poor	Good		Very poor	Good.
Good Good	Good Poor	Fair Poor	Good Good		Fair Poor	Good. Good.
Very poor	Very poor	Very poor	Very poor		Very poor	Poor.
Good	Very poor	Very poor	Very poor		Very poor	Good.
Fair Fair	Very poor Very poor	Very poor Very poor	Fair Poor		Very poor Very poor	Fair. Fair.
Good Good	Very poor Very poor	Very poor Very poor	Fair Good		Very poor Very poor	Good. Good.

TABLE 3.—*Wildlife habitat*

Soil name and map symbol	Potential for habitat elements				
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants
Mocho:					
165, 166	Good	Good	Good		
167	Good	Good	Good		
Modjeska:					
168	Fair	Fair	Good		
169	Good	Good	Good		
170, 171	Fair	Good	Good		
Myford:					
172	Poor	Poor	Good		
173, 175, 179	Fair	Good	Good		
174	Poor	Fair	Good		
176	Poor	Fair	Good		
177	Very poor	Very poor	Fair		
178	Fair	Fair	Good		
Nacimiento:					
180	Fair	Good	Good		
181	Poor	Fair	Good		
Omni:					
182	Good	Good	Good		
183	Fair	Fair	Fair		
184	Good	Good	Good		
Pits:					
185.					
Ramona:					
186	Fair	Good	Fair		
187	Fair	Good	Fair		
Rincon:					
188	Good	Good	Fair		
189	Fair	Good	Fair		
190	Fair	Good	Fair		
Riverwash:					
191.					
Rock outcrop:					
[1] 192:					
Rock outcrop part.					
Cieneba part	Very poor	Very poor	Poor		
San Andreas:					
193	Poor	Fair	Good		
San Emigdio:					
194, 196	Good	Good	Good		
195	Good	Good	Good		
Soboba:					
197, 198	Poor	Poor	Poor		
Soper:					
199	Fair	Good	Fair		
200, 201	Poor	Fair	Fair		
202, 203	Very poor	Very poor	Fair		
[1] 204:					
Soper part	Very poor	Very poor	Fair		
Rock outcrop part.					
Sorrento:					
205, 206, 208	Good	Good	Good		
207, 209	Good	Good	Good		

potentials—Continued

Potential for habitat elements—Cont.			Potential as habitat for—			
Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Good	Good	Good	Good		Good	
Good	Poor	Very poor	Good		Very poor	
Good	Poor	Very poor	Fair		Very poor	Good.
Good	Poor	Very poor	Good		Very poor	Good.
Good	Very poor	Very poor	Fair		Very poor	Good.
Poor	Poor	Poor	Fair		Poor	Fair.
Poor	Poor	Very poor	Fair		Very poor	Fair.
Poor	Poor	Very poor	Poor		Very poor	Fair.
Poor	Very poor	Very poor	Poor		Very poor	Fair.
Poor	Very poor	Very poor	Very poor		Very poor	Poor.
Poor	Poor	Poor	Fair		Poor	Fair.
Good	Very poor	Very poor	Fair		Very poor	Good.
Good	Very poor	Very poor	Fair		Very poor	Good.
Good	Poor	Poor	Good		Poor	Good.
Poor	Fair	Fair	Fair		Fair	Poor.
Poor	Poor	Poor	Good		Poor	Fair.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Good	Poor	Very poor	Good		Poor	Fair.
Good	Very poor	Very poor	Fair		Very poor	Fair.
Good	Very poor	Very poor	Fair		Very poor	Fair.
Poor	Very poor	Very poor	Very poor		Very poor	Poor.
Good	Very poor	Very poor	Fair		Very poor	Good.
Good	Poor	Poor	Good		Poor	Good.
Good	Very poor	Very poor	Good		Very poor	Good.
Poor	Very poor	Very poor	Poor		Very poor	Poor.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Very poor		Very poor	Fair.
Fair	Very poor	Very poor	Very poor		Very poor	Fair.
Good	Good	Fair	Good		Fair	
Good	Poor	Very poor	Good		Very poor	

TABLE 3.—*Wildlife habitat*

Soil name and map symbol	Potential for habitat elements				
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants
Thapto-Histic Fluvaquents:					
210	Fair	Fair	Fair		
Tidal flats:					
211.					
Tollhouse:					
[1] 212:					
Tollhouse part	Very poor	Very poor	Poor	Very poor	Very poor
Rock outcrop part.					
Vista:					
213	Poor	Fair	Fair		
214	Poor	Fair	Fair		
215	Very poor	Very poor	Fair		
[1] 216:					
Vista part	Poor	Poor	Fair		
Rock outcrop part.					
Xeralfic Arents:					
217, 218	Fair	Fair	Good		
Xerorthents:					
219, 220	Very poor	Very poor	Good		
Yorba:					
221, 222, 223	Poor	Fair	Fair		
224	Poor	Poor	Fair		
225, 226	Very poor	Very poor	Fair		

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and

structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 4 shows, for each kind of soil, the degree and kind of limitations for building site development; table 5 for sanitary facilities; and table 7 for water management. Table 6 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 4. A *slight* limitation indicates that soil properties generally are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features are so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, communications and power transmission lines, basements, and open ditches. Such digging or trenching is influenced by soil wetness caused by a seasonal high water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings

potentials—Continued

Potential for habitat elements—Cont.			Potential as habitat for—			
Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
Fair	Fair	Good	Fair		Fair	Fair.
Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Poor.
Fair	Very poor	Very poor	Fair		Very poor	Fair.
Fair	Very poor	Very poor	Poor		Very poor	Fair.
Fair	Very poor	Very poor	Very poor		Very poor	Fair.
Fair	Very poor	Very poor	Poor		Very poor	Fair.
Good	Poor	Very poor	Fair		Very poor	Good.
Good	Very poor	Very poor	Very poor		Very poor	Good.
Fair	Very poor	Very poor	Poor		Very poor	Fair.
Fair	Very poor	Very poor	Poor		Very poor	Fair.
Fair	Very poor	Very poor	Very poor		Very poor	Fair.

behavior of the whole mapping unit.

do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is given, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 4 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

Local roads and streets referred to in table 4 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, slope, depth to hard rock or very compact layers, and content of large stones affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 5 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover

TABLE 4.—*Building site development*

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Alo:				
100	Severe: too clayey, depth to rock.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength.
101, 102	Severe: too clayey, depth to rock, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.
Alo Variant:				
103	Severe: too clayey, depth to rock.	Severe: shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: shrink-swell, low strength.
104, 105	Severe: slope, too clayey, depth to rock.	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.
Anaheim:				
106, 107, 108, 109, 110	Severe: slope	Severe: slope	Severe: slope	Severe: slope, low strength.
Balcom:				
111	Severe: depth to rock	Moderate: slope, depth to rock, low strength.	Severe: slope	Moderate: slope, low strength, depth to rock.
112, 113	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
[1] 114:				
Balcom part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope.
117	Severe: large stones	Severe: large stones	Severe: slope, large stones.	Severe: low strength, large stones.
118	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, low strength.
Blasingame:				
[1] 119:				
Blasingame part	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: low strength, slope.
Rock outcrop part.				
[1] 120:				
Blasingame part	Severe: large stones	Severe: large stones	Severe: slope, large stones.	Severe: low strength, large stones.
Vista part	Moderate: slope, depth to rock.	Moderate: slope	Severe: slope	Moderate: slope.
[1] 121:				
Blasingame part	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, low strength, large stones.
Vista part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.

TABLE 4.—*Building site development*—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Bolsa: 122, 123	Moderate: wetness, floods.	Severe: floods	Severe: floods	Moderate: floods, low strength, wetness.
124, 125	Moderate: floods	Severe: floods	Severe: floods	Moderate: floods, low strength, shrink-swell.
Bosanko: 126	Severe: too clayey	Severe: shrink-swell	Severe: slope, shrink-swell.	Severe: low strength, shrink-swell.
127, 128	Severe: slope, too clayey.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
[1] 129, 130: Bosanko part	Severe: slope, too clayey.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: low strength, slope, shrink-swell.
Balcom part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
Botella: 131	Slight	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.
132	Moderate: too clayey	Moderate: low strength.	Moderate: slope, low strength.	Severe: low strength.
Botella: 133	Moderate: slope, too clayey.	Moderate: slope, low strength.	Severe: slope	Severe: low strength.
Calleguas: 134	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Capistrano: 135	Slight	Slight	Moderate: slope	Moderate: low strength.
136	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, low strength.
Chesterton: 137	Moderate: too clayey, cemented pan.	Moderate: slope, low strength, shrink-swell.	Severe: slope	Severe: low strength.
138	Severe: slope	Severe: slope	Severe: slope	Severe: slope, low strength.
Chino: 139	Moderate: wetness, too clayey.	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
140	Moderate: too clayey	Moderate: shrink-swell, low strength.	Moderate: shrink-swell, low strength.	Severe: low strength.
Cieneba: 141, 142	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
[1] 143: Cieneba part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.

TABLE 4.—*Building site development*—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Blasingame part	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope.
Rock outcrop part.				
[1] 144: Cieneba part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
[1] 145: Cieneba part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Corralitos: 146, 147	Severe: cutbanks cave.	Slight	Slight	Slight.
Cropley: 148, 149	Severe: too clayey	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
Escondido: 150	Moderate: slope, depth to rock.	Moderate: slope, low strength.	Severe: slope	Moderate: slope, low strength.
151	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Exchequer: [1] 152: Exchequer part	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.
Rock outcrop part.				
Friant: 153	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Gabino: 154	Severe: slope	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.
Garretson: 155	Moderate: small stones.	Slight	Moderate: slope	Moderate: low strength.
Hanford: 156	Slight	Slight	Moderate: slope	Slight.
Hueneme: 157	Severe: wetness	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
158	Slight	Slight	Slight	Slight.
Las Posas: 159	Severe: slope, too clayey.	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.	Severe: slope, shrink-swell, low strength.
Laughlin: 160	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.

TABLE 4.—*Building site development*—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Marina:				
161	Severe: too sandy	Slight	Slight	Slight.
162	Severe: too sandy	Slight	Moderate: slope	Slight.
Metz:				
163, 164	Severe: cutbanks cave.	Slight	Slight	Slight.
Mocho:				
165, 166	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength, shrink-swell.
167	Slight	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: low strength, shrink-swell.
Modjeska:				
168	Severe: small stones, cutbanks cave.	Slight	Slight	Slight.
169	Severe: small stones, cutbanks cave.	Slight	Moderate: slope	Slight.
170	Severe: small stones, cutbanks cave.	Moderate: slope	Severe: slope	Moderate: slope.
171	Severe: small stones, cutbanks cave, slope.	Severe: slope	Severe: slope	Severe: slope.
Myford:				
172, 173, 174, 178, 179	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell, low strength.
175	Moderate: too clayey	Severe: shrink-swell	Severe: slope, shrink-swell.	Severe: shrink-swell, low strength.
176, 177	Severe: slope	Severe: slope, shrink-swell.	Severe: slope, shrink-swell.	Severe: slope, shrink-swell, low strength.
Nacimiento:				
180, 181	Severe: slope	Severe: slope	Severe: slope	Severe: slope, low strength.
Omni:				
182, 183	Severe: too clayey	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.
184	Severe: wetness, too clayey.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.
Pits:				
185.				
Ramona:				
186	Slight	Slight	Moderate: slope	Moderate: low strength.
187	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, low strength.
Rincon:				
188	Moderate: too clayey	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.

TABLE 4.—*Building site development*—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
189	Moderate: slope, too clayey.	Severe: low strength, shrink-swell.	Severe: slope, low strength. shrink-swell.	Severe: low strength, shrink-swell.
190	Severe: slope	Severe: slope, low strength, shrink-swell.	Severe: slope, low strength, shrink-swell.	Severe: slope, low strength, shrink-swell.
Riverwash: 191.				
Rock outcrop: [1] 192:				
Rock outcrop part.				
Cieneba part	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
San Andreas: 193	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
San Emigdio: 194, 196	Slight	Slight	Slight	Slight.
195	Slight	Slight	Moderate: slope	Slight.
Soboba: 197	Severe: small stones, cutbanks cave.	Slight	Slight	Slight.
198	Severe: small stones, cutbanks cave.	Moderate: slope	Severe: slope	Moderate: slope.
Soper: 199, 200, 201, 202, 203	Severe: slope	Severe: slope	Severe: slope	Severe: slope, low strength.
[1] 204:				
Soper part	Severe: slope	Severe: slope	Severe: slope	Severe: slope, low strength.
Rock outcrop part.				
Sorrento: 205, 206, 208	Moderate: too clayey	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Severe: low strength.
207, 209	Moderate: too clayey	Moderate: low strength, shrink-swell.	Moderate: slope, low strength, shrink-swell.	Severe: low strength.
Thapto-Histic Fluvaquents: 210	Severe: wetness, excess humus.	Severe: excess humus, wetness, low strength.	Severe: wetness, excess humus, low strength.	Severe: wetness, excess humus, low strength.
Tidal flats: 211.				
Tollhouse: [1] 212:				
Tollhouse part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Vista: 213	Moderate: slope, depth to rock.	Moderate: slope	Severe: slope	Moderate: slope.
214, 215	Severe: slope	Severe: slope	Severe: slope	Severe: slope.

TABLE 4.—*Building site development*—Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
[1] 216:				
Vista part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Xeralfic Arents:				
217	Slight	Slight	Moderate: slope	Slight.
218	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope.
Xerorthents:				
219	Severe: depth to rock	Moderate: slope, depth to rock.	Severe: slope	Moderate: slope.
220	Severe: slope, depth to rock.	Severe: slope	Severe: slope	Severe: slope.
Yorba:				
221	Severe: small stones	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Moderate: low strength, shrink-swell.
222	Severe: small stones	Moderate: slope, shrink-swell.	Severe: slope	Moderate: slope, low strength, shrink-swell.
Yorba:				
223, 224, 225, 226	Severe: slope, small stones.	Severe: slope	Severe: slope	Severe: slope.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good, fair,* or *poor*, which, respectively, mean about the same as the terms *slight, moderate,* and *severe.*

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope can cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table can be installed or the size of the absorption field can be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soil material affect the performance of embankments.

Sanitary landfill is a method of disposing of solid

TABLE 5.—*Sanitary facilities*

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms used to rate soils. Absence of an entry means soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Alo:				
100	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Poor: too clayey, hard to pack.
101	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Poor: too clayey, hard to pack, slope.
102	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey, slope.	Poor: too clayey, hard to pack, slope.
Alo Variant:				
103	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: too clayey, depth to rock.	Poor: too clayey, hard to pack.
104	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: too clayey, depth to rock.	Poor: slope, too clayey, hard to pack.
105	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, too clayey, depth to rock.	Poor: slope, too clayey, hard to pack.
Anaheim:				
106, 108	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope, depth to rock.	Poor: slope.
107, 109, 110	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope	Poor: slope.
Balcom:				
111	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Fair: slope, thin layer, too clayey.
112	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope.
113	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope.
[1] 114:				
Balcom part	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope.
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	Severe: slope, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope.
117	Severe: percs slowly, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Poor: large stones.
118	Severe: slope, percs slowly, large stones.	Severe: slope, depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Poor: slope, large stones.
[1] 119:				
Blasingame part	Severe: slope, percs slowly, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Poor: slope, large stones.
Rock outcrop part.				
[1] 120:				
Blasingame part	Severe: percs slowly, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Poor: large stones.

TABLE 5.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Vista part	Severe: depth to rock	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Fair: slope, thin layer.
[1] 121:				
Blasingame part	Severe: slope, percs slowly, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Poor: slope, large stones.
Vista part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: slope.
Bolsa:				
122	Severe: percs slowly, wetness.	Moderate: wetness	Severe: wetness	Good.
123	Severe: percs slowly	Slight	Moderate: floods	Good.
124	Severe: percs slowly, wetness.	Moderate: wetness	Severe: wetness	Fair: too clayey.
125	Severe: percs slowly	Slight	Moderate: floods	Fair: too clayey.
Bosanko:				
126	Severe: percs slowly, depth to rock.	Severe: slope, depth to rock.	Severe: too clayey	Poor: too clayey.
127	Severe: percs slowly, depth to rock, slope.	Severe: slope, depth to rock.	Severe: too clayey	Poor: too clayey, slope.
128	Severe: percs slowly, depth to rock, slope.	Severe: slope, depth to rock.	Severe: too clayey, slope.	Poor: too clayey, slope.
[1] 129:				
Bosanko part	Severe: percs slowly, depth to rock, slope.	Severe: slope, depth to rock.	Severe: too clayey	Poor: too clayey, slope.
Balcom part	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope.
[1] 130:				
Bosanko part	Severe: percs slowly, depth to rock, slope.	Severe: slope, depth to rock.	Severe: too clayey, slope.	Poor: too clayey, slope.
Balcom part	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope.
Botella:				
131	Severe: percs slowly	Moderate: slope, excess humus.	Moderate: too clayey.	Fair: too clayey.
132	Severe: percs slowly	Moderate: slope, excess humus.	Moderate: too clayey.	Fair: too clayey.
133	Severe: percs slowly	Severe: slope	Moderate: too clayey.	Fair: slope, too clayey.
Calleguas:				
134	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope	Poor: slope, thin layer.
Capistrano:				
135	Slight	Severe: seepage	Severe: seepage	Good.
136	Moderate: slope	Severe: seepage, slope.	Severe: seepage	Fair: slope.
Chesterton:				
137	Severe: cemented pan, percs slowly.	Severe: slope	Moderate: cemented pan, too clayey.	Fair: slope, thin layer, too clayey.
138	Severe: slope, cemented pan, percs slowly.	Severe: slope	Moderate: slope, cemented pan, too clayey.	Poor: slope.

TABLE 5.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Chino:				
139	Severe: wetness, percs slowly.	Moderate: wetness	Severe: wetness	Fair: too clayey.
140	Severe: percs slowly	Slight	Moderate: too clayey	Fair: too clayey.
Cieneba:				
141	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: slope, thin layer.
142	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer.
[1] 143:				
Cieneba part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: slope, thin layer.
Blasingame part	Severe: slope, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope.
Rock outcrop part.				
[1] 144:				
Cieneba part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: seepage, depth to rock.	Poor: slope, thin layer.
Rock outcrop part.				
[1] 145:				
Cieneba part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer.
Rock outcrop part.				
Corralitos:				
146	Slight	Severe: seepage	Severe: seepage	Fair: too sandy.
147	Severe: wetness	Severe: seepage	Severe: seepage, wetness.	Fair: too sandy.
Cropley:				
148	Severe: percs slowly	Slight	Severe: too clayey	Poor: too clayey.
149	Severe: percs slowly	Moderate: slope	Severe: too clayey	Poor: too clayey.
Escondido:				
150	Severe: depth to rock	Severe: slope, depth to rock.	Moderate: depth to rock.	Fair: slope, thin layer.
151	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Moderate: slope, depth to rock.	Poor: slope.
Exchequer:				
[1] 152:				
Exchequer part	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: thin layer, slope.
Rock outcrop part.				
Friant:				
153	Severe: slope, depth to rock.	Severe: depth to rock, slope, seepage.	Severe: slope, depth to rock.	Poor: slope, area reclaim, thin layer.
Gabino:				
154	Severe: slope, percs slowly.	Severe: slope	Severe: slope, too clayey.	Poor: slope, too clayey.
Garretson:				
155	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Poor: small stones.

TABLE 5.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Hanford:				
156	Slight	Severe: seepage	Severe: seepage	Good.
Hueneme:				
157	Severe: wetness	Severe: seepage, floods, wetness.	Severe: wetness, seepage.	Poor: wetness.
158	Slight	Severe: seepage	Severe: seepage	Good.
Las Posas:				
159	Severe: percs slowly, depth to rock.	Severe: slope, depth to rock.	Severe: slope, too clayey.	Poor: slope, too clayey.
Laughlin:				
160	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope.
Marina:				
161	Slight	Moderate: seepage	Moderate: too sandy	Fair: too sandy.
162	Slight	Moderate: slope, seepage.	Moderate: too sandy	Fair: too sandy.
Metz:				
163, 164	Slight	Severe: seepage	Severe: seepage	Fair: too sandy.
Mocho:				
165, 166	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Good.
Mocho:				
167	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Good.
Modjeska:				
168, 169	Slight	Severe: seepage	Severe: seepage	Poor: small stones.
170	Moderate: slope	Severe: slope, seepage.	Severe: seepage	Poor: small stones.
171	Severe: slope	Severe: slope, seepage.	Severe: seepage	Poor: slope, small stones.
Myford:				
172, 178	Severe: percs slowly	Slight	Moderate: too clayey	Fair: too clayey.
173, 174, 179	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Fair: too clayey.
175	Severe: percs slowly	Severe: slope	Moderate: too clayey	Fair: too clayey, slope.
176, 177	Severe: slope, percs slowly.	Severe: slope	Moderate: too clayey	Poor: slope.
Nacimiento:				
180	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope.
181	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope.
Omni:				
182, 184	Severe: percs slowly	Slight	Severe: too clayey	Poor: too clayey.
183	Severe: percs slowly, wetness.	Severe: wetness	Severe: wetness, too clayey.	Poor: wetness, too clayey.
Pits:				
185.				

TABLE 5.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Ramona:				
186	Severe: percs slowly	Moderate: slope	Slight	Good.
187	Severe: percs slowly	Severe: slope	Slight	Fair: slope.
Rincon:				
188	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Fair: too clayey.
189	Severe: percs slowly	Severe: slope	Moderate: too clayey	Fair: too clayey, slope.
Rincon:				
190	Severe: percs slowly, slope.	Severe: slope	Moderate: too clayey, slope.	Poor: slope.
Riverwash:				
191.				
Rock outcrop:				
[1] 192:				
Rock outcrop part.				
Cieneba part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, seepage, depth to rock.	Poor: slope, thin layer.
San Andreas:				
193	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: seepage, depth to rock.	Poor: slope.
San Emigdio:				
194, 195	Slight	Severe: seepage	Severe: seepage	Good.
196	Severe: percs slowly	Severe: seepage	Severe: seepage	Good.
Soboba:				
197	Slight	Severe: seepage	Severe: seepage, too sandy.	Poor: too sandy, small stones.
198	Moderate: slope	Severe: slope, seepage.	Severe: too sandy, seepage.	Poor: too sandy, small stones.
Soper:				
199, 201	Severe: slope, percs slowly, depth to rock.	Severe: slope	Moderate: slope, depth to rock.	Poor: slope.
200, 202, 203	Severe: slope, percs slowly, depth to rock.	Severe: slope	Severe: slope	Poor: slope.
[1] 204:				
Soper part	Severe: slope, percs slowly, depth to rock.	Severe: slope	Severe: slope	Poor: slope.
Rock outcrop part.				
Sorrento:				
205, 206, 207	Moderate: percs slowly.	Moderate: seepage	Moderate: too clayey	Fair: too clayey.
208, 209	Severe: percs slowly	Moderate: seepage, slope.	Moderate: too clayey	Fair: too clayey.
Thapto-Histic Fluvaquents:				
210	Severe: wetness, percs slowly.	Severe: wetness, excess humus.	Severe: wetness, excess humus, too clayey.	Poor: wetness, excess humus.
Tidal flats:				
211.				

TABLE 5.—*Sanitary facilities*—Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Daily cover for landfill
Tollhouse:				
[1] 212:				
Tollhouse part	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Poor: slope, thin layer.
Rock outcrop part.				
Vista:				
213	Severe: depth to rock	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Fair: slope, thin layer.
214	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: slope.
215	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: slope, depth to rock, seepage.	Poor: slope.
[1] 216:				
Vista part	Severe: slope, depth to rock.	Severe: slope, depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: slope.
Rock outcrop part.				
Xeralfic Arents:				
217	Severe: percs slowly	Moderate: slope	Slight	Good.
218	Severe: percs slowly	Severe: slope	Slight	Fair: slope.
Xerorthents:				
219	Severe: depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: thin layer.
220	Severe: slope, depth to rock, percs slowly.	Severe: slope, depth to rock.	Severe: depth to rock	Poor: slope, thin layer.
Yorba:				
221	Severe: percs slowly	Moderate: slope, small stones.	Moderate: too clayey	Poor: small stones.
222	Severe: percs slowly	Severe: slope	Moderate: too clayey	Poor: small stones.
Yorba:				
223, 224, 225	Severe: slope, percs slowly.	Severe: slope	Moderate: slope, too clayey.	Poor: slope, small stones.
226	Severe: slope, percs slowly.	Severe: slope	Severe: slope	Poor: slope, small stones.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil material. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness can be a limitation, because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

Ease of excavation affects the suitability of a soil for the trench type of landfill. A suitable soil is deep to bedrock and free of large stones and boulders. If the seasonal water table is high, water will seep into trenches.

Unless otherwise stated, the limitations in table 5

TABLE 6.—*Construction materials*

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "unsuited." Absence of an entry means soils are not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Alo:				
100	Poor: shrink-swell, low strength, thin layer.	Unsuited	Unsuited	Poor: too clayey.
101	Poor: shrink-swell, low strength, thin layer.	Unsuited	Unsuited	Poor: too clayey, slope.
102	Poor: low strength, thin layer, slope.	Unsuited	Unsuited	Poor: too clayey, slope.
Alo Variant:				
103	Poor: shrink-swell, low strength, thin layer.	Unsuited	Unsuited	Poor: too clayey.
104	Poor: shrink-swell, low strength, thin layer.	Unsuited	Unsuited	Poor: slope, too clayey.
105	Poor: slope, low strength, thin layer.	Unsuited	Unsuited	Poor: slope, too clayey.
Anaheim:				
106, 108	Poor: low strength, slope.	Unsuited	Unsuited	Poor: slope.
107, 109, 110	Poor: slope, low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
Balcom:				
111	Poor: low strength, thin layer.	Unsuited	Unsuited	Fair: slope, too clayey.
112	Poor: low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
113	Poor: slope, low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
[1] 114:				
Balcom part	Poor: slope, low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	Poor: low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
117	Poor: thin layer, large stones, low strength.	Unsuited	Unsuited: large stones.	Poor: large stones.
118	Poor: slope, thin layer, large stones.	Unsuited	Unsuited: large stones.	Poor: slope, large stones.
[1] 119:				
Blasingame part	Poor: low strength, thin layer.	Unsuited	Unsuited: large stones.	Poor: slope.
Rock outcrop part.				
[1] 120:				
Blasingame part	Poor: thin layer, large stones, low strength.	Unsuited	Unsuited: large stones.	Poor: large stones.

TABLE 6.—*Construction materials*—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Vista part	Good	Unsuited: thin layer	Unsuited	Fair: slope.
[1] 121: Blasingame part	Poor: thin layer, large stones, low strength.	Unsuited	Unsuited: large stones.	Poor: slope, large stones.
Vista part	Fair: slope	Unsuited: thin layer	Unsuited	Poor: slope.
Bolsa: 122	Fair: wetness, low strength, shrink-swell.	Unsuited	Unsuited	Good.
123	Fair: low strength, shrink-swell.	Unsuited	Unsuited	Good.
124	Fair: wetness, low strength, shrink-swell.	Unsuited	Unsuited	Fair: too clayey.
125	Fair: low strength, shrink-swell.	Unsuited	Unsuited	Fair: too clayey.
Bosanko: 126	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: too clayey.
127	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: too clayey, slope.
Bosanko: 128	Poor: slope, low strength, shrink-swell.	Unsuited	Unsuited	Poor: too clayey, slope.
[1] 129: Bosanko part	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: too clayey, slope.
Balcom part	Poor: low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
[1] 130: Bosanko part	Poor: slope, low strength, shrink-swell.	Unsuited	Unsuited	Poor: too clayey, slope.
Balcom part	Poor: slope, low strength, thin layer.	Unsuited	Unsuited	Poor: slope.
Botella: 131, 132	Poor: low strength	Unsuited	Unsuited	Fair: too clayey.
133	Poor: low strength	Unsuited	Unsuited	Fair: slope, too clayey.
Calleguas: 134	Poor: slope, thin layer.	Unsuited	Unsuited	Poor: slope.
Capistrano: 135	Fair: low strength	Poor: excess fines	Unsuited	Good.
136	Fair: low strength	Poor: excess fines	Unsuited	Fair: slope.
Chesterton: 137	Poor: low strength	Unsuited	Unsuited	Fair: slope.
138	Poor: low strength	Unsuited	Unsuited	Poor: slope.

TABLE 6.—*Construction materials*—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Chino:				
139, 140	Poor: low strength	Unsuited	Unsuited	Fair: too clayey.
Cieneba:				
141	Poor: thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
142	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
[1] 143:				
Cieneba part	Poor: thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
Blasingame part	Poor: low strength, thin layer.	Unsuited	Unsuited	Poor: slope, thin layer.
Rock outcrop part.				
[1] 144:				
Cieneba part	Poor: thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
Rock outcrop part.				
[1] 145:				
Cieneba part	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
Rock outcrop part.				
Corralitos:				
146, 147	Good	Poor: excess fines	Unsuited	Poor: too sandy.
Cropley:				
148, 149	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Poor: too clayey.
Escondido:				
150	Fair: low strength	Unsuited	Unsuited	Fair: slope.
151	Fair: slope, low strength.	Unsuited	Unsuited	Poor: slope.
Exchequer:				
[1] 152:				
Exchequer part	Poor: slope, thin layer, area reclaim.	Unsuited: excess fines.	Unsuited	Poor: slope, small stones, area reclaim.
Rock outcrop part.				
Friant:				
153	Poor: slope, thin layer, area reclaim.	Poor: excess fines	Unsuited	Poor: slope, area reclaim.
Gabino:				
154	Poor: slope, shrink-swell, low strength.	Unsuited	Unsuited	Poor: slope, small stones.
Garretson:				
155	Fair: low strength	Unsuited	Unsuited	Poor: small stones.
Hanford:				
156	Good	Poor: excess fines	Unsuited	Fair: small stones.

TABLE 6.—*Construction materials*—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hueneme:				
157	Poor: wetness	Poor: excess fines	Unsuited	Poor: wetness.
158	Good	Poor: excess fines	Unsuited	Good.
Las Posas:				
159	Poor: slope, shrink-swell, low strength.	Unsuited	Unsuited	Poor: slope, small stones.
Laughlin:				
160	Poor: slope, low strength.	Unsuited	Unsuited	Poor: slope, small stones.
Marina:				
161, 162	Good	Poor: excess fines	Unsuited	Poor: too sandy.
Metz:				
163, 164	Good	Poor: excess fines	Unsuited	Poor: too sandy.
Mocho:				
165, 166, 167	Fair: shrink-swell, low strength.	Unsuited	Unsuited	Fair: excess lime.
Modjeska:				
168, 169, 170	Good	Unsuited	Fair: excess fines	Poor: small stones.
171	Fair: slope	Unsuited	Fair: excess fines	Poor: slope, small stones.
Myford:				
172, 173, 174	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Fair: too clayey.
175	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Fair: slope, too clayey.
176, 177	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: slope.
178, 179	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Good.
Nacimiento:				
180	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Nacimiento:				
181	Poor: slope, low strength.	Unsuited	Unsuited	Poor: slope.
Omni:				
182	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: too clayey.
183	Poor: wetness, shrink-swell, low strength.	Unsuited	Unsuited	Poor: wetness, too clayey.
184	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Poor: too clayey.
Pits:				
185.				
Ramona:				
186	Fair: low strength	Poor: excess fines	Unsuited	Fair: small stones.
187	Fair: low strength	Poor: excess fines	Unsuited	Poor: small stones.
Rincon:				
188	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Fair: too clayey.

TABLE 6.—*Construction materials*—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
189	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Fair: too clayey, slope.
190	Poor: low strength, shrink-swell.	Unsuited	Unsuited	Poor: slope.
Riverwash: 191.				
Rock outcrop: [1] 192:				
Rock outcrop part.				
Cieneba part	Poor: slope, thin layer, area reclaim.	Unsuited: thin layer	Unsuited	Poor: slope, thin layer, area reclaim.
San Andreas: 193	Poor: thin layer	Unsuited	Unsuited	Poor: slope.
San Emigdio: 194, 195, 196	Fair: low strength	Poor: excess fines	Unsuited	Good.
Soboba: 197	Good	Fair: excess fines	Fair: excess fines	Poor: small stones, too sandy.
198	Fair: slope	Fair: excess fines	Fair: excess fines	Poor: small stones, too sandy.
Soper: 199, 201	Poor: slope, low strength.	Unsuited	Unsuited	Poor: slope.
200, 202, 203	Poor: slope, low strength.	Unsuited	Unsuited	Poor: slope.
[1] 204:				
Soper part	Poor: low strength	Unsuited	Unsuited	Poor: slope.
Rock outcrop part.				
Sorrento: 205, 206, 207	Poor: low strength	Unsuited	Unsuited	Good.
208, 209	Poor: low strength	Unsuited	Unsuited	Fair: too clayey.
Thapto-Histic Fluvaquents: 210	Poor: wetness, excess humus, low strength.	Unsuited	Unsuited	Poor: wetness.
Tidal flats: 211.				
Tollhouse: [1] 212:				
Tollhouse part	Poor: thin layer	Poor: excess fines	Poor: excess fines	Poor: slope.
Rock outcrop part.				
Vista: 213	Good	Unsuited: thin layer	Unsuited	Fair: slope.
214	Fair: slope	Unsuited: thin layer	Unsuited	Poor: slope.
215	Poor: slope	Unsuited: thin layer	Unsuited	Poor: slope.
[1] 216:				
Vista part	Fair: slope	Unsuited: thin layer	Unsuited	Poor: slope.
Rock outcrop part.				

TABLE 6.—*Construction materials*—Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Xeralfic Arents:				
217	Good	Unsuited	Unsuited	Good.
218	Good	Unsuited	Unsuited	Fair: slope.
Xerorthents:				
219	Poor: thin layer	Unsuited	Unsuited	Fair: slope.
220	Poor: thin layer	Unsuited	Unsuited	Poor: slope.
Yorba:				
221, 222	Fair: low strength, shrink-swell.	Unsuited	Unsuited: excess fines.	Poor: small stones.
223, 224, 225	Fair: slope, low strength, shrink-swell.	Unsuited	Unsuited: excess fines.	Poor: slope, small stones.
226	Poor: slope	Unsuited	Unsuited: excess fines.	Poor: slope, small stones.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 6 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 9 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, wetness, or many stones. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand and *gravel* are used in great quantities in many kinds of construction. The ratings in table 6 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand or gravel. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Coarse fragments of soft bedrock material, such as shale and siltstone, are not considered to be sand and gravel. Fine-grained soils are not suitable sources of sand and gravel.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of min-

TABLE 7.—*Water management*

["Seepage" and some of the other terms that describe restrictive soil features are defined in the Glossary. Absence of an entry means soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Alo:					
100, 101, 102	Slope, depth to rock.	Low strength, thin layer, hard to pack.	Slope, percs slowly, depth to rock.	Slope, percs slowly, depth to rock.	Slope, percs slowly.
Alo Variant:					
103, 104, 105	Slope, depth to rock.	Low strength, thin layer, hard to pack.	Slope, percs slowly, depth to rock.	Slope, percs slowly, depth to rock.	Slope, percs slowly.
Anaheim:					
106, 107, 108, 109, 110	Slope, depth to rock.	Low strength, thin layer.	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Balcom:					
111, 112, 113	Slope, depth to rock.	Low strength, thin layer, shrink-swell.	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
[1] 114:					
Balcom part	Slope, depth to rock.	Low strength, thin layer, shrink-swell.	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Rock outcrop part.					
Beaches:					
115.					
Blasingame:					
116	Slope, depth to rock.	Low strength, compressible, thin layer.	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
117, 118	Slope, depth to rock.	Large stones, low strength, thin layer.	Slope, percs slowly, depth to rock.	Slope, depth to rock, large stones.	Slope, large stones, rooting depth.
[1] 119:					
Blasingame part.	Slope, depth to rock.	Low strength, thin layer, large stones.	Slope, percs slowly, depth to rock.	Slope, depth to rock, large stones.	Slope, rooting depth, large stones.
Rock outcrop part.					
[1] 120:					
Blasingame part.	Slope, depth to rock.	Compressible, low strength, thin layer.	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Vista part	Slope, seepage.	Seepage, piping	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, droughty.
[1] 121:					
Blasingame part.	Slope, depth to rock.	Compressible, low strength, thin layer.	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Vista part	Slope, seepage.	Seepage, piping	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, droughty.
Bolsa:					
122, 123	Percs slowly	Piping, low strength, wetness.	Wetness, percs slowly.	Percs slowly, piping.	Percs slowly, wetness.

TABLE 7.—*Water management*—Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
124, 125	Percs slowly	Piping, low strength.	Percs slowly	Percs slowly, piping.	Percs slowly.
Bosanko: 126, 127, 128	Slope, depth to rock.	Low strength, hard to pack, compressible.	Percs slowly, slope.	Slope, depth to rock, percs slowly.	Slope, percs slowly.
[1] 129: Bosanko part	Slope, depth to rock.	Low strength, hard to pack, compressible.	Percs slowly, slope.	Slope, depth to rock, percs slowly.	Slope, percs slowly.
Balcom part	Slope, depth to rock.	Low strength, thin layer, shrink-swell.	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
[1] 130: Bosanko part	Slope, depth to rock.	Low strength, hard to pack, compressible.	Percs slowly, slope.	Slope, depth to rock, percs slowly.	Slope, percs slowly.
Balcom part	Slope, depth to rock.	Low strength, thin layer, shrink-swell.	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Botella: 131, 132, 133	Slope, excess humus.	Low strength	Complex slope, percs slowly.	Complex slope, percs slowly.	Complex slope, percs slowly.
Calleguas: 134	Slope, depth to rock.	Thin layer, low strength.	Complex slope, depth to rock.	Complex slope, depth to rock.	Complex slope, rooting depth.
Capistrano: 135, 136	Seepage	Piping, low strength.	Complex slope, seepage.	Complex slope, piping.	Complex slope, piping.
Chesterton: 137, 138	Cemented pan, slope.	Low strength, thin layer.	Cemented pan, percs slowly, slope.	Cemented pan, slope, percs slowly.	Slope, percs slowly, rooting depth.
Chino: 139	Favorable	Shrink-swell, low strength, compressible.	Wetness, percs slowly, excess salt.	Percs slowly, wetness.	Percs slowly, wetness, excess salt.
140	Favorable	Shrink-swell, low strength, compressible.	Percs slowly	Percs slowly	Percs slowly.
Cieneba: 141, 142	Slope, depth to rock, seepage.	Piping, thin layer.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth, droughty.
[1] 143: Cieneba part	Slope, depth to rock, seepage.	Piping, thin layer.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth, droughty.
Blasingame part	Slope, depth to rock.	Low strength, compressible, thin layer.	Slope, percs slowly, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Rock outcrop part.					

TABLE 7.—*Water management*—Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
[1] 144:					
Cieneba part	Slope, depth to rock, seepage.	Piping, thin layer.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth, droughty.
Rock outcrop part.					
[1] 145:					
Cieneba part	Slope, depth to rock, seepage.	Piping, thin layer.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth, droughty.
Rock outcrop part.					
Corralitos:					
146	Seepage, slope	Seepage, piping	Slope	Slope, piping.	Slope, droughty.
147	Seepage, slope	Seepage, piping	Slope, percs slowly, wetness.	Slope, piping, percs slowly.	Slope, droughty.
Cropley:					
148	Favorable	Low strength, compressible, hard to pack.	Percs slowly	Percs slowly	Percs slowly, slope.
149	Slope	Low strength, compressible, hard to pack.	Percs slowly, slope.	Percs slowly	Percs slowly, slope.
Escondido:					
150, 151	Slope, depth to rock.	Thin layer, low strength, piping.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth.
Exchequer:					
[1] 152:					
Exchequer part	Slope, depth to rock.	Thin layer	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Rock outcrop part.					
Friant:					
153	Depth to rock, slope, seepage.	Thin layer, low strength, piping.	Complex slope, depth to rock.	Complex slope, depth to rock, piping.	Complex slope, rooting depth.
Gabino:					
154	Slope	Shrink-swell, low strength, piping.	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
Garretson:					
155	Seepage, slope	Low strength	Slope	Slope	Slope.
Hanford:					
156	Slope, seepage	Piping	Slope	Piping	Slope, droughty.
Hueneme:					
157	Seepage	Piping	Wetness	Poor outlets, piping.	Wetness.
Hueneme:					
158	Seepage	Piping	Favorable	Poor outlets, piping.	Favorable.
Las Posas:					
159	Slope, depth to rock.	Low strength, shrink-swell.	Slope, percs slowly.	Depth to rock, slope.	Slope, percs slowly, rooting depth.

TABLE 7.—*Water management*—Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Laughlin: 160	Slope, depth to rock.	Depth to rock, low strength, hard to pack.	Slope, depth to rock.	Slope	Slope, rooting depth.
Marina: 161	Seepage	Seepage	Favorable	Too sandy, soil blowing.	Droughty.
162	Seepage, slope	Seepage	Slope	Too sandy, soil blowing.	Droughty.
Metz: 163, 164	Seepage	Piping, seepage	Cutbanks cave	Too sandy, piping, erodes easily.	Droughty, erodes easily.
Mocho: 165, 166	Seepage	Low strength, compressible, hard to pack.	Favorable	Favorable	Favorable.
167	Slope, seepage	Low strength, compressible, hard to pack.	Slope	Favorable	Favorable.
Modjeska: 168	Seepage, slope	Seepage, piping	Cutbanks cave	Piping	Droughty.
169	Seepage, slope	Seepage, piping	Slope, cutbanks cave.	Piping	Droughty.
170, 171	Seepage, slope	Seepage, piping	Slope, cutbanks cave.	Slope, piping	Slope, droughty.
Myford: 172, 178	Favorable	Low strength, hard to pack, compressible.	Percs slowly	Percs slowly	Percs slowly.
173, 174, 179	Slope	Low strength, hard to pack, compressible.	Slope, percs slowly.	Percs slowly	Percs slowly.
175, 176, 177	Slope	Low strength, hard to pack, compressible.	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.
Nacimiento: 180, 181	Slope, depth to rock.	Low strength, hard to pack, thin layer.	Complex slope, percs slowly, depth to rock.	Complex slope, percs slowly, depth to rock.	Slope, percs slowly, rooting depth.
Omni: 182, 184	Favorable	Compressible, low strength, shrink-swell.	Percs slowly, poor outlets.	Poor outlets, percs slowly.	Percs slowly.
183	Favorable	Compressible, low strength, shrink-swell.	Wetness, poor outlets, percs slowly.	Wetness, poor outlets, percs slowly.	Wetness, percs slowly.
Pits: 185.					
Ramona: 186	Slope	Piping	Slope, percs slowly.	Percs slowly, piping.	Percs slowly.
187	Slope	Piping	Slope, percs slowly.	Percs slowly, slope, piping.	Slope, percs slowly.

TABLE 7.—*Water management*—Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Rincon: 188, 189, 190	Slope	Low strength, compressible, hard to pack.	Complex slope, percs slowly.	Percs slowly, complex slope.	Percs slowly, complex slope.
Riverwash: 191.					
Rock outcrop: [1] 192: Rock outcrop part.					
Cieneba part	Slope, depth to rock, seepage.	Piping, thin layer.	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, rooting depth, droughty.
San Andreas: 193	Slope, seepage, depth to rock.	Low strength, piping, hard to pack.	Slope, depth to rock.	Slope, piping, depth to rock.	Slope, rooting depth.
San Emigdio: 194	Seepage, slope	Piping	Favorable	Not needed	Favorable.
195	Seepage, slope	Piping	Slope	Piping	Favorable.
196	Seepage	Piping	Percs slowly	Piping, percs slowly.	Percs slowly.
Soboba: 197	Slope, seepage	Seepage	Slope	Too sandy, erodes easily.	Droughty, erodes easily.
198	Slope, seepage	Seepage	Slope	Too sandy, erodes easily, slope.	Droughty, slope, erodes easily.
Soper: 199, 200, 201, 202, 203	Slope	Low strength, piping, hard to pack.	Slope	Slope	Slope.
[1] 204: Soper part	Slope	Low strength, piping, hard to pack.	Slope	Slope	Slope.
Rock outcrop part.					
Sorrento: 205, 206	Seepage	Low strength, piping, hard to pack.	Favorable	Piping	Favorable.
Sorrento: 207	Slope, seepage	Low strength, piping, hard to pack.	Slope	Piping	Favorable.
208	Favorable	Low strength, compressible.	Favorable	Favorable	Percs slowly.
209	Slope	Low strength, compressible.	Slope	Favorable	Percs slowly.
Thapto-Histic Fluvaquents: 210	Seepage	Low strength, hard to pack, compressible.	Wetness	Wetness	Wetness.

TABLE 7.—*Water management*—Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Terraces and diversions	Grassed waterways
Tidal flats: 211.					
Tollhouse: [1] 212: Tollhouse part	Slope, seepage, depth to rock.	Thin layer, seepage.	Slope, depth to rock.	Depth to rock, slope.	Rooting depth, slope.
Rock outcrop part.					
Vista: 213, 214, 215	Slope, seepage	Seepage, piping	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, droughty.
[1] 216: Vista part	Slope, seepage	Seepage, piping	Slope, depth to rock.	Slope, depth to rock, piping.	Slope, droughty.
Rock outcrop part.					
Xeralfic Arents: 217	Slope	Low strength	Slope	Favorable	Favorable.
218	Slope	Low strength	Slope	Slope	Slope.
Xerorthents: 219, 220	Slope	Thin layer	Slope, depth to rock.	Slope, depth to rock.	Slope, rooting depth.
Yorba: 221	Slope	Low strength	Slope, percs slowly.	Percs slowly	Percs slowly.
222, 223, 224, 225, 226	Slope	Low strength	Slope, percs slowly.	Slope, percs slowly.	Slope, percs slowly.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

erals, reaction, and stratification are given in the soil series descriptions and in table 9.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slope, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick or soils that have appreciable amounts of gravel, stones, or soluble salt.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; soils having large amounts of gravel, stones, or soluble salt; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 7 the degree of soil limitation and soil and site features that affect use are indicated

TABLE 8.—*Recreational development*

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Alo:				
100	Severe: too clayey	Severe: too clayey	Severe: too clayey, slope.	Severe: too clayey.
101	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey.
102	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.
Alo Variant:				
103	Severe: too clayey	Severe: too clayey	Severe: slope, too clayey.	Severe: too clayey.
104	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.
105	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
Anaheim:				
106, 108	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
107, 109, 110	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Balcom:				
111	Moderate: slope, too clayey, percs slowly.	Moderate: slope, too clayey.	Severe: slope	Moderate: too clayey.
112	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, too clayey.
113	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
[1] 114:				
Balcom part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, dusty.
117	Severe: large stones, slope.	Moderate: slope, large stones.	Severe: slope, large stones.	Severe: large stones.
118	Severe: slope, large stones.	Severe: slope	Severe: slope, large stones.	Severe: slope, large stones.
[1] 119:				
Blasingame part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, dusty.
Rock outcrop part.				
[1] 120:				
Blasingame part	Moderate: slope, percs slowly.	Moderate: slope	Severe: slope	Moderate: dusty.
Vista part	Moderate: slope	Moderate: slope	Severe: slope	Slight.
[1] 121:				
Blasingame part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Vista part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Bolsa:				
122	Moderate: wetness, percs slowly.	Moderate: wetness	Severe: wetness	Moderate: wetness.

TABLE 8.—*Recreational development*—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
123	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
124	Moderate: percs slowly, too clayey, wetness.	Moderate: wetness, too clayey.	Severe: wetness	Moderate: wetness, too clayey.
125	Moderate: percs slowly too clayey.	Moderate: too clayey.	Moderate: percs slowly, too clayey.	Moderate: too clayey.
Bosanko: 126	Severe: too clayey	Severe: too clayey	Severe: too clayey, slope.	Severe: too clayey.
127	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey.
128	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.
[1] 129: Bosanko part	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey.
Balcom part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, too clayey.
[1] 130: Bosanko part	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.	Severe: too clayey, slope.
[1] 130: Balcom part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Botella: 131	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
132	Moderate: too clayey, percs slowly.	Moderate: too clayey	Moderate: slope, percs slowly.	Moderate: too clayey.
133	Moderate: slope, too clayey, percs slowly.	Moderate: slope, too clayey.	Severe: slope	Moderate: too clayey.
Calleguas: 134	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
Capistrano: 135	Slight	Slight	Moderate: slope	Slight.
136	Moderate: slope	Moderate: slope	Severe: slope	Slight.
Chesterton: 137	Severe: percs slowly	Moderate: slope, too sandy.	Severe: slope, percs slowly.	Moderate: too sandy.
138	Severe: slope, percs slowly.	Severe: slope	Severe: slope, percs slowly.	Moderate: slope, too sandy.
Chino: 139	Moderate: wetness, too clayey, percs slowly.	Moderate: wetness, too clayey.	Moderate: wetness, percs slowly, too clayey.	Moderate: wetness, too clayey.
140	Moderate: too clayey, percs slowly.	Moderate: too clayey	Moderate: percs slowly.	Moderate: too clayey.
Cieneba: 141	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Moderate: slope.
142	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.

TABLE 8.—*Recreational development*—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
[1] 143:				
Cieneba part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Moderate: slope.
Blasingame part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, dusty.
Rock outcrop part.				
[1] 144:				
Cieneba part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Moderate: slope.
Rock outcrop part.				
[1] 145:				
Cieneba part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
Rock outcrop part.				
Corralitos:				
146, 147	Moderate: too sandy	Moderate: too sandy	Moderate: slope, too sandy.	Moderate: too sandy.
Cropley:				
148, 149	Severe: too clayey	Severe: too clayey	Severe: too clayey	Severe: too clayey.
Escondido:				
150	Moderate: slope	Moderate: slope	Severe: slope	Slight.
151	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Exchequer:				
[1] 152:				
Exchequer part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
Rock outcrop part.				
Friant:				
153	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
Gabino:				
154	Severe: slope	Severe: slope	Severe: slope, small stones.	Severe: slope.
Garretson:				
155	Moderate: small stones.	Moderate: small stones.	Moderate: small stones.	Moderate: small stones.
Hanford:				
156	Slight	Slight	Moderate: slope	Slight.
Hueneme:				
157	Severe: wetness, floods.	Severe: wetness	Severe: wetness	Severe: wetness.
158	Slight	Slight	Slight	Slight.
Las Posas:				
159	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Laughlin:				
160	Severe: slope	Severe: slope	Severe: slope, small stones.	Severe: slope.
Marina:				
161	Moderate: too sandy	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
162	Moderate: too sandy	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.

TABLE 8.—*Recreational development*—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Metz: 163, 164	Moderate: too sandy	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
Mocho: 165, 166	Slight	Slight	Slight	Slight.
167	Slight	Slight	Moderate: slope	Slight.
Modjeska: 168, 169	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: small stones.
170	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
171	Severe: slope	Severe: slope	Severe: slope, small stones.	Moderate: small stones.
Myford: 172, 173, 174, 175, 176	Severe: percs slowly	Slight	Severe: percs slowly.	Slight.
177	Severe: percs slowly	Moderate: slope	Severe: slope, percs slowly.	Slight.
178, 179	Severe: slope, percs slowly.	Severe: slope	Severe: slope, percs slowly.	Moderate: slope.
Nacimiento: 180	Severe: slope	Severe: slope	Severe: slope	Moderate: slope, too clayey.
181	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Omni: 182	Moderate: percs slowly, dusty.	Moderate: dusty	Moderate: dusty, percs slowly.	Moderate: dusty.
183	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
184	Severe: too clayey	Severe: too clayey	Severe: too clayey.	Severe: too clayey.
Pits: 185.				
Ramona: 186	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
187	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
Rincon: 188	Moderate: percs slowly, too clayey.	Moderate: too clayey	Moderate: percs slowly, too clayey, slope.	Moderate: too clayey.
189	Moderate: percs slowly, too clayey, slope.	Moderate: too clayey, slope.	Severe: slope	Moderate: too clayey.
190	Severe: slope	Severe: slope	Severe: slope	Moderate: too clayey, slope.
Riverwash: 191.				
Rock outcrop: [1] 192: Rock outcrop part.				

TABLE 8.—*Recreational development*—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Cieneba part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
San Andreas:				
193	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
San Emigdio:				
194	Slight	Slight	Slight	Slight.
195	Slight	Slight	Moderate: slope	Slight.
196	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
Soboba:				
197	Moderate: small stones, too sandy.	Moderate: small stones, too sandy.	Severe: small stones.	Moderate: small stones, too sandy.
198	Moderate: small stones, too sandy.	Moderate: small stones, too sandy.	Severe: slope	Moderate: small stones, too sandy.
Soper:				
199, 201	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
200, 202, 203	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
[1] 204:				
Soper part	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
Rock outcrop part.				
Sorrento:				
205, 206	Slight	Slight	Slight	Slight.
207	Slight	Slight	Moderate: slope	Slight.
208	Moderate: too clayey	Moderate: too clayey	Moderate: too clayey.	Moderate: too clayey.
209	Moderate: too clayey	Moderate: too clayey	Moderate: slope, too clayey.	Moderate: too clayey.
Thapto-Histic Fluvaquents:				
210	Moderate: percs slowly, wetness, too clayey.	Moderate: wetness, too clayey.	Moderate: wetness, too clayey.	Moderate: wetness, too clayey.
Tidal flats:				
211.				
Tollhouse:				
[1] 212:				
Tollhouse part	Severe: slope	Severe: slope	Severe: slope, depth to rock.	Severe: slope.
Rock outcrop part.				
Vista:				
213	Moderate: slope	Moderate: slope	Severe: slope	Slight.
214	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
215	Severe: slope	Severe: slope	Severe: slope	Severe: slope.
[1] 216:				
Vista part	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Rock outcrop part.				

TABLE 8.—*Recreational development*—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Xeralfic Arents:				
217	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
218	Moderate: slope, percs slowly.	Moderate: slope	Severe: slope	Slight.
Xerorthents:				
219	Moderate: slope, percs slowly.	Moderate: slope	Severe: slope	Slight.
220	Severe: slope	Severe: slope	Severe: slope	Moderate: slope.
Yorba:				
221	Moderate: small stones, percs slowly.	Moderate: small stones.	Moderate: small stones, percs slowly.	Moderate: small stones.
222	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.
223, 224, 225	Severe: slope	Severe: slope	Severe: slope, small stones.	Moderate: slope, small stones.
226	Severe: slope	Severe: slope	Severe: slope, small stones.	Severe: slope.

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

for each kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a groundwater aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 7 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability; texture; depth to bedrock, hardpan, or other layers that affect the rate of water movement; depth to the water table; slope; stability of ditchbanks; susceptibility to flooding; salinity and alkalinity; and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable material; large stones; permeability; ease of establishing vegetation; and resistance to water erosion, soil blowing, soil slipping, and piping.

Grassed waterways are constructed to channel runoff to outlets at a nonerosive velocity. Features that affect the use of soils for waterways are slope, permeability, erodibility, wetness, and suitability for permanent vegetation.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to pub-

lic sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 5, and interpretations for dwellings without basements and for local roads and streets, given in table 4.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Soil Properties

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classifications, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present data about pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering properties

Table 9 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 9 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Descriptions of the Soils."

Texture is described in table 9 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The USCS system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes: eight classes of

coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL–ML.

The AASHTO system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A–1 are coarse grained and low in content of fines. At the other extreme, in group A–7, are fine-grained soils. Highly organic soils are classified in group A–8 on the basis of visual inspection.

When laboratory data are available, the A–1, A–2, and A–7 groups are further classified as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, A–7–5, and A–7–6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 12. The estimated classification, without group index numbers, is given in table 9. Also in table 9 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Ranges in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

In some surveys, the estimates are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterburg limits extend a marginal amount across classification boundaries (1 or 2 percent), the classification in the marginal zone is omitted.

Physical and chemical properties

Table 10 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field, particularly soil structure, porosity, and gradation or texture that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Salinity is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of the nonirrigated soils. The salinity of individual irrigated fields is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of individual fields can differ greatly from the value given in table 10. Salinity affects the suitability of a soil for crop production, its stability when used as a construction material, and its potential to corrode metal and concrete.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible

TABLE 9.—*Engineering properties*

[The symbol < means less than; > means greater than.

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
Alo:				
100, 101, 102	0–25	Clay	CH, CL	A–7
	25	Weathered bedrock		
Alo Variant:				
103, 104, 105	0–40	Clay	CH, CL	A–7
	40	Weathered bedrock		
Anaheim:				
106, 107	0–26	Loam	CL–ML, ML	A–4
	26	Weathered bedrock		
108, 109, 110	0–26	Clay loam	CL	A–6
	26	Weathered bedrock		
Balcom:				
111, 112, 113	0–30	Clay loam	CL	A–6, A–7
	30	Weathered bedrock		
[1] 114:				
Balcom part	0–26	Clay loam	CL	A–6, A–7
	26	Weathered bedrock		
Rock outcrop part.				
Beaches:				
115	0–60	Variable		
Blasingame:				
116	0–8	Loam	CL–ML, CL	A–4
	8–26	Clay loam	CL	A–6
	26	Weathered bedrock		
117, 118	0–8	Stony loam	CL–ML, CL	A–4
	8–26	Stony clay loam	CL	A–6
	26	Weathered bedrock		
[1] 119:				
Blasingame part	0–8	Loam	CL–ML, CL	A–4
	8–24	Clay loam	CL	A–6
	24	Weathered bedrock		
Rock outcrop part.				
[1] 120:				
Blasingame part	0–8	Loam	CL–ML, CL	A–4
	8–26	Clay loam	CL	A–6
	26	Weathered bedrock		
Vista part	0–39	Coarse sandy loam	SM	A–2
	39	Weathered bedrock		
[1] 121:				
Blasingame part	0–8	Loam	CL–ML, CL	A–4
	8–26	Clay loam	CL	A–6
	26	Weathered bedrock		
Vista part	0–39	Coarse sandy loam	SM	A–2
	39	Weathered bedrock		
Bolsa:				
122, 123	0–29	Silt loam	CL	A–6
	29–69	Silty clay loam	CL	A–6
124, 125	0–69	Silty clay loam	CL	A–6
Bosanko:				
126, 127, 128	0–37	Clay	CH, CL	A–7
	37	Weathered bedrock		

and classifications

Absence of an entry means data were not estimated]

Fragments >3 inches	Percentage passing sieve number—				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	100	100	95–100	85–100	40–60	20–40
0	100	100	95–100	85–100	40–60	20–40
0	100	100	85–95	60–75	20–35	5–10
0	100	100	90–100	70–80	30–40	10–20
0	100	100	90–100	70–85	35–45	15–20
0	100	100	90–100	70–85	35–45	15–20
0–10 0–10	100 100	85–95 90–100	75–90 90–100	60–75 70–80	20–30 30–40	5–10 10–20
10–50 10–50	80–90 80–90	75–85 75–85	60–75 70–80	50–65 60–70	20–30 30–40	5–10 10–20
0–10 0–10	100 100	85–95 90–100	75–90 90–100	60–75 70–80	20–30 30–40	5–10 10–20
0–10 0–10	100 100	85–95 90–100	75–90 90–100	60–75 70–80	20–30 30–40	5–10 10–20
0	90–100	80–95	45–65	20–35	----------	NP
0–10 0–10	100 100	85–95 90–100	75–90 90–100	60–75 70–80	20–30 30–40	5–10 10–20
0	90–100	80–95	45–65	20–35	----------	NP
0 0	100 100	100 100	95–100 95–100	80–95 80–95	25–35 25–35	10–15 10–15
0	100	100	95–100	80–95	25–35	10–15
0	100	100	85–95	65–75	40–60	20–35

TABLE 9.—*Engineering properties*

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
[1] 129:				
Bosanko part	0–37	Clay	CH, CL	A–7
	37	Weathered bedrock		
Balcom part	0–30	Clay loam	CL	A–6, A–7
	30	Weathered bedrock		
[1] 130:				
Bosanko part	0–37	Clay	CH, CL	A–7
	37	Weathered bedrock		
Balcom part	0–30	Clay loam	CL	A–6, A–7
	30	Weathered bedrock		
Botella:				
131	0–8	Loam	CL–ML, CL	A–4, A–6
	8–35	Silty clay loam	CL	A–6, A–7
	35–66	Clay loam	CL	A–6
132, 133	0–8	Clay loam	CL	A–6, A–7
	8–35	Silty clay loam	CL	A–6, A–7
	35–66	Clay loam	CL	A–6, A–7
Calleguas:				
134	0–15	Clay loam	CL, CL–ML	A–6, A–4
	15	Weathered bedrock		
Capistrano:				
135, 136	0–65	Sandy loam	SM	A–2, A–4
Chesterton:				
137, 138	0–16	Loamy sand	SM, SM–SC	A–2
	16–32	Sandy clay	CL, SC	A–6, A–7
	32	Indurated		
Chino:				
139, 140	0–47	Silty clay loam	CL	A6, A–7
	47–60	Sandy clay loam	SC, CL	A–6
Cieneba:				
141	0–17	Sandy loam	SM, ML	A–4
	17	Weathered bedrock		
142	0–7	Sandy loam	SM, ML	A–4
	7	Weathered bedrock		
[1] 143:				
Cieneba part	0–17	Sandy loam	SM, ML	A–4
	17	Weathered bedrock		
Blasingame part	0–8	Loam	CL–ML, CL	A–4
	8–26	Clay loam	CL	A–6
	26	Weathered bedrock		
Rock outcrop part.				
[1] 144:				
Cieneba part	0–7	Sandy loam	SM, ML	A–4
	7	Weathered bedrock		
Rock outcrop part.				
[1] 145:				
Cieneba part	0–7	Sandy loam	SM, ML	A–4
	7	Weathered bedrock		
Rock outcrop part.				

and classifications—Continued

Fragments >3 inches	Percentage passing sieve number—Cont.				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	100	100	85–95	65–75	40–60	20–35
0	100	100	90–100	70–85	35–45	15–20
0	100	100	85–95	65–75	40–60	20–35
0	100	100	90–100	70–85	35–45	15–20
0	80–100	75–100	65–95	50–70	25–35	5–15
0	90–100	85–100	70–95	60–80	35–45	15–25
0	90–100	85–100	70–90	50–65	30–40	10–15
0	80–100	75–100	70–95	60–80	35–45	15–25
0	90–100	85–100	70–95	60–80	35–45	15–25
0	90–100	85–100	70–95	60–80	35–45	15–25
0	90–100	80–100	65–100	55–90	20–40	5–20
0	95–100	95–100	55–85	25–50	10–25	NP–4
0	90–100	75–90	50–70	10–25	10–25	NP–5
0	90–100	75–90	60–90	40–70	35–45	15–25
0	100	100	90–100	70–85	30–50	15–25
0	100	100	95–100	35–65	30–40	10–15
0	90–100	75–95	60–80	35–60	15–30	NP–5
0	90–100	75–95	60–80	35–60	15–30	NP–5
0	90–100	75–95	60–80	35–60	15–30	NP–5
0–10	100	85–95	75–90	60–75	20–30	5–10
0–10	100	90–100	90–100	70–80	30–40	10–20
0	90–100	75–95	60–80	35–60	15–30	NP–5
0	90–100	75–95	60–80	35–60	15–30	NP–5

TABLE 9.—*Engineering properties*

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
Corralitos:				
146	0–80	Loamy sand	SM	A–1, A–2
147	0–40	Loamy sand	SM	A–2
	40–46	Silt loam, silty clay loam	ML, CL–ML	A–4, A–5, A–6
	46–80	Sand, fine sand, loamy sand	SM, SP–SM	A–1, A–2, A–3
Cropley:				
148, 149	0–65	Clay	CL, CH	A–7
Escondido:				
150, 151	0–16	Very fine sandy loam	ML, CL–ML	A–4
	16–29	Very fine sandy loam	ML, CL–ML	A–4
	29	Unweathered bedrock		
Exchequer:				
[1] 152:				
Exchequer part	0–18	Gravelly silt loam	SM, SM–SC	A–4
	18	Unweathered bedrock		
Rock outcrop part.				
Friant:				
153	0–17	Gravelly fine sandy loam	SM, SM–SC	A–4
	17	Weathered bedrock		
Gabino:				
154	0–10	Gravelly clay loam	CL, SC	A–6
	10–38	Cobbly clay, gravelly clay	CH, CL	A–7
	38	Weathered bedrock		
Garretson:				
155	0–6	Gravelly very fine sandy loam	SC, CL–ML, CL. SM–SC	A–4, A–2
	6–60	Gravelly loam, gravelly clay loam	SC, CL, CL–ML, SM–SC	A–4, A–6, A–2
Hanford:				
156	0–48	Sandy loam	SM	A–2, A–4
	48–60	Gravelly loamy sand	SM	A–1
Hueneme:				
157	0–27	Fine sandy loam	SM	A–4
	27–60	Stratified silt loam to sand	SM	A–2, A–4
158	0–27	Fine sandy loam	SM	A–4
	27–60	Stratified silt loam to loamy sand	SM	A–2, A–4
Las Posas:				
159	0–9	Gravelly loam	SM–SC, CL–ML	A–2, A–4
	9–27	Clay	CL, CH	A–6, A–7
	27	Weathered bedrock		
Laughlin:				
160	0–23	Gravelly loam	GC, CL	A–6
	23–39	Gravelly clay loam, clay loam	CL, GC	A–6
	39	Weathered bedrock		
Marina:				
161, 162	0–60	Loamy sand	SM, SP–SM	A–2
	60–80	Sand	SP–SM, SM	A–2
Metz:				
163	0–20	Loamy sand	SM	A–2
	20–63	Stratified sand to very fine sandy loam	SM	A–2
164	0–20	Loamy sand	SM	A–2
	20–40	Stratified sand to very fine sandy loam	SM	A–2
	40–56	Silty clay loam	CL	A–6
	56–63	Stratified sand to silty clay loam	SM, SC, ML, CL	A–4, A–6

and classifications—Continued

Fragments >3 inches	Percentage passing sieve number—Cont.				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	95–100	80–100	45–90	15–35	5–30	NP–5
0	95–100	75–100	50–80	15–35	5–30	NP–5
0	95–100	75–100	70–100	65–95	25–45	5–15
0	95–100	75–100	40–80	5–35	----------	NP
0	100	95–100	80–100	70–95	40–60	15–30
0	100	100	80–95	50–65	15–35	5–10
0	100	100	80–95	50–65	15–35	5–10
0–10	70–85	55–75	50–70	35–50	20–35	5–10
0–10	70–90	60–85	50–70	35–45	20–30	NP–10
5–15	75–85	60–75	55–85	40–65	30–40	10–20
5–35	80–95	70–85	65–85	50–80	40–60	25–35
0	75–100	50–75	40–70	25–60	15–30	5–10
0–10	75–100	50–75	40–75	20–65	15–40	5–20
0	85–100	80–100	50–80	20–40	15–25	NP–5
0	65–85	55–75	30–50	10–20	----------	NP
0	100	95–100	65–80	35–50	15–30	NP–5
0	100	95–100	60–70	30–50	15–30	NP–5
0	100	95–100	65–80	35–50	15–30	NP–5
0	100	95–100	60–70	30–50	15–30	NP–5
0–5	80–95	65–75	50–70	30–60	20–30	5–10
0	100	100	90–100	75–95	35–55	15–35
0–5	55–95	50–75	50–65	35–55	15–30	10–15
0–5	55–90	50–90	50–85	45–80	20–40	10–20
0	100	100	50–75	5–30	<5	NP
0	100	100	50–75	5–15	----------	NP
0	100	100	50–70	15–35	----------	NP
0	100	100	60–80	15–35	----------	NP
0	100	100	50–70	15–35	----------	NP
0	100	100	60–80	15–35	----------	NP
0	100	100	90–100	85–95	30–40	15–25
0	100	100	60–80	40–60	<40	NP–20

TABLE 9.—*Engineering properties*

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
Mocho:				
165	0–12	Sandy loam	SM	A–2, A–4
	12–61	Loam, silty clay loam, fine sandy loam	CL, CL–ML	A–4, A–6
166, 167	0–31	Loam	CL–ML, CL	A–4, A–6
	31–61	Loam, silty clay loam, fine sandy loam	CL, CL–ML	A–4, A–6
Modjeska:				
168, 169, 170, 171	0–14	Gravelly loam	SC, SM–SC	A–2, A–4
	14–63	Very cobbly loam	SM	A–1
	63–71	Very gravelly loamy sand	SM, SP–SM	A–1
Myford:				
172, 173, 174, 175, 176, 177, 178, 179	0–12	Sandy loam	SM. SM–SC, ML, CL–ML	A–2, A–4
	12–49	Sandy clay, sandy clay loam	SC, CL	A–6, A–7
	49–79	Sandy loam	SM, SM–SC. ML, CL–ML	A–2, A–4
Nacimiento:				
180, 181	0–28	Clay loam	CL	A6, A–7
	28	Weathered bedrock		
Omni:				
182	0–12	Silt loam	CL–ML, CL	A–4, A–6
	12–60	Clay	CL, CH	A–7
183	0–17	Clay	CL, CH	A–7
	17–60	Clay	CL, CH	A–7
184	0–17	Clay	CL, CH	A–7
	17–60	Clay	CL, CH	A–7
Pits:				
185.				
Ramona:				
186	0–8	Fine sandy loam	SM	A–2, A–4, A–1
	8–69	Sandy clay loam, fine sandy loam	SC, SM–SC	A–2, A–4, A–6, A–1
187	0–8	Gravelly fine sandy loam	SM	A–1, A–2, A–1
	8–69	Sandy clay loam, fine sandy loam	SC, SM–SC	A–2, A–4, A–6, A–1
Rincon:				
188, 189, 190	0–11	Clay loam	CL	A–6, A–7
	11–28	Heavy clay loam	CL, CH	A–6, A–7
	28–60	Stratified clay	SC, CL	A–6
Riverwash:				
191.				
Rock outcrop:				
[1] 192:				
Rock outcrop part.				
Cieneba part	0–7	Sandy loam	SM, ML	A–4
	7	Weathered bedrock		
San Andreas:				
193	0–31	Sandy loam	SM	A–4, A–2
	31	Weathered bedrock		
San Emigdio:				
194, 195	0–7	Fine sandy loam	SC, SM, ML, CL	A–4
	7–61	Stratified very fine sandy loam to gravelly loamy coarse sand.	SC, SM, ML, CL	A–4, A–2

and classifications—Continued

Fragments >3 inches	Percentage passing sieve number—Cont.				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	80–100	75–100	50–70	25–40	10–20	NP–5
0	80–100	75–100	70–100	65–85	25–40	5–20
0	80–100	75–100	70–95	60–75	20–40	5–15
0	80–100	75–100	70–100	65–85	25–40	5–20
5–15	75–90	50–70	45–65	35–50	15–25	5–10
30–60	80–95	15–25	15–25	10–20	10–15	NP–5
5–15	80–95	15–25	10–20	5–15	----------	NP
0	100	100	60–85	30–55	20–30	NP–10
0	100	100	80–100	40–80	25–45	10–25
0	100	100	60–85	30–55	15–30	NP–10
0	80–100	75–100	70–95	65–85	30–45	10–30
0	100	100	90–100	70–90	20–35	5–15
0	100	100	90–100	75–95	45–70	20–45
0	100	95–100	90–100	80–95	45–70	20–50
0	90–100	90–100	80–100	70–95	45–70	20–45
0	100	100	90–100	75–95	45–70	20–50
0	100	100	90–100	75–95	45–70	20–45
0	95–100	75–95	40–70	20–50	15–30	NP–5
0	95–100	50–95	30–75	15–45	20–40	5–15
0	95–100	50–75	30–50	15–35	15–30	NP–5
0	95–100	50–95	30–75	15–45	20–40	5–15
0	100	95–100	90–100	80–100	30–50	10–30
0	90–100	85–100	80–100	35–70	20–40	15–35
0	90–100	85–100	80–100	35–70	20–40	10–25
0	90–100	75–95	60–80	35–60	15–30	NP–5
0	90–100	80–100	70–95	30–40	10–40	NP–10
0	95–100	90–100	75–90	35–60	15–30	NP–10
0	80–100	70–100	60–90	35–60	15–30	NP–10

TABLE 9.—*Engineering properties*

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
196	0–7	Fine sandy loam	ML	A–4
	7–40	Stratified very fine sandy loam to gravelly loamy coarse sand	SM, ML, SC, CL	A–2, A–4
	40–43	Silt loam, silty clay loam	CL	A–6, A–7
	43–61	Stratified very fine sandy loam to gravelly loamy coarse sand.	SM, ML, SC, CL	A–2, A–4
Soboba:				
197	0–10	Cobbly loamy sand	GP–GM, SP–SM	A–1
	10–60	Very gravelly sand	GP, SP	A–1
198	0–10	Gravelly loamy sand	GP–GM, SP–SM	A–1
	10–60	Very gravelly sand	GP, SP	A–1
Soper:				
199, 200	0–8	Loam	ML, CL–ML, SM, SM–SC	A–4
	8–29	Clay loam, loam	CL, SC	A–6, A–7
	29	Weathered bedrock		
201, 202	0–8	Gravelly loam	ML, CL–ML, SM, SM–SC	A–4
	8–29	Gravelly clay loam, gravelly loam	CL, SC	A–6, A–7
	29	Weathered bedrock		
203	0–8	Cobbly loam	ML, CL–ML, SM, SM–SC	A–4
	8–29	Gravelly clay loam, gravelly loam	CL, SC	A–6, A–7
	29	Weathered bedrock		
[1] 204:				
Soper part	0–4	Gravelly loam	ML, CL–ML, SM, SM–SC	A–4
	4–20	Gravelly clay loam, gravelly loam	CL, SC	A–6, A–7
	20	Weathered bedrock		
Rock outcrop part.				
Sorrento:				
205	0–12	Sandy loam	SM	A–4
	12–62	Silty clay loam	CL	A–6, A–7
	62–72	Sandy loam	SM	A–4, A–2
206, 207	0–12	Loam	ML, CL–ML	A–4
	12–62	Silty clay loam	CL	A–6, A–7
	62–72	Sandy loam	SM	A–4, A–2
208, 209	0–12	Clay loam	CL	A–6, A–7
	12–62	Silty clay loam	CL	A–6, A–7
	62–72	Loam, sandy loam	SM	A–4, A–2
Thapto-Histic Fluvaquents:				
210	0–9	Clay loam	OH	A–7
	9–21	Silty clay	CL, CH	A–7
	21–56	Sapric material	Pt	A–8
	56–68	Silty clay loam	ML, MH	A–7
Tidal flats:				
211	0–60	Variable		
Tollhouse:				
[1] 212:				
Tollhouse part	0–8	Coarse sandy loam	SM	A–1, A–2
	8	Weathered bedrock		
Rock outcrop part.				
Vista:				
213, 214, 215	0–39	Coarse sandy loam	SM	A–2, A–1
	39	Weathered bedrock		

and classifications—Continued

Fragments >3 inches	Percentage passing sieve number—Cont.				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	100	100	80–90	50–65	20–30	NP–10
0	80–100	70–90	60–90	35–60	15–30	NP–10
0	100	100	90–100	85–95	30–50	15–25
0	80–100	70–90	55–80	15–50	10–25	NP–10
10–30	40–60	30–40	20–30	5–10	----------	NP
0–5	40–60	30–40	15–25	0–5	----------	NP
0–5	40–60	30–40	20–30	5–10	----------	NP
0–5	40–60	30–40	15–25	0–5	----------	NP
0–5	90–100	85–95	65–85	40–65	10–35	NP–10
0–15	85–95	85–95	65–85	40–55	30–50	20–35
0–25	80–100	60–75	50–65	45–60	10–35	NP–10
0–15	70–95	50–70	45–60	40–55	30–50	20–35
10–25	80–100	60–75	50–65	45–60	10–35	NP–10
0–15	70–95	50–70	45–60	40–55	30–50	20–35
0–25	80–100	60–75	50–65	45–60	10–35	NP–10
0–15	70–95	50–70	45–60	40–55	30–50	20–35
0	100	95–100	60–70	35–50	10–25	NP–5
0	100	95–100	80–95	70–85	25–45	10–25
0	100	95–100	60–70	30–40	10–25	NP–5
0	100	95–100	75–95	60–80	20–40	5–10
0	100	95–100	80–95	70–85	25–45	10–25
0	100	95–100	60–70	30–40	10–25	NP–5
0	100	95–100	95–100	75–85	30–50	10–25
0	100	95–100	80–95	70–85	25–45	10–25
0	100	95–100	60–70	30–40	10–25	NP–5
0	100	100	95–100	80–95	90–110	20–35
0	100	100	95–100	90–100	40–60	30–40
0	100	100	95–100	90–100	40–60	10–25
0	75–100	55–95	30–85	15–35	<30	NP–5
0	90–100	80–95	45–65	20–35	----------	NP

TABLE 9.—*Engineering properties*

Soil name and map symbol	Depth	USDA texture	Classification	
			Unified	AASHTO
	In			
[1] 216:				
Vista part	0–39	Coarse sandy loam	SM	A–2, A–1
	39	Weathered bedrock		
Rock outcrop part.				
Xeralfic Arents:				
217, 218	0–60	Variable		
Xerorthents:				
219, 220	0–60	Variable		
Yorba:				
221, 222, 223	0–11	Gravelly sandy loam	SM, SM–SC	A–2, A–4, A–1
	11–40	Very gravelly sandy clay loam	GC	A–2, A–6
	40–63	Very gravelly sandy loam	GM, GP–GM	A–1
224, 225	0–11	Cobbly sandy loam	SM, ML, SM–SC, CL–ML	A–2, A–4
	11–40	Very gravelly sandy clay loam	GC	A–2, A–6
	40–63	Very gravelly sandy loam	GM, GP–GM	A1
226	0–11	Cobbly sandy loam	SM, SM–SC	A–2, A–4, A–1
	11–40	Very gravelly sandy clay loam	GC	A–2, A–6
	40–63	Very gravelly sandy loam	GM, GP–GM	A–1

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and

to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water (*15*). Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 11 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding, nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that

and classifications—Continued

Fragments >3 inches	Percentage passing sieve number—Cont.				Liquid limit	Plasticity index
	4	10	40	200		
Pct					*Pct*	
0	90–100	80–95	45–65	20–35	----------	NP
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0–10	75–90	60–70	40–65	20–50	10–30	NP–10
0–60	35–55	25–50	20–50	10–40	25–40	10–20
0–20	30–50	20–50	10–35	5–20	<20	NP–5
25–35	85–100	75–95	50–85	25–65	10–30	NP–10
0–60	35–55	25–50	20–50	10–40	25–40	10–20
0–20	30–50	20–50	10–35	5–20	<20	NP–5
25–60	75–90	60–70	40–65	20–50	10–30	NP–10
0–60	35–55	25–50	20–50	10–40	25–40	10–20
0–20	30–50	20–50	10–35	5–20	<20	NP–5

behavior of the whole mapping unit.

form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however, than those provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated in table 11 are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the mapping of the soils. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Cemented pans are hard subsurface layers, within a depth of 5 or 6 feet, that are strongly compacted (indurated). Such pans cause difficulty in excavation. The hardness of pans is similar to that of bedrock. A rippable pan can be excavated, but a hard pan generally requires blasting.

Engineering test data

Table 12 contains engineering test data for some of the major soils in Orange County and the Western Part of Riverside County. These tests were made to help evaluate the soils for engineering purposes. The engineering classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits. The mechanical analysis was made by combined sieve and hydrometer methods.

Compaction (or moisture-density) data are important in earthwork. If a soil material is compacted at successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the *optimum*

TABLE 10.—*Physical and chemical*

[Dashes indicate data were not available. The symbol < means less than; > means greater than. The

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
Alo:				
100, 101, 102	0–25	0.06–0.2	0.14–0.17	6.1–8.4
	25			
Alo Variant:				
103, 104, 105	0–40	0.06–0.2	0.14–0.17	6.1–8.4
	40			
Anaheim:				
106, 107	0–26	0.6–2.0	0.15–0.17	6.1–7.8
	26			
108, 109, 110	0–26	0.2–0.6	0.17–0.19	6.1–7.8
	26			
Balcom:				
111, 112, 113	0–30	0.2–0.6	0.15–0.17	7.9–8.4
	30			
[1] 114:				
Balcom part	0–26	0.2–0.6	0.15–0.17	7.9–8.4
	26			
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	0–8	0.6–2.0	0.13–0.17	6.1–7.3
	8–26	0.2–0.6	0.17–0.19	5.6–6.0
	26			
117, 118	0–8	0.6–2.0	0.11–0.13	6.1–7.3
	8–26	0.2–0.6	0.13–0.15	5.6–6.0
	26			
[1] 119:				
Blasingame part	0–8	0.6–2.0	0.13–0.17	6.1–7.3
	8–24	0.2–0.6	0.17–0.19	5.6–6.0
	24			
Rock outcrop part.				
[1] 120:				
Blasingame part	0–8	0.6–2.0	0.11–0.13	6.1–7.3
	8–26	0.2–0.6	0.13–0.15	5.6–6.0
	26			
Vista part	0–39	2.0–6.0	0.07–0.13	6.1–7.3
	39			
[1] 121:				
Blasingame part	0–8	0.6–2.0	0.11–0.13	6.1–7.3
	8–26	0.2–0.6	0.13–0.15	5.6–6.0
	26			
Vista part	0–39	2.0–6.0	0.07–0.13	6.1–7.3
	39			
Bolsa:				
122, 123	0–29	0.2–0.6	0.19–0.21	7.9–8.4
	29–69	0.2–0.6	0.19–0.21	7.9–8.4
124, 125	0–69	0.2–0.6	0.19–0.21	7.9–8.4

properties of soils

erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not estimated]

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	High	High	Low	0.24	2
<2	High	High	Low	0.24	2
<2	Low	Low	Low	0.37	2
<2	Moderate	Moderate	Low	0.32	2
<2	Moderate	Moderate	Low	0.37	2
<2	Moderate	Moderate	Low	0.37	2
<2 <2	Low Moderate	Low Moderate	Low Moderate	0.43 0.20	2
<2 <2	Low Low	Low Moderate	Low Moderate	0.37 0.17	2
<2 <2	Low Moderate	Low Moderate	Low Moderate	0.43 0.20	2
<2 <2	Low Moderate	Low Moderate	Low Moderate	0.37 0.17	2
<2	Low	Moderate	Moderate	0.28	2
<2 <2	Low Moderate	Low Moderate	Low Moderate	0.37 0.17	2
<2	Low	Moderate	Moderate	0.28	2
<2 <2	Moderate	High	Low Low	0.43 0.43	5
<2	Moderate Moderate	High High	Low	0.43	5

TABLE 10.—*Physical and chemical*

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
Bosanko:				
126, 127, 128	0–37	0.06–0.2	0.14–0.17	6.1–8.4
	37			
[1] 129:				
Bosanko part	0–37	0.06–0.2	0.14–0.17	6.1–8.4
	37			
Balcom part	0–30	0.2–0.6	0.15–0.17	7.9–8.4
	30			
[1] 130:				
Bosanko part	0–37	0.06–0.2	0.14–0.17	6.1–8.4
	37			
Balcom part	0–30	0.2–0.6	0.15–0.17	7.9–8.4
	30			
Botella:				
131	0–8	0.6–2.0	0.15–0.18	6.1–7.3
	8–35	0.2–0.6	0.16–0.19	6.1–7.8
	35–66	0.2–0.6	0.15–0.19	7.4–8.4
132, 133	0–8	0.2–0.6	0.15–0.18	6.1–7.3
	8–35	0.2–0.6	0.16–0.19	6.1–7.8
	35–66	0.2–0.6	0.15–0.19	7.4–8.4
Calleguas:				
134	0–15	0.6–2.0	0.15–0.18	7.9–8.4
	15			
Capistrano:				
135, 136	0–65	2.0–6.0	0.09–0.13	5.6–7.3
Chesterton:				
137, 138	0–16	2.0–6.0	0.09–0.13	5.1–6.0
	16–32	<0.06	0.06–0.08	5.1–6.0
	32			
Chino:				
139	0–47	0.2–0.6	0.16–0.22	7.9–8.4
	47–60	0.2–0.6	0.16–0.22	7.9–8.4
140	0–47	0.2–0.6	0.16–0.22	7.9–8.4
	47–60	0.2–0.6	0.16–0.22	7.9–8.4
Cieneba:				
141	0–17	2.0–6.0	0.13–0.16	5.6–7.3
	17			
142	0–7	2.0–6.0	0.13–0.16	5.6–7.3
	7			
[1] 143:				
Cieneba part	0–17	2.0–6.0	0.13–0.16	5.6–7.3
	17			
Blasingame part	0–8	0.6–2.0	0.13–0.17	6.1–7.3
	8–26	0.2–0.6	0.17–0.19	5.6–6.0
	26			
Rock outcrop part.				
[1] 144:				
Cieneba part	0–17	2.0–6.0	0.13–0.16	5.6–7.3
	17			
Rock outcrop part.				

properties of soils—Continued

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	High	High	Low	0.28	3
<2	High	High	Low	0.28	3
<2	Moderate	Moderate	Low	0.37	2
<2	High	High	Low	0.28	3
<2	Moderate	Moderate	Low	0.37	2
<2	Moderate	Moderate	Low	0.43	5
<2	Moderate	Moderate	Low	0.32	
<2	Moderate	Moderate	Low	0.32	
<2	Moderate	Moderate	Low	0.37	5
<2	Moderate	Moderate	Low	0.32	
<2	Moderate	Moderate	Low	0.32	
<2	Moderate	High	Low	0.32	1
<2	Low	Low	Low	0.24	5
<2	Low	Low	Low	0.32	2
<2	Moderate	High	Low	0.32	
>2	Moderate	High	Low		
>2	Moderate	High	Low		
<2	Moderate	Moderate	Low		
<2	Moderate	High	Low		
<2	Low	Low	Low	0.24	1
<2	Low	Low	Low	0.24	1
<2	Low	Low	Low	0.24	1
<2	Low	Low	Low	0.43	2
<2	Moderate	Moderate	Moderate	0.20	
<2	Low	Low	Low	0.24	1

TABLE 10.—*Physical and chemical*

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
[1] 145:				
Cieneba part	0–7	2.0–6.0	0.13–0.16	5.6–7.3
	7			
Rock outcrop part.				
Corralitos:				
146	0–80	6.0–20	0.07–0.09	5.6–7.3
147	0–40	6.0–20	0.07–0.09	5.6–7.3
	40–46	0.06–0.2	0.19–0.21	5.6–7.3
	46–80	6.0–20	0.07–0.09	5.6–7.3
Cropley:				
148, 149	0–65	0.06–0.2	0.13–0.17	6.6–8.4
Escondido:				
150, 151	0–16	0.6–2.0	0.14–0.16	5.6–6.5
	16–29	0.6–2.0	0.13–0.16	5.6–7.3
	29			
Exchequer:				
[1] 152:				
Exchequer part	0–18	0.6–2.0	0.11–0.16	5.1–6.5
	18			
Rock outcrop part.				
Friant:				
153	0–17	2.0–6.0	0.10–0.12	5.6–7.3
	17			
Gabino:				
154	0–10	0.2–0.6	0.12–0.17	5.6–6.5
	10–38	0.06–0.2	0.10–0.15	6.1–7.8
	38			
Garretson:				
155	0–6	0.6–2.0	0.10–0.15	6.1–7.3
	6–60	0.6–2.0	0.10–0.15	6.1–7.8
Hanford:				
156	0–48	2.0–6.0	0.12–0.15	6.1–7.3
	48–60	2.0–6.0	0.12–0.15	6.1–7.3
Hueneme:				
157	0–27	2.0–6.0	0.14–0.16	7.4–8.4
	27–60	2.0–6.0	0.14–0.16	7.4–8.4
158	0–27	2.0–6.0	0.14–0.16	7.4–8.4
	27–60	2.0–6.0	0.14–0.16	7.4–8.4
Las Posas:				
159	0–9	0.6–2.0	0.11–0.13	6.1–7.3
	9–27	0.2–0.6	0.14–0.17	6.1–7.8
	27			
Laughlin:				
160	0–23	2.0–6.0	0.13–0.15	5.6–6.5
	23–39	0.6–2.0	0.13–0.15	5.6–6.5
	39			
Marina:				
161, 162	0–60	0.6–2.0	0.06–0.08	5.6–7.3
	60–80	0.6–2.0	0.05–0.07	5.6–6.5

properties of soils—Continued

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	Low	Low	Low	0.24	1
<2	Low	Moderate	Moderate	0.28	5
<2	Low	Moderate	Moderate	0.17	5
<2	Moderate	High	Moderate	0.24	
<2	Low	Moderate	Moderate	0.17	
<2	High	High	Low	0.24	5
<2	Low	Moderate	Moderate	0.43	2
<2	Low	Moderate	Moderate	0.49	
<2	Low	Low	Moderate	0.37	1
<2	Low	Low	Low	0.32	1
<2	Moderate	Moderate	Moderate	0.32	3
<2	High	High	Low	0.24	
<2	Low	Low	Low	0.32	5
<2	Low	Low	Low	0.32	
<2	Low	Moderate	Low	0.24	5
<2	Low	Moderate	Low	0.24	
2–4	Low	High	Low		
2–4	Low	High	Low		
2–4	Low	High	Low		
2–4	Low	High	Low		
<2	Low	Moderate	Low	0.24	2
<2	High	High	Low	0.24	
<2	Low	Moderate	Moderate	0.24	2
<2	Moderate	Moderate	Moderate	0.32	
<2	Low	Low	Low	0.10	5
<2	Low	Low	Low	0.10	

TABLE 10.—*Physical and chemical*

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
Metz:				
163	0–20	6.0–20	0.07–0.11	6.6–8.4
	20–63	0.6–2.0	0.07–0.10	6.6–8.4
164	0–20	6.0–20	0.07–0.11	6.6–8.4
	20–40	0.6–2.0	0.07–0.10	6.6–8.4
	40–56	0.6–2.0	0.16–0.18	6.6–8.4
	56–63	0.2–2.0	0.07–0.18	6.6–8.4
Mocho:				
165	0–12	0.6–2.0	0.16–0.20	7.9–8.4
	12–61	0.6–2.0	0.16–0.21	7.9–8.4
166, 167	0–31	0.6–2.0	0.16–0.20	7.9–8.4
	31–61	0.6–2.0	0.16–0.21	7.9–8.4
Modjeska:				
168, 169, 170, 171	0–14	2.0–6.0	0.10–0.12	6.1–6.5
	14–63	2.0–6.0	0.07–0.10	6.1–6.5
	63–71	>20	0.05–0.07	6.1–6.5
Myford:				
172, 173, 174, 175, 176, 177, 178, 179	0–12	2.0–6.0	0.10–0.14	5.1–6.0
	12–49	<0.06	0.02–0.04	5.6–8.4
	49–79	0.6–2.0	0.02–0.04	6.1–6.5
Nacimiento:				
180, 181	0–28	0.2–0.6	0.17–0.19	7.4–8.4
	28			
Omni:				
182	0–12	0.6–2.0	0.14–0.20	7.9–9.0
	12–60	0.06–0.6	0.14–0.20	7.9–9.0
183	0–17	0.06–0.2	0.14–0.20	8.5–9.0
	17–60	0.06–0.6	0.14–0.20	7.9–9.0
184	0–17	0.06–0.2	0.14–0.20	7.9–9.0
	17–60	0.06–0.6	0.14–0.20	7.9–9.0
Pits:				
185.				
Ramona:				
186	0–8	2.0–6.0	0.09–0.11	6.1–7.3
	8–69	0.2–0.6	0.13–0.18	6.1–7.8
187	0–8	2.0–6.0	0.05–0.09	6.1–7.3
	8–69	0.2–0.6	0.13–0.18	6.1–7.8
Rincon:				
188, 189, 190	0–11	0.2–0.6	0.17–0.21	6.1–8.4
	11–28	0.06–0.2	0.15–0.18	6.6–8.4
	28–60	0.2–6.0	0.13–0.17	7.4–8.4
Riverwash:				
191.				
Rock outcrop:				
[1] 192:				
Rock outcrop part.				
Cieneba part	0–7	2.0–6.0	0.13–0.16	5.6–7.3
	7			
San Andreas:				
193	0–31	2.0–6.0	0.11–0.17	5.6–6.5
	31			

properties of soils—Continued

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	Low	High	Low	0.17	5
<2	Low	High	Low	0.15	
<2	Low	High	Low	0.17	5
<2	Low	High	Low	0.15	
<2	Moderate	High	Low	0.49	
<2	Low	High	Low	0.28	
<2	Low	High	Low	0.24	5
<2	Moderate	High	Low	0.43	
<2	Low	High	Low	0.43	5
<2	Moderate	High	Low	0.43	
<2	Low	Low	Moderate	0.20	2
<2	Low	Low	Moderate	0.17	
<2	Low	Low	Moderate	0.15	
<2	Low	High	Moderate	0.32	2
<2	High	High	Moderate	0.24	
<2	Low	High	Low	0.28	
<2	Moderate	High	Low	0.32	2
<2	Moderate	High	Moderate		
<2	High	High	Moderate		
<2	Very high	High	Moderate	0.37	5
<2	Very high	High	Moderate	0.37	
<2	High	High	Moderate		
<2	High	High	Moderate		
<2	Low	Low	Moderate	0.37	5
<2	Low	Moderate	Low	0.32	
<2	Low	Low	Moderate	0.32	5
<2	Low	Moderate	Low	0.32	
<2	Moderate	Moderate	Moderate	0.37	4
<2	High	High	Low	0.43	
<2	Moderate	High	Low	0.37	
<2	Low	Low	Low	0.24	1
<2	Low	Moderate	Moderate	0.15	2

TABLE 10.—*Physical and chemical*

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
San Emigdio:				
194, 195	0–7	2.0–6.0	0.12–0.17	7.9–8.4
	7–61	2.0–6.0	0.12–0.17	7.9–8.4
196	0–7	2.0–6.0	0.12–0.17	7.9–8.4
	7–40	2.0–6.0	0.11–0.16	7.9–8.4
	40–43	0.2–0.6	0.14–0.19	7.9–8.4
	43–61	2.0–6.0	0.11–0.16	7.9–8.4
Soboba:				
197	0–10	>20	0.02–0.04	6.1–7.8
	10–60	>20	0.02–0.04	6.1–7.8
198	0–10	>20	0.02–0.04	6.1–7.8
	10–60	>20	0.02–0.04	6.1–7.8
Soper:				
199, 200	0–8	0.6–2.0	0.15–0.20	6.1–7.3
	8–29	0.2–0.6	0.12–0.14	6.1–7.8
	29			
201, 202, 203	0–8	0.6–2.0	0.13–0.18	6.1–7.3
	8–29	0.2–0.6	0.12–0.14	6.1–7.8
	29			
[1] 204:				
Soper part	0–4	0.6–2.0	0.13–0.18	6.1–7.3
	4–20	0.2–0.6	0.12–0.14	6.1–7.8
	20			
Rock outcrop part.				
Sorrento:				
205	0–12	2.0–6.0	0.15–0.18	6.1–8.4
	12–62	0.2–2.0	0.16–0.21	7.9–8.4
	62–72	0.6–2.0	0.16–0.21	7.9–8.4
206, 207	0–12	0.6–2.0	0.16–0.21	6.1–8.4
	12–62	0.2–2.0	0.16–0.21	7.9–8.4
	62–72	0.6–2.0	0.16–0.21	7.9–8.4
208, 209	0–12	0.2–0.6	0.18–0.21	6.1–8.4
	12–62	0.2–2.0	0.16–0.21	7.9–8.4
	62–72	0.6–2.0	0.16–0.21	7.9–8.4
Thapto-Histic Fluvaquents:				
210	0–9	0.06–0.2	0.15–0.18	7.9–8.4
	9–21	0.06–0.2	0.20–0.24	5.1–6.0
	21–56	2.0–6.0	0.20–0.24	5.1–6.0
	56–68	0.06–0.2	0.15–0.18	6.1–6.5
Tidal flats:				
211.				
Tollhouse:				
[1] 212:				
Tollhouse part	0–8	6.0–20	0.06–0.10	5.6–6.5
	8			
Rock outcrop part.				
Vista:				
213, 214, 215	0–39	2.0–6.0	0.07–0.13	6.1–7.3
	39			

properties of soils—Continued

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	Low	High	Low	0.32	5
<2	Low	High	Low	0.32	
<2	Low	High	Low	0.32	5
<2	Low	High	Low	0.24	
<2	Low	High	Low	0.49	
<2	Low	High	Low	0.24	
<2	Low	Low	Low	0.15	5
<2	Low	Low	Low		
<2	Low	Low	Low	0.15	5
<2	Low	Low	Low	0.15	
<2	Low	Moderate	Moderate	0.32	3
<2	Moderate	Moderate	Low	0.28	
<2	Low	Moderate	Moderate	0.32	3
<2	Moderate	Moderate	Low	0.28	
<2	Low	Moderate	Moderate	0.32	3
<2	Moderate	Moderate	Low	0.28	
<2	Low	High	Low	0.28	5
<2	Moderate	High	Low	0.37	
<2	Low	High	Low	0.37	
<2	Low	High	Low	0.37	5
<2	Moderate	High	Low	0.37	
<2	Low	High	Low	0.37	
<2	Moderate	High	Low	0.32	5
<2	Moderate	High	Low	0.37	
<2	Low	High	Low	0.37	
2–4	High	High	Low		
4–8	High	High	High		
4–8	Low	High	High		
4–8	High	High	High		
<2	Low	Low	Moderate	0.24	1
<2	Low	Moderate	Moderate	0.28	2

TABLE 10.—*Physical and chemical*

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction
	In	*In/hr*	*In/in*	*pH*
[1] 216:				
Vista part	0–39	2.0–6.0	0.07–0.13	6.1–7.3
	39			
Rock outcrop part.				
Xeralfic Arents:				
217, 218	0–60			
Xerorthents:				
219, 220	0–60			
Yorba:				
221, 222, 223	0–11	0.6–6.0	0.07–0.10	5.6–6.5
	11–40	0.06–0.2	0.09–0.11	5.6–8.4
	40–63	0.6–2.0	0.03–0.05	5.1–8.4
224, 225	0–11	0.6–6.0	0.07–0.10	5.6–6.5
	11–40	0.06–0.2	0.09–0.11	5.6–8.4
	40–63	0.6–2.0	0.03–0.05	5.1–8.4
226	0–11	0.6–6.0	0.07–0.10	5.6–6.5
	11–40	0.06–0.2	0.09–0.11	5.6–6.5
	40–63	0.6–2.0	0.03–0.05	5.1–8.4

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and

moisture content is reached. After that, density decreases with increase in moisture content. The highest dry density obtained in the compactive test is termed *maximum dry density*. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Tests to determine liquid limit and plastic limit measure the effect of water on the consistence of soil material, as has been explained earlier.

Formation and Classification of the Soils

This section describes the major factors of soil formation and tells how these factors have affected the soils of Orange County and Western Part of Riverside County. It also classifies the soils by higher categories.

Factors of Soil Formation

Soil has been defined as a natural body on the surface of the earth in which plants grow. It is organic and mineral material. Soils differ in appearance, composition, management requirements, and productivity in different localities or even within short distances in the survey area. The factors that cause soils to differ are (1) physical and mineralogical composition of the parent material, (2) relief or slope of the land, (3) climate under which the soil material has accumulated, (4) biological activity, including plant and animal life in and on the soil, and (5) length of time the forces of formation have acted on the soil material. Each soil is affected by all five factors, but the relative effect and importance of each varies from one soil to another. In the following paragraphs, each factor of soil formation is discussed as it affected the formation and development of soils in the survey area.

Parent material

Parent material is the weathered rock or unconsolidated material from which soil forms. It determines the chemical and mineralogical composition of the soil to a great extent.

Sandstone, shale, and semiconsolidated materials occupy the major part of the foothills (*5*). Considerable bedding occurs, and the material varies in hardness and in lime content. In sandstone and shale the percentage of the slowly weatherable mineral quartz is relatively high. These rocks differ mainly in size of the individual grains and strength of the cementing agents. Sandstone is coarser grained. Sandy soils, such as San Andreas and Cieneba, formed in material weathered from sandstone. Loamy and clayey soils, such as Alo, Anaheim, Balcom, Bosanko, Calleguas, and Nacimiento, formed in material weathered from shale.

Metasedimentary, igneous, and metamorphic rocks occupy most of the Santa Ana Mountains uplands. The soils that developed in materials weathered from these rock are shallow or very shallow, are steep or very steep, and have rock outcrops. Examples are Friant, Cieneba, Exchequer, and Tollhouse soils. All lack development because of active erosion. The more gently

properties of soils—Continued

Salinity	Shrink-swell potential	Risk of corrosion		Erosion factors	
		Uncoated steel	Concrete	K	T
Mmhos/cm					
<2	Low	Moderate	Moderate	0.28	2
<2	Low	Low	Moderate	0.32	1
<2	Moderate	Moderate	Moderate	0.20	
<2	Low	Low	Moderate	0.24	
<2	Low	Low	Moderate	0.32	1
<2	Moderate	Moderate	Moderate	0.20	
<2	Low	Low	Moderate	0.24	
<2	Low	Low	Moderate	0.32	1
<2	Moderate	Moderate	Moderate	0.20	
<2	Low	Low	Moderate	0.24	

behavior of the whole mapping unit.

sloping soils in this area are moderately deep. Rock crops out in only a few places. These soils, which are generally only slightly or moderately developed, are the Blasingame, Escondido, Las Posas, Laughlin, and Vista.

The soils that formed in alluvium are weakly to strongly developed. Those on flood plains, on recent alluvial fans, and in basins are weakly developed because of recent deposits of alluvium. Examples are Bolsa, Chino, Hueneme, Metz, Mocho, Omni, and San Emigdio soils, all of which are calcareous throughout. These soils are from mixed, but dominantly sedimentary, sources. Other recent alluvial soils are the Capistrano, Corralitos, and Hanford. They are from sedimentary, mixed or granitic sources, and are noncalcareous throughout. The soils formed in the alluvium of terraces are strongly developed. Examples are Myford and Yorba soils.

Relief

Relief, or the shape of the landscape, influences soil formation, mainly through its effects on erosion, drainage or movement of water, and climate. Elevation, slope and exposure to the sun, wind, and air, and drainage affect climate.

Soils on north-facing slopes receive less direct sunlight, have cooler soil temperatures, and retain moisture longer than those on south-facing slopes. They therefore have a dark colored surface layer and are deeper, have less active erosion, and tend to develop a denser vegetative cover than soils on south-facing slopes. For example, Balcom soils, many of which are on north-facing slopes, have a deeper, darker surface layer than Calleguas soils, which commonly are on adjacent south-facing slopes.

On steep and very steep slopes, relief is a major factor in soil formation. In these areas the soil material is removed by erosion almost as fast as it forms. Thus, a deep soil profile seldom develops. Examples of shallow, steep to very steep soils are Cieneba, Friant, and Tollhouse.

Climate

The effect of climate on different soils varies as a result of the complex interaction among the soil-forming factors. Some properties, however, are common to many soils because of the similarity in climate.

The survey area has mildly warm, dry summers and moderately cool, rainy winters. The average air temperature at Santa Ana is 52.5° F in January and 71° in July. The average annual rainfall for most of the area is 14 inches but ranges from 10 to 30 inches. Almost all falls during November through April.

During the rainy period the soils become saturated, and they lose moisture through runoff or deep percolation. They never freeze. In most years, soil moisture in the upper 20 inches falls below the wilting point late in May or in June. The soils become dry unless irrigated.

Evaporation measurements at the Irvine railroad station (1946–54) averaged 59.75 inches per year. The highest monthly evaporation, 7.93 inches, occurs during July, and the lowest monthly evaporation, 2.55 inches, during January. January is the only month in

TABLE 11.—*Soil and*

[Absence of an entry indicates the feature is not a concern. See text for descriptions of symbols

Soil name and map symbol	Hydrologic group	Flooding		
		Frequency	Duration	Months
Alo:				
100, 101, 102	D	None		
Alo Variant:				
103, 104, 105	D	None		
Anaheim:				
106, 107, 108, 109, 110	C	None		
Balcom:				
111, 112, 113	B	None		
[1] 114:				
Balcom part	B	None		
Rock outcrop part.				
Beaches:				
115.				
Blasingame:				
116	C	None		
117, 118	C	None		
[1] 119:				
Blasingame part	C	None		
Rock outcrop part.				
[1] 120:				
Blasingame part	C	None		
Vista part	C	None		
[1] 121:				
Blasingame part	C	None		
Vista part	C	None		
Bolsa:				
122, 123, 124, 125	C	Rare		
Bosanko:				
126, 127, 128	D	None		
[1] 129:				
Bosanko part	D	None		
[1] 129:				
Balcom part	B	None		
[1] 130:				
Bosanko part	D	None		
Balcom part	B	None		
Botella:				
131, 132, 133	B	None		
Calleguas:				
134	D	None		
Capistrano:				
135, 136	B	None		
Chesterton:				
137, 138	D	None		
Chino:				
139	C	None		
140	C	None		

water features

and such terms as "rare," "brief," and "perched." The symbol < means less than; > means greater than]

High water table			Bedrock		Cemented pan	
Depth	Kind	Months	Depth	Hardness	Depth	Hardness
Ft			*In*		*In*	
>6.0			24–40	Rippable		
>6.0			24–40	Rippable		
>6.0			20–36	Rippable		
>6.0			24–36	Rippable		
>6.0			24–36	Rippable		
>6.0			20–36	Rippable		
>6.0			20–32	Rippable		
>6.0			24–32	Rippable		
>6.0			24–36	Rippable		
>6.0			30–40	Rippable		
>6.0			24–32	Rippable		
>6.0			24–40	Rippable		
3.0–6.0	Apparent	Feb-May	>60			
>6.0			22–36	Rippable		
>6.0			26–36	Rippable		
>6.0			26–36	Rippable		
>6.0			22–32	Rippable		
>6.0			24–30	Rippable		
>6.0			>60			
>6.0			10–19	Rippable		
>6.0			>60			
>6.0			>60		20–37	Rippable.
3.5–5.0	Apparent	Feb-May	>60			
>6.0			>60			

TABLE 11.—*Soil and*

Soil name and map symbol	Hydrologic group	Flooding		
		Frequency	Duration	Months
Cieneba:				
141, 142	C	None		
[1] 143:				
Cieneba part	C	None		
Blasingame part	C	None		
Rock outcrop part.				
[1] 144:				
Cieneba part	C	None		
Rock outcrop part.				
[1] 145:				
Cieneba part	C	None		
Rock outcrop part.				
Corralitos:				
146	A	None		
147	A	None		
Cropley:				
148, 149	D	None		
Escondido:				
150, 151	C	None		
Exchequer:				
[1] 152:				
Exchequer part	D	None		
Rock outcrop part.				
Friant:				
153	D	None		
Gabino:				
154	D	None		
Garretson:				
155	B	None		
Hanford:				
156	B	None		
Hueneme:				
157	C	Rare		
158	B	None		
Las Posas:				
159	C	None		
Laughlin:				
160	C	None		
Marina:				
161, 162	B	None		
Metz:				
163, 164	A	None		
Mocho:				
165, 166, 167	B	None		
Modjeska:				
168, 169, 170, 171	B	None		

water features—Continued

High water table			Bedrock		Cemented pan	
Depth	Kind	Months	Depth	Hardness	Depth	Hardness
Ft			*In*		*In*	
>6.0			5–19	Rippable		
>6.0			15–19	Rippable		
>6.0			20–30	Rippable		
>6.0			15–19	Rippable		
>6.0			5–15	Rippable		
>6.0			>60			
3.0–5.0	Perched	May-Sep	>60			
>6.0			>60			
>6.0			24–35	Hard		
>6.0			8–18	Hard		
>6.0			9–18	Rippable		
>6.0			26–40	Rippable		
>6.0			>60			
>6.0			>60			
3.5–5.0	Apparent	Jan-Apr	>60			
>6.0			>60			
>6.0			26–40	Rippable		
>6.0			24–40	Hard		
>6.0			>60			
>6.0			>60			
>6.0			>60			
>6.0			>60			

TABLE 11.—*Soil and*

Soil name and map symbol	Hydrologic group	Flooding		
		Frequency	Duration	Months
Myford:				
172, 173, 174, 175, 176, 177, 178, 179	D	None		
Nacimiento:				
180, 181	C	None		
Omni:				
182, 183	D	None		
184	D	None		
Pits:				
185.				
Ramona:				
186, 187	B	None		
Rincon:				
188, 189, 190	C	None		
Riverwash:				
191.				
Rock outcrop:				
[1] 192:				
Rock outcrop part.				
Cieneba part	C	None		
San Andreas:				
193	B	None		
San Emigdio:				
194, 195, 196	B	None		
Soboba:				
197, 198	A	None		
Soper:				
199, 200, 201, 202, 203	C	None		
[1] 204:				
Soper part	C	None		
Rock outcrop part.				
Sorrento:				
205, 206, 207, 208, 209	B	None		
Thapto-Histic Fluvaquents:				
210	D	None		
Tidal flats:				
211.				
Tollhouse:				
[1] 212:				
Tollhouse part	D	None		
Rock outcrop part.				
Vista:				
213, 214, 215	C	None		
[1] 216:				
Vista part	C	None		
Rock outcrop part.				
Xeralfic Arents:				
217, 218	B	None		

water features—Continued

High water table			Bedrock		Cemented pan	
Depth	Kind	Months	Depth	Hardness	Depth	Hardness
Ft			*In*		*In*	
>6.0			>60			
>6.0			24–36	Rippable		
>6.0			>60			
3.5–6.0	Apparent	Nov-Mar	>60			
>6.0			>60			
>6.0			>60			
>6.0			5–15	Rippable		
>6.0			24–32	Rippable		
>6.0			>60			
>6.0			>60			
>6.0			20–36	Rippable		
>6.0			20–24	Rippable		
>6.0			>60			
2.0–3.5	Apparent	Jan-Dec	>60			
>6.0			7–18	Rippable		
>6.0			24–40	Rippable		
>6.0			24–36	Rippable		
>6.0			>60			

TABLE 11.—*Soil and*

Soil name and map symbol	Hydrologic group	Flooding		
		Frequency	Duration	Months
Xerorthents: 219, 220	C	None		
Yorba: 221, 222, 223, 224, 225, 226	D	None		

[1] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and

which precipitation exceeds evaporation. Thus, the small amounts of moisture of the present climate preclude active leaching. The rates of redistribution of carbonates and the translocation of clays by this process are slow. Most of the soils have a good supply of bases, and many lack prominent argillic horizons. The alternate wet and dry periods cause soils that are high in montmorillonitic clays to shrink and swell. Wide cracks form during the dry summer and close during the moist winter in such soils as the Bosanko or Alo soils. Some of the surface soil falls or washes into the cracks and mixes with the other horizons and prevents textural differentiation in the profiles.

The warm temperature when the soils are moist and generally throughout the year provides a suitable environment for rapid decomposition of organic matter and soil minerals. The soils in the surface layer are not well granulated, partly because they are not subject to freezing and thawing.

The soils are dry to a depth of 20 inches or more for several months in summer, unless irrigated. Biological and some chemical processes are retarded during this dry period. Most of the soils have a surface layer that is structureless and is crusted and hard when dry but becomes friable when moist.

Generally, differences in climate mean differences in soil properties. Increases in precipitation mean increases in organic matter, more leaching, and deeper soil profiles. The main difference in this area, however, seems to be caused by micro-climatic variations. For example, in the foothills, the Calleguas soils on the warmer, drier south-facing slopes are light colored, low in organic matter content, and shallow. Bosanko soils on north-facing slopes are dark colored, high in organic matter, and moderately deep. Similar conditions occur in the Santa Ana Mountains, where there is higher rainfall. Tollhouse soils on north-facing slopes are dark colored and high in organic matter content. Cieneba soils at about the same elevations on south-facing slopes are light colored, low in organic matter, and warmer.

The climate in the survey area is described in more detail under the heading "Environmental Factors Affecting Soil Use."

Biological activity

Living organisms, such as vegetation, burrowing animals, insects, earthworms, bacteria, fungi, other micro-organisms, and man affect the formation of soils. Plants generally have a greater influence than other living organisms on soil formation in the survey area. They provide shade, cover, and litter, thus reducing runoff and erosion, and they contribute organic matter to the soil, improving its structure, aeration, and other physical and chemical conditions. A sparse vegetative cover adds little organic matter to soils. Cieneba soils, for example, under only a scattered brush cover are low in content of organic matter and have a light colored surface layer. Alo soils, in contrast, developed under grasses and forbs, have a dark colored surface layer, and are high in content of organic matter.

The effects of burrowing animals are apparent in some soils. Scattered bits of parent material are on the surface, and the soils are loose and mixed as a result of the collapsing of the burrows. Ground squirrels prefer to burrow and nest in calcareous soils. Balcom and Calleguas soils have noticeably more burrows than other adjacent noncalcareous soils.

Earthworms loosen, aerate, and mix soils and with other micro-organisms help break down plant nutrients.

Recently, man has changed the natural processes of soil formation through cultivation, irrigation, and drainage and by numerous other means.

Time

Soil formation or development relates more to the length of time for weathering by the other four interacting forces than to age in terms of years. The geologic age of parent material has little to do with the age of soils.

The oldest soils in this area developed in old alluvium of terraces. These soils are on stable landscapes and have been in place longer than the other soils of the survey area. They are redder in color, finer in texture, and have stronger structure and more acid reactions than the surrounding younger soils. Chesterton, Myford, and Yorba are examples of old soils.

The young soils, which lack development, generally formed in recent alluvium or on upland slopes where erosion is active and new soil material is removed almost as it is weathered. Bolsa, Capistrano, and San Emigdio soils formed in recent alluvium. Calleguas, Cieneba, and Friant are examples of young upland soils. Soils having few or indistinct horizons are considered intermediate in age.

water features—Continued

High water table			Bedrock		Cemented pan	
Depth	Kind	Months	Depth	Hardness	Depth	Hardness
Ft			*In*		*In*	
>6.0			10–60	Hard		
>6.0			>60			

behavior of the whole mapping unit.

Classification of the Soils

The present Soil Classification System was adopted for general use by the National Cooperative Soil Survey in 1965 (*13, 14*). The five orders in the survey area are Alfisols, Entisols, Inceptisols, Mollisols, and Vertisols. In table 13, the soils of the survey area are classified according to the system.

Alfisols have been in place for a sufficient length of time for the movement and accumulation of silicate clays. They have massive, hard surface horizons and argillic horizons with high base saturation. In this area they are all naturally dry between May and November. Five subgroups of Alfisols are recognized in the survey area.

Entisols are young mineral soils. They lack pedogenic horizons but have ochric epipedons. Six subgroups of Entisols are recognized in the survey area.

Inceptisols are young mineral soils that have weakly developed horizons and cambic horizons, but lack other diagnostic horizons. There are two subgroups of Inceptisols in the survey area.

Mollisols have a thick, friable, dark colored surface horizon with a base saturation of 50 percent or more. In this area there are ten subgroups of Mollisols.

Vertisols are clayey soils with cracks that open and close as the soils shrink when dry and swell when wet. This area has two subgroups that dry and crack during summer.

Environmental Factors Affecting Soil Use

Orange County and the Western Part of Riverside County, the area surveyed, can be roughly divided as follows: A narrow strip of beaches and tidal flats along the coast; a gently sloping alluvial flood plain and fans in the northwest and central part of Orange County; and an area of terraces and rolling foothills adjacent to the flood plain in the northern part, west of the Santa Ana Mountains in the eastern part, and along the southern part of Orange County and extending up the coast to about Corona Del Mar. From Corona Del Mar a strip of intermittent terraces extends along the coast to Seal Beach. The steep Santa Ana Mountains extend along the east boundary of the area, mostly along the Orange and Riverside county line, and include a small part of Western Riverside County. Elevations in the area range from sea level along the coast to over 5,000 feet in the Santa Ana Mountains. Santiago Peak, in the central part of the range, has an elevation of 5,687 feet.

Soils of the alluvial flood plain and fans are very deep, have smooth surfaces, extend on gradually decreasing gradients toward the ocean, and often terminate in tidal flats. The soils in the lower parts of the plains and in the basins are naturally poorly drained or somewhat poorly drained. The soils at higher elevations are well drained or somewhat excessively drained. These are the most productive agricultural soils in the area. The terrace soils are not highly productive. They were planted to citrus, some avocados, and other crops in the past, but because of their strongly developed claypan subsoil, crops were only moderately good.

The foothill uplands are generally limited to dryland barley, pasture, and range. A few areas are used for citrus or avocados. The mountain uplands are generally used to a limited extent only for range. There are a few alluvial fans and terraces on the east side of the Santa Ana Mountains in Riverside County that are used for citrus, avocados, and other minor crops.

The principal river of the survey area is the Santa Ana River. It drains a large region 75 miles farther inland, but only a third or less of this survey area. The river enters the area near the San Bernardino, Riverside, and Orange county lines, through a narrow deep canyon called the Santa Ana Narrows. Its general course is southwest through the flood plain to the ocean at a point about 1.5 miles northwest of Newport Bay. Its principal tributary in this area is Santiago Creek, which flows out of Modjeska Canyon and drains most of the northwest area of the Santa Ana Mountains. The drainage of the northeast half of the Santa Ana Mountains also flows into the Santa Ana River near Corona in Riverside County. The Santa Ana River and Santiago Creek have major flood control dams that protect much of the flood plain area in Orange County. The San Gabriel River flows in a southerly direction just west of the northwest boundary of the survey area and empties just south of Alamitos Bay. Coyote Creek drains a small section of the northwestern part of the area and joins the San Gabriel west of the city of Los Alamitos.

Aliso, Trabuco, and San Juan Creeks drain large

TABLE 12.—*Engineering*

Soil name and location	Report No.	Depth (in.)	Moisture-density [1]		Percentage passing sieve [2]			
			Maximum dry density	Optimum moisture	2 in.	1½ in.	1 in.	¾ in.
			pcf	*Pct*				
Alo clay:								
NE¼, NE¼, sec. 100, T. 6S., R. 9W.[5]	6413	8–19	111	17				
	6414	33–37	117	16				
Alo Variant clay:								
SW¼, NE ¼, sec. 41, T. 5S., R. 8W.[5]	6408	10–22	116	14				
	6409	40–48	124	12				
Bolsa silt loam:								
NE¼, NW¼, sec. 45, T. 7S., R. 9W.[5]	6398	10–17	112	16				
Bosanko clay:								
NE¼, SE¼, sec. 10, T. 7S., R. 8W.	6415	12–21	106	17				
	6416	42–56	104	18				
Botella clay loam:								
NW¼, NE¼, sec. 6, T. 6S., R. 7W. (modal)	6418	0–3	106	19				100
	6419	8–24	108	17				
Capistrano sandy loam:								
NW¼, NW¼, sec. 152, T. 5S., R. 8W.[5]	6417	11–19	126	11				100
Chino silty clay loam:								
NW¼, NW¼, sec. 9, T. 5S., R. 9W.	6399	9–17	112	15				
Cieneba sandy loam:								
NE¼, NE¼, sec. 142, T. 5S., R. 8W.[5]	6402	16–29	124	11				100
Gabino cobbly clay loam:								
SW¼, SW¼, sec. 9, T. 7S., R. 6W.[7]	3186	0–7	117	14	100	99	97	94
	3187	12–17	116	14		100	96	96
	3188	22–30	116	14	100	99	95	92
Hueneme fine sandy loam:								
NW¼, NW¼, sec. 18, T. 6S., R. 10W. (modal)	3178	5–23	118	14				
	3179	23–30	101	19				
Marina loamy sand:								
NW¼, SE¼, sec. 21, T. 8S., R. 8W. (modal)	3183	0–7	113	14				
	3184	33–56	121	10				
	3185	60–80	117	13				
Metz loamy sand:								
SW¼, NE¼, sec. 108, T. 5S., R. 8W.[5]	6404	10–17	122	15				
Mocho loam:								
NW¼, NW¼, sec. 44, T. 5S., R. 9W.[5]	6397	9–17	112	15				
Myford sandy loam:								
NE¼, SE¼, sec. 112, T. 7S., R. 8W.[5]	6410	12–17	118	11				
	6411	17–30	113	14				
	6412	42–52	117	12				
Omni clay:								
NW¼, SE¼, sec. 62, T. 5S., R. 9W.[5]	3192	6–9	105	19				
	3193	25–49	102	21				
San Emigdio fine sandy loam:								
NE¼, NE¼, sec. 142, T. 5S., R. 7W.[5]	6401	11–16	112	19				

test data

Percentage passing sieve [2]—Contd.					Liquid limit	Plasticity index	Classification	
⅜ in.	No. 4	No. 10	No. 40	No. 200			AASHTO [3]	Unified [4]
		100	98	77	49	32	A-7-6(25)	CL
		100	90	30	----------	[6] NP	A-2-4(0)	SM
100	99	97	84	56	45	25	A-7-6(11)	CL
100	99	94	63	25	----------	NP	A-2-4(0)	SM
		100	90	64	35	11	A-6(6)	CL-ML
				94	58	36	A-7-6(38)	CH
		100	98	92	57	33	A-7-6(34)	CH
99	99	97	89	63	36	14	A-6(7)	CL
	100	98	92	70	39	19	A-6(12)	CL
99	97	94	75	32	----------	NP	A-2-4(0)	SM
		100	99	86	43	19	A-7-6(19)	CL
99	98	92	51	11	61	NP	A-2-4(0)	SW-SM
87	80	72	59	44	50	26	A-7-6(7)	SC
94	92	88	80	60	59	34	A-7-6(20)	CH
88	83	75	60	44	59	32	A-7-6(9)	SC
		100	99	63	----------	NP	A-4(0)	ML
		100	99	29	----------	NP	A-2-4(0)	SM
		100	70	11	----------	NP	A-2-4(0)	SW-SM
		100	68	14	----------	NP	A-2-4(0)	SM
		100	74	12	----------	NP	A-2-4(0)	SM
100	99	97	82	30	----------	NP	A-2-4(0)	SM
		100	98	82	37	15	A-6(12)	CL
	100	98	84	47	----------	NP	A-4(0)	SM
		100	93	72	43	27	A-7-6(18)	CL
	100	99	93	70	36	15	A-6(10)	CL
		100	98	80	62	42	A-7-6(35)	CH
	100	99	97	86	80	59	A-7-6(56)	CH
100	99	97	88	40	----------	NP	A-4(0)	SM

TABLE 12.—*Engineering*

Soil name and location	Report No.	Depth (in.)	Moisture-density [1]		Percentage passing sieve [2]			
			Maximum dry density	Optimum moisture	2 in.	1½ in.	1 in.	¾ in.
			pcf	*Pct*				
Soper gravelly loam:								
NE¼, SW¼, sec. 119, T. 5S., R. 7W.[5]	3189	3–12	130	9		100	97	96
	3190	17–21	126	11		100	98	95
	3191	25–37	129	10		100	99	99
Sorrento loam:								
SW¼, SW¼, sec. 120, T. 5S., R. 8W. (modal)[5]	6403	12–21	121	12				
Thapto-Histic Fluvaquents:								
NE¼, NE¼, sec. 142, T. 5S., R. 7W.[5]	6400	9–14	61	48				
Yorba gravelly sandy loam:								
SE¼, SW¼, sec. 173, T. 6S., R. 8W.[5]	6405	0–3	127	9	100	98	96	94
	6406	9–18	112	12			100	99
	6407	28–42	125	11			100	99

[1] Based on the Moisture-density Relations of Soils Using 5.5-lb. Rammer and 12-in. Drop, AASHTO Designation T 99, Method A.
[2] Mechanical analyses according to the AASHTO Designation T 88. Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 mm. in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 mm. in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

parts of the southwest section of the area. There are no major flood control dams on these creeks.

Climate

The climate of the survey area is typical of the Southern California Coastal Region. Winters are cool and moist; nearly all the precipitation falls in winter. Summers are mild, warm, and dry. Light fogs or clouds, or both, are common along the coast late in spring and early in summer but rarely remain during the entire day. Some fog generally occurs every month of the year. Maximum summer temperatures seldom exceed 90° F, and nights generally are cool throughout the year. Winter temperatures are seldom below freezing in most of the area.

On the alluvial flood plain, the frost hazard is low and only in a few of the colder areas is frost protection by wind machines or orchard heaters required to protect citrus.

Damaging winds are infrequent. Sometimes, northeast winds known as "Santa Ana's" occur for short periods. These winds are accompanied by low humidity and above average temperature. They can be somewhat detrimental to most agricultural crops. Hazardous fire conditions generally prevail on range and brushland during these periods.

Average mean annual rainfall at most of the lower elevations in the survey area is about 14 inches. Precipitation, mostly rainfall, increases considerably at the higher elevations in the Santa Ana Mountains and often exceeds 25 to 30 inches annually around Santiago Peak. Infrequent, light snowfall occurs on some of the higher mountain peaks. The annual rainfall on the east-facing slopes of the Santa Ana Mountains drops rapidly to an average of about 12 inches at the lower elevations.

Temperatures vary from very little fluctuation along the coastline because of the ocean to a much wider range in the high Santa Ana Mountain area. The area can be divided into five temperature zones (*7*):

(1) The Shoreline Zone, extending along the base of cliffs and in a few places several miles inland, is dominated by the ocean. Winter temperatures average 52° and high temperatures in summer average about 68°. Mean annual air temperature at Newport Beach is about 61°.

(2) The Nearshore Zone, extending to cold air basins and hilltops above air drained slopes, is also heavily influenced by the ocean and is only slightly warmer than the shoreline. Summer temperatures average 68°, and winter temperatures about 53°. Winter temperatures rarely drop lower than 30°.

(3) The Flatland-Foothill Zone has somewhat less ocean influence. Thus, daily and seasonal temperature variations are significantly greater in the inland zones. The daily winter temperature averages 54°. The average daily low is usually about 34°, but is occasionally in the lower twenties. This zone, encompassing more than half the area, usually is warmer during the summer and colder during winter than the immediate coastal zones. In Santa Ana, for example, the mean annual temperature is 62°. Extremes of 22° and 112° have been recorded.

(4) The Santa Ana Mountains (Foothills) Thermal

test data—Continued

Percentage passing sieve [2]—Cont'd.					Liquid limit	Plasticity index	Classification	
⅜ in.	No. 4	No. 10	No. 40	No. 200			AASHTO [3]	Unified [4]
92	88	83	64	33	----------	NP	A-2-4(0)	SM
92	90	85	67	35	30	12	A-2-6(1)	SC
89	94	89	65	25	----------	NP	A-2-4(0)	SM
	100	99	86	52	32	11	A-6(3)	CL
	100	97	80	65	103	27	A-7-6 (24) A-8	OH
89	87	83	62	28	----------	NP	A-2-4(0)	SM
98	97	92	71	37	38	19	A-6(3)	SC
98	97	92	72	27	----------	NP	A-2-4(0)	SM

[3] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHTO Designation M 145-49.
[4] Based on the Unified Soil Classification System, Technical Memorandum No. 3-357, Volume 1, Waterways Experiment Station, Corps of Engineers, March 1953.
[5] Private cadastral survey that does not meet standards of U.S. Geological Survey, Topographic Division.
[6] NP=Nonplastic.
[7] Cobbles discarded. Estimated at 3 percent by volume of surface layer.

Belt Zone is only slightly influenced by the ocean, and extreme temperatures are more diverse than in the previously mentioned zones. The average annual temperature is about 63° F. Good air drainage off the hilly slopes insures long, no-frost crop growing periods each year.

(5) The Santa Ana Mountains Non-Thermal Zone is the highest elevation region in the mountains above the thermal belts. This zone has cold winters, occasional snowfall, and temperatures sometimes below 20°. The annual temperature is about 57° on the north-facing slopes and only slightly higher on the southern exposures.

Water Supply

The main source of water in the survey area is imported from the Colorado River. The imported supply of Northern California water is minimal now but can be substantially increased in the near future. Much of the imported water is used to recharge the ground water supply. About 60 to 75 percent of the ground water pumped from the Santa Ana River Recharge area is considered to be imported, and about 25 percent is local watershed recharge water. Intrusions of salt-water have affected the quality in ground water near the coast in some areas.

Other major urban and agricultural areas outside the Santa Ana River zone also import 70 percent or more of the water. The small agricultural area on the lower east-facing slopes of the Santa Ana Mountains and a few other isolated areas depend mostly on ground water and surface runoff for the irrigation needs.

Natural Vegetation

Before man, this area was probably large areas of native grasses and thick oak forests that extended down the mountains to rolling hills of sagebrush and chaparral. Below the hills were valleys of cottonwoods, oaks, sycamore, alder, ferns, and currants. Each region had its own natural community of plants, mammals, birds, insects, and other organisms.

For centuries, the landscape showed relatively little change. With the first settlers, however, came the destructive misuse of the land. Overgrazing, fires started by man, and the resulting floods and erosion scarred the land. As farming became more intensive, native plants were replaced by domestic plants. Today this area is undergoing continual change—expanding urbanization and also farming in a few new zones.

Transportation Facilities

This area has good air, bus, truck, and rail service facilities. The Orange County Airport has several major commercial airlines providing daily flights throughout the State. It also has a regularly scheduled air commuter service to numerous points throughout the South. Major cities in the area are served by buses operated by the Orange County Transit District. Many cities also have local bus service. Two major buslines connect the area with national routes. Major trucklines provide service throughout the area. The Santa Fe Railroad services many of the major cities. A network of freeways, highways, and other major roads provides for private automobile travel within the survey area.

TABLE 13.—*Classification of the soils*

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alo	Fine, montmorillonitic, thermic Typic Chromoxererts
Alo Variant	Fine, montmorillonitic, thermic Typic Chromoxererts
Anaheim	Fine-loamy, mixed, thermic Pachic Haploxerolls
Balcom	Fine-loamy, mixed, thermic Calcixerollic Xerochrepts
Blasingame	Fine-loamy, mixed, thermic Typic Haploxeralfs
Bolsa	Fine-silty, mixed (calcareous), thermic Aquic Xerofluvents
Bosanko	Fine, montmorillonitic, thermic Chromic Pelloxererts
*Botella	Fine-loamy, mixed, thermic Pachic Argixerolls
Calleguas	Loamy, mixed (calcareous), thermic, shallow Typic Xerorthents
Capistrano	Coarse-loamy, mixed, thermic Entic Haploxerolls
*Chesterton	Fine, kaolinitic, thermic Abruptic Durixeralfs
Chino	Fine-loamy, mixed, thermic Aquic Haploxerolls
Cieneba	Loamy, mixed, nonacid, thermic, shallow Typic Xerorthents
Corralitos	Mixed, thermic Typic Xeropsamments
Cropley	Fine, montmorillonitic, thermic Chromic Pelloxererts
Escondido	Coarse-loamy, mixed, thermic Typic Xerochrepts
Exchequer	Loamy, mixed, nonacid, thermic Lithic Xerorthents
Friant	Loamy, mixed, thermic Lithic Haploxerolls
Gabino	Fine, montmorillonitic, thermic Typic Argixerolls
Garretson	Fine-loamy, mixed, nonacid, thermic Typic Xerorthents
Hanford	Coarse-loamy, mixed, nonacid, thermic Typic Xerorthents
Hueneme	Coarse-loamy, mixed (calcareous), thermic Aquic Xerofluvents
Las Posas	Fine, montmorillonitic, thermic Typic Rhodoxeralfs
*Laughlin	Fine-loamy, mixed, mesic Ultic Haploxerolls
Marina	Mixed, thermic Alfic Xeropsamments
Metz	Sandy, mixed, thermic Typic Xerofluvents
Mocho	Fine-loamy, mixed, thermic Fluventic Haploxerolls
Modjeska	Loamy-skeletal, mixed, thermic Typic Xerochrepts
Myford	Fine-loamy, mixed, thermic Typic Palexeralfs
Nacimiento	Fine-loamy, mixed, thermic Calcic Haploxerolls
Omni	Fine, montmorillonitic (calcareous), thermic Fluvaquentic Haplaquolls
Ramona	Fine-loamy, mixed, thermic Typic Haploxeralfs
Rincon	Fine, montmorillonitic, thermic Mollic Haploxeralfs
*San Andreas	Coarse-loamy, mixed, thermic Typic Haploxerolls
San Emigdio	Coarse-loamy, mixed (calcareous), thermic Typic Xerofluvents
Soboba	Sandy-skeletal, mixed, thermic Typic Xerofluvents
Soper	Fine-loamy, mixed, thermic Typic Argixerolls
Sorrento	Fine-loamy, mixed, thermic Calcic Haploxerolls
Thapto-Histic Fluaquents	Thapto-Histic Fluvaquents
Tollhouse	Loamy, mixed, mesic, shallow Entic Haploxerolls
Vista	Coarse-loamy, mixed, thermic Typic Xerochrepts
Xeralfic Arents	Xeralfic Arents
Xerorthents	Xerorthents
Yorba	Loamy-skeletal, mixed, thermic Typic Haploxeralfs

Manufacturing and Business Services

Principal industries in the area today, beside agriculture, are the petroleum industry, building construction, electronics, electrical equipment, medical equipment, aerospace, plastics, boatbuilding, and food processing firms. Sand, gravel, and clay are major mining industries.

Trends in Soil Use

In 1776, Mission San Juan Capistrano was founded. From this time of Spanish settlement until about 1863, cattle raising on large ranches was the main agricultural enterprise. The drought of 1863, however, caused a severe feed shortage and many cattle died on the range. At this time the California legislature passed the closure law, which required that cattlemen keep their livestock away from the cultivated lands. Because the drought and this law discouraged cattle raising, many of the larger ranches were broken up into smaller units.

Grapes and deciduous fruits became important crops between 1860 and 1890. Irrigation developed rapidly during this period. About 1890, however, the grape industry was nearly destroyed by the Anaheim vine disease, and it has not been reestablished in the area. Sugar beets, beans, and other irrigated fruit and truck crops have had various periods of success. Beginning about 1920, many of the fruit and walnut groves were replaced by citrus groves. Since World War II, extremely rapid urban and industrial expansion have drastically reduced the agricultural acreage in the area.

Because of the large urban market for ornamental plants in this area and surrounding areas, nursery stock has become the principal agricultural crop in the entire survey area. Strawberries, Valencia oranges, tomatoes, celery, cauliflower, sweet corn, asparagus,

and avocados are still major crops. Since this area is expected to continue to be the fastest growing area in California, the trend will be towards more industry and trade centers and fewer farms.

Literature Cited

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487–69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Bureau of Sport Fisheries and Wildlife. 1973. Threatened wildlife of the United States. Resour. Publ. 114, 289 pp., illus.

(4) California Department of Fish and Game. 1972. At the crossroads—a report on California's endangered and rare fish and wildlife, 99 pp., illus.

(5) California Department of Natural Resources, Division of Mines. 1954. Geology of southern California. Bull. 170, pp. 65–80, illus.

(6) Munz, Philip A., and David D. Keck. 1963. A California flora. Univ. Calif. Press, p. 13.

(7) Orange County Planning Department. 1972. The physical environment of Orange County. 147 pp., illus.

(8) Shaw, Samuel P. and Fredine, C. Gordon. 1956. Wetlands of the United States. Resour. Publ. 114.

(9) Storie, R. E. 1933. An index for rating agricultural value of soil. Calif. Agric. Exp. Stn. Bull. 566, 48 pp., illus. [Revised 1937, 1944, 1953.]

(10) Storie, R. E. 1953. Revision of the soil rating chart. Calif. Agric. Exp. Stn. 4 pp., illus.

(11) Storie, R. E. 1964. Handbook of soil evaluation. Assoc. Students Store, Univ. Calif., Berkeley, Calif. 225 pp.

(12) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173–188 issued May 1962]

(13) United States Department of Agriculture. 1960. Soil classification, a comprehensive system, 7th approximation. Soil Conserv. Serv., 265 pp., illus. [Supplements issued March 1967, September 1968, April 1969.]

(14) United States Department of Agriculture. 1974. Soil taxonomy, a basic system of soil classification for making and interpreting soil surveys. 330 pp.

(15) Wishmeir, W. H., C. D. Johnson, and B. V. Cross. 1971. Journal of soil and water conservation. pp. 189–193, illus.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Base saturation. The degree to which material having base exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Calcareous soil. A soil containing enough calcium carbonate (commonly with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid. A soil having measurable amounts of calcium carbonate or magnesium carbonate.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is

saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Erosion. The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes a bare surface.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant not a grass or a sedge.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Leaching. The removal of soluble material from soil or other material by percolating water.

Munsell notation. A designation of color by degrees of the three single variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Parent material. The great variety of unconsolidated organic and mineral material in which soil forms. Consolidated bedrock is not yet parent material by this concept.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are very slow (less than 0.06 inch), slow (0.06 to 0.20 inch), moderately slow (0.2 to 0.6 inch), moderate (0.6 to 2.0 inches), moderately rapid (2.0 to 6.0 inches), rapid (6.0 to 20 inches), and very rapid (more than 20 inches).

pH value. (*See* Reaction, soil). A numerical designation of acidity and alkalinity in soil.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH		pH
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline-alkali soil. A soil that contains a harmful concentration of salts and exchangeable sodium; contains harmful salts and is strongly alkaline; or contains harmful salts and exchangeable sodium and is very strongly alkaline. The salts, exchangeable sodium, and alkaline reaction are in the soil in such location that growth of most crop plants is less than normal.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slickensides. Polished and grooved surfaces produced by one

mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope classes. As used in this survey—

	Range in slope
	Percent
Nearly level	0–2
Gently sloping to moderately sloping	2–9
Strongly sloping	9–15
Moderately steep	15–30
Steep	30–50
Very steep	50–75

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows: very coarse sand (2.0 millimeters to 1.0 millimeter); coarse sand (1.0 to 0.5 millimeter); medium sand (0.5 to 0.25 millimeter); fine sand (0.25 to 0.10 millimeter); very fine sand (0.10 to 0.05 millimeter); silt (0.005 to 0.002 millimeter); and clay (less than 0.002 millimeter).

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use or management.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it can soak into the soil or flow slowly to a prepared outlet without harm. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but the limited geographic soil area does not justify creation of a new series.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

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April 19, 1996

Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods

The endangered Conservancy fairy shrimp (*Branchinecta conservatio*), longhorn fairy shrimp (*Branchinecta longiantenna*), vernal pool tadpole shrimp (*Lepidurus packardi*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*) were listed on September 19, 1994, under the Endangered Species Act of 1973, as amended (Act) (59 Federal Register 48136). These species are endemic to vernal pools in the Central Valley, coast ranges, and a limited number of sites in the Transverse Range and Riverside County, California. The endangered Riverside fairy shrimp (*Streptocephalus woottoni*) was listed under the Act on August 3, 1993 (58 Federal Register 41391). This species inhabits Riverside, Orange and San Diego Counties, California, and northern Baja California, Mexico. These five species, hereafter referred to as vernal pool branchiopods, are fully protected under the Act. The San Diego fairy shrimp (*Branchinecta sandiegonensis*) is a proposed endangered species. Surveys for all these species should follow the methodologies described in these Interim Survey Guidelines (Guidelines). It is expected that the Guidelines will be revised in the future as additional information becomes available.

These Guidelines are issued as guidance to section 10(a)(1)(A) permittees. Because taking (killing, injuring, harming or harassing) endangered species is strictly prohibited under the Act, a section 10(a)(1)(A) recovery permit must be obtained prior to initiating any surveys or studies that might result in the take of endangered or threatened branchiopods. Failure to obtain this permit may result in violation(s) of section 9 of the Endangered Species Act. Additionally, violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

For the purposes of these Guidelines, vernal pools and swales are defined as follows:

> Vernal pools and swales are ephemeral wetlands that form in areas of California with Mediterranean climates that have shallow depressions underlain by a substrate of hardpan, clay, or basalt near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. Vernal pools/swales may occur singly, but more typically occur in vernal pool/swale complexes, due to the local hydrology, geology, and topography. Initially, the dry soil in vernal pools/swales becomes wet and starts to saturate during the fall and early winter rains. The second stage in a typical vernal pool cycle is characterized by peak rainfall and inundation of the vernal pools/swales. Vernal pools may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. The vernal pools gradually dry down during the spring, quite often forming the unique "bathtub ring" of flowers from endemic vernal pool plants blooming profusely at the pool margins. This drying down stage is typified by the production of seeds in the endemic plants and the dispersal of animals from the vernal pools. These pools eventually dry down totally, with the onset of drought conditions. During this final stage, early season and shallow-rooted plants turn brown, and the soil dries and may crack. With average rainfall patterns, vernal pools are typically characterized by a predominantly annual plant community dominated by wetland species.

Note: At this time, vernal pool-associated activities not directed toward the listed species, such as botanical surveys and wetland delineations, are not considered to require a permit. However, persons conducting such activities should minimize any potential impact on the vernal pool branchiopods or plants by reducing the amount of walking through vernal pools to the lowest

extent practical. Persons conducting projects that require permits (e.g., branchiopod or amphibian surveys) should also minimize walking through the pools.

I. Survey Approval

Unless otherwise authorized by the U.S. Fish and Wildlife Service (Service) in writing, these Guidelines shall be utilized for all surveys conducted for the listed vernal pool branchiopods. Any deviations from the methods prescribed by these Guidelines must be approved by the Service before surveys are conducted. The permittee shall provide the appropriate Service Field Office (see XI, Service Contact section) with all of the following information in writing for each project site at least 10 working days prior to the anticipated start date of survey work:

a. The precise location of the project site clearly delineated on either an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The map should contain the project name, type of project by category [the categories are: development, mitigation banking, or other (specify)], the estimated area (acreage) of the project site and an estimated number or area (acreage) of pool/swales on the site, quad name, and county name;

b. Names of all vernal pool biologists and associated personnel with reference to their section 10(a)(1)(A) permit number; and

c. A written request to commence wet season or dry season sampling for each project to be surveyed for the listed vernal pool branchiopods.

II. Sampling Survey Completion

a. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if:

1. the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle; or

2. it is agreed that one or more of the listed vernal pool branchiopods are present on the subject site.

b. Permission to dry season survey for the listed vernal pool branchiopods requires the completion of both the full wet season survey and the dry season survey, including the complete analysis of all dry soil samples (see V).

c. A complete survey consists of sampling for either:

1. two full wet season surveys done within a 5-year period; or

2. two consecutive seasons of one full wet season survey and one dry season survey (or one dry season survey and one full wet season survey).

d. Each vernal pool/swale in a vernal pool/swale complex shall be surveyed as per these Guidelines. However, in the case of a large vernal pool/swale complex, the Service may authorize a representative portion or portions of the vernal pool/swale complex to be surveyed as per these Guidelines.

III. Notification of Presence

Should the permittee determine that any of the five listed vernal pool branchiopods are present at a site, the appropriate Service Field Office (see XI, Service Contact section) shall be notified within 10 working days by letter or telephone.

IV. Wet Season Surveys

Wet season survey sampling shall not be conducted at any project site unless the permittee receives prior permission from the Service (see I (c)).

a. Survey Initiation, Frequency, and Termination

1. Surveyors should visit sites after initial storm events to determine when pools/swales have been inundated. A pool/swale is considered to be inundated when it holds greater than 3 cm of standing water 24 hours after a rain event.

2. Pools/swales shall be adequately sampled once every two weeks, beginning no later than two weeks after their initial inundation and continuing until they are no longer inundated, or until they have experienced 120 days of continuous inundation. .

3. In cases where the pools/swales dry and then refill in the same wet season, sampling shall be reinitiated within eight days of refilling every time they meet the 3 cm of standing water criteria and shall continue until they have experienced 120 days of continuous inundation, or until they are no longer inundated.

4. If a vernal pool/swale has already experienced 120 days of continuous inundation, but then dries down and subsequently refills in the same wet season, surveys must be re-initiated in accordance with IV(a)(3) above, each time the vernal pool/swale refills and meets the 3 cm of standing water criteria.

5. Once initiated, surveys conducted pursuant to these Guidelines may be suspended prior to completion if the presence of one or more of the five listed branchiopods on the subject site is determined through identification at any point within the wet season survey cycle

b. Survey Sampling At each wet season visit, representative portions of the pool/swale bottom, edges, and vertical water column shall be adequately sampled using a seine, dip net or aquarium net appropriate for the size of the pool or swale. Net mesh size shall not be larger than (1/8) inch. Seines shall be examined and emptied of material at least once every five linear meters.

c. Voucher Specimens

1. Voucher specimens shall be collected only once for each individual vernal pool/swale and shall be accessioned to either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM) (see VIII).

2. Voucher specimens of all listed vernal pool branchiopods captured shall be collected and all other specimens shall be returned in good condition to the vernal pool/swale where they were found as quickly as possible.

3. No more than 20 specimens of each species of listed vernal pool branchiopods from each pool/swale, or less than 10% of the subpopulation present in the pool/swale, whichever is the lesser amount, shall be retained and preserved as voucher specimens.

4. Only sexually mature, adult branchiopods shall be used for purposes of voucher specimens for species identification. The Service will not accept species identifications made using immature specimens.

5. The sample of 20 voucher specimens shall include no less than three specimens of either sex.

V. Dry Season Surveys

Dry season soil sampling shall not be conducted at any project site unless the permittee receives prior written permission from the Service (see I (c)).

a. Soil Collection

Soil shall be collected when it is dry to avoid damaging or destroying cysts which are more fragile when wet. A hand trowel or similar instrument shall be used to collect approximately one liter volume sample per pool/swale of the top 1-3 cm of pool sediment. Whenever possible, soil samples shall be collected in chunks. The trowel shall be used to pry up intact chunks of

sediment, rather than loosening the soil by raking and shoveling which can damage cysts.

In southern California there are a number of federally listed plant species (Orcuttia californica, Pogogyne abramsii, and Pogogyne nudiscula) that often co-occur with the fairy shrimp. Removal of soil could damage populations of these plants by inadvertently removing seed. Dry sampling should be minimized or avoided within those vernal pools/swales that are known to, or may, contain these species. The permittee shall contact the Carlsbad Field Office (see XI, Service Contact section) regarding the distribution of these listed plants species prior to conducting dry sampling in Los Angeles, Orange, Riverside and other southern California counties.

b. Soil Sample Volume

Each soil sample from the 10 soil sample locations shall be labeled, stored, and analyzed individually.

1. A total of 10 soil samples of approximately 100 ml each shall be taken from each pool/swale, for a total soil sample volume of approximately one liter per pool/swale.

2. In the case of a very large playa, dry lake, or vernal pool, the Service may authorize the removal of more than one liter of soil.

3. If a pool has a diameter of less than three meters, the total soil sample taken shall not exceed ½ liter in volume per pool, and the 10 soil samples shall be approximately 50 ml each in volume.

c. Soil Sample Locations

A total of 10 soil samples shall be collected from the following locations within each pool/swale sampled:

1. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the longest transect of the pool/swale.

2. Starting with one soil sample taken from the edge of the pool/swale, at least four soil samples shall be taken from equidistant points along the widest transect of the pool/swale.

3. If neither the longest or the widest transect encompasses the deepest part (or parts) of the pool/swale, then at least two soil samples shall

be taken from the deepest part (or parts) of the pool/swale..

d. Soil Storage

1. The soil samples from each soil sample location shall be stored in separate bags, labeled with the specific location within the pool/swale from where each soil sample was taken. A sketch of the pool/swale showing the specific location of each soil sample shall be included in the 90-day report.

2. Soil samples containing any residual moisture initially shall be adequately ventilated and allowed to air dry thoroughly before storage of the sample. The bags containing the soil samples shall be kept out of direct sunlight in order to avoid excessively heating the sample.

3. All soil samples shall be retained and stored as directed in V(d)(1) and V(d)(2) above until the Service is able to provide direction in species-level identification of the cysts of all the aforementioned branchiopod species.

e. Soil Sieving

1. The soil samples shall not be ground, crushed, or otherwise manipulated in order to expedite the sieving process. A relatively short period of pre-soaking the soil sample may be helpful/necessary in order to facilitate the sieving process. Small aliquots (approximately 50 ml in volume) of soil shall be gently washed with water through a graded series of U.S. standard eight inch soil sieves ending in mesh sizes 300 micron (um), and 150 micron (um).

2. Sieves must be thoroughly rinsed and visually inspected for any cysts adhered to the sieves prior to the start of sieving. This process must be repeated for each individual soil sample location. Sieves shall also be rinsed and thoroughly inspected upon completion of sieving soil samples.

f. Soil Examination

1. Washed and sieved soil fractions from the 300 um and 150 um sieves shall be examined under a dissecting microscope for tadpole shrimp and fairy shrimp cysts. The process shall be repeated until all individual soil samples have been examined. All sieved material shall be processed and dried as quickly as possible, preferably within one hour from the initial wetting.

Note: Do not return soil to survey sampling site.

2. All fairy shrimp and tadpole shrimp cysts shall be removed from the soil, separated by cyst type into labeled vials, allowed to air-dry, and then stored dry.

g. Cyst Density

Cyst density information for each soil sample location shall be calculated by dividing the total number of cysts recovered by the total amount of soil from the individual aliquots from that soil sample location. Total cyst density information for each soil sample location shall be reported for each species in terms of: none; 1-25 cysts/100 ml soil; 26-50 cysts/100 ml soil; 51-100 cysts/100 ml soil; 101-199 cysts/100 ml soil; or more than 200 cysts/100 ml soil.

h. Cyst Identification

Each fairy shrimp and tadpole shrimp cyst type shall be identified to genus by a qualified biologist. The Service may require an independent review by a crustacean biologist(s) of any vernal pool branchiopod or cyst identification.

There are two options when a branchiopod cyst identification is made to genus:

1. the survey, pursuant to these Guidelines, may be suspended if it is agreed one or more of the listed species are present on the project site; or

2. one subsequent complete wet season sampling survey shall be conducted to complete survey requirements.

VI. Cyst Voucher Specimens

A representative sample of each cyst type from each pool/swale shall be accessioned to either CAS or LACM (see VIII).

VII. 90-Day Reports

a. U.S. Fish & Wildlife Service

The permittee shall provide the appropriate Service Field Office (listed in the Service Contact section) with all of the following information in writing, using the appropriate Vernal Pool Data Sheet where applicable as the reporting form, no more than 90 calendar days after completing the last field visit of the season at each project site:

1. The location of the project site clearly delineated on an original or high quality copy of a U.S. Geological Survey topographic map (exact scale, 7.5 minute, 1"=2,000 ft.). The location of the listed vernal pool branchiopods is to be included on the 7.5 minute maps in as precise a manner as possible (e.g., lat/long or location within a section).

2. Five color photographic 35mm slides and/or 3" x 5" photographs of each project site taken during sampling in the wet season; this is to include two slides and/or photographs taken from standing position that portray the general landscape of the site [i.e., two photos from an opposing axis of the site (e.g., north and south compass headings)]; and three slides and/or photographs of representative vernal pools, swales, and other areas within the site sampled for the five listed vernal pool branchiopod species. The following information shall be legibly written on each slide/photograph with permanent ink: precise location of the project site, direction from which photograph was taken, date of photograph, initials of photographer, and initials of the scientific names of any of the five listed vernal pool branchiopod species that were found at the depicted site. Note: Slides and/or photographs only need to be submitted once per project site.

3. The estimated number of individuals of any of the listed vernal pool branchiopods observed in each pool/swale shall be reported in terms of an order of magnitude (e.g., 10's, 100's, 1000's). (*Refer to the Vernal Pool Data Sheet*)

4. The number of individuals of any of the listed vernal pool branchiopods or cysts preserved from each pool/swale and the name of the institution in which they are accessioned. (*Refer to the Vernal Pool Data Sheet*)

5. A qualitative description of the vernal pool/swale community. A general list of amphibian species and non-listed vernal pool crustacean species (by common and/or scientific name) encountered at the project site is desirable. For purposes of this permit a full survey for these species is not required. However, if more detailed information is collected, it shall be included in the Vernal Pool Data Sheet. .
(*Refer to the Vernal Pool Data Sheet*)

6. Data collected during each field visit, including: date, air temperature, water temperature, weather conditions (e.g., sunny, overcast), maximum depth of each pool/swale, and size (area in square meters) of each pool/swale.
(*Refer to the Vernal Pool Data Sheet*).

7. (Optional) water chemistry data collected during each field visit, including: alkalinity (total: ppm or mg/l), conductivity (uMHO), dissolved oxygen (ppm or mg/l), dissolved NH4 (ppm or mg/l), pH, salinity (ppt), total dissolved solids (TDS, ppm), and turbidity. (Refer to the Vernal Pool Data Sheet)

b. California Department of Fish & Game

1. Permittees should consult with the California Department of Fish and Game (916/653-4875) to determine their responsibilities under the California Endangered Species Act and the California Fish and Game Code.

2. The permittee shall supply the California Department of Fish and Game (Natural Diversity Data Base, Staff Zoologist, California Department of Fish and Game, 1416 9th Street, Sacramento, California 95814; telephone 916/322-2494) with completed California Native Species Field Survey Forms, no more than 90 calendar days after completing the last field visit of the season at each project site.

VIII. Accessioning Voucher Specimens

a. All vernal pool branchiopod voucher specimens (including individuals collected and cysts) shall be accessioned into either the California Academy of Sciences (CAS) or the Natural History Museum of Los Angeles County (LACM). All specimens shall be preserved according to the accession standards of the repository which will accession and maintain the specimens. The October 1995 CAS and September 1995 LACM standards are attached to these Interim Survey Guidelines.

b. All vernal pool branchiopod voucher specimens (including individuals collected and cysts), along with a copy of the Vernal Pool Data Sheet containing all of the items listed in VII (a), shall be permanently deposited in the CAS or LACM within 90 calendar days of the completion of the field survey and the Service shall be supplied with the CAS or LACM catalog numbers given to the specimens.

c. The permittee shall supply the CAS or LACM with a photocopy of their section 10(a)(1)(A) permit to validate that the specimens supplied to them were taken pursuant to a permit. The Service will likely consider refusal by the CAS or LACM to accession any listed branchiopod specimens to be a violation by the permittee of their section 10(a)(1)(A) permit (e.g., if due to improper preservation/storage).

California Academy of Sciences (CAS)
Department of Invertebrate Zoology and Geology, Golden Gate Park,
San Francisco, California 94118; telephone (415) 750-7082

Natural History Museum of Los Angeles County (LACM)
Crustacea Section, Invertebrate Zoology, 900 Exposition Boulevard,
Los Angeles, California 90007; telephone (213) 744-3450

IX. Additional information, limitations, and caveats with respect to these Guidelines are as follows:

a. From time to time, specific circumstances may justify or necessitate revision of these Guidelines, on a case-by-case basis. At the discretion of the Service, such a variance may be allowable under these Guidelines if:

1. the permittee explains to the Service in writing why the variance to the Guidelines is needed and justified; and

2. the Service concurs, in writing, with the variance requested by the permittee.

b. The Service reserves the right to reject vernal pool branchiopod surveys conducted under these protocols as inadequate if:

1. survey methods used are inconsistent with these Guidelines, unless prior written permission (see I, Survey Approval) has been obtained; or

2. other information indicates that the survey is inadequate as determined by the Service.

X. Permit Infractions

The Service may consider any of these actions to be a violation by the permittee of their section 10(a)(1)(A) permit:

a. falsification of any reporting or information;

b. failure to follow the stated Guidelines sampling methodologies;

c. failure to obtain prior permission to commence wet season surveys or failure to obtain written permission to commence dry season surveys (see section I (c));

d. failure to notify the Service within 10 days of a determination of presence of one or more of the listed vernal pool branchiopods on a survey site;

e. failure to accession voucher specimens or improperly accessioned voucher specimens;

f. failure to file completed 90-day reports with the Service within 90 calendar days after completing the last field visit of the season at each project site; or

g. failure to file completed Natural Diversity Data Base forms with the California Department of Fish and Game within 90 calendar days after completing the last field visit of the season at each project site.

Violation(s) of a section 10(a)(1)(A) permit may result in its non-renewal, suspension or revocation.

XI. Service Contact

For the Central Valley hydrographic basin and the coast ranges north of the Santa Cruz County line, the Sacramento Field Office (2800 Cottage Way Room E-1803, Sacramento, California 95825; telephone 916/979-2728) should be contacted regarding vernal pool branchiopod issues.

For areas from Santa Cruz County south to Ventura County, contact the Ventura Field Office (2493 Portola Road - Suite B, Ventura, California 93003; telephone 805/644-1766).

For areas from Los Angeles County south to the U.S.- Mexico border, contact the Carlsbad Field Office (2730 Loker Avenue West, Carlsbad, California 92008; telephone 619/431-9440).

Federal Register

Wednesday,
May 30, 2001

Part II

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants Final Designation of Critical Habitat for the Riverside Fairy Shrimp; Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AG34

Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Riverside Fairy Shrimp

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for the Riverside fairy shrimp (*Streptocephalus woottoni*), pursuant to the Endangered Species Act of 1973, as amended (Act). A total of approximately 2,790 hectares (6,870 acres) in Los Angeles, Orange, Riverside, San Diego, and Ventura counties, California, is designated as critical habitat.

Critical habitat identifies specific areas that have the physical and biological features that are essential to the conservation of a listed species, and that may require special management considerations or protection. The primary constituent elements for the Riverside fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal. Critical habitat for the Riverside fairy shrimp includes those areas possessing one or more of the primary constituent elements.

Section 7 of the Act prohibits destruction or adverse modification of critical habitat by any activity funded, authorized, or carried out by any Federal agency. Section 4 of the Act requires us to consider economic and other impacts of specifying any particular area as critical habitat. We solicited data and comments from the public on all aspects of the proposed rule and economic analysis. We revised the proposal to incorporate or address new information received during the comment periods.

EFFECTIVE DATE: This rule becomes effective on June 29, 2001.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this final rule, will be available for public inspection, by appointment, during normal business hours at the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 2730 Loker Avenue West, Carlsbad, California 92008.

FOR FURTHER INFORMATION CONTACT: Jim Bartel, Field Supervisor, Carlsbad Fish and Wildlife Office, at the above address (telephone 760/431–9440; facsimile 760/431–9624).

SUPPLEMENTARY INFORMATION:

Background

The endangered Riverside fairy shrimp (*Streptocephalus woottoni*) is a small aquatic crustacean (Order: Anostraca) that occurs in vernal pools, pool-like ephemeral ponds, and human-modified depressions from coastal southern California south to northwestern Baja California, Mexico. This species is typically found in pools, ponds, and depressions that are deeper than the basins that support the endangered San Diego fairy shrimp (*Branchinecta sandiegonensis*) (Hathaway and Simovich 1996). Water chemistry, depth, temperature, and ponding are considered important factors in determining fairy shrimp distribution (Belk 1977; Branchiopod Research Group 1996; Gonzales *et al.* 1996); hence, no individuals have been found in riverine or marine waters.

The Riverside fairy shrimp was first collected in 1979 by C.H. Eriksen and was identified as a new species in 1985 (Eng *et al.* 1990). Mature males are between 13 and 25 millimeters (mm) (0.5 to 1.0 inches (in.)) long. The cercopods (structures that enhance the rudder-like function of the abdomen) are separate with plumose setae (feathery bristles) along the borders. Mature females are between about 13 to 22 mm (0.5 to 0.87 in.) in total length. The brood pouch extends to the seventh, eighth, or ninth abdominal segment. The cercopods of females are the same as the males. Both sexes of Riverside fairy shrimp have the red color of the cercopods covering all of the ninth abdominal segment and 30 to 40 percent of the eighth abdominal segment. Nearly all species of fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of organic matter (Pennak 1989; Eng *et al.* 1990).

Basins that support Riverside fairy shrimp are typically dry a portion of the year, but usually are filled by late fall, winter, or spring rains, and may persist into April or May. All anostracans, including the Riverside fairy shrimp, deposit eggs or cysts (organisms in a resting stage) in the pool's soil to wait out dry periods. The hatching of the cysts usually occurs from January to March. The species hatches within 7 to 21 days after the pool refills, depending on water temperature, and matures between 48 to 56 days, depending on a variety of habitat conditions (Hathaway and Simovich 1996). The ''resting'' or ''summer'' cysts are capable of withstanding temperature extremes and prolonged drying. When the pools refill in the same or subsequent rainy seasons, some but not all of the eggs may hatch. Fairy shrimp egg banks in the soil may be composed of the eggs from several years of breeding (Donald 1983; Simovich and Hathaway 1997). Simovich and Hathaway (1997) found that only a fraction of the total cyst bank of anostracans in areas with variable weather conditions or filling periods, such as southern California, may hatch in any given year. Thus, reproductive success is spread over several seasons.

Vernal pools are discontinuously distributed in several regions of California (Keeler-Wolf *et al.* 1995), from as far north as the Modoc Plateau in Modoc County, south to the international border with Mexico in San Diego County. Vernal pools form in regions with Mediterranean climates, where shallow depressions fill with water during fall and winter rains and then evaporate in the spring (Collie and Lathrop 1976; Holland 1976, 1988; Thorne 1984; Zedler 1987; Simovich and Hathaway 1997). In years of high precipitation, overbank flooding from intermittent streams may augment the amount of water in some vernal pools (Hanes *et al.* 1990). Vernal pool studies indicate that the contribution of subsurface or overland water flows only contribute to volume to vernal pools in years of high precipitation when pools are already saturated (Hanes and Stromberg 1996) which may promote genetic exchange with the transfer of cysts and adults between pools.

Critical to the formation of vernal pools is the presence of nearly impermeable surface or subsurface soil layers and flat or gently sloping topography (less than 10 percent slope). Downward percolation of water in vernal pool basins is prevented by the presence of this impervious layer (Holland 1976, 1988). In southern California, these impervious layers are typically alluvial materials with clay or clay loam subsoils, and they often form a distinctive micro-relief known as Gilgai or mima mound topography (Cox 1984). Basaltic or granitic substrates (e.g., Hidden Lake and Santa Rosa Plateau in Riverside County) or indurated hardpan layers (e.g., coastal San Diego County) may contribute to poor drainage as well. Vernal pool studies conducted in the Sacramento Valley indicate that the contribution of subsurface or overland water flows is significant only in years of high precipitation when pools are already saturated (Hanes and Stromberg 1996).

On the coastal terraces in San Diego County, pools are associated with the Huerhuero, Stockpen, Redding, and Olivenhain soil series. Huerhuero and Stockpen soils were derived from marine sediments and terraces, while the Redding and Olivenhain soils series were formed from alluvium. The Redding and Olivenhain soils are believed to have supported the majority of the pools historically found in San Diego County. In Riverside County, the Santa Rosa Plateau has Murrieta stony clay loams and soils of the Las Posas series (Lathrop and Thorne 1976), and at Skunk Hollow the soils in the immediate area of the vernal pool are Las Posas clay loam, Wyman clay loam, and Willows soil (Service 1998).

Vernal pool systems are often characterized by different landscape features including mima mound (miniature mounds) micro-topography, varied pool basin size and depth, and vernal swales (low tract of marshy land). Vernal pool complexes that support one or more vernal pools are often interconnected by a shared watershed. This habitat heterogeneity (consisting of dissimilar elements or parts) may allow between-pool water flow, as well as fairy shrimp cysts, particularly during years of high rainfall.

Urban and water development, flood control, highway and utility projects, as well as conversion of wildlands to agricultural use, have eliminated or degraded vernal pools and/or their watersheds in southern California (Jones and Stokes Associates 1987). Changes in hydrologic patterns, certain military activities, unauthorized fills, overgrazing, and off-road vehicle use also may imperil this aquatic habitat and the Riverside fairy shrimp. The flora and fauna in vernal pools or swales can change if the hydrologic regime is altered (Bauder 1986). Anthropogenic (human origin) activities that reduce the extent of the watershed or that alter runoff patterns (i.e., amounts and seasonal distribution of water) may eliminate the Riverside fairy shrimp, reduce population sizes or reproductive success, or shift the location of sites inhabited by this species. The introduction of non-native plant species, competition with invading species, trash dumping, fire, and fire suppression activities were some of the reasons for listing the Riverside fairy shrimp as endangered on August 3, 1993 (58 FR 4138). Because of these threats, we anticipate that intensive long-term monitoring and management will be needed to conserve this species.

Historically, vernal pool soils covered approximately 500 square kilometers (km^2) (200 square miles (mi^2)) of San Diego County (Bauder and McMillan 1998). The greatest recent losses of vernal pool habitat in San Diego County have occurred in Mira Mesa, Rancho Penasquitos, and Kearny Mesa, which account for 73 percent of all the pools destroyed in the region during the 7-year period between 1979 and 1986 (Keeler-Wolf *et al.* 1995). Other substantial losses have occurred in the Otay Mesa area, where over 40 percent of the vernal pools were destroyed between 1979 and 1990. Similar to San Diego County, vernal pool habitat was once extensive on the coastal plain of Los Angeles and Orange counties. Unfortunately, there has been a near-total loss of vernal pool habitat in these areas (Ferren and Pritchett 1988; Keeler-Wolf *et al.* 1995; Mattoni and Longcore 1997; Service 1998). Significant losses of vernal pools supporting this species have also occurred in Riverside County.

Previous Federal Action

The San Gorgonio chapter of the Sierra Club submitted a petition dated September 19, 1988, to list the Riverside fairy shrimp as endangered. The petitioner asserted that emergency listing for this species was appropriate. However, we determined that emergency listing was not warranted since the species was more widespread than first thought and occurred in at least one protected site. Nevertheless, we did publish a proposed rule to list the Riverside fairy shrimp as an endangered species in the **Federal Register** on November 12, 1991 (56 FR 57503). Because the species was not identified until 1985, and its existence remained known only to a few scientists until 1988, the proposed rule constituted the first Federal action on the Riverside fairy shrimp. We published the final rule to list the Riverside fairy shrimp as endangered in the **Federal Register** on August 3, 1993 (58 FR 41384). In 1998, the Vernal Pools of Southern California Recovery Plan (Recovery Plan) (Service 1998) was finalized. This Recovery Plan detailed the efforts required to meet the recovery needs of the Riverside fairy shrimp.

On June 30, 1999, the Southwest Center for Biological Diversity filed a lawsuit in Federal District Court for the Northern District of California for our failure to designate critical habitat for the Riverside fairy shrimp. On February 15, 2000, we entered into a settlement agreement with the plaintiff (*Southwest Center for Biodiversity* v. *United States Department of the Interior et al.,* C99–3202 SC). Under this settlement agreement, a final determination of critical habitat was to be completed by May 1, 2001. Subsequently, the plaintiffs agreed to our request to extend this deadline until May 22, 2001.

At the time of listing, we concluded that designation of critical habitat for the Riverside fairy shrimp was not prudent because such designation would not benefit the species. We were concerned that critical habitat designation would likely increase the degree of threat from vandalism, collecting, or other human activities. We believed that the publication of maps showing critical habitat units would result in additional habitat destruction through trampling, discing, grading, and intentional acts of habitat vandalism. Although we acknowledged that critical habitat designation may identify and call attention to areas important for conservation or requiring special protection, we concluded that the vandalism threat posed by designating critical habitat would outweigh these benefits.

Subsequently, in the course of working with local partners, planning for conservation and management of the Riverside fairy shrimp, responding to several Freedom of Information Act requests, and publishing the Vernal Pools of Southern California Recovery Plan (Service 1998), information about the locations of vernal pools, vernal pool complexes, and occurrences of Riverside fairy shrimp were widely distributed to the public. Since the release of these data, we have not documented an increase in the threats to the species through vandalism, collection, habitat destruction, or other means. The instances of likely vandalism, though real, were relatively isolated. In contrast, we have observed an increase in public interest in the subspecies and its conservation through survey efforts by species experts, scientific research, regional and local planning, and educational outreach. Based on the lack of an increase in vandalism threats, we have determined that the threats to the Riverside fairy shrimp and its vernal pool habitat from the specific instances of habitat destruction we identified in the final listing rule do not outweigh the broader educational, regulatory, and other possible benefits that a designation of critical habitat would provide for this subspecies. Specifically, the potential benefits include: (1) Triggering section 7 consultation in areas where it may not otherwise occur because, for example, the area becomes unoccupied; (2) focusing conservation activities in the most essential areas; (3) providing educational benefits to State or county governments or private entities; and (4) preventing people from causing inadvertent harm to this subspecies.

Therefore, we have determined that designation of critical habitat for the Riverside fairy shrimp is prudent.

The proposed rule designating critical habitat for the Riverside fairy shrimp was published on September 21, 2000 (65 FR 57136). In the proposal, we determined that it was prudent to designate approximately 4,880 hectares (ha) (12,060 acres (ac)) of lands in Los Angeles, Orange, San Diego, Riverside, and Ventura counties as critical habitat. The publication of the proposed rule opened a 60-day public comment period, which closed on November 20, 2000. On February 28, 2001, we published a notice announcing the reopening of the comment period on the proposal to designate critical habitat for the Riverside fairy shrimp, and a notice of availability of the draft economic analysis on the proposed determination (66 FR 12754). This second public comment period closed on March 30, 2001.

Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. In our regulations at 50 CFR 402.02, we define destruction or adverse modification as ''* * * a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.'' Aside from the added protection that may be provided under section 7, the Act does not provide other forms of protection to lands designated as critical habitat. Because consultation under section 7 of the Act does not apply to activities on private or other non-Federal lands that do not involve a Federal nexus, critical habitat designation would not afford any additional protections under the Act against such activities.

To be included in a critical habitat designation, the habitat must first be ''essential to the conservation of the species.'' Critical habitat designations identify, to the extent known using the best scientific and commercial data available, habitat areas that provide essential life cycle needs of the species (i.e., areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)).

Section 4 requires that we designate critical habitat at the time of listing and based on what we know at the time of the designation. When we designate critical habitat at the time of listing or under short court-ordered deadlines, we will often not have sufficient information to identify all areas of critical habitat. We are required, nevertheless, to make a decision and, thus, must base our designations on what, at the time of designation, we know to be critical habitat.

Within the geographic area occupied by the species, we will designate only areas currently known to be essential. Essential areas should already have the features and habitat characteristics that are necessary to sustain the species. We will not speculate about what areas might be found to be essential if better information became available, or what areas may become essential over time. If the information available at the time of designation does not show that an area provides essential life cycle needs of the species, then the area should not be included in the critical habitat designation. Within the geographic area occupied by the species, we will not designate areas that do not now have the primary constituent elements, as defined at 50 CFR 424.12(b), that provide essential life cycle needs of the species.

Our regulations state that, ''The Secretary shall designate as critical habitat areas outside the geographic area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species'' (50 CFR 424.12(e)). Accordingly, when the best available scientific and commercial data do not demonstrate that the conservation needs of the species require designation of critical habitat outside of occupied areas, we will not designate critical habitat in areas outside the geographic area occupied by the species.

Our Policy on Information Standards Under the Endangered Species Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that decisions we make are based upon the best scientific and commercial data available. It requires Service biologists, to the extent consistent with the Act, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information should be the listing package for the species. Additional information may be obtained from a recovery plan, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, unpublished materials, and expert opinion or personal knowledge.

Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, all should understand that critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery. Areas outside the critical habitat designation will continue to be subject to conservation actions that may be implemented under section 7(a)(1) and to the regulatory protections afforded by the section 7(a)(2) jeopardy standard and the section 9 take prohibition, as determined on the basis of the best available information at the time of the action. We specifically anticipate that federally funded or assisted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Methods

In determining areas that are essential to conserve the Riverside fairy shrimp,

we used the best scientific and commercial data available. These included data from research and survey observations published in peer-reviewed articles, recovery criteria outlined in the Recovery Plan for Vernal Pools of Southern California (Recovery Plan) (Service 1998), regional Geographic Information System (GIS) vegetation and species coverages (including layers for Los Angeles, Orange, Riverside, and San Diego counties), data collected on U.S. Marine Corps Air Station Miramar (Miramar) and U.S. Marine Corps Base Camp Pendleton (Camp Pendleton), and data collected from reports submitted by biologists holding section 10(a)(1)(A) recovery permits. In addition, information provided in comments on the proposed designation and draft economic analysis were evaluated and considered in the development of this final designation.

As stated earlier, Riverside fairy shrimp occur in ephemeral pools and ponds that may not be present throughout a given year or from year to year. Therefore, critical habitat includes a mosaic of vernal pools, ponds, and depressions currently supporting Riverside fairy shrimp and vernal pool vegetation. One area has been included in which the current occupancy by Riverside fairy shrimp is not known, but which contains the primary constituent elements for the species and is considered essential to its conservation.

Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat, we are required to consider those physical and biological features (primary constituent elements) that are essential to the conservation of the species, and that may require special management considerations or protection. These features include, but are not limited to, space for individual and population growth and for normal behavior; food, water, or other nutritional or physiological requirements; cover or shelter; sites for breeding and reproduction; and habitats that are protected from disturbance or are representative of the historic and ecological distributions of a species.

The primary constituent elements for the Riverside fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal. These primary constituent elements are found in areas that support vernal pools or other ephemeral ponds and depressions and their associated watersheds. The primary constituent elements are: small to large pools with moderate to deep depths that hold water for sufficient lengths of time necessary for Riverside fairy shrimp incubation and reproduction, but not necessarily every year; the associated watershed(s) and other hydrologic features that support pool basins and their related pool complexes; flat or gently sloping topography; and any soil type with a clay component and/or an impermeable surface or subsurface layer known to support vernal pool habitat. All designated critical habitat areas contain one or more of the primary constituent elements for the Riverside fairy shrimp.

Criteria Used To Identify Critical Habitat

In an effort to map areas essential to the conservation of the species, we used data on known Riverside fairy shrimp locations and those vernal pools and vernal pool complexes that were identified in the Recovery Plan (Service 1998) as essential for the recovery of the species, aerial photography at a scale of 1:24,000 (comparable to the scale of a 7.5 minute U.S. Geological Survey Quadrangle topographic map), current aerial photography prints, and boundaries of approved habitat conservation plans (HCPs). We then evaluated those areas based on soil types, the hydrology, watershed, and topographic features including local variation of topographic position (i.e., coastal mesas or inland valleys). Following this evaluation, a 250-meter (m) (0.16 mile (mi)) Universal Transverse Mercator (UTM) grid was overlaid on top of those vernal pool complexes and their associated watersheds to describe the unit boundaries more precisely. Each unit of the grid was evaluated to determine whether it was appropriate to include in the critical habitat designation. The critical habitat units designated using this technique encompass either individual vernal pool basins or vernal pool complexes and provide additional assurances that watersheds and hydrologic processes are captured and maintained for this species. In those cases where occupied vernal pools were not specifically mapped in the Recovery Plan (Service 1998), we relied on recent scientific data to update the map coverage. For the purpose of this final determination, critical habitat units have been described using UTM coordinates derived from a 250-m (0.16-mi) grid that approximated the boundaries delineated from the digital aerial photography.

We could not depend solely on federally owned lands for critical habitat designation as these lands are limited in geographic location, size, and habitat quality within the current range of the Riverside fairy shrimp. In addition to the federally owned lands, we are designating critical habitat on non-Federal public lands and privately owned lands. All non-Federal lands designated as critical habitat meet the definition of critical habitat under section 3 of the Act in that they are within the geographical area occupied by the species, are essential to the conservation of the species, and may require special management considerations or protection. The long-term survival and conservation of Riverside fairy shrimp is dependent upon the protection and management of existing occurrences, and the maintenance of ecological functions within these areas.

In defining critical habitat boundaries, we made an effort to exclude all developed areas, such as towns or housing developments, or other lands unlikely to contain the primary constituent elements essential for conservation of the Riverside fairy shrimp. Our 250-m (0.16 mi) UTM grid minimum mapping unit was designed to minimize the amount of development along the urban edge included in our designation. Existing features and structures, such as buildings, roads, railroads, urban development, and other such developed features not containing primary constituent elements, are not considered critical habitat. Federal actions limited to these areas would not trigger a section 7 consultation, unless they affect the species and/or the primary constituent elements in adjacent critical habitat.

Lands designated as critical habitat for the Riverside fairy shrimp are considered to be occupied by the species with the exception of 12 ha (30 ac) within critical habitat Unit 2 in which the occupancy by the Riverside fairy shrimp is not known. The lands in which the occupancy is not known contain the primary constituent elements for the species, have been determined to be essential to the conservation of the species, and are under consideration as a reestablishment site, if the species does not occur there. Refer to the description for Unit 2 for our justification as to why this location is essential to the conservation of the Riverside fairy shrimp.

Critical Habitat Designation

The areas we are designating as critical habitat currently provide all of those habitat components necessary to meet the primary biological needs of the

Riverside fairy shrimp, as described in the Recovery Plan (Service 1998), and defined by the primary constituent elements. The approximate area encompassing designated critical habitat by county and land ownership is shown in Table 1. Critical habitat for the Riverside fairy shrimp includes approximately 2,790 ha (6,870 ac) in Los Angeles, Orange, Riverside, San Diego, and Ventura counties, California, and is based on the geographic location of vernal pools, soil types, and local variation of topographic position (i.e., coastal mesas or inland valleys). Lands proposed are under private, State, and Federal ownership and divided into five critical habitat units. A brief description of each unit, and reasons for designating it as critical habitat, are presented below.

TABLE 1.—APPROXIMATE AREA ENCOMPASSING DESIGNATED CRITICAL HABITAT IN HECTARES (HA) (ACRES (AC)) BY COUNTY AND LAND OWNERSHIP [1]

County	Federal land	Local/state land	Private land	Total
Los Angeles	0 ha (0 ac)	0 ha (0 ac)	195 ha (480 ac)	195 ha (480 ac)
Orange	45 ha (110 ac)	5 ha (10 ac)	315 ha (780 ac)	365 ha (900 ac)
Riverside	0 ha (0 ac)	755 ha (1,865 ac)	1,005 ha (2,490 ac)	1,760 ha (4,355 ac)
San Diego	320 ha (770 ac)	0 ha (0 ac)	125 ha (305 ac)	445 ha (1,075 ac)
Ventura	0 ha (0 ac)	0 ha (0 ac)	25 ha (60 ac)	25 ha (60 ac)
Total	365 ha (880 ac)	760 ha (1,875 ac)	1,665 ha (4,115 ac)	2,790 ha (6,870 ac)

[1] Approximate hectares have been converted to acres (1 ha = 2.471 ac). Based on the level of imprecision of mapping at this scale, approximate hectares and acres have been rounded to the nearest 5.

Map Unit 1: Transverse Range Critical Habitat Unit, Ventura and Los Angeles counties, California (144 Ha (355 Ac))

The Transverse Range critical habitat unit includes the vernal pool habitat that is known to be occupied by the Riverside fairy shrimp and associated essential watershed which helps maintain the integrity and water quality of the vernal pool. These vernal pools are located at Cruzan Mesa, Los Angeles County, and the former Carlsberg Ranch, Ventura County. All lands designated within this unit are on private lands. These vernal pools represent the northern limit of occupied habitat for the Riverside fairy shrimp and may have genetic characteristics essential to the overall long-term conservation of the species (i.e., they may be genetically different from more centrally located populations) (Lesica and Allendorf 1995). Additionally, these vernal pools are the last remaining vernal pools in Los Angeles and Ventura counties known to support this species. The Recovery Plan for the Vernal Pools of Southern California (Service 1998) indicates that the conservation of the vernal pool habitat and associated watershed in this unit is essential to allow for the maintenance and recovery of the populations of Riverside fairy shrimp in Los Angeles and Ventura counties.

Map Unit 2: Los Angeles Basin-Orange Management Area, Los Angeles and Orange counties, California. (437 Ha (1,080 Ac))

The Los Angeles coastal prairie unit includes an approximately 13 ha (30 ac) area within and adjacent to the El Segundo Blue Butterfly Preserve, west of Pershing Drive at the Los Angeles International Airport that contains vernal pool habitat and its associated watershed essential to the conservation of the Riverside fairy shrimp. This area is, however, not known to be occupied by the Riverside fairy shrimp. This unit is the only suitable remnant of vernal pool habitat (vernal pool basin and its associated essential watershed) located within the historical coastal prairie landscape, which formerly extended from Playa del Rey south to the Palos Verdes Peninsula, an area of approximately 96 km^2 (37 mi^2). This landscape historically included the federally endangered California Orcutt grass (*Orcuttia californica*) and San Diego button-celery (*Eryngium aristulatum* var. *parishii*). This unit also supports versatile fairy shrimp (*Branchinecta lindahli*) and western spadefoot toad (*Scaphiopus hammondii*). Riverside fairy shrimp cysts were first collected east of Pershing Drive in 1997, but adult shrimp have not been found to date, likely due to the extensive disturbance to the landscape, including the introduction of fill material, changes in water chemistry, modification of the watersheds, and the resulting shortened duration of water ponding. We are not designating the area east of Pershing Drive due to the extensive alteration of the habitat that has occurred. However, we are designating the area west of Pershing Drive as critical habitat because it contains vernal pool habitat essential for the conservation of the Riverside fairy shrimp. Considering the extensive habitat available, populations of Riverside fairy shrimp in this region were likely robust and formed the core population between the Cruzan Mesa and Carlsberg Ranch pools (Unit 1), at the northern end of the range of the species, and the pool groups in central and southern Orange County. Conservation of the area west of Pershing Drive is necessary for the recovery of an isolated, formerly robust population that may have genetic characteristics important to the overall long-term conservation of the species.

In Orange County, this critical habitat unit includes the vernal pools and vernal pool-like ephemeral ponds and essential watershed lands at the Marine Corps Air Station El Toro, Chiquita Ridge, Tijeras Creek, Viejo parcel, Saddleback Meadows, and along the southern Orange County foothills. These vernal pool habitats are the last remaining vernal pools in Orange County known to support this species (58 FR 41384). The Orange County vernal pool habitat and essential associated watershed represent the vast majority of Riverside fairy shrimp habitat within this critical habitat unit. In addition, the Orange County pools represent a remnant complex of pools and vernal pool habitat unique to the Riverside fairy shrimp in southern Orange County. The Riverside fairy shrimp habitat in Orange County is geographically distinct from other pools within the species' range and is essential to the overall long-term conservation of the species. Therefore, as indicated in the Recovery Plan for the Vernal Pools of Southern California (Service 1998), the conservation of these vernal pools and their associated watersheds is essential to reduce the risk of extinction through random and natural events to Riverside fairy shrimp populations in Orange County and throughout its current range.

Map Unit 3: Western Riverside County Critical Habitat Unit, Riverside County, California (1,762 Ha (4,355 Ac))

The western Riverside County critical habitat unit includes the vernal pool basins and associated essential watersheds on the Santa Rosa Plateau and in Murrieta. These vernal pools and pool complexes represent the eastern limit of occupied Riverside fairy shrimp habitat, unique vernal pool habitat, and may have genetic characteristics important to the overall long-term conservation of the species (i.e., they may be genetically different from more centrally located populations) (Lesica and Allendorf 1995). Pools within this unit also support the federally endangered California Orcutt grass (*Orcuttia californica*) and vernal pool fairy shrimp (*Branchinecta lynchi*). These pools and their associated watersheds are essential for the conservation and recovery of the Riverside fairy shrimp as indicated in the Recovery Plan (Service 1998). This unit includes two of the five remaining populations of Riverside fairy shrimp in Riverside County. A third population, Skunk Hollow, is protected as part of an approved mitigation bank that is within the Rancho Bella Vista HCP area and as part of the conservation measures contained in the Assessment District 161 Subregional HCP. Of the remaining two vernal complexes containing Riverside fairy shrimp, one complex consists of a series of stock ponds in which the Riverside fairy shrimp was discovered after the publication of the proposed critical habitat designation. The other complex, which includes a basin (one of a series) adjacent to Lake Elsinore in which the Riverside fairy shrimp was found, was not identified as essential in the Recovery Plan and was, therefore, not included in this critical habitat designation.

Map Unit 4: North San Diego County Critical Habitat Unit, San Diego County, California (372 Ha (920 Ac))

The north San Diego County critical habitat unit includes essential vernal pool habitat and associated watersheds at Marine Corps Base Camp Pendleton and one pool complex within the City of Carlsbad. This unit encompasses approximately 312 ha (770 ac) in non-training areas within Camp Pendleton. These include pool complexes and lands within the associated watersheds in the Wire Mountain Housing Area, within the Cockleburr Sensitive Area, and lands leased to the State of California and included within San Onofre State Park. The Recovery Plan (Service 1998) includes these pool complexes and their watersheds within the San Diego North Coastal Mesas Management Areas. This critical habitat unit is included in the designation because the vernal pool habitat and associated watersheds on Marine Corps Base Camp Pendleton represent one of the largest populations of the Riverside fairy shrimp and vernal pool habitat in southern California. These parcels of land are being designated as critical habitat because they represent unique vernal pool habitat and are essential to the long-term conservation of the Riverside fairy shrimp as identified in the Recovery Plan (Service 1998).

Within the jurisdiction of the City of Carlsbad, one vernal pool complex is located at the Poinsettia Lane train station. This complex and its watershed are associated with a remnant parcel of coastal terrace habitat. These lands contain unique vernal pool habitat and are essential to the conservation of the Riverside fairy shrimp in northern San Diego County, as indicated in the Recovery Plan (Service 1998).

Map Unit 5: South San Diego County Critical Habitat Unit, San Diego County, California (63 Ha (155 Ac))

In the proposed rule (65 FR 57136), we had six units and this unit was known as unit 6. However, we deleted proposed unit 5 (Marine Corps Air Station, Miramar) from the final rule, so this unit has changed from unit 6 to unit 5.

The South San Diego County critical habitat unit is composed of private and Federal lands and includes the ephemeral basin and its associated watershed along the United States-Mexico border. This ephemeral basin is on Federal lands (Immigration and Naturalization Service (INS)) and represents the southern limit of occupied habitat for the Riverside fairy shrimp in the United States. This basin is identified in the Recovery Plan (Service 1998) as necessary for the conservation of the Riverside fairy shrimp in southern San Diego County by providing the remnant vernal pool habitat unique to this species. The protection provided through the designation of critical habitat will assist in the recovery efforts identified in the Recovery Plan.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out do not destroy or adversely modify critical habitat to the extent that the action appreciably diminishes the value of the critical habitat for the survival and recovery of the species. Individuals, organizations, States, local governments, and other non-Federal entities are affected by the designation of critical habitat only if their actions occur on Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding.

Section 7(a) of the Act requires Federal agencies, including the Service, to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is designated or proposed. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the action agency in eliminating conflicts that may be caused by the proposed action. The conservation recommendations in a conference report are advisory. We may issue a formal conference report, if requested by the Federal action agency. Formal conference reports include an opinion that is prepared according to 50 CFR 402.14, as if the species was listed or critical habitat designated. We may adopt the formal conference report as the biological opinion when the species is listed or critical habitat designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)).

If a species is listed or critical habitat is designated, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Through this consultation, we would ensure that the permitted actions do not destroy or adversely modify critical habitat.

When we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. ''Reasonable and prudent alternatives'' are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be

implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid the destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where critical habitat is subsequently designated, and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request reinitiation of consultation or conference with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat.

Activities on Federal lands that may affect the Riverside fairy shrimp or its critical habitat will require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers (Corps of Engineers) under section 404 of the Clean Water Act (CWA), a section 10(a)(1)(B) permit from the Service, or some other Federal action, including funding (e.g., Federal Highway Administration, Federal Aviation Administration, or Federal Emergency Management Agency), will also continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat and actions on non-Federal lands that are not federally funded, authorized, or permitted do not require section 7 consultation.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation. Activities that destroy or adversely modify critical habitat include those that appreciably reduce the value of critical habitat for both the survival and recovery of the Riverside fairy shrimp. We note that such activities may also jeopardize the continued existence of the species.

To properly portray the effects of critical habitat designation, we must first compare the section 7 requirements for actions that may affect critical habitat with the requirements for actions that may affect a listed species. Section 7 prohibits actions funded, authorized, or carried out by Federal agencies from jeopardizing the continued existence of a listed species or destroying or adversely modifying the listed species' critical habitat. Actions likely to ''jeopardize the continued existence'' of a species are those that would appreciably reduce the likelihood of the species' survival and recovery, and actions likely to ''destroy or adversely modify'' critical habitat are those that would appreciably reduce the value of critical habitat for the survival and recovery of the listed species.

Common to both definitions is an appreciable detrimental effect on both survival and recovery of a listed species. Given the similarity of these definitions, actions likely to destroy or adversely modify critical habitat would almost always result in jeopardy to the species concerned, particularly when the area of the proposed action is occupied by the species concerned. Therefore, designation of critical habitat in areas occupied by the Riverside fairy shrimp is not likely to result in a regulatory burden above that already in place due to the presence of the listed species.

Federal agencies already consult with us on activities in areas occupied by the species to ensure that their actions do not jeopardize the continued existence of the species. These actions include, but are not limited to:

(1) Any activity, including the regulation of activities by the Corps of Engineers under section 404 of the CWA or activities carried out by or licensed by the U.S. Environmental Protection Agency, that could alter the watershed, water quality or quantity to an extent that water quality becomes unsuitable to support Riverside fairy shrimp, or any activity that significantly affects the natural hydrologic function of the vernal pool system and/or ephemeral pond or depression;

(2) Road construction and maintenance, right-of-way designation, and regulation of agricultural activities, or any activity funded or carried out by the Department of Transportation or Department of Agriculture that results in discharge of dredged or fill material, excavation, or mechanized land clearing of ephemeral and/or vernal pool basins;

(3) Regulation of airport improvement or maintenance activities by the Federal Aviation Administration;

(4) Military training and maneuvers on Camp Pendleton and Miramar, and other applicable Department of Defense (DOD) lands;

(5) Construction of roads and fences along the international border with Mexico, and associated immigration enforcement activities by the INS; and

(6) Licensing of construction of communication sites by the Federal Communications Commission.

Any of the above activities that appreciably diminish the value of critical habitat to the degree that they affect the survival and recovery of the Riverside fairy shrimp may be considered an adverse modification of critical habitat. We note that such activities may also jeopardize the continued existence of the species.

All lands designated as critical habitat are within the current geographic range of the Riverside fairy shrimp, and are occupied by the species, and/or are likely to be used by the species, whether for foraging, breeding, growth of larvae, dispersal, migration, genetic exchange, and sheltering, with the exception of the lands within Unit 2. Lands within Unit 2 are not currently known to be occupied by the Riverside fairy shrimp. Federal agencies already consult with us on activities in areas currently occupied by the species, or if the species or vernal pool habitat may be affected by the action, to ensure that their actions do not jeopardize the continued existence of the species. Thus, we do not anticipate significant additional regulatory protection or burden will result from this critical habitat designation.

If you have questions regarding whether specific activities will constitute adverse modification of critical habitat, contact the Field Supervisor, Carlsbad Fish and Wildlife Office (see **ADDRESSES** section). Requests for copies of the regulations on listed wildlife, and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Branch of Endangered Species, 911 NE. 11th Ave, Portland, OR 97232 (telephone 503/231–2063; facsimile 503/231–6243).

Relationship of Critical Habitat to Military Lands

Exclusions Under Section 3(5)(A)

The Sikes Act Improvement Act of 1997 (Sikes Act) requires each military installation that includes land and water suitable for the conservation and management of natural resources to complete, by November 17, 2001, an Integrated Natural Resources Management Plan (INRMP). An INRMP integrates implementation of the military mission of the installation with

stewardship of the natural resources found there. Each INRMP includes an assessment of the ecological needs on the installation, including needs to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. We consult with the military on the development and implementation of INRMPs for installations with listed species. We believe that habitat on bases that have completed and approved INRMPs that address the needs of the species generally do not meet the definition of critical habitat discussed above, as they require no additional special management or protection.

Therefore, we do not include these areas in critical habitat designations if they meet the following three criteria: (1) A current INRMP must be complete and provide sufficient conservation benefit to the species, (2) the plan must provide assurances that the conservation management strategies will be implemented, and (3) the plan must provide assurances that the conservation management strategies will be effective, by providing for periodic monitoring and revisions as necessary. If all of these criteria are met, then the lands covered under the plan would not meet the definition of critical habitat.

We evaluated INRMPs for DOD land that was within the proposed critical habitat to determine whether any INRMPs met the special management criteria. To date, Miramar is the only DOD installation that has completed a final INRMP that provides for sufficient conservation management and protection for vernal pools and the Riverside fairy shrimp. We reviewed this plan and determined that it addresses and meets the three criteria. Therefore, lands on Miramar (proposed Critical Habitat Unit 5) do not meet the definition of critical habitat, and they have not been included in this final designation of critical habitat for the Riverside fairy shrimp.

Exclusions Under Section 4(b)(2)

Subsection 4(b)(2) of the Act allows us to exclude areas from critical habitat designation where the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. We have considered whether it is appropriate to exclude any DOD lands under section 4(b)(2).

In contrast to Miramar, Camp Pendleton has not yet completed their INRMP. Camp Pendleton has several substantial vernal pool complexes that support the Riverside fairy shrimp and are essential to the conservation of the species. In light of these factors, we proposed 2,295 ha (5,670 ac) on Camp Pendleton as critical habitat for the Riverside fairy shrimp.

The INRMP for Camp Pendleton will be completed by the statutory deadline of November 17, 2001. We will consult with the Marines under section 7 of the Act on the development and implementation of the INRMP. We fully expect that, once the INRMP is completed and approved, areas of Camp Pendleton included in the proposed critical habitat designation will not meet the definition of critical habitat, as they will require no additional special management or protection.

To date, as the INRMP for Camp Pendleton has not yet been completed and approved, these lands meet the definition of critical habitat. Nevertheless, we have determined that it is appropriate to exclude training areas on Camp Pendleton from this critical habitat designation under section 4(b)(2). The main benefit of this exclusion is ensuring that the mission-critical military training activities can continue without interruption at Camp Pendleton while the INRMP is being completed. On March 30, 2000, at the request of the Marines, we initiated formal consultation with Camp Pendleton on their upland activities. These activities include military training, maintenance, fire management, real estate, and recreation programs. Upon completion, this consultation will address the 93 percent of that base not included in our 1995 opinion concerning their programmatic conservation plan for riparian and estuarine/beach ecosystems (Service 1995). Because of the immense complexity of dealing with a multitude of hard-to-define upland activities and numerous federally listed plants and animals, the consultation has been extended and is on-going.

The proposed critical habitat designation included about 2,295 ha (5,670 ac), or about 10 percent of the base. If critical habitat is designated within the training areas on Camp Pendleton for the Riverside fairy shrimp, the Marines believe they would be compelled to significantly curtail necessary training within the area designated as critical habitat, to the detriment of mission-critical training capability, until the consultation is concluded. As a result, the Camp Pendleton's utility as a Marine training site could be limited.

In contrast, the benefits of designating critical habitat within the training areas on Camp Pendleton now are small. The primary benefit of designation is the prohibition on destruction or adverse modification of critical habitat under section 7 of the Act. However, we believe that section 7 consultation on any proposed action on Camp Pendleton that would result in an adverse modification conclusion would also result in a jeopardy conclusion, and we are now engaged in formal consultation with the Marines on their activities in vernal pool habitat on the base. In addition, the Marines have a statutory obligation under the Sikes Act to complete an INRMP for Camp Pendleton. As noted above, we expect that, when completed and adopted, this INRMP will provide equal or greater protection to Riverside fairy shrimp habitat on Camp Pendleton than a critical habitat designation.

We conclude that the benefits of excluding training areas on Camp Pendleton exceed the benefits of including them in the critical habitat designation. Further, we have determined that excluding the training areas will not result in the extinction of the Riverside fairy shrimp, as sufficient vernal pools remain within the final critical habitat designation, and sections 7(a)(2) and 9 of the Act still apply to the activities affecting Riverside fairy shrimp on Camp Pendleton. This exclusion does not apply to the vernal pool complexes in the Wire Mountain Housing Area, within the Cockleburr Sensitive Area, and lands leased to the State of California and included within San Onofre State Park. Because these lands are used minimally, if at all, by the Marines for training, the 312 ha (770 ac) of lands proposed on Camp Pendleton and within the San Onofre State Park are retained in the final designation.

Relationship of Critical Habitat to Habitat Conservation Plans

Subsection 4(b)(2) of the Act allows us to exclude areas from critical habitat designation where the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. For the following reasons, we believe that in most instances the benefits of excluding legally operative HCPs, for which the Riverside fairy shrimp is a covered species and take has been authorized, will outweigh the benefits of including them.

(1) Benefits of Inclusion

The benefits of including HCP lands in critical habitat are normally small. The principal benefit of any designated critical habitat is that activities in such

habitat that may affect it require consultation under section 7 of the Act. Such consultation would ensure that adequate protection is provided to avoid adverse modification of critical habitat. Where HCPs are in place, our experience indicates that this benefit is small or non-existent. Currently approved and permitted HCPs are already designed to ensure the long-term survival of covered species within the plan area. Where we have an approved HCP, lands that we ordinarily would define as critical habitat for covered species will normally be protected in reserves and other conservation lands by the terms of the HCPs and their Implementing Agreements. These HCPs and Implementing Agreements include management measures and protections for conservation lands designed to protect, restore, and enhance their value as habitat for covered species.

In addition, an HCP application must itself be consulted upon. While this consultation will not look specifically at the issue of adverse modification of critical habitat, unless critical habitat has already been designated within the proposed plan area, it will look at the very similar concept of jeopardy to the listed species in the plan area. Because HCPs, particularly large regional HCPs, address land use within the plan boundaries, habitat issues within the plan boundaries will have been thoroughly addressed in the HCP and through the consultation on the HCP. Our experience is also that, under most circumstances, consultations under the jeopardy standard will reach the same result as consultations under the adverse modification standard. Implementing regulations (50 CFR Part 402) define ''jeopardize the continued existence of'' and ''destruction or adverse modification of'' in virtually identical terms. Jeopardize the continued existence of means to engage in an action ''that reasonably would be expected * * * to reduce appreciably the likelihood of both the survival and recovery of a listed species.'' Destruction or adverse modification means an ''alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.'' Common to both definitions is an appreciable detrimental effect on both survival and recovery of a listed species, in the case of critical habitat, by reducing the value of the habitat so designated. Thus, actions satisfying the standard for adverse modification are nearly always found to also jeopardize the species concerned, and the existence of a critical habitat designation does not materially affect the outcome of consultation. Additional measures to protect the habitat from adverse modification are not likely to be required.

Further, HCPs typically provide for greater conservation benefits to a covered species than section 7 consultations because HCPs assure the long-term protection and management of a covered species and its habitat, and funding for such management through the standards found in the 5-Point Policy for HCPs (64 FR 35242) and the HCP No Surprises regulation (63 FR 8859). Such assurances are typically not provided by section 7 consultations which, in contrast to HCPs, often do not commit the project proponent to long-term special management or protections. Thus, a consultation typically does not accord the lands it covers the extensive benefits an HCP provides.

The development and implementation of HCPs provide other important conservation benefits, including the development of biological information to guide conservation efforts and assist in species recovery, and the creation of innovative solutions to conserve species while allowing for development. The education benefits of critical habitat, including informing the public of areas that are important for long-term survival and conservation of the species, are essentially the same as those that would occur from the public notice and comment procedures required to establish an HCP, as well as the public participation that occurs in the development of many regional HCPs. For these reasons, then, we believe, that designation of critical habitat has little benefit in areas covered by HCPs.

(2) Benefits of Exclusion

The benefits of excluding HCPs from being designated as critical habitat may be more significant. They include relieving landowners, communities, and counties of any additional minor regulatory review that might be imposed by critical habitat. Many HCPs, particularly large regional HCPs, take many years to develop and, upon completion, become regional conservation plans that are consistent with the recovery of covered species. Most regional plans benefit many species, both listed and unlisted. Imposing an additional regulatory review after HCP completion could be viewed as a disincentive to those developing HCPs. Excluding HCPs provides us with an opportunity to streamline regulatory compliance for HCP participants.

A related benefit of excluding HCPs is that it would encourage the continued development of partnerships with HCP participants, including States, local governments, conservation organizations, and private landowners, that together can implement conservation actions we would be unable to accomplish alone. By excluding areas covered by HCPs from critical habitat designation, we preserve these partnerships and, we believe, set the stage for more effective conservation actions in the future.

In general, then, we believe the benefits of critical habitat designation to be small in areas covered by approved HCPs, and the benefits of excluding HCPs from designation to be significant. Weighing the small benefits of inclusion against the benefits of exclusion, including the benefits of relieving property owners of an additional layer of approvals and regulation, together with the encouragement of conservation partnerships, would generally result in approved HCPs being excluded from critical habitat designation under section 4(b)(2) of the Act.

Not all HCPs are alike with regard to species coverage and design. Within this general analytical framework, we need to evaluate completed and legally operative HCPs in which the Riverside fairy shrimp is a covered species on a case-by-case basis to determine whether the benefits of excluding these particular areas outweigh the benefits of including them.

Section 4(b)(2) Evaluation of Specific HCPs

We expect that critical habitat may be used as a tool to identify those areas essential for the conservation of the species, and we will encourage development of HCPs for such areas on non-Federal lands. Habitat conservation plans currently under development are intended to provide for protection and management of habitat areas essential for the conservation of the Riverside fairy shrimp, while directing development and habitat modification to nonessential areas of lower habitat value.

Only HCPs within the boundaries of the proposed critical habitat units are discussed herein. Those approved and legally operative HCPs that provide coverage and incidental take approval for the Riverside fairy shrimp have been excluded from this designation.

A number of habitat planning efforts have been completed within the range of the Riverside fairy shrimp. Principal among these are the San Diego Multiple Species Conservation Program (MSCP) in San Diego County, the Rancho Bella Vista HCP, and the Assessment District 161 Subregional HCP in Riverside

County. The MSCP, through its subarea plans, provides conservation measures for the Riverside fairy shrimp as a covered species, although authorization for take, should any be needed, would come from a subsequent permitting process (typically through a section 7 consultation with the Corps of Engineers). The MSCP provides that the remaining Riverside fairy shrimp habitat within the Multiple Habitat Planning Area (MHPA) should be avoided to the maximum extent practicable. Unavoidable impacts to this remaining area of habitat are to be minimized and mitigated to achieve no net loss of wetland function and value, and to provide additional protective measures, including adaptive management, contained in the MSCP.

The Rancho Bella Vista HCP planning area includes a reserve established as a mitigation bank for the vernal pool that contains the Riverside fairy shrimp (Skunk Hollow), and the HCP includes the Riverside fairy shrimp as a covered species. The mitigation bank agreement, as confirmed in the HCP, provides management for the pool and watershed in perpetuity. The Riverside fairy shrimp is also a covered species under Assessment District 161 Subregional HCP, and this HCP provides for the protection and conservation of the remainder of Skunk Hollow's watershed.

Consequently, we find that the benefits of excluding lands covered by these HCPs would be significant in preserving positive relationships with our conservation partners, lessening potential additional regulatory review and potential economic burdens, reinforcing the regulatory assurances provided for in the implementing agreements for the approved HCPs, and providing for more established and cooperative partnerships for future conservation efforts.

In summary, the benefits of including these approved HCPs in critical habitat for the Riverside fairy shrimp include increased educational benefits and minor additional management protections and measures. The benefits of excluding these HCPs from designated critical habitat for the Riverside fairy shrimp include additional conservation measures for this and other listed species, preservation of partnerships that may lead to future conservation, and the avoidance of the minor regulatory and economic burdens associated with the designation of critical habitat. Therefore, we believe the benefits of exclusion outweigh the benefits of including these areas. Furthermore, we have determined that these exclusions will not result in the extinction of the species. We have already completed section 7 consultation on the impacts of these HCPs on the species. We determined that the approved HCPs will not jeopardize the continued existence of the Riverside fairy shrimp, which means that they will not appreciably reduce the likelihood of the survival and recovery of the species.

We have not excluded the NCCP/HCP for the Central/Coastal Orange County subregion. This plan provides only conditional coverage for the Riverside fairy shrimp. Riverside fairy shrimp in vernal pool habitats that are highly degraded and/or artificially created are a covered species and take is authorized under the HCP. However, Riverside fairy shrimp in non-degraded, natural vernal pool habitats are not considered covered species under the HCP, and take, should any be needed, can be authorized only under a separate permitting process (typically through a section 7 consultation with the Corps of Engineers). Because the natural vernal pools within the Central/Coastal Orange County subregion that are considered to be high-quality habitat for the Riverside fairy shrimp are not covered by the current HCP, the benefits from designating this area as critical habitat are not outweighed by the benefits provided by the HCP. Therefore, we are including the natural vernal pools at the Viejo parcel, Tijeras Creek, and Marine Corps Air Station El Toro in this final critical habitat designation.

HCPs currently under development are intended to provide for the protection and management of habitat areas essential for the conservation of the Riverside fairy shrimp, while directing development and habitat modification to areas of lower habitat value. The HCP development process provides an opportunity for more intensive data collection and analysis regarding the use of particular habitat areas by the Riverside fairy shrimp. The process also enables us to conduct detailed evaluations of the importance of such lands to the long-term survival of the species in the context of constructing a biologically configured system of interlinked habitat blocks. We fully expect that HCPs undertaken by local jurisdictions (e.g., counties, cities) and other parties will identify, protect, and provide appropriate management for those specific lands within the boundaries of the plans that are essential for the long-term conservation of the species. We believe and fully expect that our analyses of these proposed HCPs and proposed permits under section 7 will show that covered activities carried out in accordance with the provisions of the HCPs and biological opinions will not result in destruction or adverse modification of critical habitat.

We will provide technical assistance and work closely with applicants throughout the development of future HCPs to identify lands essential for the long-term conservation of the Riverside fairy shrimp, and appropriate conservation management actions. Several HCP efforts are now under way that address listed and nonlisted species in areas within the range of the Riverside fairy shrimp that we are designating as critical habitat. The take minimization and mitigation measures provided under these HCPs are expected to protect the essential habitat in this rule and provide for the conservation of the covered species. Furthermore, we will complete intra-service consultation on our issuance of section 10(a)(1)(B) permits for these HCPs to ensure permit issuance will not destroy or adversely modify critical habitat. If an HCP that includes the Riverside fairy shrimp is ultimately approved, we will reassess the critical habitat boundaries in light of the HCP. We will seek to undertake this review when the HCP is approved, but funding constraints may influence the timing of such a review.

Should additional information become available that changes our assessment of the benefits of excluding any of these (or other) areas compared to the benefits of including them in the critical habitat designation, we may revise the designation accordingly. Similarly, if new information indicates any of these areas should not be included in the designated critical habitat because they no longer meet the definition of critical habitat, we may revise this final rule. If, consistent with available funding and program priorities, we elect to revise this designation, we will do so through a subsequent rulemaking.

Summary of Comments and Recommendations

In the September 21, 2000, proposed rule (65 FR 57136), we requested all interested parties to submit comments on the specifics of the proposal including information, policy, treatment of HCPs, and proposed critical habitat boundaries as provided in the proposed rule. The first comment period closed on November 20, 2000. The comment period was reopened from February 28, 2001, to March 30, 2001 (66 FR 12754), to allow for additional comments on the proposed rule, and comments on the draft economic analysis of the proposed critical habitat. We accepted comments received from September 21, 2000, to

March 30, 2001, and entered them into the administrative record for the rule.

We contacted all appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment. In addition, we invited public comment through the publication of notices in the following newspapers in southern California: San Diego Union Tribune and Riverside Press Enterprise on September 25, 2000, and the Los Angeles Times on September 28, 2000. There were no requests for a public hearing.

We requested four biologists, who have familiarity with the Riverside fairy shrimp and the conservation of vernal pools, to peer review the proposed critical habitat designation. Two of the peer reviewers submitted comments on the proposed critical habitat designation, providing updated biological information, critical review, and editorial comments, and two did not respond.

We received a total of 632 written comments during the two comment periods. Comments were received from 1 Federal agency, 2 local agencies, and 617 private organizations or individuals. We reviewed all comments received for substantive issues and new information regarding critical habitat and the Riverside fairy shrimp. Of the 632 comments we received, 621 commenters supported the designation of critical habitat for the Riverside fairy shrimp, 7 were opposed to it, and 4 provided information or declined to oppose or support the designation. Similar comments were grouped into four general issues relating specifically to the proposed critical habitat determination and draft economic analysis on the proposed determination. These are addressed in the following summary.

Issue 1: Biological Justification and Methodology

(1) *Comment:* The scale of the proposed critical habitat is overly broad, resulting in vague unit boundaries. Several commenters questioned the biological justification for proposing critical habitat for the Riverside fairy shrimp using such a landscape-scale approach when more precise information is available for use by the Service. Also, some commenters voiced concern that their property was within proposed critical habitat boundaries even though the land contained no Riverside fairy shrimp or primary constituent elements.

Our Response: We are required to describe critical habitat (50 CFR 424.12(c)) with specific limits using reference points and lines as found on standard topographic maps of the area.

We recognize that not all parcels of land designated as critical habitat will contain the habitat components essential to the conservation of the Riverside fairy shrimp. Due to the time constraints imposed by the court, and the absence of detailed map information during the preparation of the proposed determination, we used a 250-m (0.16-mi) UTM grid to delineate the critical habitat boundaries. Due to the mapping scale, some areas not essential to the conservation of the Riverside fairy shrimp were included within the boundaries of proposed critical habitat, such as towns, housing developments, or other developed lands unlikely to provide habitat for the Riverside fairy shrimp. Because these areas do not contain one or more of the primary constituent elements for the species, Federal actions limited to those areas will not trigger a section 7 consultation, unless they affect the species and/or primary constituent elements in adjacent critical habitat.

(2) *Comment:* The proposal does not provide adequate notice of location of critical habitat units to impacted landowners as per the 1978 amendments to the Act, causing a burden to landowners who must determine which portions of their land contain critical habitat.

Our Response: We identified specific areas in the proposed determination that are referenced by UTM coordinates, which are found on standard topographic maps. We also made available, during the public comment period at the Carlsbad Fish and Wildlife Office, a public viewing room where the proposed critical habitat units, superimposed on 7.5 minute topographic maps, could be inspected. Furthermore, we distributed geographic data and maps of the proposed critical habitat to all 34 individuals, organizations, local jurisdictions and State and Federal agencies that requested them. We believe the information made available to the public was sufficiently detailed to allow for determination of critical habitat boundaries. This final rule contains the legal descriptions of areas designated as critical habitat required under 50 CFR 424.12(c). The accompanying maps are for illustration purposes only. If additional clarification is necessary, contact the Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

(3) *Comment:* The descriptions of the primary constituent elements of critical habitat for the Riverside fairy shrimp are vague.

Our Response: The description of the primary constituent elements for the Riverside fairy shrimp is based on the best available scientific and commercial data regarding the species, including a compilation of data from peer-reviewed published literature, unpublished or non-peer-reviewed survey or research reports, and biologists knowledgeable about the Riverside fairy shrimp and its habitat. The primary constituent elements, as described, represent our best estimate of what habitat components are essential for the conservation of the species.

(4) *Comment:* The proposed rule inappropriately uses a ''recovery standard'' to determine critical habitat, resulting in the inclusion of large areas in which the Riverside fairy shrimp is not known to occur or have occurred. The Service ignores the intent of Congress to designate only occupied areas and those areas essential to a species' conservation, and the Service has failed to determine if these unoccupied areas are essential to the Riverside fairy shrimp.

Our Response: The definition of critical habitat in section 3(5)(A) of the Act includes ''(i) specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.'' The term ''conservation,'' as defined in section 3(3) of the Act, means ''to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary'' (*i.e.,* the species is recovered and removed from the List of Endangered and Threatened Species).

In proposing critical habitat for the Riverside fairy shrimp, we identified those areas that are essential to the conservation of this species. The areas we proposed to designate as critical habitat provide all of those habitat components essential for the Riverside fairy shrimp as described in the Recovery Plan (Service 1998). We did not include all areas currently occupied by the Riverside fairy shrimp, but designated those areas that possess large populations, have unique ecological characteristics, and/or represent the historic geographic areas where the

Riverside fairy shrimp can be re-established.

The Recovery Plan (Service 1998) detailed the efforts required to meet the recovery needs of the Riverside fairy shrimp, and provides a description of habitat attributes that are essential to the survival and recovery of the species. After weighing the best available information, including the Recovery Plan, we conclude that the areas designated by this final rule, including areas that were not known to be occupied at the time the species was listed, are essential for the recovery of the species and subsequent removal from the List of Endangered and Threatened Species.

(5) *Comment:* The lands that are being proposed as critical habitat for the Riverside fairy shrimp represent a gross, unsubstantiated increase from the amount of habitat that was described in the final listing rule as being available for this species. In addition, the increase in number of known populations of Riverside fairy shrimp since listing indicates that designation of critical habitat may be unnecessary or unwarranted.

Our Response: In the August 3, 1993, final listing rule for the Riverside fairy shrimp (58 FR 41384), we stated that there were four occupied pools near Temecula in Riverside County, encompassing 96 km^2 (37 mi^2) (approximately 9,713 ha (24,000 ac)), one population in Orange County (area not quantified), an unspecified number of occupied vernal pools at (then) Naval Air Station (NAS) Miramar and Otay Mesa in San Diego County, and two locations in Baja California, Mexico.

Since the listing of this species, scientific and commercial studies on the distribution, life history, and ecology of the Riverside fairy shrimp have been conducted and a recovery plan covering the species published. We now recognize that conservation of the Riverside fairy shrimp depends not only on specific vernal pools, but also on vernal pool complexes, the watersheds immediately surrounding them, and the hydrological processes associated with those watersheds.

Further, the known geographic range of the species has been expanded based on the identification of previously undocumented Riverside fairy shrimp populations in Los Angeles, Orange, Riverside, San Diego, and Ventura counties. Many of these previously undocumented occurrences consist of small, isolated pools varying in condition from highly degraded to high quality. Large complexes of vernal pools containing Riverside fairy shrimp were also discovered on Camp Pendleton. These complexes, many of which are interconnected, contain the highest concentration of Riverside fairy shrimp within the species' range, with the pools and adjoining watersheds encompassing approximately 2,295 ha (5,670 ac).

The proposed determination of critical habitat for the Riverside fairy shrimp (65 FR 57136) identified approximately 4,880 ha (12,060 ac) of vernal pools and their adjacent watersheds essential to the conservation of the species that was proposed as critical habitat. This value is less than half of the lands identified as being occupied in Riverside County in the final listing rule. This final determination designates 2,790 ha (6,870 ac) as critical habitat.

Even though additional populations of the Riverside fairy shrimp have been discovered in the time since the species was listed, the factors that contributed to the decline of the species and its subsequent listing as federally endangered are still affecting vernal pool habitat and the species. Because these factors continue to affect the Riverside fairy shrimp and its habitat, the species still warrants protection under the Act, including the designation of lands essential to its conservation as critical habitat.

(6) *Comment:* No scientific data were provided to indicate how the Service determined the extent of watersheds or the hydrological processes that comprise critical habitat.

Our Response: As described in the section titled ''Criteria Used to Identify Critical Habitat,'' above, we compiled data on known Riverside fairy shrimp locations and those vernal pools and vernal pool complexes that were identified in the Recovery Plan as essential for the stabilization and recovery of the species. Second, we evaluated the hydrology, watershed, and topographic features of the surrounding areas to identify the drainages, or watersheds feeding the pools using our GIS system. Third, based on this evaluation, a 250-m (0.16-mi) UTM grid was overlaid on top of those vernal pool complexes and their associated watersheds using GIS to describe the unit boundaries more precisely. Each unit of the grid was evaluated to determine whether it was appropriately included as critical habitat. The critical habitat units designated using this technique encompassed individual vernal pool basins or vernal pool complexes to ensure that watersheds and hydrologic processes were captured and maintained for this species. Where occupied vernal pools were not specifically mapped in the Recovery Plan (Service 1998), we relied on recent scientific data to update the map coverage.

Issue 2: Policy and Regulations

(7) *Comment:* In response to the Service's request that the public comment on critical habitat designation relative to currently approved and future HCPs, many commenters stated that critical habitat should be retained within the boundaries of approved HCPs. They felt that HCPs cannot be viewed as a functional substitute for critical habitat designation, and the approved HCPs provided inadequate protection and special management considerations for the species and their habitat. Other commenters supported the exclusion of approved HCPs from critical habitat designation, and several of these same commenters wanted pending HCPs to be excluded as well. They supported their recommendations by asserting that landowners will be reluctant to participate in HCPs unless they have incentives, including the removal of critical habitat from HCP boundaries.

Our Response: We recognize that critical habitat is only one of many conservation tools for federally listed species. HCPs are one of the most important tools for reconciling land use with the conservation of listed species on non-Federal lands. Section 4(b)(2) of the Act allows us to exclude from critical habitat designation areas where the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. We believe that in most instances the benefits of excluding HCPs from critical habitat designations will outweigh the benefits of including them. For this designation, we find that the benefits of exclusion outweigh the benefits of designation for all approved and legally operative HCPs in which the Riverside fairy shrimp is a covered species and the plan provides for its long-term conservation. These include the San Diego MSCP in San Diego County and the Rancho Bella Vista HCP and Assessment District 161 Subregional HCP in Riverside County.

We anticipate that future HCPs in the range of the Riverside fairy shrimp will include it as a covered species and provide for its long-term conservation. We expect that HCPs undertaken by local jurisdictions (e.g., counties and cities) and other parties will identify, protect, and provide appropriate management for those specific lands within the boundaries of the plans that are essential for the long-term conservation of the species. Section 10(a)(1)(B) of the Act states that HCPs must meet issuance criteria, including

minimizing and mitigating any take of the listed species covered by the permit to the maximum extent practicable, and that the taking must not appreciably reduce the likelihood of the survival and recovery of the species in the wild. We fully expect that our future analyses of HCPs and section 10(a)(1)(B) permits under section 7 will show that covered activities carried out in accordance with the provisions of the HCPs and section 10(a)(1)(B) permits will not result in the destruction or adverse modification of critical habitat designated for the Riverside fairy shrimp. The take minimization and mitigation measures provided under these HCPs are expected to adequately protect the essential habitat lands designated as critical habitat in this rule, such that the value of these lands for the survival and recovery of the Riverside fairy shrimp is not appreciably diminished through direct or indirect alterations. If an HCP that addresses the Riverside fairy shrimp as a covered species is ultimately approved, we will reassess the critical habitat boundaries in light of the HCP. We will seek to undertake this review when the HCP is approved, but funding constraints may influence the timing of such a review.

The designation of critical habitat should not deter participation in the NCCP or HCP processes. Approvals issued under these processes include assurances of no additional mitigation through the HCP No Surprises regulation (63 FR 8859). The development of new HCPs or NCCPs should not be affected by designation of critical habitat primarily because we view the standards of jeopardy for listed species and of adverse modification for critical habitat as being virtually identical. We discuss these standards in detail in the ''Section 7 Consultation'' portion of this document.

(8) *Comment:* The Service violated the National Environmental Policy Act of 1969 (NEPA) by failing to prepare an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS).

Our Response: We have determined that we do not need to prepare an Environmental Assessment and/or an Environmental Impact Statement as defined by the National Environmental Policy Act of 1969 in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

(9) *Comment:* The Service violated the Administrative Procedure Act by not making available for public review and comment the scientific data relied on in formulating the proposed rule, and not providing a complete list of references or access to unpublished data despite requests from interested parties.

Our Response: In the proposed rule, we stated that all supporting documentation, such as the references and unpublished data used in the preparation of the proposed rule, would be available for public inspection at the Carlsbad and Ventura Fish and Wildlife Offices. A public viewing room was made available at the Carlsbad Fish and Wildlife Office where the proposed critical habitat units, superimposed on 7.5 minute topographic maps, could be inspected. In addition, we had 34 requests for maps or GIS data and we responded to each request in a timely manner by providing copies of the maps and/or digital data. We believe we provided information pertaining to the proposed critical habitat to all those who requested it.

(10) *Comment:* Comments received from the Marines requested that their lands be excluded from the critical habitat designation because protections and management afforded the Riverside fairy shrimp by Miramar's INRMP, pursuant to the Sikes Act, was sufficient, so the lands on that base did not require special management or protection, and did not meet the definition of critical habitat. In addition, the Marines requested that Camp Pendleton be excluded from critical habitat because of its existing programmatic, habitat-based management efforts, which already ensure long-term conservation of the species. Furthermore, designation of critical habitat would detrimentally impact the Marines' capability to perform military missions. Other commenters felt that: (a) The vernal pools on the bases are essential for the conservation of the species; (b) no evidence exists that training activities on Camp Pendleton would be significantly limited, especially considering the small amount of land within the proposed critical habitat that actually contains primary constituent elements; and (c) Miramar's INRMP is a guidance document only and does not provide the special management or protection for the Riverside fairy shrimp.

Our Response: We agree that INRMPs provide special management for lands such that they no longer meet the definition of critical habitat when the plans meet the following criteria: (1) A current INRMP must be complete and provide conservation benefit to the species; (2) the plan must provide assurances that the conservation management strategies will be implemented; and (3) the conservation management strategies will be effective and provide for periodic monitoring and revisions as necessary.

To date, Miramar is the only DOD installation that has completed a final INRMP that provides for sufficient conservation management and protection for the Riverside fairy shrimp. We have reviewed the plan and have determined that it addresses and meets the three criteria. Therefore, lands on Miramar (proposed Critical Habitat Unit 5) do not meet the definition of critical habitat, and have not been included in this final designation of critical habitat for the Riverside fairy shrimp.

Additionally, we have determined that it is appropriate to exclude training areas on Camp Pendleton from this critical habitat designation under section 4(b)(2) of the Act. We have concluded that the benefits of excluding training areas on Camp Pendleton exceed the benefits of including them in the critical habitat designation. Further, we have determined that excluding the training areas will not result in the extinction of the Riverside fairy shrimp, as sufficient vernal pools remain within the final critical habitat designation and sections 7(a)(2) and 9 of the Act still apply to the activities affecting Riverside fairy shrimp on Camp Pendleton. This exclusion does not apply to vernal pool complexes in the Wire Mountain Housing Area, within the Cockleburr Sensitive Area, and lands leased to the State of California and included within San Onofre State Park. Because these lands are used minimally, if at all, by the Marines for training, the 312 ha (770 ac) of lands proposed on Camp Pendleton and within the San Onofre State Park are retained in the final designation.

Please refer to the Exclusions Under Section 4(b)(2) section of this rule for a more detailed discussion of the exclusion of the training areas on Camp Pendleton from this final critical habitat designation.

(11) *Comment:* A number of commenters requested additional areas be designated as critical habitat, including all vernal pools identified in the Recovery Plan (Service 1998) and other lands, because these areas are needed for the conservation of the Riverside fairy shrimp.

Our Response: The Recovery Plan for the Vernal Pools of Southern California (Service 1998), discusses vernal pool complexes and pools, their distribution, and known occupancy by federally listed species at the time of the plan's publication. Not all vernal pools discussed in the plan are known to be

occupied by the Riverside fairy shrimp, or considered to be essential to the conservation of the Riverside fairy shrimp. Only those vernal pool habitats that are essential to the conservation of Riverside fairy shrimp were included in the critical habitat designation for the Riverside fairy shrimp.

(12) *Comment:* A number of commenters identified specific areas that they thought should not be designated as critical habitat. For example, one commenter does not believe the Moorpark vernal pool is essential to the conservation of the Riverside fairy shrimp because it is 40 km (25 mi) from the nearest population, it is the only population known in Ventura County, and in the proposed rule, there is no connection made between the site and the conservation of the species.

Our Response: Where site-specific information was submitted to us providing a rationale as to why an area should not be designated critical habitat, we evaluated that information in accordance with the definition of critical habitat, pursuant to section 3 of the Act, and made a determination as to whether modifications to the proposal were appropriate. We excluded lands from the final designation that we determined to be nonessential to the conservation of the Riverside fairy shrimp or located within an approved HCP for this species. We included lands in the final designation that we considered essential and which did not have special management sufficient for the species' conservation.

The isolation of the Moorpark vernal pool is not unique. Other than the individual pools in a complex of vernal pools, most vernal pools are isolated from each other by topography and hydrology. This isolation does not diminish the value of individual pools to the conservation of the Riverside fairy shrimp. In fact, and as the commenter notes, the Moorpark vernal pool is at the northwestern edge of the Riverside fairy shrimp distribution. Conservation biologists have demonstrated that populations at the edge of a species' distribution can be important sources of genetic variation and represent the best opportunity for colonization or re-colonization of unoccupied vernal pools and, thus, long-term conservation. These outlying populations may be genetically divergent from populations in the center of the range and, therefore, may have genetic characteristics that would allow adaptation in the face of environmental change. Such characteristics may not be present in other parts of the species' range (Lesica and Allendorf 1995). Considering these factors, the designation of the Moorpark vernal pool as critical habitat for the Riverside fairy shrimp meets the criterion defined in section 3(5)(A)(i) of the Act that critical habitat includes specific areas within the geographic range of the species on which are found the physical and biological features essential to the conservation of the species.

(13) *Comment:* The proposed boundary of critical habitat at the Lennar property is incorrect because it excludes portions of the watershed and includes areas that are outside of the watershed.

Our Response: We reviewed the boundaries of the vernal pool containing the Riverside fairy shrimp and the proposed critical habitat relative to the project/property boundaries submitted to us on behalf of Lennar-Moorpark LLC. The proposed critical habitat unit consists of four 250-m (0.16-mi) UTM grid squares that intersect in the center of the vernal pool. Therefore, any revisions to our mapping of the Unit would result in the removal of portions of the vernal pool and its watershed.

As indicated earlier in this determination, in defining critical habitat boundaries, we made an effort to exclude all developed areas, such as towns or housing developments, or other lands unlikely to contain the primary constituent elements essential for conservation of the Riverside fairy shrimp. Our 250-m (0.16-mi) UTM grid minimum mapping unit was designed to minimize the amount of development along the urban edge included in our designation. However, this minimum mapping unit does not exclude all developed areas, such as buildings, roads, aqueducts, railroads, airports, other paved areas, lawns, and other lands unlikely to contain the primary constituent elements. Federal actions limited to these areas would not trigger a section 7 consultation, unless they affect the species and/or the primary constituent elements in adjacent critical habitat.

(14) *Comment:* The construction of ponds west of Pershing Drive may attract birds, which could result in a wildlife hazard by increasing the threat of aircraft collisions with birds.

Our Response: We are in negotiations with Los Angeles World Airports on restoring vernal pool habitat west of Pershing Drive near Los Angeles International Airport (LAX), and using dormant Riverside fairy shrimp cysts that occur east of Pershing Drive to innoculate the new pools. While we understand the safety concerns regarding birds and aircraft collisions, we do not believe that restoring this vernal pool habitat will increase the amount of wildlife in the area, especially with the close proximity of the proposed vernal pools and LAX to the Pacific Ocean.

Issue 3: Economic Issues

(15) *Comment:* The Service did not provide for adequate public notice of the proposed rule and sufficient opportunity for public comment. Additionally, the proposed rule was not accompanied by an economic analysis as required by law.

Our Response: We published the proposed rule to designate critical habitat for the Riverside fairy shrimp on September 21, 2000 (65 FR 57136), and accepted comments from the public for 60 days, until November 20, 2000. We contacted all appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment on the proposed rule. In addition, we invited public comment through the publication of notices in the San Diego Union Tribune and Riverside Press Enterprise on September 25, 2000, and the Los Angeles Times on September 28, 2000. We published a notice in the **Federal Register** on February 28, 2001 (66 FR 12754), announcing the availability of the draft economic analysis and opening a public comment period from February 28, 2001, to March 30, 2001, to allow for comments on the draft economic analysis and additional comments on the proposed determination itself. We provided notification of the draft economic analysis through telephone calls, letters, and news releases faxed and/or mailed to affected elected officials, local jurisdictions, and interest groups. We also published the draft economic analysis and associated material on our Fish and Wildlife Office internet site following the draft's release on February 28, 2001. Because of the court-ordered time frame, we were not able to extend the second comment period or open an additional public comment period.

(16) *Comment:* Within the proposed rule, there are assumptions that the rule is not expected to result in any restrictions in addition to those currently in place.

Our Response: In the proposed rule and draft economic analysis, we indicated that we did not expect that the designation of critical habitat would provide significant additional regulatory or economic burdens or restrictions incremental to those afforded the species pursuant to the Act. This assertion is based on the regulatory protections afforded vernal pools and the federally listed species that occur

within them by the Corps of Engineers (Corps) pursuant to section 404 of the CWA and section 7 of the Act. Following a review of our consultation history with the Corps, it appears that the Corps has consulted with us on every project that may have affected vernal pools for which they have issued permits. Because of this consultation history with the Corps, we do not believe that critical habitat will provide any significant additional regulatory burdens or restrictions.

(17) *Comment:* A couple of commenters were concerned that our economic analysis was incorrect to assume that a Regulatory Flexibility Analysis was not required.

Our Response: The Regulatory Flexibility Act, as amended by the Small Business Regulatory Enforcement Fairness Act, generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act, or any other statute, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. We are certifying that this rule will, in fact, not have a significant economic impact on a substantial number of small entities and as a result, we do not need to prepare either an initial or final regulatory flexibility analysis.

Our economic analysis identified several potential impacts associated with critical habitat designation, including increased consultation costs, project modification costs, and potential temporary decreases in property values. However, because we have only designated property that is within the geographic range occupied by the Riverside fairy shrimp, and because this species is federally listed, other Federal agencies are already required to consult with us on activities that they authorize, fund, permit, or carry out that may affect the Riverside fairy shrimp. Any associated costs related to these consultations, including project modifications, will therefore be attributable to the listing of the species and not to designation of critical habitat. In a few instances, completed (or near-complete) consultations may have to be reinitiated once the critical habitat designation is finalized to ensure Federal agencies' responsibilities under section 7 are met. As a result, the critical habitat designation could result in an economic effect associated with any delays to complete these consultations. Similarly, most decreases in property values, to the extent that they can be attributed to the Riverside fairy shrimp and result from actual restrictions in land use, would be a result of its listing and not because of critical habitat designation. We recognize that the market response to a critical habitat designation, due to the perception of an increased regulatory burden, may lower real estate values on lands within the designation. However, we expect this decrease in value to be temporary. Our draft and final economic analysis further discusses how we arrived at our conclusion regarding impacts to small entities.

(18) *Comment:* Several commenters stated that we should have analyzed the cumulative effect of the critical habitat designation for the Riverside fairy shrimp, along with the effect of existing and proposed critical habitat for other species in the area.

Our Response: The commenters appear to be using the term ''cumulative impacts'' in the context of the National Environmental Policy Act. This is not appropriate in analyzing the effects of a regulation designating critical habitat for a listed species. We are required to consider only the effect of the proposed government action, which in this case is the designation of critical habitat for the Riverside fairy shrimp. The appropriate baseline to use in this analysis is the regulatory environment without this regulation. Against this baseline, we attempt to identify and measure the incremental costs and benefits associated with this designation of critical habitat. Because the Riverside fairy shrimp is a federally protected species, any effects the listing has on the regulated community is considered part of the baseline scenario, which remains unaffected by our critical habitat designation. Existing and proposed critical habitat designations for other species in the area will be part of separate rulemakings, and consequently, their economic effects will be considered separately.

(19) *Comment:* The draft economic analysis failed to consider the effect critical habitat designation would have on the demand for new housing, and the economic analysis ignores the impact of the designation on California's critical housing shortage.

Our Response: We are aware that some of the land that we have proposed as critical habitat for the Riverside fairy shrimp faces significant development pressure. Development activities can have a significant effect on the land and the species dependent on the habitat being developed. We also recognize that many large-scale development projects are subject to some type of Federal nexus before work actually begins. As a result, we expect that future consultations will, in part, include planned and future real estate development.

However, we believe that these resulting consultations will not take place solely with respect to critical habitat issues. While it is true that development activities can adversely affect designated critical habitat, we believe that our future consultations regarding new housing development will take place because such actions have the potential to adversely affect a federally listed species. We believe that such planned projects would require a section 7 consultation regardless of the critical habitat designation. Again, as we have previously mentioned, section 7 of the Act requires Federal agencies to consult with us whenever actions they fund, authorize, or carry out may affect a listed species or adversely modify its critical habitat.

We also recognize that, in some instances, the designation of critical habitat could result in a distorted real estate market because participants may believe that land within critical habitat designation is subject to additional constraints. This is not the case because critical habitat designation for the Riverside fairy shrimp is not adding any significant additional protection, nor impacting landowners significantly beyond that associated with the listing of the species as endangered under the Act. As a result, we believe that any resulting distortion will be temporary and have a relatively insignificant effect on the real estate market as it should become readily apparent to market participants that critical habitat for the Riverside fairy shrimp is not imposing any significant additional constraints on landowner activities beyond those currently associated with the listing.

(20) *Comment:* One commenter expressed concern that the Service failed to quantify section 7 consultation costs on projects when designating critical habitat for the Riverside fairy shrimp.

Our Response: In the draft economic analysis, which was made available to the public on February 28, 2001 (66 FR 12754), there is a section that specifically discusses the cost estimates of completing section 7 consultations. These costs are developed through a review of consultation files, and estimating the level of effort of the Service, the action agency, and the applicant during both formal and informal consultations. Costs associated with these consultations include preparation of a biological assessment as well as the costs of the consultation itself. Also, please refer to our response to Comment 23.

(21) *Comment:* Some commenters were concerned that, while we discussed impacts that are more appropriately attributable to the listing of the Riverside fairy shrimp than to the proposed designation of critical habitat, we did not include the baseline costs attributable to the listing or provide quantified estimates of the costs associated with the listing.

Our Response: The Act is clear that the listing decision be based solely on the best available scientific and commercial data available (section 4(b) of the Act). Congress also made it clear in the Conference Report accompanying the 1982 amendments to the Act that ''economic considerations have no relevance to determinations regarding the status of species * * *.'' If we were to consider the economic impacts of listing in the critical habitat designation analysis, it would lead to confusion, because the designation analysis is meant to determine whether areas should be excluded from the designation of critical habitat based solely upon the costs and benefits of the designation, and not upon the costs and benefits of the species' listing. Our economic analyses address how our actions may affect current or planned activities and practices; they do not address impacts associated with previous Federal actions, which includes the listing of the Riverside fairy shrimp as an endangered species.

(22) *Comment:* The assumption that future section 7 consultations would not be subject to regulatory uncertainty and legal challenge, and that the designation of critical habitat will cause no impacts above and beyond those caused by listing of the species is faulty, legally indefensible, and contrary to the Act. ''Adverse modification'' and ''jeopardy'' are different, will result in different impacts, and should be analyzed as such in the economic analysis.

Our Response: We disagree with the commenter's assertion that ''jeopardy'' and ''adverse modification'' represent different standards. Section 7 prohibits actions funded, authorized, or carried out by Federal agencies from jeopardizing the continued existence of a listed species or destroying or adversely modifying the listed species' critical habitat. Actions likely to ''jeopardize the continued existence'' of a species are those that would appreciably reduce the likelihood of both the survival and recovery of a listed species. Actions likely to result in the destruction or adverse modification of critical habitat are those that would appreciably reduce the value of critical habitat for both the survival and recovery of the listed species. Common to both definitions is an appreciable detrimental effect on both survival and recovery of a listed species. Given the similarity of these definitions, actions likely to result in the destruction or adverse modification of critical habitat would almost always result in jeopardy to the species concerned.

(23) *Comment:* Many commenters expressed concern that the draft economic analysis failed to quantify the effects of proposed critical habitat designation.

Our Response: We were only able to identify the types of impacts likely to occur as a result of the proposed critical habitat designation. These impacts include new consultations, reinitiation of consultations, and perhaps the need for additional time for completion of ongoing consultations to address critical habitat concerns, as required under section 7 of the Act. In some of these cases, it is possible that we might suggest reasonable and prudent alternatives to the proposed activity that triggered the consultation, which would also be an impact. Also associated with consultations is the length of time required to carry out consultations, which may result in opportunity costs associated with project delays.

In the case of proposed critical habitat for the Riverside fairy shrimp, we have designated habitat that is within the geographic range occupied by the species. As a result, impacts are not likely to be significant because Federal agencies are already required to consult with us on activities taking place on lands that have the potential to adversely affect the Riverside fairy shrimp.

We also recognize that in some instances, the designation of critical habitat could result in a distorted real estate market because participants may incorrectly perceive that land within critical habitat designation is subject to additional constraints. In truth, this is not the case because critical habitat designation for the Riverside fairy shrimp is not adding any significant additional protection, nor resulting in significant impacts to landowners beyond those associated with the listing of the species as endangered under the Act. As a result, we believe that any resulting distortion will be temporary and have a relatively insignificant effect on the real estate market, as it should become readily apparent to market participants that critical habitat for the Riverside fairy shrimp is not imposing any significant additional constraints on landowner activities beyond those currently associated with the listing.

(24) *Comment:* Some commenters felt that the economic analysis is flawed because it is based on the premise that we have proposed designating only occupied habitat as critical habitat.

Our Response: The determination of whether or not proposed critical habitat is within the geographic range occupied by the Riverside fairy shrimp is part of the biological decision-making process and lies beyond the scope of an economic analysis. Please refer to our response to Comment 16 and the Methods section of this rulemaking for a discussion of the decision-making process.

(25) *Comment:* One commenter was concerned because our economic analysis failed to consider the impact of critical habitat on implementation of the Southern California Association of Governments and the San Diego Association of Governments regional transportation plans.

Our Response: Because we have determined that the lands designated as critical habitat are within the geographic range occupied by the Riverside fairy shrimp, this designation does not present any significant additional regulatory burdens upon regional transportation projects beyond those attributable to the listing of the Riverside fairy shrimp as a federally endangered species. Consequently, we do not believe that the designation of critical habitat for the fairy shrimp adds any significant additional economic burden within critical habitat boundaries.

(26) *Comment:* One commenter suggested that we failed to consider the impacts of the final designation of critical habitat for the Riverside fairy shrimp on regional air quality plans in Southern California.

Our Response: We did not take into consideration potential impacts from the proposed critical habitat designation on regional air quality plans. In order to do so, we would first have to: (1) Establish the potential incremental impacts resulting from critical habitat, (2) establish the percentage of these potential impacts that could affect regional air quality plans, and then (3) attempt to quantify the economic impacts resulting from the potential incremental impacts to air quality that are attributable to critical habitat. Because we believe that incremental impacts resulting from critical habitat are not significant, therefore not resulting in an additional significant regulatory or economic burden above and beyond that attributable to the listing of the species, we do not believe that the designation of critical habitat would have a significant effect on regional air quality planning.

Issue 4: Other Relevant Issues

(27) *Comment:* One commenter wanted to know if the Riverside fairy shrimp is actually the same species as the San Diego fairy shrimp, and whether there is a commonality of habitat.

Our Response: We may have inadvertently caused some confusion about the taxonomy of fairy shrimp in southern California by two errors on page 57137 of the proposed rule (65 FR 57136). We misidentified San Diego fairy shrimp as *Streptocephalus sandiegonensis*, instead of the correct *Branchinecta sandiegonensis*. We also mistakenly stated that the Riverside fairy shrimp is closely related to the San Diego fairy shrimp. We apologize for the errors. Although the two organisms belong to the same scientific order, they are not closely related, but are members of different genera and families.

Additionally, in general terms of habitat, the Riverside fairy shrimp inhabits pools, ponds, and depressions that are deeper than the basins that support the endangered San Diego fairy shrimp.

Summary of Changes From the Proposed Rule

Based on a review of public comments received on the proposed determination of critical habitat and economic analysis for the Riverside fairy shrimp, we reevaluated our proposed designation of critical habitat for this species. These changes include the following: (1) The removal of subunit 2H in southern Orange County from the designation because the vernal pool had previously been destroyed by the construction of Antonio Parkway; (2) corrections to area designated by land ownership (Table 1) based on the use of updated GIS land ownership coverages; (3) removal of Miramar (proposed Critical Habitat Unit 5) from critical habitat designation due to an existing, finalized INRMP; (4) removal of the training areas on Camp Pendleton from the designation under section 4(b)(2) of the Act; (5) changing the name of proposed Critical Habitat Unit 6 to Critical Habitat Unit 5 for this final designation.

During the comment period for the proposed determination of critical habitat for the Riverside fairy shrimp, we received comments from the Marine Corps requesting the removal of Marine Corps Air Station Miramar from the designation because they believed their final INRMP adequately protected and managed for the Riverside fairy shrimp. We have evaluated this plan and determined that the conservation management measures and protections afforded the Riverside fairy shrimp are sufficient to ensure its conservation on this base (see discussion under the Exclusions Under section 3(5)(A) Definition section of this rule and in response to Comment 10). Therefore, we have not included Miramar in this final determination of critical habitat for Riverside fairy shrimp.

We also determined that it is appropriate to exclude the training areas on Camp Pendleton from this critical habitat designation. Under section 4(b)(2) of the Act, we weighed the benefits of excluding Camp Pendleton land against the benefits of designating these areas and concluded that the benefits of excluding the areas outweigh the benefits of including them. The main benefit of this exclusion is ensuring that the mission-critical military training activities can continue without interruption at Camp Pendleton while formal consultation on upland activities at the base is being completed. The acreage being designated as critical habitat for the Riverside fairy shrimp on Camp Pendleton has been reduced from 2,295 ha (5,670 ac) to 312 ha (770 ac). The areas designated include pool complexes at the Wire Mountain Housing Area, within the Cockleburr Sensitive Area, and on lands leased to the State of California and included within San Onofre State Park. Refer to the Exclusions Under Section 4(b)(2) section and response to Comment 10 for a more complete discussion of this issue.

Economic Analysis

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific and commercial data available, and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species.

Economic effects caused by listing the Riverside fairy shrimp as an endangered species, and by other statutes, are the baseline against which the effects of critical habitat designation are evaluated. The economic analysis must then examine the incremental economic and conservation effects and benefits of the critical habitat designation. Economic effects are measured as changes in national income, regional jobs, and household income. An analysis of the economic effects of Riverside fairy shrimp critical habitat designation was prepared (Industrial Economics, Incorporated 2001) and made available for public review (February 28 through March 30, 2001; 66 FR 12754). The final analysis, which reviewed and incorporated public comments, concluded that no significant additional economic impacts are anticipated from the critical habitat designation above and beyond those already attributable to the listing of the Riverside fairy shrimp as an endangered species. The most likely economic effects of critical habitat designation are on activities funded, authorized, or carried out by a Federal agency. The analysis examined the effects of the proposed designation on: (1) Re-initiation of section 7 consultations, (2) length of time in which section 7 consultations are completed, and (3) new consultations resulting from the determination. Because areas proposed for critical habitat are primarily within the geographic range occupied by the Riverside fairy shrimp, activities that may affect critical habitat may also affect the species, and would thus be subject to consultation whether or not critical habitat is designated. In those limited cases where activities occur on designated critical habitat where Riverside fairy shrimp and other listed species are not found at the time of the action, section 7 consultation with the Service may be necessary for actions funded, authorized, or carried out by Federal agencies.

We believe that any project that would adversely modify or destroy critical habitat would also jeopardize the continued existence of the species, and that reasonable and prudent alternatives to avoid jeopardizing the species would also avoid adverse modification of critical habitat. Thus, no significant additional regulatory burden or associated significant additional costs would accrue because of critical habitat above and beyond those attributable to the listing of the Riverside fairy shrimp. Our economic analysis does recognize that there may be costs from delays associated with reinitiating completed consultations after the critical habitat designation is made final. There may also be economic effects due to the reaction of the real estate market to critical habitat designation, as real estate values may be lowered due to perceived increase in the regulatory burden. We believe these impacts will be short-term, however.

In summary, our economic analysis concludes that no, or minimal, significant incremental costs are anticipated as a result of the designation of critical habitat. This estimate is based on the existing consultation history with

the Corps on projects that may affect vernal pools and increased public awareness regarding the actual impacts of critical habitat designation on land values.

A copy of the final economic analysis and a description of the exclusion process with supporting documents are included in our administrative record and may be obtained by contacting our Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

Required Determinations

Regulatory Planning and Review

In accordance with the criteria in Executive Order 12866, this rule is a significant regulatory action and has been reviewed by the Office of Management and Budget (OMB).

(a) This rule will not have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities. The Riverside fairy shrimp was listed as an endangered species in 1993. In fiscal years 1997 through 1999, we conducted seven formal section 7 consultations with other Federal agencies to ensure that their actions would not jeopardize the continued existence of the fairy shrimp.

Under the Act, critical habitat may not be adversely modified by a Federal agency action; critical habitat does not impose any restrictions on non-Federal persons unless they are conducting activities funded or otherwise sponsored or permitted by a Federal agency (see Table 2 below). Section 7 requires Federal agencies to ensure that they do not jeopardize the continued existence of listed species. Based upon our experience with the species and its needs, we conclude that any Federal action or authorized action that could potentially cause an adverse modification of the designated critical habitat currently occupied by Riverside fairy shrimp would currently be considered as ''jeopardy'' under the Act. Accordingly, the designation of currently occupied areas as critical habitat does not have any incremental impacts on what actions may or may not be conducted by Federal agencies or non-Federal persons that receive Federal authorization or funding. Non-Federal persons that do not have a Federal ''sponsorship'' of their actions are not restricted by the designation of critical habitat (however, they continue to be bound by the provisions of the Act concerning ''take'' of the species). Additionally, designation of critical habitat in areas that are not known to be occupied by this species will also not likely result in an increased regulatory burden because the Corps of Engineers requires review of projects requiring permits in all vernal pools, whether it is known that Riverside fairy shrimp are present or not. In those limited cases where activities occur on designated critical habitat where Riverside fairy shrimp and other listed species are not found at the time of the action, additional section 7 consultation with the Service not previously required may be necessary for actions funded, authorized, or carried out by Federal agencies.

TABLE 2.—IMPACTS OF RIVERSIDE FAIRY SHRIMP LISTING AND CRITICAL HABITAT DESIGNATION

Categories of activities	Activities potentially affected by species listing only [1]	Additional activities potentially affected by critical habitat designation [2]
Federal Activities Potentially Affected [3].	Activities such as those affecting waters of the United States by the Army Corps of Engineers under section 404 of the Clean Water Act; road construction and maintenance, right-of-way designation, and regulation of agricultural activities; regulation of airport improvement activities under Federal Aviation Administration jurisdiction; maintenance, management, and construction activities on Marine Corps Base Camp Pendleton and Marine Corps Air Station, Miramar and other applicable DOD lands; construction of roads and fences along the international border with Mexico and associated immigration enforcement activities by the Immigration and Naturalization Service; construction of communication sites licensed by the Federal Communications Commission; and activities funded by any Federal agency.	None in occupied habitat. In unoccupied habitat containing vernal pools, additional consultations are not anticipated because the Corps of Engineers already initiates consultations in these areas.
Private or other non-Federal Activities Potentially Affected [4].	Activities such as removing or destroying Riverside fairy shrimp habitat (as defined in the primary constituent elements discussion), whether by mechanical, chemical, or other means (e.g., grading, overgrazing, construction, road building, herbicide application, etc.) and appreciably decreasing habitat value or quality through indirect effects (e.g., edge effects, invasion of exotic plants or animals, or fragmentation that require a Federal action (permit, authorization, or funding)).	None in occupied habitat. In unoccupied habitat containing vernal pools, additional consultations are not anticipated because the Corps of Engineers already initiates consultations in these areas.

[1] This column represents the activities potentially affected by listing the Riverside fairy shrimp as an endangered species (August 3, 1993; 58 FR 41384) under the Endangered Species Act.
[2] This column represents activities potentially affected by the critical habitat designation in addition to those activities potentially affected by listing the species.
[3] Activities initiated by a Federal agency.
[4] Activities initiated by a private or other non-Federal entity that may need Federal authorization or funding.

(b) This rule will not create inconsistencies with other agencies' actions. As discussed above, Federal agencies have been required to ensure that their actions do not jeopardize the continued existence of the Riverside fairy shrimp since the listing in 1993. The prohibition against adverse modification of critical habitat is not expected to impose any significant restrictions in addition to those that currently exist in occupied areas of designated critical habitat. Because of the potential for impacts on other Federal agencies' activities, we will continue to review this final action for any inconsistencies with other Federal agencies' actions.

(c) This rule will not materially affect entitlements, grants, user fees, loan programs, or the rights and obligations

of their recipients. Federal agencies are currently required to ensure that their activities do not jeopardize the continued existence of the species, and, as discussed above, we do not anticipate that the adverse modification prohibition (resulting from critical habitat designation) will have any incremental effects in areas of occupied habitat. Designation of critical habitat in areas that are not known to be occupied by this species will also not likely result in a significant increased regulatory burden because the Corps of Engineers already requires review of projects involving vernal pools, whether it is known that Riverside fairy shrimp are present or not. In those limited cases where activities occur on designated critical habitat where Riverside fairy shrimp and other listed species are not found at the time of the action, section 7 consultation with us may be necessary for actions funded, authorized, or carried out by Federal agencies.

(d) OMB has determined that this rule may raise novel legal or policy issues and, as a result, this rule has undergone OMB review.

Regulatory Flexibility Act

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities.

SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities. The following discussion explains our determination.

We have examined this rule's potential effects on small entities as required by the Regulatory Flexibility Act, and have determined that this action will not have a significant economic impact on a substantial number of small entities.

As discussed in the economic analysis for this rulemaking and the preamble above, this rule is not expected to result in any significant restrictions in addition to those currently in existence for areas occupied by the Riverside fairy shrimp and designated as critical habitat. As indicated in Table 1 (see Critical Habitat Designation section), we designated critical habitat on property owned by Federal, State, and local governments and private property, and identified the types of Federal actions or authorized activities that are of potential concern (Table 2). If these activities sponsored by Federal agencies within the designated critical habitat areas are carried out by small entities (as defined by the Regulatory Flexibility Act) through contract, grant, permit, or other Federal authorization, as discussed above, these actions are currently required to comply with the listing protections of the Act, and the designation of critical habitat is not anticipated to have any significant additional effects on these activities in areas of critical habitat occupied by the species. Designation of critical habitat in areas that are not known to be occupied by this species will also not likely result in a significant increased regulatory burden since the Corps of Engineers already requires review of projects involving vernal pools because vernal pools typically contain listed species for which the Corps must consult with us under section 7. For actions on non-Federal property that do not have a Federal connection (such as funding or authorization), the current restrictions concerning take of the species remain in effect, and this rule will have no additional restrictions.

Therefore, we are certifying that this final designation of critical habitat is not expected to have a significant adverse impact on a substantial number of small entities. Thus, no regulatory flexibility analysis is necessary.

Executive Order 13211

On May 18, 2001, the President issued an Executive Order (EO 13211) on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. As this final rule is not expected to significantly affect energy supplies, distribution, or use, this action is not a significant energy action and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*):

(a) This rule will not ''significantly or uniquely'' affect small governments. A Small Government Agency Plan is not required. Small governments will be affected only to the extent that any programs having Federal funds, permits, or other authorized activities must ensure that their actions will not adversely affect the critical habitat. However, as discussed above, these actions are currently subject to equivalent restrictions through the listing protections of the species, and no further restrictions are anticipated in areas of occupied designated critical habitat. Designation of critical habitat in areas that are not known to be occupied by this species will also not likely result in an increased regulatory burden because the Corps of Engineers already requires review of projects involving vernal pools as vernal pools typically contain listed species for which the Corps of Engineers must consult with us under section 7. In those limited cases where activities occur on designated critical habitat where Riverside fairy shrimp and other listed species are not found at the time of the action, section 7 consultation with the Service may be necessary for actions funded, authorized, or carried out by Federal agencies.

(b) This rule will not produce a Federal mandate of $100 million or greater in any year, that is, it is not a ''significant regulatory action'' under the Unfunded Mandates Reform Act. The designation of critical habitat imposes no obligations on State or local governments.

Takings

In accordance with Executive Order 12630, the rule does not have significant takings implications. A takings implication assessment is not required. As discussed above, the designation of critical habitat affects only Federal agency actions. The rule will not increase or decrease the current restrictions on private property concerning take of the Riverside fairy shrimp. Due to current public knowledge of the species' protection under the ESA, the prohibition against take of the species both within and outside of the designated areas, and the fact that critical habitat provides no incremental restrictions in areas of occupied critical habitat, we do not anticipate that property values will be affected by the critical habitat designation. Designation of critical habitat in areas that are not known to be occupied by this species will also not likely result in an increased regulatory burden because the Corps already requires review of projects involving vernal pools as vernal pools typically contain listed species for which the Corps must consult with us under section 7. In those limited cases where

activities occur on designated critical habitat where Riverside fairy shrimp and other listed species are not found at the time of the action, section 7 consultation with the Service may be necessary for actions funded, authorized, or carried out by Federal agencies.

Additionally, critical habitat designation does not preclude development of habitat conservation plans and issuance of incidental take permits. Landowners in areas that are included in the designated critical habitat will continue to have opportunity to utilize their property in ways consistent with the survival and recovery of the Riverside fairy shrimp.

Federalism

In accordance with Executive Order 13132, this rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior policy, we requested information from, and coordinated development of this critical habitat proposal with, appropriate State resource agencies in California. We will continue to coordinate any future designation of critical habitat for the Riverside fairy shrimp with the appropriate State agencies. The designation of critical habitat in areas currently occupied by the Riverside fairy shrimp imposes no additional restrictions to those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments in that the areas essential to the conservation of the species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. While making this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning (rather than waiting for case-by-case section 7 consultations to occur).

Civil Justice Reform

In accordance with Executive Order 12988, the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order. We designate critical habitat in accordance with the provisions of the Act, and plan public hearings on the proposed designation during the comment period. The rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of the Riverside fairy shrimp.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any information collection requirements for which OMB approval under the Paperwork Reduction Act is required. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB Control Number.

National Environmental Policy Act

We have determined that we do not need to prepare an Environmental Assessment and/or an Environmental Impact Statement as defined by the National Environmental Policy Act of 1969 in connection with regulations adopted pursuant to section 4(a) of the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and the Department of the Interior's requirement at and 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no Tribal lands essential for the conservation of the Riverside fairy shrimp because these lands do not support populations, nor do they provide essential habitat. Therefore, critical habitat for the Riverside fairy shrimp has not been designated on Tribal lands.

References Cited

A complete list of all references cited in this proposed rule is available upon request from the Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

Author

The primary authors of this document are the Carlsbad Fish and Wildlife Office staff (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Final Regulation Promulgation

For the reasons given in the preamble, we hereby amend 50 CFR part 17 as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. In § 17.11(h) revise the entry for ''Fairy shrimp, Riverside'' under ''CRUSTACEANS'' to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						
*	*	*	*	*	*		*
CRUSTACEANS							
*	*	*	*	*	*		*
Fairy shrimp, Riverside.	*Streptocephalus woottoni*.	U.S.A.(CA)	Entire	E	512	17.95(h)	NA
*	*	*	*	*	*		*

3. In § 17.95 add critical habitat for the Riverside fairy shrimp (*Streptocephalus woottoni*) under paragraph (h) in the same alphabetical order as this species occurs in § 17.11(h), to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(h) *Crustaceans.*

* * * * *

Riverside Fairy Shrimp (*Streptocephalus woottoni*)

1. Critical habitat units are depicted for Los Angeles, Orange, Riverside, San Diego, and Ventura counties, California, on the maps below.

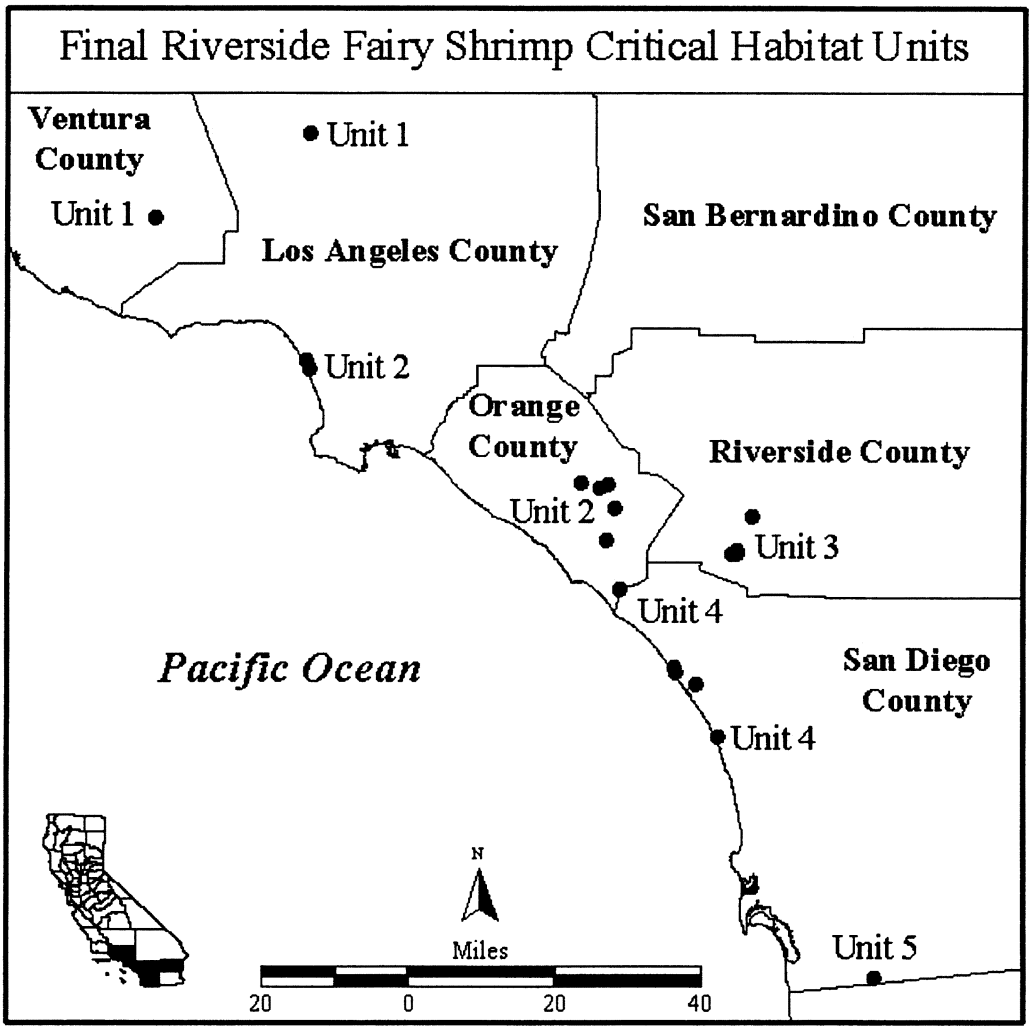
2. Critical habitat includes vernal pools, vernal pool complexes, and ephemeral ponds and depressions and their associated watersheds and hydrologic regime indicated on the maps below and in the legal descriptions.

3. Within these areas, the primary constituent elements for the Riverside fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal. The primary constituent elements are found in those areas that support vernal pools or other ephemeral ponds and depressions, and their associated watersheds. The primary constituent elements are: small to large pools with moderate to deep depths that hold water for sufficient lengths of time necessary for incubation and reproduction, but not necessarily every year; entire watershed(s) and other hydrologic features that support pool basins and their related pool complexes; flat or gently sloping topography; and any soil type with a clay component and/or an impermeable surface or subsurface layer known to support vernal pool habitat. All designated critical habitat areas contain one or more of the primary constituent elements for Riverside fairy shrimp.

4. Existing features and structures, such as buildings, roads, railroads, urban development, and other such developed features not containing primary constituent elements, are not considered critical habitat. Federal actions limited to these areas would not trigger a section 7 consultation, unless they affect the species and/or the primary constituent elements in adjacent critical habitat.

Note: Map follows:

BILLING CODE 4310–55–U



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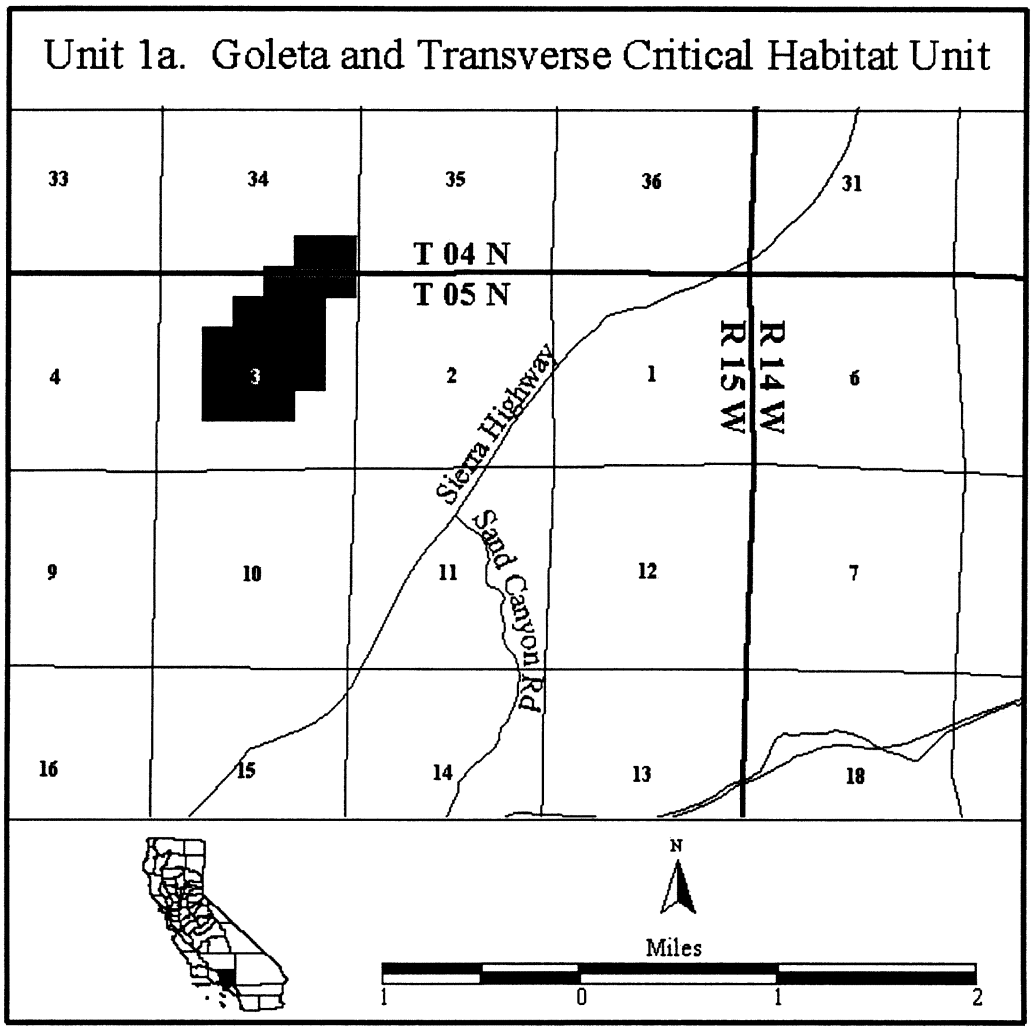
Map Unit 1: Goleta and Transverse Management Area, Ventura and Los Angeles counties, California

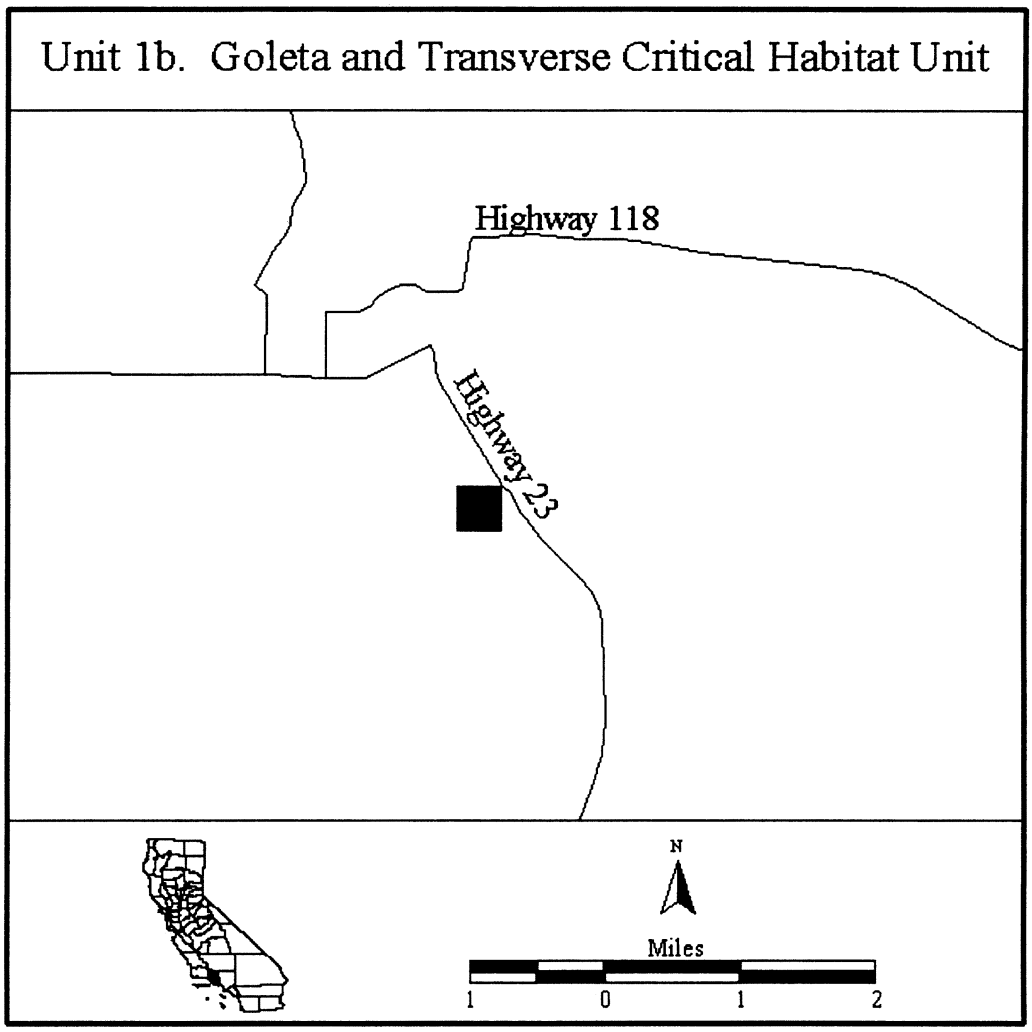
Unit 1a: From USGS 1:24,000 quadrangle map Mint Canyon, the lands bounded by the following UTM coordinates (E,N): 368000,3815000; 368500,3815000; 368500,3814500; 368250,3814500; 368250,3813750; 368000,3813750; 368000,3813500; 367250,3813500; 367250,3814250; 367500,3814250; 367500,3814500; 367750,3814500; 367750,3814750; 368000,3814750; 368000,3815000.

Unit 1b: From USGS 1:24,000 quadrangle map Simi Valley West, the lands bounded by the following UTM coordinates (E,N): 329000,3793250: 329500,3793250; 329500,3792750; 329000,3792750; 329000,3793250.

Note: Maps follow:

BILLING CODE 4310–55–U


Unit 1a. Goleta and Transverse Critical Habitat Unit
33
34
35
36
31
T 04 N
T 05 N
4
3
2
1
6
R 14 W
R 15 W
Sierra Highway
Sand Canyon Rd
9
10
11
12
7
16
15
14
13
18
N
Miles
1
0
1
2



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Map Unit 2: Los Angeles Basin-Orange Management Area, Los Angeles and Orange counties, California

Unit 2A: From USGS 1:24,000 quadrangle map Venice, the lands bounded by the following UTM coordinates (E,N): 366750,3757750; 367250,3757750; 367250,3757250; 367500,3757250; 367500,3756250; 367250,3756250; 367250,3756500; 367000,3756500; 367000,3757250; 366750,3757250; 366750,3757750.

Unit 2B: From USGS 1:24,000 quadrangle map Venice, the lands bounded by the following UTM coordinates (E,N): 367750,3755500; 368000,3755500; 368000,3755250; 367750,3755250; 367750, 3755500.

Unit 2C: From USGS 1:24,000 quadrangle map El Toro, the lands bounded by the following UTM coordinates (E,N): 435750,3726750; 436750,3726750; 436750,3726500; 436500,3726500; 436500,3726250; 435750,3726250; 435750,3726750.

Unit 2D: From USGS 1:24,000 quadrangle map El Toro, the lands bounded by the following UTM coordinates (E,N): 440500,3725750; 441000,3725750; 441000,3725000; 440500,3725000; 440500,3725750.

Unit 2E: From USGS 1:24,000 quadrangle map Santiago Peak, the lands bounded by the following UTM coordinates (E,N): 442500,3727000; 443750,3727000; 443750,3726000; 442250,3726000; 442250,3726500; 442500,3726500; 442500,3727000.

Unit 2F: From USGS 1:24,000 quadrangle maps Santiago Peak and Canada Gobernadora, the lands bounded by the following UTM coordinates (E,N): 444500,3721000; 445000,3721000; 445000,3720000; 444000,3720000; 444000,3720500; 444250,3720500; 444250,3720750; 444500,3720750; 444500,3721000.

Unit 2G: From USGS 1:24,000 quadrangle map Canada Gobernadora, the lands bounded by the following UTM coordinates (E,N): 442000,3713000; 442500,3713000; 442500,3712500; 442750,3712500; 442750,3712000; 442000,3712000; 442000,3713000.

Note: Maps for Units 2A through 2G follow:

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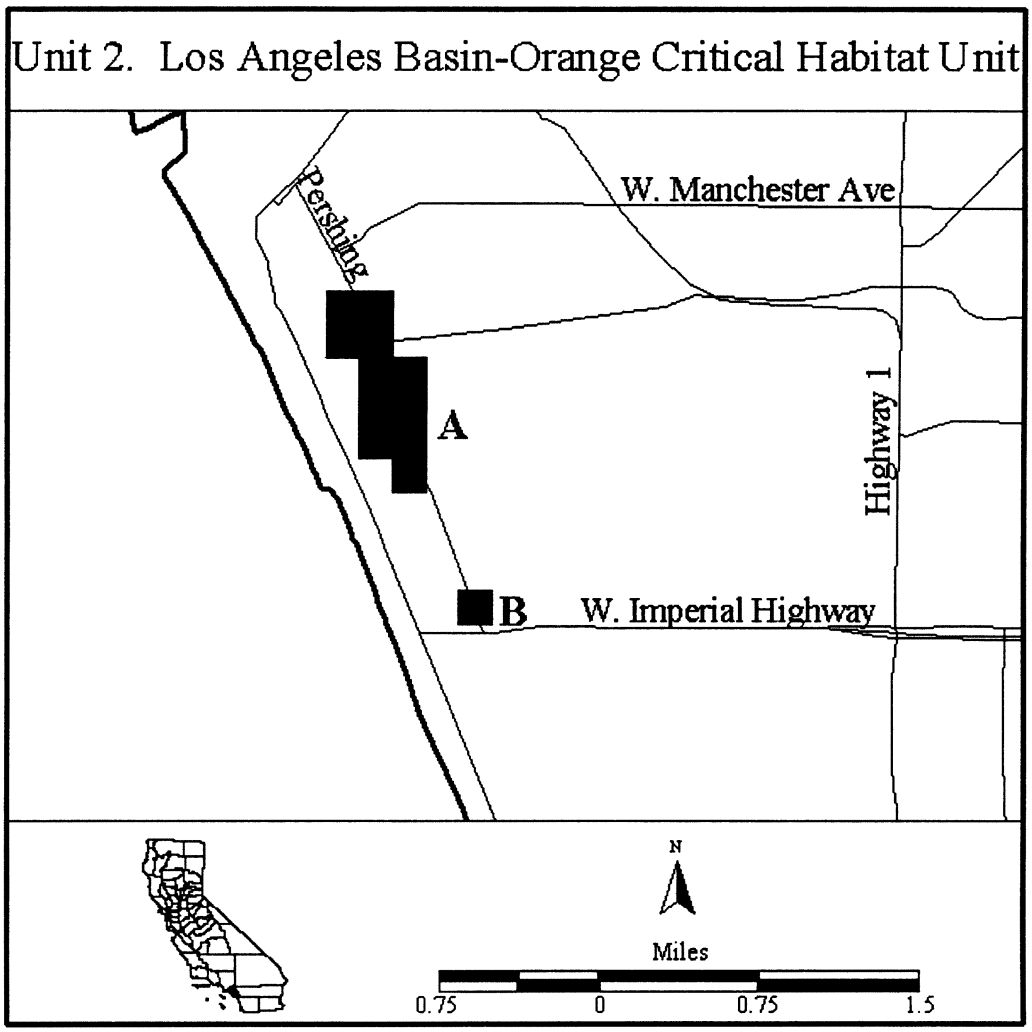
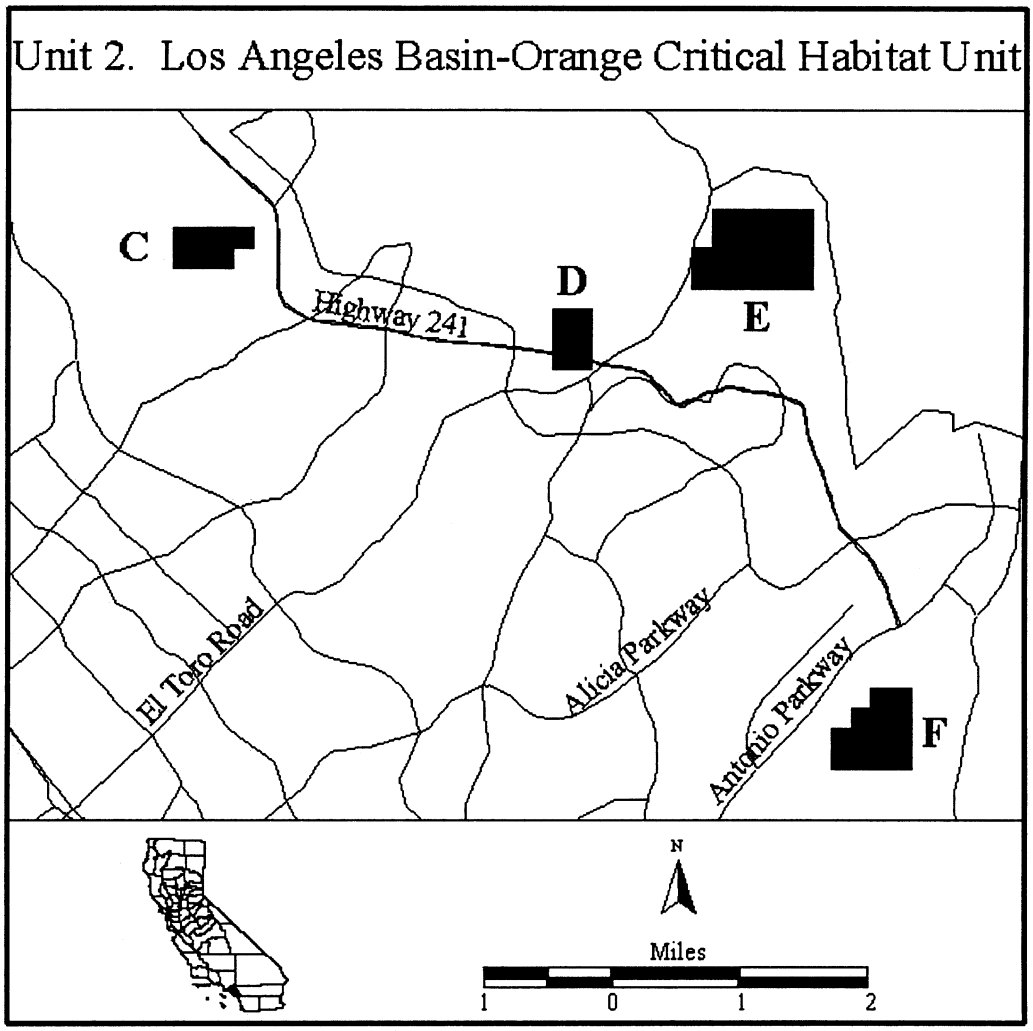
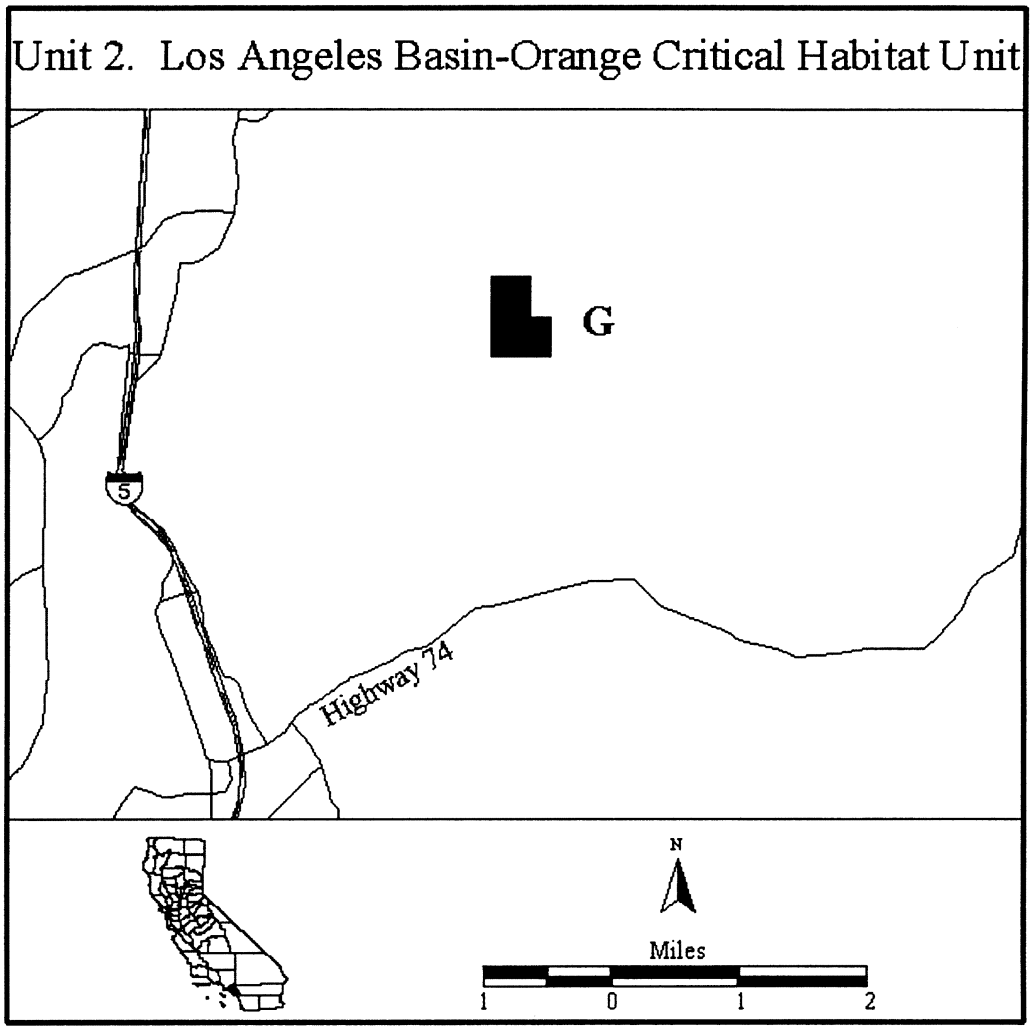



Unit 2. Los Angeles Basin-Orange Critical Habitat Unit
C
D
E
F
Highway 241
El Toro Road
Alicia Parkway
Antonio Parkway
N
Miles
1
0
1
2


Unit 2. Los Angeles Basin-Orange Critical Habitat Unit
G
5
Highway 74
N
Miles
1
0
1
2

BILLING CODE 4310–55–C

Map Unit 3: Riverside Management Area, Riverside County, California

Unit 3A: From USGS 1:24,000 quadrangle map Murrieta, the lands bounded by the following UTM coordinates (E,N): 478750,3718500; 479500,3718500; 479500,3717750; 478750,3717750; 478750,3718500.

Unit 3B: From USGS 1:24,000 quadrangle maps Wildomar and Murrieta, the lands bounded by the following UTM coordinates (E,N): 476250,3711500; 477000,3711500; 477000,3711250; 477250,3711250; 477250,3710750; 478000,3710750; 478000,3710500; 478250,3710500; 478250,3710250; 478500,3710250; 478500,3710000; 478750,3710000; 478750,3709750; 479250,3709750; 479250,3709500; 479500,3709500; 479500,3709250; 479250,3709250; 479250,3709000; 479500,3709000; 479500,3708500; 479250,3708500; 479250,3708250; 479000,3708250; 479000,3708500; 478750,3708500; 478750,3708750; 478250,3708750; 478250,3709000; 477500,3709000; 477500,3709250; 476750,3709250; 476750,3709000; 476500,3709000; 476500,3708500; 475750,3708500; 475750,3708000; 475000,3708000; 475000,3707000; 474000,3707000; 474000,3706750; 472000,3706750; 472000,3708250; 472500,3708250; 472500,3708500; 472750,3708500; 472750,3709250; 473000,3709250; 473000,3710500; 473250,3710500; 473250,3710750; 474000,3710750; 474000,3710500; 474250,3710500; 474250,3710250; 474500,3710250; 474500,3710000; 474750,3710000; 474750,3709750; 475000,3709750; 475000,3710000; 475500,3710000; 475500,3710250; 475750,3710250; 475750,3711250; 476250,3711250; 476250,3711500. Excluding lands bounded by the following UTM coordinates (E,N): 475000,3709500; 475000,3709000; 475250,3709000; 475250,3709250; 475500,3709250; 475500,3709500; 475000,3709500 and lands bounded by the following UTM coordinates (E,N): 473500,3709000; 473500,3708750; 474250,3708750; 474250,3709000; 473500,3709000.

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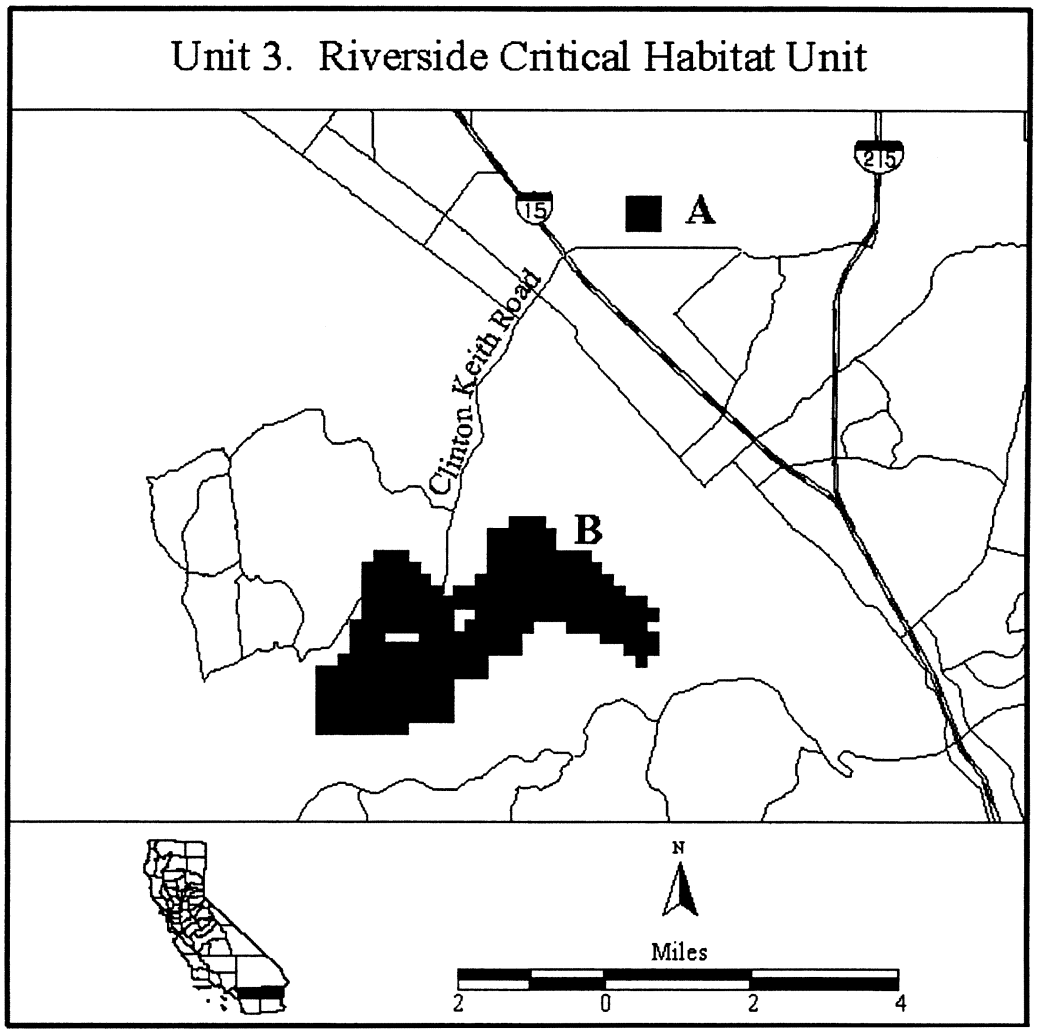
Note: Map follows:



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Map Unit 4: San Diego: North Coastal Mesa Management Area, San Diego, California

Unit 4A: From USGS 1:24,000 quadrangle map San Clemente, the lands bounded by the following UTM coordinates (E,N): 446250,3701000; 446500,3701000; 446500,3699500; 445750,3699500; 445750,3700000; 446000,3700000; 446000,3700750; 446250,3700750; 446250,3701000.

Unit 4B: From USGS 1:24,000 quadrangle map Las Pulgas Canyon, the lands bounded by the following UTM coordinates (E,N): 446250,3701000; 446500,3701000; 446500,3699500; 445750,3699500; 445750, 3700000; 446000,3700000; 446000,3700750; 446250,3700750; 446250,3701000, excluding the Pacific Ocean.

Unit 4C: From USGS 1:24,000 quadrangle map Las Pulgas Canyon, the lands bounded by the following UTM coordinates (E,N): 460000,3680000; 460250,3680000; 460250,3679750; 460500,3679750; 460500,3679000; 459500,3679000; 459500,3679250; 459250,3679250; 459250,3679750; 460000,3679750; 460000,3680000, excluding the Pacific Ocean.

Unit 4D: From USGS 1:24,000 quadrangle maps Oceanside and San Luis Rey, the lands bounded by the following UTM coordinates (E,N): 464250,3677000; 465250,3677000; 465250,3676750; 465750,3676750; 465750,3675750; 465500,3675750; 465500,3675500; 465000,3675500; 465000,3675750; 464750,3675750; 464750,3676250; 465000,3676250; 465000,3676500; 464250,3676500; 464250,3677000.

Unit 4E: From USGS 1:24,000 quadrangle maps Encinitas, the lands bounded by the following UTM coordinates (E,N): 470250,3663500; 470750,3663500; 470750,3662500; 470500,3662500; 470500,3662750; 470250,3662750; 470250,3663500.

Note: Maps for Units 4A through 4E follow:

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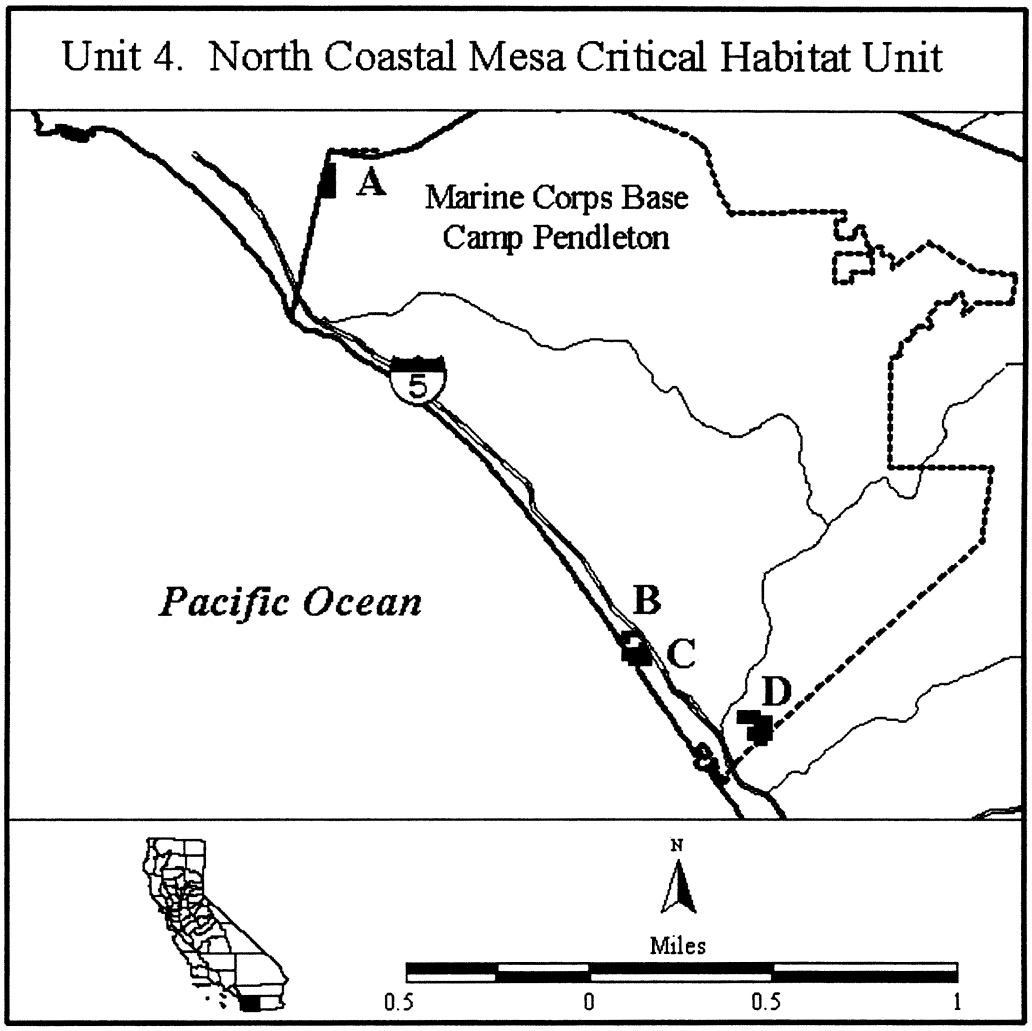

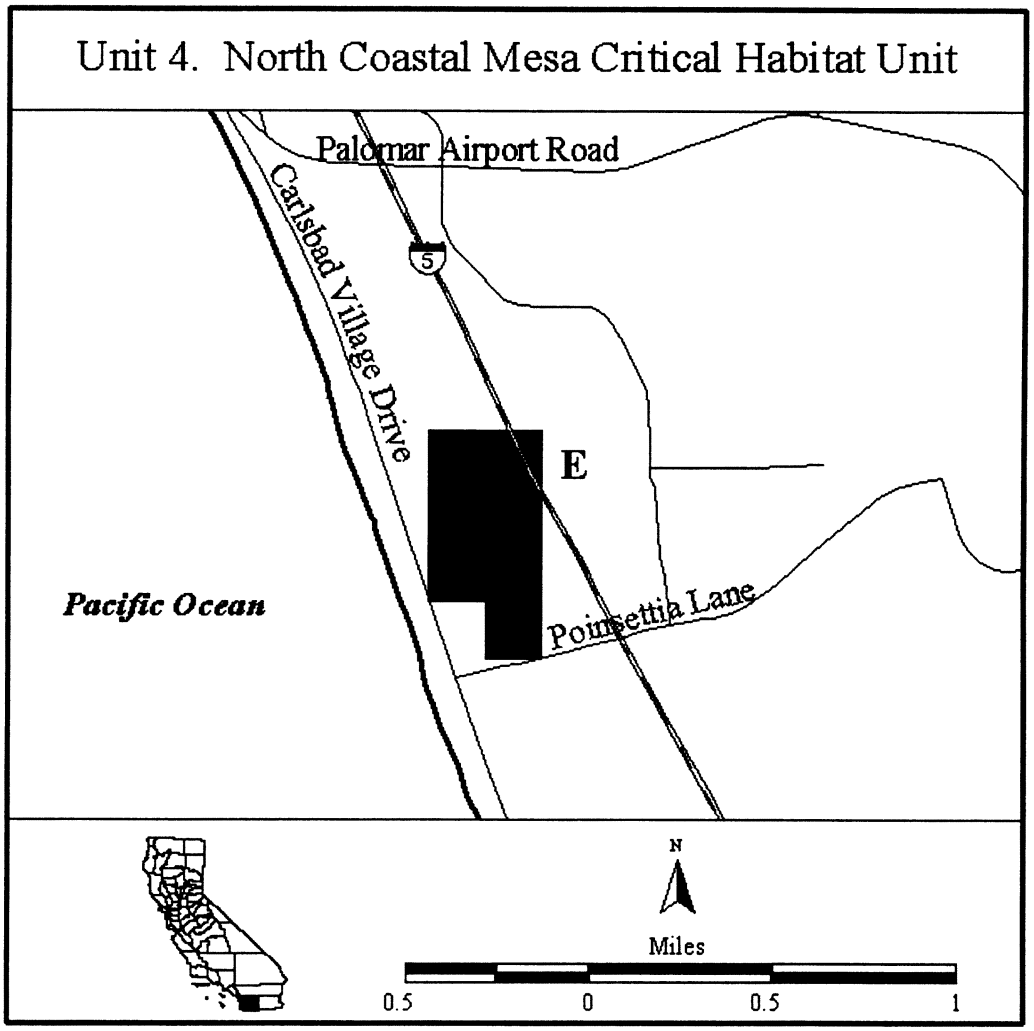

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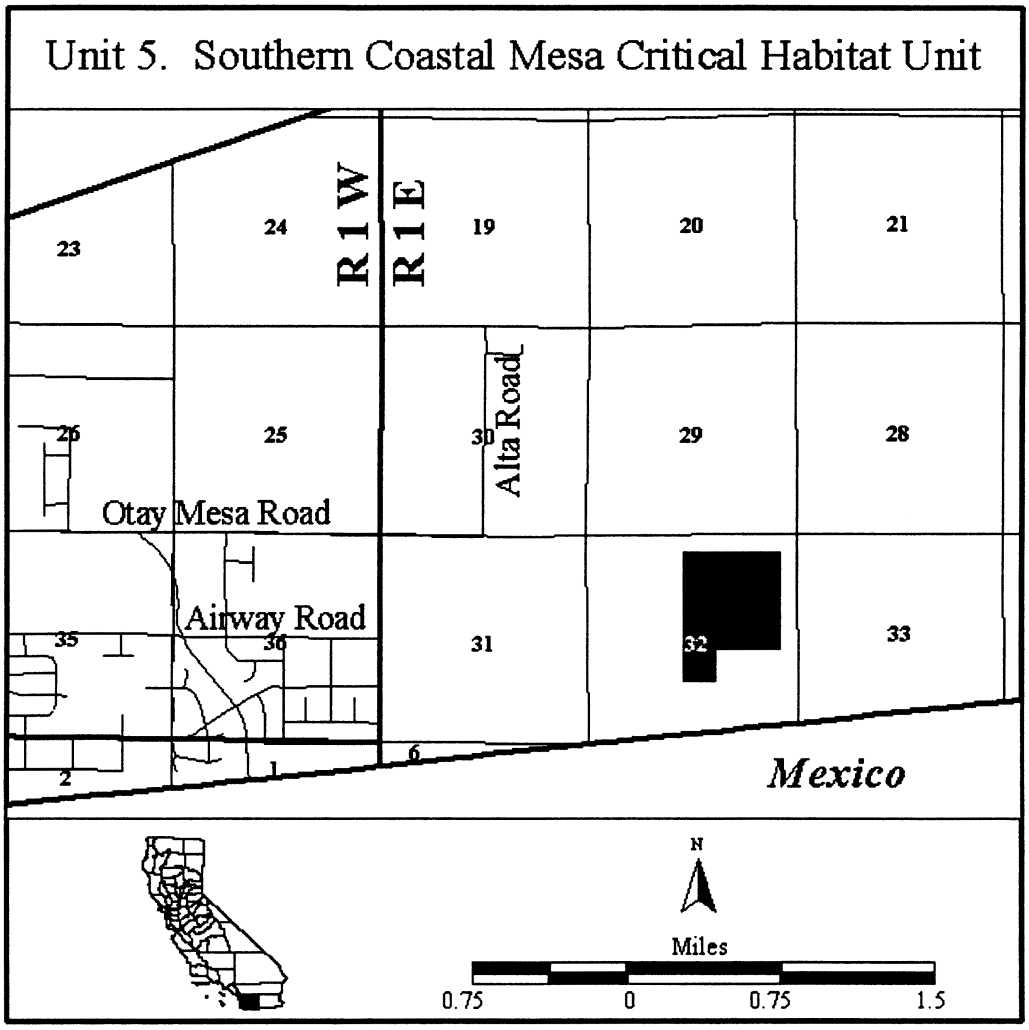
Map Unit 5: San Diego: South Coastal Management Area, San Diego County, California. From USGS 1:24,000 quadrangle maps Otay Mesa, the lands bounded by the following UTM coordinates (E,N): 509250,3603000; 510000,3603000; 510000,3602250; 509500,3602250; 509500,3602000; 509250,3602000; 509250,3603000.

Note: Map follows:



Dated: May 22, 2001.

Joseph E. Doddridge,

Acting Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 01–13337 Filed 5–23–01; 4:03 pm]

BILLING CODE 4310–55–C

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2009–0073; MO 92210–0–0009]

RIN 1018–AW54

Endangered and Threatened Wildlife and Plants; Final Revised Critical Habitat for Brodiaea filifolia (Thread-Leaved Brodiaea)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, are designating revised critical habitat for *Brodiaea filifolia* (thread-leaved brodiaea) under the Endangered Species Act of 1973, as amended (Act). Approximately 2,947 acres (ac) (1,193 hectares (ha)) in 10 units are being designated as revised critical habitat for *B. filifolia* in Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California.

DATES: This rule becomes effective on March 10, 2011.

ADDRESSES: The final rule, final economic analysis, and map of revised critical habitat will be available on the Internet at *http://www.regulations. gov* at Docket No. FWS–R8–ES–2009–0073. Supporting documentation we used in preparing this final rule will be available for public inspection, by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Suite 101, Carlsbad, CA 92011; telephone 760–431–9440; facsimile 760–431–5901.

FOR FURTHER INFORMATION CONTACT: Jim Bartel, Field Supervisor, U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office (*see* **ADDRESSES**). If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

We intend to discuss only those topics directly relevant to the designation of revised critical habitat for *Brodiaea filifolia* under the Endangered Species Act (Act), as amended (16 U.S.C. 1531 *et seq.*), in this final rule. For information on the taxonomy, biology, and ecology of *B. filifolia,* refer to the final listing rule published in the **Federal Register** on October 13, 1998 (63 FR 54975), the designation of critical habitat for *B. filifolia* published in the **Federal Register** on December 13, 2005 (70 FR 73820), the proposed revised designation of critical habitat published in the **Federal Register** on December 8, 2009 (74 FR 64930), and the Notice of Availability (NOA) of the draft economic analysis (DEA) published in the **Federal Register** on July 20, 2010 (75 FR 42054). Additionally, more information on this species can be found in the five-year review for *B. filifolia* signed on August 13, 2009, which is available on our Web site at: *http//:www.fws.gov/Carlsbad.*

New Information on Species' Description, Life History, Ecology, Habitat, and Geographic Range and Status

We received no new information pertaining to the description, life history, ecology, habitat, geographic range, or status of *Brodiaea filifolia* following the 2009 proposed revised critical habitat designation (74 FR 64930).

Previous Federal Actions

We published our final designation of critical habitat for *Brodiaea filifolia* on December 13, 2005 (70 FR 73820). The Center for Biological Diversity filed a complaint in the U.S. District Court for the Southern District of California on December 19, 2007, challenging our designation of critical habitat for *B. filifolia* and *Navarretia fossalis* (*Center for Biological Diversity* v. *United States Fish and Wildlife, et al.,* Case No. 07–CV–02379–W–NLS). In a settlement agreement dated July 25, 2008, we agreed to reconsider the critical habitat designation for *B. filifolia.* The settlement stipulated that the U.S. Fish and Wildlife Service (Service) shall submit a proposed revised critical habitat designation for *B. filifolia* to the **Federal Register** by December 1, 2009, and submit a final revised critical habitat designation to the **Federal Register** by December 1, 2010. The proposed revised critical habitat designation was published in the **Federal Register** on December 8, 2009 (74 FR 64930). On November 19, 2010, the U.S. District Court granted a motion to modify the settlement agreement to extend to January 31, 2011, submittal of a final revised critical habitat designation to the **Federal Register**.

Summary of Changes From the Proposed Revised Rule and the Previous Critical Habitat Designation

Summary of Changes From the 2005 Critical Habitat Rule

The areas identified in this rule constitute a revision from the areas we designated as critical habitat for *Brodiaea filifolia* on December 13, 2005 (70 FR 73820). In cases where we have new information or information that was not available for the previous designation, we made changes to the critical habitat for *B. filifolia* to ensure that this rule reflects the best scientific data available.

In the 2005 rule, we excluded subunits under section 4(b)(2) of the Act within the planning boundaries for the Villages of La Costa Habitat Conservation Plan (HCP). The Villages of La Costa HCP is now included within (considered part of) the City of Carlsbad's Habitat Management Plan (Carlsbad HMP) under the Multiple Habitat Conservation Plan (MHCP); therefore, all revised critical habitat that overlaps with the Villages of La Costa HCP was analyzed under section 4(b)(2) of the Act as part of the Carlsbad HMP discussion. These areas have again been excluded from this revised designation under section 4(b)(2) of the Act (*see* Exclusions Under Section 4(b)(2) of the Act section below).

In the 2005 rule, we identified areas covered by HCPs that provided protections for *Brodiaea filifolia,* and excluded those areas because we concluded they did not require special management considerations or protection. We are not using this approach in this rule. In this rule, we identified areas covered by HCPs that are conserved and managed and have weighed the benefits of exclusion against the benefits of including these areas in the revised critical habitat designation pursuant to section 4(b)(2) of the Act.

This rule uses a new economic analysis to identify and estimate the potential economic effects resulting from implementation of conservation actions associated with the revised critical habitat. The analysis is based on estimated incremental impacts associated with critical habitat.

We made changes to the primary constituent elements (PCEs) and our criteria used to identify critical habitat. We incorporated information related to the taxonomy of the species including the change in plant family for *Brodiaea filifolia.* We redefined the boundaries of each subunit proposed as revised critical habitat to more accurately reflect the areas that include the features that

are essential to the conservation of *B. filifolia,* and we analyzed new distribution data (in the 2009 proposed revised critical habitat rule) that has become available to us following the 2005 designation. Table 1 shows the progression of each subunit of critical habitat from the 2005 final critical habitat designation to this final revised critical habitat designation. Table 2 includes name changes that we made for some of the subunits where the old names were ambiguous or do not reflect the current name used to refer to these areas; although the names of these units changed, the locations of these units have not changed. Following Tables 2 and 3, we provide a detailed description of each change made in this revised rule and point to new information that precipitated the change.

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
Unit 1: Los Angeles County:			
1a. Glendora	96 ac (39 ha)	67 ac (27 ha)	67 ac (27 ha).
1b. San Dimas	198 ac (80 ha)	138 ac (56 ha)	138 ac (56 ha).
Unit 2: San Bernardino County:			
2. Arrowhead Hot Springs	Not designated, wrong location.	61 ac (25 ha)	61 ac (25 ha).
Unit 3: Central Orange County:			
3. Aliso Canyon	Not designated, did not meet the definition of critical habitat.	113 ac (46 ha)	11 ac (4 ha); partially excluded under section 4(b)(2).
Unit 4: Southern Orange County:			
4a. Arroyo Trabuco	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4b. Caspers Wilderness Park	Excluded under section 4(b)(2).	205 ac (83 ha)	12 ac (5 ha); partially excluded under section 4(b)(2).
4c. Cañada Gobernadora/Chiquita Ridgeline.	Excluded under section 4(b)(2).	133 ac (54 ha)	133 ac (54 ha).
4d. Prima Deschecha	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4e. Forster Ranch	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4f. Talega/Segunda Deshecha	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4g. Cristianitos Canyon	Excluded under section 4(b)(2).	587 ac (238 ha)	587 ac (238 ha).
4h. Cristianitos Canyon South	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4i. Blind Canyon	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
Unit 5: Northern San Diego County:			
5a. Miller Mountain	Not designated, mostly hybrid plants.	Not proposed, only *Brodiaea santarosae* present.	N/A.
5b. Devil Canyon	249 ac (101 ha)	274 ac (111 ha)	274 ac (111 ha).
Unit 6: Oceanside:			
6a. Alta Creek	Not designated, did not meet the definition of critical habitat.	72 ac (29 ha)	72 ac (29 ha).
6b. Mesa Drive	Excluded under section 4(b)(2).	17 ac (7 ha)	17 ac (7 ha).
6c. Mission View/Sierra Ridge	Not designated, did not meet the definition of critical habitat.	12 ac (5 ha)	12 ac (5 ha).
6d. Taylor/Darwin	Excluded under section 4(b)(2).	35 ac (14 ha)	35 ac (14 ha).
6e. Arbor Creek/Colucci	N/A	94 ac (38 ha)	94 ac (38 ha).
Unit 7: Carlsbad			
7a. Letterbox Canyon	Excluded under section 4(b)(2).	57 ac (23 ha)	43 ac (17 ha); partially excluded under section 4(b)(2); 2 ac (1 ha) removed—do not meet the definition of critical habitat.
7b. Rancho Carrillo	Not designated, did not meet the definition of critical habitat.	37 ac (15 ha)	37 ac (15 ha).

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *—Continued

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
7c. Calavera Hills Village H	Excluded under section 4(b)(2).	71 ac (29 ha)	26 ac (11 ha); partially excluded under section 4(b)(2).
7d. Villages of La Costa (Rancho La Costa)	Excluded under section 4(b)(2).	98 ac (40 ha)	Excluded under section 4(b)(2).
Carlsbad Oaks	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Carlsbad Highlands	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Poinsettia	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Unit 8: San Marcos and Vista:			
8a. Rancho Santa Fe Road North	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8b. Rancho Santalina/Loma Alta	Not included under section 3(5)(A).	47 ac (19 ha)	47 ac (19 ha).
8c. Grand Avenue	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8d. Upham	54 ac (22 ha)	54 ac (22 ha)	54 ac (22 ha).
8e. Linda Vista	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8f. Oleander/San Marcos Elementary	N/A	7 ac (3 ha)	7 ac (3 ha).
Unit 9:			
9. Double LL Ranch	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
Unit 10:			
10. Highland Valley	Not designated; could not verify occurrence.	N/A	N/A.
Unit 11: Western Riverside County:			
11a. San Jacinto Wildlife Area	Excluded under section 4(b)(2).	401 ac (162 ha)	401 ac (162 ha).
11b. San Jacinto Avenue/Dawson Road	Excluded under section 4(b)(2).	117 ac (47 ha)	117 ac (47 ha).
11c. Case Road	Excluded under section 4(b)(2).	180 ac (73 ha)	180 ac (73 ha).
11d. Railroad Canyon	Excluded under section 4(b)(2).	257 ac (104 ha)	257 ac (104 ha).
11e. Upper Salt Creek (Stowe Pool)	Excluded under section 4(b)(2).	145 ac (59 ha)	145 ac (59 ha).
11f. Santa Rosa Plateau—Mesa de Colorado.	Excluded under section 4(b)(2).	234 ac (95 ha)	13 ac (5 ha); partially excluded under section 4(b)(2).
Santa Rosa Plateau—Tenaja Rd	Excluded under section 4(b)(2).	Not proposed; only *Brodiaea santarosae* present.	N/A.
11g. Santa Rosa Plateau—South of Tenaja Rd.	Excluded under section 4(b)(2).	117 ac (47 ha)	Excluded under section 4(b)(2).
11h. Santa Rosa Plateau—North of Tenaja Rd.	Excluded under section 4(b)(2).	44 ac (18 ha)	Excluded under section 4(b)(2).
East of Tenaja Guard Station	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
N. End Redondo Mesa	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Corona (north)	Not designated, could not verify occurrence.	N/A	N/A.
Corona (south)	Not designated, could not verify occurrence.	N/A	N/A.
Moreno Valley	Not designated, could not verify occurrence.	N/A	N/A.
Unit 12: San Diego County:			

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *—Continued

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
12. Artesian Trails	N/A	109 ac (44 ha)	105 ac (43 ha); partially excluded under section 4(b)(2).
TOTAL FOR NON-MILITARY LANDS	**597 ac (242 ha)**	**3,786 ac (1,532 ha)**	**2,945 ac (1,193 ha)**.
Marine Corps Base Camp Pendleton:			
Cristianitos Canyon Pendleton	N/A	4(a)(3) exemption	4(a)(3) exemption.
Bravo One	4(a)(3) exemption	4(a)(3) exemption	4(a)(3) exemption.
Bravo Two South	N/A	4(a)(3) exemption	4(a)(3) exemption.
Alpha One/Bravo Three	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Basilone/San Mateo Junction	N/A	4(a)(3) exemption	4(a)(3) exemption.
Camp Horno	4(a)(3) exemption	4(a)(3) exemption	4(a)(3) exemption.
SE Horno Summit	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Kilo One	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Pilgrim Creek	N/A	4(a)(3) exemption	4(a)(3) exemption.
South White Beach	N/A	4(a)(3) exemption	4(a)(3) exemption.
TOTAL FOR MILITARY LANDS***	**0 ac (0 ha)**	**0 ac (0 ha)**	**0 ac (0 ha)**.
TOTALS	**597 ac (242 ha)**	**3,786 ac (1,532 ha)**	**2,947 ac (1,193 ha)**.

* This table does not include all locations that are occupied by *Brodiaea filifolia.* It includes only those locations that have met the definition of critical habitat in this or one of the past proposed or final critical habitat rules for *B. filifolia.*

** Values in this table and the following text may not sum due to rounding.

*** Military Lands are exempt from this rule under section 4(a)(3) of the Act.

TABLE 2—NAME CHANGES FROM THE 2005 FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA TO THIS FINAL REVISED CRITICAL HABITAT DESIGNATION

Subunit No.	Previous name	Current name	Reason for change
6c	Oceanside East/Mission Ave	Mission View/Sierra Ridge	Not the eastern most occurrence in Oceanside.
7a	Fox-Miller	Letterbox Canyon	Includes more properties than just Fox-Miller.
7c	Calavera Heights	Calavera Hills Village H	New name is more specific.
11b	San Jacinto Floodplain	San Jacinto Avenue/Dawson Road	New name is more specific.
11c	Case Road Area	Case Road	New name is more specific.

Summary of Changes From the 2009 Proposed Revised Critical Habitat Rule

The most significant changes between the December 2009 proposed revision and this final revised rule are outlined in Table 1 above and include:

(1) In the proposed revised rule, we considered lands covered by the Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan, now known as the Orange County Southern Subregion HCP, for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the Orange County Southern Subregion HCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 192 ac (78 ha) of proposed revised critical habitat in Subunit 4b that are covered by the Orange County Southern Subregion HCP and are conserved and managed. We also determined that exclusion of these areas will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(2) In the proposed revised rule, we considered lands covered by the Carlsbad Habitat Management Plan (HMP) under the San Diego Multiple Habitat Conservation Program (MHCP) for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the Carlsbad HMP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 156 ac (63 ha) of proposed revised critical habitat in Subunits 7a, 7c, and 7d that are covered by the Carlsbad HMP under the MHCP and are conserved and managed. We also determined that exclusion of these areas will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(3) We have determined that 2 ac (1 ha) of land in Subunit 7a do not meet the definition of critical habitat for *Brodiaea filifolia* because they do not contain habitat suitable for the species. We are therefore not including these areas in the revised critical habitat designation.

(4) In the proposed revised rule, we considered lands within the Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP) planning area for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion

under the Western Riverside County MSHCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 381 ac (154 ha) of proposed revised critical habitat in Subunits 11g, 11h, and a portion of Subunit 11f that are covered by the Western Riverside County MSHCP and are conserved and managed. We also determined that exclusion of these lands will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(5) In the proposed revised rule, we considered lands covered by the San Diego Multiple Species Conservation Program (MSCP) for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the MSCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 4 ac (2 ha) of proposed revised critical habitat in Unit 12 that are under the County of San Diego Subarea Plan and are conserved and managed. We also determined that exclusion of these lands will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(6) A number of comments we received suggested editorial changes and technical corrections to sections of the rule pertaining to the Background and Criteria Used To Identify Critical Habitat sections of the proposed revised rule. These changes were recommended to improve clarity, include additional information, and correct minor errors. They have been incorporated into this final rule, where appropriate.

Critical Habitat

Background

Critical habitat is defined in section 3(5)(A) of the Act as: (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features:

(a) Essential to the conservation of the species and

(b) Which may require special management considerations or protection; and (2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management, such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot otherwise be relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing activities that are likely to result in the destruction or adverse modification of critical habitat. Section 7(a)(2) of the Act requires consultation on Federal actions that may affect critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by private landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) would apply, but even in the event of a destruction or adverse modification finding, the landowner's obligation is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

For inclusion in a critical habitat designation, the habitat within the geographical area occupied by the species at the time of listing must contain physical or biological features that are essential to the conservation of the species, and be included only if those features may require special management considerations or protection. The physical and biological features are the primary constituent elements (PCEs) laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species. Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species (*i.e.,* areas on which are found the PCEs laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species). Under the Act and regulations at 50 CFR 424.12, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed as critical habitat only when we determine that those areas are essential for the conservation of the species and that designation limited to the geographical area occupied at the time of listing would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (44 U.S.C. 3516), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific and commercial data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge. Substantive comments received in response to proposed critical habitat designations are also considered.

Habitat is often dynamic, and species may move from one area to another over time. Climate change will be a particular challenge for biodiversity because the interaction of additional stressors associated with climate change and current stressors may push species beyond their ability to survive (Lovejoy 2005, pp. 325–326). The synergistic

implications of climate change and habitat fragmentation are the most threatening facet of climate change for biodiversity (Hannah *et al.* 2005, p. 4). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al.* 1999, pp. 1–3; Hayhoe *et al.* 2004, p. 12422; Cayan *et al.* 2005, p. 6; Intergovernmental Panel on Climate Change (IPCC) 2007, p. 11; Cayan *et al.* 2009, p. xi). Additionally, the southwestern region of the country is predicted to become drier and hotter overall (Hayhoe *et al.* 2004, p. 12424; Seager *et al.* 2007, p. 1181). Climate change may also affect the duration and frequency of drought and these climatic changes may become even more dramatic and intense (Graham 1997). Documentation of climate-related changes that have already occurred in California (Croke *et al.* 1998, pp. 2128, 2130; Brashears *et al.* 2005, p. 15144), and future drought predictions for California (*e.g.,* Field *et al.* 1999, pp. 8–10; Lenihen *et al.* 2003, p. 1667; Hayhoe *et al.* 2004, p. 12422; Brashears *et al.* 2005, p. 15144; Seager *et al.* 2007, p. 1181) and North America (IPCC 2007, p. 9) indicate prolonged drought and other climate-related changes will continue in the foreseeable future.

We anticipate these changes could affect a number of native plants, including *Brodiaea filifolia* habitat and occurrences. For example, if the amount and timing of precipitation or the average temperature increases in southern California, the following four changes may affect the long-term viability of *B. filifolia* occurrences in their current habitat configuration:

(1) Drier conditions may result in a lower germination rate and smaller population sizes;

(2) A shift in the timing of annual rainfall may favor nonnative species that impact the quality of habitat for this species;

(3) Warmer temperatures may affect the timing of pollinator life-cycles causing pollinators to become out-of-sync with timing of flowering *B. filifolia;* and

(4) Drier conditions may result in increased fire frequency, making the ecosystems in which *B. filifolia* currently grows more vulnerable to the threats of subsequent erosion and nonnative or native plant invasion.

At this time, we are unable to identify the specific ways that climate change may impact *Brodiaea filifolia;* therefore, we are unable to determine if any additional areas may be appropriate to include in this revised critical habitat designation. Additionally, we recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not promote the recovery of the species.

Areas that support occurrences of the species, but are outside the critical habitat designation, will continue to be subject to conservation actions we and other Federal agencies implement under section 7(a)(1) of the Act. In these areas, the species is also subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best scientific and commercial information available at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, HCPs, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Primary Constituent Elements

Physical and Biological Features

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas occupied by the species at the time of listing to designate as critical habitat, we consider those physical or biological features that are essential to the conservation of the species that may require special management considerations or protection. We consider the physical or biological features to be the PCEs laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species. The PCEs include, but are not limited to:

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, and rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

We derive the PCEs required for *Brodiaea filifolia* from its biological needs. The areas included in our revised critical habitat for *B. filifolia* contain the appropriate soils and associated vegetation at suitable elevations, and adjacent areas necessary to maintain associated physical processes such as a suitable hydrological regime. The areas provide suitable habitat, water, minerals, and other physiological needs for reproduction and growth of *B. filifolia,* as well as habitat that supports pollinators of *B. filifolia.* The PCEs and the resulting physical and biological features essential to the conservation of *B. filifolia* are derived from studies of this species' habitat, ecology, and life history as described in the **Background** section of the proposed revised rule (74 FR 64930; December 8, 2009), the previous critical habitat rule (70 FR 73820; December 13, 2005), and in the final listing rule (63 FR 54975; October 13, 1998).

Space for Individual and Population Growth and for Normal Behavior

Habitats that provide space for growth and persistence of *Brodiaea filifolia* include areas: (1) With combinations of appropriate elevation and clay or clay-associated soils, on mesas or low to moderate slopes that support open native or annual grasslands within open coastal sage scrub or coastal sage scrub-chaparral communities; (2) in floodplains or in association with vernal pool or playa complexes that support various grassland, scrub, or riparian herb communities; (3) on soils derived from olivine basalt lava flows on mesas and slopes that support vernal pools within grassland, oak woodland, or savannah communities; or (4) on sandy loam soils derived from basalt and granodiorite parent material with deposits of cobbles and boulders supporting intermittent seeps, and open marsh communities. Despite the wide range of habitats where *B. filifolia* occurs, this species occupies a specific niche of habitat that is moderately wet to occasionally wet.

Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements

All members of the genus *Brodiaea* require full sun and many tend to occur on only one or a few soil series (Niehaus 1971, pp. 26–27). *Brodiaea filifolia* occurs on several formally named soil series, but most (if not all) of these are primarily clay soils with varying amounts of sand and silt. In this rule, we listed all the mapped soils that

overlap with the distribution of *B. filifolia.* Sometimes clay soils occur as inclusions within other soil series; as such, we have named those other soil series in this rule. Another reason that there are many differently named soil series is because this species occurs in five counties, each of which has uniquely named soils. In some areas in northern San Diego County and southwestern Riverside County, the species is identified with mapped soils with no known clay component; however, closer study and sight specific sampling may show these soils contain clay in the specific areas supporting *B. filifolia.* Despite this issue and the diversity in named soil series, *B. filifolia* is considered a clay soils endemic.

In San Diego, Orange, and Los Angeles Counties, occurrences of *Brodiaea filifolia* are highly correlated with specific clay soil series such as, but not limited to: Alo, Altamont, Auld, and Diablo or clay lens inclusions in a matrix of loamy soils such as Fallbrook, Huerhuero, and Las Flores series (63 FR 54975, p. 54978; CNDDB 2009, pp. 1–76; Service Geographic Information System (GIS) data 2009; USDA 1994). These soils generally occur on mesas and hillsides with gentle to moderate slopes, or in association with vernal pools. These soils are generally vegetated with open native or nonnative grassland, open coastal sage scrub, or open coastal sage scrub-chaparral communities. In San Bernardino County, the species is associated with Etsel family-Rock outcrop-Springdale and Tujunga-Urban land-Hanford soils (Service 2009a, Service GIS data). These soils are generally vegetated with open native and nonnative grassland, open coastal sage scrub, or open coastal sage scrub-chaparral communities.

In western Riverside County, the species is often found on alkaline silty-clay soil series such as, but not limited to, Domino, Grangeville, Waukena, and Willows underlain by a clay subsoil or caliche (a hardened gray deposit of calcium carbonate). These soils generally occur in low-lying areas and floodplains or are associated with vernal pool or playa complexes. These soils are generally vegetated with open native and nonnative grassland, alkali grassland, or alkali scrub communities. Also in western Riverside County, the species is found on clay loam soils underlain by heavy clays derived from basalt lava flows (*i.e.,* Murrieta series on the Santa Rosa Plateau) (Bramlet 1993, p. 1; CNDDB 2009, pp. 1–76; Service 2009a, Service GIS data). These soils generally occur on mesas and gentle to moderate slopes or are associated with basalt vernal pools. These soils are vegetated with open native or nonnative grassland or oak woodland savannah communities.

In some areas in northern San Diego County and southwestern Riverside County, the species is found on sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps. These soils and deposits are generally vegetated by open riparian and freshwater marsh communities associated with intermittent drainages, floodplains, and seeps. These soils facilitate the natural process of seed dispersal and germination, cormlet disposition or movement to an appropriate soil depth, and corm persistence through seedling and adult phases of flowering and fruit set.

Habitats That Are Protected From Disturbance or Are Representative of the Historical, Geographical, and Ecological Distributions of the Species

The conservation of *Brodiaea filifolia* is dependent on several factors including, but not limited to, maintenance of areas of sufficient size and configuration to sustain natural ecosystem components, functions, and processes (such as full sun exposure, natural fire and hydrologic regimes, adequate biotic balance to prevent excessive herbivory); protection of existing substrate continuity and structure, connectivity among groups of plants of this species within geographic proximity to facilitate gene flow among the sites through pollinator activity and seed dispersal; and sufficient adjacent suitable habitat for vegetative reproduction and population expansion.

A natural, generally intact surface and subsurface soil structure, perhaps lightly impacted, but not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), and associated physical processes such as a natural hydrological regime is necessary to provide water, minerals, and other physiological needs for *Brodiaea filifolia.* A natural hydrological regime includes seasonal hydration followed by drying out of the substrate to promote growth of plants and new corms for the following season. These conditions are also necessary for the normal development of seedlings and young vegetative cormlets.

Habitat for Pollinators of *Brodiaea filifolia*

Cross-pollination is essential for the survival and recovery of *Brodiaea filifolia* because this species is self-incompatible and it cannot sexually reproduce without the aid of insect pollinators. A variety of insects are known to cross-pollinate *Brodiaea* species, including tumbling flower beetles (Mordellidae, Coleoptera) and sweat bees (Halictidae, Hymenoptera; Niehaus 1971, p. 27). Bell and Rey (1991, p. 3) report that native bees observed pollinating *B. filifolia* on the Santa Rosa Plateau in Riverside County include *Bombus californicus* (Apidae, Hymenoptera), *Hoplitus* sp. (Megachilidae, Hymenoptera), *Osmia* sp. (Megachilidae, Hymenoptera), and an unidentified Anthophorid (digger-bee). Anthophoridae and Halictidae are important pollinators of *B. filifolia,* as shown at a study site in Orange County (Glenn Lukos Associates 2004, p. 3). Supporting and maintaining pollinators and pollinator habitat is essential to the conservation of *B. filifolia* because this species cannot set viable seed without cross-pollination.

Of primary concern to the conservation of *Brodiaea filifolia* are solitary bees (such as sweat bees (*Hoplitus* sp. and *Osmia* sp.)) because these are the pollinators that have the most specific habitat requirements (such as nesting requirements) and are impacted by fragmentation and reduced diversity of natural habitats at a small scale (Gathmann and Tscharntke 2002, p. 757; Steffan-Dewenter 2003, p. 1041; Shepherd 2009, pers. comm.). Due to the focused foraging habits of solitary bees, we believe that these insects may be the most important to the successful reproduction of *B. filifolia.* To sustain an active pollinator community for *B. filifolia,* alternative pollen or food source plants may be necessary for the persistence of these insects when *B. filifolia* is not in flower. It is also necessary for nest sites for pollinators to be located within flying distance of *B. filifolia* occurrences.

Bombus spp. (bumblebees) may also be important to the pollination of *Brodiaea filifolia,* however, these insects may be able to travel greater distances and cross fragmented landscapes to pollinate *B. filifolia.* In a study of experimental isolation and pollen dispersal of *Delphinium nuttallianum* (Nuttall's larkspur), Schulke and Waser (2001, pp. 242–243) report that adequate pollen loads were dispersed by bumblebees within control populations and in isolated experimental "populations" from 164 to 1,312 feet (ft) (50 to 400 meters (m)) from the control populations. One of several pollinator taxa effective at 1,312 ft (400 m) was *Bombus californicus* (Schulke and Waser 2001, pp. 240–243), which was also one of four bee species observed

pollinating *B. filifolia* by Bell and Rey (1991, p. 2). Studies by Steffan-Dewenter and Tscharntke (2000, p. 293) demonstrated that it is possible for bees to forage as far as 4,920 ft (1,500 m) from a colony, and at least one study suggests that bumblebees may forage many kilometers away (Sudgen 1985, p. 308). Bumblebees may be effective at transferring pollen between occurrences of *B. filifolia* because they are larger and have been found pollinating plants at distances of 1,312 to 4,920 ft (400 to 1,500 m). However, the visits and focused effort of bumblebees may be less frequent than ground-nesting bees.

Ground-nesting solitary bees appear to have limited dispersal and flight abilities (Thorp and Leong 1995, p. 7). Studies have shown that as areas are fragmented by development, remaining habitat areas have reduced pollinator diversity (Steffan-Dewenter 2003, p. 1041). If pollinators are eliminated from an occurrence, *Brodiaea filifolia* will no longer be able to reproduce sexually. Of the native bees that have been observed pollinating *B. filifolia,* solitary ground-nesting bees are the most sensitive to habitat disturbance and the most likely to be lost from an area. Sweat bees, *Holitus,* and Osmia (mason bees), fly approximately 900 to 1,500 ft (274 to 457 m), 600 to 900 ft (183 to 274 m), and 600 to 1,800 ft (183 to 549 m), respectively (Shepherd 2009, pers. comm.). *Bombus californicus* (family Apidae) and digger bees (family Apidae) fly further, generally more than 2,640 ft (804 m) (Shepherd 2009, pers. comm.). These flight distances are important in determining what habitat associated with *B. filifolia* occurrences provides habitat for this species' pollinators. Conserving habitat where these pollinators nest and forage will sustain an active pollinator community and provide for the cross-pollination of *B. filifolia.*

In our review of the data on pollinators of *Brodiaea filifolia* in the 2005 critical habitat rule, we determined that an 820-ft (250-m) area around each occurrence identified in the critical habitat would provide adequate space to support *B. filifolia's* pollinators. In the 2005 critical habitat rule, we based the 820-ft (250-m) distance on a conservative estimate for the mean routine flight distance for bees. This distance represents an estimate of flight distance for pollinators that fly an average of less than 1,800 ft (549 m) (*i.e.,* the maximum distance observed by known pollinators of *B. filifolia* except *Bombus californicus*). Research supports this distance, as studies looking at areas with a radius of 820 ft (250 m) have found that solitary bees forage at this scale and that if fragmentation occurs at this scale the presence of solitary bees will decrease (Steffan-Dewenter *et al.* 2002, pp. 1027–1029; Shepherd 2009, pers. comm.). Insects that travel greater distances than 1,800 ft (549 m) on average may also find habitat within 820 ft (250 m) of *B. filifolia* occurrences. It is also possible that insects flying greater than 1,800 ft (549 m) are flying in from greater distances (*Bombus californicus* and *Anthophora*) and are living in habitats that are not directly connected with areas supporting *B. filifolia.* Delineating a pollinator use area larger than 820 ft (250 m) around *B. filifolia* would capture habitat that may not directly contribute to the conservation of *B. filifolia.* Including habitat extending beyond the perimeters of mapped occurrences of *B. filifolia* by up to 820 ft (250 m) in the PCEs is necessary to support pollinator activity in critical habitat, support the sexual reproduction of *B. filifolia,* and provide for gene flow, pollen dispersal, and seed dispersal.

Primary Constituent Elements for Brodiaea filifolia

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of *Brodiaea filifolia* and that may require special management considerations or protection. The physical or biological features essential to the conservation of the species are those PCEs laid out in an appropriate quantity and spatial arrangement determined to be essential to the conservation of the species. All final revised critical habitat areas for *B. filifolia* are currently occupied, are within the geographical area occupied by the species at the time of listing, and contain sufficient PCEs to support at least one life history function of the species (*see* the Spatial Distribution and Historical Range section of the proposed revised rule).

Based on our current knowledge of the life history, biology, and ecology of *Brodiaea filifolia,* and the requirements of the habitat to sustain the life-history traits of the species, we determined that the PCEs specific to *B. filifolia* are:

(1) PCE 1—Appropriate soil series at a range of elevations and in a variety of plant communities, specifically:

(A) Clay soil series of various origins (such as Alo, Altamont, Auld, or Diablo), clay lenses found as unmapped inclusions in other soils series, or loamy soils series underlain by a clay subsoil (such as Fallbrook, Huerhuero, or Las Flores) occurring between the elevations of 100 and 2,500 ft (30 and 762 m).

(B) Soils (such as Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils) altered by hydrothermal activity occurring between the elevations of 1,000 and 2,500 ft (305 and 762 m).

(C) Silty loam soil series underlain by a clay subsoil or caliche that are generally poorly drained, moderately to strongly alkaline, granitic in origin (such as Domino, Grangeville, Traver, Waukena, or Willows) occurring between the elevations of 600 and 1,800 ft (183 and 549 m).

(D) Clay loam soil series (such as Murrieta) underlain by heavy clay loams or clays derived from olivine basalt lava flows occurring between the elevations of 1,700 and 2,500 ft (518 and 762 m).

(E) Sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps occurring between 1,800 and 2,500 ft (549 and 762 m).

(2) PCE 2—Areas with a natural, generally intact surface and subsurface soil structure, not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), extending out up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide for space for individual population growth, and space for pollinators.

This revision to the previous critical habitat designation is designed for the conservation of those areas containing PCEs necessary to support the species' life history traits. All units/subunits of the revised critical habitat contain one of the specific soil components identified in PCE 1, which facilitate the natural process of seed dispersal and germination, cormlet disposition or movement to an appropriate soil depth, and corm persistence through seedling and adult phases of flowering and fruit set (*see* Habitat section of the proposed revised critical habitat rule for this species (74 FR 64932)), and have natural, generally intact surface and subsurface soil structure necessary to provide water, minerals, and other physiological needs for the species and support habitat for pollinators, which facilitate reproduction, as identified in PCE 2. These two factors are sufficient to support life-history traits of *Brodiaea filifolia* in the units/subunits we designate as revised critical habitat. In general, we designate units/subunits based on the presence of the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of the species. In the case of this designation, all of the units/subunits contain both of the PCEs.

Special Management Considerations or Protection

When designating critical habitat within the geographical area occupied by the species at the time of listing, we assess whether the physical or biological features essential to the conservation of the species may require special management considerations or protection. In all units/subunits, special management considerations or protection of the essential features may be required to provide for the growth, reproduction, and sustained function of the habitat on which *Brodiaea filifolia* depends.

The lands designated as revised critical habitat represent our best assessment of the habitat that meets the definition of critical habitat for *Brodiaea filifolia* at this time. The essential physical or biological features within the areas designated as revised critical habitat may require some level of management to address current and future threats to *B. filifolia,* including the direct and indirect effects of habitat loss and degradation from urban development; the introduction of nonnative invasive plant species; recreational activities; discing and mowing for agricultural practices or fuel modification for fire management; dumping of manure and sewage sludge; and hybridization with other species of *Brodiaea.*

Loss and degradation of habitat from development was cited in the final listing rule as a primary cause for the decline of *Brodiaea filifolia.* Most of the populations of this species are located in San Diego, Orange, and Riverside counties. These counties have had (and continue to have) increasing human populations and attendant housing pressure. Natural areas in these counties are frequently near or bounded by urbanized areas. Urban development removes the plant community components and associated clay soils identified in the PCEs, which eliminates or fragments the populations of *B. filifolia.* Grading, discing, and scraping areas in the preparation of areas for urbanization also directly alters the soil surface as well as subsurface soil layers to the degree that they will no longer support plant community types and pollinators associated with *B. filifolia* (PCE 2). Conservation and management of *B. filifolia* habitat and adjacent pollinator habitat is needed to address the threat of development.

Nonnative invasive plant species may alter the vegetation composition or physical structure identified in the PCEs to an extent that the area does not support *Brodiaea filifolia* or the plant community that it inhabits. Additionally, invasive species may compete with *B. filifolia* for space and resources by depleting water that would otherwise be available to *B. filifolia.* Management activities including (but not limited to) nonnative plant removal and control are needed to reduce this threat.

Unauthorized recreational activities may impact the vegetation composition and soil structure that supports *Brodiaea filifolia* to an extent that the area will no longer have intact soil surfaces or the plant communities identified in the PCEs. Off-highway vehicle (OHV) activity is an example of this type of activity. Management activities such as (but not limited to) fencing or other barriers to unauthorized access, signage, and monitoring are needed to address this threat.

Some methods of mowing or discing for agricultural purposes or fuel modification for fire management may preclude the full and natural development of *Brodiaea filifolia* by adversely affecting the PCEs. Mowing may preclude the successful reproduction of the plant, or alter the associated vegetation needed for pollinator activity (PCE 2). Dumping of sewage sludge can cover plants as well as the soils they need. Additionally, this practice can alter the chemistry of the substrate and lead to alterations in the vegetation supported at the site (PCE 1). Management activities such as (but not limited to) fencing, signage, and education of landowners and land managers about the detrimental effects that mowing, discing, and dumping sewage have on *B. filifolia* and its habitat are needed to address this threat.

Manure dumping on private property along the San Jacinto River area is impacting habitat within the Western Riverside County MSHCP plan area. These impacts are occurring despite identification of these areas as important for the survival and recovery of *Brodiaea filifolia* in the Western Riverside County MSHCP. Manure dumping is not a covered activity under the Western Riverside County MSHCP and was not discussed as an impact to *B. filifolia* in the Biological Opinion on the Western Riverside County MSHCP (Service 2004b, pp. 378–386). As outlined in the Western Riverside County MSHCP, we have been working with permittees to implement additional ordinances that will help to control activities (such as manure dumping) that may impact the implementation of the Western Riverside County MSHCP conservation objectives. To date, the City of Hemet is the only Western Riverside County MSHCP permittee that has addressed the negative impacts that manure dumping has on species such as *B. filifolia* and *Navarretia fossalis* and their habitats through the enactment of Ordinance 1666 (*i.e.,* the ordinance that prevents manure dumping activities and educates its citizens). We will continue to work with Riverside County and permittees of the Western Riverside County MSHCP to address activities that may impact the species within the Western Riverside County MSHCP plan area.

The Service is aware of occurrences of some hybrids within the range of *Brodiaea filifolia* in Subunit 5b (Devil Canyon) in northwestern San Diego County (Chester et al. 2007, p. 193). The presumed parent taxa of these hybrids are considered to be *B. filifolia* and *B. orcuttii* because of the apparent morphological intermediacy of the individuals and proximity of their ranges. This is supported by the close relationship of the two species noted above. Although there are some hybrids of *B. filifolia* and *B. orcuttii* in this subunit, it is likely that a minimum of 850 plants are pure *B. filifolia* (Service 2009b, p. 15) (we consider occurrences that have between 850 and 3,000 flowering stems observed in multiple years to be stable and persistent because we expect these occurrences to have a sufficient amount of corms to sustain the occurrence for a number of years if the habitat remains unaltered (see *Criteria Used* section below)). Plants of hybrid origin have also been reported in Subunit 8d (Upham) in the City of San Marcos (Chester *et al.* 2007, p. 191). Chester *et al.* (2007) only found a few hybrid specimens at this location, therefore it is likely that a minimum of 850 plants are pure *B. filifolia.* Hybridization could result in the loss of portions of *B. filifolia* occurrences if other *Brodiaea* species are transplanted adjacent to existing *B. filifolia* occurrences, or if existing *B. filifolia* occurrences are transplanted adjacent to other *Brodiaea* species and the two species are able to hybridize. Informing biological resource managers of the existence of this threat will help to keep human-mediated hybridization from occurring.

In summary, we find that the areas we are designating as revised critical habitat contain the physical or biological features essential to the conservation of *Brodiaea filifolia,* and that these features may require special management considerations or protection. Special management considerations or protection may be required to eliminate, or reduce to negligible level, the threats affecting each unit/subunit and to preserve and

maintain the essential features that the revised critical habitat units/subunits provide to *B. filifolia.* Additional discussions of threats facing individual sites are provided in the individual unit/subunit descriptions.

The designation of critical habitat does not imply that lands outside of critical habitat may not play an important role in the conservation of *Brodiaea filifolia.* In the future, and with changed circumstances, these lands may become essential to the conservation of *B. filifolia.* Activities with a Federal nexus that may affect areas outside of revised critical habitat, such as development, agricultural activities, and road construction, are still subject to review under section 7 of the Act if they may affect *B. filifolia* because Federal agencies must consider both effects to the plant and effects to critical habitat independently. The prohibitions of section 9 of the Act applicable to *B. filifolia* under 50 CFR 17.71 (*e.g.,* the prohibition against reducing to possession or maliciously damaging or destroying listed plants on Federal lands) also continue to apply both inside and outside of designated critical habitat.

Criteria Used To Identify Critical Habitat

We determined that all areas we are designating as final revised critical habitat are within the geographical area occupied by *Brodiaea filifolia* at the time of listing and are currently occupied (*see* the Spatial Distribution and Historical Range section of the proposed revised critical habitat rule (74 FR 64929; December 8, 2009) for more information). We considered the areas outside the geographical area occupied by the species at the time of listing, but are not designating any areas outside the geographical area occupied by *B. filifolia* at the time of listing because we determined that a subset of occupied lands within the species' historical range are adequate to ensure the conservation of *B. filifolia.* Occupied areas exist throughout this species' historical range, and through the conservation of a subset of occupied habitats (35 of 68 extant occurrences, *see* Table 1), we will be able to stabilize and conserve *B. filifolia* throughout its current and historical range. All units/subunits designated as revised critical habitat contain the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of this species and support multiple life-history traits for *B. filifolia.*

As required by section 4(b) of the Act, we use the best scientific and commercial data available in determining areas that contain the physical or biological features that are essential to the conservation of *Brodiaea filifolia.* The data used for this revised critical habitat are summarized below. This rule reflects the best available scientific and commercial information and thus differs from our 2005 final critical habitat rule.

This section provides details of the process we used to delineate critical habitat. This final rule reflects a progression of conservation efforts for *Brodiaea filifolia* that is largely based on the past analysis of the areas identified as meeting the definition of critical habitat for *B. filifolia* as identified in the 2004 proposed critical habitat rule, the 2005 final critical habitat designation, and new information we obtained on the species' distribution since listing. For some areas that were analyzed in 2005 but determined not to meet the definition of critical habitat, we received new distribution information for the proposed revised rule that resulted in determining that those areas do meet the definition of critical habitat. There are also some areas identified as meeting the definition of critical habitat in the 2005 critical habitat designation that we did not include in the proposed revised rule and this final revised critical habitat designation because we determined, based on a review of the best available information, that they do not meet the definition of critical habitat. The specific differences from the 2005 designation of critical habitat are summarized in the Summary of Changes from the Proposed Revised Rule and the Previous Critical Habitat Designation section of this rule.

Species and plant communities that are protected across their ranges are expected to have lower likelihoods of extinction (Soule and Simberloff 1986, p. 35; Scott *et al.* 2001, pp. 1297–1300). Genetic variation generally results from the effects of population isolation and adaptation to locally distinct environments (Lesica and Allendorf 1995, pp. 754–757; Hamrick and Godt 1996, pp. 291–295; Fraser 2000, pp. 49–51). We sought to include the range of ecological conditions in which *Brodiaea filifolia* is found to preserve the genetic variation that may reflect adaptation to local environmental conditions, as documented in other plant species (such as in Millar and Libby 1991, pp. 150, 152–155; or Hamrick and Godt 1996, pp. 299–301). A suite of locations that possess unique ecological characteristics will represent more of the environmental variability under which *B. filifolia* has evolved. Protecting these areas will promote the adaptation of the species to different environmental conditions and contribute to species recovery.

We also determined that habitat for pollinators is essential to the survival and recovery of this species because *Brodiaea filifolia* is self-incompatible (genetically similar individuals are not able to produce viable seeds). Sexual reproduction, facilitated through pollination, is necessary for the long-term conservation of this species.

All critical habitat discussed in this final revised critical habitat designation is occupied by the species at the subunit level, meaning that each subunit contains at least one known occurrence of *Brodiaea filifolia.* Occupied areas were determined from survey data and element occurrence data in the California Natural Diversity Database (CNDDB) (CNDDB 2009, pp. 1–76). Using GIS data in the areas identified as occupied by this species as a guide, we identified the areas that contain the physical and biological features essential to the conservation of *B. filifolia.* The essential features in each subunit are necessary for the conservation of the occurrence within the subunit, which contributes to the overall conservation of the species.

To map the areas that meet the definition of critical habitat, we identified areas that contain the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of this species using the following criteria: (1) Areas supporting occurrences on rare or unique habitat within the species' range; (2) areas supporting the largest known occurrences of *Brodiaea filifolia;* or (3) areas supporting stable occurrences of *B. filifolia* that are likely to be persistent. These criteria are explained in greater detail below and a summary of our analysis of all current and past areas supporting *B. filifolia* is presented in Table 3.

We determined that the areas supporting 36 of the 68 extant occurrences meet the definition of critical habitat; of these 36 occurrences, 7 are on Marine Corps Base Camp Pendleton (MCB Camp Pendleton) and the areas are exempt from critical habitat under section 4(a)(3) of the Act (*see* Exemptions under Section 4(a)(3) of the Act section below). Of the 29 occurrences in areas proposed as revised critical habitat (74 FR 64930; December 8, 2009), four are in areas excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (Subunits 7d, 8f, 11g, and 11h), and eight are in areas partially excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (portions of Subunits 6a, 6d,

7a, 7c, 8b, 11f, and Units 3 and 12) (*see* Exclusions under Section 4(b)(2) of the Act section below). Areas containing the PCEs and that meet at least one of the above criteria are considered to contain the physical and biological features essential to the conservation of the species and, therefore, meet the definition of critical habitat. Included in PCE 2 are areas up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide adequate space to support the habitat and alternate food sources needed for pollinators of *B. filifolia.* The 820-ft (250-m) distance for determining the pollinator use area is based on a conservative estimate for the mean routine flight distance for ground-nesting solitary bees that pollinate *B. filifolia.* This distance is not meant to capture all habitat that is potentially used by pollinators, but it is meant to capture a sufficient area to allow for pollinators to nest, feed, and reproduce in habitat that is adjacent and connected to the areas where *B. filifolia* grows (see Habitat for Pollinators of *Brodiaea filifolia* section above for a more detailed explanation of pollinator requirements and our derivation of the 820-ft (250-m) distance used to determine the pollinator use area).

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Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
Los Angeles County, California						
1	Glendora	20	X	--	X	1a
2	San Dimas/Gordon Highlands	40	X	X	--	1b
San Bernardino County, California						
3	Arrowhead Hot Springs	7	X	--	X	2
4	Waterman Canyon	8	--	--	--	N/A
Riverside County, California						
5	San Jacinto Wildlife Area	43 27	X	--	X	11a
6**	San Jacinto Ave/Dawson Rd	65	X	--	--	11b
7	Case Road	2	X	X	--	11c
X	Goetz Road	1	--	--	--	extirpated
8	Railroad Canyon	25	--	X	--	11d
9	Upper Salt Creek (Stowe Pool)	26	X	--	--	11e

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
10	Santa Rosa Plateau - Tenaja Rd.	3	--	--	--	*B. santarosae*
11	Santa Rosa Plateau - North of Tenaja Rd.	31	X	--	--	11h
12	Santa Rosa Plateau - South of Tenaja Rd.	30	X	--	--	11g
13	Santa Rosa Plateau - Mesa de Colorado	5	X	X	--	11f
14	East of Tenaja Guard Station	29	--	--	--	N/A
15	Redonda Mesa	52	--	--	--	N/A
16**	Corona Cala Camino	N/A	--	--	--	N/A
Orange County, California						
17	Edison Viejo	55	--	--	--	N/A
18	Aliso and Wood Canyons Wilderness Park	56	--	X	--	3
19	Cañada Gobernadora/Chiquita Ridgeline	64	--	--	X	4c
20**	Trampas Canyon	N/A	--	--	--	N/A
21**	Middle Gabino	N/A	--	--	--	N/A
22	Cristianitos Canyon	N/A	X	X	--	4g
	Cristianitos Canyon/Lower Gabino Canyon	62				
23**	East Talega/Blind Canyon	N/A	--	--	--	N/A
24	Caspers Wilderness Park	24	--	--	X	4b
25	Arroyo Trabuco Golf Course/Lower Arroyo Trabuco	N/A	--	--	--	N/A
x**	Prima Deshecha****	61	--	--	--	extirpated
26	Talega/Segunda Deshecha***	57	--	--	--	N/A

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
27	Forster Ranch***	58	--	--	--	N/A
		59				
		60				
28	Cristianitos Canyon South	63	--	--	--	N/A
San Diego County, California						
29	Miller Mountain	37	--	--	--	*B. santarosae*
	Devil Canyon	39	X	--	X	5b
30	Tributary off of Talega Canyon	N/A	--	--	--	N/A
31**	Cristianitos Canyon Pendleton	N/A	--	--	X	exempt
32**	San Mateo Creek	N/A	--	--	--	N/A
33	Bravo One	45	--	--	X	exempt
34**	Bravo Two North	N/A	--	--	--	N/A
35	Bravo Two South	N/A	--	--	X	exempt
36	Alpha One/Bravo Three	44	--	--	--	N/A
37**	Basilone/San Mateo Junction	N/A	--	--	X	exempt
38	Camp Horno	46,47, 48,49	--	X	--	exempt
39	Southeast of Horno Summit	50	--	--	--	N/A
40**	Top of Las Pulgas Canyon/Roblar Rd	N/A	--	--	--	N/A
41**	Top of Aliso Canyon/Roblar Rd	N/A	--	--	--	N/A

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
42	Basilone/Roblar Junction	51	--	--	--	N/A
43	East of I-5/South of Las Flores Creek	67	--	--	--	N/A
		68				
44**	Pilgrim Creek	N/A	--	--	X	exempt
45	Pueblitos Canyon	N/A	--	--	--	N/A
46**	West of Whelan Lake	N/A	--	--	--	N/A
47**	South of French Creek	N/A	--	--	--	N/A
48**	South White Beach	N/A	--	--	X	exempt
49	Taylor***	41	--	X	--	6d
	Undeveloped parcel between Darwin properties					
	Darwin Knolls and Darwin Glen					
50**	Arbor Creek/Colucci	N/A	X	--	X	6e
51	Mission View/Sierra Ridge	53	--	--	X	6c
52	Mesa Drive, SDG&E Substation		--	--	X	6b
53	Eternal Hills/Alta Creek	N/A	--	--	X	6a
	Cornerstone Community Church/Oceanside Blvd & El Camino Real					
54**	Vista Pacific	N/A	--	--	--	N/A
55**	Buena Vista Creek preserve	N/A	--	--	--	N/A
56	Calavera Heights Mitigation Site	N/A	--	--	--	N/A
57	Calavera Hills Village H	23	--	--	X	7c

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
58**	Calavera Hills Village X		--	--	--	N/A
59	Letterbox Canyon - Taylor Made***	N/A	--	X	--	7a
	Letterbox Canyon - Salk/Fox-Miller***	N/A				
	Letterbox Canyon - Newton Business Center	16				
X	North of Carlsbad dragstrip	14	--	--	--	extirpated
60**	Carlsbad Oaks	N/A	--	--	--	N/A
61	Rancho Carrillo	22	--	X	--	7b
	Rancho Santa Fe Rd North		--	--	--	N/A
62	Rancho La Costa	33	--	X	--	7d
		34				
63	La Costa Town Square	N/A	--	--	--	N/A
	Park View West/La Costa Ave & Rancho Santa Fe Rd****	21	--	--	--	extirpated
64	Poinsettia	N/A	--	--	--	N/A
X	Shelley Property/Olivenhein & Rancho Santa Fe Rd junction	32	--	--	--	extirpated
X	Calle Tres Vistas	54	--	--	--	extirpated
X	Vista	15	--	--	--	extirpated
X	Brengle Terrace	18	--	--	--	extirpated

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
X	Vista, east of South Melrose Ave****	17	--	--	--	extirpated
X	North of Carlsbad dragstrip	13	--	--	--	extirpated
X	SSE of Buena, near Mission Rd & RR tracks	12	--	--	--	extirpated
65	Rancho Santalina***	11	--	X	--	8b
	Loma Alta					
	Rancho Santalina/Loma Alta					
	Las Posas Road Extension Project****		--	--	--	extirpated
66	Grand Avenue/Las Posas Rd pools***	36	X	X	--	8d
	Upham/Pacific St/Superior Ready Mix	10				
67**	Oleander/San Marcos Elementary***	N/A	--	X	--	8f
68**	Artesian Trails	70	--	--	X	12
		66				
X	4S Ranch****	N/A	--	--	--	extirpated

* California Department of Fish and Game, Natural Diversity Database
** New occurrence since listing, but determined to be occupied at the time of listing
*** Partially translocated (some plants currently exist at the original location)
**** Completely translocated (no plants currently exist at the original location)

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We identified habitat containing the features essential to the conservation of *Brodiaea filifolia* by using data from the following GIS databases: (1) Species occurrence information in Los Angeles, San Bernardino, Orange, Riverside, and San Diego Counties from the CNDDB and from survey reports; (2) vegetation data layers from Orange, Riverside, and San Diego Counties and vegetation data layers from the U.S. Forest Service's Cleveland National Forest (CNF) for Los Angeles and San Bernardino Counties; and (3) Natural Resources Conservation Service's Soil Survey Geographic Database (SSURGO) soil data layers for Orange, Riverside, and San Diego Counties, and State Soil Geographic Database (STATSGO) soil data layers for Los Angeles and San Bernardino Counties.

Criteria Used

If habitat areas met one or more of the following criteria, they were determined to meet the definition of critical habitat under section 3(5)(A)(i) of the Act.

(1) The first criterion is any area that supports an occurrence in rare or unique habitat within the species' range. We evaluated all occurrences of *Brodiaea filifolia* under this criterion, regardless of occurrence size. We identified four main factors that

constitute rare or unique habitat for *B. filifolia:*

(a) Occurrences in habitat types that are uncommon such as grassland habitat that occurs intermixed with chaparral, grassland habitat that is associated with vernal pools, or large areas of native grassland;

(b) Occurrences on uncommon soil types such as clay soils that are altered by hydrothermal activity;

(c) Occurrences that grow along ephemeral drainages in seep-type habitats; and

(d) Occurrences that grow in gravel, cobbles, and small boulder substrate.

These four unique situations differ from the majority of occurrences of this species, which are found on clay soils intermixed with coastal sage scrub habitat. The conservation of *Brodiaea filifolia* occurring in these rare or unique situations will preserve the diversity of habitats where this species is found.

(2) The second criterion is any area that supports one of the largest known populations of *Brodiaea filifolia.* Occurrences of this species range from just a few plants to several thousand plants, while the majority of the known occurrences are under 3,000 plants (*see* the **Background** section of the 2009 proposed revised critical habitat rule for a discussion on how occurrences of *B. filifolia* are grouped and counted). However, there are 13 occurrences that stand out as the largest, each having greater than 3,000 plants. Occurrences supporting large numbers of plants (3,000 or more) are noted in Table 1 and are found in the following areas:

(a) Los Angeles County: Subunit 1b-San Dimas;

(b) Riverside County: Subunit 11c-Case Road, Subunit 11d-Railroad Canyon, and Subunit 11f-Santa Rosa Plateau-Mesa de Colorado;

(c) Orange County: Unit 3–Aliso Canyon, and Subunit 4g-Cristianitos Canyon; and

(d) San Diego County: Subunit 6d-Taylor/Darwin, Subunit 7a-Letterbox Canyon, Subunit 7b-Rancho Carrillo, Subunit 7d-Rancho La Costa, Subunit 8b-Rancho Santalina/Loma Alta, Subunit 8d-Upham, and Subunit 8f-Oleander/San Marcos Elementary (*See* Table 1).

These large occurrences are present in habitat areas that contain the physical and biological features essential to the conservation of this species. These areas generally represent large contiguous blocks of intact habitat. The conservation of these large populations will increase the resilience of the species across its range and contribute to the overall recovery of this species.

(3) The third criterion is any area that supports an occurrence considered to be stable and persistent. We consider occurrences that have between 850 and 3,000 flowering stems that have been observed in multiple years to be stable and persistent because we expect these occurrences to have a sufficient number of corms to sustain the occurrence for a number of years if the habitat remains unaltered. These areas contribute to the conservation of *Brodiaea filifolia* by providing resilience for the species by decreasing the probability of the species becoming extinct, and by contributing to the genetic diversity of the species. The conservation of these areas helps *B. filifolia* to maintain its current geographic distribution, since these resilient occurrences are found throughout the range of the species. This is particularly important for *B. filifolia* because this species relies on outcrossing for successful reproduction.

To determine if any additional areas met the third criterion, we looked at all occurrences with fewer than 850 flowering stalks to determine if any of these exhibited the same persistence and stability characteristics to provide similar conservation value as the other identified occurrences with greater than 850 flowering stalks (since the counts for an occurrence vary from year to year). We found that one occurrence with fewer than 850 flowering stalks (at the Arbor Creek/Colucci site) exhibited characteristics of a stable, persistent occurrence (*i.e.,* an occurrence of consistent size not substantially less than 850 flowering stalks); therefore, this occurrence fulfills the ecological role of sites we are interested in identifying through this criterion, even though the high count at this site is 620 flowering stalks.

Of the 68 occurrences of *Brodiaea filifolia* that we identified as being extant in our 5-year review for this species (Service 2009b), areas supporting 36 occurrences meet one or more of the 3 criteria outlined above. Seven of these areas are exempt from this critical habitat designation under section 4(a)(3) of the Act (*see* Exemptions Under Section 4(a)(3) of the Act section), and the remaining 29 areas were proposed as revised critical habitat (74 FR 64930; December 8, 2009). Of these 29 areas, 14 fit into one of the 4 reasons that areas meet the "rare or unique habitat" criterion, 13 meet the "largest occurrences" criterion, and 13 meet the "stable and persistent occurrences" criterion. Of these 29 areas, 3 are excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (Subunits 7d, 11g, and 11h), and 5 are partially excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (portions of Subunits 7a, 7c, 11f, and Units 3 and 12) (*see* Exclusions under Section 4(b)(2) of the Act section below).

The habitat areas that meet one or more of the criteria represent the historical range of the species, and are adequate to provide for this species' conservation. Habitat areas and the occurrences they support that do not meet any of the three criteria may still be important to the conservation of this species, but without the conservation of the habitat areas and occurrences identified through this process, the recovery effort for this species may be impaired.

Other Factors Involved With Delineating Critical Habitat

Following the identification of areas supporting 36 occurrences of the 68 extant occurrences that met one of the 3 criteria listed above, we mapped the area that contained the PCEs at each occurrence including habitat extending beyond the perimeters of mapped occurrences of *Brodiaea filifolia* by up to 820 ft (250 m) to provide adequate space to support the habitat and alternate food sources needed for pollinators of *B. filifolia* (see Habitat for Pollinators of *Brodiaea filifolia* section).

Areas that did not provide habitat for *Brodiaea filifolia* or potential pollinators were removed from the 820-ft (250-m) zone of mapped occurrences of *B. filifolia,* such as areas that were developed or severely altered by grading. Our mapping methodology captures the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of the species, and encompasses the range of environmental variability for this species.

When determining the final revised critical habitat boundaries for *Brodiaea filifolia,* we made every effort to map precisely the areas that contain the physical or biological features essential to the conservation of the species. However, we cannot guarantee that every fraction of revised critical habitat contains the PCEs due to the mapping scale that we use to draft critical habitat boundaries. Additionally, we made every attempt to avoid including developed areas such as lands underlying buildings, pavement, and other structures because such lands lack PCEs for *B. filifolia.* The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any

such lands inadvertently left inside critical habitat boundaries shown on the maps of this revised critical habitat are excluded by text in this rule and are not designated critical habitat. Therefore, Federal actions involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification, unless the specific actions may affect adjacent critical habitat.

Revised Critical Habitat Designation

We are designating 2,947 ac (1,193 ha) in 10 units, subdivided into 23 subunits as revised critical habitat for *Brodiaea filifolia.* The unit numbers in this rule correspond to those used in the 2004 proposed rule and the 2005 final rule; however, Units 9 and 10 were not proposed and Units 11 and 12 are new to this revised rule. Unit 11 represents lands in Riverside County excluded from the 2005 designation of critical habitat, and Unit 12 represents the Artesian Trails area in San Diego County that is now partially included based on new occurrence data in this area. To minimize confusion with the previous proposal and designation we are not using Unit numbers 9 and 10 in this rule (*see* Table 2 and Summary of Changes from the Proposed Revised Rule and the Previous Critical Habitat Designation section).

The areas we describe below constitute our best assessment of areas that meet the definition of critical habitat for *Brodiaea filifolia.* We determined these areas are within the geographical area occupied at the time of listing, and contain the physical and biological features essential to the conservation of *B. filifolia* that may require special management considerations or protection. We are not designating any areas outside the geographical area occupied by the species at the time of listing because we determined that the lands we are designating as revised critical habitat are adequate to ensure conservation of *B. filifolia.* The lands designated as revised critical habitat represent a subset of the total lands occupied by *B. filifolia.* Table 4 identifies the approximate area of each designated critical habitat subunit by land ownership. These subunits, which generally correspond to the geographic area of the subunits delineated in the 2005 designation (see Table 2 for a detailed comparison of this rule and the 2005 designation), replace the 2005 critical habitat designation for *B. filifolia* in 50 CFR 17.96(a).

TABLE 4—AREA ESTIMATES IN ACRES (AC) AND HECTARES (HA), AND LAND OWNERSHIP FOR BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT

Location	Ownership				Total area **
	Federal *	State government	Local government	Private	
Unit 1: Los Angeles County					
1a. Glendora	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	67 ac (27 ha)	67 ac (27 ha).
1b. San Dimas	13 ac (5 ha)	0 ac (0 ha)	0 ac (0 ha)	125 ac (51 ha)	138 ac (56 ha).
Unit 2: San Bernardino County					
2. Arrowhead Hot Springs	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	61 ac (25 ha)	61 ac (25 ha).
Unit 3: Central Orange County					
3. Aliso Canyon	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	11 ac (4 ha)	11 ac (4 ha).
Unit 4: Southern Orange County					
4b. Caspers Wilderness Park	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	12 ac (5 ha)	12 ac (5 ha).
4c. Cañada Gobernadora/Chiquita Ridgeline.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	133 ac (54 ha)	133 ac (54 ha).
4g. Cristianitos Canyon	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	587ac (238 ha)	587ac (238 ha).
Unit 5: Northern San Diego County					
5b. Devil Canyon	266 ac (108 ha)	0 ac (0 ha)	0 ac (0 ha)	8 ac (3 ha)	274 ac (111ha).
Unit 6: Oceanside					
6a. Alta Creek	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	72 ac (29 ha)	72 ac (29 ha).
6b. Mesa Drive	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	17 ac (7 ha)	17 ac (7 ha).
6c. Mission View/Sierra Ridge	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	12 ac (5 ha)	12 ac (5 ha).
6d. Taylor/Darwin	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	35 ac (14 ha)	35 ac (14 ha).
6e. Arbor Creek/Colucci	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	94 ac (38 ha)	94 ac (38 ha).
Unit 7: Carlsbad					
7a. Letterbox Canyon	0 ac (0 ha)	1 ac (<1 ha)	0 ac (0 ha)	41 ac (17 ha)	43 ac (17 ha).
7b. Rancho Carrillo	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	37 ac (15 ha)	37 ac (15 ha).
7c. Calavera Hills Village H	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	26 ac (11 ha)	26 ac (11 ha).
Unit 8: San Marcos and Vista					
8b. Rancho Santalina/Loma Alta	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	47 ac (19 ha)	47 ac (19 ha).
8d. Upham	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	54 ac (22 ha)	54 ac (22 ha).
8f. Oleander/San Marcos Elementary.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	7 ac (3 ha)	7 ac (3 ha).
Unit 11: Western Riverside County					
11a. San Jacinto Wildlife Area	0 ac (0 ha)	366 ac (148 ha)	17 ac (7 ha)	18 ac (7 ha)	401 ac (162 ha).
11b. San Jacinto Avenue/Dawson Road.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	117 ac (47 ha)	117 ac (47 ha).
11c. Case Road	0 ac (0 ha)	0 ac (0 ha)	11 ac (5 ha)	169 ac (68 ha)	180 ac (73 ha).
11d. Railroad Canyon	53 ac (21 ha)	0 ac (0 ha)	1 ac (<1 ha)	204 ac (83 ha)	257 ac (104 ha).
11e. Upper Salt Creek (Stowe Pool)	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	145 ac (59 ha)	145 ac (59 ha).
11f. Santa Rosa Plateau—Mesa de Colorado.	0 ac (0 ha)	0 ac (0 ha)	5 ac (2 ha)	8 ac (3 ha)	13 ac (5 ha).
Unit 12: Central San Diego County					
12. Artesian Trails	0 ac (0 ha)	0 ac (0 ha)	7 ac (3 ha)	98 ac (40 ha)	105 ac (43 ha).

TABLE 4—AREA ESTIMATES IN ACRES (AC) AND HECTARES (HA), AND LAND OWNERSHIP FOR BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT—Continued

Location	Ownership				Total area **
	Federal *	State government	Local government	Private	
Total**	332 ac (134 ha)	367 ac (148 ha)	41 ac (17 ha)	2,205 ac (894 ha)	2,947 ac (1,193 ha).

* 1,531 ac (620 ha) of federally owned land on MCB Camp Pendleton is exempt from this revised critical habitat (*see* Exemptions Under Section 4(a)(3) of the Act section).
** Values in this table and the following text may not sum due to rounding.

Presented below are brief descriptions of all subunits and reasons why they meet the definition of critical habitat for *Brodiaea filifolia.* The subunits are listed in order geographically north to south and west to east.

Unit 1: Los Angeles County

Unit 1 is located in Los Angeles County, and consists of two subunits totaling 206 ac (83 ha). This unit contains 13 ac (5 ha) of federally owned land and 192 ac (78 ha) of private land.

Subunit 1a: Glendora

Subunit 1a consists of 67 ac (27 ha) of private land in the City of Glendora, in the foothills of the San Gabriel Mountains in Los Angeles County. Lands within this subunit contain Cieneba-Exchequer-Sobrante soils, a type of silty loam, and consist primarily of northern mixed chaparral and coastal sage scrub habitat. Subunit 1a contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of two occurrences located in the foothills of the San Gabriel Mountains which are part of the Transverse Ranges where the species was historically found, and is also significant because it is the northernmost occurrence known; and (3) supports a stable, persistent occurrence of approximately 2,000 plants. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. The site is protected from development and is owned by the Glendora Community Conservancy (GCC). The GCC has expressed interest in creating a management plan for their land; however, a comprehensive management plan that would specifically address the control of nonnative plants has not been completed at this time. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 1b: San Dimas

Subunit 1b consists of 13 ac (5 ha) of Federal land (Angeles National Forest) and 125 ac (51 ha) of private land near the City of San Dimas in the foothills of the San Gabriel Mountains in Los Angeles County. Lands within this subunit contain Cieneba-Exchequer-Sobrante soils, a type of silty loam, and consist primarily of northern mixed chaparral and coastal sage scrub habitat. Subunit 1b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of two occurrences located in the foothills of the San Gabriel Mountains which are part of the Transverse Ranges where the species was historically found, and represents the only likely genetic connection to plants in the Glendora subunit; and (3) supports two significant populations totaling about 6,000 individuals of *B. filifolia,* as documented in 1990 (CNDDB 2009, p. 37). Several proposals for development of this area have been reviewed by the City of Glendora (D. Walter, Senior Planner City of Glendora pers. comm. to G. Wallace, Service 2005). Additionally, illegal grading has occurred on the northern portion of this subunit (grading was halted by the City of Glendora). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from urban development on private lands, including minimizing disturbance to the surface and subsurface structure, and to maintain pollinator habitat. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 2: San Bernardino County—Arrowhead Hot Springs

Unit 2 is located in San Bernardino County, California, and consists of 61 ac (25 ha) of private land at the southwestern base of the San Bernardino Mountains. This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this unit contain Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils altered by hydrothermal activity, some of which are considered alluvial, and consist primarily of coastal sage scrub habitat. Unit 2 contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including soils altered by hydrothermal activity (PCE 1B) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing the only occurrence of this plant in the foothills of the San Bernardino Mountains part of the Transverse Ranges where the species was historically found, and representing the type locality for *B. filifolia* (Niehaus 1971, p. 57; CNDDB 2009, p. 7); and (3) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 3: Central Orange County—Aliso Canyon

Unit 3 is located in central Orange County, California, and consists of 11 ac (4 ha) of private land in the City of Laguna Niguel, southwestern Orange County. These totals do not include 102 ac (42 ha) of land in Unit 3 that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this unit contain clay loam or other types of loam and consist of annual and needlegrass grassland. Unit 3 contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 5,000 individuals of *B. filifolia,* as documented in 2001 (CNDDB 2009, p. 51). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from fuel management activities (annual mowing) and pipeline work. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 4: Southern Orange County

Unit 4 is located in southern Orange County, California, and consists of 3 subunits totaling 732 ac (297 ha) of private land. These totals do not include portions of Subunit 4b (192 ac (78 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). Subunits 4a, 4d, 4e, 4f, 4h, and 4i as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and were not proposed for revised designation.

Subunit 4b: Wilderness Park

Subunit 4b consists of 12 ac (5 ha) of private land in the City of San Juan Capistrano and the Audubon California Starr Ranch Sanctuary, in the southwestern region of the Santa Ana Mountains, southern Orange County. Lands within this subunit contain clay loam, sandy loam, or rocky outcrop, and consist primarily of grassland and sagebrush-buckwheat scrub habitat. Subunit 4b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. This subunit is located in the foothills of the Santa Ana Mountains and represents the highest elevation and northernmost occurrence in Orange County. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 4c: Cañada Gobernadora/Chiquita Ridgeline

Subunit 4c consists of 133 ac (54 ha) of private land in and around Cañada Gobernadora on Rancho Mission Viejo in southern Orange County. Lands within this subunit contain clay, clay loam, or sandy loam and consist primarily of dry-land agriculture and sagebrush-buckwheat scrub habitat. Subunit 4c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 4g: Cristianitos Canyon

Subunit 4g consists of 587 ac (238 ha) of privately owned land in Cristianitos Canyon on Rancho Mission Viejo in southern Orange County. Lands within this subunit are underlain by clay and sandy loam soils and consist primarily of annual grassland and needlegrass grassland. Subunit 4g contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports an occurrence in rare and unique habitat, representing one of the few places where this species occurs in needlegrass grassland in Orange County; and (3) supports an occurrence of at least 6,505 individuals of *B. filifolia,* as documented in 2003 (Dudek & Associates, Inc. 2006, Chapter 3 pp. 73–74, 83; Service 2007, pp. 149–150). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 5: Northern San Diego County

Unit 5 is located in northern San Diego County, and consists of one subunit totaling 274 ac (111 ha). This unit contains 266 ac (108 ha) of Federal Government land and 8 ac (3 ha) of private land. This unit is located entirely within the boundary of the CNF. Subunit 5a as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and was not proposed for revised designation.

Subunit 5b: Devil Canyon

Subunit 5b consists of 266 ac (108 ha) of Federal land (CNF) and 8 ac (3 ha) of private land in northern San Diego County. Hybrids between *Brodiaea filifolia* and *B. orcuttii* have been reported from the Devil Canyon site, however, we believe *B. filifolia* occurs in sufficient numbers in this area to meet the criteria for critical habitat designation (*see* the Special Management Considerations or Protection section of this rule for a discussion of *Brodiaea* hybridization). Lands within this subunit contain Cieneba Very Rocky Coarse Sandy Loam, Fallbrook Sandy Loam, and Cieneba Coarse Sandy Loam soils and

consist primarily of chaparral and oak woodland vegetation. Subunit 5b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports an occurrence in rare and unique habitat, representing one of the few places where this species occurs in a drainage in oak woodland habitat and occurring in unusual seeps and drainages on low granitic outcrops; and (3) supports a stable, persistent occurrence. The CNF does not currently have a management plan specific to *B. filifolia.* The 2005 critical habitat rule for *B. filifolia* and the 2009 proposed revised critical habitat rule erroneously stated that grazing occurs in this area; this area is in fact not subjected to cattle grazing (Winter 2004, pers. comm.). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. Please see the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 6: Oceanside, San Diego County

Unit 6 is located in Oceanside, San Diego County, California, and consists of five subunits totaling 230 ac (93 ha) of private land.

Subunit 6a: Alta Creek

Subunit 6a consists of 72 ac (29 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine sandy loam, loam, or loamy fine sand and consist primarily of coastal sage scrub habitat. Subunit 6a contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,500 individuals of *B. filifolia* (Affinis 2005, pp. 1–3; AMEC 2005 pp. 3–18). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6b: Mesa Drive

Subunit 6b consists of 17 ac (7 ha) of private land in the City of Oceanside, in northern coastal San Diego County. Lands within this subunit contain loamy fine sands and consist primarily of grassland habitat. Subunit 6b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,500 individuals of *B. filifolia* (Roberts 2005a, pp.1–2). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and habitat disturbance on local government lands (Roberts 2005, pp. 1–3). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6c: Mission View/Sierra Ridge

Subunit 6c consists of 12 ac (5 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine loamy sands and consist primarily of coastal sage scrub habitat. Subunit 6c contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,300 individuals of *B. filifolia* (Roberts 2005b, p. 1). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6d: Taylor/Darwin

Subunit 6d consists of 35 ac (14 ha) of private land in the City of Oceanside, in northern coastal San Diego County. Lands within this subunit contain clay soil and fine loamy sands and consist primarily of annual and needlegrass grassland. Subunit 6d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 6,200 individuals of *B. filifolia,* as documented in 2005 (CNDDB 2009, p. 38). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6e: Arbor Creek/Colucci

Subunit 6e consists of 94 ac (38 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay soil and fine loamy sands and consist primarily of annual and needlegrass grassland. Subunit 6e contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2);

and (2) supports a stable, persistent occurrence; and (3) consists primarily of annual and needlegrass grassland and occurs in the largest continuous block of grassland habitat remaining in the City of Oceanside. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants and urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 7: Carlsbad, San Diego County

Unit 7 is located in Carlsbad, San Diego County, California, and consists of three subunits totaling 105 ac (43 ha). This unit contains 1 ac (<1 ha) of State land and 104 ac (43 ha) of private land. These totals do not include Subunit 7d (98 ac (40 ha)) and portions of Subunit 7a (13 ac (5 ha)) and Subunit 7c (45 ac (18 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule), or 2 ac (<1 ha) that were proposed as revised critical habitat but are not included in this final revised critical habitat designation because they do not support suitable habitat for the species.

Subunit 7a: Letterbox Canyon

Subunit 7a consists of 1 ac (<1 ha) of State land and 41 ac (17 ha) of private land in the City of Carlsbad, in northern coastal San Diego County, California. Lands within this subunit contain heavy clay soils and consist primarily of annual grassland. Subunit 7a contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 39,500 individuals of *B. filifolia,* as documented in 2005 (CNDDB 2009, p. 15). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 7b: Rancho Carrillo

Subunit 7b consists of 37 ac (15 ha) of private land in the City of Carlsbad, in northern coastal San Diego County, California. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay or sandy loam soils and consist primarily of annual grasslands and coastal sage scrub habitat. Subunit 7b contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 797,000 individuals of *B. filifolia,* as documented in 2005 (this estimate was of vegetative plants and not flowering plants) (Scheidt and Allen 2005, p. 1). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 7c: Calavera Hills Village H

Subunit 7c consists of 26 ac (11 ha) of private land in the City of Carlsbad, in northern coastal San Diego County. Lands within this subunit contain clay soil and consist primarily of annual and needlegrass grassland. Subunit 7c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 2,243 plants, as documented in 2008 (McConnell 2008, p. 9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 8: San Marcos, San Diego County

Unit 8 is located in San Marcos, northern San Diego County, California, and consists of three subunits totaling 108 ac (44 ha) of private land. Subunits 8a, 8c, and 8e as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and were not proposed for revised designation.

Subunit 8b: Rancho Santalina/Loma Alta

Subunit 8b consists of 47 ac (19 ha) of private land in the City of San Marcos, northern San Diego County, California. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay, loam, or loamy fine sand soils and consist primarily of annual and needlegrass grassland. Subunit 8b contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 5,552 individuals of *B. filifolia,* as documented in 2000, and approximately 12,000 *B. filifolia* corms were transplanted to the area in 2004 (CNDDB 2009, p. 10). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, unauthorized recreational activities, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 8d: Upham

Subunit 8d consists of 54 ac (22 ha) of private land in the City of San Marcos, northern San Diego County. Hybrids between *Brodiaea filifolia* and *B. orcuttii* have been reported from the Upham site (Chester *et al.* 2007, p. 188),

however, based on the best scientific information available to us at this time, we believe *B. filifolia* occurs in sufficient numbers in this area to meet the criteria for critical habitat designation (*see* the Special Management Considerations or Protection section of this rule for a discussion of *Brodiaea* hybridization). Lands within this subunit contain clay soils and consist primarily of annual and needlegrass grassland and vernal pool habitat. Subunit 8d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat; and (3) supports an occurrence of at least 342,000 individuals of *B. filifolia,* as documented in 1993 (CNDDB 2009, p. 9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, unauthorized recreational activities, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 8f: Oleander/San Marcos Elementary

Subunit 8f consists of 7 ac (3 ha) of land owned by the San Marcos Unified School District near the City of San Marcos, in northern San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay, loam, or loamy fine sand soils and consist primarily of annual grassland. Unit 8f contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 3,211 individuals of *B. filifolia,* as documented in 2005 (Dudek and Associates, Inc. 2007, p.9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 11: Western Riverside County

Unit 11 is located in western Riverside County, California, and consists of 6 subunits totaling 1,113 ac (450 ha). This unit contains 53 ac (21 ha) of Federal land, 366 ac (148 ha) of State land, 33 ac (13 ha) of local government land, and 661 ac (267 ha) of private land. These totals do not include Subunits 11g (117 ac (47 ha)), 11h (44 ac (18 ha)) and portions of Subunit 11f (221 ac (89 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule).

Subunit 11a: San Jacinto Wildlife Area

Subunit 11a consists of 366 ac (148 ha) of State land (California Department of Fish and Game (CDFG)), 17 ac (7 ha) of local government land, and 18 ac (7 ha) of private land at the San Jacinto Wildlife Area, in western Riverside County. Lands within this subunit contain Willows silty clay, Waukena loam and Waukena fine sandy loam, Traver fine sandy loam and Traver loamy fine sand, and Hanford coarse sandy loam soils and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11a contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of four occurrences associated with alkali playa habitat; and (3) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants and construction of new roads or improvements to existing roadways (Service 2004b, pp. 137–189). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11b: San Jacinto Avenue/ Dawson Road

Subunit 11b consists of 117 ac (47 ha) of private land near San Jacinto Avenue and Dawson Road, in western Riverside County. Lands within this subunit contain Willows silty clay and Domino silt loam soils and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a rare or unique occurrence, representing one of four occurrences that are associated with alkali playa habitat. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from discing, grazing, manure dumping, and nonnative invasive plants (CNDDB 2009, p. 60). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11c: Case Road

Subunit 11c consists of 11 ac (4 ha) of local government land and 169 ac (68 ha) of private land near the City of Perris, in western Riverside County. Lands within this subunit contain Willows silty clay and Domino silt loam soils and consist primarily of agricultural land, floodplain habitat, alkali scrub habitat, and alkali playa habitat. Subunit 11c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and

pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of four occurrences that are associated with alkali playa habitat; and (3) supports an occurrence of at least 4,555 individuals of *B. filifolia,* as documented in 2000 (Glenn Lukos Associates, Inc. 2000a, Map of San Jacinto River Stage 3 Project Impacts Version 2 Alignment; Glenn Lukos Associates, Inc. 2000b, pp. 17–18; CNDDB 2009, p. 2). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from OHV activity, encroaching urban development, manure dumping, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11d: Railroad Canyon

Subunit 11d consists of 53 ac (21 ha) of Federal land owned by the Bureau of Land Management, 1 ac (<1 ha) of local government land, and 204 ac (83 ha) of private land north of Kabian County Park and southwest of the City of Perris, in western Riverside County. Lands within this subunit contain Lodo rocky loam, Garretson gravelly very fine sandy loam and Garretson very fine sandy loam, Escondido fine sandy loam, and Grangeville fine sandy loam soils and consist primarily of annual grassland. Subunit 11d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 3,205 individuals of *B. filifolia,* as documented in 2000 (Glenn Lukos Associates 2000a, pp. 13, 24; CNDDB 2009, p. 23). The occurrence in Railroad Canyon is at risk from the San Jacinto River Flood Control Project. That project includes channelization of the river, which may result in changes in floodplain process essential to the species persistence in this subunit (Service 2004b, p. 382). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, river channelization for flood control, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11e: Upper Salt Creek (Stowe Pool)

Subunit 11e consists of 145 ac (59 ha) of private land in the Upper Salt Creek drainage west of Hemet, in western Riverside County. Lands within this subunit contain Willows silty clay, Chino silt loam, Honcut loam, and Wyman loam and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11e contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat. This subunit is crossed by roadways that, if altered (widened or realigned), could change the topography and thereby negatively affect the hydrologic integrity of the pool complexes and favor the growth of nonnative invasive plant species (CNDDB 2009, p. 24; Service 2004b, p. 382). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants (such as *Hordeum marinum* subsp. *gussoneanum*) and transportation projects. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11f: Santa Rosa Plateau—Mesa de Colorado

Subunit 11f consists of 5 ac (2 ha) of local government land and 8 ac (3 ha) of private land in southwestern Riverside County. Lands within this subunit contain Murrieta stony clay loam, and Las Posas rocky loam and Las Posas loam soils and consist primarily of annual and needlegrass grassland and vernal pool habitat. Subunit 11f contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay loam soil series underlain by heavy clay loams or clays derived from olivine basalt lava flows that generally occur on mesas and gentle to moderate slopes (PCE 1D) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat; and (3) supports an occurrence of at least 31,725 individuals of *B. filifolia,* as documented in 1990 (CNDDB 2009, p. 5). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 12: Central San Diego County—Artesian Trails

Unit 12 is located in central San Diego County, California, and consists of 105 ac (43 ha). This unit contains 7 ac (3 ha) of local government land and 98 ac (40 ha) of private land. These totals do not include 4 ac (2 ha) of land in Unit 12 that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine loamy sands and consist primarily of coastal sage scrub habitat and annual grassland. Unit 12 contains physical and biological features that are essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or

protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. Decisions by the 5th and 9th Circuit Courts of Appeals have invalidated our definition of "destruction or adverse modification" (50 CFR 402.02) (*see Gifford Pinchot Task Force* v. *U.S. Fish and Wildlife Service,* 378 F. 3d 1059 (9th Cir 2004) and *Sierra Club* v. *U.S. Fish and Wildlife Service et al.,* 245 F.3d 434, 442F (5th Cir 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the Federal action, the affected critical habitat would remain functional (or retain the current ability for the PCEs to be functionally established) to serve its intended conservation role for the species (Service 2004c, p. 3).

Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us in most cases. As a result of this consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or designated critical habitat; or

(2) A biological opinion for Federal actions that are likely to adversely affect listed species or designated critical habitat.

An exception to the concurrence process referred to in (1) above occurs in consultations involving National Fire Plan projects. In 2004, the U.S. Forest Service (USFS) and the U.S. Bureau of Land Management (BLM) reached agreements with the Service to streamline a portion of the section 7 consultation process (BLM–ACA 2004, pp. 1–8; FS–ACA 2004, pp. 1–8). The agreements allow the USFS and the BLM the opportunity to make "not likely to adversely affect" (NLAA) determinations for projects implementing the National Fire Plan. Such projects include prescribed fire, mechanical fuels treatments (thinning and removal of fuels to prescribed objectives), emergency stabilization, burned area rehabilitation, road maintenance and operation activities, ecosystem restoration, and culvert replacement actions. The USFS and the BLM must ensure staff are properly trained, and both agencies must submit monitoring reports to the Service to determine if the procedures are being implemented properly and that effects on endangered species and their habitats are being properly evaluated. As a result, we do not believe the alternative consultation processes being implemented as a result of the National Fire Plan will differ significantly from those consultations being conducted by the Service.

If we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. We define "Reasonable and prudent alternatives" at 50 CFR 402.02 as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Director's opinion, avoid jeopardizing the continued existence of the listed species or destroying or adversely modifying its critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies may sometimes need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Federal activities that may affect *Brodiaea filifolia* or its designated critical habitat will require section 7 consultation under the Act. Activities on State, tribal, local, or private lands requiring a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit under section 10 of the Act from the Service) or involving some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency) will also be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded, authorized, or permitted, do not require section 7 consultations.

Application of the "Adverse Modification" Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species, or would retain its current ability for the primary constituent elements to be functionally established. Activities that may destroy or adversely modify critical habitat are those that alter the physical and biological features to an extent that appreciably reduces the conservation value of critical habitat for *Brodiaea filifolia.* As discussed above, the role of critical habitat is to support the life-history needs of the species and provide for the conservation of the species. Generally, the conservation role of the *B. filifolia* critical habitat units is to support viable occurrences in appropriate habitat areas.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that, when carried out, funded, or authorized by a Federal agency, may adversely affect critical habitat and, therefore, should result in consultation for *Brodiaea filifolia* include, but are not limited to (*please see* Special Management Considerations or Protection section for a more detailed discussion on the impacts of these actions to the listed species):

(1) Actions that result in ground disturbance. Such activities could include (but are not limited to) residential or commercial development, OHV activity, pipeline construction, new road construction or widening, existing road maintenance, manure dumping, and grazing. These activities potentially impact the habitat and PCEs of *Brodiaea filifolia* by damaging, disturbing, and altering soil composition through direct impacts, increased erosion, and increased nutrient content. Additionally, changes in soil composition may lead to changes in the vegetation composition, thereby changing the overall habitat type.

(2) Actions that result in alteration of the hydrological regimes typically associated with *Brodiaea filifolia* habitat. Such activities could include residential or commercial development, OHV activity, pipeline construction, new road construction or widening, existing road maintenance, and channelization of drainages. These activities could alter surface layers and the hydrological regime in a manner that promotes loss of soil matrix components and moisture necessary to support the growth and reproduction of *B. filifolia.*

(3) Actions that would disturb the existing vegetation communities adjacent to *Brodiaea filifolia* habitat prior to annual pollination and seed set (reproduction). Such activities could include (but are not limited to) grazing, mowing, grading, or discing habitat in the spring and early summer months. These activities could alter the habitat for pollinators leading to potential decreased pollination and reproduction.

(4) Road construction and maintenance, right-of-way designation, and agricultural activities, or any activity funded or carried out, permitted, or regulated by the Department of Transportation or Department of Agriculture that could result in excavation, or mechanized land clearing of *Brodiaea filifolia* habitat. These activities could alter the habitat in such a way that soil, seeds, and corms of *B. filifolia* are removed and which permanently alter the habitat or the species' presence.

(5) Licensing or construction of communication sites by the Federal Communications Commission or funding of construction or development activities by the U.S. Department of Housing and Urban Development that could result in excavation, or mechanized land clearing of *Brodiaea filifolia* habitat. These activities could alter the habitat in such a way that soil, seeds, and corms of *B. filifolia* are removed and that permanently alter the habitat or the species' presence.

Exemptions Under Section 4(a)(3) of the Act

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108–136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act [Improvement Act of 1997 (Sikes Act)] (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

The Sikes Act required each military installation that includes land and water suitable for the conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

(1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;

(2) A statement of goals and priorities;

(3) A detailed description of management actions to be implemented to provide for these ecological needs; and

(4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

We consult with the military on the development and implementation of INRMPs for installations with federally listed species. Only one military installation with a Service-approved INRMP, MCB Camp Pendleton, is located within the range of *Brodiaea filifolia* and supports the physical and biological features essential to the conservation of the species. We analyzed MCB Camp Pendleton's INRMP to determine if the lands subject to the INRMP should be exempted under the authority of section 4(a)(3)(B) of the Act.

MCB Camp Pendleton has committed to work closely with us, CDFG, and California Department of Parks and Recreation to continually refine the existing INRMP as part of the Sikes Act's INRMP review process. Based on the considerations discussed below and in accordance with section 4(a)(3)(B)(i) of the Act, we determined that conservation efforts identified in the INRMP provide a benefit to *Brodiaea filifolia* occurring in habitats within or adjacent to MCB Camp Pendleton. Therefore, approximately 1,531 ac (620 ha) of habitat on MCB Camp Pendleton subject to the INRMP is exempt from critical habitat designation under section 4(a)(3) of the Act, and is not included in this final revised critical habitat designation.

In the previous final critical habitat designation for *Brodiaea filifolia,* we exempted lands determined to contain features essential to the conservation of species on MCB Camp Pendleton from the designation of critical habitat (70 FR 73820; December 13, 2005). We based this decision on the conservation benefits to *B. filifolia* identified in the INRMP developed by MCB Camp Pendleton in November 2001. A revised and updated INRMP was prepared by MCB Camp Pendleton in March 2007 (MCB Camp Pendleton 2007). We determined that conservation efforts identified in the INRMP provide a benefit to the populations of *B. filifolia* and this species' habitat occurring on MCB Camp Pendleton (MCB Camp Pendleton 2007, Section 4, pp. 51–76). The INRMP provides measures that promote the conservation of *B. filifolia* within the 1,531 ac (620 ha) of habitat that we determined contain the physical or biological features essential to the conservation of *B. filifolia* on MCB Camp Pendleton within the following areas: Cristianitos Canyon, Bravo One, Bravo Two South, Basilone/San Mateo Junction, Camp Horno, Pilgrim Creek, and South White Beach.

Measures included for *Brodiaea filifolia* in the MCB Camp Pendleton INRMP require ongoing efforts to survey and monitor the species, and provide this information to all necessary personnel through MCB Camp

Pendleton's GIS database on sensitive resources and in their published resource atlas. The updated INRMP includes the following conservation measures for *B. filifolia:*

(1) Surveys and monitoring, studies, impact avoidance and minimization, and habitat restoration and enhancement;

(2) Species survey information stored in MCB Camp Pendleton's GIS database and recorded in a resource atlas that is published and updated on a semi-annual basis;

(3) Use of the resource atlas to plan operations and projects to avoid impacts to *B. filifolia* and to trigger section 7 consultation if an action may affect the species; and

(4) Transplantation when avoidance is not possible.

These measures are established and represent ongoing aspects of existing programs that provide a benefit to *B. filifolia.* MCB Camp Pendleton also has Base directives and Range and Training Regulations that are integral to their INRMP and provide benefits to *B. filifolia.* MCB Camp Pendleton implements Base Directives to avoid and minimize adverse effects to *B. filifolia,* such as: (1) Limit bivouac, command post, and field support activities such that they are no closer than 164 ft (50 m) to occupied habitat year round; (2) limit vehicle and equipment operations to existing road and trail networks year round; and (3) require environmental clearance prior to any soil excavation, filling, or grading. Finally, MCB Camp Pendleton contracted and funded surveys for *B. filifolia* in the summer of 2005 and the development of a GIS-based monitoring system that will provide improved management of natural resources on the installation, including for *B. filifolia.*

Additionally, MCB Camp Pendleton's environmental security staff review projects and enforce existing regulations and orders that, through their implementation, avoid and minimize impacts to natural resources, including *Brodiaea filifolia* and its habitat. As a result, activities occurring on MCB Camp Pendleton are currently being conducted in a manner that minimizes impacts to *B. filifolia* habitat. Finally, MCB Camp Pendleton provides training to personnel on environmental awareness for sensitive resources on the Base, including *B. filifolia* and its habitat.

Based on MCB Camp Pendleton's Sikes Act program (including the management of *Brodiaea filifolia*), there is a high degree of certainty that MCB Camp Pendleton will continue to implement their INRMP in coordination with the Service and the CDFG in a manner that provides a benefit to *B. filifolia,* coupled with a high degree of certainty that the conservation efforts of their INRMP will be effective. Service biologists work closely with MCB Camp Pendleton on a variety of issues relating to endangered and threatened species, including *B. filifolia.* The management programs, Base Directives, and Range and Training Regulations that avoid and minimize impacts to *B. filifolia* are consistent with section 7 consultations with MCB Camp Pendleton. Therefore, the Secretary determined that the INRMP for MCB Camp Pendleton has and will continue to provide a benefit for *B. filifolia,* and lands subject to the INRMP for MCB Camp Pendleton containing the physical and biological features essential to the conservation of the species are exempt from critical habitat designation pursuant to section 4(a)(3) of the Act. As a result, we are not including approximately 1,531 ac (620 ha) of habitat for *B. filifolia* on MCP Camp Pendleton in this final revised critical habitat designation.

Exclusions Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary must designate and revise critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the legislative history is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

In the following paragraphs, we address a number of general issues that are relevant to our analysis under section 4(b)(2) of the Act.

Under section 4(b)(2) of the Act, we must consider the economic impact, national security impact, or any other relevant impact of specifying any particular area as critical habitat. In considering whether to exclude a particular area from the designation, we must identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and determine whether the benefits of exclusion outweigh the benefits of inclusion. If based on this analysis, we make this determination, then we can exclude the area only if such exclusion would not result in the extinction of the species.

We consider a number of factors in a section 4(b)(2) analysis. For example, we consider whether there are lands owned or managed by the Department of Defense (DOD) where a national security impact might exist. We also consider whether the landowners have developed any conservation plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. Additionally, we look at any tribal issues, and consider the government-to-government relationship of the United States with tribal entities. We also consider the economic impacts, environmental impacts, and social impacts that might occur because of the designation.

When considering the benefits of inclusion for an area, we consider the additional regulatory benefits that area would receive from the protection from adverse modification or destruction as a result of actions with a Federal nexus; the educational benefits of mapping essential habitat for recovery of the listed species; and any benefits that may result from a designation due to State or Federal laws that may apply to critical habitat.

In considering the benefits of including in a designation lands that are covered by a current HCP or other management plan, we evaluate a number of factors to help us determine if the plan provides equivalent or greater conservation benefit than would likely result from designation of critical habitat. Specifically, when evaluating a conservation plan we consider, among other factors: whether the plan is finalized; how it provides for the conservation of the essential physical and biological features; whether the conservation management strategies and actions contained in a management plan are in place and there is a strong likelihood they will be implemented into the future; whether the conservation strategies in the plan are likely to be effective; and whether the plan contains a monitoring program or adaptive management to ensure that the conservation measures are effective and can be adapted in the future in response to new information.

When considering the benefits of exclusion, we consider, among other things, whether exclusion of a specific area is likely to result in long-term conservation; the continuation, strengthening, or encouragement of partnerships that result in conservation

of listed species; or implementation of a management plan that provides equal to or more conservation than a critical habitat designation would provide.

We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion.

After evaluating the benefits of inclusion and the benefits of exclusion, we carefully weigh the two sides to determine whether the benefits of exclusion outweigh those of inclusion. If we determine that they do, we then determine whether exclusion would result in extinction. If exclusion of an area from critical habitat will result in extinction, we will not exclude it from the designation.

In the case of *Brodiaea filifolia,* this revised critical habitat designation does not include any tribal lands or tribal trust resources. However, this revised critical habitat designation does include some lands covered by the Western Riverside County MSHCP, City and County of San Diego Subarea Plans under the MSCP, Orange County Central-Coastal NCCP/HCP, Orange County Southern Subregion HCP, and Carlsbad HMP under the MHCP. No additional HCPs or conservation plans covering *B. filifolia* were finalized since the proposed revised designation published in the **Federal Register** on December 8, 2009 (74 FR 64930).

Benefits of Excluding Lands With HCPs

The benefits of excluding lands with approved HCPs from critical habitat designation, such as HCPs that cover listed plant taxa, include relieving landowners, communities, and counties of any additional regulatory burden that might be imposed as a result of the critical habitat designation. Many HCPs take years to develop, and upon completion, are consistent with the recovery objectives for listed taxa that are covered by the plan. Many conservation plans also provide conservation benefits to unlisted sensitive species.

A related benefit of excluding lands covered by approved HCPs from critical habitat designation is the unhindered, continued ability it gives us to seek new partnerships with future plan participants, including States, counties, local jurisdictions, conservation organizations, and private landowners, which together can implement conservation actions that we would be unable to accomplish otherwise. Habitat Conservation Plans often cover a wide range of species, including listed plant species and species that are not State and federally listed and would otherwise receive little protection from development. By excluding these lands, we preserve our current partnerships and encourage additional conservation actions in the future.

We also note that permit issuance in association with HCP applications requires consultation under section 7(a)(2) of the Act, which would include the review of the effects of all HCP-covered activities that might adversely impact the species under a jeopardy standard, including possibly significant habitat modification (see definition of "harm" at 50 CFR 17.3), even without the critical habitat designation. In addition, all other Federal actions that may affect the listed species would still require consultation under section 7(a)(2) of the Act, and we would review these actions for possibly significant habitat modification in accordance with the definition of harm referenced above.

The information provided above applies to the following discussions of exclusions under section (4)(b)(2) of the Act. *Brodiaea filifolia* is covered under the Orange County Central-Coastal NCCP/HCP, Orange County Southern Subregion HCP, Carlsbad HMP under the MHCP, Western Riverside County MSHCP, and the City and County of San Diego Subarea Plans under the MSCP. Brief descriptions of each plan, and lands excluded from revised critical habitat covered by each plan, are described below. The areas where we determined the benefits of exclusion outweigh the benefits of inclusion are listed in Table 5. Additional details on these areas can be found in the proposed revised critical habitat rule 74 FR 64930 (December 8, 2009) and the NOA (75 FR 42054, dated July 20, 2010).

San Diego Multiple Species Conservation Plan (MSCP)—City of San Diego Subarea Plan

We analyzed the benefits of including lands covered by the City of San Diego Subarea Plan under the MSCP in the final revised critical habitat designation and the benefits of excluding those lands from the designation. The plan has established valuable partnerships that are intended to implement conservation actions for *Brodiaea filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding portions of Unit 12 under the City of San Diego MSCP Subarea Plan from revised critical habitat outweighs the benefits of inclusion. Therefore, we are not exercising our delegated discretion to exclude any of the 7 ac (3 ha) within the City of San Diego Subarea Plan from this final revised critical habitat designation.

TABLE 5—AREAS EXCLUDED FROM BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT DESIGNATION UNDER SECTION 4(b)(2) OF THE ACT

HCP or management plan and associated subunit	Area excluded (acres/hectares) *
Aliso and Wood Canyons Wilderness Park Resource Management Plan (Orange County Central-Coastal NCCP/HCP)	
Unit 3. Central Orange County—Aliso Canyon	102 ac (42 ha).
Orange County Southern Subregion HCP	
Subunit 4b. Caspers Wilderness Park	192 ac (78 ha).

TABLE 5—AREAS EXCLUDED FROM BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT DESIGNATION UNDER SECTION 4(b)(2) OF THE ACT—Continued

HCP or management plan and associated subunit	Area excluded (acres/hectares) *
Carlsbad HMP Under the San Diego MHCP	
Subunit 7a. Letterbox Canyon	13 ac (5 ha).
Subunit 7c. Calavera Hills Village H	45 ac (18 ha).
Subunit 7d. Villages of La Costa (Rancho La Costa)	98 ac (40 ha).
Subtotal Carlsbad HMP under the San Diego MHCP	*156 ac (63 ha).*
Western Riverside County MSHCP	
Subunit 11f. Santa Rosa Plateau—Mesa de Colorado	221 ac (89 ha).
Subunit 11g. Santa Rosa Plateau—South of Tenaja Road	117 ac (47 ha).
Subunit 11h. Santa Rosa Plateau—North of Tenaja Road	44 ac (18 ha).
Subtotal for Western Riverside County MSHCP	*381 ac (154 ha).*
County of San Diego Subarea Plan Under the San Diego MSCP	
Unit 12. Central San Diego County—Artesian Trails	4 ac (2 ha).
Total	837 ac (339 ha).

* Values in this table may not sum due to rounding.

Aliso and Wood Canyons Wilderness Park Resource Management Plan (AWCWP Resource Management Plan), Orange County Central-Coastal NCCP/HCP

We determined that approximately 113 ac (46 ha) in Unit 3 meet the definition of critical habitat under the Act. Of this area, 102 ac (42 ha) are covered by the Aliso and Wood Canyons Wilderness Park Resource Management Plan (AWCWP Resource Management Plan), and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. In making our final decision with regard to these lands, we considered several factors including our relationship with stakeholders, existing consultations, beneficial conservation measures that are in place on these lands (including preservation and long-term management), and impacts to current and future partnerships. As described in our section 4(b)(2) analysis below, we reached the determination to exclude these lands in consideration of the benefits of exclusion balanced against the benefits of inclusion in the final revised critical habitat designation.

The AWCWP is a preserve area that covers approximately 3,873 ac (1,567 ha) of land in Aliso and Wood Canyons and portions of Laguna Canyon in the cities of Laguna Niguel, Laguna Hills, Aliso Viejo, Laguna Beach, and Dana Point, Orange County, California. The AWCWP is located within the Nature Reserve of Orange County (which is part of a larger 17,000-ac (6,880-ha) regional coastal canyon ecosystem comprised of Laguna Coast Wilderness Park, Crystal Cove State Park, and City of Irvine Open Space) and is subject to the Orange County Central-Coastal NCCP/HCP and associated implementing agreement (R.J. Meade Consulting 1996a, pp. 1–567; The California Resources Agency et al., 1996, pp. 1–217; LSA Associates 2009, p. 25). Orange County Parks owns and operates the AWCWP, which is designated as a wilderness park (according to the Orange County General Plan) and encompasses a large island of habitat (coastal sage scrub, chaparral, native grassland, and oak woodland) that is almost entirely surrounded by urban development (LSA Associates 2009, p. 1).

The AWCWP Resource Management Plan provides comprehensive, long-term management for the preserve area, including those lands represented in Unit 3 of this rule. The fundamental objective for the AWCWP Resource Management Plan is to identify the best way to manage, protect, and enhance the natural resource values of the park while providing safe recreational and educational opportunities to the public (LSA Associates 2009, p. 25). As required by the Orange County Central-Coastal NCCP/HCP Implementing Agreement, the AWCWP Resource Management Plan includes policies for managing and monitoring the park, conducting research, conducting habitat restoration and enhancement, implementing fire management, and managing public access, recreation, and infrastructure (LSA Associates 2009, p. 26). The management regime addresses active management of resources with flexibility for adaptive management strategies, including the gradual modification of management techniques based on the results of ongoing management, research, and monitoring activities.

The most significant threats for the AWCWP include habitat fragmentation, invasive plant species, existing fuels and fire hazard conditions, urban edge effects, public use, and erosion. The AWCWP Resource Management Plan is designed to address these issues and threats, and minimize impacts while supporting the intent of a county wilderness park (LSA Associated 2009, p. 94). General management strategies for the park's biological resources that would benefit *Brodiaea filifolia* and its habitat identified in Unit 3 include:

(1) Protecting and maintaining populations of native plant and wildlife with an emphasis on managing Orange County Central-Coastal NCCP/HCP covered species;

(2) Improving biological productivity and diversity through protection, enhancement, and restoration activities consistent with the adaptive management strategy of the Orange County Central-Coastal NCCP/HCP;

(3) Monitoring enhancement and restoration activities as part of the adaptive management program to evaluate effectiveness and progress. Through monitoring, seek to identify

new enhancement and restoration opportunities and priorities within the park; and

(4) Implementing and coordinating with adjacent landowners to determine fire management methods that cause the least damage to park resources while providing effective fire control to protect human life and property (LSA Associates 2009, p. 103).

In addition to the preservation and management of the AWCWP as described above, management zones were created to allow for describing management goals by area or showing relationships between one area and another in terms of land use and management strategies, and are based on: (1) Geographic relationships; (2) resource values; (3) ecological parameters; (4) management issues, goals, or objectives; (5) types and intensities of land use; or (6) visitor use and experiences (LSA Associates 2009, p. 105). Unit 3 for *Brodiaea filifolia* occurs in the Lower Aliso Canyon Management Zone, which is managed to provide access into the park to communities at the southernmost segment of Lower Aliso Canyon, enhance recreation use, and improve riparian habitat and water quality in Aliso Creek (LSA Associated 2009, p. 109). Specific management strategies in the Lower Aliso Canyon Management Zone that would benefit *B. filifolia* and the habitat identified in Unit 3 include protecting and restoring riparian habitat along Aliso Creek through habitat restoration efforts and control of invasive, nonnative species, and continuing to participate in and support Aliso Creek Watershed planning efforts to improve water quality and review all watershed practices within the AWCWP (LSA Associates 2009, p. 109).

Approximately 102 ac (42 ha) of lands that meet the definition of critical habitat within Unit 3 are conserved and managed by Orange County Parks at the AWCWP. These conserved lands in Unit 3 are part of the large, interconnected network of conserved lands that make up the AWCWP, including areas that encompass occupancy records for *Brodiaea filifolia* and lands adjacent to the occurrences that will conserve and manage habitat that supports pollinators of *B. filifolia* and provide for habitat connectivity between *B. filifolia* populations. Thus, the AWCWP and associated management plan provides protection to the park's *B. filifolia* habitat through the conservation and management of an area that may otherwise be left unprotected without the wilderness park.

Benefits of Inclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; The regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas where the species occurs would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have a regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat in wetland areas. However, because all areas within the AWCWP are already conserved and managed under the AWCWP Resource Management Plan, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur, and if such actions do occur, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the AWCWP Resource Management Plan. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including the areas proposed for designation in the portion of Unit 3 covered by the AWCWP Resource Management Plan in revised critical habitat would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the B. filifolia proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. Because the habitat identified in the portion of Unit 3 covered by the AWCWP Resource Management Plan is already conserved and managed under the AWCWP Resource Management Plan, no educational benefits would be realized in this instance.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). These laws analyze the potential for projects to significantly affect the environment. In Orange County, additional protections associated with critical habitat may be beneficial in areas not currently conserved. However, in the case of *B. filifolia,* all areas within the AWCWP

are conserved and managed under the AWCWP Resource Management Plan. Therefore, *B. filifolia* critical habitat designation in this area would not signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas meeting the definition of critical habitat that are conserved and managed by the AWCWP Resource Management Plan, nor would any additional educational benefits be realized under these circumstances.

Benefits of Exclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the AWCWP Resource Management Plan including: (1) Continuance and strengthening of our effective working relationships with Orange County Parks and with all Orange County Central Coastal NCCP/HCP jurisdictions and stakeholders to promote voluntary, proactive conservation of *B. filifolia* and its habitat as opposed to reactive regulation; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; and (3) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in Orange County, the partnership and commitment by the Orange County Central-Coastal NCCP/HCP jurisdictions (and specifically Orange County Parks) resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

We developed close partnerships with all participating entities through the development of the Orange County Central-Coastal NCCP/HCP, including Orange County Parks through the development of the AWCWP Resource Management Plan, which incorporates substantial protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. By excluding 102 ac (42 ha) of lands in Unit 3 from this revised critical habitat designation, we eliminate an essentially redundant layer of regulatory review for projects covered by the AWCWP Resource Management Plan, which helps preserve our ongoing partnership with participating entities of the Orange County Central-Coastal NCCP/HCP (such as Orange County Parks), supporters/contributors to the long-term preservation of AWCWP, and encourages new partnerships with other landowners and jurisdictions and establishment of conservation and management for the benefit of *B. filifolia* and other sensitive species on additional lands; these partnerships and conservation actions are crucial for proactive conservation of *B. filifolia,* as opposed to the reactive, regulatory approach of consultation.

The Orange County Central-Coastal NCCP/HCP and the AWCWP Resource Management Plan address conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 or section 10 of the Act for smaller-scale management plans or HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex management plans or regional and jurisdiction-wide HCPs (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section).

In summary, we believe excluding land covered by the AWCWP Resource Management Plan (which is subject to the Orange County Central-Coastal NCCP/HCP) from revised critical habitat could provide the significant benefit of maintaining existing regional management plan and HCP partnerships, and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands covered by the AWCWP Resource Management Plan proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands covered by the AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Currently, all (approximately 102 ac (42 ha), or 91 percent of lands in Unit 3) lands that meet the definition of critical habitat within the AWCWP Resource Management Plan are conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within the AWCWP, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because this species has been a focus of conservation in Orange County for more than 10 years (as indicated by those measures evaluated and addressed by the Orange County Central-Coastal NCCP/HCP), we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnerships and conservation and management we developed with Orange County Parks and other local stakeholders in the development of the AWCWP Resource Management Plan and other management plans subject to the Orange County Central-Coastal NCCP/HCP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation for conserved and managed lands.

Exclusion Will Not Result in Extinction of the Species—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We determined that the exclusion of approximately 102 ac (42 ha) of land covered by the AWCWP Resource Management Plan in Unit 3 from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. The AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP provides a framework for long-term management and continued conservation of excluded lands that meet the definition of critical habitat in Unit 3. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude

approximately 102 ac (42 ha) or 91 percent of lands in Unit 3 from this final revised critical habitat designation.

Orange County Southern Subregion HCP

We determined that approximately 925 ac (375 ha) of land in Subunits 4b, 4c, and 4g owned by or under the jurisdiction of the permittees of the Orange County Southern Subregion HCP meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 192 ac (78 ha) of land conserved and managed by Orange County Southern Subregion HCP permittees within a portion of Subunit 4b from this final revised critical habitat designation. We are not exercising our delegated discretion to exclude 732 ac (297 ha) of land within the Orange County Southern Subregion HCP in Subunits 4c and 4g and a portion of Subunit 4b, and these lands are included in this revised critical habitat designation. As described in our section 4(b)(2) analysis below, we reached this determination in consideration of the benefits of exclusion balanced against the benefits of including an area in the final revised critical habitat designation.

The Orange County Southern Subregion HCP is a large-scale HCP encompassing approximately 86,021 ac (34,811 ha) in southern Orange County (including lands within Subunits 4b, 4c, and 4g). Originally developed as the Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan, we now refer to the plan as the Orange County Southern Subregion HCP. Although the plan is intended to be a subregional plan under the State of California's Natural Community Conservation Planning (NCCP) Act of 2001, the NCCP has not yet been permitted by the California Department of Fish and Game. On January 10, 2007, the Service approved the Habitat Conservation Plan and issued incidental take permits (TE144105–0, TE144113–0, and TE144140–0) under section 10(a)(1)(B) of the Act to the three permittees for a period of 75 years. The Orange County Southern Subregion HCP was developed by the County of Orange (County), Rancho Mission Viejo, LLC (Rancho Mission Viejo), and the Santa Margarita Water District (Water District) to address impacts resulting from residential and associated infrastructure development to 32 species including *Brodiaea filifolia.* The Orange County Southern Subregion HCP is a multi-species conservation program that minimizes and mitigates expected habitat loss and associated incidental take of covered species.

The Orange County Southern Subregion HCP addresses development and associated infrastructure on Rancho Mission Viejo lands, installation and maintenance of infrastructure by the Water District, expansion of Prima Deshecha Landfill by the County, and monitoring and adaptive management of covered species on reserve lands.

The Orange County Southern Subregion HCP will establish approximately 30,426 ac (12,313 ha) of habitat reserve, which will consist primarily of land owned by Rancho Mission Viejo and three pre-existing County parks (Service 2007, pp. 10 and 19). The HCP provides for a large, biologically diverse and permanent habitat reserve that will protect: (1) Large blocks of natural vegetation communities that provide habitat for the covered species; (2) "important" and "major" populations of the covered species in key locations; (3) wildlife corridors and habitat linkages that connect the large habitat blocks and covered species populations to each other, the Cleveland National Forest, and the adjacent Orange County Central-Coastal NCCP/HCP; and (4) the underlying hydrogeomorphic processes that support the major vegetation communities providing habitat for the covered species (Service 2007, p. 10).

The overall habitat reserve will be managed and monitored according to the collective Habitat Reserve Management and Monitoring Program (Habitat Reserve Management Program). The Habitat Reserve Management Program focuses on the development and implementation of a coordinated monitoring and management program to sustain and enhance species populations and their habitats over the long term, while adapting management actions to new information and changing habitat conditions. The management program comprises two components: (1) An ongoing management program on County park lands within the habitat reserve; and (2) an adaptive management program that will be implemented on the Rancho Mission Viejo portion of the habitat reserve and on selected portions of the County park lands within the habitat reserve (Service 2007, p. 12).

In addition to the creation of a habitat reserve, the following conservation measures specific to *Brodiaea filifolia* and its habitat include:

(1) Avoid and minimize potential impacts to *B. filifolia* associated with construction activities on Rancho Mission Viejo through preparation of Biological Resources Construction Plans in coordination with the Service.

(2) Removal and control of the nonnative artichoke thistle (*Cynara cardunculus*). This invasive plant species may compete with *B. filifolia* for space and resources, and alter habitat in an area to the extent that it no longer supports *B. filifolia.* Removal and control of artichoke thistle occurs on Rancho Mission Viejo and is expected to continue into the future as the Invasive Species Control Plan is implemented within the reserve.

(3) Translocate and propagate *B. filifolia* under the Translocation, Propagation and Management Plan for Special-Status Plants to the extent feasible and appropriate, when impacts to *B. filifolia* are unavoidable. Potential translocation and associated restoration areas will be focused in areas that are also targeted for coastal sage scrub and coastal sage scrub/valley needlegrass grassland restoration, including Chiquita Ridge and Chiquadora Ridge (Subunit 4c). The plan also provides success criteria to evaluate the effectiveness of the restoration of *B. filifolia* in areas of temporary impacts.

(4) Monitor *B. filifolia* populations, focusing on the Cañada Gobernadora/Chiquita Ridgeline (Subunit 4c) and Cristianitos Canyon populations (Subunit 4g). Additionally, information will be gathered regarding nonnative species, observations of pollinators, and signs of disturbance. Annual monitoring will occur every year for the first 5 years after dedication to the reserve and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Below is a brief analysis of the lands in Subunit 4b that are currently conserved and managed consistent with the Orange County Southern Subregion HCP.

Approximately 192 ac (78 ha) of Subunit 4b within the Ronald W. Caspers Wilderness Park (Caspers Wilderness Park) is covered by the Ronald W. Caspers Wilderness Park General Development Plan Phase III Habitat Conservation Program (Caspers Wilderness Park Program). The Caspers Wilderness Park Program functions as an operational program under the Orange County Southern Subregion HCP to ensure protection of existing biological communities and sensitive plant and animal species through

implementation of, at minimum: (1) An ongoing review of sensitive habitat areas; and (2) identification of site-specific operational directives for the protection of habitats, which include a mechanism for review and adjustment of directives in light of new information (Lewis 1987, pp. 1–1 and 2–11). Thus, the Caspers Wilderness Park Program provides protection to *Brodiaea filifolia* proposed revised critical habitat through the conservation and management of this area that may otherwise be left unprotected.

Benefits of Inclusion—Orange County Southern Subregion HCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat, the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat. However, because areas proposed for designation within Caspers Wilderness Park in Subunit 4b are already conserved and managed under the Caspers Wilderness Park Program, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur in these areas. If such actions do occur, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the Caspers Wilderness Park Program. Therefore, we expect the regulatory benefit of including this area in revised critical habitat would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to land owners and managers in prioritizing conservation and management of identified areas. Because the habitat identified in Caspers Wilderness Park within Subunit 4b is already conserved and managed under the Caspers Wilderness Park Program, no educational benefits would be realized in this area.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In Orange County, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas meeting the definition of critical habitat that are conserved and managed under the Orange County Southern Subregion HCP, nor would any additional educational benefits be realized under these circumstances. In areas that are not currently conserved and managed, we believe there may be significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—Orange County Southern Subregion HCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the Orange County Southern Subregion HCP including: (1) Continuance and strengthening of our effective working relationships with all Orange County Southern Subregion HCP stakeholders to promote conservation of *B. filifolia* and its habitat; (2) allowance for continued meaningful collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; and (3) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species, which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in Orange County, the partnership and commitment by the County resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

The Orange County Southern Subregion HCP addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under sections 7 of the Act or through smaller HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical

habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex regional and jurisdiction-wide HCPs, such as the Orange County Southern Subregion HCP (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section of this rule). Exclusion of Orange County Southern Subregion HCP lands would help preserve the partnership we developed with the County of Orange and other permittees in the development of the HCP, and foster future partnerships and development of future HCPs.

In summary, we believe excluding land covered by the Orange County Southern Subregion HCP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Orange County Southern Subregion HCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands owned by or under the jurisdiction of Orange County Southern Subregion HCP permittees as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands already conserved and managed in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 192 ac (78 ha) of land in Subunit 4b at Caspers Wilderness Park are conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within Caspers Wilderness Park, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because the habitat identified in Caspers Wilderness Park within Subunit 4b is already conserved and managed under the Caspers Wilderness Park Program, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Caspers Wilderness Park Program (under the Orange County Southern Subregion HCP) from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with Orange County and other local stakeholders in the development of the Orange County Southern Subregion HCP and the Caspers Wilderness Park Program, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation. We analyzed the benefits of including lands within Subunits 4c, 4g, and the reminder of 4b (that is not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the plan has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding Subunits 4c, 4g, and the remainder of 4b (that is not conserved and managed) from revised critical habitat outweighs the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunit 4b, Orange County Southern Subregion HCP

We determined that the exclusion of approximately 192 ac (78 ha) of land in Subunit 4b owned by or under the jurisdiction of Orange County Southern Subregion HCP permittees from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 192 ac (78 ha) of land conserved and managed by Orange County Southern Subregion HCP permittees in Subunit 4b from this final revised critical habitat designation.

San Diego Multiple Habitat Conservation Program (MHCP)—Carlsbad Habitat Management Plan (Carlsbad HMP)

We determined approximately 261 ac (106 ha) of land in Subunits 7a, 7b, 7c, and 7d within the Carlsbad HMP planning area meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors, including conservation measures and management that are in place on these lands, our relationship with the participating MHCP jurisdiction, our relationship with other MHCP stakeholders, existing consultations, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 156 ac (63 ha) of land within Subunit 7d and portions of Subunits 7a and 7c from this final revised critical habitat designation. We are including approximately 106 ac (43 ha) of land within Subunit 7b and portions of Subunits 7a and 7c in this revised critical habitat designation. As described in our section 4(b)(2) analysis below, we reached this determination in consideration of the benefits of exclusion balanced against the benefits of including the areas in the final revised critical habitat designation.

The Carlsbad HMP is a subarea plan under the purview of the San Diego MHCP. The San Diego MHCP is a comprehensive, multi-jurisdictional planning program designed to create, manage, and monitor an ecosystem preserve in northwestern San Diego County. The San Diego MHCP is also a subregional plan under the State of California's Natural Communities Conservation Plan (NCCP) program and was developed in cooperation with CDFG. The MHCP preserve system is intended to protect viable occurrences of native plant and animal species and their habitats in perpetuity, while accommodating continued economic development and quality of life for residents of northern San Diego County. The MHCP includes an approximately 112,000-ac (45,324-ha) plan area within the cities of Carlsbad, Encinitas, Escondido, San Marcos, Oceanside, Vista, and Solana Beach. At this time, only the City of Carlsbad has completed its Subarea Plan (Carlsbad HMP). The section 10(a)(1)(B) permit for the City of Carlsbad HMP was issued on November 9, 2004 (Service 2004a).

Brodiaea filifolia is a covered species under the Carlsbad HMP. Nine occurrences of *B. filifolia* exist within the City of Carlsbad. We proposed 4 of these 9 occurrences as revised critical habitat in Subunits 7a, 7b, 7c, and 7d. Under the Carlsbad HMP, all known occurrences of *B. filifolia* within existing preserve areas (7 of 9 known occurrences) will be conserved at 100 percent. All covered activities impacting *B. filifolia* outside of already preserved areas are required to be consistent with the MHCP's narrow endemic policy, which requires mitigation for unavoidable impacts and management practices designed to achieve no net loss of narrow endemic populations, occupied acreage, or population viability within Focused Planning Areas (planning areas within which preserves may be designated by city subarea

plans). Additionally, cities cannot permit more than 5 percent gross cumulative loss of narrow endemic populations or occupied acreage within the Focused Planning Areas, and no more than 20 percent cumulative loss of narrow endemic locations, population numbers, or occupied acreage outside of Focused Planning Areas (AMEC 2003, pp. 2–14, D–1). All conserved populations of *B. filifolia* will be incorporated into the Carlsbad HMP's preserve areas. The Carlsbad HMP includes provisions to manage the populations within the preserve areas in order to provide for the long-term conservation of the species. Portions of Subunits 7a and 7c, and Subunit 7b in its entirety are within pre-existing open space easements owned by private landowners outside Focused Planning Areas and are not yet incorporated into the Carlsbad HMP's preserve. Therefore, additional regulatory protection could provide significant conservation benefits to *B. filifolia* and its habitat in portions of Subunits 7a and 7c, and the entirety of Subunit 7b.

At the time the Carlsbad HMP permit was issued (November 9, 2004), *Brodiaea filifolia* was a conditionally covered species under the Carlsbad HMP, as the proposed reserve on the Fox-Miller property within Subunit 7a did not meet the conditions for coverage of the species under the Carlsbad HMP. The project was subsequently redesigned to meet the narrow endemic standards by impacting less than five percent of the known population, and a long-term management plan was submitted. On December 2, 2005, the Service and CDFG concluded that the City of Carlsbad would receive full coverage for *B. filifolia* under the Carlsbad HMP (CDFG and Service 2005, p. 1).

Approximately 13 ac (5 ha), of lands that meet the definition of critical habitat within Subunit 7a are conserved and managed under the Long-Term Management Plan for Fox-Miller Property Open Space (Fox-Miller Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. The approximately 13 ac (5 ha) have been conserved and managed in a preserve to mitigate impacts to the biological resources associated with the development of the Fox-Miller property (RECON 2005, p. 1). The Fox-Miller Management Plan provides a framework for the enhancement and management of *Brodiaea filifolia,* its habitat, and other habitats within the preserve. The preserve will be managed in perpetuity to maintain and improve the habitat quality on-site. Scheduled management activities include: (1) Vegetation mapping performed at a minimum of every five years; (2) annual exotic species removal and control within the preserve; (3) preserve signage creation, installation, and monitoring; (4) monthly site visits to check fencing and identify any threats to the habitat, such as unauthorized access to the site; (5) annual monitoring of the *B. filifolia* population and its habitat; (6) annual publication of an educational newsletter to surrounding businesses; and (7) preparation of annual reports to the City of Carlsbad, CDFG, and the Service (RECON 2005, pp. 12–13, 16, 18, 24).

Approximately 45 ac (18 ha), or 63 percent, of Subunit 7c is covered by the Calavera Hills Phase II Final Habitat Management Plan (Calavera Hills Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. Within this area is a population of *Brodiaea filifolia* that is conserved and managed within a 144 ac (58 ha) habitat preserve set aside by the developer of Calavera Hills Phase II (Planning Systems 2002, pp. 1, 4). The purpose of the Calavera Hills Management Plan is to establish parameters for the permanent protection and management of the preserve (Planning Systems 2002, p. 3). Scheduled management activities include, but are not limited to: (1) Habitat monitoring and mapping; (2) patrolling for signs of trespassing, dumping, vandalism, off-road vehicle use, homeowner encroachment, and any other disturbances by humans; (3) trash removal conducted at a minimum of every six months; (4) publication of an educational flyer for distribution to surrounding property owners; (5) photograph documentation of site conditions; (6) monitoring of preserve signage and fencing; (7) exotic species removal and control; (8) erosion control; and (9) preparation of annual reports to the City of Carlsbad, CDFG, and the Service (Planning Systems 2002, pp. 9–14, 16, 25–26). In addition to routine monitoring of the preserve, specific management strategies that benefit *B. filifolia* and its proposed revised critical habitat include: (1) Annual mapping and counting of the *B. filifolia* population; and (2) protection from human trampling or other potential threats to the degree feasible (Planning Systems 2002, p. 11).

Approximately 98 ac (40 ha), or 100 percent, of Subunit 7d is covered by the Habitat Management Plan for the Rancho La Costa Habitat Conservation Area (Rancho La Costa Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. Within this area is a population of *Brodiaea filifolia* and its habitat that is conserved and managed in its entirety within a 1,400 ac-(565-ha) habitat preserve set aside by the property owners as mitigation for impacts to natural habitat as part of the Villages of La Costa and University Commons developments (CNLM 2005, pp. 1, 5). Management strategies outlined in the plan include: (1) Annual counts of the *B. filifolia* population; (2) exotic species removal and control; (3) regular patrolling of the preserve to monitor public use; (4) maintenance of access control (*e.g.,* fencing and signage) and trails; (5) informing and educating the local residents through publication of outreach information, guided nature walks, and annual publication of educational newsletters; and (6) preparation of annual reports to the Cities of Carlsbad and San Marcos, CDFG, and the Service (CNLM 2005, pp. 28, 32–34, 36, 38). In addition to routine monitoring of the preserve, specific management strategies that would benefit *B. filifolia* and its proposed revised critical habitat include monitoring percent cover of native and nonnative annual plant species within its habitat and removing nonnative plant species (CNLM 2005, p. 21).

Benefits of Inclusion—Carlsbad HMP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects

to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7 of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation could have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat. However, the probability of a project with a Federal nexus occurring in land covered by the Carlsbad HMP within Subunits 7a, 7b, 7c, and 7d is low, as the areas are outside any wetland areas, and are privately owned; the probability of a project with a Federal nexus occurring in Subunit 7d (which is conserved and managed) or the conserved and managed portions of Subunits 7a and 7c is further lessened by the fact that these areas are protected from development and other potential impacts. If such actions do occur in the conserved and managed portions of Subunits 7a, 7c, or 7d, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by conservation under the Carlsbad HMP. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including the conserved and managed areas proposed for designation in Subunits 7a, 7c, and 7d in revised critical habitat would be minimal. However, we expect the regulatory benefit to the conservation of *B. filifolia* of including areas proposed for designation that are not conserved and managed in Subunits 7a, 7b, and 7c in revised critical habitat would be greater than the benefit to the conserved and managed areas.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. However, we do not believe critical habitat designation for *B. filifolia* will provide significant additional educational benefits in areas that are already conserved and managed because this species has been a focus of conservation in the City of Carlsbad for several years.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In the City of Carlsbad, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas that meet the definition of critical habitat and are currently conserved and managed under the Carlsbad HMP. We also believe no significant educational benefits will be realized in areas that meet the definition of critical habitat and are currently conserved and managed under the Carlsbad HMP because this species has been a focus of conservation in the City of Carlsbad for many years. In areas that are not currently conserved and managed, we believe there may be more significant regulatory benefits of critical habitat designation.

Benefits of Exclusion—Carlsbad HMP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat on lands covered by the Carlsbad HMP including: (1) Continuance and strengthening of our effective working relationships with all MHCP jurisdictions and stakeholders to promote conservation of *Brodiaea filifolia* and its habitat; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; (3) encouragement of other jurisdictions to complete subarea plans under the MHCP (*i.e.,* the cities of Encinitas, Escondido, San Marcos, Oceanside, Vista, and Solana Beach); and (4) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species, which is voluntary because the Act does not prohibit take of plant species.

The Carlsbad HMP addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 of the Act or through smaller HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex regional and jurisdiction-wide HCPs, such as the Carlsbad HMP (as discussed further in Comments 57 and 75 below in the Summary of Comments and Recommendations section of this rule). Exclusion of Carlsbad HMP lands would help preserve the partnership we developed with the City of Carlsbad in the development of the HMP, and foster

future partnerships and development of future HCPs.

In summary, we believe excluding land covered by the Carlsbad HMP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Carlsbad HMP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands covered by the Carlsbad HMP proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands covered by the Carlsbad HMP that are conserved and managed in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 13 ac (5 ha) of land in Subunit 7a at Fox-Miller, approximately 45 ac (18 ha) of land in Subunit 7c at Calavera Hills, and all of the approximately 98 ac (40 ha) of land in Subunit 7d at Rancho La Costa are already conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within these areas, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because this species has been a focus of conservation in the City of Carlsbad for several years, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits in areas that are already conserved and managed.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Carlsbad HMP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with the City of Carlsbad and other local stakeholders in the development of the Carlsbad HMP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation. We analyzed the benefits of including lands within Subunit 7b and portions of Subunits 7a and 7c (that are not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the Carlsbad HMP has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas that are not conserved and managed (Subunit 7b and portions of Subunits 7a and 7c) from revised critical habitat outweigh the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunits 7a, 7c, and 7d, Carlsbad HMP

We determined that the exclusion of approximately 156 ac (63 ha) of land covered by the Carlsbad HMP in Subunit 7d and a portion of Subunits 7a and 7c from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 156 ac (63 ha) of conserved and managed land in Subunit 7d and portions of Subunits 7a and 7c from this final revised critical habitat designation.

Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)

We determined that approximately 1,494 ac (604 ha) of land in Subunits 11a, 11b, 11c, 11d, 11e, 11f, 11g, and 11h that are within the Western Riverside County MSHCP planning area meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 381 ac (154 ha) of land within Subunits 11g, 11h, and a portion of Subunit 11f from this final revised critical habitat designation. We are including 1,113 ac (450 ha) of land within Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f in this revised critical habitat designation. As described in our analysis below, we reached this conclusion by weighing the benefits of exclusion balanced against the benefits of including an area in the final revised critical habitat designation.

The Western Riverside County MSHCP is a regional, multi-jurisdictional HCP encompassing approximately 1.26 million ac (510,000 ha) of land in western Riverside County. The Western Riverside County MSHCP addresses 146 listed and unlisted "covered species," including *Brodiaea filifolia.* The Western Riverside County MSHCP includes a multi-species conservation program designed to minimize and mitigate the effects of expected habitat loss and associated incidental take of covered species. On June 22, 2004, the Service issued a single incidental take permit under section 10(a)(1)(B) of the Act to 22 permittees under the Western Riverside County MSHCP for a period of 75 years (Service 2004b, TE–088609–0). We concluded in our biological opinion (Service 2004b, p. 386) that implementation of the plan, as proposed, was not likely to jeopardize the continued existence of *B. filifolia.* Our determination was based on our conclusion that 78 percent of *B. filifolia* suitable habitat and at least 76 percent of the extant occurrences known at that time would be protected or will remain within the Western Riverside County MSHCP Conservation Area.

The Western Riverside County MSHCP, when fully implemented, will establish approximately 153,000 ac (61,917 ha) of new conservation lands (Additional Reserve Lands) to complement the approximately 347,000 ac (140,426 ha) of pre-existing natural and open space areas (Public/Quasi-Public (PQP) lands). These PQP lands include those under ownership of public or quasi-public agencies, primarily the United States Forest Service (USFS) and Bureau of Land Management (BLM), as well as permittee-owned or controlled open-space areas managed by the State of California and Riverside County. Collectively, the Additional Reserve Lands and PQP lands form the overall Western Riverside County MSHCP Conservation Area. The configuration of the 153,000 ac (61,916 ha) of Additional Reserve Lands is not mapped or precisely identified ("hard-lined") in the Western Riverside County MSHCP. Rather, it is based on textual descriptions of habitat conservation necessary to meet the conservation goals for all covered species within the bounds of the approximately 310,000-ac (125,453-ha) Criteria Area and is determined as implementation of the Western Riverside County MSHCP takes place. In an effort to predict one possible future configuration of the Additional Reserve Lands, we internally

mapped a "Conceptual Reserve Design" based on our interpretation of the textual descriptions of habitat conservation necessary to meet conservation goals.

Specific conservation objectives in the Western Riverside County MSHCP for *Brodiaea filifolia* include providing 6,900 ac (2,786 ha) of occupied or suitable habitat for the species in the MSHCP Conservation Area along portions of San Jacinto River (Subunits 11a, 11b, 11c, 11d), Mystic Lake, and Salt Creek (Subunit 11e) (Service 2004b, p. 384). This acreage can be attained through acquisition or other dedications of land assembled from within the Criteria Area (as these lands are acquired they become part of the Additional Reserve Lands). Floodplain processes along the San Jacinto River and along Salt Creek will be maintained to provide for persistence of the species. Additionally, at least 76 percent of the known *B. filifolia* occurrences as of 2004 will remain on existing PQP lands or be conserved within the Additional Reserve Lands. Finally, areas within the Criteria Area where there is potential suitable habitat for *B. filifolia* that is not yet protected are subject to the Additional Survey Needs and Procedures Policy (see Additional Survey Needs and Procedures, Western Riverside County MSHCP, Volume 1, section 6.3.2 in Dudek & Associates, Inc. 2003b). In these areas, surveys for *B. filifolia* are required as part of the project review process for public and private projects where suitable habitat is present (see Criteria Area Species Survey Area (CASSA) Map, Figure 6–2 of the Western Riverside County MSHCP, Volume I in Dudek & Associates, Inc. 2003b). For locations with positive survey results, 90 percent of those portions of the property that provide long-term conservation value for the species will be avoided until it is demonstrated that the conservation objectives for the species are met. Once species-specific objectives are met, avoided areas would be evaluated to determine whether they should be released for development or included in the MSHCP Conservation Area.

Preservation and management of approximately 6,900 ac (2,786 ha) of *Brodiaea filifolia* habitat under the Western Riverside County MSHCP will contribute to the conservation and ultimate recovery of this species. *Brodiaea filifolia* is threatened primarily by habitat destruction and fragmentation from urban and agricultural development, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, OHV activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from nonnative plant species (Service 2004b, p. 380). The Western Riverside County MSHCP will remove and reduce threats to *B. filifolia* and the physical and biological features essential to the conservation of the species as the plan is implemented by preserving large blocks of suitable habitat throughout the Conservation Area. The plan also generates funding for long-term management of conserved lands for the benefit of the species they protect.

Below is a brief analysis of the lands in Subunits 11g, 11h, and a portion of Subunit 11f that we are exercising our delegated discretion to exclude under section 4(b)(2) of the Act, and how these areas are conserved and managed consistent with the Western Riverside County MSHCP.

Approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f are conserved and managed on PQP lands at the Santa Rosa Plateau Ecological Reserve (Santa Rosa Plateau). This reserve has four landowners: CDFG, the County of Riverside, the Metropolitan Water District of Southern California, and The Nature Conservancy. The landowners and the Service (which owns no land on the Santa Rosa Plateau) signed a cooperative management agreement on April 16, 1991 (Dangermond and Associates, Inc. 1991), and meet regularly to work on the management of the reserve (Riverside County Parks 2009, p. 2). These conserved lands in Subunits 11g, 11h, and a portion of Subunit 11f are part of the large, contiguous area of approximately 8,500 ac (3,432 ha) that make up the Santa Rosa Plateau, including areas that provide for habitat connectivity between *B. filifolia* populations. Thus, the Santa Rosa Plateau and associated management plan provides protection to the reserve's *B. filifolia* proposed revised critical habitat through the conservation and management of an area that may otherwise be left unprotected without the reserve.

Benefits of Inclusion—Western Riverside County MSHCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat: the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify revised critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation will have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat.

As discussed above, the Western Riverside County MSHCP provides for protection of *Brodiaea filifolia* habitat considered necessary for survival and recovery of the species. For locations with positive survey results, impacts to 90 percent of portions of the property that provide long-term conservation value for the species will be avoided until it is demonstrated that the conservation objectives for the species

have been met. The Western Riverside County MSHCP does not include dumping of manure and other soil amendments as a covered activity, and thus does not include measures to minimize or mitigate impacts from that activity. However, the activity is occurring in some habitat areas that have not yet been conserved. As discussed in Comment 28 below, this threat is significant and ongoing within the Western Riverside County MSHCP plan area (specifically in Subunits 11b, 11c, and 11e) in habitat that is not yet conserved and managed to benefit the species. Therefore, for activities covered under the plan, we believe that protections provided by the designation of revised critical habitat will be partially redundant with protections provided by the HCP; however, additional regulatory protection from manure dumping could provide significant conservation benefits to *B. filifolia* in Subunits 11b, 11c, and 11e.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed rule identifies those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. In general, we believe the designation of critical habitat for *B. filifolia* will provide to the public additional information not already sufficiently emphasized through meetings, and educational materials provided to the general public by the County of Riverside.

The benefit of educating the public about *Brodiaea filifolia* habitat may be significant because the distribution of *B. filifolia* habitat in Riverside County is not well known and the importance of these habitat areas may not be known to the public. Activities are taking place that harm habitat where *B. filifolia* occurs (including the associated local watershed areas) in Riverside County possibly due to the lack of public awareness. For example, manure dumping on private property along the San Jacinto River is impacting habitat within the Western Riverside County MSHCP plan area. These impacts are occurring despite identification of these areas as important for the survival and recovery of *B. filifolia* in the Western Riverside County MSHCP and the critical habitat designation published in the **Federal Register** on December 13, 2005 (70 FR 73820) (*see* Comment 27 in the Summary of Comments and Recommendations section below). Manure dumping was not discussed as an impact to *B. filifolia* in the Biological Opinion on the Western Riverside County MSHCP (Service 2004b, pp. 378–386). We have been working with permittees to implement additional ordinances that will help to control activities (such as manure dumping) that may impact the implementation of the Western Riverside County MSHCP conservation objectives. To date, the City of Hemet is the only Western Riverside County MSHCP permittee that has addressed the negative impacts that manure dumping has on vernal pool habitat through the enactment of Ordinance 1666 (*i.e.,* the ordinance that prevents manure dumping activities and educates its citizens). We believe including areas in the *B. filifolia* revised critical habitat designation where manure dumping still occurs on non-conserved land will provide information to the public and local jurisdictions regarding the importance of addressing this threat, which alters the physical and biological features essential to the conservation of *B. filifolia.* Therefore, we believe there is a significant educational conservation benefit of critical habitat designation in areas where manure dumping occurs within the Western Riverside County MSHCP plan area. However, no educational benefits would be realized in the approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f that are already conserved and managed on PQP lands at the Santa Rosa Plateau Ecological Reserve.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In Riverside County, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat will provide minimal regulatory benefits under section 7(a)(2) of the Act in areas currently conserved and managed, and no additional educational benefits would be realized under these circumstances. In areas that are not currently conserved or where no local ordinance exists to protect *Brodiaea filifolia* habitat from manure dumping activities (*i.e.,* impacts that are not a covered activity under the Western Riverside County MSHCP), we believe that there are significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—Western Riverside County MSHCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the Western Riverside County MSHCP including:

(1) Continuance and strengthening of our effective working relationships with all Western Riverside County MSHCP jurisdictions and stakeholders to promote conservation of the *B. filifolia,* its habitat, and 145 other species covered by the HCP and their habitat;

(2) Allowance for continued meaningful proactive collaboration and cooperation in working toward protecting and recovering this species and the many other species covered by the HCP, including conservation benefits that might not otherwise occur;

(3) Encouragement for local jurisdictions to fully participate in the Western Riverside County MSHCP; and

(4) Encouragement of additional HCPs and other conservation and management activities in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species.

We developed a close partnership with the permittees of the Western Riverside County MSHCP through the development of the HCP, which incorporates protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in

developing and implementing complex regional and jurisdiction-wide HCPs, such as the Western Riverside County MSHCP (as discussed further in Comments 57 and 75 below in the Summary of Comments and Recommendations section of this rule). Exclusion of Western Riverside County MSHCP lands would help preserve the partnerships we developed with the County of Riverside and other local jurisdictions in the development of the HCP, and foster future partnerships and development of future HCPs, and encourage the establishment of future conservation and management of habitat for *B. filifolia* and other sensitive species.

In summary, we believe excluding land covered by the Western Riverside County MSHCP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for lands covered by the Western Riverside County MSHCP proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including conserved and managed lands under the Western Riverside County MSHCP in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f are conserved and managed on PQP lands at the Santa Rosa Plateau. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within these areas, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because these areas are conserved and managed, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Western Riverside County MSHCP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with Western Riverside County and other permitees and stakeholders in the development of the Western Riverside County MSHCP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation for lands that are conserved and managed. We analyzed the benefits of including lands within Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f (that are not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the Western Riverside County MSHCP has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas that are not conserved and managed (Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f) from revised critical habitat outweigh the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunits 11f, 11g, and 11h, Western Riverside County MSHCP

We determined exclusion of 381 ac (154 ha) of land in Subunits 11g, 11h, and a portion of 11f within the Western Riverside County MSHCP planning area from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 381 ac (154 ha) of conserved and managed land in Subunits 11g, 11h, and 11f from this final revised critical habitat designation.

San Diego Multiple Species Conservation Plan (MSCP)—County of San Diego Subarea Plan

The MSCP is a subregional HCP (one of multiple subregional HCPs in the San Diego County region) made up of several subarea plans. The MSCP has been in place for more than a decade. The subregional plan area encompasses approximately 582,243 ac (235,626 ha) (MSCP 1998, p. 2–1) and provides for conservation of 85 federally listed and sensitive species ("covered species"). The conservation of these species is being achieved through the establishment and management of approximately 171,920 ac (69,574 ha) of preserve lands within the Multi-Habitat Planning Area (MHPA) (City of San Diego Subarea Plan), Pre-Approved Mitigation Areas (PAMA) (County of San Diego Subarea Plan), and Mitigation Area (City of Poway Subarea Plan). The MSCP was developed in support of applications for incidental take permits by 12 participating jurisdictions in southwestern San Diego County. Under the umbrella of the MSCP, each of the 12 participating jurisdictions is required to prepare a subarea plan that implements the goals of the MSCP within that particular jurisdiction. *Brodiaea filifolia* was evaluated in the MSCP subregional plan, and is a covered species under the County of San Diego MSCP Subarea Plan. The Service issued the County of San Diego a single incidental take permit (TE–840414) under section 10(a)(1)(B) of the Act for the County of San Diego Subarea Plan under the MSCP for a period of 50 years on March 17, 1998.

The County of San Diego has both "hardline" boundaries as well as preserve areas that do not have "hardline" boundaries. In areas where the "hardlines" are not defined, the County's subarea plan identifies areas where mitigation activities should be focused to assemble its preserve areas or the PAMA. Those areas of the County of San Diego Subarea preserve, and other MSCP subarea preserves that are either conserved or designated for inclusion in the preserves under the plan are referred to as the "MSCP preserve" in this discussion. When the preserve is completed, the public sector (Federal, State, and local government) and private landowners will have contributed 108,750 ac (44,010 ha) (63 percent) to the preserve, of which 81,750 ac (33,083 ha) (48 percent) was existing public land when the MSCP was established and 27,000 ac (10,927 ha) (16 percent) will have been acquired. At completion, the private sector will have contributed 63,170 ac (25,564 ha) (37 percent) to the preserve as part of the development process, either through avoidance of impacts or as compensatory mitigation for impacts to biological resources outside the preserve. Currently and in the future, Federal and State governments, local jurisdictions and special districts, and managers of privately owned lands will manage and monitor their lands in the preserve for species and habitat protection (MSCP 1998, p. 2–1).

At the time the permit was issued for the County of San Diego subarea plan, no occurrences of *Brodiaea filifolia* were known to exist within the MSCP. As *B. filifolia* is on the MSCP's list of narrow

endemic species, each subarea plan specifies conservation measures for the species if an occurrence is newly identified. Occurrences within the County of San Diego Subarea will be avoided to the maximum extent practicable. Where complete avoidance is infeasible, encroachment may be authorized but will not exceed 20 percent.

As discussed under the *Benefits of Excluding Lands with HCPs* section of this rule, we considered excluding lands under the County of San Diego Subarea Plan. After reviewing the areas covered by the County of San Diego Subarea Plan, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude approximately 4 ac (2 ha) in Unit 12. We determined that approximately 109 ac (44 ha) of land in Unit 12 within the County of San Diego Subarea Plan meet the definition of critical habitat under the Act. We are including 105 ac (43 ha) of land within Unit 12 (within the County of San Diego Subarea Plan) in this revised critical habitat designation. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. As described in our analysis below, we reached this conclusion by weighing the benefits of exclusion against the benefits of including an area in the final revised critical habitat designation.

Approximately 4 ac (2 ha), or 9 percent, of Unit 12 is covered by the Artesian Trails Resource Management Plan (Artesian Trails Management Plan) in conformance with the County of San Diego MSCP Subarea Plan, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. In this area, a population of *Brodiaea filifolia* is conserved and managed within a preserve set aside by the property owners consistent with a biological mitigation ordinance as part of the Artesian Trails Minor Subdivision project (Tierra Environmental 2007, pp. 1–2). The Artesian Trails Management Plan provides an overview of the property's operation, maintenance, and personnel requirements to implement management goals in perpetuity (Tierra Environmental 2007, pp. 1, 3). Planned management activities include: (1) Annual monitoring of the *B. filifolia* population; (2) exotic species removal and control; (3) maintenance of access control (such as fencing and signage); (4) site assessments with photo documentation; (5) trash removal; (6) notifying property owners of conditions degrading habitat; (7) maintaining community awareness of sensitive habitat and protection of area; and (8) preparation of annual reports to the County of San Diego, CDFG, and the Service (Tierra Environmental 2007, pp. 11–15, 17).

Benefits of Inclusion—County of San Diego Subarea Plan

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; the regulatory standard of section 7 of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify revised critical habitat. Specifically, we expect projects in wetland areas where the species occurs would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have a regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat in wetland areas. In areas within Unit 12 that are not conserved and managed, we believe critical habitat designation would have a significant regulatory benefit to the conservation of *B. filifolia* due to the presence of a potential Federal nexus, and because the regulatory protections afforded by the designation of critical habitat would not be entirely redundant with protections already in place. However, in areas within the Artesian Trails Resource Management Plan area which are conserved and managed under the Artesian Trails Resource Management Plan, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur. If such actions do occur in conserved and managed areas, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the Artesian Trails Resource Management Plan. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including areas proposed for designation in revised critical habitat in Unit 12 that have not been conserved and managed could be significant, while the regulatory benefit of including areas that have been conserved and managed would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on

habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas that are not already conserved and managed. No educational benefits would be realized in portions of Unit 12 that are already conserved and managed under the Artesian Trails Resource Management Plan. However, the inclusion of lands in the *B. filifolia* revised critical habitat designation that are not conserved and managed could be beneficial to the species because designation will identify lands that require conservation and management for the recovery of *B. filifolia.*

The designation of *B. filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In the County of San Diego, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas that meet the definition of critical habitat currently conserved and managed under the County of San Diego Subarea Plan, nor would any additional educational benefits be realized under these circumstances. In areas that are not expected to be conserved, we believe there are significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—County of San Diego Subarea Plan

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the County of San Diego Subarea Plan including: (1) Continuance and strengthening of our effective working relationships with all MSCP jurisdictions and stakeholders; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; (3) the encouragement for local jurisdictions to fully participate in the MSCP; and (4) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in San Diego County, the partnership and commitment by the County of San Diego resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

We developed a close partnership with the County of San Diego through the development of the subregional MSCP and the County of San Diego MSCP Subarea Plan, which incorporates substantial protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. By excluding approximately 4 ac (2 ha) of Unit 12 from this revised critical habitat designation, we eliminate an essentially redundant layer of regulatory review for projects covered by the Artesian Trails Management Plan (in conformance with the County of San Diego MSCP Subarea Plan), which helps preserve our ongoing partnership with the County of San Diego, supporters/contributors to the long-term preservation of the Artesian Trails preserve area, and encourages new partnerships with other landowners and jurisdictions and establishment of conservation and management for the benefit of *B. filifolia* and other sensitive species on additional lands; these partnerships and conservation actions are crucial for proactive conservation of *B. filifolia,* as opposed to the reactive, regulatory approach of consultation.

The County of San Diego MSCP Subarea Plan addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 or section 10 of the Act for smaller scale management plans or HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex management plans or regional and jurisdiction-wide HCPs (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section).

In summary, we believe excluding land covered by the County of San Diego Subarea Plan from revised critical habitat could provide the significant benefit of maintaining existing regional management plan and HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—County of San Diego Subarea Plan

We reviewed and evaluated the benefits of inclusion and benefits of exclusion from revised critical habitat for *Brodiaea filifolia* for lands under the County of San Diego Subarea Plan. The benefits of including conserved and managed lands covered by the Artesian Trails Resource Management Plan in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 4 ac (2 ha), of land in Unit 12 at the Artesian Trails Minor Subdivision is already conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within this area, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. We do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits for conserved and managed portions of Unit 12 since these benefits (protection and management of the habitat area) have already been realized. However for the portions of Unit 12 that have not been conserved and managed, we believe inclusion in the revised critical habitat designation could have significant regulatory and educational benefits due to the existence of a potential Federal nexus, the lack of existing protections that would diminish the likelihood of development or other impacts and that would be redundant with additional regulatory protection, and the need for additional protection and management that may be brought about through public education.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the County of San Diego MSCP Subarea Plan from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with the County of San Diego and other local stakeholders in the development of the County of San Diego MSCP Subarea Plan and the Artesian Trails Resource Management Plan, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the

significant benefits of exclusion outweigh the minor benefits of critical habitat designation for lands that are conserved and managed. We analyzed the benefits of including lands within Unit 12 that are not conserved and managed in the final revised designation and the benefits of excluding those lands from the designation. We recognize that the County of San Diego MSCP Subarea Plan has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas in Unit 12 that are not conserved and managed from revised critical habitat outweighs the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Unit 12, County of San Diego Subarea Plan

We determined that the exclusion of approximately 4 ac (2 ha) of land covered by the County of San Diego Subarea Plan in Unit 12 from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its proposed revised critical habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 4 ac (2 ha) of conserved and managed land in Unit 12 from this final revised critical habitat designation.

Economics

An analysis of the economic impacts for the previous proposed critical habitat designation for *Brodiaea filifolia* was conducted and made available to the public on October 6, 2005 (70 FR 58361). That economic analysis was finalized for the final rule to designate critical habitat for *B. filifolia* published in the **Federal Register** on December 13, 2005 (70 FR 73820). The analysis determined that the costs associated with critical habitat for *B. filifolia* across the entire area considered for designation (across designated and excluded areas) were primarily a result of the potential effects of critical habitat designation on residential, industrial, and commercial development; water supply; flood control; transportation; agriculture; the development of HCPs; and the management of military bases, other Federal lands, and other public or conservation lands. After excluding land in Riverside, Orange, and San Diego counties from the 2004 proposed critical habitat (December 8, 2004 (69 FR 71284)), the economic impact was estimated to be between $1.0 and $3.3 million over the next 20 years expressed in undiscounted dollars. Based on the 2005 economic analysis, we concluded that the designation of critical habitat for *B. filifolia,* as proposed in 2004, would not result in significant small business impacts. This analysis is presented in the NOA for the economic analysis published in the **Federal Register** on October 6, 2005 (70 FR 58361).

We prepared a new economic impact analysis associated with this revised critical habitat designation for *Brodiaea filifolia.* In the revised DEA, we evaluated the potential economic effects on small business entities resulting from implementation of conservation actions related to the proposed revision to critical habitat for *B. filifolia.* The analysis is based on the estimated incremental impacts associated with the proposed rulemaking as described in Chapters 2 through 6 of the analysis. We announced the availability of the draft economic analysis in the **Federal Register** on July 20, 2010 (75 FR 42054).

The final economic analysis determined that the costs associated with revised critical habitat for *Brodiaea filifolia,* across the entire area considered for designation (both designated and excluded areas), are primarily a result of residential and commercial development, transportation, utility, and flood control projects, and public and conservancy lands management. The incremental economic impact of designating revised critical habitat was estimated to be between $500 and $600 thousand over the next 20 years using a 7 percent discount rate (Industrial Economics, Inc. (IEc) 2010, p. ES–7). The difference between the economic impacts projected with this designation compared to those in the 2005 designation are due to the use of an incremental analysis in this designation rather than the broader coextensive analysis used in the 2005 designation. Based on the 2010 final economic analysis, we concluded that the designation of revised critical habitat for *B. filifolia,* as proposed in 2009, would not result in significant small business impacts. This analysis is presented in the Economic Analysis of Revised Critical Habitat Designation for Thread-Leaved Brodiaea (IEc 2010).

Summary of Comments and Recommendations

We requested written comments from the public on the proposed rule to designate revised critical habitat for *Brodiaea filifolia* during two comment periods. The first comment period opened with the publication of the proposed revised rule in the **Federal Register** on December 8, 2009 (74 FR 64930), and closed on February 8, 2010. The second comment period opened with the publication of the notice of availability of the Draft Revised Economic Analysis (DEA) in the **Federal Register** on July 20, 2010 (75 FR 42054), and closed on August 19, 2010. During both public comment periods, we contacted appropriate Federal, State, and local agencies; scientific organizations; and other interested parties and invited them to comment on the proposed revised rule to designate critical habitat for *B. filifolia* and the associated revised DEA. During the comment periods, we requested that all interested parties submit comments or information related to the proposed revised critical habitat, including (but not limited to) the following: reasons why we should or should not designate habitat as "critical habitat"; information that may assist us in clarifying or identifying more specific PCEs; the appropriateness of designating critical habitat for this species; the amount and distribution of *B. filifolia* habitat included in this proposed rule; what areas are essential to the conservation of the species; unit boundaries and methodology used to delineate the areas proposed as revised critical habitat; land use designations and current or planned activities in the areas proposed as revised critical habitat; special management considerations; economic, national security, or other relevant impacts of designating any area; the exclusions being considered under section 4(b)(2) of the Act; whether the benefit of an exclusion of any particular area outweighs the benefit of inclusion under section 4(b)(2) of the Act; and how to improve public outreach during the critical habitat designation process.

During the first comment period, we received 11 comment letters-3 from peer reviewers and 8 from public organizations or individuals. During the second comment period we received 6 comment letters addressing the proposed revised critical habitat designation and the DEA. Of these latter comments, 1 was from a peer reviewer and 5 from public organizations or individuals. We did not receive any requests for a public hearing. We appreciate all peer reviewer and public comments submitted and their contributions to the improvement of the content and accuracy of this document.

Peer Review

In accordance with our Policy for Peer Review in Endangered Species Act Activities, published on July 1, 1994 (59 FR 34270), we solicited expert opinions from four knowledgeable individuals with scientific expertise that included familiarity with *Brodiaea filifolia,* the geographic region in which it occurs, and conservation biology principles pertinent to the species. Three peer reviewers submitted responses that included additional information, clarifications, and suggestions that we incorporated into this final revised critical habitat rule.

We reviewed all comments received from the peer reviewers and the public for substantive issues and new information regarding the designation of revised critical habitat for *Brodiaea filifolia.* All comments are addressed in the following summary and incorporated into this final revised rule as appropriate.

Peer Reviewer's Comments

Comment 1: Two peer reviewers expressed the opinion that the methods, analysis, and results of the proposed revised critical habitat for *Brodiaea filifolia* were careful, thoughtful, and in strict adherence to the requisite methodology to define and designate critical habitat. The peer reviewers also stated that the best available science and methodology was used to arrive at the conclusions in the proposed revised rule, and that the proposed revised critical habitat designation encompasses a representative range of habitat types, geographic distribution, and population sizes that meet the requirements of the Act (59 FR 34270, July 1, 1994) for designation of critical habitat. The peer reviewers believe the proposed revised critical habitat for *B. filifolia* is more comprehensive and more accurate than the December 13, 2005, final critical habitat rule for *B. filifolia* (70 FR 73820).

Our Response: We appreciate the peer reviewers' critical reviews.

Comment 2: One peer reviewer expressed confusion and concern with the Service's use of number of flowering stalks of *Brodiaea filifolia* as a measure of occurrence size, as discussed on page 64932 of the December 8, 2009, proposed revised rule (74 FR 64930). The peer reviewer stated that the number of flowering stalks does not provide a maximum number of *B. filifolia* in an occurrence and believed the Service should instead compare numbers of non-flowering plants between occurrences, which presents a more accurate estimate of relative size between populations. The peer reviewer believes that densities of *B. filifolia* are larger than reported based on flowering stalk counts, and appear to be dependent on soil types and geographical location.

A second peer reviewer believes that we did not clearly state that the locality counts used to determine the importance of each locality were based on stem counts. The second peer reviewer also questioned our reasoning concerning how to determine which occurrences should be considered the largest for this species, since any locality may in fact contain many more *Brodiaea filifolia* plants than surveys might indicate.

Our Response: As stated in the December 8, 2009, proposed revised rule (74 FR 64930) on page 64932, the Service considers the number of flowering *Brodiaea filifolia* stalks at a site to be an estimate of the minimum number of *B. filifolia* plants present, not a maximum number or an exact count. We understand that the number of *B. filifolia* individuals in a population is larger than the number of flowering stalks; thus, we only used the number of flowering stalks as an estimate useful in comparing the relative abundance of *B. filifolia* at various sites across the species' range. We thank the peer reviewer for the information regarding soil type and geographic location.

In response to the issues brought up by the second peer reviewer; we stated plainly in the Criteria Used To Identify Critical Habitat section—rather than being buried in a discussion of various survey methods—that we are using counts of flowering stalks to estimate relative *Brodiaea filifolia* population sizes. It is possible that a very large population of the species could be mistakenly recorded as having an average or low number of plants if only a few individuals flower and the vegetative portions of the plants are difficult to see. It seems unlikely, however, that the largest occurrences would be so cryptic as to appear to be average or small occurrences.

Comment 3: One peer reviewer asked if it is known whether the field study on Santa Rosa Plateau that noted the 8:1 ratio of corms to flowering stems might have been conducted using *Brodiaea santarosae* instead of *B. filifolia.*

Our Response: Comparing the description of the occurrence used in the field study (EO 5 in Morey (1995, p. 2)) and the description of the only known occurrence of *Brodiaea filifolia* within the range of *B. santarosae* in Chester *et al.* (2007, p. 195), it appears the two are the same occurrence. The field study was conducted on an occurrence of *B. filifolia;* although some individuals of *B. santarosae* may have been present as well.

Comment 4: One peer reviewer noted that the text in the "*Taxonomy andFamily Placement—Movement of Brodiaea From Liliaceae (Lily Family) to Themidaceae (Cluster Lily Family)*" section of the proposed revised rule describing hybrids being described as *Brodiaea santarosae* should have cited Chester *et al.* (2007), since this reference provides the original description for this species.

Our Response: We thank the peer reviewer for this observation; Chester *et al.* (2007) is cited later in the passage, but should have been cited at the first mention of *Brodiaea santarosae* in that section of the text.

Comment 5: One peer reviewer suggested that the term "systematic surveys" should be replaced with "comprehensive surveys" at the top of page 64933 in the proposed revised rule, stating that in close proximity with the discussion on taxonomy, the use of the term "systematic surveys" suggests a study of the relationship of species within the genus *Brodiaea.*

Our Response: We appreciate the peer reviewer's critical review, and will note the potential for confusion when using the word "systematic" when we mean "methodical" when drafting future rules.

Comment 6: One peer reviewer recommended revision to a sentence on page 64933 in the **Background** section of the proposed revised rule to read, "Additionally, plants that were previously identified as hybrids and not pure *B. filifolia* have now been described as *B. santarosae* (Chester *et al.* 2007). Pires (2007.1) and Preston (2007, pers. comm.) intend to include *B. santarosae* as a separate species in their treatment of the genus *Brodiaea* for the revision of the Jepson Manual that is now in progress." The peer reviewer felt the passage was awkward as written in the proposed rule. Pires (2007.1) refers to J.C. Pires, Assistant Professor of Biological Sciences, University of Missouri-Columbia, pers. comm. to G. Wallace, Service September 17, 2007; Preston (2007, pers. comm.) refers to R. Preston, Senior Botanist, IFC Jones and Stokes, Sacramento, California, pers. comm. to G. Wallace, Service September 17, 2007.

Our Response: We agree that the revision provided by the peer reviewer communicates the information in question more clearly; however, we could not revise this passage for the final revised rule because the **Background** section is not repeated in the final revised rule.

Comment 7: Two peer reviewers expressed concern regarding the

Service's argument that adding an 820-ft (250-m) radius area around populations of *Brodiaea filifolia* to provide adequate habitat for pollinators based on flight distances for the pollinators is the best way to determine critical habitat subunit boundaries. Both peer reviewers believe the arguments behind this methodology are speculative in part because studies have not established what species is or are the most important pollinators for *B. filifolia* or the pollinator's conservation requirements. One peer reviewer reported speaking with a local insect expert who believes bumblebees cannot pollinate *B. filifolia* because they are too heavy.

Our Response: On page 64936 of the December 8, 2009, proposed revised rule (74 FR 64930), we outline a number of insects known to pollinate *Brodiaea filifolia* and cite documented observations of these insects pollinating *B. filifolia,* including bumblebees (*Bombus californicus*). While we may not know what species is the most frequent pollinator of *B. filifolia,* we do know that the majority of species that have been observed pollinating *B. filifolia* have flight distances that fall within the 820-ft (250-m) range; therefore, we believe using this measurement to define critical habitat boundaries is appropriate and not speculative.

Comment 8: One peer reviewer believes that the critical habitat boundaries should not be limited to the 820-ft (250-m) pollinator area if there is additional contiguous suitable or restorable habitat, or if the population is within a larger landscape feature such as a floodplain with an ecology that relies upon a suite of characters such as hydrology and soils to support *Brodiaea filifolia.* According to the peer reviewer, this is because there is much scientific information indicating that soils, hydrology, and plant community structure are the most important factors in plant distribution; because if there are additional populations separated by 300 to 1,000 meters within a contiguous block of suitable habitat it is not always certain additional *B. filifolia* populations could not exist in the intervening habitat; and because habitat conservation works more effectively with larger conservation areas than in small areas. The peer reviewer suggests that soil type boundaries (recommends using the boundaries of the Willows soils unit, at least from San Jacinto Ave. south), changes in plant community type, drainage watershed boundaries, or barriers such as roads and existing development may make more appropriate critical habitat boundary limits. A second peer reviewer was in agreement, stating that developing critical habitat based on pollinator dispersal does not appear to be as valid as a basic habitat approach in conserving the PCEs for *B. filifolia* at critical localities. The second peer reviewer suggested that the determination of the critical habitat for this species should be based on potential habitat that could be occupied by this species in the vicinity of occupied habitat, and should also consider the basics of reserve design, and developing more consolidated critical habitat areas rather than fragmented and isolated pockets of habitat.

Our Response: To include areas in the revised critical habitat designation that are contiguous suitable or restorable unoccupied habitat between areas occupied by *Brodiaea filifolia* at the time of listing, we need evidence that these areas are essential for the conservation of the species. Additionally, our regulations at 50 CFR 424.12(e) state that we "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." Based on the best scientific information available to us at this time, we believe that limiting the designation to the species' present range is adequate to ensure the conservation of *B. filifolia,* and except for unoccupied habitat areas within the geographical area occupied by the species at the time of listing needed to sustain pollinators of the species, unoccupied habitat, in and of itself, is not essential for the conservation of *B. filifolia.*

Comment 9: One peer reviewer stated that pollinators should only be one element considered in drawing critical habitat unit boundaries, and noted that many populations of *B. filifolia* reproduce largely by clone and some (*e.g.,* the Glendora population) appear to have been isolated from cross-pollination for some time and continue to persist as significant contributors to the species.

Our Response: In addition to identifying undisturbed habitats able to support pollinators as a criterion for determining the revised critical habitat boundaries we used numerous other criteria such as: (1) Areas supporting occurrences on rare or unique habitat within the species' range; (2) areas supporting the largest known occurrences of *Brodiaea filifolia;* or (3) areas supporting stable occurrences. We thank the peer reviewer and have taken into consideration *B. filifolia* population dynamics and other interactions through the use of the above criteria as identified in the Criteria Used To Identify Critical Habitat section of this rule.

Comment 10: One peer reviewer recommended altering PCE 2 to read "Areas with a natural, generally intact or lightly disturbed surface * * *" According to the peer reviewer *B. filifolia* can persist in areas that have been disked, especially if the subsoil structure is intact. A second peer reviewer also felt PCE 2 should be eliminated or altered to reduce its significance for the same reasons.

Our Response: We appreciate the suggestion, but do not believe this change is necessary since "generally intact" was meant to indicate that the surface could be lightly disturbed as long as the disturbance did not result in permanent alteration of the surface or subsurface soil structure.

Comment 11: One peer reviewer asked how an intact soil surface provides habitat for pollinators, and whether this was an error and we meant "intact plant community."

Our Response: The passage actually reads, "* * * generally intact surface and subsurface soil structure and support habitat for pollinators * * *" In other words, the soil surface should be able to support pollinator habitat, not the pollinators themselves.

Comment 12: One peer reviewer suggested that the Special Management Considerations or Protection section of the revised critical habitat rule should discuss potential gaps in the conservation or management of localities that could be considered critical habitat for *Brodiaea filifolia* within existing or proposed HCPs. The peer reviewer goes on to state that some HCPs have little control over current land use practices on lands proposed for inclusion into the reserve system, and some HCPs have limited control on agricultural conversion of these lands.

Our Response: We appreciate the peer reviewer's suggestion, however the appropriate place for this discussion is in the Exclusions under Section 4(b)(2) of the Act section of the rule. In this section, we discuss the protections afforded the species and its habitat by various relevant HCPs and management plans.

Comment 13: One peer reviewer asked whether extremely large localities, *e.g.*, over 10,000 plants, should be given a higher priority as a factor in determining occurrences being determined for critical habitat.

Our Response: It is unclear what the peer reviewer means by giving occurrences 'priority.' All occurrences

that met one or more of the criteria were proposed as critical habitat in the proposed revised critical habitat designation. Critical habitat designation acreage is not limited; therefore, there was no need to prioritize or rank occurrences to make sure those with the highest conservation value were included in the proposal.

Comment 14: One peer reviewer felt that Criterion 3 was inconsistently applied to *Brodiaea filifolia* occurrences in the proposed revised critical habitat rule. According to the peer reviewer, it is unclear whether the Service intended Criterion 3 to mean that the population is stable and persistent despite recent losses, stable and persistent because it is in protected habitat without immediate future threat, or has not suffered declines in recent years.

Our Response: We meant "stable and persistent" in the ecological sense, *i.e.,* to mean that a population is resilient—it contains enough individuals to sustain the population over time. We did not consider impacts or threats when evaluating *Brodiaea filifolia* occurrences in the context of this criterion.

Comment 15: One peer reviewer pointed out that, according to Table 1 of the December 8, 2009, proposed revised critical habitat rule (74 FR 64930), the *Brodiaea filifolia* occurrence in Subunit 11a does not meet Criterion 2, but according to the text on page 64942 this occurrence does meet Criterion 2.

Our Response: We thank the peer reviewer for this observation. The text on page 64942 of the December 8, 2009, proposed revised rule (74 FR 64930) is incorrect; this occurrence does not meet criterion 2. Table 1 in the proposed revised rule (Table 3 in this final revised rule) is correct.

Comment 16: One peer reviewer suggested that we confirm the *Brodiaea filifolia* occurrence in Corona Cala Camino is in fact *B. filifolia.* According to the peer reviewer, this area is within the general range of *B. santarosae,* and the plants may actually be affiliated with that taxon.

Our Response: We will attempt to verify this occurrence as time permits. The data reported in the proposed revised critical habitat rule represents the best data available to us at the time the proposed revision was written. Because this occurrence does not meet any of the criteria for designation as *Brodiaea filifolia* critical habitat, this uncertainty is outside the scope of this critical habitat analysis and will not be addressed here.

Comment 17: One peer reviewer stated that the Cristianitos Canyon Pendleton occurrence is actually within San Onofre State Beach, therefore, it would appear that this occurrence would not be exempt from critical habitat designation under section 4(a)(3) of the Act.

Our Response: According to the GIS data provided to us by MCB Camp Pendleton, the Cristianitos Canyon Pendleton occurrence is located on the northern end of MCB Camp Pendleton.

Comment 18: One peer reviewer pointed out that Devil Canyon (Subunit 5b) is noted as both occurrence 38 and 39 in CNDDB. The reviewer suggests noting in the revised rule whether this subunit includes both occurrences or is limited to occurrence 39. The peer reviewer adds that since CNDDB notes this site as a hybrid population, additional citations should be provided in the revised rule, noting the current opinion on the species of *Brodiaea* found at this locality.

Our Response: Subunit 5b includes occurrence 39 only. We see the reviewer's point regarding adding a note to the revised rule to indicate that Subunit 5b does not contain CNDDB occurrence 38; however, we feel this may cause unnecessary confusion for readers who are not familiar with the situation. Our understanding at this point is that occurrence 39 (Subunit 5b) does not entirely comprise hybrids (Chester 2007, p. 191).

Comment 19: One peer reviewer asked how areas with PCEs were mapped if there was no actual field review of the localities being considered for critical habitat. According to the peer reviewer, a more precise mapping would require actual field examinations of the localities being mapped.

Our Response: We used GIS data from multiple sources as well as other resources outlined in the Criteria Used To Identify Critical Habitat section of this revised final rule to map the areas containing PCEs. We do not have staffing or resources to field identify each occurrence; therefore, we must rely on the best information available.

Comment 20: According to one peer reviewer, the *Brodiaea filifolia* occurrence in Subunit 11e meets Criterion 1 because it is the only remaining occurrence known to be associated with relatively high-quality annual alkali grassland. This occurrence is also unique because it persists in a more mesic habitat than is typically found along the San Jacinto River.

Our Response: Our analysis found the *Brodiaea filifolia* occurrence in Subunit 11e to meet Criterion 1 (see Table 3 above).

Comment 21: One peer reviewer pointed out that some of the survey results used to determine whether a population of *Brodiaea filifolia* had sufficient number of plants to be considered stable (850 flowering plants) were counts of non-flowering plants while others were counts of flowering plants.

Our Response: We consider the number of flowering *Brodiaea filifolia* stalks at a site to be an estimate of the minimum number of *B. filifolia* plants present. We understand that the number of *B. filifolia* individuals in a population is larger than the number of flowering stalks, thus we only used the number of flowering stalks as an estimate useful in comparing the relative abundance of *B. filifolia* at various sites across the species' range. If survey results for a site are reported in counts of non-flowering plants, and the numbers exceeded 850 plants, we could say with confidence that the site contained a sufficient number of plants to meet Criterion 3; if survey results reported in counts of non-flowering plants and were less than 850 plants, we would take into consideration the fact that non-flowering plant counts were used and also examine other characteristics of the occurrence to determine whether the occurrence met the stability standards of Criterion 3: "Additionally, we looked at all occurrences with fewer than 850 flowering stalks to determine if any of these exhibited the same persistence and stability characteristics to provide similar conservation value as the other identified occurrences with greater than 850 flowering stalks (since the counts for an occurrence vary from year to year)" (*see* Criteria Used To Identify Critical Habitat section above).

Comment 22: One peer reviewer suggested that the "2005 fCH" box for Unit 10 in Table 2 of the proposed revised critical habitat rule should read "Not designated; based on misidentification of *Brodiaea orcuttii*" rather than "Not designated, did not meet the definition of critical habitat" because the suggested revision more accurately reflects the situation. The peer reviewer feels it is important to separate such reports from those that actually support *B. filifolia* but did not meet the criteria for critical habitat.

Our Response: We have changed the entry in the "2005 fCH" box for Unit 10 in Table 2 of the proposed revised critical habitat rule to "Not designated; could not verify occurrence", because that is the language used in the 2005 final critical habitat rule (see 70 FR 73834).

Comment 23: Two peer reviewers suggested that Table 2 should indicate that the Corona North, Corona South, and Moreno Valley occurrences were not designated as critical habitat in 2005

because they were based on unsubstantiated claims that the locations were occupied by *Brodiaea filifolia.* The peer reviewers feel it is important to separate such reports from those that actually support *B. filifolia* but did not meet the criteria for critical habitat.

Our Response: We have changed the entry in the "2005 fCH" box for the Corona North, Corona South, and Moreno Valley occurrences to "Not designated, could not verify occurrence" as suggested by the peer reviewer.

Comment 24: One peer reviewer recommended the Service verify the number of *Brodiaea filifolia* plants found in Unit 3. The peer reviewer is not aware of any reports substantiating this number, and other sources (including the peer reviewer's own survey data) indicate a much smaller number of *B. filifolia* in this area. The peer review added that the population should be considered stable and persistent.

Our Response: We will attempt to verify these data as time permits. The data reported in the proposed revised critical habitat rule represents the best data available to us at the time the proposed revision was written. Because this occurrence meets Criterion 1 and thus qualifies for designation as *Brodiaea filifolia* critical habitat regardless of the accuracy of the survey data in question, this uncertainty is outside the scope of this critical habitat analysis and will not be addressed here.

Comment 25: One peer reviewer stated that the unit descriptions in the proposed revised rule generally provide a good overview of each locality proposed for critical habitat. However, the reviewer recommended that the Service add more information regarding the plant communities that occur in each of the units/subunits. The peer reviewer believes the unit descriptions are overly repetitive, and that these descriptions should focus on the existing plant communities, soils, and unique features of each locality. According to the reviewer, these descriptions should also provide more information on sites with large *Brodiaea filifolia* populations, noting the total number and distribution of plants within the unit or subunit of critical habitat. The reviewer then provides specific suggestions along these lines for a number of units/subunits as well as proposing instances where subunits could be expanded into adjacent unoccupied habitat, providing corrections where inaccurate information is given for an occurrence.

Our Response: We appreciate the peer reviewer's thorough review, suggestions, and information provided to improve this revised critical habitat rule and associated designation. We have incorporated the reviewer's suggested edits where appropriate.

Comment 26: One peer reviewer noted that many of the *Brodiaea* plants in Subunit 8b could be *B. orcuttii* or *B. filifolia* x *B. orcuttii* hybrids; however, the peer reviewer agrees with the Service that there is a sizable population of *B. filifolia* at this site and that the site qualifies for critical habitat based on supporting a persistent population. The reviewer also added that recent evidence suggests that *B. filifolia* and *B. orcuttii* do not hybridize readily, so hybridization may not be a long-term concern.

Our Response: We thank the peer reviewer for this information. *Please see* the Special Management Considerations Or Protection section above for further discussion of hybridization among species of *Brodiaea.*

Comment 27: One peer reviewer argued that in cases where conservation for species facing significant threats is not a priority of landowners, designating critical habitat will probably have little additional negative impact on either the condition of habitat or the willingness of landowners to participate in conservation because landowners are already actively degrading the habitat on their properties and are already unwilling to participate in conservation activities.

According to the peer reviewer, in Western Riverside County in particular, there are many examples indicating that designation of critical habitat would likely not make the conservation situation any worse than it is, or make the private stakeholders any less willing to participate in conservation actions than they have historically been. The peer reviewer believes that landowners in Western Riverside County are aware of the conservation value of lands such as the areas along the San Jacinto River and at Hemet that are necessary to the conservation of *Brodiaea filifolia* and other sensitive species, and are purposely working to eradicate resources via increases in discing frequency, early season discing, manure dumping, and irrigated cultivation rather than partner with regulators.

Because of this, the peer reviewer believes that in Western Riverside County there is no merit to the Service's argument that designating critical habitat on lands already covered by HCPs discourages landowners from participating in conservation actions and makes landowners believe having endangered species on their property is a liability because it has been clearly demonstrated that the landowners hold these views regardless. Thus Service should employ all regulatory mechanisms available including critical habitat designations to protect biological resources in these areas.

Our Response: Section 4(b)(2) of the Act authorizes the Secretary to designate critical habitat after taking into consideration the economic impacts, national security impacts, and any other relevant impacts of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of designating a particular area as critical habitat, unless the failure to designate will result in the extinction of the species. We believe the exclusions made in this final revised rule are legally supported under section 4(b)(2) of the Act and scientifically justified. After analyzing the benefits of inclusion and exclusion of proposed revised critical habitat units and subunits on lands covered under the Western Riverside County MSHCP, we determined that the benefits of exclusion outweighed the benefits of inclusion of lands already conserved and managed in Subunits 11g, 11h, and portions of 11f (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above). Service biologists continue to work with the County of Riverside and permittees of the HCP to ensure *B. filifolia* and its habitat receive the full extent of protections anticipated by the Western Riverside County MSHCP.

Comment 28: One peer reviewer stated that manure dumping is probably the most significant and immediate threat to the seasonally flooded alkali vernal plains habitat and *B. filifolia* along the San Jacinto River. The peer reviewer further stated that the Western Riverside County MSHCP appears to have provided no mechanism to stop the manure dumping.

Our Response: We realize that manure dumping is not a covered activity under the Western Riverside County MSHCP. Because of the lack of protection afforded to biological resources against manure dumping by the Western Riverside County MSHCP, we have not excluded any areas that are subject to this activity from this revised critical habitat designation.

Comment 29: One peer reviewer expressed doubt that the partnership between the Service and the County of Riverside provides enough conservation potential to warrant excluding lands covered under the Western Riverside County MSHCP from critical habitat

designation in order to preserve this partnership. The peer reviewer believes that preserving this partnership is important, but if the partnership does not result in significant conservation benefits and does little to offset immediate and clearly identifiable threats, it should not preclude the introduction of additional regulatory conservation tools (such as critical habitat designations).

The peer reviewer goes on to state that the partnerships between the Service and the City of Carlsbad and the County of San Diego are more meaningful, making the argument in favor of excluding lands covered under the Carlsbad HMP and the County of San Diego MSCP Subarea Plan in order to preserve these partnerships more valid.

Our Response: Although we are striving to maintain and improve our partnerships with the Western Riverside County MSHCP permittees, they do not restrict the Service from designating critical habitat on lands covered by the Western Riverside County MSHCP. In this revised critical habitat designation for *Brodiaea filifolia,* we have not concluded that the partnership benefits of excluding lands in areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including those lands in Subunits 11a, 11b, 11c, 11d, 11e, and a portion of 11f that are not currently conserved and managed (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

We also agree with the peer reviewer that the conservation actions taken by the City of Carlsbad over time, and the willingness of the County of San Diego to work toward species conservation, serve to support the argument in favor of excluding under section 4(b)(2) of the Act lands covered under the Carlsbad HMP and the County of San Diego MSCP Subarea Plan. However, in our balancing analysis under section 4(b)(2) of the Act, we relied more heavily on the presence of conservation and management on lands considered for exclusion than partnership benefits. As a result, we are only exercising our delegated discretion to exclude lands covered by the Carlsbad HMP (in Subunit 7d, and portions of Subunit 7a and 7c) and the County of San Diego MSCP Subarea Plan (portion of Unit 12), which are conserved and managed (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Carlsbad HMP and Weighing Benefits of Exclusion Against Benefits of Inclusion—County of San Diego Subarea Plan sections above).

Comment 30: One peer reviewer stated that although the Orange County Southern Subregion HCP is untested at this point, the 2006 Environmental Impact Report/Environmental Impact Statement for the HCP proposed significant impacts to rare plants, including *Brodiaea filifolia,* suggests that while the plan will not jeopardize *B. filifolia,* it could significantly reduce recovery options within Orange County. The peer reviewer believes that the proposed revised rule did not offer enough specifics in its discussion of this HCP to support an exclusion of lands that are covered under the Orange County Southern Subregion HCP under section 4(b)(2).

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. The areas covered by the Orange County Southern Subregion HCP in Subunits 4c, and 4g, and approximately 12 ac (5 ha) in Subunit 4b, are not currently conserved and managed for the benefit of *Brodiaea filifolia,* and we have not concluded that the partnership benefits of excluding these areas outweigh the benefits of including these areas in the final revised designation. We are not exercising our delegated discretion to exclude these areas under section 4(b)(2) of the Act in this the final revised critical habitat designation (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Orange County Southern Subregion HCP section).

Comment 31: One peer reviewer discussed numerous problems he believes exist within the Western Riverside County MSHCP that may impede *Brodiaea filifolia* conservation or even contribute to the decline of the species:

- There is no guarantee that many of the MSHCP goals will be achieved.
- Establishment of baseline populations, monitoring, and management take place only after the County of Riverside has acquired lands for conservation or when an environmental review is triggered for a specific development project.
- There are no hard-line conservation goals. Criteria Areas are merely guidelines for where conservation will take place but do not assure that the most suitable habitat is set aside in an appropriate configuration.
- The goals of the Western Riverside County MSHCP may be irrelevant to occurrences of *B. filifolia* along the San Jacinto River that could be extirpated or near extirpation before conservation triggers are activated within the HCP. If impacts continue at the current rate, there will be almost no *B. filifolia* habitat remaining along the San Jacinto River outside of the San Jacinto Wildlife Area within another 5 years.
- There has been no effort to stop land use activities that are greatly reducing the viability of habitats, such as proposed flood control projects along the San Jacinto River.
- The requirement that 90 percent of those portions of a property with long-term conservation value within the Criteria Area Species Survey Area will be avoided until the species conservation objectives are met is (1) unachievable relative to historic baseline conditions because over 10 percent of the original habitat has been degraded or developed, and (2) ineffective relative to a baseline established after habitat has been degraded.
- The current rate of acquiring land and implementing management on these lands is too slow to appreciably contribute to the stabilization and recovery of *B. filifolia.*
- Contradicting designations and directives within the Western Riverside County MSHCP undermine the effectiveness of proposed conservation measures.
- The Western Riverside County MSHCP calls for 6,900 ac (2,792 ha) of *B. filifolia* habitat to be set aside to provide adequate conservation and contribute to the recovery of the species. However, the Santa Rosa Plateau, which was likely expected to constitute a significant portion of this conservation area, can no longer contribute much acreage to the conservation area as only a small portion of the Santa Rosa Plateau is occupied by *B. filifolia.*

Our Response: The Western Riverside County MSHCP has provided an opportunity for valuable partnerships to be established and conservation measures for *Brodiaea filifolia* to be

implemented. Although we are striving to maintain and improve our partnerships with the Western Riverside County MSHCP permittees, they do not restrict the Service from designating critical habitat on lands covered by the Western Riverside County MSHCP. In this revised critical habitat designation for *Brodiaea filifolia,* in evaluating the partnership benefits contributed by the Western Riverside County MSHCP in the context of the current status the species and its habitat, we have not concluded that the benefits of excluding areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including those lands in Subunits 11a, 11b, 11c, 11d, 11e, and a portion of 11f that are not currently conserved and managed (*see* Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

Comment 32: One peer reviewer stated that HCPs are required only to meet an extinction (*i.e.,* jeopardy) standard, and because recovery is not a requirement of HCPs, Section 10/HCP requirements to avoid jeopardy could result in reducing a species to a minimal existence that contributes little to the overall biotic community, and could also leave a species at perpetual risk of extinction from a variety of factors, while technically not qualifying as a jeopardy.

Our Response: We appreciate the peer reviewer's concerns regarding the long-term recovery of *Brodiaea filifolia.* Although not specifically stated by the peer reviewer, their comment indicates they believe that lands covered under an HCP should not be a basis for exclusion from a critical habitat designation because the plans do not protect a listed species to the level beyond that evaluated in a jeopardy analysis under section 7 of the Act. We do not agree that protections given to listed species under HCPs are necessarily limited to avoidance of jeopardy; we believe the protections afforded by each HCP for each species differ and need to be assessed on a case-by-case basis, which is what we have done in our exclusion analysis. *See* the Exclusions under Section 4(b)(2) of the Act section above for a detailed discussion.

Section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species. Consequently, we may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act based on economic impacts, impacts on national security, or other relevant impacts, such as preservation of conservation partnerships, if we determine the benefits of excluding an area from critical habitat outweigh the benefits of including the area in critical habitat, provided the action of excluding the area will not result in the extinction of the species. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. *See* Exclusions under Section 4(b)(2) of the Act and *Benefits of Excluding Lands with HCPs* section for further discussion.

We found the benefits of excluding lands that are both conserved and managed under the Western Riverside County MSHCP, the County of San Diego MSCP Subarea Plan, the Carlsbad HMP, and the Orange County South and Central-Coastal HCPs to be greater than the benefits of including these lands. *See* the Exclusions under Section 4(b)(2) of the Act section above for a detailed discussion.

Comment 33: One peer reviewer stated that critical habitat is intended to provide for the conservation of the species (*i.e.,* to go beyond just preventing extinction and achieve a status where the protections afforded by the Act are no longer necessary); and that critical habitat designations within the context of regional HCPs could assure that the intent of the Act is achieved and improve the opportunity for recovery. The peer reviewer stated that relinquishing an important tool for conservation (*i.e.,* critical habitat) in cases where a Federal nexus would otherwise exist because of the HCP overlay is not wise if the overall strategic goal is to recover or stabilize an endangered species.

Our Response: Please see our response to Comment 32.

Comment 34: One peer reviewer stated that critical habitat is a tool that Federal agencies can use for conservation and by excluding lands within HCP boundaries other Federal agencies may miss opportunities to conserve species and their critical habitat.

Our Response: As a conservation tool, a critical habitat designation ensures that when actions with a Federal nexus may impact critical habitat, the Federal action agency consults with the Service to determine if the action will adversely modify critical habitat. Critical habitat does not require a Federal agency to perform any additional conservation actions nor does it direct conservation actions. With regard to areas that are within the boundaries of an HCP, each exclusion is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of an area will not result in extinction of a species. For the areas that we are exercising our delegated discretion to exclude under section 4(b)(2) of the Act from this final rule, we have evaluated the benefits of highlighting the importance of these areas for Federal agencies and the public, but found that the benefits of exclusion outweigh the benefits of inclusion for the areas we are excluding (*see* the Exclusions under Section 4(b)(2) of the Act section above for details).

Comment 35: One peer reviewer submitted numerous comments requesting additions to the text of the revised critical habitat rule regarding the life history, ecology, and habitat of *Brodiaea filifolia:*

- More information should have been presented on the significance of the clonal populations, even if seed production is a rare occurrence.
- More information on the population biology of monocots in this genus would be very helpful in determining the needs for habitat conservation.
- Any known information on seed viability in this or related species of *Brodiaea* should also be presented. Seed viability should provide some information on the rate of successful out-crossing in known occurrences of this species.
- The recorded localities of the two *Brodiaea* species on or near Santa Rosa Plateau need to be carefully reviewed to determine the actual remaining localities of *Brodiaea filifolia* found on the plateau or adjacent areas.

Our Response: We agree with the peer reviewer that having more information on the species would be helpful. We

have based our determinations in this revised critical habitat designation on the best available information, and have addressed the need for further information in our five-year review of the species (Service 2009a, pp. 35–36).

Comment 36: One peer reviewer stated that the description of *Brodiaea filifolia* habitat should also include riparian habitats, specifically riparian herb communities.

Our Response: We thank the peer reviewer for this information, and have added this to the text of the final revised critical habitat rule.

Comment 37: One peer reviewer suggested that the text of the rule be expanded to note that all areas excluded from the revised critical habitat designation under section 4(b)(2) of the Act are found within the Western Riverside County MSHCP Criteria Area cells or CASSA survey areas.

Our Response: We are exercising our delegated discretion to exclude only those areas that are both conserved and managed from this revised designation. These areas are protected from development impacts. Therefore, whether or not excluded areas under the Western Riverside County MSHCP fall within the Criteria Area or CASSA survey areas is not relevant.

Comment 38: One peer reviewer submitted a number of comments recommending edits or changes to the *Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)* section of the revised critical habitat rule to correct or clarify information presented in the proposed revised rule, or add information the peer reviewer felt was relevant but missing from the rule.

Our Response: The *Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)* section of the final revised rule includes the changes and additional information suggested by the peer reviewer as appropriate.

Comment 39: One peer reviewer requested additional explanation detailing why *Brodiaea filifolia* occurrences in San Diego and Riverside counties have been excluded from this revised critical habitat designation when more protected occurrences of the species are needed to offset the loss of many "secure" *B. filifolia* locations on Santa Rosa Plateau which were to be an important component of the recovery strategy for the species.

Our Response: Only units/subunits protected by conservation and management have been excluded from this revised critical habitat designation; the peer reviewer's issue is therefore moot. The Exclusions under Section 4(b)(2) of the Act and *Benefits of Excluding Lands with HCPs* sections of this revised critical habitat rule explain in detail our exclusion analyses and the outcomes thereof.

Comment 40: One peer reviewer expressed dissatisfaction with the Service's practice of not publishing "literature cited" sections with the text of **Federal Register** rules or on-line following the publication of a rule in the **Federal Register**.

Our Response: Complete lists of all references cited in any Service rulemaking are made available on-line at *http://www.regulations.gov* following publication of a rule. For rules written by the Carlsbad Fish and Wildlife Office, reference cited lists are also available upon request from the Field Supervisor of the Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section of the rule).

Comment 41: One peer reviewer pointed out that apparently some previous summaries of location information on *Brodiaea filifolia* prepared by Service staff (Roberts 1997, Roberts and Vanderwier 1997) were overlooked in the preparation of the proposed revised critical habitat rule. The peer reviewer believes that this material should have been used as the basis for the information in the text of the proposal and could have potentially eliminated some of the errors in the proposed revised rule. The peer reviewer added that other important updates provided to the Service by the California Native Plant Society (CNPS) (Roberts 2002a and 2002b) were also not reviewed in the preparation of the proposed revised critical habitat rule.

Our Response: We do have copies of the references the peer reviewer referred to in his comment. We used information from these resources to complete the 5-year review for *Brodiaea filifolia;* much of the occurrence information in this revised critical habitat rule was derived from the 5-year review.

Public Comments

Comment 42: One commenter expressed agreement with the Service's proposed exclusion of all lands covered by the Western Riverside County MSHCP from the revised critical habitat designation for *Brodiaea filifolia* (Subunits 11a, 11b, 11c, 11d, 11e, 11f, 11g, and 11h). The commenter stated that under provisions in section 6.9 of the Western Riverside County MSHCP and section 14.10 of the Implementing Agreement for the Western Riverside County MSHCP, no critical habitat for *Brodiaea filifolia* should be designated in the Western Riverside County MSHCP plan area; that the proposed exclusion of lands covered by the Western Riverside MSHCP was consistent with the United States District Court's (E.D.Cal. Nov. 11, 2006) Case No. 05–629–WBS–KJMA, which upheld the Service's decision to exclude the Western Riverside County MSHCP from the designation of critical habitat for the 15 vernal pool species, finding that this exclusion was a reasonable exercise of the Service's discretion; and that the Western Riverside County MSHCP already adequately provides for the survival and recovery of the species.

Our Response: With regard to the commenter's assertion that lands owned or under the jurisdiction of the Western Riverside County MSHCP should be excluded because the HCP provides adequate protection for the species, the adequacy of an HCP to protect a species and its essential habitat is one consideration taken into account in our evaluation under section 4(b)(2). Exclusion of an area from critical habitat is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of an area will not result in extinction of a species, which is a more complex analysis process. We have examined the protections afforded *Brodiaea filifolia* by the Western Riverside County MSHCP during our exclusion analysis in this revised critical habitat designation for *B. filifolia,* and have not concluded that the benefits of excluding areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f that are not currently conserved and managed, and we are not exercising our delegated discretion to exclude these lands under section 4(b)(2) of the Act in this final revised critical habitat rule. Our determination not to exercise our delegated discretion to exclude areas from critical habitat designation under section 4(b)(2) of the Act is committed to agency discretion by law and is not reviewable (see *Home Builders Ass'n of N. Cal.* v. *U.S. Fish & Wildlife Serv.,* 2006 U.S. Dist. LEXIS 80255 at *66 (E.D. Cal. Nov. 2, 2006); *Cape Hatteras Access Preservation Alliance et al.* v. *U.S. Dept. of the Interior,* 2010 U.S. Dist. LEXIS 84515 ** 36–38 (D.D.C. August 17, 2010)). We did, however, determine that the benefits of excluding lands in areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees that are conserved and managed (Subunits 11g, 11h, and a portion of Subunit 11f) outweigh the

benefits of including those lands as revised critical habitat for *B. filifolia* (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

With regard to the commenter's belief that critical habitat should not be designated in the Western Riverside County MSHCP Plan Area based on language in section 6.9 of the HCP and the associated Implementing Agreement, section 14.10 of the Implementing Agreement does not preclude critical habitat designation within the plan area (Dudek & Associates 2003b, p. 6–109; Western Riverside County Regional Conservation Authority *et al.,* p. 51). Consistent with our commitment under the Implementing Agreement, and after public review and comment on the proposed revised critical habitat for *Brodiaea filifolia,* we determined through our analysis under section 4(b)(2) of the Act that the maximum extent of allowable exclusions under the Western Riverside County MSHCP is limited to the exclusion of lands owned by or under the jurisdiction of the permittees of the Western Riverside County MSHCP that are both conserved and managed (Subunits 11g, 11h, and a portion of Subunit 11f) (see Benefits of Exclusion—Western Riverside County MSHCP section above for a detailed discussion of the exclusion analysis).

Comment 43: Two commenters stated that the Orange County Southern Subregion Habitat Conservation Plan provides for the conservation and management of *Brodiaea filifolia.* One of the commenters requested that the Secretary exercise his discretion under section 4(b)(2) of the Act to exclude the Orange County Southern Subregion Subarea 1 lands from the revised critical habitat designation for *B. filifolia,* and provided a number of reasons in support of a 4(b)(2) exclusion of the Orange County Southern Subregion Subarea 1 lands.

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. However, in reviewing the specific circumstances of *Brodiaea filifolia,* we have not concluded that the partnership benefits of excluding lands covered by the Orange County Southern Subregion HCP, the Western Riverside County MSHCP, the Carlsbad HMP, and the City and County of San Diego MSCP Subarea Plans that are not currently conserved and managed outweigh the regulatory and educational benefits afforded under section 7 of the Act as a consequence of designating critical habitat in these areas (*see* Exclusions under Section 4(b)(2) of the Act section above for details), and we are not exercising our delegated discretion to exclude these lands under section 4(b)(2) of the Act in this final revised critical habitat rule. Our determination not to exercise our delegated discretion to exclude areas from critical habitat designation under section 4(b)(2) of the Act is committed to agency discretion by law and is not reviewable (see *Home Builders Ass'n of N. Cal.* v. *U.S. Fish & Wildlife Serv.,* 2006 U.S. Dist. LEXIS 80255 at *66 (E.D. Cal. Nov. 2, 2006); *Cape Hatteras Access Preservation Alliance et al.* v. *U.S. Dept. of the Interior,* 2010 U.S. Dist. LEXIS 84515 ** 36–38 (D.D.C. August 17, 2010)).

Comment 44: Two commenters stated that the Service should have conducted the 4(b)(2) analysis in the proposed revised critical habitat rule and based its proposed revision on that analysis, because deferral of this analysis deprives the commenting public of information that is necessary to review and to provide meaningful comments on the proposed revised rule.

Our Response: Generally, it is our practice to include a discussion of areas we are considering for exclusion in proposed critical habitat rules in order to inform the commenting public of what areas may be excluded from the final designation under section 4(b)(2) of the Act and why, and allow the public opportunity to comment on potential exclusions prior to conducting a final exclusion analysis under section 4(b)(2) of the Act.

Comment 45: Two commenters stated that the Service should exclude the proposed 241 Completion Project right-of-way from Subunit 4c of the revised critical habitat designation. One of the commenters also pointed out that the Service issued a biological opinion finding that the construction of the 241 Completion Project would not appreciably reduce the likelihood of the survival and recovery of *Brodiaea filifolia.*

Our Response: Please see our response to Comment 43. While the 241 Completion Project did not specifically factor into our exclusion analysis, it is within the plan boundaries of the Orange County Southern Subregion HCP and our section 4(b)(2) analysis for the HCP covers this area.

Comment 46: One commenter expressed a belief that the proposed revised critical habitat rule for *Brodiaea filifolia* is flawed because it does not include all areas of occupied habitat. The commenter believes that at least 33 extant populations of *B. filifolia* that were present at the time of listing were arbitrarily dismissed from the proposed revised designation because they do not meet the criteria. According to the commenter, at least one of these populations is at the edge of the species range, and may thus have unique genetic characteristics that can impart novel evolutionary potential that may be particularly important under climate change scenarios.

Our Response: All currently occupied and formerly occupied habitat (including all extant CNDDB Element Occurrences) was considered for designation as revised critical habitat for *Brodiaea filifolia,* and all occurrences were included in the proposed revised critical habitat unless they were known to have been extirpated, presumed to have been extirpated based on documented negative survey results, are not natural occurrences (transplants or plants moved from their natural location with fill soil), or did not meet the criteria used to identify critical habitat (*see* Criteria Used To Identify Critical Habitat section above).

While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to *B. filifolia* at this time. However, the revised critical habitat subunits have been designed to capture the areas we believe to support the most stable and persistent populations, unique and rare habitat, and the largest populations of the species (*see* Criteria Used To Identify Critical Habitat section above). We believe these areas will be important to the conservation of *B. filifolia* under climate change scenarios.

Comment 47: One commenter expressed a belief that the Service failed to justify why the three criteria used to define revised critical habitat for *Brodiaea filifolia* are the only criteria

used to identify habitat critical for the survival and recovery of the species. The commenter believes that the three criteria fail to incorporate the effect of global climate change on the persistence of *B. filifolia* and that many more criteria are needed to identify essential plant habitat.

Our Response: We believe the three criteria used to define revised critical habitat for *Brodiaea filifolia* were broad enough to result in the proposal of a wide range of occurrences of the species. As a result, we expect the revised designation will afford protections to the species that will enhance its overall stability and persistence as well as providing for conservation. Because we cannot predict what effects global climate change may have on *B. filifolia,* its habitat, or distribution of the species and its habitat, we are unable to craft criteria that specifically address this issue.

Comment 48: One commenter expressed a belief that the proposed revised rule is flawed because it does not include unoccupied habitat that the commenter considers essential to the recovery of the species. The commenter further states that not including additional habitat that may not be occupied currently but was occupied in the recent past and where field conditions have not changed precludes the opportunity for species recovery in these areas, which the commenter considers essential.

Our Response: Critical habitat designation is a different process than development of recovery goals and objectives that are outlined in a recovery plan (which has not yet been developed for *Brodiaea filifolia*). A critical habitat designation is a regulatory action that defines specific areas that are essential to the conservation of the species in accordance with the statutory definition. A recovery plan (and the associated recovery goals and objectives) is a guidance document developed in cooperation with partners, which provides a roadmap with detailed site-specific management actions to help conserve listed species and their ecosystems. Recovery plans provide important information about the species and the actions that are needed to bring about a species' recovery.

We believe we have, to the best of our ability and based on the best available scientific and commercial information, identified all habitat areas that are essential to the conservation of *Brodiaea filifolia.* We recognize that the designation of revised critical habitat may not include all of the habitat that may eventually be determined to be necessary for the recovery of *B. filifolia,* and critical habitat designations do not signal that habitat outside the designation is unimportant or may not contribute to recovery. Areas outside the revised critical habitat designation will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and regulatory protections afforded by the section 7(a)(2) jeopardy standard and the prohibitions of section 9 of the Act if actions occurring in these areas may affect *B. filifolia;* these protections and conservation tools will continue to contribute to recovery of this species.

Comment 49: One commenter stated that species with designated critical habitat are more likely to be recovering than species that lack the designation, citing Taylor *et al.* 2005. This commenter believes that without critical habitat, *Brodiaea filifolia* has a reduced chance of persisting and recovering. This commenter goes on to state that the Service should consider and evaluate the recovery benefits of critical habitat designation in order to promulgate a legally valid critical habitat rule (which the commenter believes was not done in the proposed revised rule).

Our Response: Taylor *et al.* (2005) did not evaluate the effects of the conservation benefits provided by HCPs, long-term management plans, or INRMPs on the population trends of the species they evaluated in their study. We believe that the conservation benefits provided by critical habitat designation in areas we have included in the revised designation and by INRMPs, long-term management plans, and HCPs in areas exempted or excluded from the designation will provide the protection to *Brodiaea filifolia* anticipated by section 4 of the Act. Please see the response to comment 49 regarding recovery benefits to the species.

Comment 50: One commenter expressed opposition to any exclusions from the proposed revised critical habitat of areas that may be covered by other management plans, HCPs or INRMPs, pursuant to section 3(5)(A) under the logic that they do not need "special management" or under section 4(b)(2). The commenter believes that all *Brodiaea filifolia* essential habitat needs special management because of the variety of direct and indirect impacts to the habitat. The commenter stated that areas that require special management considerations but which are covered or will be covered in the future by management plans or conservation plans should not be excluded pursuant to ESA section 3(5)(A) or 4(b)(2) from the protection that a designation of critical habitat provides. The commenter went on to state that, in *Center for Biological Diversity, et al.* v. *Norton,* 240 F. Supp. 2d 1090, 1099 (D. Az. 2003), the court found that the existence of a management plan, far from being a reason to exclude an area from critical habitat, is indisputable proof that the area qualifies as critical habitat. An additional comment states that the Service fails to conduct the required 4(b)(2) analysis of the benefits of exclusion versus inclusion of lands covered by the existing HCPs.

Our Response: The Service does not interpret the definition of critical habitat (section 3(5)(A) of the Act) to mean that areas receiving protection or management do not meet the definition of critical habitat. We agree with the commenter that prong one of the definition of critical habitat in section 3(5)(A) of the Act requires only that an area contain a physical or biological feature essential to the conservation of the species that "may require" special management considerations or protection; it does not require an absolute finding that the area requires special management considerations or protection. Prong two of the definition of critical habitat does not require a finding that special management considerations or protection may be required.

Under section 4(b)(2) of the Act, exclusion of an area from critical habitat designation is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of the area will not result in extinction of a species, which is a complex analysis process. We found the benefits of exclusion of lands that are both conserved and managed under HCPs or long-term management plans to be greater than the benefits of including these lands in the revised critical habitat designation in large part because the associated HCPs and management plans afford protection to the excluded areas, and due to the benefits of preserving partnerships and encouraging development of additional HCPs and other conservation plans in the future. We believe we appropriately applied our exclusion analysis as required by section 4(b)(2) of the Act for existing HCPs. For more information, *see* the Exclusions under Section 4(b)(2) of the Act section for a detailed discussion.

Section 4(a)(3)(B)(i) of the Act states: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources

management plan prepared under section 101 of the Sikes Act [Improvement Act of 1997 (Sikes Act)] (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

We determined that conservation efforts identified in the INRMP provide a benefit to the populations of *Brodiaea filifolia* and this species' habitat occurring on MCB Camp Pendleton (the only military lands on which the species is known to occur) (MCB Camp Pendleton 2007, Section 4, pp. 51–76). The INRMP provides measures that promote the conservation of *B. filifolia* within the 1,531 ac (620 ha) of habitat that we believe contain the features essential to the conservation of *B. filifolia* on MCB Camp Pendleton, which are subject to the INRMP, within the following areas: Cristianitos Canyon, Bravo One, Bravo Two South, Basilone/San Mateo Junction, Camp Horno, Pilgrim Creek, and South White Beach. As a result, we are not including these areas in this final revised critical habitat designation.

Comment 51: One commenter stated that whether habitat does or does not require special management is not determinative on whether or not that habitat is "critical" to a threatened or endangered species; what is determinative is whether or not the habitat is "essential to the conservation of the species" and special management of that habitat is possibly necessary (16 U.S.C. 1532(5)(A)(i)). Thus, according to the commenter, the fact that a particular habitat does, in fact, require special management is demonstrative evidence that the habitat is "critical."

Our Response: We agree with the commenter that prong one of the definition of critical habitat in section 3(5)(A) of the Act requires only that an area contain a physical or biological feature essential to the conservation of the species that "may require" special management considerations or protection; it does not require an absolute finding that the area requires special management considerations or protection. Prong two of the definition of critical habitat does not require a finding that special management considerations or protection may be required. *Please see* the Criteria Used To Identify Critical Habitat and Exclusions Under Section 4(b)(2) of the Act sections for a detailed discussion of the process followed to delineate critical habitat for this revised designation.

Comment 52: One commenter stated that any exclusion of critical habitat that relies on not yet adopted, preliminary and not publicly reviewed plans for conservation is unacceptable and provides only a highly speculative conservation benefit at best. The commenter does not believe that the proposed revised critical habitat rule demonstrates unequivocally that the benefits of excluding these areas from the revised critical habitat designation for *Brodiaea filifolia* outweigh the benefits of including them in the designation.

Our Response: We did not exclude any habitat from this revised critical habitat designation that falls within the plan area of an HCP permit that has not yet been issued. *Please see* the Exclusions Under Section 4(b)(2) of the Act section for a detailed discussion on our exclusion analyses of those areas we considered for exclusion in the proposed revised critical habitat designation (74 FR 64292).

Comment 53: One commenter recommended that the revised critical habitat designation carefully consider all of the existing conservation investments through mitigation of impacts to *Brodiaea filifolia* and support those investments so that they can succeed. The commenter expressed concern that withdrawing these lands from the revised critical habitat designation would undermine and devalue the previous conservation investments because the surrounding land would no longer be highly valued for conservation, which would lead to isolation and fragmentation of adjacent areas which would degrade the mitigation lands, and ultimately make irrelevant the mitigation.

Our Response: We have excluded only lands that are both conserved and managed from this revised designation. Some of these excluded areas include lands set aside as mitigation or as a result of consultations under section 7 of the Act to offset project impacts. We do not agree with the commenter's assertion that not designating revised critical habitat would decrease the perceived conservation value of mitigation areas because these lands are understood to have high conservation value due to their conserved status.

Comment 54: One commenter asserted that the Service needs to include all occupied and suitable unoccupied habitat in the revised final economic analysis (FEA) and final revised critical habitat rule, and not rely on the proposed revised critical habitat rule as the basis for the economic analysis.

Our Response: The purpose of the economic analysis is to identify and analyze the potential incremental economic impacts associated with the revised designation of critical habitat for *Brodiaea filifolia.* Occupied areas not proposed as revised critical habitat are outside the scope of the Economic Analysis, as they are not expected to be impacted by the designation.

Comment 55: One commenter noted that Subunit 8f is in unincorporated San Diego County, not the City of San Marcos as indicated in the proposed revised critical habitat rule. It is within the County of San Diego MSCP North County Plan, but owned by the San Marcos Unified School District. School districts are their own jurisdiction and not subject to the County plans and regulations. The commenter does not object to the designation of this area as critical habitat for *Brodiaea filifolia.*

Our Response: We thank the commenter for this information and have incorporated it into the final revised critical habitat rule.

Comment 56: One commenter noted that Unit 12 is in a Minor Amendment area of the County of San Diego MSCP Subarea Plan; therefore, proposed projects require Service concurrence of proposed impacts and mitigation to move forward. Because Service concurrence is required, the commenter believes there will be no additional benefit from critical habitat. Approximately 28 ac (11 ha) of the southern portion of Unit 12 are Take Authorized and approximately 3.5 ac (1.4 ha) are hardline preserve. Mitigation for the Take Authorized area was coordinated with the Service prior to the approval of the Subarea Plan; therefore these areas should not be included in the revised critical habitat designation for *Brodiaea filifolia* according to this commenter.

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. Only a portion of the Minor Amendment area of the

County of San Diego MSCP Subarea Plan is both conserved and managed, and we have not concluded that the partnership benefits of excluding all lands within the Minor Amendment area under section 4(b)(2) of the Act outweigh the benefits of including these areas in the final revised critical habitat designation. Based on the results of our exclusion analysis for proposed lands covered under the County of San Diego MSCP Subarea Plan, we did determine that the benefits of exclusion outweighed the benefits of inclusion in the area already conserved and managed under the Artesian Trails Management Plan, and this is the only portion of the Minor Amendment area of the County of San Diego MSCP Subarea Plan that has been excluded from this revised designation.

Comment 57: One commenter suggested we exclude the Metropolitan Water District right-of-way from Unit 11a of the revised critical habitat designation. According to the commenter, the right-of-way includes the shoulders of Davis Road, which are highly disturbed and not suitable for sensitive plants. Alternatively, the commenter suggests we exclude all of Subunit 11a under 4(b)(2) of the Act because it is within the area covered by the Western Riverside County MSHCP. The commenter further expressed concern that the designation of revised critical habitat for *Brodiaea filifolia* may delay, limit, or impede access needed to ensure safe and effective operation of critical infrastructure (Metropolitan Water District) facilities in Subunit 11a. The commenter is concerned that maintenance activities in these areas could be delayed or prevented by additional permitting requirements of regulatory agencies due to the revised critical habitat designation.

Our Response: When determining the revised critical habitat boundaries, we made every effort to map precisely only the areas that contain the PCEs and provide for the conservation of *Brodiaea filifolia.* However, we cannot guarantee that every fraction of critical habitat contains the PCEs due to the mapping scale we use to draft critical habitat boundaries. We made every attempt to avoid including developed areas such as lands underlying buildings, paved areas, and other structures that lack PCEs for *B. filifolia.* The scale of maps prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed areas. Any developed structures and the land under them inadvertently left inside critical habitat boundaries shown on the maps of this final revised critical habitat designation are excluded by text in this rule and are not designated as critical habitat. Therefore, Federal actions involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific actions may affect the species or PCEs in adjacent critical habitat.

Please see our response to Comment 42 for a discussion regarding our 4(b)(2) analysis for areas covered by the Western Riverside County MSHCP. We are not exercising our delegated discretion under section 4(b)(2) of the Act to exclude Subunit 11a from this final revised critical habitat designation. Therefore, any Metropolitan Water District activities that might impact lands in Subunit 11a outside of the Davis Road right-of-way will require consultation with the Service if there is a Federal nexus; this may result in project delays.

Comment 58: One commenter pointed out that Metropolitan Water District purchased 74 ac (30 ha) of land and funded research to conserve and enhance populations of *Brodiaea filifolia* as part of the consultation under section 7 of the Act for the Inland Feeder Project (Service 1999 (1–6–99–F–18)). The commenter stated that these lands should be excluded from the revised critical habitat designation for *B. filifolia* because they have been conferred to CDFG for inclusion into the San Jacinto Wildlife Area, and are protected and managed by CDFG as part of the wildlife area.

Our Response: Please see our response to Comment 42 for a discussion regarding our 4(b)(2) analysis for areas covered by the Western Riverside County MSHCP. We are not exercising our delegated discretion under section 4(b)(2) of the Act to exclude lands within the San Jacinto Wildlife Area from this final revised critical habitat designation. Therefore, any Metropolitan Water District activities that might impact lands in Subunit 11a outside of the Davis Road right-of-way will require consultation with the Service if there is a Federal nexus.

Comment 59: One commenter submitted several comments describing needed and planned research activities for the Devil's Canyon (Subunit 5b) occurrence of *Brodiaea filifolia.*

Our Response: We thank the commenter for this information. We will consider this information in our next 5-year review for this species.

Economic Analysis Comments

General Comments About Framework, Assumptions, and Economic Benefits

Comment 60: Two commenters stated the discount rate applied and the development projections should be reevaluated given current economic conditions. The next few years will have far lower economic activity than expected, and should be reevaluated given current economic conditions.

Our Response: The U.S. Office of Management and Budget (OMB) requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A–4, 2003). The DEA relies on growth projections at the census tract level provided by the San Diego Association of Governments (SANDAG) and the Southern California Association of Governments (SCAG). These projections forecast growth over a 20-year period; however, they generally do not provide information about the percent of this growth occurring in intermediate time periods. It is possible that, given current economic conditions, development activity will be slower in the early part of this timeframe and more aggressive during the latter half. However, lacking specific data on which to base assumptions about a variable growth rate, we assume linear growth between 2010 and 2030. A note has been added to Exhibit 3–13 of the FEA to draw attention to this assumption (IEc 2010, p 3–20).

Comment 61: One commenter stated that as a result of decreased development and associated construction spending, it appears that there may not be funding available for many of the conservation efforts included in the HCPs. Therefore, the DEA's assumptions regarding the implementation of conservation measures under the HCPs and the availability of funds to carry out these measures are flawed.

Our Response: The DEA does not evaluate the broader goals of the regional HCPs and whether they will be achieved. The costs of implementing the HCPs outside of proposed revised critical habitat are not estimated. Rather, the DEA identifies development that is likely to occur over the next 20 years based on data obtained from regional planning agencies and uses the conservation and mitigation requirements defined in the HCPs as proxies for the best estimate of the outcome of future section 7 consultations. Specifically, the DEA assumes that 95 percent of critical habitat acres overlapping a development project must be preserved and salvaging

and transplantation of plants occurs on the remaining 5 percent. We agree that if a developer does not have the funds to carry out these measures, then the project is unlikely to move forward. However, the loss in land value that occurs as a result of these requirements is real, regardless of whether the individual projects actually take place.

Comment 62: One commenter stated that the DEA does not clearly define how it estimates potential cost associated with time delays, regulatory uncertainty, and stigma.

Our Response: Chapter 2 defines these categories of cost for the purposes of the analysis (IEc 2010, pp. 2–1–2–22). Data are not readily available to quantify potential impacts from regulatory uncertainty and stigma, thus they are discussed qualitatively.

Comment 63: One commenter stated that because all units within the proposed revised critical habitat are currently occupied by *Brodiaea filifolia,* no additional expenses would be incurred during section 7 consultation to address adverse modification of critical habitat.

Our Response: As is described in Chapter 2, new consultations taking place after critical habitat designation must include additional analysis and text to address whether the action will adversely modify critical habitat (IEc 2010, pp. 2–12–2–14). The Service, relevant action agencies, and third party participants in section 7 consultations have provided information for this and other economic analyses of critical habitat designation estimating the additional regulatory and administrative burdens imposed by this requirement. These costs are incremental because absent designation, no requirement to evaluate, comment on, or address the potential for adverse modification exists.

Comment 64: One commenter stated that including the cost of considering additional land for pollinators as an incremental cost of the designation is inappropriate because the Service must consider pollinators in consultations for impacts to the species regardless of designation of critical habitat.

Our Response: This assumption is explained in detail in the incremental effects memorandum from the Service provided in Appendix D (IEc 2010, p. D–1). It represents the professional judgment of Service staff and represents the best available information.

Comment 65: One commenter stated that no data are presented to justify the assumption that in areas greater than 50 ft (15 m) of a known *Brodiaea filifolia* occurrence, 20 percent of the time the action agency would not have been aware of the need to consult on potential effects to *B. filifolia.* Furthermore, relying upon this assumption to assign all costs associated with these consultations to the designation of critical habitat is not accurate. The commenter argues that these consultations should be required under the listing of the species and thus should be considered a baseline cost.

Our Response: The incremental effects memorandum provided in Appendix D justifies this assumption (IEc 2010, p. D–1). The Service relies upon consultation data for the San Diego fairy shrimp to determine the number of consultations which would not have occurred absent critical habitat. The Service states that "similar to [*Brodiaea filifolia*], impacts to lands adjacent to the habitat physically occupied by San Diego fairy shrimp (*i.e.,* the local watershed that surrounds a vernal pool) were not necessarily addressed through consultation with the Service prior to critical habitat designation" (Service 2010, *in litt.*). The Service determines that the designation of critical habitat for the fairy shrimp resulted in a 20 percent increase in the number of consultations and believes that it may see a comparable increase in the number of consultations for *B. filifolia* after the designation of revised critical habitat. This behavioral change is directly attributable to the designation of revised critical habitat; thus we count the costs of this new behavior as incremental. This assumption represents the professional judgment of Service staff and represents the best available information.

Comment 66: Two commenters stated that the administrative costs of consultation used in the analysis are underestimated. One commenter suggested that based on personal experience, the cost for technical assistance varies from $5,000 to $10,000 and can be more if outside legal counsel is necessary. Similarly, the costs for preparing a biological assessment are also underestimated; a more accurate figure would be $10,000 to $25,000. Another commenter suggested that the cost of preparing a biological assessment for a new consultation considering only adverse modification should be 5–10 times higher than the amount given in Exhibit 2–3 ($4,200). Additionally, the commenter believes that third party costs of consultation are substantially underestimated.

Our Response: We have reviewed the cost estimates presented by the commenters and find that they fall within acceptable range limits identified through discussions with other project proponents and as a result, have adjusted the FEA to reflect this new information on administrative costs associated with the designation. The FEA uses an administrative cost of preparing a biological assessment of $25,000; this estimate reflects the high-end estimate provided by one commenter and falls within the range provided by another commenter. The FEA uses an administrative cost to third parties of $10,000 for all types of consultation. It should be noted that a cost of $250,000 for a programmatic consultation and CEQA review of the Inland Feeder Project is used in place of the costs provided in Exhibit 2–3; because a cost estimate specific to the project was provided by the stakeholder (IEc 2010, p. 2–15).

Comment 67: One commenter stated that the Service's methodological approach of separately estimating incremental impacts of the designation relative to existing baseline protections omits substantial economic impacts resulting from the proposed rule.

Our Response: The identification and estimation of incremental impacts is consistent with direction provided by OMB to Federal agencies for the estimation of the costs and benefits of Federal regulations (*see* OMB, Circular A–4, 2003). It is also consistent with several recent court decisions, including *Cape Hatteras Access Preservation Alliance* v. *U.S. Department of the Interior,* 344 F. Supp. 2d 108 (D.D.C.) and *Center for Biological Diversity* v. *U.S. Bureau of Land Management,* 422 F. Supp. 2d 1115 (N.D. Cal. 2006). Those decisions found that estimation of incremental impacts stemming solely from the designation is proper.

Comment 68: One commenter stated that the Service's framework ignores indirect and cumulative effects of the designation of critical habitat. The measurement of these types of impacts is required under another Federal environmental law, the National Environmental Policy Act (NEPA).

Our Response: Executive Order 12866, Regulatory Planning and Review, and OMB's Circular A–4, which provides direction to Federal agencies on the implementation of Executive Order 12866, represent the framework used to estimate the costs and benefits of regulations promulgated by all Federal agencies. They do not require the estimation of indirect or cumulative impacts. Furthermore, section 4(b)(2) of the ESA is silent on the definition of "economic impacts" to be considered prior to the designation of critical habitat. Thus, the Service relies on the well-established and universally followed principles laid out in Circular A–4.

Also it is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA (42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. *See National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.)* section below.

Comment 69: One commenter stated that the DEA does not consider added environmental reviews by other regulatory agencies that could trigger more complex permits and more mitigation measures. Nor did it assess the costs of consultation under section 10 of the Act.

Our Response: Chapter 2 of the DEA explains that critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under State or local laws, such as CEQA (IEc 2010, pp. 2-1–2-22). Where appropriate the DEA includes costs associated with CEQA review. We are not aware of any new HCPs likely to be prepared under section 10 of the Act to cover *Brodiaea filifolia.* The HCPs currently in place were developed prior to the designation of critical habitat for *B. filifolia* and thus are outside of the scope of this analysis. Additionally, HCPs are usually not prepared for plant species because there is no prohibition against take of plants. In general, plant species will be covered by an HCP only if a listed animal species is present in the area.

Comment 70: One commenter stated that the DEA should consider cumulative effects (defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)) of the revised critical habitat designation for *Brodiaea filifolia* and other existing or pending critical habitat designations in Southern California. The commenter stated NEPA and its implementing regulations require Federal agencies to evaluate these cumulative impacts.

Our Response: It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA in connection with designating critical habitat under the Act, including the economic analyses performed as part of the critical habitat designation process. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). The Ninth Circuit of the U.S. Court of Appeals upheld this position (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Comment 71: One commenter stated that the DEA fails to include consideration of all the benefits resulting from the designation, such as the positive impact on property values in the surrounding community due to the designation and non-development of open space; protection of clean water and clean air; preservation of natural habitat for other species which may alleviate the need for listing species in the future; and maintaining a mosaic of habitat types that native species use as movement corridors in arid southern California. The commenter asserts that these benefits should be assessed and quantified where possible or otherwise included in a detailed qualitative analysis.

Our Response: As described in Chapter 6 of the DEA, the purpose of critical habitat is to support the conservation of *Brodiaea filifolia* (IEc 2010, pp. 6-1–6-4). The data required to estimate and value in monetary terms the incremental changes in the probability of conservation resulting from the designation are not available. Depending on the project modifications ultimately implemented as a result of the regulation, other ancillary benefits that are not the stated objective of critical habitat (such as increasing the value of homes adjacent to preserved habitat or preserving habitat for other non-listed species) may occur. These benefits are discussed qualitatively. The DEA includes a discussion of the potential benefits to property values as well as the overall benefit to ecosystem health that is shared by other, coexisting species. The FEA has been revised to include discussion of the new ancillary benefit categories referenced in the comment (see Exhibit 6–1 of the FEA) (IEc 2010, p. 6-4).

Impacts to Residential and Commercial Development Activities

Comment 72: One commenter stated that the DEA's assertion that the areas proposed for designation covered by the Orange County Southern Subregion HCP are within lands mapped as Reserves and Open Space Areas is incorrect. The commenter calculates that the proposed revised critical habitat designation covers 43.8 ac (17.7 ha) of land designated for development in Planning Area 2. This land falls within Subunit 4c.

Our Response: Chapter 3 of the DEA states that 90 ac (36 ha) out of a total 133 ac (54 ha) in Subunit 4c is or will be conserved under the Orange County Southern Subregion HCP (see Exhibit 3–2) (IEc 2010, p. 3–4). This leaves 43 ac (17 ha) of land that is not within lands mapped as Reserves and Open Space. The text on page 2–18 has been revised to clarify that only a portion of the land covered by the Orange County Southern Subregion HCP is within lands mapped as Reserves and Open Space (IEc 2010, p. 2–18).

Comment 73: One commenter stated that acres of private developable land attributable to Subunit 4c should be 43.8 ac (17.7 ha), not 18.53 ac (7.49 ha) set forth in Exhibit 3–3.

Our Response: The DEA characterizes potentially developable land as that where development is not currently restricted (*e.g.,* lands not conserved under an HCP) that has been categorized as "vacant" by SCAG or SANDAG. The FEA has been revised to reflect the information about potentially developable land in Subunit 4c provided by this comment. The FEA considers 25.01 ac (10.12 ha) categorized as "non-irrigated cropland and improved pastureland" as potentially developable land in addition to the 18.53 ac (7.49 ha) of vacant land. Exhibit 3–3 has been revised to reflect this new information and the economic impact estimates in the FEA have been revised accordingly (IEc 2010, p. 3–6).

Impacts to Transportation, Utility, and Flood Control Activities

Comment 74: One commenter stated that the DEA should include an evaluation of the impacts of designating revised critical habitat on the 241 Completion Project and all other transportation projects including project delays, the economic impact of designing, refining, and negotiating a preferred alternative to avoid *Brodiaea filifolia* critical habitat, costs associated with mitigation measures, and impacts arising from reduction in housing supply.

Our Response: The FEA evaluates potential economic impacts of this revised critical habitat designation on all known transportation projects within the areas proposed as revised critical habitat. Regarding the 241 Completion Project, we have become aware that the proposed project does not meet the requirements of the Coastal Zone Management Act and the California Coastal Commission (CCC) has denied a permit for this project as currently planned based on concerns related to a portion of the project located outside of revised critical habitat. Based on the

CCC's concerns, it appears that no viable project alternatives exist at this time and the proposed project as currently designed cannot move forward without project modification. Because the issues related to the CCC's permit denial concern areas not proposed as revised critical habitat, we consider these costs to be baseline and have identified these costs in the FEA (see 241 Completion Project in the FEA) (IEc 2010, p. 4-3). All other impacts on known transportation projects as a result of the designation are identified in Chapter 4 of the FEA (IEc 2010, pp. 4-1–4-3).

Comment 75: One commenter stated that designation of revised critical habitat for *Brodiaea filifolia* may result in increased economic burden to the Metropolitan Water District in Subunit 11a due to increased number of consultations with permitting agencies including consultations under section 10 of the Act where there is no Federal nexus (technically referred to as issuing an incidental take permit; the term 'consultation' refers to the process under section 7 of the Act, not under section 10 of the Act), increased environmental compliance costs for mitigation and CEQA documentation, and increased time and cost to obtain permits for maintenance operations.

Our Response: The FEA evaluated potential economic impacts of this revised critical habitat designation on all landowners and project proponents within the designated area. Regarding Metropolitan Water District activities, the FEA assumes that a programmatic consultation resulting entirely from the designation of revised critical habitat and CEQA review will occur in 2011. The FEA estimated the incremental costs to Metropolitan Water District to be $250,000. Additionally, according to the FEA, any project modifications that are requested as a result of the consultation are also considered incremental costs of the designation. However, because specific project modifications likely to be requested were not known at the time the FEA was completed, project modification costs have not been quantified for this project. Also, note that if there is no Federal nexus, issuing an incidental take permit under section 10 of the Act is not required for plant species.

Comment 76: One commenter stated that during consultation for the Inland Feeder project in Subunit 11A additional mitigation requirements may be imposed increasing the cost of compliance with the Act.

Our Response: The DEA includes the costs of a programmatic consultation resulting entirely from the designation of revised critical habitat and CEQA review for this project. Because this consultation would not have occurred absent critical habitat, any project modification costs would be considered incremental impacts of the designation. At this time we do not know specific project modifications that may be requested and thus cannot estimate potential costs. A qualitative discussion of the potential for additional project modification costs has been added to Chapter 4.

Comment 77: One commenter stated that the DEA should have included transportation projects in the regional and interregional transportation plans prepared for regional and Federal transportation planning and Federal air quality conformity such as the Regional Transportation Plans and Regional Transportation Improvement Plans.

Our Response: The SCAG and SANDAG Regional Transportation Plans and Regional Transportation Improvement Plans have been reviewed for the FEA. This review identified two projects that may occur within Subunit 11c: the widening of Case Road between Goetz Road and I–215 and construction of a two-lane arterial and two-lane grade separation on Ellis Avenue. These projects are identified as "financially constrained projects" that are subject to available funding. Because these projects are not yet funded and are, therefore, uncertain they will not be included in this analysis. A footnote to this effect has been added to Chapter 4 of the FEA.

Comment 78: One commenter stated that the DEA improperly and in violation of the requirement to use the "best scientific data available" excludes the 241 Completion Project from consideration of economic impacts resulting from the proposed rule. The commenter states that: the Service's conclusion that no viable alternatives exist for the 241 Completion Project is outside of the scope of the agency's expertise; new information alone is not a trigger for re-initiation of consultation; and the Service cannot determine at this time whether the 2008 biological opinion is no longer valid.

Our Response: As is described in the text box on page ES–11 and in Chapter 4 of the DEA the Service believes that no viable alternative exists for this project (IEc 2010, pp. ES–11, 4–2). The Service maintains that the Foothill/Eastern Transportation Corridor Agency would need to engage in additional consultation under section 7 of the Act for a redesigned project.

Required Determinations

Regulatory Planning and Review—Executive Order 12866

The Office of Management and Budget (OMB) has determined that this rule is not significant and has not reviewed this proposed rule under Executive Order 12866 (E.O. 12866). OMB bases its determination upon the following four criteria:

(1) Whether the rule will have an annual effect of $100 million or more on the economy or adversely affect an economic sector, productivity, jobs, the environment, or other units of the government.

(2) Whether the rule will create inconsistencies with other Federal agencies' actions.

(3) Whether the rule will materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

(4) Whether the rule raises novel legal or policy issues.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions), as described below. However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. In this final rule, we are certifying that the revised critical habitat designation for *Brodiaea filifolia* will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

According to the Small Business Administration, small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and

heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term "significant economic impact" is meant to apply to a typical small business firm's business operations.

To determine if the designation of revised critical habitat for *Brodiaea filifolia* would significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities, such as residential and commercial development. We apply the "substantial number" test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define "substantial number" or "significant economic impact." Consequently, to assess whether a "substantial number" of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat affects only activities conducted, funded, permitted, or authorized by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the species is present, Federal agencies already are required to consult with us under section 7 of the Act on activities they fund, permit, or implement that may affect *Brodiaea filifolia.* Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities (*see Application of the* "*Adverse Modification*" *Standard* section).

In our final economic analysis of the revised critical habitat designation, we evaluated the potential economic effects on small business entities resulting from implementation of conservation actions related to the revised designation of critical habitat for *Brodiaea filifolia.* The analysis is based on the estimated impacts associated with the rulemaking as described in sections 3 through 5 of the analysis and evaluates the potential for economic impacts related to: Commercial and residential development; transportation, utility, and flood control; and public and conservancy lands management (IEc 2010, p. 1–5). The FEA estimates the total incremental impacts associated with development as a whole to be $280,000 to $384,000 over the 20-year timeframe of the FEA. The FEA identifies incremental impacts to small entities to occur only due to residential and commercial development (IEc 2010, p. A–4). The other categories of projects either will have no impacts (transportation, utility, and flood control; management of public and conservation lands) or are Federal, State, or public entities not considered small or exceed the criteria for small business status (IEc 2010, p. A–4). Of the approximately 1,025 ac (415 ha) of land considered developable in the designation, only 132 ac (53 ha) have been forecasted to be developed over the next 20-year timeframe (IEc 2010, p. A–5). The FEA equates this acreage to 23 projects, with one developer per project (IEc 2010, p. A–6). The FEA summarizes that less than one new project is likely to occur annually that may be affected by the designation of revised critical habitat resulting in total annualized incremental impacts to small entities of $24,700 to $33,900 (IEc 2010, p. 3–19). The FEA assumes all developers are considered small; this estimate may overstate impacts if not all of the developers are small. Please refer to our final economic analysis of the revised critical habitat designation for *B. filifolia* for a more detailed discussion of potential economic impacts.

In summary, we considered whether this designation would result in a significant economic effect on a substantial number of small entities. The total number of small businesses impacted annually by the designation is estimated to be fewer than one, with an annualized impact of approximately $24,700 to $33,900. This impact is less than 10 percent of the total incremental impact identified for development activities. Based on the above reasoning and currently available information, we concluded this rule would not result in a significant economic impact on a substantial number of small entities for transportation, development, and flood control impacts as identified in the FEA (IEc 2010, p. A–1–A–6). Therefore, we are certifying that the designation of revised critical habitat for *Brodiaea filifolia* will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act, we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)–(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or Tribal governments," with two exceptions. First, it excludes "a condition of federal assistance." Second, it also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding" and the State, local, or Tribal governments "lack authority" to adjust accordingly. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance; or (ii) a duty arising from participation in a voluntary Federal program."

Critical habitat designation does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. Designation of critical habitat may indirectly impact non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency. However, the legally binding duty to avoid destruction or adverse

modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above on to State governments.

(2) As discussed in the FEA of the proposed designation of revised critical habitat for *Brodiaea filifolia,* we do not believe that this rule would significantly or uniquely affect small governments because it would not produce a Federal mandate of $100 million or greater in any year; that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. The FEA concludes incremental impacts may occur due to administrative costs of section 7 consultations for development activities; however, these are not expected to affect small governments. Incremental impacts stemming from various species conservation and development control activities are expected to be borne by the Federal Government, California Department of Transportation, CDFG, Riverside County, Riverside County Flood Control and Water Conservation District, and City of Perris, which are not considered small governments. Consequently, we do not believe that the revised critical habitat designation would significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 ("Government Actions and Interference with Constitutionally Protected Private Property Rights"), we analyzed the potential takings implications of designating revised critical habitat for *Brodiaea filifolia* in a takings implications assessment. Critical habitat designation does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits. The designation of revised critical habitat for *B. filifolia* does not pose significant takings implications for the above reasons.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior policy, we requested information from, and coordinated development of this proposed revised critical habitat designation with, appropriate State resource agencies in California. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the PCEs of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist these local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), it has been determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have designated critical habitat in accordance with the provisions of the Act. This rule uses standard property descriptions and identifies the PCEs within the designated areas to assist the public in understanding the habitat needs of *Brodiaea filifolia.*

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA (42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we have a responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We determined that there are no tribal lands occupied at the time of listing that contain the features essential to the conservation of the species, nor are there any unoccupied tribal lands that are essential for the conservation of *Brodiaea filifolia.* Therefore, critical habitat for *B. filifolia* is not being designated on tribal lands.

Energy Supply, Distribution, or Use—Executive Order 13211

E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute "a significant adverse effect" when compared to not taking the regulatory action under consideration. The economic analysis finds that none of these criteria are relevant to this analysis. Thus, based on information in the economic analysis, energy-related

impacts associated with *Brodiaea filifolia* conservation activities within revised critical habitat are not expected. As such, the designation of revised critical habitat for *Brodiaea filifolia* is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

References Cited

A complete list of all references cited in this rulemaking is available on *http://www.regulations.gov* at Docket No. FWS–R8–ES–2009–0073 and upon request from the Field Supervisor, Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section).

Author(s)

The primary author of this notice is the staff from the Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

■ 2. In § 17.12(h), revise the entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under family Themidaceae to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*	*	*	*	*	*		*
FLOWERING PLANTS							
*	*	*	*	*	*		*
Brodiaea filifolia	Thread-leaved brodiaea.	U.S.A. (CA)	Themidaceae	T	650	17.96(a)	NA
*	*	*	*	*	*		*

■ 3. Amend § 17.96(a) by:

■ a. Removing the entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under Family Liliaceae; and

■ b. Adding a new entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under Family Themidaceae in alphabetic order by family name to read as follows:

§ 17.96 Critical habitat—plants.

(a) *Flowering plants.*

* * * * *

Family Themidaceae: *Brodiaea filifolia* (thread-leaved brodiaea)

(1) Critical habitat units are depicted for Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California, on the maps below.

(2) Within these areas, the primary constituent elements (PCE) for *Brodiaea filifolia* consist of two components:

(i) PCE 1—Appropriate soil series at a range of elevations and in a variety of plant communities, specifically:

(A) Clay soil series of various origins (such as Alo, Altamont, Auld, or Diablo), clay lenses found as unmapped inclusions in other soils series, or loamy soils series underlain by a clay subsoil (such as Fallbrook, Huerhuero, or Las Flores) occurring between the elevations of 100 and 2,500 ft (30 and 762 m).

(B) Soils (such as Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils) altered by hydrothermal activity occurring between the elevations of 1,000 and 2,500 ft (305 and 762 m).

(C) Silty loam soil series underlain by a clay subsoil or caliche that are generally poorly drained, moderately to strongly alkaline, granitic in origin (such as Domino, Grangeville, Traver, Waukena, or Willows) occurring between the elevations of 600 and 1,800 ft (183 and 549 m).

(D) Clay loam soil series (such as Murrieta) underlain by heavy clay loams or clays derived from olivine basalt lava flows occurring between the elevations of 1,700 and 2,500 ft (518 and 762 m).

(E) Sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps occurring between 1,800 and 2,500 ft (549 and 762 m).

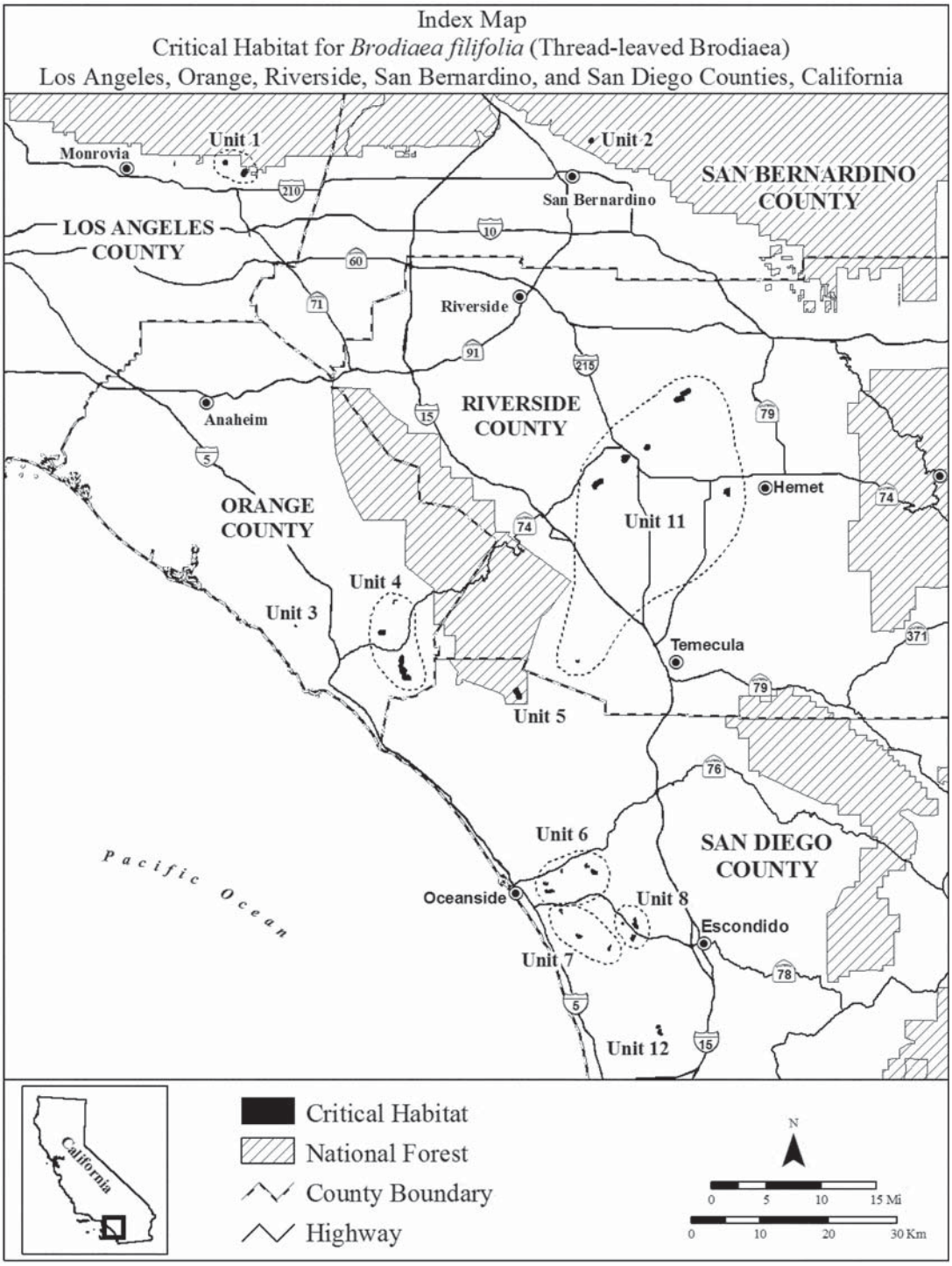
(ii) PCE 2—Areas with a natural, generally intact surface and subsurface soil structure, not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), extending out up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide for space for individual population growth, and space for pollinators.

(3) Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the primary constituent elements, such as buildings, aqueducts, airports, and roads, and the land on which such structures are located.

(4) *Critical habitat map units.* Data layers defining map units were created using a base of U.S. Geological Survey 7.5' quadrangle maps. Critical habitat units were then mapped using Universal Transverse Mercator (UTM) zone 11, North American Datum (NAD) 1983 coordinates.

(5) *Note:* Index map of critical habitat units for *Brodiaea filifolia* (thread-leaved brodiaea) follows:

BILLING CODE 4310–55–P



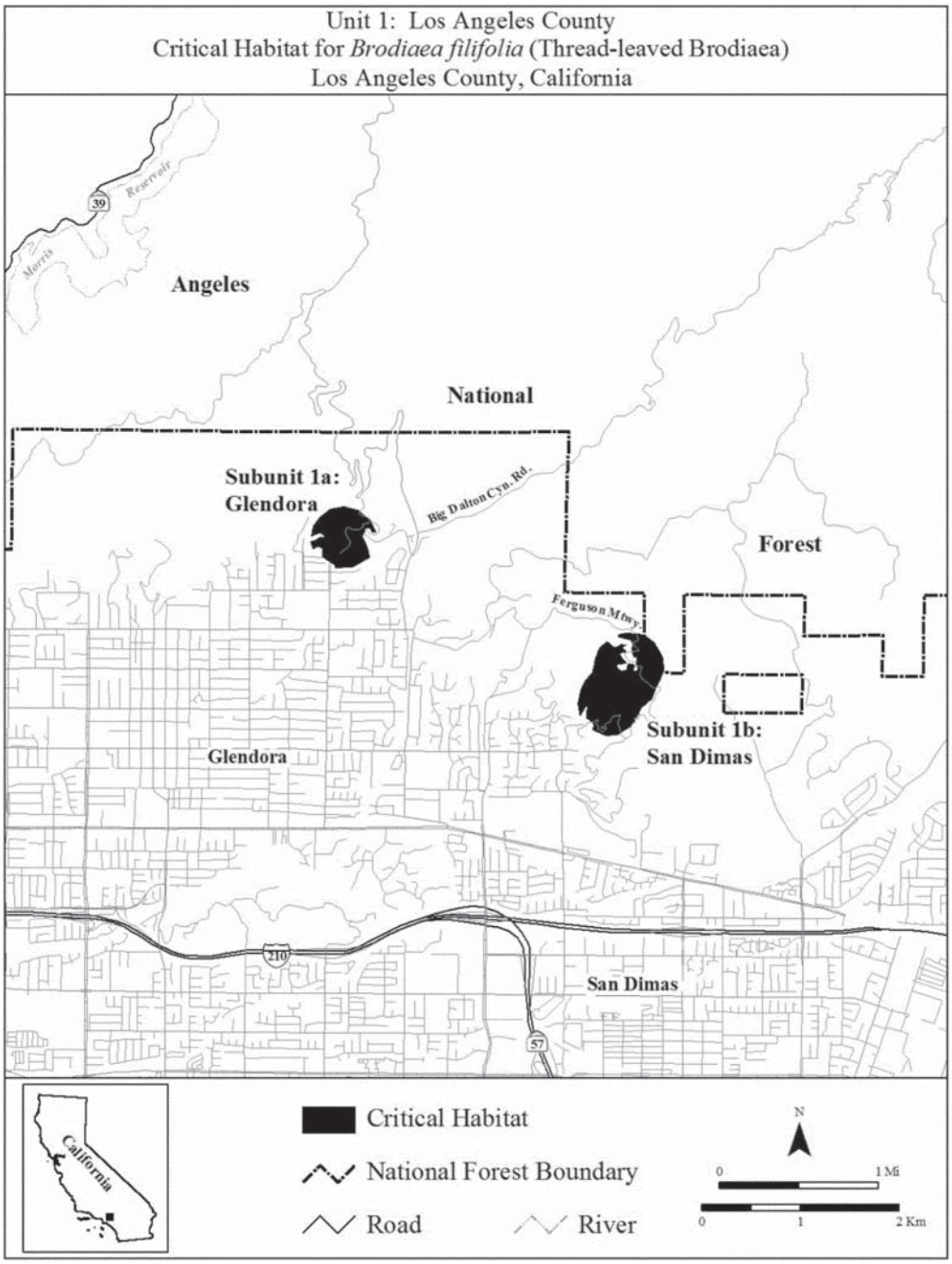
(6) Unit 1: Los Angeles County. From USGS 1:24,000 quadrangle map Glendora, Los Angeles County, California.

(i) Subunit 1a: Glendora. Land bounded by the following Universal Transverse Mercator (UTM) Zone 11, North American Datum of 1983 (NAD83) coordinates (E, N): 422408, 3779882; 422462, 3779764; 422424, 3779771; 422405, 3779809; 422356, 3779811; 422323, 3779723; 422353, 3779662; 422391, 3779567; 422397, 3779509; 422224, 3779417; 422051, 3779401; 422039, 3779437; 422008, 3779452; 421977, 3779480; 421925, 3779519; 421920, 3779598; 421883, 3779624; 421826, 3779599; 421803, 3779670; 421860, 3779684; 421896, 3779720; 421919, 3779713; 421945, 3779727; 421896, 3779760; 421809, 3779730; 421815, 3779760; 421829, 3779825; 421899, 3779920; 422002, 3779999; 422139, 3780025; 422294, 3779985; thence returning to 422408, 3779882.

(ii) Subunit 1b: San Dimas. Land bounded by the following UTM NAD83 coordinates (E, N): 425325, 3778572; 425359, 3778490; 425367, 3778364; 425315, 3778234; 425284, 3778164; 425246, 3778076; 425149, 3777990; 425092, 3777884; 425044, 3777802; 424905, 3777719; 424787, 3777708; 424656, 3777764; 424662, 3777823; 424647, 3777849; 424590, 3777886;

424590, 3777928; 424597, 3778011; 424571, 3777991; 424529, 3777914; 424515, 3777936; 424506, 3778028; 424518, 3778113; 424537, 3778181; 424582, 3778271; 424644, 3778345; 424667, 3778401; 424676, 3778492; 424719, 3778597; 424795, 3778660; 424826, 3778640; 424843, 3778626; 424851, 3778608; 424889, 3778602; 424920, 3778616; 424940, 3778637; 424968, 3778629; 424993, 3778622; 424973, 3778619; 424951, 3778602; 424961, 3778582; 424985, 3778568; 424985, 3778557; 424964, 3778557; 424936, 3778546; 424928, 3778529; 424953, 3778490; 424979, 3778462; 424990, 3778449; 424984, 3778438; 424930, 3778435; 424896, 3778429; 424896, 3778402; 424908, 3778387; 424931, 3778378; 424945, 3778359; 425004, 3778379; 425004, 3778413; 425016, 3778438; 425027, 3778427; 425044, 3778433; 425072, 3778426; 425076, 3778399; 425064, 3778387; 425066, 3778358; 425087, 3778364; 425112, 3778384; 425097, 3778407; 425089, 3778424; 425098, 3778441; 425095, 3778477; 425095, 3778509; 425067, 3778508; 425052, 3778572; 425058, 3778633; 425038, 3778671; 424916, 3778705; 424914, 3778733; 425001, 3778749; 425169, 3778727; 425271, 3778648; thence returning to 425325, 3778572.

(iii) *Note:* Map of Unit 1, Los Angeles County, follows:

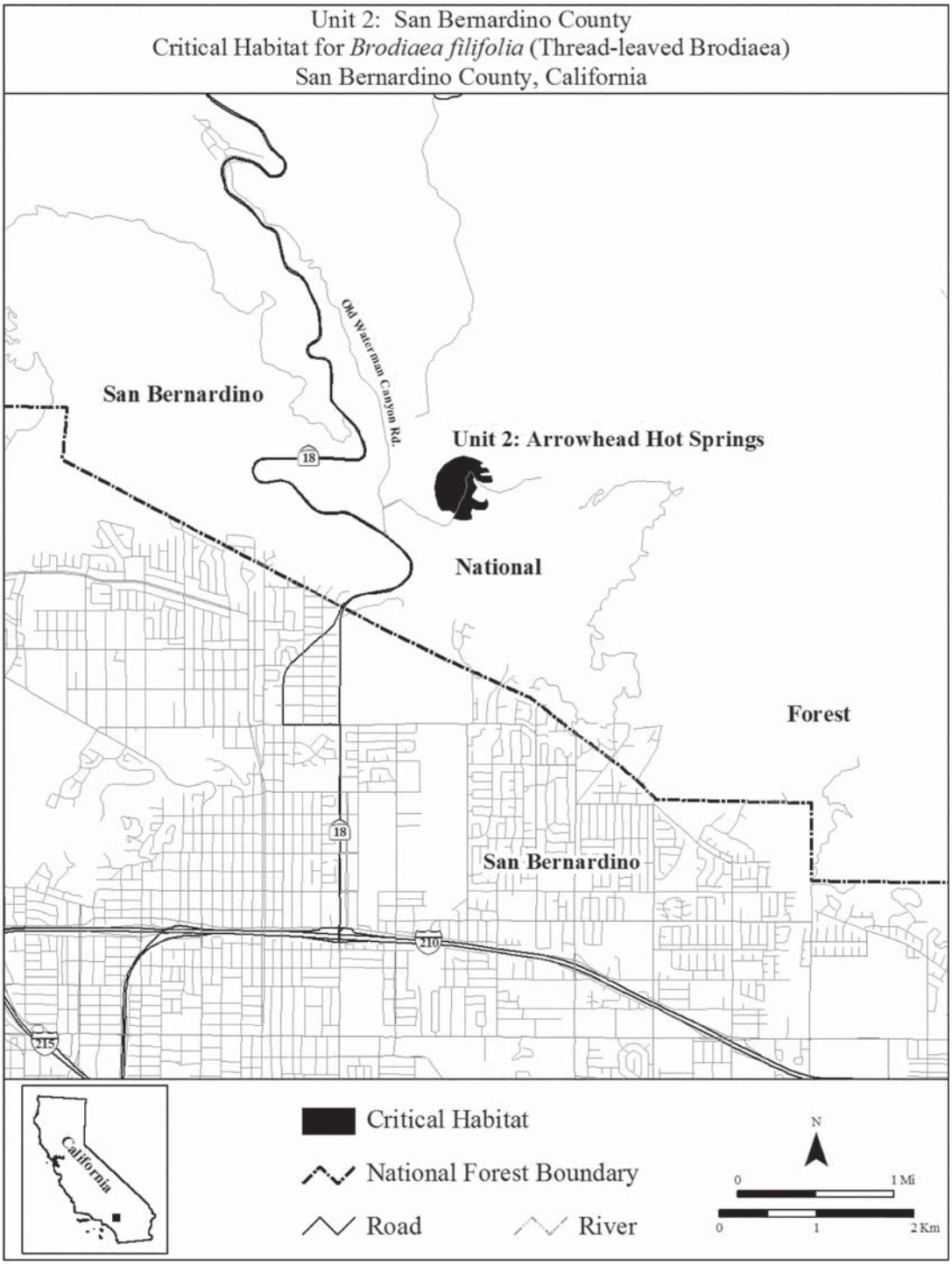


(7) Unit 2: San Bernardino County. From USGS 1:24,000 quadrangle map San Bernardino North, San Bernardino County, California.

(i) Arrowhead Hot Springs. Land bounded by the following UTM NAD83

coordinates (E, N): 475756, 3783146; 475763, 3783104; 475808, 3783104; 475830, 3783096; 475842, 3783067; 475744, 3783060; 475761, 3783023; 475827, 3783025; 475863, 3783021; 475876, 3782965; 475854, 3782962; 475836, 3782958; 475800, 3782956; 475773, 3782962; 475744, 3782971; 475721, 3782983; 475709, 3783006; 475684, 3783005; 475682, 3782992; 475686, 3782947; 475711, 3782920; 475716, 3782905; 475709, 3782895; 475705, 3782874; 475681, 3782844; 475668, 3782829; 475666, 3782807; 475682, 3782791; 475714, 3782768; 475748, 3782753; 475784, 3782755; 475820, 3782787; 475838, 3782735; 475827, 3782707; 475801, 3782677; 475790, 3782677; 475744, 3782680; 475705, 3782677; 475677, 3782696; 475654, 3782661; 475660, 3782581; 475612, 3782573; 475545, 3782573; 475482, 3782592; 475504, 3782635; 475472, 3782646; 475440, 3782672; 475403, 3782667; 475358, 3782674; 475324, 3782715; 475290, 3782821; 475289, 3782917; 475311, 3783037; 475380, 3783142; 475483, 3783208; 475584, 3783230; 475689, 3783208; 475767, 3783164; 475773, 3783155; thence returning to 475756, 3783146.

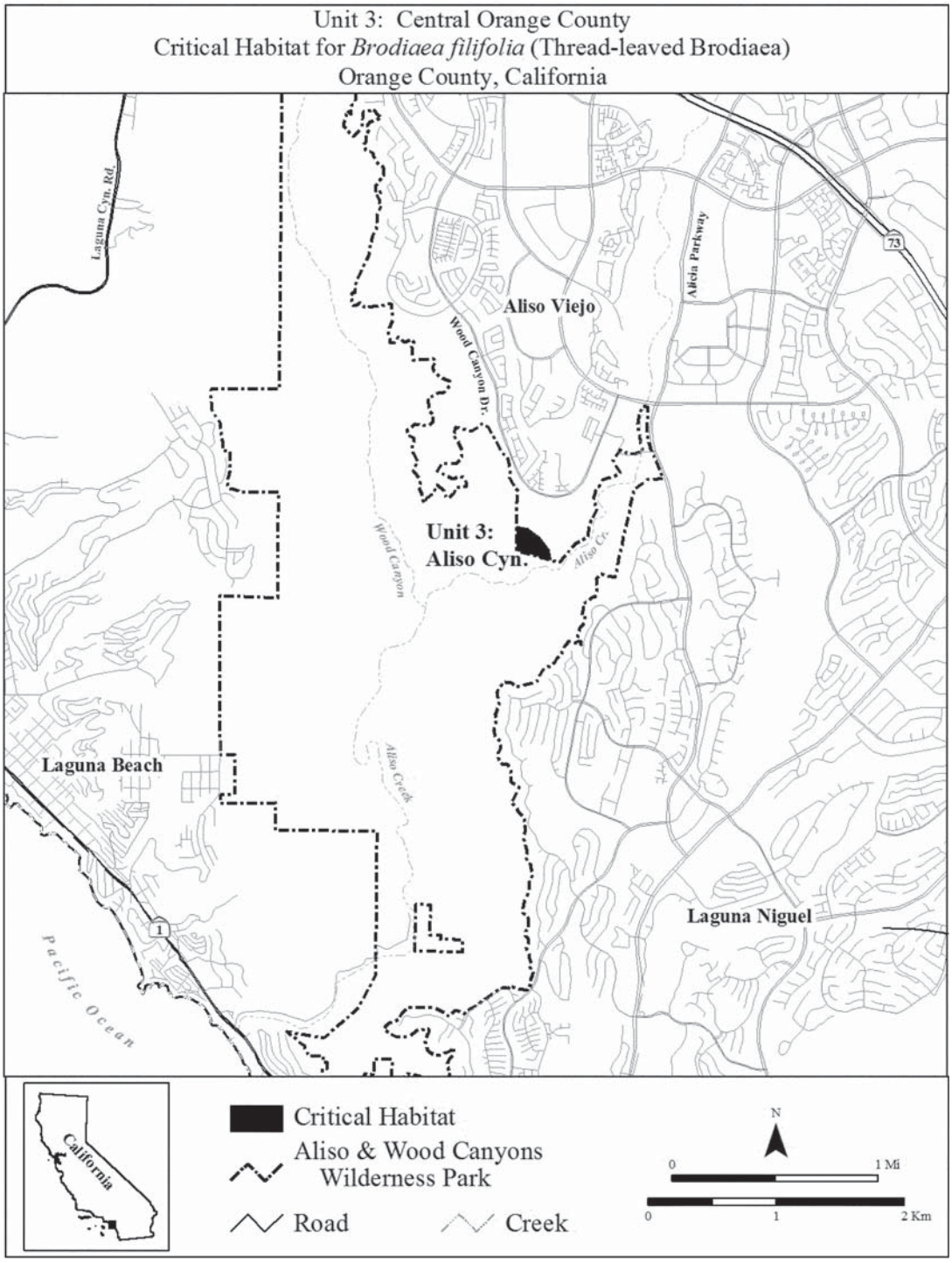
(ii) *Note:* Map of Unit 2, San Bernardino County, follows:



(8) Unit 3: Central Orange County. From USGS 1:24,000 quadrangle map San Juan Capistrano, Orange County, California.

(i) Aliso Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 432560, 3711875; 432501, 3711891; 432471, 3711899; 432436, 3711909; 432389, 3711922; 432289, 3711950; 432288, 3712146; 432371, 3712127; 432467, 3712061; 432539, 3711960; thence returning to 432560, 3711875.

(ii) *Note:* Map of Unit 3, Central Orange County, follows:



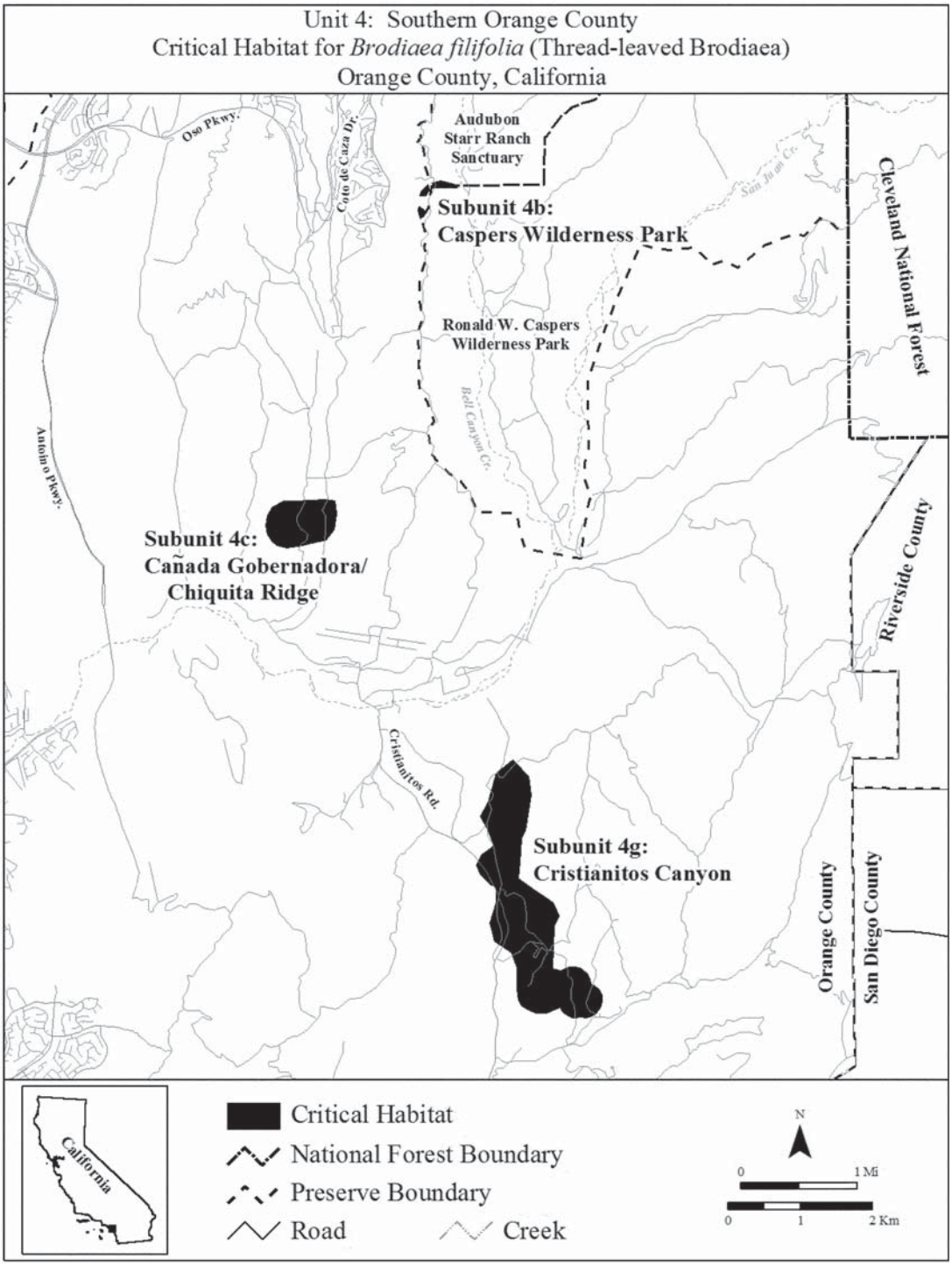
(9) Unit 4: Southern Orange County. From USGS 1:24,000 quadrangle map Cañada Gobernadora, Orange County, California.

(i) Subunit 4b: Caspers Wilderness Park. Land bounded by the following UTM NAD83 coordinates (E, N): 446657, 3715594; 446679, 3715660; 446777, 3715754; 446787, 3715756; 446802, 3715670; 446787, 3715650; 446749, 3715599; thence returning to 446657, 3715594. Continue to 446672, 3715282; 446635, 3715383; 446634, 3715424; 446664, 3715452; 446750, 3715379; 446725, 3715324; thence returning to 446672, 3715282. Continue to 447195, 3715710; 446853, 3715710; 446834, 3715765; 446831, 3715772; 446952, 3715811; 447141, 3715767; thence returning to 447195, 3715710.

(ii) Subunit 4c: Cañada Gobernadora/Chiquita Ridgeline. Land bounded by the following UTM NAD83 coordinates (E, N): 444988, 3710736; 444822, 3710714; 444688, 3710749; 444620, 3710811; 444555, 3710909; 444525, 3711030; 444549, 3711176; 444622, 3711280; 444769, 3711366; 444952, 3711370; 445174, 3711382; 445357, 3711387; 445494, 3711375; 445509, 3711195; 445478, 3710975; 445371, 3710832; 445127, 3710778; thence returning to 444988, 3710736.

(iii) Subunit 4g: Cristianitos Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 448505, 3704899; 448619, 3704865; 448693, 3704908; 448753, 3704920; 448807, 3704923; 448869, 3704911; 448913, 3704891; 448985, 3704826; 449023, 3704752; 449034, 3704695; 449095, 3704664; 449153, 3704605; 449187, 3704527; 449193, 3704439; 449172, 3704362; 449116, 3704286; 449051, 3704239; 448973, 3704215; 448885, 3704225; 448831, 3704215; 448781, 3704219; 448727, 3704235; 448660, 3704282; 448631, 3704315; 448603, 3704363; 448423, 3704282; 448272, 3704282; 448162, 3704323; 448074, 3704378; 448026, 3704460; 448012, 3704611; 448012, 3704741; 448012, 3704830; 448012, 3704912; 447930, 3705117; 447800, 3705206; 447704, 3705275; 447635, 3705535; 447717, 3705816; 447724, 3706014; 447635, 3706076; 447505, 3706199; 447444, 3706336; 447519, 3706480; 447684, 3706606; 447615, 3706809; 447498, 3707014; 447615, 3707206; 447724, 3707603; 447950, 3707795; 448176, 3707567; 448204, 3707309; 448128, 3706809; 448073, 3706701; 448057, 3706368; 448033, 3706154; 448231, 3706001; 448430, 3705877; 448512, 3705802; 448594, 3705631; 448525, 3705487; thence returning to 448505, 3704899.

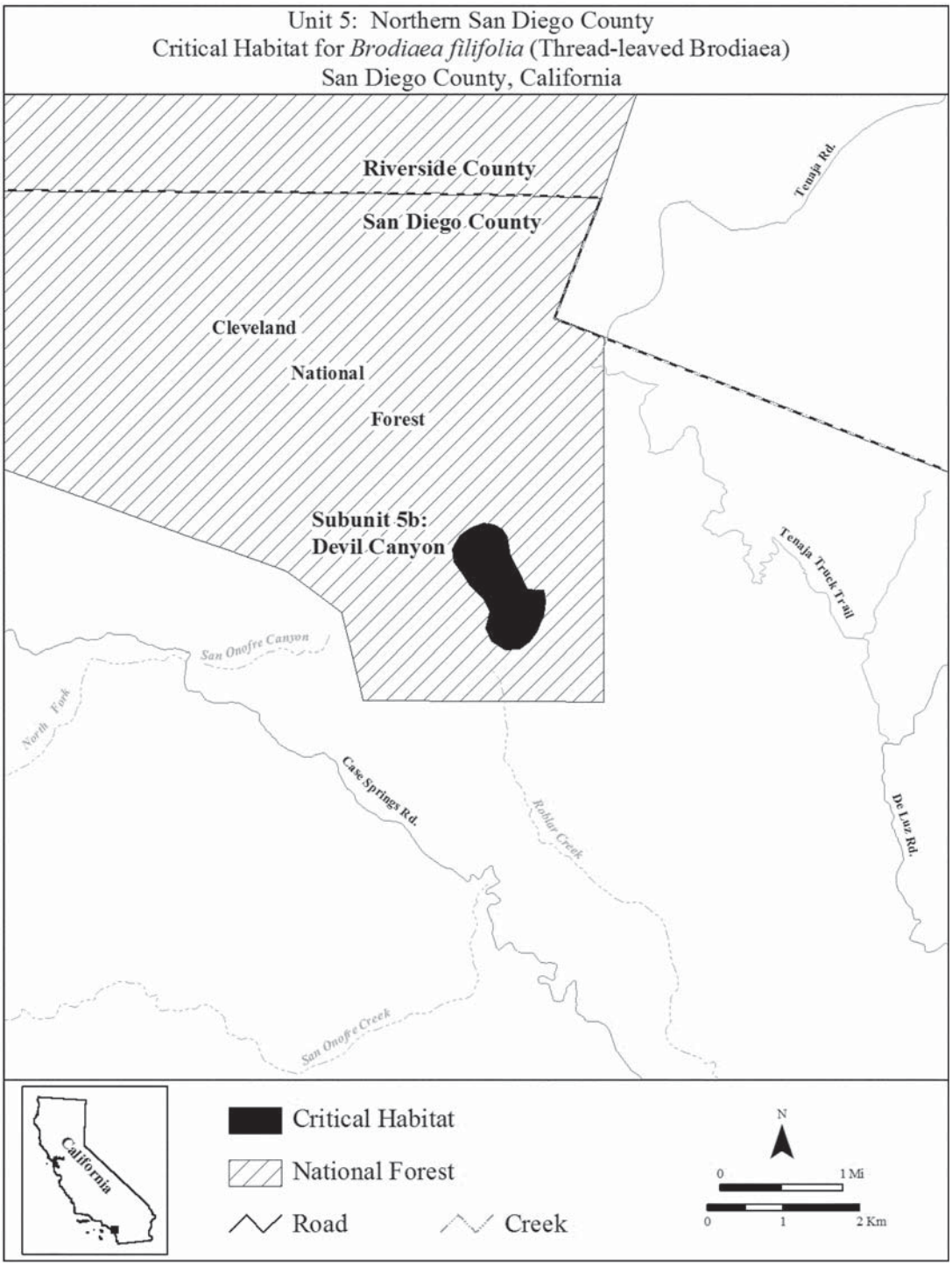
(iv) *Note:* Map of Unit 4, Southern Orange County, follows:



(10) Unit 5: Northern San Diego County. From USGS 1:24,000 quadrangle maps Fallbrook and Margarita Peak, San Diego County, California.

(i) Subunit 5b: Devil Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 465203, 3702184; 465318, 3702168; 465420, 3702168; 465439, 3702023; 465428, 3701850; 465333, 3701622; 465239, 3701500; 465113, 3701402; 464908, 3701394; 464732, 3701504; 464665, 3701669; 464716, 3701889; 464645, 3702050; 464448, 3702235; 464342, 3702416; 464248, 3702534; 464228, 3702719; 464323, 3702888; 464464, 3702990; 464633, 3703049; 464775, 3703026; 464885, 3702963; 464948, 3702872; 464964, 3702739; 464987, 3702616; 465070, 3702463; 465144, 3702322; thence returning to 465203, 3702184.

(ii) *Note:* Map of Unit 5, Northern San Diego County, follows:



(11) Unit 6: Oceanside, San Diego County, California. From USGS 1:24,000 quadrangle map San Luis Rey, San Diego County, California.

(i) Subunit 6a: Alta Creek. Land bounded by the following UTM NAD83 coordinates (E, N): 470033, 3673422; 470028, 3673364; 470103, 3673390; 470049, 3673279; 469947, 3673268; 469933, 3673297; 469861, 3673292; 469765, 3673271; 469754, 3673290; 469733, 3673288; 469694, 3673241; 469647, 3673203; 469340, 3673150; 469290, 3673280; 469454, 3673280; 469472, 3673385; 469461, 3673464; 469459, 3673517; 469775, 3673595; 469819, 3673600; 469861, 3673591; 469965, 3673540; 469936, 3673513; 469941, 3673452; thence returning to 470033, 3673422. Continue to 469160, 3673457; 469299, 3673146; 469251, 3673150; 469207, 3673154; 469101, 3673149; 469028, 3673175; 468994, 3673187; 468917, 3673248; 468862, 3673350; 468862, 3673358; 468853, 3673464; 468852, 3673477; thence returning to 469160, 3673457.

(ii) Subunit 6b: Mesa Drive. Land bounded by the following UTM NAD83 coordinates (E, N): 468915, 3674517; 468893, 3674517; 468892, 3674526; 468877, 3674541; 468863, 3674561; 468863, 3674587; 468857, 3674609; 468848, 3674625; 468844, 3674648; 468835, 3674670; 468864, 3674678; 468878, 3674689; 468899, 3674707;

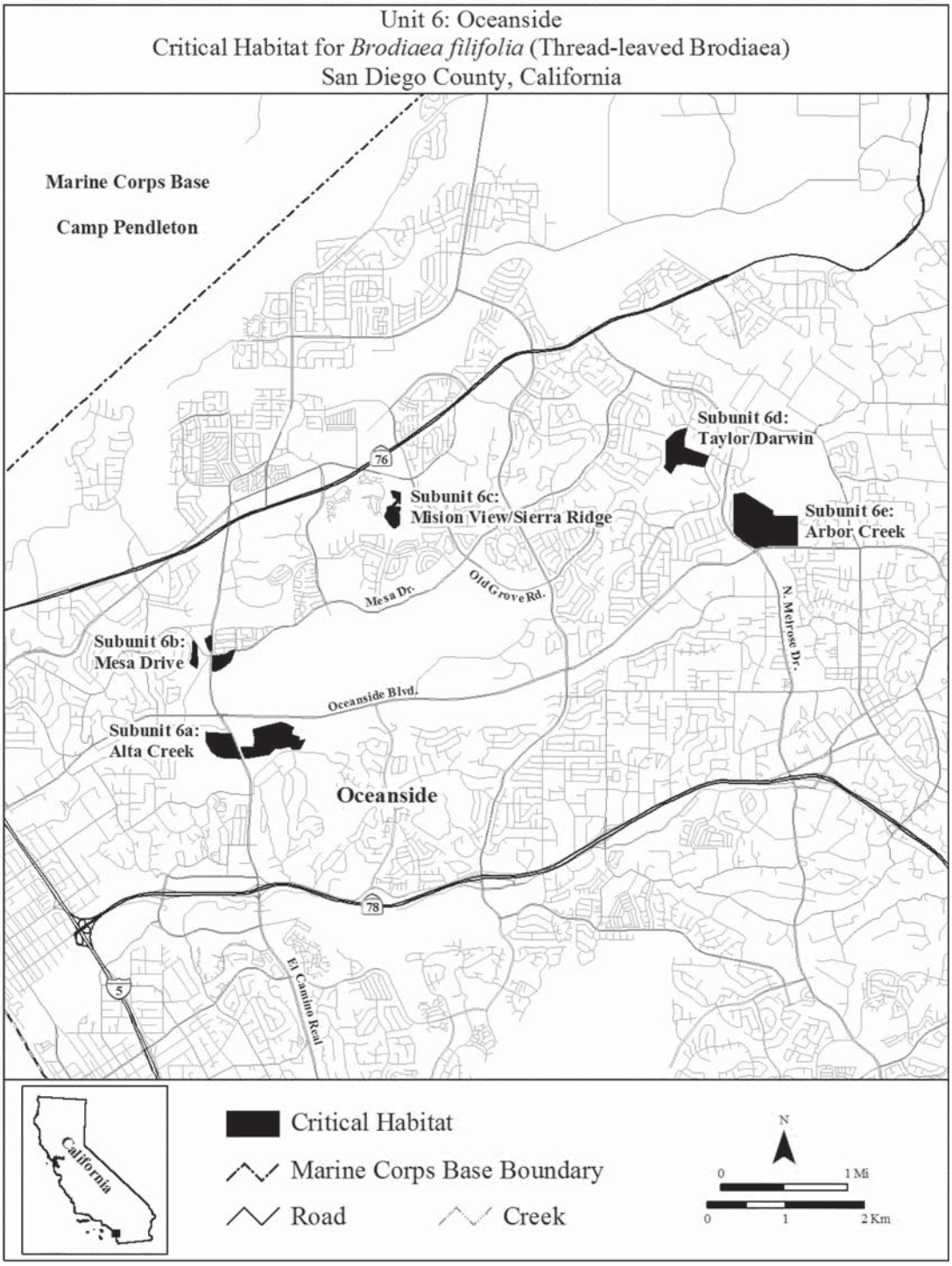
468918, 3674700; thence returning to 468915, 3674517. Continue to 468732, 3674337; 468733, 3674299; 468680, 3674337; 468641, 3674369; 468652, 3674387; 468664, 3674416; 468674, 3674490; 468682, 3674548; 468687, 3674609; 468687, 3674641; 468711, 3674605; 468736, 3674562; 468736, 3674526; 468736, 3674474; 468739, 3674441; 468749, 3674423; 468750, 3674395; 468750, 3674374; 468743, 3674350; thence returning to 468732, 3674337. Continue to 468977, 3674272; 468936, 3674260; 468942, 3674457; 469035, 3674460; 469086, 3674475; 469154, 3674504; 469216, 3674523; 469195, 3674471; 469172, 3674417; 469150, 3674383; 469103, 3674339; 469064, 3674311; 469028, 3674288; thence returning to 468977, 3674272.

(iii) Subunit 6c: Mission View/Sierra Ridge. Land bounded by the following UTM NAD83 coordinates (E, N): 471256, 3676540; 471308, 3676525; 471322, 3676525; 471325, 3676497; 471325, 3676436; 471323, 3676399; 471318, 3676384; 471293, 3676426; 471285, 3676401; 471265, 3676381; 471248, 3676356; 471263, 3676342; 471293, 3676341; 471310, 3676341; 471323, 3676329; 471323, 3676322; 471306, 3676295; 471293, 3676269; 471310, 3676248; 471318, 3676235; 471312, 3676210; 471305, 3676181; 471313, 3676166; 471313, 3676151; 471313, 3676137; 471301, 3676117; 471275, 3676100; 471265, 3676085; 471241, 3676075; 471182, 3676137; 471149, 3676188; 471137, 3676205; 471137, 3676236; 471145, 3676267; 471167, 3676279; 471167, 3676346; 471182, 3676354; 471228, 3676354; 471236, 3676386; 471263, 3676413; 471280, 3676418; 471288, 3676440; 471253, 3676466; 471234, 3676476; 471226, 3676502; 471216, 3676525; 471216, 3676540; thence returning to 471256, 3676540.

(iv) Subunit 6d: Taylor/Darwin. Land bounded by the following UTM NAD83 coordinates (E, N): 475246, 3676994; 475198, 3676860; 474920, 3676914; 474920, 3676911; 474917, 3676900; 474843, 3676895; 474840, 3676895; 474762, 3676777; 474688, 3676855; 474720, 3676903; 474720, 3677197; 474818, 3677296; 474888, 3677325; 474968, 3677352; 474925, 3677213; 474936, 3677192; 474928, 3677106; thence returning to 475246, 3676994.

(v) Subunit 6e: Arbor Creek/Colucci. Land bounded by the following UTM NAD83 coordinates (E, N): 475917, 3675848; 475854, 3675822; 475695, 3675915; 475579, 3676018; 475583, 3676501; 475701, 3676520; 476070, 3676287; 476071, 3676228; 476380, 3676221; 476380, 3675858; 476001, 3675858; thence returning to 475917, 3675848.

(vi) *Note:* Map of Unit 6, Oceanside, follows:



(12) Unit 7: Carlsbad, San Diego County, California.

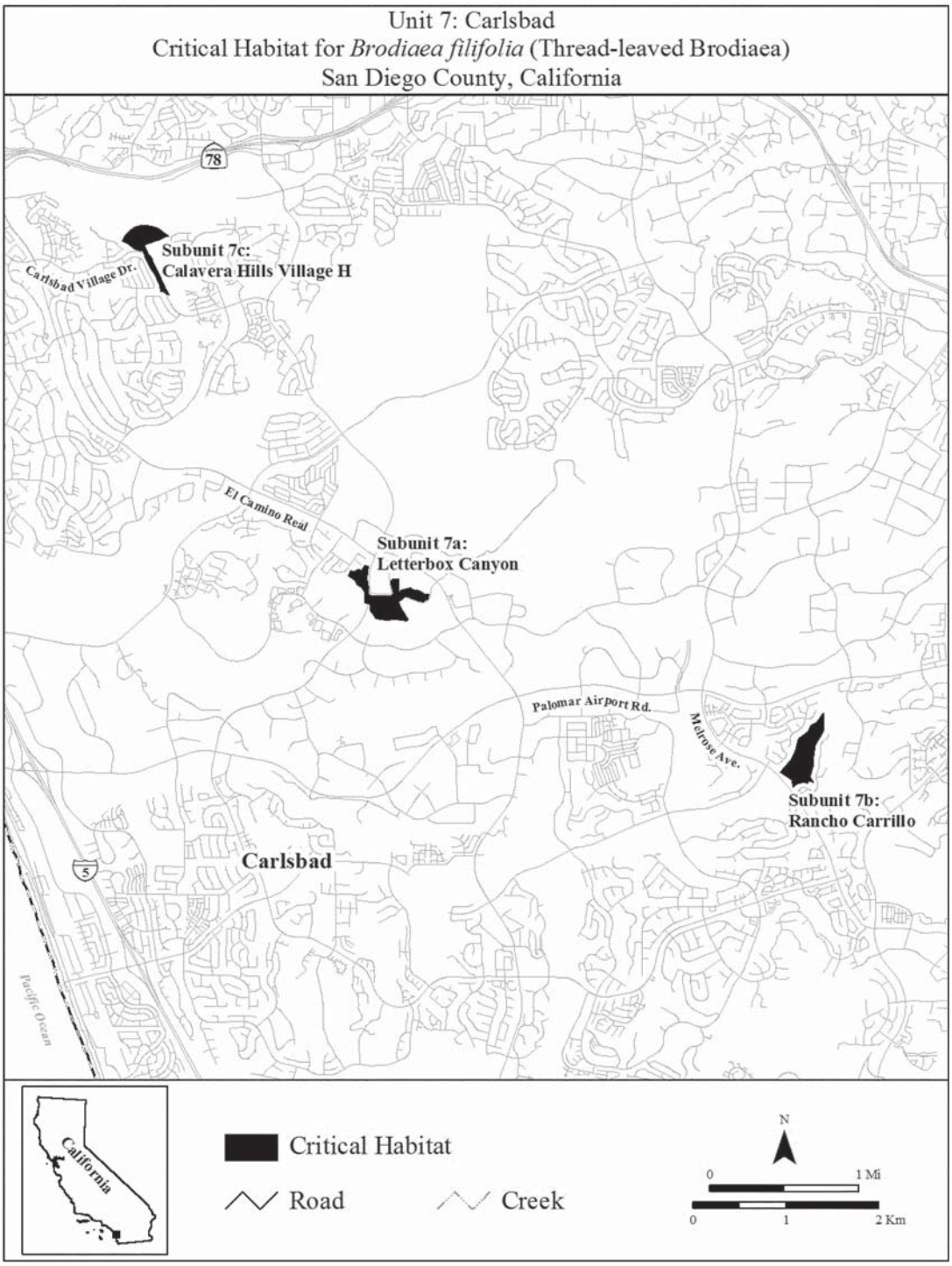
(i) Subunit 7a: Letterbox Canyon. From USGS 1:24,000 quadrangle map San Luis Rey, land bounded by the following UTM NAD83 coordinates (E, N): 473516, 3667072; 473504, 3666941; 473516, 3666839; 473519, 3666765; 473558, 3666762; 473635, 3666758; 473759, 3666758; 473782, 3666785; 473756, 3666880; 473761, 3666926; 473777, 3666940; 473845, 3666935; 473846, 3666935; 473847, 3666778; 473848, 3666778; 473849, 3666778; 473850, 3666781; 473860, 3666822; 473904, 3666832; 473971, 3666844; 473968, 3666840; 473973, 3666838; 473978, 3666836; 474005, 3666824; 474011, 3666821; 474033, 3666818; 474036, 3666817; 474081, 3666811; 474121, 3666781; 474134, 3666779; 474136, 3666779; 474149, 3666777; 474151, 3666777; 474156, 3666777; 474159, 3666776; 474161, 3666776; 474167, 3666775; 474173, 3666774; 474160, 3666727; 474159, 3666726; 474159, 3666724; 474155, 3666721; 474153, 3666720; 474120, 3666699; 474118, 3666698; 474112, 3666694; 474100, 3666695; 474099, 3666695; 474098, 3666695; 474095, 3666695; 474090, 3666695; 474087, 3666695; 474061, 3666696; 473920, 3666753; 473848, 3666694; 473861, 3666635; 473890, 3666593; 473952, 3666506; 473930, 3666483; 473810, 3666500;

473706, 3666498; 473599, 3666515; 473533, 3666593; 473539, 3666667; 473480, 3666686; 473474, 3666798; 473441, 3666848; 473394, 3666880; 473370, 3666918; 473297, 3666974; 473330, 3667034; 473360, 3667013; 473404, 3667041; 473441, 3667031; 473480, 3667085; thence returning to 473516, 3667072.

(ii) Subunit 7b: Rancho Carrillo. From USGS 1:24,000 quadrangle maps Rancho Santa Fe and San Marcos, land bounded by the following UTM NAD83 coordinates (E, N): 478285, 3664797; 478307, 3664759; 478307, 3664749; 478251, 3664772; 478244, 3664745; 478200, 3664753; 478146, 3664747; 478085, 3664702; 478076, 3664774; 477946, 3664862; 477994, 3664920; 478066, 3664996; 478104, 3665067; 478117, 3665119; 478147, 3665221; 478249, 3665297; 478278, 3665368; 478339, 3665400; 478409, 3665501; 478419, 3665498; 478419, 3665496; 478419, 3665309; 478383, 3665244; 478345, 3665196; 478327, 3665137; 478319, 3665051; 478304, 3665021; 478303, 3664935; 478270, 3664821; thence returning to 478285, 3664797.

(iii) Subunit 7c: Calavera Hills Village H. From USGS 1:24,000 quadrangle map San Luis Rey, land bounded by the following UTM NAD83 coordinates (E, N): 471354, 3670039; 471355, 3670036; 471357, 3670032; 471361, 3670025; 471364, 3670018; 471374, 3669997; 471361, 3669999; 471345, 3669999; 471310, 3670039; 471282, 3670039; 471271, 3670102; 471257, 3670129; 471225, 3670198; 471181, 3670281; 471131, 3670366; 471109, 3670410; 471099, 3670466; 471068, 3670472; 471018, 3670480; 470999, 3670495; 470982, 3670510; 470940, 3670542; 470876, 3670576; 470871, 3670578; 470893, 3670639; 470935, 3670684; 471000, 3670729; 471009, 3670731; 471066, 3670749; 471099, 3670749; 471119, 3670749; 471188, 3670741; 471258, 3670710; 471348, 3670646; 471362, 3670634; 471362, 3670629; 471351, 3670626; 471252, 3670590; 471219, 3670578; 471107, 3670536; 471141, 3670460; 471150, 3670442; 471154, 3670434; 471156, 3670431; 471158, 3670429; 471161, 3670426; 471163, 3670423; 471165, 3670421; 471168, 3670418; 471170, 3670416; 471172, 3670413; 471174, 3670410; 471176, 3670408; 471178, 3670405; 471180, 3670402; 471182, 3670399; 471183, 3670396; 471185, 3670393; 471187, 3670390; 471189, 3670387; 471190, 3670384; 471192, 3670381; 471193, 3670378; 471195, 3670375; 471262, 3670230; 471322, 3670100; 471325, 3670092; 471328, 3670086; 471332, 3670079; 471335, 3670072; 471339, 3670065; 471344, 3670056; 471350, 3670046; thence returning to 471354, 3670039.

(iv) *Note:* Map of Unit 7, Carlsbad, follows:



(13) Unit 8: San Marcos and Vista. From USGS 1:24,000 quadrangle map San Marcos, San Diego County, California.

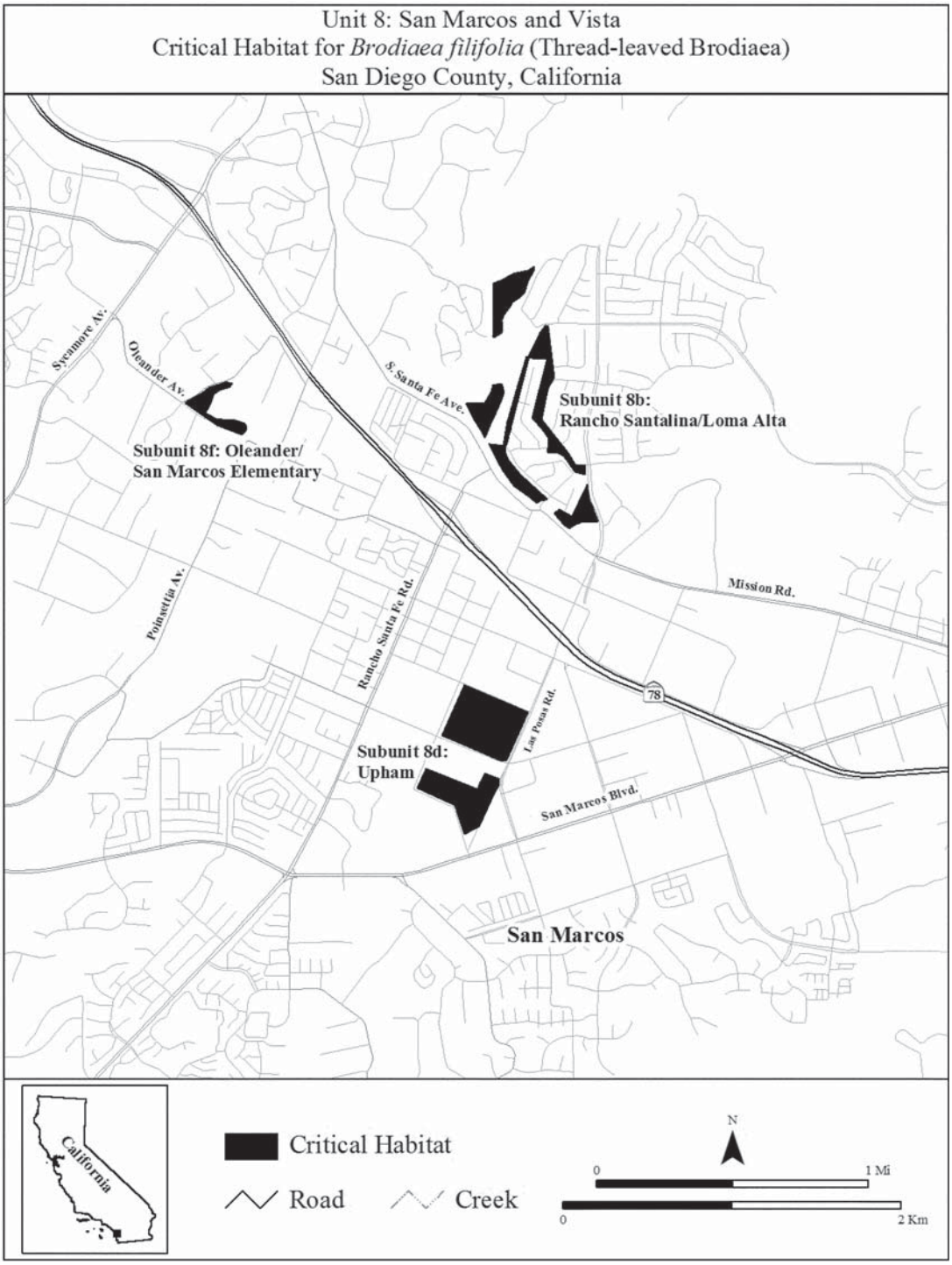
(i) Subunit 8b: Rancho Santalina/Loma Alta. Land bounded by the following UTM NAD83 coordinates (E, N): 482357, 3668036; 482390, 3667949; 482348, 3667946; 482282, 3667946; 482244, 3667925; 482220, 3667908; 482187, 3667931; 482127, 3667997; 482157, 3668021; 482235, 3667976; 482324, 3668168; 482336, 3668078; thence returning to 482357, 3668036. Continue to 481816, 3669068; 481771, 3669038; 481765, 3669046; 481771, 3669329; 481771, 3669358; 481807, 3669373; 481891, 3669418; 481974, 3669435; 482013, 3669456; 482007, 3669432; 481974, 3669373; 481953, 3669307; 481921, 3669274; 481879, 3669244; 481870, 3669223; 481865, 3669217; 481831, 3669175; 481819, 3669136; 481822, 3669089; thence returning to 481816, 3669068. Continue to 481753, 3668523; 481720, 3668446; 481689, 3668496; 481648, 3668562; 481604, 3668646; 481714, 3668649; 481723, 3668661; 481756, 3668718; 481768, 3668756; 481816, 3668766; 481831, 3668715; 481819, 3668670; 481786, 3668595; thence returning to 481753, 3668523. Continue to 482091, 3669106; 482121, 3668876; 482130, 3668802; 482091, 3668736; 482052, 3668553; 482214, 3668350; 482258,

3668281; 482312, 3668281; 482315, 3668230; 482258, 3668242; 482253, 3668242; 482187, 3668338; 482154, 3668356; 482091, 3668356; 482091, 3668386; 482097, 3668443; 482052, 3668502; 481995, 3668562; 482085, 3668912; 482000, 3668916; 481989, 3668917; 481980, 3668918; 481877, 3668514; 481876, 3668512; 481872, 3668496; 481872, 3668494; 481862, 3668457; 481861, 3668453; 481852, 3668416; 481837, 3668383; 481840, 3668353; 481841, 3668350; 481861, 3668308; 481933, 3668224; 482085, 3668084; 482064, 3668072; 482046, 3668072; 482025, 3668060; 481986, 3668093; 481888, 3668164; 481819, 3668260; 481809, 3668280; 481786, 3668323; 481783, 3668329; 481741, 3668407; 481828, 3668398; 481852, 3668541; 481915, 3668751; 481962, 3668927; 481974, 3668923; 482046, 3669067; 482062, 3669090; 482076, 3669110; thence returning to 482091, 3669106.

(ii) Subunit 8d: Upham. Land bounded by the following UTM NAD83 coordinates (E, N): 481849, 3666534; 481819, 3666534; 481462, 3666688; 481594, 3666985; 481973, 3666823; thence returning to 481849, 3666534. Continue to 481372, 3666489; 481677, 3666364; 481689, 3666409; 481719, 3666459; 481804, 3666429; 481801, 3666386; 481779, 3666359; 481687, 3666147; 481597, 3666102; 481550, 3666247; 481535, 3666274; 481320, 3666376; thence returning to 481372, 3666489.

(iii) Subunit 8f: Oleander/San Marcos Elementary. Land bounded by the following UTM NAD83 coordinates (E, N): 480307, 3668488; 480280, 3668462; 480137, 3668521; 480047, 3668580; 479946, 3668654; 480044, 3668711; 480087, 3668741; 480190, 3668776; 480226, 3668765; 480210, 3668748; 480149, 3668728; 480117, 3668702; 480092, 3668639; 480066, 3668592; 480125, 3668556; 480158, 3668554; 480241, 3668547; 480297, 3668531; 480310, 3668511; thence returning to 480307, 3668488.

(iv) *Note:* Map of Unit 8, San Marcos and Vista, follows:



(14) Unit 11: Western Riverside County, Riverside County, California.

(i) Subunit 11a: San Jacinto Wildlife Area. From USGS 1:24,000 quadrangle maps Lakeview and Perris, land bounded by the following UTM NAD83 coordinates (E, N): 488983, 3745493; 489065, 3745348; 489100, 3745144; 489088, 3745019; 489008, 3744998; 488955, 3744984; 488940, 3744982; 488834, 3744968; 488827, 3744966; 488803, 3744959; 488696, 3744929; 488626, 3744907; 488610, 3744902; 488565, 3744888; 488532, 3744878; 488500, 3744869; 488441, 3744853; 488363, 3744831; 488314, 3744794; 488285, 3744772; 488171, 3744760; 487999, 3744760; 487873, 3744819; 487818, 3744885; 487811, 3744894; 487796, 3744916; 487773, 3744954; 487767, 3744964; 487765, 3744983; 487756, 3745058; 487756, 3745172; 487783, 3745258; 487846, 3745333; 487948, 3745395; 487978, 3745412; 488042, 3745450; 488050, 3745454; 488159, 3745489; 488289, 3745470; 488336, 3745470; 488438, 3745517; 488563, 3745603; 488728, 3745658; 488786, 3745693; 488724, 3745740; 488677, 3745854; 488669, 3745964; 488692, 3746105; 488739, 3746179; 488783, 3746226; 488785, 3746227; 488803, 3746231; 488885, 3746250; 488990, 3746269; 489131, 3746336; 489273, 3746420; 489374, 3746481; 489511, 3746574; 489547, 3746598;

489652, 3746637; 489668, 3746643; 489719, 3746661; 489876, 3746657; 489895, 3746633; 489982, 3746517; 490025, 3746461; 490033, 3746371; 490018, 3746275; 490013, 3746242; 489983, 3746214; 489951, 3746183; 489637, 3745987; 489425, 3745858; 489198, 3745787; 489096, 3745677; 488998, 3745634; thence returning to 488983, 3745493.

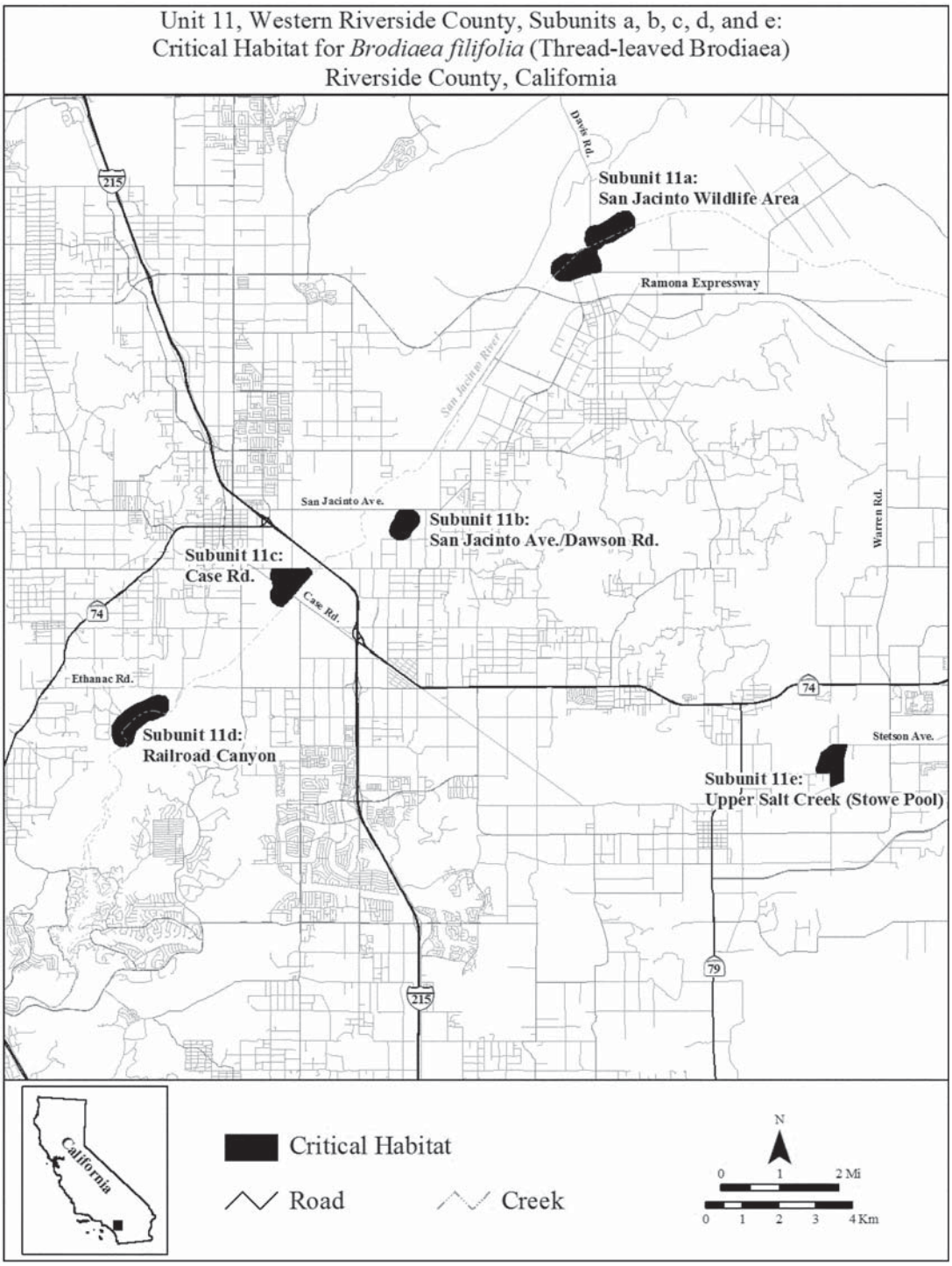
(ii) Subunit 11b: San Jacinto Avenue/Dawson Road. From USGS 1:24,000 quadrangle map Perris, land bounded by the following UTM NAD83 coordinates (E, N): 483682, 3737705; 483570, 3737705; 483524, 3737712; 483463, 3737755; 483380, 3737824; 483344, 3737895; 483344, 3737975; 483366, 3738075; 483387, 3738129; 483423, 3738183; 483470, 3738269; 483491, 3738345; 483538, 3738434; 483621, 3738506; 483983, 3738506; 484059, 3738445; 484127, 3738348; 484145, 3738186; 484116, 3738104; 484023, 3738021; 483965, 3737949; 483922, 3737867; 483865, 3737777; 483789, 3737741; thence returning to 483682, 3737705.

(iii) Subunit 11c: Case Road. From USGS 1:24,000 quadrangle map Perris, land bounded by the following UTM NAD83 coordinates (E, N): 481228, 3736775; 480714, 3736203; 480100, 3736631; 480093, 3736652; 480100, 3736807; 480139, 3736897; 481124, 3736908; 481192, 3736854; thence returning to 481228, 3736775. Continue to 480689, 3736146; 480416, 3735873; 480258, 3735905; 480121, 3736024; 480082, 3736139; 480100, 3736315; 480172, 3736390; 480157, 3736473; 480150, 3736548; thence returning to 480689, 3736146.

(iv) Subunit 11d: Railroad Canyon. From USGS 1:24,000 quadrangle maps Lake Elsinore and Romoland, land bounded by the following UTM NAD83 coordinates (E, N): 476192, 3732071; 476177, 3732058; 476095, 3732067; 476092, 3732068; 476075, 3732070; 475968, 3732083; 475828, 3732198; 475767, 3732413; 475789, 3732650; 475922, 3732859; 475949, 3732877; 476026, 3732931; 476086, 3732989; 476141, 3733042; 476417, 3733214; 476590, 3733286; 476816, 3733401; 476878, 3733419; 476891, 3733423; 476983, 3733450; 477099, 3733465; 477223, 3733446; 477305, 3733326; 477300, 3733201; 477280, 3733049; 477274, 3733042; 477252, 3733009; 477230, 3732975; 477227, 3732972; 477210, 3732947; 477204, 3732938; 477090, 3732890; 477055, 3732876; 476892, 3732809; 476888, 3732808; 476755, 3732787; 476694, 3732744; 476583, 3732650; 476410, 3732510; 476367, 3732352; 476342, 3732230; 476335, 3732194; 476265, 3732134; 476216, 3732091; thence returning to 476192, 3732071.

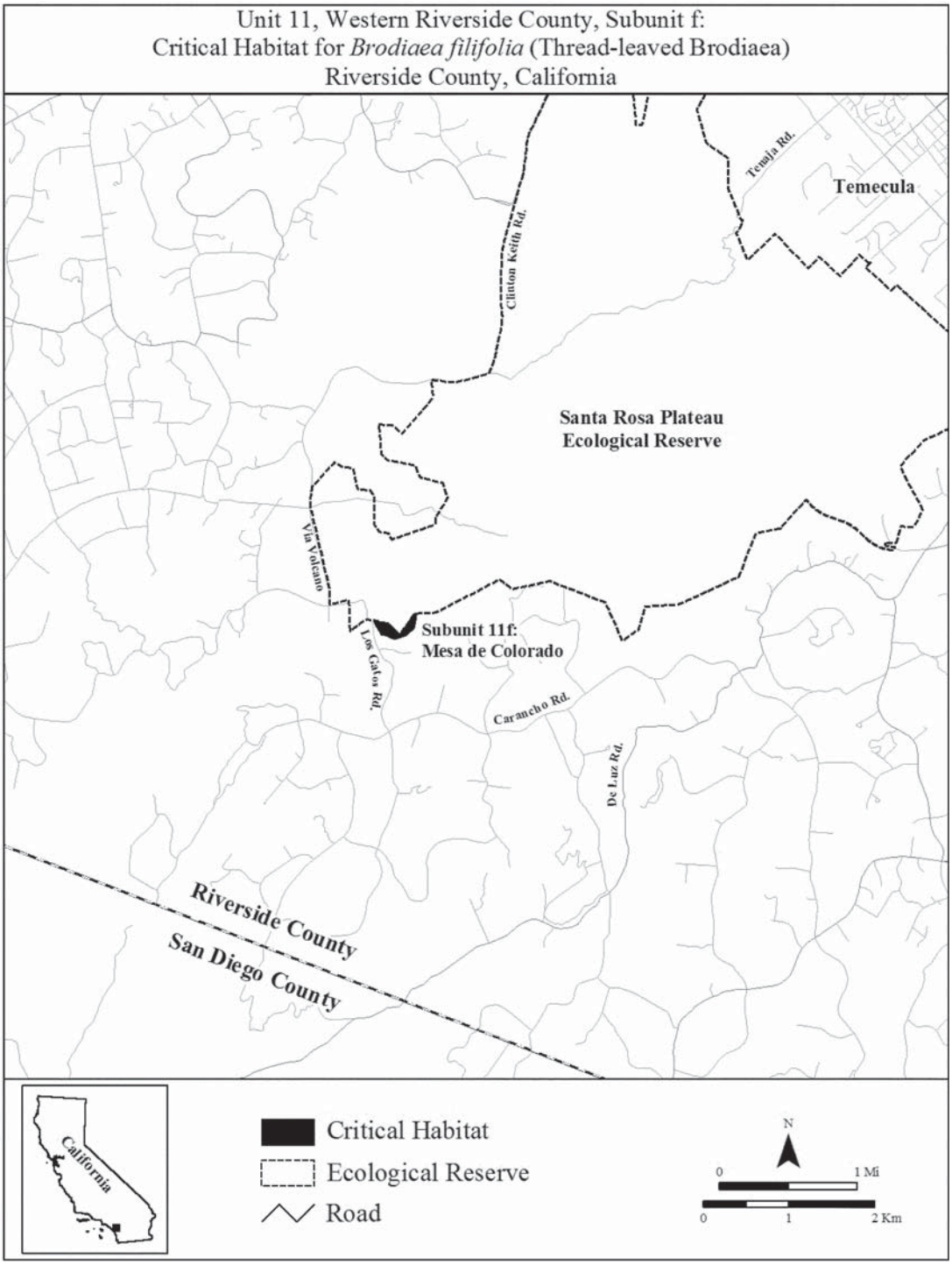
(v) Subunit 11e: Upper Salt Creek (Stowe Pool). From USGS 1:24,000 quadrangle map Winchester, land bounded by the following UTM NAD83 coordinates (E, N): 495693, 3731707; 495719, 3731126; 495375, 3730970; 495372, 3731340; 494997, 3731340; 494979, 3731381; 494982, 3731490; 495018, 3731613; 495074, 3731735; 495112, 3731898; 495260, 3732003; 495334, 3732070; 495421, 3732105; 495811, 3732113; thence returning to 495693, 3731707.

(vi) *Note:* Map of Unit 11, Western Riverside County, Subunits a, b, c, d, and e, follows:



(vii) Subunit 11f: Santa Rosa Plateau—Mesa de Colorado. From USGS 1:24,000 quadrangle maps Wildomar, land bounded by the following UTM NAD83 coordinates (E, N): 473758, 3706932; 473672, 3706842; 473581, 3706815; 473540, 3706803; 473426, 3706843; 473384, 3706858; 473296, 3706997; 473298, 3707017; 473454, 3706981; 473594, 3706853; 473766, 3707097; 473785, 3707063; thence returning to 473758, 3706932.

(viii) *Note:* Map of Unit 11, Western Riverside County, Subunit 11f, follows:

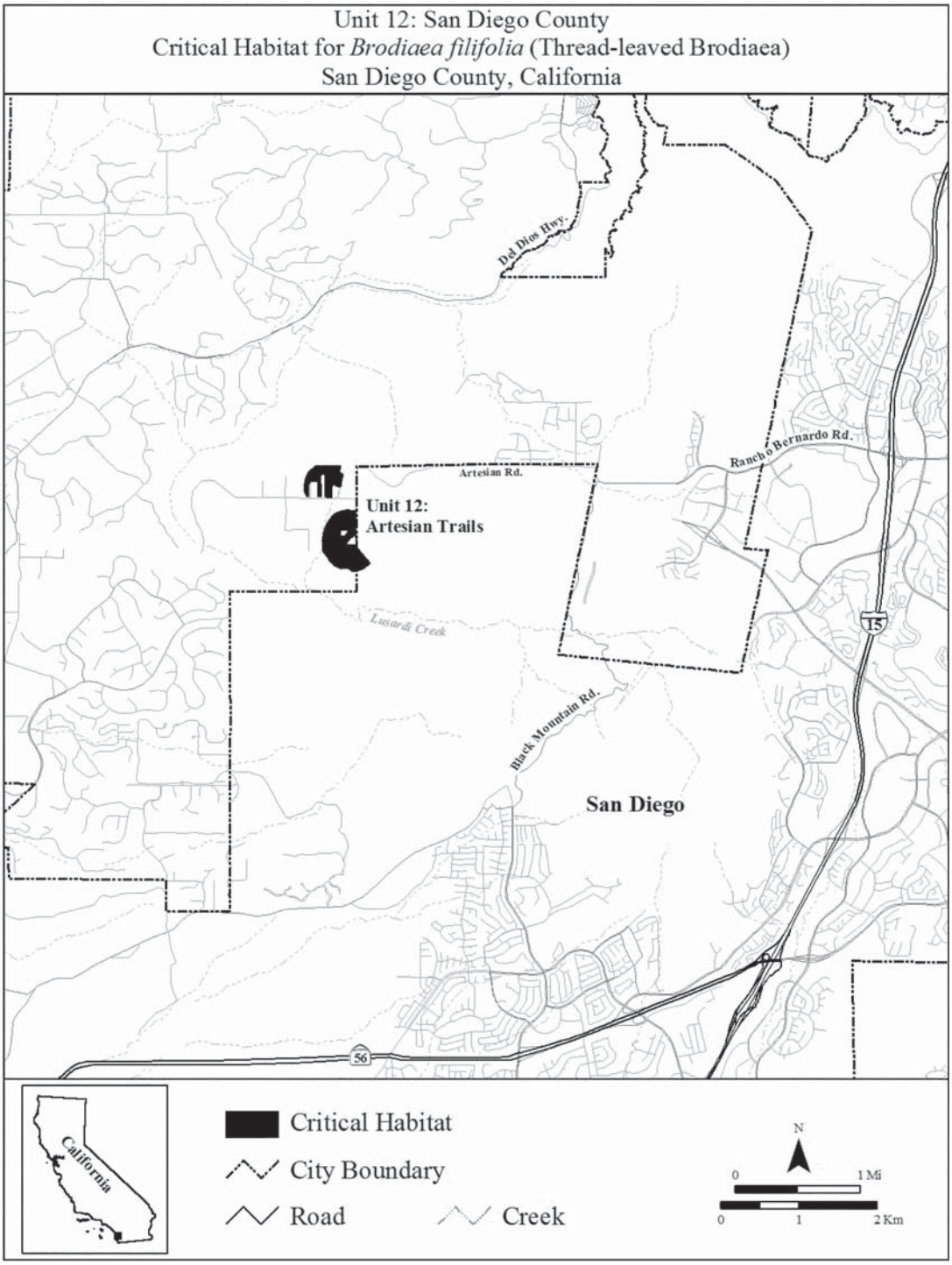


(15) Unit 12: San Diego County. From USGS 1:24,000 quadrangle map Rancho Santa Fe, San Diego County, California.

(i) Artesian Trails. Land bounded by the following UTM NAD83 coordinates (E, N): 485589, 3653612; 485575, 3653542; 485571, 3653524; 485570, 3653490; 485569, 3653489; 485569, 3653487; 485569, 3653486; 485569, 3653474; 485565, 3653471; 485564, 3653470; 485563, 3653469; 485543, 3653449; 485537, 3653450; 485493, 3653460; 485462, 3653486; 485459, 3653480; 485448, 3653449; 485448, 3653343; 485448, 3653326; 485448, 3653319; 485444, 3653319; 485370, 3653319; 485356, 3653325; 485354, 3653500; 485354, 3653526; 485354, 3653577; 485354, 3653610; 485332, 3653612; 485299, 3653597; 485307, 3653383; 485307, 3653327; 485255, 3653327; 485256, 3653411; 485257, 3653522; 485169, 3653522; 485164, 3653522; 485146, 3653473; 485144, 3653466; 485146, 3653323; 485112, 3653325; 485086, 3653397; 485086, 3653470; 485096, 3653542; 485114, 3653602; 485146, 3653657; 485216, 3653715; 485227, 3653725; 485557, 3653721; 485556, 3653713; 485554, 3653696; 485551, 3653660; 485549, 3653645; 485550, 3653644; thence returning to 485589, 3653612. Continue to 485700, 3653157; 485748, 3653150; 485750, 3653151; 485754, 3652943; 485754, 3652911; 485759, 3652710;

485760, 3652681; 485761, 3652680; 485768, 3652672; 485939, 3652471; 485934, 3652466; 485932, 3652465; 485925, 3652459; 485863, 3652401; 485766, 3652366; 485761, 3652364; 485748, 3652359; 485702, 3652364; 485668, 3652395; 485636, 3652403; 485583, 3652399; 485569, 3652394; 485477, 3652439; 485406, 3652509; 485400, 3652515; 485324, 3652630; 485319, 3652795; 485346, 3652902; 485396, 3653009; 485458, 3653090; 485468, 3653103; 485481, 3653110; 485495, 3653117; 485496, 3653118; 485529, 3653134; 485557, 3653142; 485581, 3653148; 485652, 3653163; thence returning to 485700, 3653157; excluding land bounded by 485555, 3652857; 485555, 3652822; 485572, 3652827; 485610, 3652827; 485613, 3652829; 485651, 3652882; 485667, 3652882; 485667, 3652899; 485556, 3652899; 485555, 3652857; and land bounded by 485629, 3652710; 485749, 3652710; 485749, 3652807; 485746, 3652807; 485745, 3652820; 485744, 3652822; 485723, 3652822; 485717, 3652810; 485708, 3652806; 485690, 3652791; 485679, 3652788; 485671, 3652784; 485670, 3652780; 485665, 3652765; 485663, 3652761; 485649, 3652754; 485648, 3652750; 485635, 3652718; 485629, 3652710.

(ii) *Note:* Map of Unit 12, San Diego County, follows:



* * * * *

Dated: January 25, 2011.

Thomas L. Strickland,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 2011–2403 Filed 2–7–11; 8:45 am]

BILLING CODE 4310–55–C

Dated: May 27, 2004.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 04–12658 Filed 6–3–04; 8:45 am]

BILLING CODE 4310–35–C

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AJ10

Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for Allium munzii (Munz's onion)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to designate critical habitat for the federally endangered *Allium munzii* (Munz's onion) pursuant to the Endangered Species Act of 1973, as amended (Act). We propose to designate 227 acres (ac) (92 hectares (ha)) of critical habitat of Federal land in western Riverside County, California. We excluded 1,068 ac (433 ha) from proposed critical habitat within approved habitat conservation plans (HCPs) and the draft Western Riverside Multiple Species HCP (MSHCP), Riverside County, California.

We hereby solicit data and comments from the public on all aspects of this proposal, including data on economic and other impacts of the designation. We may revise this proposal prior to final designation to incorporate or address new information received during public comment periods.

DATES: We will accept comments until August 3, 2004. Public hearing requests must be received by July 19, 2004.

ADDRESSES: If you wish to comment, you may submit your comments and materials concerning this proposal by any one of several methods:

1. You may submit written comments and information to the Field Supervisor, Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 6010 Hidden Valley Road, Carlsbad, CA 92009.

2. You may hand-deliver written comments and information to our Carlsbad Fish and Wildlife Office, at the above address, or fax your comments to 760/731–9618.

3. You may send your comments by electronic mail (e-mail) to *fw1cfwoalmu@r1.fws.gov.* For directions on how to submit electronic filing of comments, see the ''Public Comments Solicited'' section.

All comments and materials received, as well as supporting documentation used in preparation of this proposed rule, will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Field Supervisor, Carlsbad Fish and Wildlife Office (telephone 760/431–9440; facsimile 760/431–9618).

SUPPLEMENTARY INFORMATION:

Public Comments Solicited

It is our intent that any final action resulting from this proposal will be as accurate as possible. Therefore, we solicit comments or suggestions from the public, other concerned governmental agencies, the scientific community, industry, or any other interested party concerning this proposed rule. Maps of essential habitat not included in the proposed critical habitat are available for viewing by appointment during regular business hours at the Carlsbad Fish and Wildlife Office (see **ADDRESSES** section) or on the Internet at *http://carlsbad.fws.gov.* On the basis of public comment, during the development of the final rule we may find that areas proposed are not essential, are appropriate for exclusion under section 4(b)(2), or not appropriate for exclusion, and in all of these cases, this information would be incorporated into the final designation. We particularly seek comments concerning:

(1) The reasons why any areas should or should not be determined to be critical habitat as provided by section 4 of the Act, including whether the benefits of designation will outweigh any threats to the species resulting from the designation;

(2) Specific information on the amount and distribution of *Allium munzii* and its habitat, and which habitat or habitat components are essential to the conservation of this species and why;

(3) Land use designations and current or planned activities in or adjacent to the areas proposed and their possible impacts on proposed critical habitat;

(4) Any foreseeable economic or other potential impacts resulting from the proposed designation, in particular, any impacts on small entities;

(5) Most of the lands we have identified as essential for the conservation of *Allium munzii* are proposed for exclusion as critical habitat. Eighteen of 19 known occurrences of this species have been proposed for exclusion from this proposed designation of critical habitat because they are within approved HCPs or the draft Western Riverside MSHCP. These areas are proposed for exclusion from critical habitat because we believe the value of excluding these areas outweighs the value of including them. We specifically solicit comment on the inclusion or exclusion of such areas and: (a) Whether these areas are essential; (b) whether these areas warrant exclusion; and (c) the basis for excluding these areas as critical habitat (section 4(b)(2) of the Act); and

(6) Whether our approach to designate critical habitat could be improved or modified in any way to provide for greater public participation and understanding, or to assist us in accommodating public concerns and comments.

If you wish to comment, you may submit your comments and materials concerning this proposal by any one of several methods. Please submit electronic comments in ASCII file format and avoid the use of special characters or any form of encryption. Please also include ''Attn: RIN 1018–AJ10'' in your e-mail subject header and your name and return address in the body of your message. If you do not receive a confirmation from the system that we have received your internet message, contact us directly by calling our Carlsbad Fish and Wildlife Office at phone number 760–431–9440. Please note that the e-mail address, *fw1cfwoalmu@r1.fws.gov,* will be closed out at the termination of the public comment period.

Our practice is to make comments, including names and home addresses of respondents, available for public review during regular business hours. Individual respondents may request that we withhold their home addresses from the rulemaking record, which we will honor to the extent allowable by law. There also may be circumstances in which we would withhold from the rulemaking record a respondent's identity, as allowable by law. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. However, we will not consider anonymous comments. We will make all submissions from organizations or businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, available for public inspection in their entirety. Comments and materials received will be available for public inspection, by appointment, during normal business hours at the above address.

Preamble

Designation Of Critical Habitat Provides Little Additional Protection to Species

In 30 years of implementing the ESA, the Service has found that the designation of statutory critical habitat provides little additional protection to most listed species, while consuming significant amounts of conservation resources. The Service's present system for designating critical habitat is driven by litigation rather than biology, limits our ability to fully evaluate the science involved, consumes enormous agency resources, and imposes huge social and economic costs. The Service believes that additional agency discretion would allow our focus to return to those actions that provide the greatest benefit to the species most in need of protection.

Role of Critical Habitat in Actual Practice of Administering and Implementing the Act

While attention to and protection of habitat is paramount to successful conservation actions, we have consistently found that, in most circumstances, the designation of critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources. Sidle (1987) stated, ''Because the ESA can protect species with and without critical habitat designation, critical habitat designation may be redundant to the other consultation requirements of section 7.''

Currently, only 445 species, or 36 percent, of the 1,244 listed species in the U.S. under the jurisdiction of the Service have designated critical habitat. We address the habitat needs of all 1,244 listed species through conservation mechanisms such as listing, section 7 consultations, the section 4 recovery planning process, the section 9 protective prohibitions of unauthorized take, section 6 funding to the States, and the section 10 incidental take permit process. The Service believes that it is these measures that may make the difference between extinction and survival for many species.

Procedural and Resource Difficulties in Designating Critical Habitat

We have been inundated with lawsuits regarding critical habitat designation, and we face a growing number of lawsuits challenging critical habitat determinations once they are made. These lawsuits have subjected the Service to an ever-increasing series of court orders and court-approved settlement agreements, compliance with which now consumes nearly the entire listing program budget. This leaves the Service with little ability to prioritize its activities to direct scarce listing resources to the listing program actions with the most biologically urgent species conservation needs.

The consequence of the critical habitat litigation activity is that limited listing funds are used to defend active lawsuits and to comply with the growing number of adverse court orders. As a result, the Service's own to proposals to undertake conservation actions based on biological priorities are significantly delayed.

The accelerated schedules of court ordered designations have left the Service with almost no ability to provide for additional public participation beyond those minimally required by the Administrative Procedures Act (APA), the Act, and the Service's implementing regulations, or to take additional time for review of comments and information to ensure the rule has addressed all the pertinent issues before making decisions on listing and critical habitat proposals, due to the risks associated with noncompliance with judicially imposed. This in turn fosters a second round of litigation in which those who will suffer adverse impacts from these decisions challenge them. The cycle of litigation appears endless, is very expensive, and in the final analysis provides little additional protection to listed species.

The costs resulting from the designation include legal costs, the cost of preparation and publication of the designation, the analysis of the economic effects and the cost of requesting and responding to public comment, and in some cases the costs of compliance with the National Environmental Policy Act (NEPA), all are part of the cost of critical habitat designation. These costs result in minimal benefits to the species that is not already afforded by the protections of the Act enumerated earlier, and they directly reduce the funds available for direct and tangible conservation actions.

Background

In January 1990, *Allium munzii* was listed as a threatened species by the State of California pursuant to the California Endangered Species Act. The Service listed *A. munzii* as endangered under the Act on October 13, 1998 (63 FR 54975).

Allium munzii is a member of the Liliaceae (lily family). *A. munzii* belongs to the *A. fimbriatum* complex, a group of seven species found primarily in California (McNeal 1992), and was first referred to as *A. fimbriatum* var. *munzii* by M. Ownbey (Munz and Keck 1959). McNeal (1992) elevated this taxon to species status based on unique morphological characteristics of the perianth (the outer parts of a flower, consisting of the calyx, corolla, and also enclosing the stamen and carpel) and ovarian crests.

Allium munzii is a bulb-forming perennial herb that annually produces a single leaf and a scapose inflorescence (a leafless flower stalk that grows directly from the ground) 0.5 to 1.2 feet (ft) (15 to 35 centimeters (cm)) tall. Each leaf is hollow and generally 1.5 times as long as the inflorescence and round (terete) in cross-section. The inflorescence is umbellate (a flat topped or rounded flower cluster where each flower stalk radiates from the same point), consisting of 10 to 35 flowers. The flowers have six white, or white with a red midvein, perianth segments that are 0.2 to 0.3 inches (in) (6 to 8 millimeters (mm)) long and become red with age. The ovary is crested with fine, irregularly dentate processes and the fruit is a three-lobed capsule (McNeal 1993). *A. munzii* can be distinguished from other members of the genus within its range by its single hollow and terete leaf, the shape of the perianth segments, flower color, and the irregularly dentate crest of the ovary.

Three to five years are required after seeds germinate for the plant to reach maturity and produce flowers (Schmidt 1980). The plants are dormant except in the spring and early summer months. Prior to flowering, a single, cylindrical leaf is produced (Munz 1974). The flowering period for this species is March to May (California Native Plant Society (CNPS) 2001). The best time to detect the species is in early May. *Allium munzii* shares its range and habitat with the similar-appearing *A. haematochiton* (red-skinned onion). Though the two species can occur within several feet of each other, the species do not interbreed (California Department of Fish and Game (CDFG) 1989). After flowering, the plant dies back to the bulb. *A. munzii* is well adapted to summer drought and varied amounts of rainfall from year to year and responds to environmental conditions in the aboveground emergence from year to year. McNeal (1992) observed that flowering in the *A. fimbriatum* complex appeared to be correlated with rains in the late fall and early winter. When rainfall is plentiful, most plants within a population bloom. When rainfall is light, most plants sprout leaves, but very few flower. There is no information regarding pollinators. No studies are available regarding seed dispersal.

Status and Distribution

Allium munzii is endemic to mesic clay soils in western Riverside County, California, throughout the foothills east of the Santa Ana Mountains extending south and east to the low hills south of Hemet (Roberts 1993; U.S. Fish and Wildlife Service 1998; CNDDB 2000; Natural Resource Consultants (NRC) 2000). Currently there are 19 occurrences of *Allium munzii* according to the California Natural Diversity Database (CNDDB 2004). One historical population in the CNDDB was lost to development, however, the extent of the historical distribution of this plant is unknown.

At the time of listing, the Service estimated the total population to be approximately 20,000 to 70,000 individuals. Six populations are large (around 2,000 or more individuals) and cover as much as 20 ac (8 ha). The largest populations are at Harford County Park and adjacent private lands (20,000 to 50,000 individuals altogether), Alberhill (at least 7,700 individuals), Elsinore Peak (~5,000 individuals), Dawson Canyon (~2,000 individuals), Estelle Mountain (at least 2,000 individuals), and Bachelor Mountain (over 3,000 individuals). Most populations contain fewer than 1,000 individuals, and occupy areas ranging from several square feet to less than 2.5 ac (several square meters to less than 1 ha.

Threats

As much as 80 to 90 percent of the suitable habitat for this species has been lost to agriculture, urbanization, and clay mining (California Department of Fish and Game 1989). Populations continue to be threatened by housing and business development, dry land farming activities, off-road vehicle activity, clay mining, and competition with non-native plants (Roberts 1993; U.S. Fish and Wildlife Service 1998; CNDDB 2003).

Clay pit mining has affected and continues to threaten *Allium munzii* populations. The largest disturbance resulting from clay mining operations have been west of Alberhill and northwest of Indian Truck Trail. At least three smaller historic clay mining areas are known from Dos Lagos (Butterfield Station) east of Temescal Wash, Estelle Mountain, and north Domenigoni Hills. Clay mining activities are ongoing in the area northwest of Alberhill and continue to threaten the large population there.

The native perennial and annual grasslands found on most clay soils in western Riverside County have been negatively affected by grazing activities and a frequent fire return interval. Even conserved areas that are protected through other rules and regulations are at risk of trampling and foraging primarily by sheep, which have been known to escape onto the Estelle Mountain areas containing the onion. Historic grazing has also led to invasion by non-native grasses and forbs over large areas. Fire and atmospheric nitrification of soil (resulting from air pollution) may each play a role in advancing the invasion of non-native grasses. Many of the native grasslands and a large portion of the sage scrub areas in western Riverside have been replaced by non-native annual grasses and forbs by repeated cycles of fire, grazing and nitrification. Competition with non-native grasses is a threat to *Allium munzii* because the non-native annual grasses form a dense cover that is more difficult for the *A. munzii* to penetrate than cover provided by the more patchily distributed native grasses or open sage scrub and chaparral communities.

Historic and recent housing and business development, road building, and road maintenance threaten *Allium munzii* populations. The Sycamore Creek housing development, for example, impacted a portion of the adjacent population, and development of a freeway interchange at Indian Truck Trail is known to have significantly reduced one population. Existing roads have bisected *A. munzii* populations or reduced population numbers significantly at Gavilan Hills, Alberhill, Di Palma, and Indian Truck Trail.

Off-road vehicle activity can trample onions and alter soil conditions. The Elsinore Peak population has been negatively affected by off-road vehicle activity. Off-road vehicle activity remains a threat to almost every remote occurrence of this species. Utility development has negatively affected *Allium munzii* populations at Elsinore Peak and Scott Road. Due to the large number of anthropogenic activities within occupied habitat, development and maintenance of these facilities remains a threat to the species where they intersect with suitable habitat. Right-of-way maintenance activities, such as mowing or grubbing, can result in degradation of population viability if repeatedly conducted during the spring and summer growth period.

Previous Federal Action

We published the final rule to list *Allium munzii* as endangered in the **Federal Register** on October 13, 1998 (63 FR 54975). The listing was based on a variety of factors including habitat destruction and fragmentation from agricultural and urban development, clay mining, off-road vehicle activity, cattle and sheep grazing, weed abatement, fire suppression practices, and competition from alien plant species. A Recovery plan for this species has not yet been completed.

At the time of listing, we concluded that designation of critical habitat for *Allium munzii* was not prudent because such designation would not benefit the species. On November 15, 2001, a lawsuit was filed against the Department of the Interior (DOI) and the Service by the Center for Biological Diversity and California Native Plant Society, challenging our ''not prudent'' determinations for eight plants including *A. munzii* (No. CV–01–2101) (*CBD et al.* v. *USDOI*). A second lawsuit asserting the same challenge was filed against DOI and the Service by the Building Industry Legal Defense Foundation (BILD) on November 21, 2001 (No. CV–01–2145) (*BILD* v. *USDOI*). Both cases were consolidated on March 19, 2002, and all parties agreed to remand the critical habitat determinations to the Service for additional consideration. In an order dated July 1, 2002, the U.S. District Court for the Southern District of California directed us to reconsider our not prudent finding and publish a proposed critical habitat rule for *A. munzii*, if prudent, on or before May 30, 2004. This proposed rule complies with the court's ruling. We have reconsidered our not prudent finding, and now believe that critical habitat designation may provide educational information to individuals, local and State governments, and other entities engaged in long-ranging planning, since areas essential to the conservation of the species are more clearly defined and, to the extent currently feasible, the primary constituent elements of the habitat necessary to the conservation of the species are identified.

Critical Habitat

Section 3(5)(A) of the Act defines critical habitat as—(i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures that are

necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. It does not allow government or public access to private lands. Under section 7 of the Act, Federal agencies must consult with the Service on activities they undertake, fund, or permit that may affect critical habitat and lead to its destruction or adverse modification. However, the Act prohibits unauthorized take of listed species and requires consultation for activities that may affect them, including habitat alterations, regardless of whether critical habitat has been designated. We have found that the designation of critical habitat provides little additional protection to most listed species.

To be included in a critical habitat designation, habitat must be either a specific area within the geographic area occupied by the species on which are found those physical or biological features essential to the conservation of the species (primary constituent elements, as defined at 50 CFR 424.12(b)) and which may require special management considerations or protection, or be specific areas outside of the geographic area occupied by the species which are determined to be essential to the conservation of the species. Section 3(5)(c) of the Act states that not all areas that can be occupied by a species should be designated as critical habitat unless the Secretary determines that all such areas are essential to the conservation of the species. Our regulations (50 CFR 424.12(e)) also state that, ''The Secretary shall designate as critical habitat areas outside the geographic area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species.''

Regulations at 50 CFR 424.02(j) define special management considerations or protection to mean any methods or procedures useful in protecting the physical and biological features of the environment for the conservation of listed species. When we designate critical habitat, we may not have the information necessary to identify all areas which are essential for the conservation of the species. Nevertheless, we are required to designate those areas we consider to be essential, using the best information available to us. Accordingly, we do not designate critical habitat in areas outside the geographic area occupied by the species unless the best available scientific and commercial data demonstrate that unoccupied areas are essential for the conservation needs of the species.

Section 4(b)(2) of the Act requires that we take into consideration the economic impact, effects to national security, and any other relevant impact, of specifying any particular area as critical habitat. We may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

Our Policy on Information Standards Under the Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that our decisions represent the best scientific and commercial data available. It requires our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information should be the listing package for the species. Additional information may be obtained from a recovery plan, articles in peer-reviewed journals, conservation plans developed by States and counties or other entities that develop HCPs, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge.

Section 4 of the Act requires that we designate critical habitat on the basis of what we know at the time of designation. Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery.

Areas that support populations, but are outside the critical habitat designation, will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available information at the time of the action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Criteria for Defining Essential Habitat

All of the areas known to support *Allium munzii* are considered essential habitat for this species. *A. munzii* is known only from a narrow geographic range and within that range is limited to clay soils. There are currently 19 occurrences of this plant known to exist. One known historical occurrence has been lost to agriculture and urban development; others have been degraded or reduced in size. Due to the limited range and distribution of this species and the degradation of known populations of this species, preservation of all the known occurrences is essential for its conservation. The majority of the known occurrences are in the Gavilan Hills, the Gavilan Plateau, and the Temescal Valley regions of Riverside County. Other populations are found near Elsinore Peak, the Domenigoni Hills, Paloma Valley, Bachelor Mountain, and Skunk Hollow. It is possible that there are populations of this species that have gone undetected in Riverside County due to the cryptic nature of this species. Plants are only obvious in April and May when in flower, and plants do not often flower in years of low rainfall.

Primary Constituent Elements

In accordance with section 3(5)(A)(I) of the Act and regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we consider those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection. These features include but are not limited to: Space for individual and population growth and for normal behavior; food, water, air, light, minerals or other nutritional or physiological requirements; cover or shelter; sites for germination or seed dispersal; and habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

The specific biological and physical features, otherwise referred to as the primary constituent elements, that

comprise *Allium munzii* habitat are based on specific components that provide for the essential biological components of the species as described below.

Allium munzii is restricted to mesic clay soils in western Riverside County, California, along the southern edge of the Perris basin. The clay soils are scattered in a band several miles wide and extending 40 miles from Gavilan Hills to west of Temescal Canyon and Lake Elsinore at the eastern foothills of the Santa Ana Mountains and along the Elsinore Fault Zone to the southwestern foothills of the San Jacinto Mountains near Lake Skinner and Vail Lake. Clay soil associations include Altamont, Auld, Bosanko, Claypit and Porterville clay soil types. At least one population (Bachelor Mountain) was reported by Bramlet in 1991 to be associated with pyroxenite outcrops instead of clay (California Natural Diversity Data Base (CNDDB) 2003). Rounded cobbles and boulders are embedded within the clay, which has a sticky, adobe consistency when wet and large cracks when dry. *A. munzii* is typically found on the more mesic sites within the clay deposits (Boyd 1988). The clay deposits typically support grassland vegetation within a surrounding scrub community.

Allium munzii occurs at elevations from 984 to 3,511 feet (ft) (300 to 1,070 meters (m)), and on level or slightly sloping lands.

Allium munzii is typically found in open native grasslands and, increasingly, non-native grasslands which can be either the dominant community or found in a mosaic with Riversidean sage scrub, scrub oak chaparral, chamise chaparral, coast live oak woodland, or peninsular juniper woodland and scrub (Holland 1986). Based upon the dominant species, these plant communities where *A. munzii* is found have been further divided into series which include, but are not limited to, California annual grassland, nodding needlegrass, purple needlegrass, foothill needlegrass, black sage, white sage, California buckwheat, California buckwheat-white sage, California sagebrush, California sagebrush-black sage, California sagebrush-California buckwheat, mixed sage, chamise, chamise-black sage, coast live oak, scrub oak, and California juniper (Sawyer and Keeler-Wolf 1994).

A characteristic ''clay soil flora'' is associated with the island-like clay deposits in southwestern Riverside County. This includes perennial herbs, such as *Fritillaria biflora* (chocolate lily), *Harpagonella palmeri* (Palmer's grappling hook), *Chorizanthe polygonoides* var. *longispina* (knot-weed spine flower), *Sanicula bipinnatifida* (purple sanicle), *S. arguta* (snakeroot), *Lomatium utriculatum* (common lomatium), *L. dasycarpum* (lace parsnip), *Dodecatheon clevelandii* (Cleveland's shooting star), *Bloomeria crocea* (goldenstar), *Chlorogalum parviflorum* (soaproot), *Dudleya multicaulis* (many-stemmed dudleya), *Allium haematochiton* (red-skinned onion) and *A. munzii* (Boyd 1988).

Pursuant to our regulations, we are required to identify the known physical and biological features, *i.e.*, primary constituent elements, essential to the conservation of *Allium munzii*, together with a description of any critical habitat that is proposed. In identifying the primary constituent elements, we used the best available scientific and commercial data available. The physical ranges described in the primary constituent elements may not capture all of the variability that is inherent in natural systems that support *A. munzii.* The primary constituent elements determined essential to the conservation of *A. munzii* are:

(1) Clay soil series of sedimentary origin (*e.g.*, Altamont, Auld, Bosanko, Claypit, Porterville), or clay lenses of such which may be found as unmapped inclusions in other soil series, or soil series of sedimentary or igneous origin with a clay subsoil (*e.g.*, Cajalco, Las Posas, Vallecitos); found on level or slightly sloping landscapes; generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); and as part of open native or non-native grassland plant communities and ''clay soil flora'' which can occur in a mosaic with Riversidean sage scrub, chamise chaparral, scrub oak chaparral, coast live oak woodland, and peninsular juniper woodland and scrub; or

(2) Alluvial soil series of sedimentary or igneous origin (*e.g.*, Greenfield, Ramona, Placentia, Temescal) and terrace escarpment soils found as part of alluvial fans underlying open native or non-native grassland plant communities which can occur in a mosaic with Riversidean sage scrub generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); or Pyroxenite deposits of igneous origin found on Bachelor Mountain as part of non-native grassland and Riversidean sage scrub generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); and

(3) Clay soils or other soil substrate as described above with intact, natural surface and subsurface structure that have been minimally altered or unaltered by ground-disturbing activities (*e.g.*, disked, graded, excavated, re-contoured).

All areas proposed as critical habitat for *Allium munzii* are within the geographic area occupied by the species and contain one or more primary constituent elements (*e.g.*, soil, associated plant community) essential for its conservation.

Methods

In determining areas that are essential to conserve *Allium munzii*, we used the best scientific and commercial data available. These included data from research and survey observations published in peer-reviewed articles, regional Geographic Information System (GIS) vegetation, soil, and species coverages (including layers for Riverside County), and data compiled in the CNDDB. In addition, information provided in comments on the proposed critical habitat designation and draft economic analysis will be evaluated and considered in the development of the final designation for *A. munzii.*

After all the information about the known occurrences of *Allium munzii* was compiled, we created maps indicating the essential habitat associated with each of the occurrences. We used the information outlined above to aid in this task. The essential habitat was mapped using GIS and refined using topographical and aerial map coverages. These essential habitat areas were further refined by discussing each area in detail with Fish and Wildlife Service biologists familiar with each area. Areas not containing the primary constituent elements were not included in the boundaries of proposed critical habitat whenever possible.

After creating a GIS coverage of the essential areas, we created legal descriptions of the essential areas. We used a 100-meter grid to establish Universal Transverse Mercator (UTM) North American Datum 27 (NAD 27) coordinates which, when connected, provided the boundaries of the essential areas. The areas were then analyzed with respect to section 4(b)(2) of the Act, and any applicable and appropriate exclusions were made. The remaining essential areas are the proposed critical habitat. The essential areas, an elaboration on the exclusions, and the specific areas proposed for critical habitat are described below.

Special Management Considerations or Protection

As we undertake the process of designating critical habitat for a species, we first evaluate lands defined by those physical and biological features essential to the conservation of the

species for inclusion in the designation pursuant to section 3(5)(A) of the Act. Secondly, we then evaluate lands defined by those features to assess whether they may require special management considerations or protection. As discussed throughout this proposed rule, *Allium munzii* and its habitat are threatened by a multitude of factors. Threats to those features that define essential habitat (primary constituent elements) are caused by various types of development, dry-land farming activities, off-road vehicle activity, clay mining, and competition with non-native plants. Habitat loss continues to be the greatest threat to *A. munzii.* It is essential for the survival of this species to protect those features that define the remaining essential habitat, through purchase or special management plans, from irreversible threats and habitat conversion. We believe the area proposed for designation as critical habitat may require some level of management and/or protection to address the current and future threats to *A. munzii* and maintain the primary constituent elements essential to its conservation to ensure the overall recovery of the species.

Relationship to Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data available after taking into consideration the economic impact, effects to national security, and any other relevant impact, of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined, following an analysis, that the benefits of such exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species. Consequently, we may exclude an area from designated critical habitat based on economic impacts, effects to national security, or other relevant impacts such as preservation of conservation partnerships, if we determine the benefits of excluding an area from critical habitat outweigh the benefits of including the area in critical habitat, provided the action of excluding the area will not result in the extinction of the species.

In our critical habitat designations we have used the provisions outlined in section 4(b)(2) of the Act to evaluate those specific areas that are proposed for designation as critical habitat and those areas which are subsequently finalized (*i.e.*, designated). We have applied the provisions of this section of the Act to lands essential to the conservation of the subject species to evaluate them and either exclude them from final critical habitat or not include them in proposed critical habitat. Lands which we have either excluded from or not included in critical habitat based on those provisions include but are not limited to those covered by: (1) Legally operative HCPs that cover the species and provide assurances that the conservation measures for the species will be implemented and effective; (2) draft HCPs that cover the species, have undergone public review and comment, and provide assurances that the conservation measures for the species will be implemented and effective (*i.e.*, pending HCPs); (3) Tribal conservation plans that cover the species and provide assurances that the conservation measures for the species will be implemented and effective; (4) State conservation plans that provide assurances that the conservation measures for the species will be implemented and effective; and (5) Service National Wildlife Refuge System Comprehensive Conservation Plans that provide assurances that the conservation measures for the species will be implemented and effective. Within the essential habitat for *Allium munzii* there are no tribal lands or lands owned by the Department of Defense.

Relationship of Critical Habitat to Approved Habitat Conservation Plans and Draft Western Riverside Multiple Species Habitat Conservation Plan (MSHCP)

As described above, section 4(b)(2) of the Act requires us to consider other relevant impacts, in addition to economic and national security impacts, when designating critical habitat. Section 10(a)(1)(B) of the Act authorizes us to issue permits for the take of listed wildlife species incidental to otherwise lawful activities. Development of an HCP is a prerequisite for the issuance of an incidental take permit pursuant to section 10(a)(1)(B) of the Act. An incidental take permit application must be supported by an HCP that identifies conservation measures that the permittee agrees to implement for the species to minimize and mitigate the impacts of the permitted incidental take.

HCPs vary in size and may provide for incidental take coverage and conservation management for one or many federally listed species. Additionally, more than one applicant may participate in the development and implementation of an HCP. The areas occupied by *Allium munzii* include approved HCPs and the Western Riverside MSHCP that address multiple species, cover a large area, and have many participating permittees. Large regional HCPs expand upon the basic requirements set forth in section 10(a)(1)(B) of the Act because they reflect a voluntary, cooperative approach to large-scale habitat and species conservation planning. Many of the large regional HCPs in southern California have been, or are being, developed to provide for the conservation of numerous federally listed species and unlisted sensitive species and the habitat that provides for their biological needs. These HCPs address impacts in a planning area and create a preserve design within the planning area. Over time, areas in the planning area are developed according to the HCP and the area within the preserve is acquired, managed, and monitored. These HCPs are designed to implement conservation actions to address future projects that are anticipated to occur within the planning area of the HCP in order to reduce delays in the permitting process.

In the case of approved regional HCPs (*e.g.*, those sponsored by cities, counties or other local jurisdictions) wherein *Allium munzii* is a covered species, a primary goal is to provide for the protection and management of habitat essential for the conservation of the species while directing development to non-essential areas. The regional HCP development process provides an opportunity for more intensive data collection and analysis regarding the use of particular habitat areas by *A. munzii.* The process also enables us to construct a habitat preserve system that provides for the biological needs and long-term conservation of the species.

Completed HCPs and their accompanying Implementing Agreements (IA) contain management measures and protections for identified preserve areas that protect, restore, and enhance the value of these lands as habitat for *Allium munzii.* These measures include explicit standards to minimize any impacts to the covered species and its habitat. In general, HCPs are designed to ensure that the value of the conservation lands are maintained, expanded, and improved for the species that they cover.

In approving these HCPs, the Service has provided assurances to permit holders that once the protection and management required under the plans are in place and for as long as the permit holders are fulfilling their obligations under the plans, no additional mitigation in the form of land or financial compensation will be required of the permit holders and in some cases,

specified third parties. Similar assurances will be extended to future permit holders in accordance with the Service's HCP Assurance (''No Surprises'') rule codified at 50 CFR 17.22(b)(5) and (6) and 17.32(b)(5) and (6).

Portions of the proposed critical habitat within approved and legally operative HCPs or Natural Community Conservation Plan (NCCP)/HCPs in which *Allium munzii* is a covered species warrant exclusion from the designation of critical habitat under section 4(b)(2) of the Act. We believe that in most instances, the benefits of excluding legally operative HCPs from the proposed critical habitat designations will outweigh the benefits of including them. We have considered but not proposed critical habitat within the Rancho Bella Vista, North Peak Development Project, and Lake Matthews HCPs. All of these HCPs are for a small number of private landowners. *A. munzii* is a covered species in these HCPs.

Draft Western Riverside MSHCP

The Draft Western Riverside MSHCP has been in development for several years. Participants in this HCP include 14 cities; the County of Riverside, including the Riverside County Flood Control and Water Conservation Agency, Riverside County Transportation Commission, Riverside County Parks and Open Space District, and Riverside County Waste Department; the California Department of Parks and Recreation; and the California Department of Transportation. The Western Riverside MSHCP is also being proposed as a subregional plan under the State's NCCP and is being developed in cooperation with the California Department of Fish and Game. Within the 1.26 million-acre (510,000 ha) planning area of the MSHCP, approximately 153,000 ac (62,000 ha) of diverse habitats are proposed for solely conservation uses. The proposed conservation of 153,000 ac (62,000 ha) will complement other existing natural and open space areas that are already conserved through other means (*e.g.*, State Parks, Forest Service, and County Park lands).

The County of Riverside and the participating jurisdictions have signaled their sustained support for the Western Riverside MSHCP as evidenced by the November 5, 2002, passage of a local bond measure to fund the acquisition of land in support of the MSHCP. On November 14, 2002, a Notice of Availability of a Draft Environmental Impact Report (EIS/EIR) and Receipt of and Application for an Incidental Take Permit was published in the **Federal Register** (67 FR 69236). Public comment on these documents was accepted until January 14, 2003. Subsequently, on June 17, 2003, the County of Riverside Board of Supervisors voted unanimously to support the completion of the Western Riverside MSHCP.

Conservation actions within the Western Riverside MSHCP planning area will be implemented to promote the long-term conservation of *Allium munzii.* Although the MSHCP is not yet completed and implemented, significant progress has been achieved in the development of this HCP, including the preparation of the EIS/EIR, the solicitation of public review and comment, and the preparation of final documents. We are proposing to exclude from the proposed critical habitat designation the non-Federal lands covered by the draft Western Riverside MSHCP. This includes all known occurrences except one, which is on lands managed by the Forest Service. We are proposing to designate critical habitat on Federal lands within the planning area boundary of the Western Riverside MSHCP because the activities of Federal agencies are not covered under the section 10(a)(1)(B) permit. In the event that the Western Riverside MSHCP does not provide the coverage for this species, we will include these essential areas in the final designation of critical habitat.

Specific conservation objectives are provided in the Western Riverside MSHCP to ensure that suitable habitat and known populations of the *Allium munzii* will persist. Conservation objectives for *A. munzii* are: (1) Include in the MSHCP Conservation Area at least 13 localities, including the two whole and two partial populations currently outside the MSHCP Conservation Area; (2) include in the MSHCP Conservation Areas the Additional Reserve Lands (as defined in the MSHCP), public/quasi-public (PQP) lands (as defined in the MSHCP), and *A. munzii* habitat identified in the MSHCP. Given the presently known *A. munzii* localities, all of the known populations will be conserved; (3) implement management and monitoring practices within the Additional Reserve Lands including surveys for the *A. munzii*. Cooperative management and monitoring is anticipated on PQP Lands; (4) *A. munzii* is considered a Narrow Endemic Plant Species (defined in section 6 of the Riverside MSHCP; requires specific consideration in the plan). Thus, until such time as the Additional Reserve Lands are assembled and conservation objectives for this species are met, surveys will be conducted as part of the project review process for public and private projects where suitable habitat for *A. munzii* is present within Narrow Endemic Plant Species Survey Area (NEPSSA) 1 and 4.

Other management actions described in the draft Western Riverside MSHCP include addressing competition with non-native plant species, clay mining, off-road vehicle use, and disking activities. This management will help maintain *Allium munzii* populations and habitat.

The following represents our rationale for excluding the proposed critical habitat within approved HCPs and the Draft Western Riverside MSHCP.

(1) Benefits of Inclusion

The principal benefit of any designated critical habitat is that federally funded or authorized activities in such habitat that require consultation under section 7 of the Act. Such consultation would ensure that adequate protection is provided to avoid adverse modification of critical habitat. Where HCPs are in place, our experience indicates that this benefit is small or nonexistent. Currently approved and permitted HCPs and NCCP/HCPs are designed to ensure the long-term survival of covered species within the plan area. In an approved HCP or NCCP/HCP, lands we ordinarily would define as critical habitat for covered species will normally be protected in reserves and other conservation lands by the terms of the HCP or NCCP/HCP and their IAs. These HCPs or NCCP/HCPs and IAs include management measures and protections for conservation lands designed to protect, restore, and enhance their value as habitat for covered species, and thus provide benefits well in excess of those that would result from a critical habitat designation.

(2) Benefits of Exclusion

The benefits of excluding lands within HCPs from critical habitat designation include carrying out the assurances provided by the Service to landowners, communities, and counties in return for their voluntary adoption of the HCP, including relieving them of the additional regulatory burden that might be imposed by critical habitat. Many HCPs, particularly large regional HCPs take many years to develop and, upon completion, become regional conservation plans that are consistent with the recovery objectives for listed species that are covered within the plan area. Additionally, many of these HCPs provide conservation benefits to unlisted, sensitive species. Imposing an additional regulatory review after an

HCP is completed solely as a result of the designation of critical habitat may undermine conservation efforts and partnerships in many areas. In fact, it could result in the loss of species' benefits if participants abandon the voluntary HCP process because it may result in additional regulations requiring more of them than other parties who have not voluntarily participated in species conservation. Designation of critical habitat within the boundaries of approved HCPs could be viewed as a disincentive to those entities currently developing HCPs or contemplating them in the future.

A related benefit of excluding lands within HCPs from critical habitat designation is the unhindered, continued ability to seek new partnerships with future HCP participants including States, counties, local jurisdictions, conservation organizations, and private landowners, which together can implement conservation actions that we would be unable to accomplish otherwise. If lands within HCP plan areas are designated as critical habitat, it would likely have a negative effect on our ability to establish new partnerships to develop HCPs, particularly large, regional HCPs that involve numerous participants and address landscape-level conservation of species and habitats. By preemptively excluding these lands, we preserve our current partnerships and encourage additional conservation actions in the future.

Furthermore, an HCP or NCCP/HCP application must itself be consulted upon. While this consultation will not look specifically at the issue of adverse modification to critical habitat, unless critical habitat has already been designated within the proposed plan area, it will determine if the HCP jeopardizes the species in the plan area. The jeopardy analysis is similar to the analysis of adverse modification to critical habitat. In addition, Federal actions that may affect listed species or any designated critical habitat would still require consultation under section 7 of the Act. HCP and NCCP/HCPs typically provide for greater conservation benefits to a covered species than section 7 consultations because HCPs and NCCP/HCPs assure the long-term protection and management of a covered species and its habitat, and funding for such management through the standards found in the 5 Point Policy for HCPs (64 FR 35242) and the HCP ''No Surprises'' regulation (63 FR 8859). Such assurances are typically not provided by section 7 consultations which, in accordance with the Provisions of the Act, are limited to requiring that the specific action being consulted upon not jeopardize the continued existence of the species. Thus, a consultation typically does not accord the lands it covers the extensive benefits a HCP or NCCP/HCP provides. The development and implementation of HCPs or NCCP/HCPs provide other important conservation benefits, including the development of biological information to guide the conservation efforts and assist in species conservation, and the creation of innovative solutions to conserve species while allowing for development.

The Western Riverside MSHCP seeks to accomplish the goals of protecting, restoring, monitoring, managing, and enhancing the habitat to benefit the conservation of *Allium munzii* through the implementation of specific conservation objectives. Excluding non-Federal lands within the MSHCP from the proposed critical habitat will provide benefits, as follows: (1) Exclusion of the lands from the final designation will allow us to continue working with the participants in a spirit of cooperation and partnership; (2) other jurisdictions, private landowners, and other entities will see the benefit of working cooperatively with us to develop HCPs, which will provide the basis for future opportunities to conserve species and their essential habitat.

(3) Benefits of Exclusion Outweigh the Benefits of Inclusion

We have reviewed and evaluated the HCPs currently approved and being implemented, and the draft Western Riverside MSHCP within the areas being proposed as critical habitat for *Allium munzii*. Based on this evaluation, we find that the benefits of exclusion outweigh the benefits of proposing the portions of essential habitat for *A. munzii* covered by the approved HCPs and the draft Western Riverside MSHCP as critical habitat.

The exclusion of these lands from critical habitat will help preserve the partnerships that we have developed with the local jurisdictions and project proponents in the development of HCPs and NCCP/HCPs. The educational benefits of critical habitat, including informing the public of areas that are essential for the long-term survival and conservation of the species, is still accomplished from material provided on our website and through public notice and comment procedures required to establish an HCP or NCCP/HCP. The public has also been informed through the public participation that occurs in the development of many regional HCPs or NCCP/HCPs. For these reasons, we believe that proposing critical habitat has little benefit in areas covered by HCPs, provided that the HCP or NCCP/HCP specifically and adequately covers the species for which critical habitat is being proposed. We do not believe that these exclusions will result in the extinction of the species because the combination of existing preserves and the implementation of the draft Western Riverside MSHCP provide adequate conservation of this species on lands within the plan area.

Proposed Critical Habitat Designation

The proposed critical habitat includes *Allium munzii* habitat at a single location in the species' range and is located entirely within Riverside County, California. The majority of essential habitat for this species has been excluded under section 4(b)(2). As a result, only Federal lands are proposed as critical habitat. Areas proposed as critical habitat and the areas proposed for exclusion from critical habitat are summarized in Table 1.

TABLE 1.—SUMMARY OF ESSENTIAL HABITAT ACREAGE FOR *Allium munzii.*

	Federal*	Local/state	Private	Total
Essential Habitat	227 ac (92 ha)	73 ac (30 ha)	995 ac (403 ha)	1,295 ac (525 ha).
Excluded under 4(b)(2)	0 ac (0 ha)	73 ac (30 ha)	995 ac (403 ha)	1,068 ac (433 ha).
Proposed Critical Habitat	227 ac (92 ha)	0 ac (0 ha)	0 ac (0 ha)	227 ac (92 ha).

* Federal lands include U.S. Forest Service lands.

Western Riverside Unit, Riverside County, California (227 ac (92 ha))

As discussed above, the Western Riverside MSHCP, when approved, will provide for the conservation of all known occurrences of *A. munzii.* Only the habitat located on Federal lands is proposed as critical habitat. This is because the habitat is essential to the conservation of the species, but activities of Federal agencies are not covered under the section 10(a)(1)(B) permit. A map of the areas identified as essential habitat can be viewed on our Web site at *http://carlsbad.fws.gov.*

The single unit of essential habitat that we are proposing to designate as critical habitat is located in the vicinity of Elsinore Peak in the Cleveland National Forest. The easternmost stand of *Allium munzii* at this location is considered to be the most undisturbed and pristine of any of the known occurrences of this species (Boyd and Mistretta 1991). The land identified for this unit of critical habitat supports the first and third primary constituent elements discussed above. The habitat is characterized by mixed native/non-native grassland and chaparral vegetation. *A. munzii* occurs primarily in the grassland and the transitional vegetation between the grassland and chaparral. The soils are primarily mapped as Bosanko clay, Cieneba-blasingame-rock outcrop complex, and Cieneba-rock outcrop complex. The stands of *A. munzii* are associated with mesic microhabitats, such as the mesic exposures on cobble deposits and at the bottom of slopes. This population is estimated at 5,000 plants and is ranked as a top conservation priority by a working group assembled by the California Department of Fish and Game (Mistretta 1993).

This site represents the southwestern-most extent of the range for *Allium munzii.* The habitat at this location is high quality. This site also supports three other species of wild onion, *A. haematochition, A. lacunosum,* and *A. peninsulare.* This composition of four *Allium* species at a single location is important to understanding the evolutionary history and divergence of the *Allium* genus in southern California. The southwestern portion of the essential habitat at this site is located on land that will be subject to the terms and conditions of the Western Riverside MSHCP. This portion of essential habitat has been excluded from critical habitat, and only the essential habitat on Forest Service land is proposed as critical habitat.

Effects of Critical Habitat Designation

Section 7 Consultation

The regulatory effects of a critical habitat designation under the Act are triggered through the provisions of section 7, which applies only to activities conducted, authorized, or funded by a Federal agency (Federal actions). Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR 402. Individuals, organizations, States, local governments, and other non-Federal entities are affected by the designation of critical habitat only if their actions occur on Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding.

Section 7(a)(2) of the Act requires Federal agencies, including us, to insure that their actions are not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. This requirement is met through section 7 consultation under the Act. Our regulations define ''jeopardize the continued existence of'' as to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). ''Destruction or adverse modification of designated critical habitat'' for this species would include habitat alterations that significantly affect any of those physical or biological features that were the basis for determining the habitat to be critical.

Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist Federal agencies in eliminating conflicts that may be caused by their proposed actions. The conservation measures in a conference report are advisory.

We may issue a formal conference report, if requested by the Federal action agency. Formal conference reports include an opinion that is prepared according to 50 CFR 402.14, as if the species was listed or critical habitat designated. We may adopt the formal conference report as the biological opinion when the species is listed or critical habitat designated, if no substantial new information or changes in the action alter the content of the opinion (50 CFR 402.10(d)).

If a species is listed or critical habitat is designated, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Through this consultation, the Federal action agency would ensure that the permitted actions do not destroy or adversely modify critical habitat.

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide ''reasonable and prudent alternatives'' to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Service's Regional Director believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions under certain circumstances, including instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request reinitiating of consultation or conference with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat, or adversely modify or destroy proposed critical habitat.

Federal activities that may affect *Allium munzii* or its critical habitat will require consultation under section 7. Activities on private, State, or county lands, or lands under local jurisdictions

requiring a permit from a Federal agency, such as Federal Highway Administration or Federal Emergency Management Act funding, or a permit from the Corps under section 404 of the Clean Water Act, will continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat, and actions on non-Federal lands that are not federally funded, authorized, or permitted, do not require section 7 consultations.

Section 4(b)(8) of the Act requires us to evaluate briefly and describe, in any proposed or final regulation that designates critical habitat, those activities involving a Federal action that may adversely modify such habitat or that may be affected by such designation. Activities that may destroy or adversely modify critical habitat include those that alter the primary constituent elements to an extent that the value of critical habitat for both the survival and recovery of *Allium munzii* is appreciably reduced. We note that such activities may also jeopardize the continued existence of the species.

Activities that, when carried out, funded, or authorized by a Federal agency, may directly or indirectly destroy or adversely modify critical habitat for *Allium munzii* include, but are not limited to:

(1) Removing, thinning, or destroying *Allium munzii* habitat (as defined in the primary constituent elements discussion), whether by burning, mechanical, chemical, or other means;

(2) Activities that appreciably degrade or destroy *Allium munzii* habitat (and its primary constituent elements) that could include, but are not limited to, livestock grazing, clearing, disking, farming, residential or commercial development, the spread of nonnative species, off-road vehicle use, and heavy recreational use;

(3) Activities that appreciably diminish habitat value or quality through indirect effects (*e.g.,* edge effects, invasion of exotic plants or animals, or fragmentation); and

(4) Any activity that could alter watershed or soil characteristics in ways that would appreciably alter or reduce the quality or quantity of surface and subsurface flow of water needed to maintain *Allium munzii* habitat. These activities could include, but are not limited to, altering the natural fire regime; development, including road building; livestock grazing; and vegetation manipulation such as clearing or grubbing in the watershed upslope from *A. munzii.*

(5) Road construction and maintenance, right-of-way designation, and regulation of agricultural activities, or any activity funded or carried out by the Department of Transportation or Department of Agriculture that results in discharge of dredged or fill material, or mechanized land clearing of *Allium munzii* habitat;

(6) Sale or exchange of lands by a Federal agency to a non-Federal entity; and

(7) Licensing of construction of communication sites by the Federal Communications Commission.

All lands proposed as critical habitat are within the geographical area occupied by the species and are necessary for the conservation of *Allium munzii.* Federal agencies already consult with us on actions that may affect *A. munzii* to ensure that their actions do not jeopardize the continued existence of the species. Thus, we do not anticipate substantial additional regulatory protection will result from critical habitat designation.

If you have questions regarding whether specific activities will constitute destruction or adverse modification of critical habitat, contact the Field Supervisor, Carlsbad Fish and Wildlife Office (see **ADDRESSES** section). Requests for copies of the regulations on listed wildlife and plants and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Branch of Endangered Species, 911 NE. 11th Ave, Portland, OR 97232 (telephone 503/231–2063; facsimile 503/231–6243).

Economic Analysis

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific and commercial data available and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species.

An analysis of the economic impacts of proposing critical habitat for *Allium munzii* is being prepared. We will announce the availability of the draft economic analysis as soon as it is completed, at which time we will seek public review and comment. At that time, copies of the draft economic analysis will be available for downloading from the Internet at *http://carlsbad.fws.gov,* or by contacting the Carlsbad Fish and Wildlife Office directly (see **ADDRESSES** section).

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we will solicit the expert opinions of at least three appropriate and independent specialists regarding this proposed rule. The purpose of such review is to ensure that our critical habitat designation is based on scientifically sound data, assumptions, and analyses. We will send these peer reviewers copies of this proposed rule immediately following publication in the **Federal Register**. We will invite these peer reviewers to comment, during the public comment period, on the specific assumptions and conclusions regarding the proposed designation of critical habitat.

We will consider all comments and information received during the 60-day comment period on this proposed rule as we prepare our final rulemaking. Accordingly, the final designation may differ from this proposal.

Public Hearings

The Act provides for one or more public hearings on this proposal, if requested. Requests must be received within 45 days of the date of publication of the proposal in the **Federal Register**. Such requests must be made in writing and be addressed to the Field Supervisor (see **ADDRESSES** section). We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of those hearings in the **Federal Register** and local newspapers at least 15 days prior to the first hearing.

Clarity of the Rule

Executive Order 12866 requires each agency to write regulations and notices that are easy to understand. We invite your comments on how to make this proposed rule easier to understand, including answers to questions such as the following: (1) Are the requirements in the proposed rule clearly stated? (2) Does the proposed rule contain technical jargon that interferes with the clarity? (3) Does the format of the proposed rule (grouping and order of the sections, use of headings, paragraphing, etc.) aid or reduce its clarity? (4) Is the description of the notice in the **SUPPLEMENTARY INFORMATION** section of the preamble helpful in understanding the proposed rule? (5) What else could we do to make this proposed rule easier to understand? Send a copy of any comments on how we could make this proposed rule easier to understand to: Office of Regulatory Affairs, Department of the Interior, Room 7229, 1849 C Street, NW.,

Washington, DC 20240. You may e-mail your comments to this address: *Exsec@ios.doi.gov.*

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is not a significant rule and, therefore, was not reviewed by the Office of Management and Budget (OMB). We will be preparing a draft economic analysis of this proposed action; we will use this analysis to meet the requirement of section 4(b)(2) of the Act to determine the economic consequences of designating the specific areas as critical habitat and excluding any area from critical habitat if it is determined that the benefits of such exclusion outweigh the benefits of specifying such areas as part of the critical habitat, unless failure to designate such area as critical habitat will lead to the extinction of *Allium munzii.* This analysis will also be used to determine compliance with Executive Order 12866, Regulatory Flexibility Act, Small Business Regulatory Enforcement Fairness Act, and Executive Order 12630.

This draft economic analysis will be made available for public review and comment before we finalize this designation. At that time, copies of the analysis will be available for downloading from the Carlsbad Fish and Wildlife Office's Internet Web site at *http://carlsbad.fws.gov* or by contacting the Carlsbad Fish and Wildlife Office directly (see **ADDRESSES** section).

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the Regulatory Flexibility Act (RFA) to require Federal agencies to provide a statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

At this time, the Service lacks the available economic information necessary to provide an adequate factual basis for the required RFA finding. Therefore, the RFA finding is deferred until completion of the draft economic analysis prepared pursuant to section 4(b)(2) of the ESA and E.O. 12866. This draft economic analysis will provide the required factual basis for the RFA finding. Upon completion of the draft economic analysis, the Service will publish a notice of availability of the draft economic analysis of the proposed designation and reopen the public comment period for the proposed designation for an additional 60 days. The Service will include with the notice of availability, as appropriate, an initial regulatory flexibility analysis or a certification that the rule will not have a significant economic impact on a substantial number of small entities accompanied by the factual basis for that determination. The Service has concluded that deferring the RFA finding until completion of the draft economic analysis is necessary to meet the purposes and requirements of the RFA. Deferring the RFA finding in this manner will ensure that the Service makes a sufficiently informed determination based on adequate economic information and provides the necessary opportunity for public comment.

Small Business Regulatory Enforcement Fairness Act (5 U.S.C. 802(2))

In the draft economic analysis, we will determine whether designation of critical habitat will cause (a) any effect on the economy of $100 million or more; (b) any increases in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or (c) any significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises.

Executive Order 13211

On May 18, 2001, the President issued an Executive Order (E.O. 13211) on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This proposed rule to designate critical habitat for *Allium munzii* is not a significant regulatory action under Executive Order 12866, and it is not expected to significantly affect energy supplies, distribution, or use because there are no pipelines, distribution facilities, power grid stations, *etc.* within the boundaries of proposed critical habitat. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501), the Service makes the following findings:

(a) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute or regulation that would impose an enforceable duty upon State, local, tribal governments, or the private sector and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)–(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ''a condition of federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding'' and the State, local, or tribal governments ''lack authority'' to adjust accordingly. (At the time of enactment, these entitlement programs were: Medicaid; AFDC work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement.) ''Federal private sector mandate'' includes a regulation that ''would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance; or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities who receive Federal funding, assistance, or permits or who otherwise require approval or authorization from a Federal agency for

an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply; nor would critical habitat shift the costs of the large entitlement programs listed above on to State governments.

(b) We do not believe that this rule will significantly or uniquely affect small governments, because only Federal lands are involved in the proposed designation. As such, Small Government Agency Plan is not required. We will, however, further evaluate this issue as we conduct our economic analysis and, as appropriate, review and revise this assessment as warranted.

Takings

In accordance with Executive Order 12630 (''Government Actions and Interference with Constitutionally Protected Private Property Rights''), we have analyzed the potential takings implications of designating critical habitat for *Allium munzii.* This preliminary assessment concludes that this proposed rule does not pose significant takings implications. However, we have not yet completed the economic analysis for this proposed rule. Once the economic analysis is available, we will review and revise this preliminary assessment as warranted.

Federalism

In accordance with Executive Order 13132, this rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior policies, we requested information from and coordinated development of this proposed critical habitat designation with appropriate State resource agencies in California.

The proposed designation of critical habitat in areas currently occupied by *Allium munzii* imposes no additional significant restrictions beyond those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The proposed designation of critical habitat may have some benefit to the State and local resource agencies in that the areas essential to the conservation of this species are more clearly defined, and the primary constituent elements of the habitat necessary to the conservation of this species are specifically identified. While this definition and identification does not alter where and what federally sponsored activities may occur, it may assist local governments in long-range planning (rather than waiting for case-by-case section 7 consultations to occur).

Civil Justice Reform

In accordance with Executive Order 12988, the Department of the Interior's Office of the Solicitor has determined that this rule does not unduly burden the judicial system and does meet the requirements of sections 3(a) and 3(b)(2) of the Order. We are proposing to designate critical habitat in accordance with the provisions of the Endangered Species Act. The rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of Allium munzii.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This proposed rule does not contain new or revised information collection for which OMB approval is required under the Paperwork Reduction Act. Information collections associated with certain Act permits are covered by an existing OMB approval and are assigned clearance No. 1018–0094, Forms 3–200–55 and 3–200–56, with an expiration date of July 31, 2004. Detailed information for Act documentation appears at 50 CFR 17. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act

We have determined that an Environmental Assessment and/or an Environmental Impact Statement as defined by the National Environmental Policy Act of 1969 need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act, as amended. A notice outlining our reason for this determination was published in the **Federal Register** on October 25, 1983 (48 FR 49244). This proposed rule does not constitute a major Federal action significantly affecting the quality of the human environment.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no Tribal lands essential for the conservation of *Allium munzii.* Therefore, designation of critical habitat for the *A. munzii* has not been proposed on Tribal lands.

References Cited

A complete list of all references cited herein, as well as others, is available upon request from the Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

Author

The primary authors of this notice are the Carlsbad Fish and Wildlife Office staff (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. In § 17.12(h) revise the entry for ''Allium munzii'' under ''FLOWERING PLANTS'' to read as follows:

17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
*	*	*	*	*	*	*	*
Allium munzii	Munz's onion	U.S.A. (CA)	Liliaceae—Lily	E	650	17.96(a)	NA
*	*	*	*	*	*	*	*

3. In § 17.96(a), add critical habitat for *Allium munzii* in alphabetical order under Family Liliaceae to read as follows:

§ 17.96 Critical habitat—plants.

(a) *Flowering plants.*

* * * * *

Family Liliaceae: *Allium munzii* (Munz's onion)

(1) Critical habitat unit for *Allium munzii* is depicted for Riverside County, California, on the map below.

(2) The primary constituent elements of critical habitat for *Allium munzii* are:

(i) Clay soil series of sedimentary origin (*e.g.*, Altamont, Auld, Bosanko, Claypit, Porterville), or clay lenses of such which may be found as unmapped inclusions in other soil series, or soil series of sedimentary or igneous origin with a clay subsoil (*e.g.*, Cajalco, Las Posas, Vallecitos); found on level or slightly sloping landscapes; generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); and as part of open native or non-native grassland plant communities and ''clay soil flora'' which can occur in a mosaic with Riversidean sage scrub, chamise chaparral, scrub oak chaparral, coast live oak woodland, and peninsular juniper woodland and scrub; or

(ii) Alluvial soil series of sedimentary or igneous origin (*e.g.*, Greenfield, Ramona, Placentia, Temescal) and terrace escarpment soils found as part of alluvial fans underlying open native or non-native grassland plant communities which can occur in a mosaic with Riversidean sage scrub generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); or Pyroxenite deposits of igneous origin found on Bachelor Mountain as part of non-native grassland and Riversidean sage scrub generally between the elevations of 985 ft and 3,500 ft (300 m and 1,068 m) above mean sea level (AMSL); and

(iii) Clay soils or other soil substrate as described above with intact, natural surface and subsurface structure that have been minimally altered or unaltered by ground-disturbing activities (*e.g.*, disked, graded, excavated, re-contoured).

(3) Critical habitat for *Allium munzii* does not include existing features and structures, such as buildings, roads, aqueducts, railroads, airport runways and buildings, other paved areas, lawns, and other urban landscaped areas not containing one or more of the primary constituent elements.

(4) Critical habitat unit for *Allium munzii* is described below.

(i) Map Unit 1: Riverside County, California. From USGS 1:24,000 quadrangle map Wildomar, California, land bounded by the following UTM 11 NAD27 coordinates (E, N): 467900, 3718200; 469000, 3718200; 469000, 3717300; 468500, 3717300; 468500, 3717500; 468100, 3717500; 468100, 3717400; thence east to the U.S. Forest Service, Cleveland National Forest boundary at y-coordinate 3717400; thence northwest following the U.S. Forest Service, Cleveland National Forest boundary to y-coordinate 371800; thence east to 467700, 3718000; 467700, 3718100; 467900, 3718100; returning to 467900, 3718200.

(ii) **Note:** Map of critical habitat unit follows:

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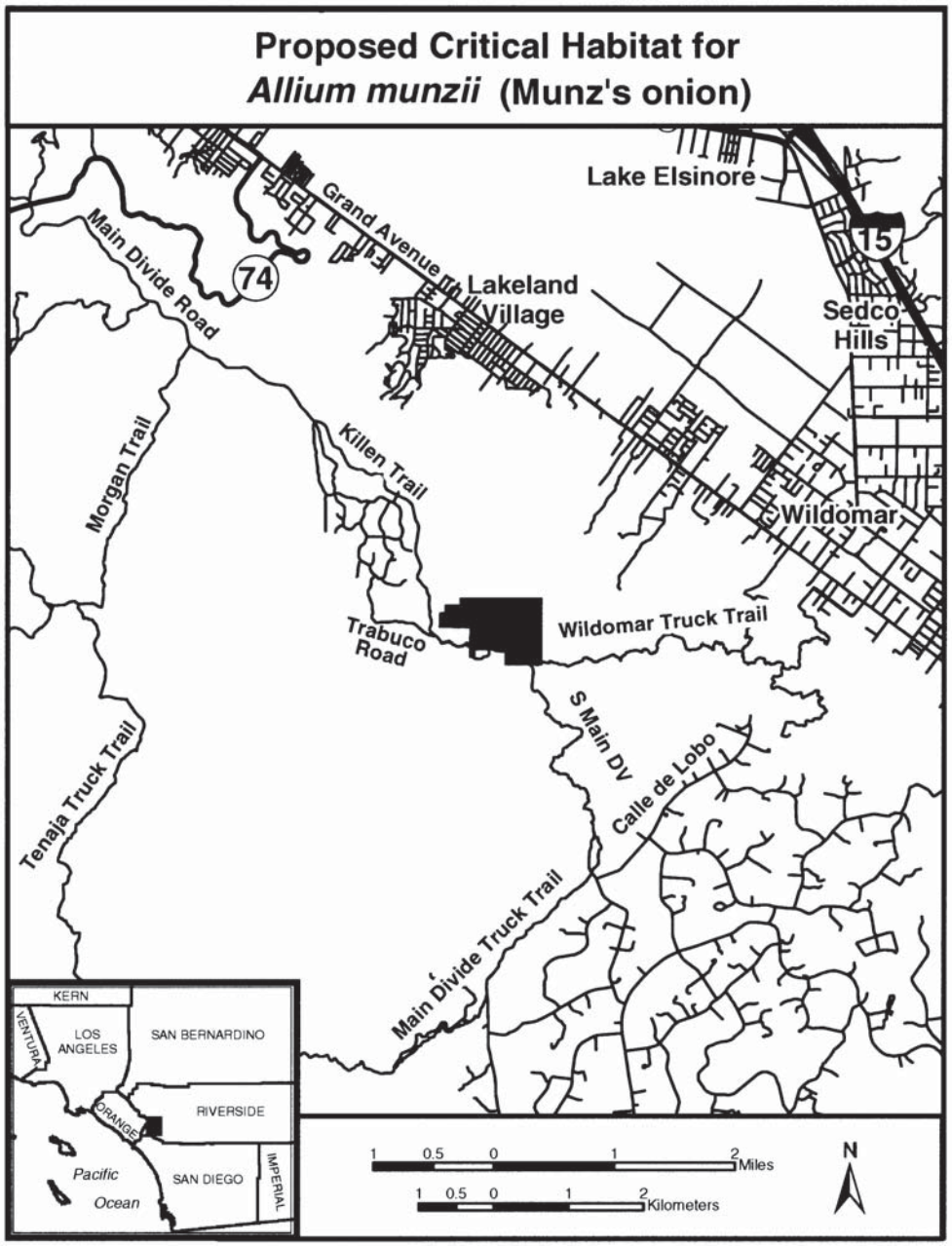

Dated: May 27, 2004.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 04–12657 Filed 6–3–04; 8:45 am]

BILLING CODE 4310–55–C

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 18

RIN 1018–AT48

Marine Mammals; Native Exemptions

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the Fish and Wildlife Service (Service), propose to amend regulations implementing the Marine Mammal Protection Act of 1972 (MMPA), as amended. This action would revise our existing definition of ''authentic native articles of handicrafts and clothing'' to reflect a December 28, 1992, Court ruling, which found that our regulation defining ''authentic native articles of handicrafts and clothing'' is inconsistent with the MMPA.

DATES: We will consider comments on the proposed rule if received by August 3, 2004.

ADDRESSES: You may submit comments by any of the following methods:

- By mail or hand-delivery to: Diane Bowen, Division of Federal Program Activities, U.S. Fish and Wildlife Service, Attention: Native Handicrafts, Room 400, ARLSQ, 4401 North Fairfax Drive, Arlington, Virginia 22203.

[Federal Register: April 12, 2005 (Volume 70, Number 69)]
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Part II

Department of the Interior

Fish and Wildlife Service

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50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Riverside Fairy Shrimp (Streptocephalus woottoni); Final Rule

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018--AT45

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Riverside Fairy Shrimp (Streptocephalus woottoni)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for the federally endangered Riverside fairy shrimp (Streptocephalus woottoni) pursuant to the Endangered Species Act of 1973, as amended (Act). The critical habitat designation encompasses approximately 306 acres (ac) (124 hectares (ha)) of land within Ventura, Orange, and San Diego counties, California.

DATES: This rule becomes effective on May 12, 2005.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this final rule, are available for public inspection, by appointment, during normal business hours, at the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 6010 Hidden Valley Road, Carlsbad, California 92009 (telephone 760/431-9440). The final rule, economic analysis, and maps of the designation are also available via the Internet at http://carlsbad.fws.gov.

FOR FURTHER INFORMATION CONTACT: Jim Bartel, Field Supervisor, Carlsbad Fish and Wildlife Office, at the above address (telephone 760/431-9440; facsimile 760/431-9618).

SUPPLEMENTARY INFORMATION:

Designation of Critical Habitat Provides Little Additional Protection to Species

In 30 years of implementing the Act, the Service has found that the designation of statutory critical habitat provides little additional protection to most listed species, while consuming significant amounts of available conservation resources. The Service's present system for designating critical habitat has evolved since its original statutory prescription into a process that provides little real conservation benefit, is driven by litigation and the courts rather than biology, limits our ability to fully evaluate the science involved, consumes enormous agency resources, and imposes huge social and economic costs. The Service believes that additional agency discretion would allow our focus to return to those actions that provide the greatest benefit to the species most in need of protection.

Role of Critical Habitat in Actual Practice of Administering and Implementing the Act

While attention to and protection of habitat are paramount to successful conservation actions, we have consistently found that, in most circumstances, the designation of critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources. Sidle (1987) stated, ``Because the Act can protect species with and without critical habitat designation, critical habitat designation may be redundant to the other consultation requirements of section 7.'' Currently, of the 1,253 listed species in the U.S. under the jurisdiction of the Service, only 470 species (38 percent) have designated critical habitat.

We address the habitat needs of all 1,244 listed species through conservation mechanisms such as listing, section 7 consultations, the section 4 recovery planning process, the section 9 protective prohibitions of unauthorized take, section 6 funding to the States, and the section 10 incidental take permit process. The Service believes that it is these measures that may make the difference between extinction and survival for many species.

We note, however, that the recent 9th Circuit judicial opinion in the case of Gifford Pinchot Task Force v. United States Fish and Wildlife Service has invalidated the Service's regulation defining destruction or adverse modification of critical habitat. We are currently reviewing the decision to determine what effect it may have on the outcome of consultations pursuant to section 7 of the Act.

Procedural and Resource Difficulties in Designating Critical Habitat

We have been inundated with lawsuits for our failure to designate critical habitat, and we face a growing number of lawsuits challenging critical habitat determinations once they are made. These lawsuits have subjected the Service to an ever-increasing series of court orders and court-approved settlement agreements, compliance with which now consumes nearly the entire listing program budget. This leaves the Service with little ability to prioritize its activities to direct scarce listing resources to the listing program actions with the most biologically urgent species conservation needs.

The consequence of the critical habitat litigation activity is that limited listing funds are used to defend active lawsuits, to respond to Notices of Intent (NOIs) to sue relative to critical habitat, and to comply with the growing number of adverse court orders. As a result, listing petition responses, the Service's own proposals to list critically imperiled species and final listing determinations on existing proposals are all significantly delayed.

The accelerated schedules of court ordered designations have left the Service with almost no ability to provide for adequate public participation or to ensure a defect-free rulemaking process before making decisions on listing and critical habitat proposals due to the risks associated with noncompliance with judicially-imposed deadlines. This in turn fosters a second round of litigation in which those who fear adverse impacts from critical habitat designations challenge those designations. The cycle of litigation appears endless, is very expensive, and in the final analysis provides relatively little additional protection to listed species.

The costs resulting from the designation include legal costs, the cost of preparation and publication of the designation, the analysis of the economic effects and the cost of requesting and responding to public comment, and in some cases the costs of compliance with the National Environmental Policy Act (NEPA). None of these costs result in any benefit to the species that is not already afforded by the protections of the Act enumerated earlier, and they directly reduce the funds available for direct and tangible conservation actions.

Background

Among the rarest animal species endemic (native) to Southern California is a tiny freshwater crustacean known as the Riverside fairy shrimp (Streptocephalus woottoni). Its distribution is highly restricted, with most of the known populations of the endangered Riverside fairy shrimp observed in vernal pools located in portions of a few counties and 50 miles (mi) (24 kilometers (km)) or less from the California coast, and ranging only approximately 125 mi (200 km) from its known northern limit (Ventura and Los Angeles counties) to its southern limit (Mexico border, San Diego County) within the U.S. (Eng et al. 1990; Simovich and Fugate 1992; Eriksen and Belk 1999; Service 2004 (69 FR 23024)). It does not occur in the nearby desert or

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mountain areas (Hathaway and Simovich 1996). It is also among the most recently discovered freshwater crustacean species in California, first identified in 1985 as a unique species (Eng et al. 1990) in the genus Streptocephalus (Baird 1852). With 63 species that occur worldwide (retrieved February 22, 2005, from the Integrated Taxonomic Information System on-line database, http://www.itis.usda.gov), Streptocephalus is

the most species-rich genus within the aquatic crustacean order Anostraca, which comprises over 258 fairy shrimp species and 7 subspecies worldwide, organized into 21 genera (Belk et al. 1993). The fairy shrimp (Anostraca) are, except for one other group, the most primitive living crustaceans, or members of the sub-phylum Crustacea (Eriksen and Belk 1999). Among the 23 fairy shrimp (Anostracan) species that are found in California, 8 species are found only in this State, giving California the highest level of endemism for any comparable geographic region in North America (Eng et al. 1990), and resulting in the highest number of species occurring in a comparable land area in both North America and worldwide (Eriksen and Belk 1999). Despite this fact, the level of knowledge about many Anastrocans is relatively low due to the relative recentness of their discovery.

The Riverside fairy shrimp and vernal pool crustaceans in general, occupy the first consumer level in the food chain, and thus constitute a cornerstone in the food web. Fairy shrimp form an important food source for an array of aquatic and terrestrial species, from diving beetles, backswimmers (Notonectids), vernal pool tadpole shrimp (Branchinecta species), predaceous aquatic insects and their larvae, to waterfowl and shorebirds, and occasionally even for frogs, toads, and tadpoles (Eriksen and Belk 1999). Humans have also been known to consume fairy shrimp; tribes in California have been known to extensively consume dried Artemia, and Tripos is said to be used as food by some natives in Mexico (Pennak 1989).

The Riverside fairy shrimp, along with numerous sensitive and rare plant species, lives only in vernal pools, vernal ponds, swales, and ephemeral (short-lived) freshwater habitats. A vernal pool (including vernal pond and vernal lake) is defined as an area of shallow depression, usually underlain by some subsurface layer which prohibits drainage into the lower soil profile, thus causing water to collect during the rainy winter season (Holland 1976; Chetham 1976; Weitkamp et al. 1996), i.e., the depression is inundated for portions of the wet season, when temperatures are sufficient for plant growth (Keeley and Zedler 1998). Following a brief waterlogged period during the late wet season or early dry season, a vernal pool will eventually drain and dry out, followed by an extended period of extreme soil-drying conditions (Keeley and Zedler 1998; Rains et al. 2005). Swales are defined as shallow drainages that carry water seasonally. Central to the distinctive ecology of vernal pools is that they are vernal, or ephemeral, i.e., occurring only temporarily, during late winter and spring. The water in vernal pools stands sufficiently long to prohibit zonal vegetation growth (Holland 1976), yet not long enough to allow for colonization by fish species. Vernal pool habitat thus forms a unique type of ecosystem, different in character and species composition from the surrounding habitats (Service 2003; 68 FR46684), and being intermediate between marsh (nearly always wet) and most zonal vegetation communities (nearly always dry) (Holland 1976). In California, where extensive areas of vernal pool habitat have developed over long periods, unique species groups have evolved special adaptations to allow them to survive the unusual conditions of vernal pools. Vernal pools are often defined by their unique, often endemic, flora as well (Smith and Verrill 1998).

The Riverside fairy shrimp occupies, and is thus completely dependent upon, vernal pools to survive. A combination of physical and environmental factors allows for the annual formation and maintenance of their vernal pool habitat. Vernal pools form generally where there is a Mediterranean climate, i.e., a wet season during fall and winter, when rainfall exceeds evaporation and fills the pools, followed by a spring and summer dry season, when evaporation exceeds rainfall and the pools dry up. A typical vernal pool season is characterized by an inundation phase, an aquatic phase, a water-logged drying phase, and a dried-out phase (Keeley and Zedler 1998). Thus, the water regime (hydrologic system) is crucial to the formation and functioning of a healthy vernal pool ecosystem. Some pools fill entirely from direct precipitation (Hanes and Stromberg 1998), while others have a substantial watershed, including both surface, subsurface, and groundwater, flowing through the surrounding bedrock and soils that contributes to their water inputs (Rains et al. 2005).

Vernal pools can be a variety of shapes and sizes, from less than a square yard (0.8 square meters (m\2\), to 2.5 ac (1 ha) or more. They occur on gently sloping mesas above the primary drainages, or in valleys at the low end of a watershed (Bauder and McMillan 1998). Vernal pools may be fed or connected by low drainage pathways, or swales. The micro-relief of a vernal pool may be complex, and some are dotted with numerous rounded soil mounds (mima) (Scheffer 1947). Their typical patterning, visible from the air, has allowed a number of vernal pools to be mapped throughout California's Central Valley, on a 10-40 ac unit scale (Holland 1998; 2003, Service 2003). The landscape in which they occur is typically grassland, but vernal pools also occur in a variety of other habitat types (Service 2003).

A critical factor in the development of a vernal pool is the soil conditions of the landscape (an impermeable surface or subsurface layer) and a gently sloping topography (slope of 10 percent or less).

Vernal pools form because the soil or sediment layer at or below the surface is nearly or completely impermeable to downward water seepage (Smith and Verrill 1998), and thus rainfall and water from the surrounding watershed becomes trapped above this layer. Soil types of the California vernal pools are volcanic flows, and hardpans and claypans, the latter of which have developed gradually over thousands of years, and can be a yard (1 m) or more thick. The unique assemblage of soils plays a critical role in nutrient cycling in vernal pool ecosystems. The soil types which underlie and surround the vernal pool therefore greatly influence the species composition of both plant and animals, as well as the hydrological functioning of the vernal pool (Hanes and Stromberg 1998; Hobson and Dahlgren 1998; Smith and Verrill 1998). Because water and precipitation flow through the soil to the pool, the chemistry of the soils underlying a vernal pool, and in the surrounding upslope areas, is directly linked to the chemistry of the vernal pool's water, i.e., on its alkalinity, pH, oxidation and reduction processes, dissolved salts and gasses, ion concentrations, mineral richness, and organic material. Thus, soil chemistry likely has a tremendous impact on aquatic invertebrate endemism (cf. Hobson and Dahlgren 1998). The distinct seasonality of vernal pools results in alternating conditions of reduction and oxidation within the soil profile, creating edaphic (soil-influenced) controls that may provide a refuge for competition-sensitive plant and animal species (Hobson and Dahlgren 1998). The length of ponding may also be affected by variables like

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consistency of soil, depth of soil to impervious layer (e.g., duripan, claypan), type and thickness of the impervious layer, and local climatic factors (e.g., rainfall abundance and regularity, evaporation rates; Helm 1998).

Because of the transportation of water, soil, minerals and nutrients over the landscape into vernal pools, the upland, or upslope areas associated with vernal pools are an important source of these for vernal pool organisms (Wetzel 1975). Since vernal pools are mostly rain-fed, they tend to have low nutrient levels (Keeley and Zedler 1998). In fact, most of the nutrients that vernal pool crustaceans derive from their vernal pool habitat come from the detritus (decaying organic matter) that washes into pools from the adjacent upslope areas; these nutrients provide the foundation for the food chain in the vernal pool aquatic community (Eriksen and Belk 1999), of which the fairy shrimp fauna constitutes an important component.

Typical to vernal pools are their dramatic fluctuations in local environmental conditions. The water, generally unbuffered, fluctuates greatly on a daily basis in pH, and concentrations of ions and dissolved gasses (oxygen and carbon dioxide), due to varying daily evaporation (Keeley and Zedler 1998). On a larger time-scale, there is extensive monthly and annual variation in the duration and extent of ponding of vernal pools, some pools not filling at all in some years, as the timing and amount of annual rainfall in California varies widely. Because of the unique and ephemeral nature of vernal pool habitat, and the adaptations of its plant and animal species, vernal pools are rich in species composition and contain a large number of highly specialized, native species that are found nowhere else in the region (endemic) (Holland and Jain 1978; Simovich 1998). Vernal pool habitats yield the highest number and species richness of endemics (native species) in comparison to other wetland types (Helm 1998).

Riverside Fairy Shrimp (Streptocephalus woottoni)

The Riverside fairy shrimp is a small (0.56-0.92 inches (in) (14-23 millimeters (mm))), slender Anostracan that has large stalked compound eyes and a delicate, elongate body with 11 pairs of phyllopods, or swimming appendages, which also function as gills (Eng et al. 1990; Eriksen and Belk 1999). Using their phyllopods in a complex, wavelike motion from front to back, they swim gracefully upside-down. As they swim about, fairy shrimp use these same appendages to filter-feed from the water column, allowing them to non-selectively consume algae, bacteria, protozoa, rotifers and bits of detritus (Eng et al. 1990; Eriksen and Belk 1999). Note that nothing is known specifically about the Riverside fairy shrimp's food resource requirements (Simovich and Ripley, pers. comm., May 25, 2004).

Riverside fairy shrimp are distinguished from other fairy shrimp species primarily by the second pair of antennae on the adult male, which are enlarged for grasping the female during copulation (Pennak 1989; Eriksen and Belk 1999; Service 2003). Both males and females are generally off-white in color, with orange pigment in their tail appendages (cercopods) and sometimes along the edges of the phyllopods (although some females have been observed to be entirely bright red-orange) (Eriksen and Belk 1999). The females, when mature, can be identified by their brood pouch, the elongate, ventral protruding egg sac immediately behind the phyllopods (Eriksen and Belk 1999).

Relative to most other fairy shrimp species, the Riverside fairy shrimp is a rare species with a highly restricted distribution (Hathaway and Simovich 1996). They are found only in a few pools at lower elevations in the Southern California coastal range that are inundated for a longer duration and generally deeper (greater than 12 in or 30 centimeters (cm)) than pools that support San Diego fairy shrimp (Branchinecta sandiegonensis) (Hathaway and Simovich 1996). Some of these pools may have been artificially deepened with berms (i.e., cattle tanks and road embankments) (Hathaway and Simovich 1996). The two species are known to co-occur in a few deep pools; however they

generally do not co-exist, as adults of the Riverside fairy shrimp emerge later in the season than San Diego fairy shrimp (Simovich and Fugate 1992; Hathaway and Simovich 1996).

After copulation, the males of some fairy shrimp species die within a few hours (Pennak 1989). When the eggs are fertilized in the female's pouch, they become coated (encysted) with a protein layer that develops into a thick, usually multilayered shell (Eriksen and Belk 1999). When the egg enters the late stage of embryonic development, all growth then ceases, and the egg enters into a dormant stage, or diapause (Drinkwater and Clegg 1991; Eriksen and Belk 1999). The female then either ejects the cysts to fall to the pool bottom, or, if she survives for an extended period, continues to move successive clutches of eggs into her brood pouch. If the vernal pool persists for several weeks to a few months, fairy shrimp may have multiple hatches in a single season (Eriksen and Belk 1999). Cysts can also remain in the brood pouch until the female dies and sinks to the pool bottom (Eriksen and Belk 1999). However, females of some fairy shrimp species can, in the presence of male adults during the wet period, eject thin-shelled cysts that hatch immediately without becoming dormant (``summer eggs''), thus allowing for multiple generations during a single wet season, while the thick-shelled, dormant (``winter'') eggs are deposited in the absence of males in the population (Pennak 1989). By the time the pool dries out, the numbers of dormant cysts within each pool basin can reach tens of thousands to millions, depending on pool size, volume, and depth (Belk 1998).

Mature cysts become fully desiccated (dried) after their pool has evaporated, and due to their protective coating, they can withstand extreme environmental conditions (Pennak 1989; Eriksen and Belk 1999). For example, they can survive subjection to physical extremes, such as near-boiling temperatures, months of freezing (Carlisle 1968), fire (Wells et al. 1997), or near-vacuum conditions for 10 years without damage to the embryo (Clegg 1967). These adaptations allow fairy shrimp cysts to survive extreme environmental fluctuations, and hatch only when conditions are favorable, after remaining dormant for as much as decades, possibly centuries (Belk 1998). In one closely related fairy shrimp, Streptocephalus sealii, cysts were brought to hatch after 25 years of storage in the lab (Belk 1998). Further, because the wall of the cyst can even resist damage by stomach enzymes (Horne 1966), the cyst can pass through the digestive tract of animals without harm, thus allowing for one possible mechanism of cyst dispersal. There are several mechanisms for cyst dispersal, and thus fairy shrimp dispersal, to other habitats. Historically, large-scale flooding from heavy winter and spring rains has been a primary dispersal mechanism, but other major mechanisms include dispersal by migratory birds (i.e., wading birds, shorebirds, waterfowl), ungulates (i.e., cattle, buffalo, deer), and possibly amphibians (i.e., salamanders, frogs) and humans (Eriksen and Belk 1999). These animals either carry cyst-containing mud on their bodies incidentally from pool to pool, or the cysts are ingested and are passed through the gut at another location.

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Wind, although less probable, may also be a dispersal agent (Eriksen and Belk 1999).

Although cysts can remain dormant within the pool for decades, they can also hatch about a week after a rain-fill, due to their advanced stage of embryonic development (Pennak 1989; Hathaway and Simovich 1996). However, when a dry vernal pool is once again inundated with water, only a fraction of the dormant cysts in the pool will hatch. Simovich and Hathaway (1997) found that when Riverside fairy shrimp cysts were hydrated once, only 0.18 percent hatched, and after three successive hydration periods, the cumulative total increased to only 2.8 percent. This is among the lowest hatching rates, or prolonged diapause, yet recorded among fairy shrimp species (Simovich and Hathaway 1997). They suggested that the prolonged diapause of so many cysts was an adaptation to the variable nature of local rainfall patterns, as pools at times fill only partially and dry quickly--before the fairy shrimp are able to reach maturity and reproduce. Thus, in such an environment with unpredictable filling events, it benefits the individual to have offspring in prolonged diapause, such that not all hatch after just one hydration (Simovich and Hathaway 1997). In San Diego County, only approximately 28 percent of all filling events recorded over 13 years lasted at least a 17-day period, the minimum length of time needed by the San Diego fairy shrimp to develop to first reproduction (and insufficient time for the Riverside fairy shrimp); this period corresponded to the 28-percent hatching rate for their cysts found in the lab (Philippi 2001). This strategy of prolonged diapause is possibly a risk-spreading (``bet-hedging'') adaptation to the unpredictability of their environment (Simovich and Hathaway 1997; Philippi 2001).

In addition to their low hatching percentage, the cysts of the Riverside fairy shrimp also take longer to hatch after inundation, relative to other species (Hathaway and Simovich 1996). The time from hydration to the hatching of Riverside fairy shrimp cysts took between 12 to 25 days in the lab at varying temperatures, with the most rapid hatching occurring when temperatures were fluctuating at 41-59 degrees Fahrenheit ((F) 5-15 degrees Celsius (C)). San Diego fairy shrimp, in comparison, can hatch after only 3 days (Hathaway and Simovich 1996). The greatest number of Riverside fairy shrimp cysts hatching in the lab, however, was achieved at 50 degrees F (10 degrees C) (Hathaway and Simovich 1996). Their development or maturation rate is also slow, and individuals are relatively long-lived (Hathaway and Simovich 1996), as is typical of obligate deep pool species. The developmental time to

maturity for the Riverside fairy shrimp was found to be 7-8 weeks, far longer than to the 7-10 day period of the San Diego fairy shrimp.

It is not surprising, therefore, that the Riverside fairy shrimp also lives much longer (2.5 to over 4 months) than the San Diego fairy shrimp (4-6 weeks) (Hathaway and Simovich 1996). Thus, the minimum period of inundation, or pool duration, that the Riverside fairy shrimp need in order to hatch and reach maturity is 9 to 10 weeks (Gonzalez et al. 1996; Hathaway and Simovich 1996). Thus, the association of the Riverside fairy shrimp with large, deep vernal pools that pond continuously for many months may perhaps be explained by its long period of maturity and longevity (cf. Helm 1998). Because of their slow hatch and growth, the Riverside fairy shrimp occur therefore much later in the season than other fairy shrimp species (cf. Hathaway and Simovich 1996).

The vernal pools that Riverside fairy shrimp are found in typically have water with a relatively neutral pH (approximately 7), low to moderate salinity, and low to moderate levels of total dissolved solids (Gonzalez et al. 1996; Eriksen and Belk 1999). One laboratory study conducted on the tolerance of Riverside fairy shrimp to variations in water chemistry found that they tolerate an 8-hour exposure to pH levels ranging from 8 to 10.5, with little effect (Gonzalez et al. 1996). Generally, in vernal pools where Riverside fairy shrimp occur, the external ion concentrations (Na+) averaged 0.73 mmol/l\3\ (Gonzalez et al. 1996). Although the species was also able to maintain its internal levels of salt concentration fairly constantly over a wide range of external concentrations (0.5-60 mmol/l\3\), it was sensitive to the extremes, with 100-percent mortality occurring at 100 mmol/l\3\ (Gonzalez et al. 1996). Levels of alkalinity in the vernal pool are affected by the surrounding soil type and hydrological regime of the immediate adjacent upland watershed; in four vernal pools, alkalinity averaged 41 mg/l\3\ (Gonzalez et al. 1996). In the laboratory, Riverside fairy shrimp were found to tolerate a wide range of alkalinities (0-600 mg/l\3\), but none could survive levels above 800 mg/l\3\ (Gonzalez et al. 1996). Importantly, studies show that the Riverside fairy shrimp is sensitive to water temperature; with their hatching occurring a longer time after inundation (25 days) and fewer hatching (1-3 percent) at steady higher temperature of 77 degrees F (25 degrees C), than at cooler temperatures (i.e., 7 days hatching time at 59-77 degrees F (15-25 degrees C); over 10 percent hatching at 50 degrees F (10 degrees C) (Gonzalez et al. 1996).

The upslope areas surrounding vernal pools are critical to the functioning of the vernal pool and thus to the survival of the Riverside fairy shrimp. The surrounding upslope areas provide the vernal pool with the appropriate annual and season temporality and volume of hydrological flow. With that flow follows the necessary nutrients, salts and minerals from the soil and bedrock that all influence the pool's water volume, the duration of ponding, and the complete chemistry, mineral and nutrient contents of the water itself. Therefore, Riverside fairy shrimp, together with its cohabitating vernal pool flora and fauna, is as dependent upon the upland areas for survival and reproduction as it is upon the pool it occupies.

Urban and water development, flood control, and highway and utility projects, as well as conversion of wild lands to agricultural use, have eliminated or degraded vernal pools and/or their watersheds in southern California (Jones and Stokes Associates 1987). Changes in hydrologic patterns, certain military activities, unauthorized fills, overgrazing, and off-road vehicle use also may imperil this aquatic habitat and the Riverside fairy shrimp. The flora and fauna in vernal pools or swales can change if the hydrologic regime is altered (Bauder 1986). Anthropogenic (human-origin) activities that reduce the extent of the watershed or that alter runoff patterns (i.e., amounts and seasonal distribution of water) may eliminate the Riverside fairy shrimp, reduce population sizes or reproductive success, or shift the location of sites inhabited by this species. The introduction of non-native plant species, competition with invading species, trash dumping, fire, and fire suppression activities were some of the reasons for listing the Riverside fairy shrimp as endangered on August 3, 1993 (58 FR 41384). Because of these threats, we anticipate that intensive long-term monitoring and management will be needed to conserve this species. Historically, vernal pool soils covered approximately 500 km\2\ (200 mi\2\ of San Diego County (Bauder and McMillan 1998). The greatest recent losses of vernal pool habitat in San Diego County have occurred in Mira Mesa, Rancho Pe[ntilde]asquitos, and Kearny Mesa, which together account for 73 percent of all the pools destroyed in the region during the

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7-year period between 1979 and 1986 (Keeler-Wolf et al. 1995). Other substantial losses have occurred in the Otay Mesa area, where over 40 percent of the vernal pools were destroyed between 1979 and 1990. Similar to San Diego County, vernal pool habitat was once extensive on the coastal plain of Los Angeles and Orange counties. Unfortunately, there has been a near-total loss of vernal pool habitat in these areas (Ferren and Pritchett 1988; Keeler-Wolf et al. 1995; Mattoni and Longcore 1997; Service 1998). Significant losses of vernal pools supporting this species have also occurred in Riverside County.

Adequately quantifying occurrence and distribution of the Riverside fairy shrimp can be difficult due to a number of factors. Firstly, Riverside fairy shrimp are restricted to a narrow geographic region, to certain pool types, and also temporally, as they emerge later in the season than other fairy shrimp species (Hathaway and Simovich 1996). Thus, surveys conducted to also encounter earlier-occurring species may

actually miss the Riverside fairy shrimp as they may still be so small (in the juvenile stage) that they pass through the mesh of the collecting nets (Eriksen and Belk 1999). Secondly, surveys may also miss collecting adults simply due to their low hatching percent (as few as 0.18 percent; Simovich and Hathaway 1997), which may result in either a very low population level, or to none being detected in a particular year, when viable cysts are actually present. Further, only males can be identified to the species level with certainty (Eriksen and Belk 1999), and cysts can only be identified to the genus level. To add to the difficulty, vernal pools are generally too small to appear on topographic maps (Holland 1976), not all vernal pools fill each year, or fill long enough for hatching (i.e., discovery) of the Riverside fairy shrimp. Some estimates for San Diego County show that over a period of 13 years, only about 28 percent of the pool-filling events lasted 17 days or longer (Philippi 2001).

For a more detailed discussion about the Riverside fairy shrimp's physical description, ecology, range, status and distribution, and a discussion of factors affecting this species, please refer to the following documents from the Federal Register: The final rule listing the species as threatened (58 FR 41384), published on August 3, 1993, the previous final rule to designate critical habitat (66 FR 29384), published on May 30, 2001, and our latest proposed rule to designate critical habitat (69 FR 23024), published on April 27, 2004.

Previous Federal Actions

For more information on previous Federal actions concerning the Riverside fairy shrimp, please refer to the proposed rule to designate critical habitat for the Riverside fairy shrimp (69 FR 23024) and the notice of availability for the draft economic analysis (DEA) and reopening of the public comment period for the proposed designation of critical habitat for the Riverside fairy shrimp published in the Federal Register (October 19, 2004, 69 FR 61461).

Summary of Comments and Recommendations

We requested written comments from the public on the proposed designation of critical habitat for the Riverside fairy shrimp in the proposed rule (69 FR 23024). We also contacted and invited the appropriate Federal, State, and local agencies, as well as scientific organizations and other interested parties to comment on the proposed rule. In the notice of availability of the draft economic analysis for the proposed designation of critical habitat (69 FR 61461), we again solicited comments from the public on both the draft economic analysis and the proposed rule. All comments and new information received during the two comment periods were incorporated into the final rule as appropriate.

During the first comment period, open from April 27, 2004, to May 27, 2004, we received 21 letters containing 143 comments directly addressing the proposed critical habitat designation from 6 peer reviewers, 5 Federal agencies, 2 county and local agencies, 1 group, 4 businesses, 1 city, 1 water district, 1 individual, and 1 law firm writing on behalf of 2 groups and 2 transportation agencies.

During the second comment period, open from October 19, 2004, to November 18, 2004, we received 11 letters containing 148 comments directly addressing the proposed critical habitat designation and the draft economic analysis. The letters came from 4 Federal agencies, 3 groups, 2 businesses, 1 law firm on behalf of 2 businesses, and 1 law firm on behalf of 2 groups and 2 transportation agencies.

Of a total 32 letters received, 4 supported the designation of critical habitat for the Riverside fairy shrimp, 2 opposed the designation, 18 letters suggested reducing the area of designation, and 4 letters suggested expanding the area. Two letters were requests for an extension of the comment submission period, but did not express support or opposition to the proposed critical habitat designation. Comments received were grouped into six general issues specifically relating to the proposed critical habitat designation for the Riverside fairy shrimp, and are addressed in the following summary and incorporated into the final rule as appropriate. We did not receive any requests for a public hearing. We have reviewed all comments received from the peer reviewers and the public for substantive issues and new information regarding critical habitat for the Riverside fairy shrimp, and have incorporated them into the final rule as appropriate. These are addressed below in the following summary.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), to solicit opinions from at least three experts, we solicited the expert opinions of 7 knowledgeable individuals with significant scientific expertise that included familiarity with the Riverside fairy shrimp, the geographic region in which the species occurs, and conservation biology principles. We received responses from six of the peer reviewers. The peer reviewers were generally supportive of the designation of critical habitat, but strongly endorsed the approach that the appropriate management unit was the vernal pool complex (not single pools) together with their immediately surrounding upland watershed. They emphasized the importance of providing conservation protection of pool complexes to ensure the survival of the Riverside fairy shrimp in perpetuity, and of identifying and preserving all remaining populations of Riverside fairy shrimp, including those within conservation-managed areas. Three peer reviewers also gave specific comments on our decision to exclude certain lands from critical habitat

based on Habitat Conservation Plans (HCPs) and Integrated Natural Resources Management Plans (INRMPs).

Comments From Peer Reviewers

1. Peer Reviewer Comment: Most of the reviewers stressed the importance of providing or increasing Federal protection to the Riverside fairy shrimp and their vernal pool habitat, since conservation measures are needed to protect them. Over 95 percent of vernal pools in Southern California have been extirpated (destroyed), and the remaining vernal pools and the species that inhabit them are currently under threat of elimination from both private and public organizations. Additionally, vernal pools are valuable in that they are ecologically unique, while also

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providing valuable ecosystem functions. Vernal pool complexes act as hydrologic ``sponges,'' buffering against drought and flooding. Large-scale alterations or developments within the local watershed of vernal pool complexes would affect the local hydrology dramatically and, from an engineering and public works perspective, can lead to increases in the need for management of unnaturally large amounts of runoff following a rainstorm. Thus, vernal pools have not received adequate recognition in the rule for the benefits (ecological services) they provide. For their long-term survival, vernal pools must be adequately protected; the designation of critical habitat does not seem to provide adequate conservation measures to serve this purpose.

Our Response: Section 4 of the Act requires us to designate critical habitat to the maximum extent prudent and determinable, which we have done, based upon the best data available to us at this time. We concur that additional, long-term conservation measures are needed to protect the Riverside fairy shrimp and its habitat, and additional data is needed on locations of their occurrence.

In developing our final designation of critical habitat for the Riverside fairy shrimp, we used the best scientific and commercial data available to identify those areas that contain essential occurrences of Riverside fairy shrimp and/or are defined by the physical and biological features essential to their conservation. We used a number of criteria in defining critical habitat, including but not limited to the known species occurrence (known at the time of listing, as well as discovered subsequently) and distribution data, habitat types, presence of PCE's, degree of habitat fragmentation, soil and landform relationships, connectivity and dispersal factors, and conservation biology principles. We did not include all vernal pool landscapes within the Riverside fairy shrimp's range although surveys in these areas may result in the detection of other occurrences in the future. If significant information becomes available indicating that areas outside of our designation are essential to the conservation of the Riverside fairy shrimp, we can, under the Act, revise critical habitat in the future.

2. Peer Reviewer Comment: While the Service's proposed designation of critical habitat for the Riverside fairy shrimp in southern California was supported, reviewers stated it is questionable whether 5,795 acres in the proposed rule is ``enough'' critical habitat for the conservation of the remaining Riverside fairy shrimp populations. Firstly, reviewers strongly emphasized the importance of considering the vernal pool complex and the surrounding watershed as the management unit for this species. The unique physiochemical requirements of the Riverside fairy shrimp make it particularly vulnerable to changes in hydrology. Further, other vernal pool species have their own unique ecological requirements in terms of soil, hydrology, etc. Protecting and maintaining entire vernal pool complexes and their surrounding watershed as a functioning unit will benefit the Riverside fairy shrimp and the other endangered species that live in these habitats. If the landscape at a site is changed sufficiently to alter the hydrology of individual vernal pools, then the species in them will eventually go extinct, regardless of whether the pools are disturbed or not. Secondly, some vernal pools excluded from the designation, but set aside for conservation or mitigation, do not have sufficient protection in the surrounding watershed, and thus become ecologically useless. The exclusion of military lands from the final designation is particularly troubling in this regard, because there are no guarantees that the watershed, let alone pools with Riverside fairy shrimp in them, will be adequately protected.

Our Response: Firstly, we note the support of our critical habitat designation, and concur with the reviewers on the importance of considering the vernal pool complexes together with their immediately surrounding upslope areas as the management unit (see Background and Primary Constituent Elements sections below). We have used this approach in our analyses when finalizing our critical habitat designation for the Riverside fairy shrimp, and have, wherever possible, included the upslope areas surrounding the pools. Secondly, for approved, legally operative HCPs that include areas eligible for designation as critical habitat and that specifically address the Riverside fairy shrimp and provide for its long-term conservation, we believe that the benefits of excluding those HCPs will outweigh the benefits of including them. Thirdly, we received requests from three military bases to exclude lands owned or managed by the Department of Defense for military purposes because the designation would increase the costs and regulatory requirements, hamper the military's ability to carry out their national security objectives, or because there is an INRMP in place that provides a benefit to the Riverside fairy shrimp.

These installations have either been excluded from final designated critical habitat pursuant to section 4(b)(2) of the Act, or exempted according to section 4(a)(3) of the Act. Please refer to the sections Relationship of Critical Habitat to Approved Habitat Conservation Plans and Relationship of Critical Habitat to Department of Defense Lands below in this final rule for detailed discussions of our rationale for exclusions and exemptions.

3. Peer Reviewer Comment: Any consideration of whether the Riverside fairy shrimp will persist indefinitely (i.e., avoid extinction due to anthropogenic causes) would require a quantification of the Riverside fairy shrimp's (a) dispersal biology, (b) adaptation to local physiochemical conditions, and (c) adaptation to hydrologic uncertainties (via reliance on an egg bank). In terms of the hydrology of the vernal pool habitat, quantifiable data is needed on (d) the historic environmental variation and (e) the predicted future environmental variation. However, only rudimentary data are available on any of these topics, with the possible exception of (d). Therefore, it would be wise to err on the side of caution and offer maximal protection to all remaining populations of this species.

Our Response: We concur that more detailed studies are needed on most aspects of the Riverside fairy shrimp's biology. In this rule, we address the issue of designating critical habitat areas, areas containing the necessary primary constituent elements (PCEs) that are essential to the conservation of the Riverside fairy shrimp. For this purpose, we used the best scientific and commercial information that were available to us and based our analyses upon areas either containing with existing populations of Riverside fairy shrimp or containing features essential for the conservation of the species using the vernal pool complex together with the immediately surrounding upslope areas as our management unit. To assist us in developing this final rule, we also opened two comment periods to obtain as much additional, currently available information as possible.

4. Peer Reviewer Comment: One reviewer suggested that the designation of critical habitat is no longer effective as a means to protect the species and its habitat, as funds that are needed to achieve that goal are spent instead on litigation. Rather, a new method is needed to accomplish this goal, such that the Riverside fairy shrimp and its habitat are actually preserved (rather than designated, then litigated).

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Our Response: We concur that the Service's present system for designating critical habitat has evolved into a process that is often driven by litigation and the courts, and thus consumes enormous agency resources. The Service believes that additional agency discretion would allow our focus to return to those actions that provide the greatest benefit to the species most in need of protection. Pursuant to section 4 of the Act, however, the Secretary shall, to the maximum extent prudent and determinable, designate any habitat which is then considered to be critical habitat for listed endangered or threatened species. Alternative or additional methods for accomplishing more effective conservation of the Riverside fairy shrimp are discussed in the Recovery Plan, Multiple Species Habitat Conservation Plans (MSHCPs), Natural Community Conservation Programs (NCCPs), and other conservation plans. These plans address the survival and recovery of this species, and we expect they will be in a continual process of improvement and increased efficiency with time.

5. Peer Reviewer Comment: Several reviewers disagreed with the Service's statement in the rule (see SUPPLEMENTARY INFORMATION above) that designation of critical habitat provides little additional protection to species, and believed this should be amended or omitted from the rule, as it is self-contradictory. Although designating critical habitat does not in itself protect any habitat, the biggest advantage of critical habitat designation is the ability to address the ``cumulative effects'' of many small impacts to the habitat. Impacts to a single location are not likely to drive the species to extinction, but the effects of impacts at many individual locations may, in total, create a substantial risk for species extinction. Designating critical habitat establishes a core, reducing the potential for individual small impacts to be allowed to drive the species to extinction.

Our Response: While we concur that critical habitat designation can provide some level of species protection by addressing cumulative effects of numerous impacts to the habitat in certain circumstances, this can only be provided if there is Federal nexus for those agencies planning actions that may impact the designated habitat.

6. Peer Reviewer Comment: The Service's statement in the rule, that the exclusion of HCPs offers ``unhindered, continued ability to seek new partnerships with future HCP participants'' (see Relationship of Critical Habitat to Approved Habitat Conservation Plans) should be amended in the rule as it is illogical and self-contradictory. Not designating critical habitat within HCPs in order to allow seeking new partnerships implies that the new partnerships would be compromised if they were actually forced to protect Riverside fairy shrimp habitat, which should be one goal of any ``partnership.''

Our Response: Both HCPs and critical habitat designations are designed to provide conservation measures to protect the Riverside fairy shrimp. The advantage of seeking new conservation partnerships, through HCPs or other means, is that they can offer active management and other conservation measures for the habitat on a full-time and predictable basis, while a critical habitat designation only prevents adverse modification of the habitat where there is a Federal nexus to the modifying activity, a far lesser level of protection. It is our

experience that landowners generally react very negatively to having their property designated as critical habitat, and that this is then a strong disincentive for them to cooperate in conservation of the species in question. HCPs offer conservation of covered species whether or not the area is designated as critical habitat (for details see the section Relationship of Critical Habitat to Approved Habitat Conservation Plans).

7. Peer Reviewer Comment: The proposed rule appears to find ways to exclude most of the ``potential'' critical habitat in Riverside and San Diego counties. Except for areas on March Air Reserve Base, the proposed Map Unit 3 for Riverside County excludes all critical habitat, and specifically that on the Santa Rosa Plateau, based on the speculative assertion that the proposed Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) will adequately protect the Riverside fairy shrimp. What is the benefit of excluding critical habitat for the Riverside fairy shrimp on the Santa Rosa Plateau? Any scientifically defensible HCP must protect nearly all of the Santa Rosa Plateau.

Our Response: HCPs and their Implementing Agreements include management measures and protections designed to protect, restore, monitor, manage, and enhance the habitat to benefit the conservation of the species covered in the plans. The Western Riverside County MSHCP, which has now been finalized, seeks to accomplish these goals for the Riverside fairy shrimp through the implementation of species-specific conservation objectives.

In our analyses, the benefits of excluding critical habitat areas covered by the Western Riverside County MSHCP outweigh the benefits of inclusion. Of the conservation measures this plan identifies for the Riverside fairy shrimp, the first objective is to include within its Conservation Area at least five Core Areas of vernal pools (or vernal pool complexes) and their watersheds; these areas contain five known key Riverside fairy shrimp populations. Core Areas include the Santa Rosa Plateau Ecological Reserve (17,188 acres), Skunk Hollow (156 acres), Murrieta (1,292 acres) and Lake Elsinore back basin (3,180 acres). Within the key population areas, approximately 5,868 acres (33 percent) of potential vernal pool and playa habitat and suitable soils habitat land coverages would be located outside the MSHCP Conservation Area. Any Riverside fairy shrimp present within this area would be subject to incidental take under the guidelines implemented as part of this Plan. Each Reserve Manager responsible for a Core Area containing soils identified as supporting the Riverside fairy shrimp (e.g., the Santa Rosa Plateau Ecological Reserve) shall evaluate their Core Area for the presence of historic or vestigial vernal pools. A program to enhance these areas will be undertaken. Within the MSHCP Conservation Area, that pond water seasonally will be identified and monitored for the presence of fairy shrimp. Reserve managers will ensure habitat support functions within the MSHCP Conservation Area by maintaining and/or preserving watersheds of conserved known or future vernal pools or depressions. Particular management emphasis will be given to disking, illegal dumping and maintaining hydrology (MSHCP Final Documents, Vol. 1--The Plan, June 17, 2003). See Western Riverside County Multiple Species Habitat Conservation Plan in the section Relationship of Critical Habitat to Approved Habitat Conservation Plans below for more details.

8. Peer Reviewer Comment: The Service's assumption that the existence of an HCP automatically affords protection to the Riverside fairy shrimp within the covered area is questionable. In the development of the San Diego Multiple Species Conservation Plan (MSCP)/HCP, vernal pools were explicitly excluded from its intended coverage, because at the time, those areas covered by the conservation plans were regulated as wetlands by the Environmental Protection Agency. As San Diego County does not have a good record of enduring protection of vernal pools, it is important, from a scientific and land-management perspective, to

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have an explicit analysis of what (if any) Riverside fairy shrimp populations and their habitats are actually covered in the designated protected areas of the HCP, before exclusion of any areas are made.

Our Response: Vernal pool habitats that support the Riverside fairy shrimp that were considered essential but excluded from critical habitat were included on our website for public review and comment. Of the 1,183 ac (479 ha) of mapped vernal pool habitat within the MSCP planning area, over 847 ac (343 ha) occur within the planning area. The Service has completed a Biological Opinion (June 1997) on the San Diego MSCP, and found that the Plan meets the standards set forth in 50 CFR 17.32(b)(2), and has issued an incidental take permit to the City of San Diego for the 85 species covered in the plan, including the Riverside fairy shrimp. The permit action does not, however, authorize impacts to wetlands or wetland communities; the MSCP assumes a policy of ``no net loss'' of vernal pools. The permit requires that impacts to vernal pools be avoided; unavoidable impacts will be minimized to the maximum extent practicable and mitigated at a 2:1 or 4:1 ratio to prevent any net loss of vernal pool function and value. In addition to conserving existing vernal pool habitat, the Multiple Habitat Planning Area is expected to conserve 7,745 ac (3,134 ha) of undeveloped areas with clay soils and clay hardpan, and implement management and monitoring measures for vernal pools within the area. In the Biological Opinion issues, the Service has specifically addressed the Riverside fairy shrimp, and emphasized the conservation of the hydrological processes needed for vernal pool functioning. Pursuant to section 4(b)(2), we have excluded lands within legally operative HCPs,

including the San Diego MSCP, that address the conservation needs of the Riverside fairy shrimp, if the plans provide assurances that the conservation measures outlined will be implemented and effective. Please see Relationship of Critical Habitat to Approved Habitat Conservation Plans section of the rule below.

9. Peer Reviewer Comment: Several reviewers stated that the proposed critical habitat designation does not go far enough to provide for the protection of the Riverside fairy shrimp, because significant portions of the species' range were excluded from critical habitat protection. These areas include Department of Defense lands and MSCP/HCP lands. The Riverside fairy shrimp populations in these areas, particularly those on Department of Defense land, are not protected and are either being lost at present, or vulnerable to loss due to a number of sources and activities, including military maneuvers, crushing by vehicles and toxic poisoning from vehicles or ordnances. In fact, lands under the jurisdiction of HCPs, MSCPs, and the Department of Defense have continued to lose populations of San Diego fairy shrimp (e.g., Cousin's pool, Marine Corps Air Station Miramar) and restoration/creation efforts have thus far not succeeded, and this will likely happen with the Riverside fairy shrimp unless adequate protection is provided for the existing populations. For example, in San Diego County, 66 of 67 vernal pools occupied by the federally endangered San Diego fairy shrimp (Branchinecta sandiegonensis) have been recently lost in Mira Mesa, an area covered by the San Diego County MSCP. Thus, the benefits of exclusion do not outweigh the benefits of inclusion due to the significantly increased threat to the species survival that exclusion of critical habitat poses to the species.

Our Response: We do not agree with the peer reviewer that excluding critical habitat on lands covered by an HCP or INRMP poses a ``significantly increased threat to the species survival.'' Please refer to the responses to Peer Reviewer Comments 7 and 8 above, and the sections Relationship of Critical Habitat to Department of Defense Lands and Relationship of Critical Habitat to Approved Habitat Conservation Plans below.

10. Peer Reviewer Comment: The small amounts of habitat designated as critical habitat may be questionable. The strip along the international border in the proposed rule (Map Sub-unit 5B, southwestern Otay Mesa) appears to be mitigation or restoration from the Border Infrastructure System. It is not clear that the current hydroperiods are comparable to the pre-impact hydroperiods. Further, it appears that the Department of Homeland Defense drives vehicles through the pools with impunity, without the need for permitted take from the Service. Habitat of such dubious condition is not a suitable substitute for the excluded (but intact) habitat surrounding the proposed areas on western Otay Mesa (critical habitat Map Sub-units 5A, 5B).

Our Response: Please refer to the response to Comment 4-1 below.

11. Peer Reviewer Comment: Areas of critical habitat that have been excluded in the proposed rule are under a high level of threat, and local populations of Riverside fairy shrimp in those areas thus face considerable risk of being extirpated, as has happened with populations of the San Diego fairy shrimp. Currently, there is not enough scientific information on the population genetic structure or life history of the Riverside fairy shrimp to be able to predict the consequences of population losses. Without such data, it is not possible to identify the areas of highest genetic variability, population sources and sinks, levels of gene flow, gene flow distances, evolutionarily significant units or population viability requirements. Loss of critical populations or connections between populations could increase the probability of extinction and put the species as a whole in jeopardy. Thus, it is important that all populations of the Riverside fairy shrimp be included in the critical habitat designation to provide adequate protection of the species as required by the Act.

Our Response: We recognize the current threats facing the Riverside fairy shrimp, the need to minimize fragmentation effects, and to provide adequate conservation protection. However, we did not designate critical habitat for all populations of the Riverside fairy shrimp. Some areas in our proposed designation were not designated as critical habitat for the following reasons: (1) The area did not meet the definition of critical habitat under section 3(5)(A) of the Act, (2) the area is now included within legally operative HCPs, (3) the area was necessary for national security measures, or (4) economic impact costs. However, for some areas which were excluded from critical habitat under section 4(b)(2) of the Act, or exempted under section 4(a)(3) of the Act, the Riverside fairy shrimp still receives protection under conservation plans such as HCPs or INRMPs.

12. Peer Reviewer Comment: According to the proposed rule, critical habitat is identified for the Riverside fairy shrimp in six separate units, each of which correspond to the larger Management Areas that support Riverside fairy shrimp occurrences as outlined in the Recovery Plan (Service 1998; 2004). However, the management areas specified in the Recovery Plan for Vernal Pools of Southern California are based on simple geographical locations, not the biology of the species considered, and the Recovery Plan does not include a population viability analysis. Genetic information on the San Diego fairy shrimp has shown that these management areas do not coincide with the species' evolutionarily significant units based on the population genetic structure of the species. The identification of populations essential to the species requires genetic analysis and

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life history analysis to determine ``source/sink'' status and to evaluation the viability of the population and probability of

persistence. Simple geographic location is not sufficient, especially considering the amount of loss of intervening habitat. The management areas are therefore not relevant to the species' conservation, a fact which likely also applies for the Riverside fairy shrimp (Bohonak et al. 2003).

Our Response: We agree that no scientific information is available on the genetic diversity of the Riverside fairy shrimp, as is the case for the San Diego fairy shrimp. Thus, we used geographical descriptions to identify critical habitat units. These geographical descriptions are not meant to suggest any evolutionary divergence or population genetic structure. At the same time, we also based our analyses on what areas constituted critical habitat upon the best available scientific and commercial data available to us at the time, and made available public comment periods to allow for submission of any new information.

13. Peer Reviewer Comment: The proposed rule stated that an artificial vernal pool complex had been created to offset the impacts to a population of Riverside fairy shrimp by the Redhawk Development, and that another artificial vernal pool creation was planned in order to offset the taking of Riverside fairy shrimp at the Clayton Ranch Pool. Two reviewers questioned whether these artificial pools have produced viable, reproducing populations with positive rates of increase, rather than simply hatching shrimp from the transplanted cysts. To the reviewers' knowledge, no such successes have been recorded in the primary literature; i.e., see Ripley et al. (2004). Furthermore, the proposed rule stated that on Otay Mesa in San Diego County, significant work had been done to restore and enhance vernal pools for listed species, including the Riverside fairy shrimp. However, the reviewers noted that due to failure to check the transplanted cysts, the Otay pools have become ``infected'' with a ``weedy'' species, the winter fairy shrimp (Branchinecta lindahli), which can hybridize with the San Diego fairy shrimp (Fugate 1998); its effect on the Riverside fairy shrimp is yet unknown. Thus, the restoration or creation efforts have not been verified as successful (producing viable populations and a growing cyst bank) for either San Diego fairy shrimp or Riverside fairy shrimp, and have in fact, introduced new potential threats.

Our Response: We did not designate any artificial vernal pools as critical habitat for the Riverside fairy shrimp.

Public Comments

Issue 1: Policy and Regulations

1-1. Comment: It was suggested that all essential Riverside fairy shrimp habitat areas within the boundaries covered by the Western Riverside County Habitat Conservation Plan (HCP), Central/Coastal Orange County Natural Community Conservation Program (NCCP), and San Diego Multiple Species Conservation Plan (MSCP) should be included in the final critical habitat designation because (a) areas within those plans meet the definition of critical habitat; the Service has identified those areas as essential to the conservation of the species, and the plans provide special management for the species, (b) the benefits of inclusion far outweigh the harm wrongly perceived by others, (c) the critical habitat designation provides greater conservation benefits than those contained in the plans, which are inadequate to conserve the Riverside fairy shrimp, (d) because the educational benefits of HCPs are much less than those provided by critical habitat designation, and (e) the critical habitat designation has greater specificity, addressing the needs of specific species, than HCPs. Another commenter suggested that the critical habitat designation should be expanded to include all Riverside fairy shrimp populations, including those in excluded Department of Defense lands or HCP areas. In contrast, one commenter suggested that lands within the Western Riverside County MSHCP do not require additional special management considerations or protection, and thus do not meet definition of ``critical habitat.''

Our Response: Although the habitat within the boundaries of these conservation plans contains one or more of the physical and biological characteristics essential to the conservation of the Riverside fairy shrimp, we have determined that these conservation plans provide special management and/or protection for the Riverside fairy shrimp, and we have concluded that the benefits of excluding the lands covered by these plans from the final critical habitat designation outweigh the benefits of including these areas. Thus, we have excluded these areas from critical habitat designation under 4(b)(2) of the Act.

We recognize that critical habitat is only one of many conservation tools for federally listed species. HCPs are one of the most important tools for reconciling land use with the conservation of listed species on non-Federal lands. Section 4(b)(2) of the Act allows us to exclude from critical habitat designation areas where the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. We believe that in most instances, the benefits of excluding HCPs from critical habitat designations will outweigh the benefits of including them. For this designation, we find that the benefits of exclusion outweigh the benefits of designation for all approved and legally operative HCPs which address the Riverside fairy shrimp and provide for its long-term conservation. These include the San Diego MSCP in San Diego County, the Western Riverside County MSHCP and the Rancho Bella Vista HCP and Assessment District 161 Sub-regional HCP in Riverside County.

HCPs must meet issuance criteria, according to section 10(a)(1)(B) of the Act, including minimizing and mitigating any take of the listed species covered by the permit to the maximum extent practicable, and that the taking must not appreciably reduce the likelihood of the

survival and recovery of the species in the wild. The take minimization and mitigation measures provided under the above-mentioned HCPs are expected to adequately protect the essential habitat lands designated as critical habitat in this rule, such that the value of these lands for the survival and recovery of the Riverside fairy shrimp is not appreciably diminished through direct or indirect alterations. We expect that HCPs undertaken by local jurisdictions (e.g., counties and cities) and other parties will identify, protect, and provide appropriate management for those specific lands within the boundaries of the plans that are essential for the long-term conservation of the species. We discuss these standards in detail in the section 7 Consultation and Relationship of Critical Habitat to Approved Habitat Conservation Plans portions of this document below).

1-2. Comment: It was suggested that the essential Riverside fairy shrimp habitat areas within the boundaries covered by the Western Riverside County HCP should not be excluded as critical habitat because the plan was only recently approved and the protection benefits the plan provided to the species were thus unproven and speculative. According to the Act, the Service cannot base its decisions to exclude areas from its critical habitat designation on unproven conservation activities.

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Our Response: Under section 4(b)(2), we may exclude any area from critical habitat if we determine that the benefits of such an exclusion outweigh the benefits of including the area in the critical habitat designation, unless, based on the best scientific and commercial data available, we determine that failure to designate the area as critical habitat will result in the extinction of the species. We have excluded the areas within the Western Riverside County MSHCP from the final critical habitat designation under section 4(b)(2) of the Act because the benefits of exclusion outweigh the benefits of inclusion. (For a detailed discussion please see the section Relationship of Critical Habitat to Approved Habitat Conservation Plans below).

1-3. Comment: Several comments were made that the Service inaccurately overstates the benefits of conservation plans while overemphasizing possible harm of critical habitat designation within plans' boundaries, that the Service cannot rest any claim of harm on mere perceptions; possible complaints by plan participants would suggest intention of significantly reduced conservation compared to those in a designated critical habitat. Critical habitat designation of an area after the approval of an HCP there will not serve as disincentive, but actually encourage HCP preparation.

In an opposing view, one commenter supported the exclusion of critical habitat within the Western Riverside County MSHCP, asserting that if it were included, it would undermine cooperative conservation partnerships. Two commenters stated, in general, that all lands covered by an HCP (e.g., NCCPs/ special area management plans) should be automatically excluded from critical habitat designation upon approval of the respective conservation or management plan.

Our Response: It is our experience that most landowners strongly object to inclusion of their lands within critical habitat; thus while proposing a designation may in some cases provide an incentive to participate in developing an HCP, we have no indication that designating private lands as critical habitat encourages the owners to engage in conservation activities. We do recognize that the designation of critical habitat does not provide the same set of conservation conditions that an HCP does, and an HCP may well provide more benefits to the species than critical habitat designation. We recognize that critical habitat is only one of many conservation tools for federally listed species, but HCPs are one of the most important tools for reconciling land use with the conservation of listed species on non-Federal lands. Furthermore, the benefits of including HCPs or NCCP/HCPs in the critical habitat designation are normally small; i.e., any federally funded or authorized activities in such habitat that may affect critical habitat would require consultation under section 7 of the Act. Such consultation would ensure that adequate protection is provided to avoid adverse modification of critical habitat. Where HCPs are in place, we believe that this benefit is small or non-existent. Although conservation plans are important tools to ensure the species survival and recovery, our actions regarding newly implemented plans are not automatic; it is our policy is to carefully review each plan, and only exclude areas from critical habitat designations consistent with section 4(b)(2) of the Act.

1-4. Comment: All essential habitats within the boundaries of the Central/Coastal Orange County NCCP/HCP should be included in the critical habitat designation because the Riverside fairy shrimp in natural vernal pools is not covered by these plans, and therefore cannot benefit from the conservation measures in the plan.

Our Response: The Riverside fairy shrimp is known to occur in only two areas within the Central-Coastal Orange County NCCP/HCP, which provides for the establishment of approximately 38,738 ac (15,677 ha) of reserve lands for 39 Federal or State listed, unlisted, and sensitive species. Within this NCCP/HCP, we proposed critical habitat at the former Marine Corps Air Station (MCAS) El Toro but we excluded this area pursuant to section 4(b)(2) for economic impacts. We excluded an area within the Edison Viejo Conservation Bank, as their management plan meets our criteria for conservation measure for the species. The Riverside fairy shrimp is also known to occur in the North Ranch Policy Plan area which was originally not included within the Central-Coastal NCCP/HCP. However, in 2002, the Irvine Company, owner of lands within the North Ranch Policy Plan area, granted a conservation easement to

The Nature Conservancy over the portion of the land where this vernal pool is located, and provided a $10 million management endowment. The conservation easement and management endowment ensure conservation of the Riverside fairy shrimp at this site. (For details, see Relationship of Critical Habitat to Approved Habitat Conservation Plans below).

1-5. Comment: The critical habitat designation does not give landowners effective notice as to whether their property contains critical habitat, causing a burden to landowners who must determine which portions of their land contain critical habitat.

Our Response: We identified, as critical habitat, specific areas in the proposed determination that are referenced by UTM coordinates found on standard topographic maps. Note that areas delineated as critical habitat on the maps do not include developed areas within the boundaries that do not contain more than one of the primary constituent elements for the species. During the public comment periods, we also made available the proposed critical habitat units, superimposed on 7.5 minute topographic maps and spot imagery, for inspection by the public at the Carlsbad Fish and Wildlife Office. Furthermore, we distributed geographic data and maps of the proposed critical habitat to all individuals, organizations, local jurisdictions and State and Federal agencies that requested them. We believe the information made available to the public is sufficiently detailed to allow for determination of critical habitat boundaries. This final rule contains the legal descriptions of areas designated as critical habitat required under 50 CFR 424.12(c). The accompanying maps are for illustration purposes only. If additional clarification is necessary, contact the Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Carlsbad, California 92009 (telephone 760/431-9440).

1-6. Comment: Essential Riverside fairy shrimp habitat within MCAS Miramar should be included as critical habitat because the habitat under their Integrated Natural Resource Management Plan (INRMP) meets the definition of critical habitat, as the Service has identified those areas as essential to conservation of species and the plan provides special management for the species. Further, the current INRMP (a) does not provide details for any existing or future exotic control project and thus does not provide adequate protection against current threats posed by the spread of exotic plants, (b) contains mainly future plans and few active measures addressing current conservation needs, and little information on when and where the actions will be accomplished, (c) does not include the Navy's past Miramar Vernal Pool Management Plan, i.e., treatment of vernal pools is not mandated, (d) its protection measures are not permanent, i.e., its reference to ``political developments'' could be seen as future decision to convert base to a

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regional airport or other development; (e) identifies the NEPA and the Clean Water Act as primary mechanisms for reconciling land uses with conservation, but these do not provide effective conservation of vernal pools, and (f) the INRMP provides few benefits, as the INRMP and past consultations will not ensure conservation or protection of Riverside fairy shrimp and its essential habitat.

Our Response: Under section 4(a)(3) of the Act, we must exempt military lands subject to an INRMP from critical habitat if that plan provides a benefit to Riverside fairy shrimp. The lands at MCAS Miramar are covered by an approved INRMP that identifies sensitive natural resources within management areas that have various resource conservation requirements and management concerns. These areas have been assigned five levels of conservation priority corresponding with their sensitivity, with e.g., Level I management areas receiving the highest proactive measures. MCAS Miramar continues to monitor, restore and manage its vernal pool resources, including studies in progress, and has indicated it has no plans for changes in future land use. MCAS Miramar has completed an INRMP which we have reviewed and determined that it provides benefits to the Riverside fairy shrimp. Therefore, lands at MCAS Miramar have not been included in the proposed or final designation in accordance with 4(a)(3) of the Act (for more details, see benefits analysis in proposed rule (69 FR 23024) under Relation of Critical Habitat to Department of Defense Lands; Marine Corps Air Station Miramar).

1-7. Comment: The Service did not provide for adequate public notice of the proposed rule and sufficient opportunity for public comment. Additionally, requests for extension of the comment period were denied, while previous comments have not been acted upon. The 30-day comment period on the draft economic analysis lacks compliance with the required 60-day comment period per the Service's own regulations, the Act and the Regulatory Flexibility Act; with a shorter comment period.

Our Response: Pursuant to our implementing regulations at 50 CFR 424.16, we are required to provide for at least 60-days for public comment following the publication of a proposed rule in the Federal Register. We published the proposed rule to designate critical habitat for the Riverside fairy shrimp in the Federal Register on April 27, 2004 (69 FR 23024), and accepted comments from the public for 30 days, to May 27, 2004. We contacted all appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment on the proposed rule. In addition, we published notices in the San Diego Union Tribune, the Orange County Register, and the Los Angeles Times, all on May 6, 2004. We published a second notice in the Federal Register on October 19, 2004 (69 FR 61461), announcing the availability of the draft economic analysis and opening a 30-day public comment period until November 18, 2004, to

allow for comments on the draft economic analysis and additional comments on the proposed determination. We provided notification of the draft economic analysis through telephone calls, letters, and news releases faxed and/or mailed to relevant elected officials, local jurisdictions, and interest groups. Following its release, we also published the draft economic analysis and associated material on our Web site (http://carlsbad.fws.gov). We believe these two public comment

periods provided adequate opportunity for public comment and constitute compliance with our implementing regulations at 50 CFR 424.16. Because of the court-ordered time frame, we were not able to extend the second comment period or open an additional public comment period.

1-8. Comment: Would the designation of critical habitat for the Riverside fairy shrimp be considered a changed or unforeseen circumstance with respect to the various sub-area HCPs presently approved or pending?

Our Response: In this rule, no critical habitat was designated within lands covered by any pending or un-approved HCP.

1-9. Comment: One commenter stated that the proposal to designate critical habitat violates the Act because of (a) failure to use the best available science to exclude non-essential lands from the critical habitat designation, (b) failure to determine whether any specific areas may require special management considerations or protection, (c) it does not contain an economic impact analysis; Congress intended that the Service consider economic and other impacts of the critical habitat designation concurrently with the formulation of critical habitat proposals, (d) certification pursuant to the Regulatory Flexibility Act impermissibly relies on the as-yet unavailable economic analysis, reducing ability of public to provide meaningful comment, and because (e) the Service has failed to comply with NEPA prior to designating critical habitat.

Our Response: We are directed by the Act to use the best commercial and scientific information available to us at the time we conduct our analyses. In response to part (a), we relied on the best scientific resources when determining to either designate areas essential to the conservation of the Riverside fairy shrimp and to exclude other areas from our final critical habitat designation. Our final delineation of critical habitat is based on the best available scientific and commercial data regarding the species, including a compilation of data from peer-reviewed published scientific literature, unpublished or non-peer-reviewed survey or research reports, and statements from expert biologists knowledgeable about the Riverside fairy shrimp and its habitat. In addition to the above information available to us, we also requested additional information from the public and from peer reviewers to further assist us in our analyses. All new information that was provided during the public comment periods was considered in this final designation, as appropriate. The areas designated as critical habitat represents our best estimate of what areas are essential and critical for the conservation of the species. In response to part (b), please refer to our section Relationship of Critical Habitat to Approved Habitat Conservation Plans for details on our analyses of approved conservation plans. In response to comments (c) and (d), we have provided a draft economic analysis, available for public review during the second comment period, giving individuals opportunity to submit comments on its contents, which we have reviewed and addressed in this rule. In response to comment (e), we are not required to prepare environmental analyses as defined by the NEPA in connection with designating critical habitat under the Endangered Species Act of 1973, as amended. (For more details, see National Environmental Policy Act (NEPA) below).

1-10. Comment: Would on-going activities (such as routine inspections, road grading, construction, etc.) that occur adjacent to designated critical habitat be considered to appreciably decrease habitat values or quality through indirect effects?

Our Response: The Federal agency planning to conduct such activities must determine if their proposed action may affect critical habitat designated for the Riverside fairy shrimp. The action agency determines whether their action(s) ``may affect'' the Riverside fairy shrimp or its primary constituent elements within the adjacent critical habitat based on their analyses. If so, the

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action agency would enter into consultation with the Service under section 7.

1-11. Comment: Can the Service exclude all areas addressed under existing section 7 permits in a manner similar to the exclusions for areas covered under existing section 10 permits? Specifically, can an existing section 7 permit based on a biological opinion for the California gnatcatcher be amended to cover the Riverside fairy shrimp critical habitat in the Otay Mesa area? Specifically, this would be necessary for ongoing operations and maintenance by the San Diego County Water Authority of the Mexico Emergency Connection Pipeline on the western portion of Otay Mesa (final Map Unit 4).

Our Response: Consultation under section 7 of the Act does not result in the issuance of a section 7 ``permit'' per se. Federal actions that we conclude are not likely to jeopardize the continued existence of a listed species are exempted from the prohibition against take of listed animal species under section 9 of the Act so long as the Federal agency and any permittee comply with the terms and conditions of the incidental take statement accompanying the Service's biological opinion. Assuming the Federal agency that was subject to consultation under section 7 of the Act for a listed species still retains

discretionary jurisdiction over the action, the Federal agency must re-initiate section 7 consultation if its action ``may affect'' designated critical habitat for the Riverside fairy shrimp. See Section 7 Consultation below.

1-12. Comment: One commenter requested that the Major and Minor Amendment areas of the eastern portion of Otay Mesa, southern San Diego region (Map Unit 5C), be excluded from the critical habitat designation because these areas must conform to the MSCP, sub-area plans, and the resource protection ordinance, and a critical habitat designation would result in additional section 7 requirements, economic burdens on HCP participants, discourage HCP development, cause additional regulatory review that could jeopardize ongoing conservation efforts, possibly encourage legal challenges to the HCPs because of the uncertainty of the ``adverse modification'' threshold, and afford no additional benefit to the species because HCPs provide better long-term conservation measures.

Our Response: Although the Major/Minor Amendment areas are within the boundaries of the San Diego MSCP, these areas are not covered by completed plans that address the conservation of the Riverside fairy shrimp. While we have excluded lands covered by approved sub-area plans under the MSCP, the plans for the Major/Minor Amendment areas are incomplete and thus do not provide adequate conservation measures addressing the Riverside fairy shrimp. However, we have excluded all of Sub-unit 5C in private ownership within the Otay Mesa Major/Minor Amendment areas, under section 4(b)(2) of the Act, in order to avoid some or all of the additional costs incurred by affected landowners.

1-13. Comment: One commenter suggested that the areas proposed as Riverside Fairy Shrimp critical habitat (a) do not need special protection or satisfy the definition of critical habitat because they receive substantial protections under new regulations (i.e., Clean Water Act, Porter-Cologne Water Quality Control Act, California Environmental Quality Act, California Department of Fish and Game permitting codes, State Water Board regulations; and (b) must be re-evaluated to determine whether the habitat requires special protection in light of new regulations governing such areas, i.e., the California Porter-Cologne Water Quality Control Act.

Our Response: While the statutes listed above may provide some regulatory protection for the Riverside fairy shrimp and its associated essential habitat, they do not provide assured management for the species.

Therefore, exclusion of essential habitat from this designation on the basis of the regulatory protections potentially afforded by these statutes is not warranted.

1-14. Comment: One commenter asserted that Service has unlawfully pre-determined that exclusion from the final critical habitat designation of essential Riverside fairy shrimp habitat that lies within other conservation plan areas outweighs any benefits of inclusion because the acknowledged essential habitat was excluded prior to the public's review of the Service's analyses of benefits and harm.

Our Response: Notice of our intent to exclude lands within approved and/or pending HCPs was provided to the public, and maps showing the lands proposed for exclusion were readily available to the public for inspection during the two public comment periods. We solicited comments from the public for 30 days about the areas which we proposed to include or exclude from the proposed rule to designate critical habitat for the Riverside fairy shrimp on April 27, 2004 (69 FR 23024). In the Federal Register notice, we notified the public that we may revise the critical habitat designation if additional information becomes available that changes our assessment of the relative benefits of including or excluding these areas from critical habitat. We also contacted appropriate State and Federal agencies, county governments, elected officials, and other interested parties and invited them to comment on the proposed rule, and published notices in the San Diego Union Tribune, Orange County Register, and Los Angeles Times on May 6, 2004. We published a second notice on October 19, 2004 (69 FR 61461), announcing the availability of the draft economic analysis and opening a 30-day public comment period until November 18, 2004, and also published the draft economic analysis and associated material on our Web site (http://carlsbad.fws.gov). In making our final critical habitat determination, we considered every comment submitted.

Issue 2: Adequacy and Extent of Critical Habitat Designation

2-1. Comment: One commenter stated that there is no substantiation for an increase in area designated as critical habitat from the previous critical habitat rule issued on May 30, 2001 (66 FR 29384).

Our Response: In the May 30, 2001, final critical habitat rule for the Riverside fairy shrimp (66 FR 29384), we designated approximately 6,870 ac (2,790 ha) as critical habitat. Since then, additional, new information on vernal pools and the occurrences of the little-studied Riverside fairy shrimp has become available, while on the other hand, numerous of the discovered essential areas have been included in several regional HCPs or INRMPs. Thus, on April 27, 2004, we proposed to designate approximately 5,795 ac (2,345 ha) of vernal pools and their adjacent watersheds essential to the conservation of the species as critical habitat for the Riverside fairy shrimp (69 FR 23024). This final determination designates 306 ac (124 ha) as critical habitat, which represents less than five percent of the area originally designated as critical habitat in the previous rule of 2001.

2-2. Comment: One commenter stated that the Service did not use an appropriate mapping scale for this species, and since the species' range is well known in San Diego County, the Service should have been able to delineate critical habitat boundaries with extreme precision. The current 100 m\2\ blocks include areas that do not have the PCEs for

the Riverside fairy shrimp, and those areas should be excluded. Another commenter asked whether the Service intends to exclude from the designated critical habitat all existing

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roads, aqueducts, etc. regardless of the state of these features.

Our Response: We are required to define and delimit critical habitat by specific limits using reference points and lines as found on standard topographic maps of the area'' (50 CFR 424.12(c)). We have delimited the boundaries of critical habitat boundaries in this rule based on a minimum mapping scale of 100 m. This mapping scale was based on the availability and accuracy of aerial photography and GIS data layers used to develop the designation. In drawing our critical habitat boundaries for the proposed and final rules, we have attempted to exclude all areas that do not contain essential habitat for the Riverside fairy shrimp as defined by its PCEs. Based on information obtained through public comments and updated imagery and GIS data layers, we have been able to further refine the boundaries of critical habitat during the development of this final rule. Within the limitations of our mapping scale, we have been able to exclude most, but not all areas, that do not contain the PCEs, including some man-made features. Note, however, that we have determined that existing man-made features and structures, such as buildings, roads, railroads, airports, runways, other paved areas, lawns, and other urban landscaped areas are not likely to contain one or more of the PCEs and thus do not constitute critical habitat and the lands on which they are found. Activities in these areas are unlikely to affect PCEs (i.e., essential habitat for the Riverside fairy shrimp), and therefore, consultation under section 7 of the Act would not be required unless such activities would affect the species or adjacent critical habitat. In making the critical habitat designation, we used the best scientific and commercial information available to us, including information obtained during the two public comment periods

2-3. Comment: The proposed critical habitat designation violates the Act because of the Service's failure to limit the designation to areas essential to the conservation of the Riverside fairy shrimp.

Our Response: In proposing critical habitat designation, we used the best scientific and commercial information available to determine those areas essential for the conservation of the Riverside fairy shrimp. We used additional information available to us, including a more detailed aerial imagery, a finer mapping grid (changed from 250 m\2\ to 100 m\2\), as well as information provided by commenters to refine our mapping of all essential habitat included in the final designation. Please see the sections Background, Criteria Used to Identify Critical Habitat, and Critical Habitat Designation of this rule for further discussions on how we determined habitat that is essential to the conservation of the species. The areas designated by this final rule are limited to lands essential for the conservation of the Riverside fairy shrimp.

2-4. Comment: Rancho Mission Viejo stated that in the proposed rule: (a) The Service used a ``recovery standard'' which resulted in an overly broad critical habitat designation, (b) the Service did not provide scientific data to indicate how it determined the extent of watersheds that comprise the extent of critical habitat within Rancho Mission Viejo, and that (c) one vernal pool (within Map Unit 2), included in the proposed designation, no longer exists.

Our Response: The definition of critical habitat in section 3(5)(A) of the Act includes ``(i) specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.'' The term ``conservation,'' as defined in section 3(3) of the Act, means ``to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary''. In designating critical habitat for the Riverside fairy shrimp, we identified those areas that are essential to the conservation of this species. The areas we designate as critical habitat provide one or more of those habitat components essential for conservation of the Riverside fairy shrimp. In this final rule, we have not included all areas currently occupied by the Riverside fairy shrimp, but instead have designated those areas that are essential for the conservation of the species and that may possess large populations, have unique ecological characteristics, and/or represent the known historic geographic areas where the Riverside fairy shrimp can be re-established. The Recovery Plan (Service 1998) details some measures to meet the recovery needs of the Riverside fairy shrimp, and provides a description of habitat attributes that are essential to conservation of the species. We believe that we used the best scientific and commercial information available in determining those areas essential for the Riverside fairy shrimp that were proposed as critical habitat and subsequently finalized. Please see the sections Background, Criteria Used to Identify Critical Habitat, and Critical Habitat Designation of this rule for further discussion on how we determined habitat that is essential to the conservation of the Riverside fairy shrimp.

Issue 3: Biological Justification and Methodology

3-1. Comment: There is insufficient data to show that the Riverside fairy shrimp is present in the proposed critical habitat areas at March

Air Reserve Base (March ARB). Further, the Service did not use best scientific data available in the proposed critical habitat designation, as it did not consider the ``1998 Fairy Shrimp Surveys at March Air Reserve Base, Riverside County, California'' (RECON Number 2965B, September 14, 1998) which concluded that ``potential habitats at March Air Reserve Base are of poor quality and do not support the Riverside fairy shrimp.'' Because the surveys indicated that the habitat was unoccupied, the pools on March ARB are not essential to the conservation of the species.

Our Response: The delineation of critical habitat for the Riverside fairy shrimp was based on the best available scientific and commercial data regarding the species. During both public comment periods, all new information provided was considered in this final designation, as appropriate. The areas proposed and designated as critical habitat, as described, represent our best estimate of what areas are essential and critical for the conservation of the species. Critical habitat at March ARB was excluded from critical habitat based on section 4(b)(2) of the Act.

Issue 4: Comments on Individual Map Units--Exclusions

4-1. Comment: The U.S. Department of Homeland Security (DHS), U.S. Border Patrol, San Diego Sector, submitted comments (May 27, 2004) raising the following issues: (1) Lands owned by the DHS within Sub-units 5B and 5C have previously been disturbed and developed by the construction of the Border Infrastructure System (BIS), (2) the DHS has conducted two restoration projects to offset losses for fairy shrimp, and 135 ac (55 ha) of DHS-owned lands located north of the BIS have been designated as mitigation for completion of the border system and

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should not be designated as critical habitat. DHS has made a commitment to the Service to transfer these lands to a conservation resource agency and/or to protect and conserve the lands in perpetuity, (3) lands within the footprint of the BIS do not or will not contain any of the primary constituent elements for the Riverside fairy shrimp once construction is completed, and (4) the BIS is considered integral to national security.

Our Response: We have excluded essential habitat within DHS-owned lands along the U.S.-Mexico border (i.e., all of Sub-unit 5B, and portions of Sub-unit 5C) under section 4(b)(2) of the Act and removed non-essential areas. The concerns related to the presence or absence of primary constituent elements within the footprint of the BIS are moot because no lands owned by the DHS have been designated as critical habitat. For a detailed explanation, please see the section Application of Section 4(b)(2) to Department of Homeland Security (DHS) lands below.

4-2. Comment: March ARB requested that vernal pools located on their lands be excluded from critical habitat under section 4(b)(2) of the Act because designation would adversely impact commercial reuse of former military property currently under development, severely limit civilian aviation at the joint-use March ARB airport, result in aviation delays, jeopardize public safety and impact firefighting mission of California Department of Forestry, increase possible risk of bird-aircraft strikes, and ``adversely impact mission execution and military training critical to national security.'' One pool is located near the airfield zone where ongoing maintenance is necessary to ensure proper drainage and prevent possible runway damage. Further, they suggested that the vernal pools on March ARB (called Pools 3 and 6 by March ARB) do not meet the definition of ``critical habitat,'' suitable habitat for the Riverside fairy shrimp is not present or determinable and cannot be maintained on March ARB, and the pools are not essential to the conservation of the species as required by Act. Thus, the benefits of exclusion outweigh benefits of inclusion, will not result in extinction of the Riverside fairy shrimp, and the proposed critical habitat designation is not prudent. The Air Force's Environmental Impact Analysis Process ensures the compliance of March ARB with the NEPA, and also, an INRMP is being revised that will ensure all potential habitat areas on March ARB will be investigated for Riverside fairy shrimp.

Our Response: We have determined to: (1) Remove Sub-unit 3A from this critical habitat designation as the area has been modified and no longer contains the primary constituent elements for the Riverside fairy shrimp, and (2) exclude Sub-unit 3B from this final critical habitat designation according to section 4(b)(2) of the Act. The main benefit of the latter exclusion is to ensure that mission-critical military flight activities can continue without interruption at March ARB while their INRMP is being completed. Under section 4(b)(2) of the Act, we may exclude lands from critical habitat if the benefits of excluding them, including the benefits to national security, outweigh the benefits of including them in the designation. We have determined that the benefits to national security of excluding lands within Sub-unit 3B from critical habitat outweighs the benefits of including these lands in the critical habitat designation (see Application of Section 4(b)(2) to March Air Reserve Base (March ARB) for a detailed discussion).

4-3. Comment: We received comment letters from the Federal Aviation Administration (FAA) and Los Angeles World Airports (LAWA; Sapphos Environmental 2004) regarding the proposed designation of critical habitat at the Los Angeles International Airport (Sub-units 2A and 2B). FAA and LAWA questioned the appropriateness of the proposed designation of critical habitat because of past decisions by the Service in the Recovery Plan for Vernal Pools in Southern California, previous designation of critical habitat for the Riverside fairy shrimp, the

April 2004 biological opinion for the Los Angeles International Airport Master Plan, concern for the potential increased risk to public safety and air navigation, and conflicts with FAA's mission. These agencies also recommended that critical habitat not be designated within the Los Angeles International Airport because of the ongoing section 7 consultations for the Riverside fairy shrimp with FAA and LAWA for their operations and maintenance activities and the absence of the primary constituent elements for the Riverside fairy shrimp within the proposed critical habitat units.

Our Response: In the proposed rule, we identified vernal pools at the Los Angeles International Airport (LAX) as critical habitat (Sub-units 2A, 2B). As a result of the ongoing operations and maintenance activities at LAX, the requirement of the primary constituent element related to the length of time that ponding seasonally occurs within these ephemeral wetlands is not met. Thus, these ephemeral wetlands do not contain this primary constituent element; the Riverside fairy shrimp is unable to complete its lifecycle at LAX without these pools being inundated for a minimum of two months. Thus, we conclude that the ephemeral pools originally proposed as critical habitat at LAX are not essential for the conservation of the Riverside fairy shrimp and we are not designating them as critical habitat.

4-4. Comment: The U.S. Marine Corps has requested the exclusion of lands on Marine Corps Base (MCB) Camp Pendleton from critical habitat designation per the Act, under section 4(a)(3) and section 4(b)(2) They stated that MCB Camp Pendleton has an INRMP that provides significant direct and indirect benefits to the Riverside fairy shrimp, that section 7 provides sufficient protection for the Cocklebur Sensitive Area as described in a previous biological opinion (1-1-82-I-92) and therefore, this area should be excluded from critical habitat. They stated that designation would interfere with the base's critical military training mission and military readiness and concurred with the Service's proposal to exclude mission-critical areas from critical habitat designation.

Our Response: According to section 4(a)(3) of the Act, we must exempt Department of Defense lands covered by an INRMP from the critical habitat designation if we determine that the INRMP provides a benefit to the Riverside fairy shrimp. We have reviewed Camp Pendleton's INRMP and conclude that their plan provide a benefit to the Riverside fairy shrimp. With the INRMP in place and progress being made towards improving the protection of Riverside fairy shrimp, we have therefore exempted MCB Camp Pendleton under section 4(a)(3) of the Act. See the Exclusion of Critical Habitat Under Sections 4(a)(3), 3(5)(A) and 4(b)(2) of the Act section below for further discussion of lands excluded from critical habitat.

4-5. Comment: We received a request to exclude areas owned by San Diego Gas and Electric (SDG&E) that fall within their sub-regional NCCP/HCP boundaries from the critical habitat designation because these areas do not meet definition of critical habitat (i.e., is covered by an HCP plan) and exclusion will not pose any potential risk to the Riverside fairy shrimp. Designation of critical habitat imposes economic burdens on HCP participants, increases the cost of consultation, increases delay, imposes additional regulatory review, and will reduce incentive to participate in the HCP process. HCPs provide a much greater conservation benefit to

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private land areas than other Endangered Species Act programs, while critical habitat designation affords no additional benefits to the species as section 7 is applied on an inconsistent and sporadic basis, and does not provide long-term protection.

Our Response: Where site-specific documentation was submitted to us providing a rationale as to why an area should not be designated critical habitat, we evaluated that information in accordance with the definition of critical habitat pursuant to section 3 of the Act. We made a determination as to whether modifications to the proposal were appropriate. We reviewed the maps to ensure that only those lands essential for the conservation of the Riverside fairy shrimp were designated as critical habitat. We excluded lands from the final designation that we determined to be non-essential to the species' conservation. We also excluded lands, including lands identified in the Vernal Pool Recovery Plan that were included in an approved HCP which provides for the conservation of Riverside fairy shrimp, and where we determined that the benefits of excluding those areas outweighed the benefits of including them. We included lands in the final designation that are essential to the conservation of the species which may require special management considerations or protection for the Riverside fairy shrimp. Portions of essential habitat areas within the SDG&E Sub-regional Plan which are used for SDG&E operational maintenance activities have been excluded from critical habitat based on section 4(b)(2) of the Act. This sub-regional plan and the clarification document (July 2004) defines avoidance, minimization, and offsetting measures to be implemented by SDG&E for the operations and maintenance activities and future construction of new facilities and roads.

4-6. Comment: Skyline Ranch suggested that lands owned by Pardee Homes be removed from critical habitat designation because it does not fit critical habitat designation, and is not within the geographical area occupied by the species. The commenter stated that: (a) The Service has no proof showing Cruzan Mesa pools in Skyline Ranch property are occupied; attached information referred to two surveys conducted in 2002 and 2003 that recorded the vernal pool fairy shrimp (Branchinecta lynchi), but did not record Riverside fairy shrimp on Cruzan Mesa; (b) because the Service has not made a finding that the

site is essential to the species, and Skyline Ranch does not need special management or protection, the site cannot be designated critical habitat; (c) the area that has been proposed as critical habitat (536 ac) exceeds the area that contains the PCEs. Pardee Homes engaged Sikand Engineering, whose hydrological model determined that the maximum surface area of the two main pools was 12 ac (5 ha) and the tributary area necessary to fill the pool volumes from rainfall run-off constituted 90 ac (36 ha), totaling 102 ac (41 ha), and (d) the benefits of excluding outweigh the benefits of including lands within Skyline Ranch as critical habitat; exclusion would not lead to the extinction of the species. The commenter listed the benefits of exclusion from critical habitat designation as the implementation of Pardee plans to construct approximately 1,344 single family detached homes on the property, creation of new jobs and tax revenues for local jurisdictions, and the removal of burden of substantial impending litigation to Skyline Ranch property by ``No Growth'' advocates.

Our Response: Cruzan Mesa (proposed Map Sub-unit 1C), constitutes a portion of a larger area of Pardee-owned property (Skyline Ranch). Cruzan Mesa contains several isolated vernal pool complexes within a unique topography, i.e., a topographically enclosed basin atop a large, elevated mesa (1,230 ft (375 m)) on an eroded foothill. In 2004, the Los Angeles County Department of Regional Planning proposed to designate a 958 ac area Sensitive Ecological Area (SEA), including all of Cruzan Mesa, due to its regional biological values. In evaluating the Cruzan Mesa sub-unit, we relied upon various sources, including information in the Final Recovery Plan for Vernal Pools of Southern California (Service 1998) and the Biological Resources Assessment Report of the Proposed Cruzan Mesa Vernal Pools SEA prepared for the Los Angeles County Department of Regional Planning (PCR Services 2000). This information referenced the occurrence of Riverside fairy shrimp at Cruzan Mesa. Information from the referenced comment letter refers to another survey of some vernal pools on Cruzan Mesa that did not encounter Riverside fairy shrimp. However, we have not designated critical habitat on Cruzan Mesa for the Riverside fairy shrimp because at present, we do not have sufficient documentation supporting the occurrence or non-occurrence of the Riverside fairy shrimp in the Cruzan Mesa vernal pools. Thus, we have concluded that Cruzan Mesa is not essential for the Riverside fairy shrimp.

4-7. Comment: San Diego County Water Authority, citing undue increased regulatory burden, costs, and administrative delays that would be caused by a critical habitat designation, requested that their facilities (the Mexico Emergency Connection Pipeline) on Otay Mesa (Sub-unit 5C) be excluded or, alternatively, that provisions be made in the designation to address the existing activities and operations within their right-of-way, through either exclusions or textual exemptions.

Our Response: Please see the response to comment 1-10 above and discussion in Section 7 Consultation, below. Please note that critical habitat within Sub-unit 5C has been excluded based on section 4(b)(2) of the Act.

4-8. Comment: One commenter stated that critical habitat designation should exclude Rancho Mission Viejo lands (within Map Sub-units 2F and 2G) ``in light of disincentives to continued participation in conservation planning,'' because of a pending HCP, and because the benefits of exclusion outweigh benefits of inclusion.

Our Response: We are continuing to work with Rancho Mission Viejo to complete their HCP (please see Relationship of Critical Habitat to HCPs in Development section below). The South Orange County NCCP/HCP covers approximately 128,000 ac (51,799 ha) of land within the plan area and has been in development for a number of years. This NCCP/HCP planning effort includes the participation of Rancho Mission Viejo and the cities of Rancho Santa Margarita, Mission Viejo, San Juan Capistrano and San Clemente, and the County of Orange. However, the Environmental Impact Statement and Environmental Impact Report for the NCCP/HCP proposal have not been released for public review and comment. There are altogether at least four vernal pools that support the Riverside fairy shrimp within the study area of the South Orange County NCCP/HCP (please see Critical Habitat Designation below for more information). The features within these pools have been determined to be essential to the conservation of the species and may require special management consideration or protections. Please note that critical habitat within these subunits has been excluded based on section 4(b)(2) of the Act.

4-9. Comment: The vernal pool on the former MCAS El Toro does not have the PCEs to support the Riverside fairy shrimp and further, critical habitat designation at El Toro would impede the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions

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necessary to remediate both soil and groundwater contamination on the property. Thus, the benefits of excluding the pool at El Toro from the critical habitat designation outweigh the benefits of including it.

Our Response: We have reviewed the available information and believe that the vernal pool at former MCAS El Toro has the primary constituent elements for the Riverside fairy shrimp. We have excluded all of Unit 2C, consisting of lands within the former MCAS El Toro from critical habitat based on section 4(b)(2) of the Act.

Issue 5: Comments on Individual Map Units--Inclusions

5-1. Comment: One group and the City of Moorpark requested the inclusion of areas containing vernal pools within Map Unit 1 in the final critical habitat designation as it will help ensure the

protection of the habitat and the species. In addition, clarification was given that (a) the vernal pool located on the former Carlsberg Ranch is on part of a land parcel (650,000 ac) owned and managed by the Santa Monica Nature Conservancy, and (b) Sub-units 1A and 1B include portions of land within the Tierra Rejada Greenbelt, an area of land with formal agreement by the Cities of Moorpark, Thousand Oaks, Simi Valley, and the County of Ventura to be preserved for open space and agricultural uses.

Our Response: This area is included in our final critical habitat designation, and we have amended our records to include the ownership and land usages information.

5-2. Comment: A number of requests were made that additional areas be included in the critical habitat designation because critical habitat provides significant conservation benefits to listed species, is an essential tool for species recovery, it mandates higher habitat conservation standards not otherwise available to the species, provides detailed, practical guidance on locations of areas essential to the species' survival, and also carries a very valuable, practical educational value. It was also requested that the vernal pools identified in Appendices F and G of the Service's Recovery Plan for Vernal Pools of Southern California be included because they are essential to conservation of the species and in need of special management.

Our Response: The Recovery Plan for the Vernal Pools of Southern California (Service 1998), discusses vernal pool complexes and pools, their distribution, and known occupancy by federally listed species at the time of the plan's publication. Not all vernal pools discussed in the plan are known to be occupied by the Riverside fairy shrimp, or considered to be essential to the conservation of the Riverside fairy shrimp. Only those vernal pool habitats that are essential to the conservation of Riverside fairy shrimp were included in the critical habitat designation for the Riverside fairy shrimp. Where site-specific documentation was submitted to us providing a rationale as to why an area should not be designated critical habitat, we evaluated that information in accordance with the definition of critical habitat pursuant to section 3 of the Act. We made a determination as to whether modifications to the proposal were appropriate. We reviewed the maps to ensure that only those lands essential for the conservation of the Riverside fairy shrimp were designated as critical habitat. We removed lands from the final designation that we determined to be non-essential to the species' conservation. We also excluded lands, including those identified in the Vernal Pool Recovery Plan, that were located within an approved HCP, which provides for the conservation of Riverside fairy shrimp, and where we determined that the benefits of excluding those areas outweighed the benefits of including them, or an INRMP which provided a benefit to the species. We included lands in the final designation that are essential to the conservation of the species which may require special management considerations or protection for the Riverside fairy shrimp.

5-3. Comment: All essential Riverside fairy shrimp habitat within MCB Camp Pendleton should be included in the critical habitat designation because (a) Service has failed to state how benefits of exclusion outweigh benefits of designation, especially in light of the Act's exemptions that would allow otherwise incompatible military training activities; (b) inclusion will not limit or additionally impact military training and readiness at the base; existing requirements of uplands consultation at MCB Camp Pendleton will ensure the avoidance of adverse impacts to the Riverside fairy shrimp and involve section 7 consultations; thus little benefit of exclusion, (c) it has the benefit of providing the military with clear, independent scientific regulatory guidance on location of critical habitats for the Riverside fairy shrimp and other endangered species, and (d) the benefits of inclusion outweigh any costs of inclusion.

Our Response: Please see our responses to Peer Reviewer Comment 2 and to Comment 4-4 above, and the section below on Relationship of Critical Habitat to Department of Defense Lands.

Issue 6--Miscellaneous

6-1. Comment: The U.S. Navy at the former MCAS El Toro commented that the proposed inclusion of the El Toro property as critical habitat was based on erroneous property ownership information, as the Department of Defense still owns almost 3,800 ac of former MCAS El Toro Property. Further, Map Sub-unit 2C included 1000 ac of Navy and Federal Aviation Administration owned property, not 1 ac as described in rule.

Our Response: We have noted these errors and have amended our records and this rule.

6-2. Comment: The Service's citation of its website as an example of public education about the Riverside fairy shrimp is inadequate; all the available materials about the Riverside fairy shrimp at the website are related entirely to critical habitat.

Our Response: We thank the commenter for their observation, and will seek to improve our website with additional educational material on the Riverside fairy shrimp.

Comments Related to the Draft Economic Analysis

1. Comment: One comment requests that the DEA update its land use and land ownership information regarding the former MCAS El Toro in Orange County. The comment also suggests that the Riverside fairy shrimp conservation activities will impose higher costs on facility improvements and land transfer projects planned for the former base than estimated by the DEA.

Our Response: The DEA describes the former MCAS El Toro's likely future land uses based on the best available public information and

statements made by knowledgeable individuals in personal interviews. Base Realignment and Closure staff estimated that Riverside fairy shrimp-related conservation costs for El Toro would be $150,000 over the next 20 years based on the assumption that the Service would allow historical uses of the site to continue if El Toro instituted a particulate monitoring program.

The comment suggests that if historical uses for the site continue and planned improvements to the base uses are implemented, then the habitat mitigation costs incurred by MCAS Tustin, a neighboring base that was also recently decommissioned, serve as a better estimate of costs for El Toro. The Final Economic Analysis (FEA) revises the land use and land ownership

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context of the El Toro Sub-unit 2C and accepts the revised cost impact of $100 million, noting that El Toro plans to acquire expensive land off-site, restore vernal pools, relocate the species to these pools, initiate biological monitoring, and provide for project management.

2. Comment: One commenter stated that the DEA underestimates the impact of Riverside fairy shrimp conservation activities on operations and planned capital improvements to March ARB in Riverside County.

Our Response: The DEA estimates impacts of Riverside fairy shrimp conservation activities on the former March Air Force Base based on the best available public information and statements made by knowledgeable individuals in personal interviews. For impacts likely to occur in the next 20 years, March Joint Powers Authority staff estimated that $500,000 would be required to implement required Riverside fairy shrimp conservation while increasing the capacity of drainage facilities within which the habitat is located. The drainage facility improvements would support real estate development on more than 3,000 acres of the former base.

The comment suggests that ongoing operations at March ARB will also need costly modifications to comply with Riverside fairy shrimp-related regulations and laws. Based on March ARB's understanding of NEPA, an additional $950,000 of environmental studies (at the Environmental Impact Statement level) will need to be completed to maintain operations of its runway and taxiways. In addition, a California Air National Guard heavy equipment unit will require relocation, costing an additional $31.5 million. Although the comment references additional improvements to the site, including the relocation of California Department of Forestry aircraft to March ARB, construction of a parallel taxiway on the existing airfield, and installation of instrument upgrades as part of the March Inland Port, no information is available about the potential for these projects to impact Riverside fairy shrimp habitat or the magnitude of Riverside fairy shrimp-related project modification, if any.

The FEA accepts revised total cost impacts of $33.0 million resulting from the California Air National Guard unit relocation, the incremental Environmental Impact Statement costs, and March Joint Powers Authority's drainage improvements.

3. Comment: A number of commenters stated that the DEA omits consideration of Riverside fairy shrimp-related conservation impacts to major transportation infrastructure projects in Southern California.

Our Response: The DEA estimated no impacts of Riverside fairy shrimp conservation activities on the proposed extension of the 241 Toll Road based on the best available public GIS information and statements made by knowledgeable individuals in personal interviews. At this time, the project has nine alternatives that range from no action to two alternative road widening projects (I-5 and local arterials, both avoiding construction of the 241 Toll Road itself) to six alignment variations for the toll road. The public review, comment, and approval process for this project has been and is expected to continue be a time-consuming and politically contentious. Given the wide variety of regulatory, institutional, and political factors are play, the ultimate outcome cannot be predicted at this time.

The comment suggests that critical habitat Sub-unit 2H has the potential to add enormous costs to three of the Far East alignments. Additional analysis and interviews with local experts suggest instead that Map Sub-units 2F and 2H lie in the path of the Alignment 7/Avenida La Pata Variation alternative and the A-7 Far East Crossover, Far East (West), and Far East Modified alternatives. While no information is publicly available on the surface area of vernal pools likely to be disturbed by any of these alignments, there is some probability that one of these alignments will be chosen and Riverside fairy shrimp conservation measures may be required prior to project construction.

Given the uncertainty associated with the ultimate outcome, the FEA weights each of the nine project alternatives equally and multiplies the probability of each (\1/9\ or 11 percent) by an estimated worst case cost impact for each alternative. The analysis assumes no impact (a $0 economic costs estimate) if the toll road is not built or if the construction footprint is located outside of proposed critical habitat. For alternatives expected to cross Riverside fairy shrimp habitat, the impact is the surface area of all vernal pools in the sub-unit times $500,000 per acre as a generalized mitigation cost for transportation projects. Based on this revised methodology, the FEA estimates the 241 Toll Road may incur an additional $43,000 in project modification costs based on available vernal pool surface area data for all nine alternatives.

The Service recognizes that the Toll Road alignment ultimately constructed, if any, will impact local, and possibly regional, traffic flow. Future differences in traffic flows and volumes can, in turn, have a variety of indirect economic effects, including opportunity

costs of labor, efficiency of goods delivery, and growth-inducing effects, among other factors. However, given the high degree of uncertainty associated with the Toll Road project and the variety of factors at play, it is difficult to isolate the unique contribution of the Riverside fairy shrimp conservation activities on the final outcome. Consequently, the FEA does not estimate potential economic impacts associated with potential changes in future transportation patterns attributable to the Riverside fairy shrimp conservation activities.

The comment also suggests that no formal analysis was completed on Caltrans projects underway or just completed in Southern San Diego County. Estimates of project-specific cost impacts based on Caltrans interviews for three projects in the Otay Mesa area of San Diego County can be found in Chapter V of the Economic Analysis.

4. Comment: Two comments suggest that real estate assumptions used to calculate impacts to private land development activities in one Southern Orange County sub-unit are inaccurate. The comments also recommend using census tract level data for supply and price effects associated with Riverside fairy shrimp conservation activities.

DEA Methods

Our Response: The DEA relies on DataQuick's transaction-based 2003 residential market data to characterize real estate prices in all zip codes where critical habitat was proposed. In addition, regional planning agencies such as the Southern California Association of Governments and the San Diego Association of Governments provided the DEA with Global Information System (GIS) layers that describe existing and planned land uses for areas of proposed critical habitat. Biological opinion records from the Service also establish a range for the habitat setaside, given variable project footprint and vernal pool site geometry. The combination of the three datasets produces an estimate of the total value of unimproved land affected by Riverside fairy shrimp-related conservation measures such as on-site habitat setasides.

The DEA considers the potential for habitat set-asides to affect aggregate housing supply and market prices. The San Diego Association of Government's data covering the period of 1990 to 1995 allow for an estimate of gross public

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land uses required per 1,000 acres of private development. The Construction Industry Research Board supplies information about building activity since 1993. From this information, a forecast can be made of the Riverside fairy shrimp-related conservation land that is taken from residential development as a share of the market's future demand for land used to build new housing. The result suggests an insignificant or near zero impact on housing market supply and price in all ``since listing'' time periods and counties and in all but one county during the ``2005-2024'' time period.

Specific Real Estate Assumptions

Several comments object to the use of a 4.25 percent property appreciation rate in the DEA, believing it to be an understatement of the true appreciation rate given an anticipated shortage of finished lots for new housing in the County. To estimate future appreciation in home values, the DEA relies on long-term historical trends which are appropriate for the 20-year forecast utilized by the DEA.

In particular, the DEA relies on the average of a 10-year and a 20-year trend of repeat sales and refinancing of the same properties in California. The price indexing of the same properties over time controls for potential changes in housing quality, location and size over time. These data were obtained from U.S. Department of Labor, Office of Federal Housing Enterprise Oversight. The Service regards this source as the most reliable indicator of long-term real estate price trends because it is less affected by short-term business cycle fluctuations.

Several comments also state that 2004 housing price data would show a significant increase over 2003 data. Although potentially true at the County level, different zip codes may have highly varied year to year changes in housing prices. Establishing the actual year to year change in housing prices at the zip code level would require a purchase of a new dataset and matching (using GIS-based weighting) of this data to critical habitat land areas. Recalculating the median housing price is not possible given the time constraints for preparation of the FEA.

Finally, the comments posit that returns on real estate investments typically fall below the 10 percent level, in contrast to the assumption in the DEA of a 25 percent pre-tax return. These assumptions are used to determine the value of raw land as a percent of finished home price. The DEA bases its calculation on the understanding that the development of a finished home may require the actions of several major agents who in turn move the land from an agricultural or un-entitled basis to an entitled, paper lot basis through to a finished lot and finished home, at which point the product is sold to the end user. Multiple private entities are likely to have participated in this process, each at different levels of risk.

The comments' preferences for a below-10 percent return on investment apply best to higher volume segments of the homebuilding industry in which a single entity purchases lots, builds homes, and sells them to buyers. The DEA, in contrast, uses a composite risk level that includes the greater returns to speculative land purchase and

entitlement obtained for such property, and bases its calculations on a more appropriate composite return of 25 percent.

5. Comment: One comment requests that the DEA revise the sub-unit land use and land ownership descriptions for Southern Orange County proposed critical habitat. The comment also states that development of one sub-unit is now foreseeable and will be adversely impacted by Riverside fairy shrimp-related conservation activities.

Our Response: The DEA estimated the impacts of Riverside fairy shrimp conservation activities for the Radio Tower Road (Sub-unit 2G) and other Foothill sub-units based on the best available public information and statements made by knowledgeable individuals in personal interviews. After the publication of the notice of availability of the DEA, the Orange County Board of Supervisors changed the designation of the property to Suburban Residential from Open Space, and rezoned much of the land for Planned Community instead of Agricultural.

The FEA analyzes impacts from Riverside fairy shrimp-related conservation using the same methods established and applied to land use data in the DEA. Land that is zoned for development is deemed likely to be developed within the next 20 years, given general trends in land use for the areas identified as supportive of the Riverside fairy shrimp. These areas tend to be generally flat and readily built upon, notwithstanding other development considerations such as infrastructure, and land ownership. Given this conservative assumption, all 753 undeveloped acres of the Radio Tower Road are considered impacted by Riverside fairy shrimp-related conservation measures that include on-site habitat setasides worth $8 million to $45 million dollars in potential land value over the next 20 years.

The FEA also uses corrected references of this region's habitat sub-units to the Ranch Plan, a master planned community covering many thousands of acres of the area.

6. Comment: One comment requests that the land ownership and planned uses information for Los Angeles International Airport (LAX) from the DEA be revised. The comment also suggests that the impacts to LAX from Riverside fairy shrimp-related conservation activities in the DEA are grossly understated.

Our Response: DEA Methods.

The DEA estimated the impacts of Riverside fairy shrimp conservation activities on LAX based on the best available public information and statements made by knowledgeable individuals in personal interviews. Several individuals contacted for personal interviews did not return phone calls during the process of preparing the DEA. The agency operating LAX, in recent publications, has characterized the airport's daily operations at and major facility expansion plans as incompatible with maintenance of Riverside fairy shrimp habitat.

Given LAX's objectives of minimizing the risk of aircraft-bird collisions that it believes is higher due to the presence of seasonal vernal pools on the airfield, the DEA assumes that Riverside fairy shrimp-related conservation measures would include eventual off-site mitigation of the entire 1.3 acres of wetted area. Adding monitoring and administrative costs to this sub-total, approximately $950,000 in impacts are estimated for the airport over the next 20 years.

Impacts of Significant Events

The comment requests that a full accounting of the cost impact of two significant events be attributed to the designation of critical habitat on the LAX airfield:

Property loss and loss of life damages resulting from serious aircraft-bird collisions.

Loss of regional mobility for goods and people given an inability of the airport to complete its planned improvements.

Publicly available literature was searched for references to impacts related to catastrophic events involving bird strikes. One source estimates that between 1990 and 2004 approximately 732 bird strikes have taken place at LAX, inflicting total damages of $17.5 million. The estimate did not match the damage levels of these incidents to birds

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using vernal pool habitat, apart from birds that came into contact with aircraft because of other landscape features, natural or human constructed. It is not possible, therefore, to easily distinguish damage due to Riverside fairy shrimp-related habitat from damage related to birds attracted by other habitat or landscape features.

In addition, these bird strike loss estimates do not include an analysis of hardware or other means that would reduce bird attraction to ephemeral wetlands on airport land without removal of the wetlands as a habitat feature. Current discussions being held between LAX and the Service will explore the installation of equipment that allows for wetlands to be maintained on the airfield while discouraging avian feeding or travel patterns within the habitat.

Regarding airport operation and expansion plans, the DEA assumes that Riverside fairy shrimp conservation activities will have no impact on regional transportation mobility. Based on comments received, additional research was conducted on the potential relationship between LAX's operational capacity and regional economic activity. However, the Service was unable to identify any existing studies providing quantitative analysis of this relationship. A detailed analysis of the impact of LAX on the regional economy and/or the potential for RSF conservation activities to affect airport capacity, would require more

time and effort than can be devoted to this FEA.

No information about Riverside fairy shrimp habitat disposition appears in any Environmental Impact Report/Statement alternative besides a loss of a small amount of wetted acreage in Alternative D. A consultation has been completed with the Service regarding Alternative D of the LAX Master Plan, in which construction activities at LAX would require a staging area that will necessitate fill of portions of the vernal pools. A second consultation recently began that will address LAX operations. As a worst case scenario, the FEA calculates the impact of Riverside fairy shrimp conservation as a requirement for LAX to mitigate for the entire loss of vernal pool habitat. At $500,000 per wetted acre in unit mitigation costs, the sub-total of habitat restoration activities for the worst case scenario is estimated at $650,000 for LAX.

The comment also stipulates that the restoration monitoring period will last 15 years instead of 5, and that the administrative cost of the operations consultation will amount to $180,000. The FEA accepts these statements and calculates monitoring impacts at $750,000. Administrative costs are listed in the FEA as $400,000 for historical (since listing) section 7 compliance regarding the Riverside fairy shrimp, and $180,000 for the recently initiated consultation, for a total of $580,000 in administrative spending.

FEA References to Documents and Permitting Processes

The FEA text on LAX's Master Plan and operations has been revised based on new information provided in the comment. EIR/EIS documents released to the public since the appearance of the first drafts of the DEA were reviewed, and the consultation history with the Service was updated.

Land Ownership Information

The DEA cites GIS layers provided by Southern California Association of Governments as the basis of existing land uses for proposed critical habitat on or near LAX. Table 10 in the DEA notes that Southern California Association of Governments data classifies 3 acres of the proposed habitat sub-unit as private developed, 66 acres as public land, and 35 acres as unfeasible to develop due to physical constraints. The comment requests that all sub-unit land be recognized as airport controlled (public) land. The impacts estimated by the FEA would not change based on the different land use classifications assigned to the proposed critical habitat by either the Southern California Association of Governments or the comment. Hence, the Southern California Association of Governments information will remain the primary source of land use data.

Comments From States

Section 4(i) of the Act states ``the Secretary shall submit to the State agency a written justification for her failure to adopt regulation consistent with the agency's comments or petition.'' Comments received from States regarding the proposal to designate critical habitat for the Riverside fairy shrimp are addressed below.

1. State Comment: The California Department of Fish and Game requested that the Service avoid any later revisions to the proposed critical habitat that would include Department-owned lands.

Our Response: No lands or areas within the jurisdiction of the California Department of Fish and Game were considered within the proposed or final critical habitat designation.

Summary of Changes From Proposed Rule

Based on our review of the public comments received on the proposed designation of critical habitat, the economic analysis for the Riverside fairy shrimp, and available information, we re-evaluated our proposed designation and revised the final critical habitat designation for this species as follows.

Areas Removed From Critical Habitat Designation

We re-evaluated our proposed critical habitat unit boundaries, refined our mapping methodology, and used new information to remove 4,822 ac (1,951 ha) of non-essential habitat within each critical habitat map sub-unit (see Table 1 and Methods section below for more details).

In the proposed rule, we identified critical habitat in Sub-units 1C, 2A, 2B, 3A, and in portions of 5A and 5B. However, we have re-evaluated these sub-units based on updated information, and determined that, due to habitat modifications and ongoing operations and maintenance activities, these areas no longer contain one or more of the necessary PCE's for the Riverside fairy shrimp to successfully complete its life-cycle. We therefore removed the following areas from consideration for the final critical habitat designation:

(1) Cruzan Mesa (Sub-unit 1C). This sub-unit consisted of approximately 534 ac (216 ha). We have insufficient documentation regarding the occurrence or non-occurrence of the Riverside fairy shrimp in the Cruzan Mesa vernal pools, it occurs outside the known geographical range of the species, and we were unable to determine whether this area is essential to the conservation of this species. We therefore removed this sub-unit from our analyses of critical habitat.

(2) Los Angeles International Airport (LAX; Sub-units 2A, 2B). These sub-units consisted of approximately 103 ac (42 ha) in total. As

a result of the ongoing operations and maintenance activities at LAX, these ephemeral wetlands cannot pond long enough for the Riverside fairy shrimp to complete its lifecycle. Thus, we have removed both proposed sub-units at LAX from critical habitat designation as they do not contain this primary constituent elements, and are thus not essential for the conservation of the Riverside fairy shrimp.

(3) March ARB (Sub-unit 3A). This sub-unit consisted of approximately 101 ac (41 ha). We have re-evaluated this sub-unit and determined to remove it

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from this critical habitat designation as the vernal pool area has been modified and no longer contains the primary constituent elements for the Riverside fairy shrimp.

(4) Southwestern and Southeastern Otay Mesa (portions of Sub-units 5A, 5B). These sub-units consisted of approximately 255 ac (104 ha) in total. Portions of these sub-units (totaling 119 ac (48 ha)) lie within the footprint of the BIS, which is completed or under construction by the DHS for use in their border patrol activities. After evaluation of these areas, we determined that the necessary PCE's for the Riverside fairy shrimp are absent; these areas have thus been removed from our critical habitat analyses. See discussion of Units Excluded Due to National Security Under Section 4(b)(2) of the Act below.

Units Exempted Due to INRMPs Under Section 4(a)(3) of the Act

(1) MCB Camp Pendleton (Sub-units 4A, 4B). The total area of these proposed sub-units was approximately 254 ac (103 ha), and contains approximately 226 ac (91 ha) of essential habitat in the final rule. In the proposed rule, we excluded essential habitat within mission-critical training areas on MCB Camp Pendleton under section 4(b)(2) of the Act. In this final rule, we re-evaluated this exclusion and instead have exempted these mission-critical training areas as well as other essential habitat areas on MCB Camp Pendleton from critical habitat under section 4(a)(3) of the Act (see Application of Section 4(a)(3) to MCB Camp Pendleton for a detailed discussion). Thus, no lands owned or controlled by MCB Camp Pendleton have been designated as critical habitat in this final rule.

Lands leased to the California Department of Parks and Recreation have been excluded under section 4(b)(2) of the Act (see Units Excluded Due to National Security Under Section 4(b)(2) of the Act).

(2) MCAS Miramar. We reaffirm our exemption of MCAS Miramar under section 4(a)(3) of the Act.

Units Excluded Due to National Security Under Section 4(b)(2) of the Act

(2) March ARB (Sub-unit 3B). This sub-unit consisted of approximately 44 ac (18 ha) of essential habitat. See Application of Section 4(b)(2) National Security to March Air Reserve Base (March ARB) for a detailed discussion. Thus, no lands owned or controlled by March ARB have been designated as critical habitat in this final rule.

(3) Department of Homeland Security (DHS; Sub-unit 5B). We have excluded approximately 147 ac (59 ha) of essential habitat within DHS-owned lands along the U.S--Mexico border (see Application of Section 4(b)(2) to Department of Homeland Security lands for a detailed discussion). Thus, no lands owned by the DHS have been designated as critical habitat.

(1) Lands near Christianitos Creek (Sub-unit 2H). This sub-unit consisted of approximately 47 (19 ha) of essential habitat on lands MCAS Camp Pendleton leased to the California Department of Parks and Recreation. We have excluded this sub-unit (see Application of Section 4(b)(2) National Security to MCAS Camp Pendleton for a detailed discussion.

Exclusions Due to Economic Impacts Under Section 4(b)(2) of the Act

In the proposed rule, we identified vernal pools in 6 sub-units for which we proposed critical habitat. In this final rule, we have conducted benefits analyses and under section 4(b)(2) of the Act and have determined not to designate critical habitat in these sub-units for economic impacts. By excluding these 6 units, some or all of the costs associated with a critical habitat designation in those areas will be avoided. This regards the following sub-units:

(1) Former MCAS El Toro (Sub-unit 2C). The proposed area of this sub-unit was approximately 133 ac (54 ha), and contains approximately 14 ac (6 ha) of essential habitat in the final rule. We have excluded all of this sub-unit (see Application of Section 4(b)(2) Economic Exclusion to lands on Former MCAS El Toro (Sub-unit 2C) below for a detailed discussion).

(2) Saddleback Meadows (northern portion of Sub-unit 2D). In the proposed rule, Sub-unit 2D consisted of approximately 736 ac (298 ha). We have excluded approximately 57 ac (23 ha) of essential habitat in the northern portion of sub-unit 2D that occurs within private lands owned by Saddleback Meadows Residential Development Project and other private landowners. See Application of Section 4(b)(2) Economic Exclusion to Saddleback Meadows (portion of Sub-unit 2D) below for a detailed discussion.

(3) Tijeras Creek (Sub-unit 2E). The proposed area of this sub-unit was approximately 321 ac (130 ha), and contains approximately 101 ac (41 ha) of essential habitat in the final rule. We have excluded all of this sub-unit (see Application of Section 4(b)(2) Economic Exclusion to

lands near Tijeras Creek (Sub-unit 2E) below for a detailed discussion).

(4) Chiquita Ridge (Sub-unit 2F). The proposed area of this sub-unit was approximately 489 ac (198 ha), and contains approximately 263 ac (106 ha) of essential habitat in the final rule. We have excluded all of this sub-unit (see Application of Section 4(b)(2) Economic Exclusion to lands on Chiquita Ridge (Sub-unit 2F) below for a detailed discussion).

(5) Radio Tower Road (Sub-unit 2G). The proposed area of this sub-unit was approximately 736 ac (298 ha), and contains approximately 417 ac (169 ha) of essential habitat in the final rule. We have excluded all of this sub-unit (see Application of Section 4(b)(2) Economic Exclusion to lands near Radio Tower Road (Sub-unit 2G) below for a detailed discussion).

(6) Southeastern Otay Mesa (Sub-unit 5C). The proposed area of this sub-unit was approximately 866 ac (350 ha), and contains approximately 111 ac (45 ha) of essential habitat in the final rule. We have excluded all of this sub-unit (see Application of Section 4(b)(2) Economic Exclusion to Southeastern Otay Mesa (Sub-unit 5C) below for a detailed discussion).

Critical Habitat

Critical habitat is defined in section 3 of the Act as: (i) The specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ``Conservation'' means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 requires consultation on Federal actions that are likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow government or public access to private lands.

To be included in a critical habitat designation, the habitat within the area occupied by the species must first have

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features that are ``essential to the conservation of the species.'' Critical habitat designations identify, to the extent known using the best scientific and commercial data available, habitat areas that provide essential life cycle needs of the species (i.e., areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)).

Specific areas within the geographic area occupied by the species may be included in critical habitat only if the essential features thereon may require special management or protection. Thus, we do not include areas where existing management is sufficient to conserve the species. (As discussed below, such areas may also be excluded from critical habitat pursuant to section 4(b)(2).)

Our regulations state that, ``The Secretary shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species'' (50 CFR 424.12(e)). Accordingly, when the best available scientific and commercial data do not demonstrate that the conservation needs of the species so require, we will not designate critical habitat in areas outside the geographic area occupied by the species.

The Service's Policy on Information Standards Under the Endangered Species Act, published in the Federal Register on July 1, 1994 (59 FR 34271), and section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658) and the associated Information Quality Guidelines issued by the Service, provide criteria, establish procedures, and provide guidance to ensure that decisions made by the Service represent the best scientific and commercial data available. They require Service biologists to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas constitute critical habitat, a primary source of information is generally the listing documents for the species. Additional information sources include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge. All information is used in accordance with the provisions of section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub.L. 106-554; H.R. 5658) and the associated Information Quality Guidelines issued by the Service.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Habitat is often dynamic, and species may move from one area to another over time.

Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery.

Areas that support populations, but are outside the critical habitat designation, will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available information at the time of the action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Methods

As required by section 4(b)(2) of the Act and regulations at 50 CFR 424.12, we are to use the best scientific and commercial data available to determine areas that contain the physical and biological features that are essential to the conservation of the Riverside fairy shrimp. We have reviewed available information that pertains to the habitat requirements of this species. To accomplish this, we utilized data and information contained in, but not limited to, the final rule listing the Riverside fairy shrimp (58 FR 41384, the prior proposed and final rules designating critical habitat for the Riverside fairy shrimp (69 FR 23024, 65 FR 57136, 66 FR 29384), the proposed rule to designate critical habitat for the San Diego fairy shrimp (68 FR 19888), the Vernal Pools of Southern California Final Recovery Plan (Recovery Plan; Service 1998), research and survey observations published in peer-reviewed scientific journals, maps from the regional Geographic Information System (GIS) database with vegetation and species coverages (including vegetation layers for Orange and San Diego counties), the California Natural Diversity Database (CNDDB), the California Vernal Pool Assessment Preliminary Report (Keeler-Wolf et al. 1998), vernal pool mapping and other data collected for the development of HCPs, reports submitted by biologists holding section 10(a)(1)(A) recovery permits, biological assessments provided to us through section 7 consultations, reports from site investigations on MCB Camp Pendleton and MCAS Miramar, site visit reports by staff biologists, reports and documents on file in the Service's field offices, and communications with experts outside the Service who have extensive knowledge of vernal pool species and habitats. In addition, we used information contained in comments received by May 27, 2004 which were submitted on the proposed critical habitat designation (69 FR 23024) and comments received by November 18, 2004 submitted on the draft economic analysis (69 FR 61461).

Based on a compilation of information listed above on the known occurrences of Riverside fairy shrimp, we created maps indicating the habitat associated with each of the occurrences. The habitat units were delineated using ArcView (Environmental Systems Research Institute, Inc.), a computer GIS program to evaluate GIS data derived from a variety of Federal, State, and local agencies, and from private organizations and individuals. Data layers included current and historic species occurrence locations (CNDDB 2002); we presumed occurrences identified in the database to be extant unless there was affirmative documentation that an occurrence had been extirpated. We also relied on unpublished species occurrence data contained within our files, including section 10(a)(1)(A) reports and biological assessments.

We then evaluated the areas defined by the overlap of the combined coverages (data layers) to initially focus on those areas which provide those physical and biological features essential to the conservation of the Riverside fairy shrimp; i.e., we identified and mapped vernal pool basins and ephemeral wetlands supporting the Riverside fairy shrimp that contained the primary constituent elements for the species. The areas were further refined by using satellite imagery, aerial map coverages,

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elevational modeling data, vegetation/land cover data, and agricultural/urban land use data to eliminate areas that contained features such as cultivated agriculture fields, housing developments, and other areas that are unlikely to contribute to the conservation of the Riverside fairy shrimp.

Next, the upslope areas, located immediately surrounding the vernal pool basins and ephemeral wetlands, areas that also contained the primary constituent elements for the Riverside fairy shrimp were mapped based on topographic features such as ridges, mima mounds, and elevational gradients or slopes. The boundaries for these areas were further refined and delineated by mapping those areas that sloped toward the pools, from highest point to highest point in the immediate surrounding upland areas, following the map's topographic elevational gradient around the high points (peaks), to the sides and the lowest part of the basin that encompassed the complex of vernal pools, keeping within the boundaries of the previously proposed critical habitat. Those areas that the topographic maps showed sloped steeply away from the pools, or that were developed or altered, such that necessary PCEs

(i.e., water, soil, minerals) could not be transported toward the vernal pools over such areas, were left outside the refined delineation. This method was used for vernal pools in both basin and mesa-type topographic settings.

The combined extent of these mapped areas was defined as the habitat essential to the survival and recovery of the Riverside fairy shrimp. Whenever possible, areas not containing the primary constituent elements, such as developed areas or open water, were not included as essential habitat. To aid us in this elimination, we used a finer mapping unit of 100 x 100 m. After creating GIS coverage of the essential areas, we described the boundaries of the essential areas using a 100 m grid to establish Universal Transverse Mercator (UTM) North American Datum 27 (NAD 27). The areas were then analyzed with respect to sections 4(a)(3), and 4(b)(2) of the Act, and any applicable and appropriate exclusions were made.

We eliminated areas because: (1) The area is highly degraded and may not be restorable or, (2) the area is small, highly fragmented, or isolated, and may provide little or no long-term conservation value. We also exempted areas under section 4(a)(3) and excluded areas under section 4(b)(2) of the Act for military, economic or other reasons where we concluded that such exclusions will not result in the extinction of the Riverside fairy shrimp (see Exclusion of Critical Habitat Under Sections 4(a)(3), 3(5)(A) and 4(b)(2) of the Act below). The specific modifications are described in the Summary of Changes from the Proposed Rule section of this rule. The remaining essential areas are the final designation of critical habitat, presented as four geographically distinct habitat units. The essential areas, an elaboration on exclusions, and the specific areas designated as critical habitat are described below.

Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat, we are required to base critical habitat determinations on the best scientific and commercial data available and to consider those physical and biological features (primary constituent elements (PCEs)) that are essential to the conservation of the species, and that may require special management considerations and protection. These include, but are not limited to: Space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Based on our current knowledge of the life history and ecology of the Riverside fairy shrimp, the requirements of the habitat to sustain the essential life history functions of the species, and the ecological and hydrologic functions of vernal pool complexes, as summarized above in the Background section, we have determined that the Riverside fairy shrimp has several primary constituent elements, or PCEs. Its two most significant PCEs are: (1) Vernal pools, swales, and other ephemeral wetland features of appropriate sizes and depths that typically become inundated during winter rains and hold water for sufficient lengths of time necessary for the Riverside fairy shrimp to complete their life cycle; and (2) the geographic, topographic, and edaphic features that support aggregations or systems of hydrologically interconnected pools, swales, and other ephemeral wetlands and depressions within a matrix of immediately surrounding upslope areas that together form hydrologically and ecologically functional units called vernal pool complexes. These features contribute to the filling and drying of the vernal pool, maintain suitable periods of pool inundation, and maintain water and nutrient quality and soil moisture to enable the Riverside fairy shrimp to carry out their lifecycle.

1. Primary Constituent Element: Vernal Pools, Swales, Other Ephemeral Wetland Features

Vernal pools provide for space, physiological requirements, shelter, and reproduction sites for the Riverside fairy shrimp. Vernal pools provide the necessary soil moisture and aquatic environment required for cyst hatching, growth, maturation, reproduction, and dispersal, and the appropriate periods of dry-down for seed and cyst dormancy, as well as for seed germination of plant species found in the pool that contribute organic matter and dissolved gasses to the water. Both the wet and dry phases of the vernal pool help to reduce competition with strictly terrestrial or strictly aquatic plant or animal species. The wet phase provides the necessary cues for hatching, germination, and growth, while the drying phase allows the vernal pool plants to flower and produce seeds and the vernal pool crustaceans to mature and produce cysts. We conclude this element is essential to the conservation of the Riverside fairy shrimp because this species is ecologically dependent on seasonal fluctuations, such as absence or presence of water during specific times of the year, and duration of inundation and the rate of drying of their habitats. The Riverside fairy shrimp cannot persist in perennial wetlands or wetlands that are inundated for the majority of the year, nor can they persist without periodic seasonal inundation.

Vernal pools and other ephemeral wetlands provide space during their wetted periods for individual and population growth and normal behavior of vernal pool species by providing still, freshwater habitat of appropriate depth, duration, temperature, and chemical

characteristics for juvenile and adult vernal pool crustaceans to hatch, swim, grow, reproduce and behave normally. Vernal pools and other ephemeral wetlands also provide soil space during both dry and wetted periods for the maintenance of dormant cyst and seed banks, which allow populations of vernal pool species to maintain themselves throughout the unpredictable and highly variable environmental conditions experienced by their active, non-dormant life history stages. Vernal pools and other ephemeral wetlands also provide various physiological requirements for both vernal pool plants and crustaceans.

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For crustaceans they provide water, oxygen, and food such as plankton, detritus, and rotifers. By drying seasonally, ephemeral wetlands provide cover or shelter from many aquatic predators and competitors. Similarly, by undergoing seasonal inundation, these areas provide shelter for vernal pool species from invading species which would otherwise out-compete them for space, light, water, or nutrients. Finally, vernal pool crustaceans require wetted ephemeral wetlands in which to mate, and both vernal pool crustaceans and vernal pool plants deposit cysts or eggs in these wetland areas, which must then dry to allow hatching or germination. Wetted ephemeral wetlands may also tend to attract waterfowl, which act as important seed and cyst dispersers (Proctor 1965; Silveira 1998).

2. Primary Constituent Element: Geographic, Topographic, and Edaphic Features That Support Aggregations of Hydrologically Interconnected Pools, Swales, and Other Ephemeral Wetlands

The second PCE (the entire vernal pool complex, including the pools, swales, and associated upslope areas) is essential to maintain both the aquatic phase and the drying phase of the vernal pool habitat. Although the Riverside fairy shrimp does not occur in the strictly upslope areas surrounding vernal pools, they are critically dependent on these upland areas to maintain the seasonal cycle of ponding and drying in the ephemeral wetland areas. The hatching of cysts (and the germination of vernal pool plants) is dependent on the timing and length of inundation of the vernal pool habitat. The rate of vernal pool drying, which greatly influences the water chemistry, in turn directly affecting the life cycle of the Riverside fairy shrimp, is also largely controlled by interactions between the vernal pool and the surrounding uplands (Hanes et al. 1990; Hanes and Stromberg 1998). Soil morphology at the pool basin and on the upslope areas provides the pool with an impermeable surface or subsurface layer, accumulation of organic matter, and a unique assemblage of nutrient availability; in fact, biotic and reduction-oxidation (redox) interactions in the soil control the turnover of nutrients in the pool (Hobson and Dahlgren 1998). Thus, the biogeochemical environment strongly influences hydrologic properties and play a critical role in nutrient cycling in vernal pool ecosystems (Hobson and Dahlgren 1998). Additionally, upslope areas provide an important (and often primary) source of detritus, which is a major food source for vernal pool crustaceans and nutrient source for vernal pool plants. Certain upland and swale areas may also provide for population growth by channeling flood waters from overflowing ephemeral wetland areas so that seeds, cysts, or adult individuals are washed from one such wetland to another. The upslope areas provide habitat for avian species and other animals known to aide in the dispersal of vernal pool species (Zedler and Black 1992; Silveira 1998). The surrounding upslope and swale areas also provide habitat for pollinator species that may be specifically adapted to some of the vernal pool plant species (Thorp 1998; Eriksen and Belk 1999), as well as habitat for waterfowl, amphibians, mammals, or insects, all of which are important for dispersal of cysts (and seeds, pollen of vernal pool flora).

The upslope areas immediately surrounding vernal pools are therefore essential for providing the same physical and biological factors as are provided by the vernal pools or ephemeral wetland areas. We have used vernal pool complexes as the basis for determining populations of vernal pool crustaceans since the species were first proposed for listing. The genetic characteristics of fairy shrimp, as well as ecological conditions, such as watershed contiguity, indicate that populations of these animals are defined by pool complexes rather than by individual vernal pools (cf. Fugate 1992, 1998; King 1996). Therefore, the most accurate indication of the distribution and abundance of the Riverside fairy shrimp is the number of inhabited vernal pool complexes. Individual vernal pools occupied by the Riverside fairy shrimp are most appropriately referred to as ``sub-populations'' (59 FR 48136).

Our use of vernal pool complexes to define populations of the four listed crustaceans was upheld by the U.S. District Court in post-listing challenge to the listing (Building Industry Association of Superior California et al. v. Babbitt et al., CIV 95-0726 PLF). The July 25, 1997, court decision stated that the plaintiffs were on notice that the Service would consider vernal pool complexes as a basis for determining fairy shrimp populations. The court also concluded that the use of this methodology was neither arbitrary nor capricious. The Court of Appeals for the D.C. Circuit upheld the district court's decision, and the Supreme Court has declined to hear the case. Each of the critical habitat units likely includes some areas that are unoccupied by the vernal pool crustaceans. ``Unoccupied'' is defined here as an area that contains no hatched vernal pool crustaceans, and that is unlikely to contain a viable cyst or seed bank. Determining the specific areas that the vernal pool crustaceans occupy is difficult

(see Background). Depending on climatic factors and other natural variations in habitat conditions, the size of the localized area in which hatched crustaceans appear may fluctuate dramatically from one year to another. In some years, individuals may be observed throughout a large area, and in other years they may be observed in a smaller area or not at all. Because it is logistically difficult to determine how extensive the cyst or seed bank is at any particular site, and because hatched Riverside fairy shrimp may or may not be present in all vernal pools within a site every year, we cannot quantify in any meaningful way what proportion of each critical habitat unit may actually be occupied by the vernal pool crustaceans. Therefore, small areas of currently unoccupied habitat are probably interspersed with areas of occupied habitat in each unit. The inclusion of unoccupied habitat in our critical habitat units reflects the dynamic nature of the habitat and the life history characteristics of the Riverside fairy shrimp. Unoccupied areas provide areas into which populations might expand, provide connectivity or linkage between groups of organisms within a unit, and support populations of vernal pool plant pollinators and cyst dispersal organisms. Both occupied and unoccupied areas that are designated as critical habitat are essential to the conservation of the Riverside fairy shrimp. All of the above described PCEs do not have to occur simultaneously within a unit for that unit to constitute critical habitat for the Riverside fairy shrimp.

3. Water Chemistry and Physiological Requirements

Temperature, water chemistry, and length of time vernal pools are inundated with water are important factors that effect and potentially limit the distribution of the Riverside fairy shrimp. The water in the pools that support Riverside fairy shrimp typically is dilute with (1) low to moderate total dissolved solids (mean 77 milligrams per liter (mg/l) or parts per million (ppm)), (2) low to moderate salinity, (3) low levels of alkalinity (mean 65 mg/l), and (4) water pH at neutral or just below (6.4-7.1; Eng et al. 1990; Gonzalez et al. 1996; Eriksen and Belk 1999). Riverside fairy shrimp can tightly regulate their internal body chemistry in pool environments with varying salinity and alkalinity (Gonzalez et al. 1996). In a

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laboratory experiment, Riverside fairy shrimp could maintain their internal levels of salt concentration (Na^+) fairly constant over a wide range of external concentrations (0.5-60 mmol/l\3\), but they were sensitive to the extremes, with 100 percent mortality occurring at 100 mmol/l\3\ (2,300 mg/l\3\; Gonzalez et al. 1996). Although the species could maintain their internal levels of salt concentration fairly constant over a wide range of external concentrations (0.5-60 mmol/l\3\), Riverside fairy shrimp could not survive in laboratory environments where external alkalinity was higher than 800 to 1,000 mg/l HCO-3.

The Riverside fairy shrimp is found in water temperatures ranging between 50 and 77 degrees F (10 and 25 degrees C; Hathaway and Simovich 1996). Importantly, studies show that the Riverside fairy shrimp is sensitive to water temperature (Hathaway and Simovich 1996). After pool inundation, hatching occurred significantly more rapidly (mean 7 days) when the temperature was cooler and fluctuated within a range of 41-77 degrees F (5-25 degrees C), and most slowly (mean 25 days) with steady warm temperature of 77 degrees F (25 degrees C). Furthermore, at cooler fluctuating temperatures (41-59 degrees F (5-15 degrees C)), the highest proportion of cysts hatched, over 15 percent, while fewest cysts hatched (1-3 percent) at a steady higher temperature of 77 degrees F (25 degrees C). In fact, the proportion of cysts hatching after exposure to a (5-15 C) fluctuating temperature range regime far exceeded that reached at steady temperature, with cysts exposed to any steady temperature above 50 (10 degrees C) showing almost no hatching success (Hathaway and Simovich 1996). Water within pools supporting fairy shrimp may be clear, but more commonly it is moderately turbid (Eriksen and Belk 1999).

4. Sites for Breeding, Reproduction and Rearing of Offspring

The Riverside fairy shrimp is restricted to a small sub-set of long-lasting vernal pools and ephemeral wetlands in southern California because this animal takes approximately two months to mature and reproduce (Hathaway and Simovich 1996). In contrast, the San Diego fairy shrimp, another federally endangered fairy shrimp species found in southern California, can mature and reproduce in less than one month. Most vernal pools in southern California do not pool for a sufficient amount of time to support the Riverside fairy shrimp. Pools that contain Riverside fairy shrimp usually accumulate water to a depth greater than 10 in (25 cm) and some pools that support this species fill to a depth of 5 to 10 ft (1.5-3 m). In the years that Riverside fairy shrimp successfully reproduce, pools fill for 2 to 3 months and some pools have been reported to remain filled for up to 7 months. Riverside fairy shrimp can survive as cysts for multiple years; therefore, it is not necessary for ideal conditions to exist every year for this species to persist.

5. Disturbance, Protection, and the Historical Geographical Distributions

The majority of sites currently supporting the Riverside fairy shrimp have experienced disturbance, some more recently than others and

some to a greater extent than others. The pools that support Riverside fairy shrimp are generally found in flat or moderately sloping areas. Many of the pools are on gently sloping areas near the coast, and in grassland habitats. These areas, located in a region of current explosive urban expansion, are easily assessable and amenable to construction. Thus a major factor contributing to the decline of vernal pool species, including the Riverside fairy shrimp, is mortality and habitat elimination through human construction and development of vernal pool areas for a wide variety of purposes. Additionally, vernal pool areas have been vulnerable to agriculture, cattle grazing, and off-road vehicle activities. Many of the pools that currently support Riverside fairy shrimp have been artificially deepened in the past by ranchers to provide water for stock animals (Hathaway and Simovich 1996). This species has only been studied since the late 1980s; therefore, the extent of its historical distribution is not well understood. Current estimates suggest that 90 to 97 percent of vernal pool habitat has been lost in southern California (Mattoni and Longcore 1997; Bauder and McMillan 1998; Keeler-Wolf et al. 1998; Service 1998). The conservation of the few remaining occurrences of Riverside fairy shrimp is essential for its conservation (Service 1998).

6. Summary of PCEs Essential to the Conservation of the Riverside Fairy Shrimp

Pursuant to our regulations, we are required to identify the known physical and biological features, i.e., primary constituent elements, essential to the conservation of the Riverside fairy shrimp, together with a description of any critical habitat that is proposed. In identifying the primary constituent elements, we used the best available scientific and commercial data available. The three main primary constituent elements determined essential to the conservation of Riverside fairy shrimp must have the following characteristics.

A. The first PCE, small to large pools or pool complexes, must have the appropriate size and volume, local climate, topography, water temperature, water chemistry, soil conditions, and length of time of inundation with water necessary for Riverside fairy shrimp incubation and reproduction, as well as dry periods necessary to provide the conditions to maintain a dormant and viable cyst bank. Specifically, the vernal pool conditions necessary to allow for successful reproduction of Riverside fairy shrimp fall within the following ranges:

i. Moderate to deep depths ranging from 10 in (25 cm) to 5-10 ft (1.5-3 m),

ii. Ponding inundation lasting for a minimum length of 2 months up to 5-8 months or more, i.e., a sufficient wet period in winter and spring months to allow the Riverside fairy shrimp to hatch, mature, and reproduce, followed by a dry period prior to the next winter and spring rains,

iii. Water temperature that falls within the range of 41 and 77 degrees F (5 and 25 degrees C),

iv. Water chemistry with low total dissolved solids and alkalinity (means of 77 and 65 parts per million, respectively), and

v. Water pH within a range of 6.4-7.1.

B. The second PCE, the immediately surrounding upslope areas, must provide:

i. Hydrologic flow to fill the pools and maintain the seasonal cycle of ponding and drying, at the appropriate rates,

ii. A source of detritus and nutrients,

iii. A source of soil and mineral transport to maintain the appropriate water chemistry and impermeability of the pool basin, and

iv. Habitat for animals that act as dispersers of cysts and vernal pool plant seeds or pollen.

The size of the immediately surrounding upslope areas varies greatly and cannot be generalized and has been assessed for each sub-unit. Factors that affect the size of the surrounding upslope area include surface and underground hydrology, the topography of the area surrounding the pool or pools, the vegetative coverage, and the soil substrate in the area. Watershed sizes designated vary from a few acres to greater than 100 ac (40 ha).

C. The third PCE, the soils in the summit, rim and basin geomorphic positions, must have a clay component and/or an impermeable surface or

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subsurface layer, and must provide a unique assemblage of available nutrients and redox conditions known to support vernal pool habitat. The biogeochemical environment strongly influences hydrologic properties and play a critical role in nutrient cycling in vernal pool ecosystems (Hobson and Dahlgren 1998).

Criteria Used To Identify Critical Habitat

Based on the best scientific information available, we are designating as critical habitat lands that are essential to the conservation of the Riverside fairy shrimp and contain the PCEs identified above and require special management considerations or protection. Both individual vernal pools and vernal pool complexes are essential for conservation of the Riverside fairy shrimp because of the limited numbers of remaining vernal pools and their highly localized distribution (cf. Gilpin and Soule 1986; Lesica and Allendorf 1995; Lande 1999).

Areas essential to the conservation of the species are those that are necessary to advance at least one of the following conservation

criteria: (1) The conservation of areas representative of the geographic distribution of the species. Species that are protected across their ranges have lower chances of extinction (Soule and Simberloff 1986; Murphy et al. 1990; Primack 1993; Given 1994; Hunter 1996; Pavlik 1996; Noss et al. 1999; Grosberg 2002). Maintenance of representative occurrences of the species throughout its geographic range helps ensure the conservation of regional adaptive differences and makes the species less susceptible to environmental variation or negative impacts associated with human disturbances or natural catastrophic events across the species' entire range at any one time (Primack 1993; New 1995; Hunter 1996; Helm 1998; Redford and Richter 1999; Rossum et al. 2001; Grosberg 2002). Additionally, the conservation of the geographic distribution of the species is one of the physical and biological features we are required to consider under our regulations (50 CFR 424.13(b)). Accordingly, we considered the number of occupied areas in each vernal pool region, and determined whether each occupied area is essential to the conservation of the species in the region or as a whole.

(2) The conservation of areas representative of the ecological distribution of the Riverside fairy shrimp. Each of the critical habitat units is associated with various combinations of soil types, vernal pool chemistry, geomorphic surfaces (landforms), and vegetation community associations. Maintaining the full range of varying habitat types and characteristics for a species is essential because it would encompass the full extent of the physical and environmental conditions necessary for the species (Zedler and Ebert 1979; Ikeda and Schlising 1990; Fugate 1992; Gonzales et al. 1996; Fugate 1998; Platenkamp 1998; Bainbridge 2002; Noss et al. 2002a). Vernal pool species are extremely adapted to the physical and chemical characteristics of the habitat in which they occur. Additionally, the conservation of the ecological distribution of the species is one of the physical and biological features we are required to consider under our regulations 50 CFR 424.13(b), and was also strongly endorsed by several peer reviewers (see Peer Review section). Accordingly, we considered the extent to which habitat types occupied by the species could be conserved in light of the number of occupied areas and the threats involved.

(3) The conservation of areas necessary to allow movement of cysts between areas representative of the geographic and ecological distribution of the species. As a result of dispersal events within and between vernal pool complexes, and environmental conditions that may prevent the emergence of dormant cysts for up to several decades, the presence of vernal pool species is dynamic in both space and time (Eriksen and Belk 1999; Noss et al. 2002a). We therefore determined that essential habitat for the Riverside fairy shrimp must provide for movement within and between vernal pool complexes to provide for the varying nature and expression of the species, and also allow for gene flow and dispersal and habitat availability that accommodate natural processes of local extirpation and colonization over time (Stacey and Taper 1992; Falk et al. 1996; Davies et al. 1997; Husband and Barrett 1998; Holt and Keitt 2000; Keymer et al. 2000; Donaldson et al. 2002).

We therefore selected vernal pool complexes occupied by the Riverside fairy shrimp in a distribution sufficient to ensure the known geographic range, geographical isolation, and likely genetic diversity of the species. Map Unit 1 represents the northern extreme of the distribution and Map Unit 4 represents the southern extreme of the distribution. Each of these isolated occurrences is greater than 10 mi (16 km) from other known Riverside fairy shrimp locations. We also selected vernal pools occupied by Riverside fairy shrimp to ensure that the density and localized distribution of vernal pools occurs within a variety of different habitat types. Map Unit 2 represents the last known vernal pools in Orange County, and they are within 5 mi (8 km) of each other and include pool habitats not associated with mima mound vernal pools complexes.

Section 10(a)(1)(B) of the Act authorizes us to issue permits for the take of listed species incidental to otherwise lawful activities. An incidental take permit application must be supported by a habitat conservation plan (HCP) that identifies conservation measures that the permittee agrees to implement for the species to minimize and mitigate the impacts of the requested incidental take. We often exclude non-Federal public lands and private lands that are covered by an existing operative HCP and executed implementation agreement under section 10(a)(1)(B) of the Act from designated critical habitat because the benefits of exclusion outweigh the benefits of inclusion as discussed in section 4(b)(2) of the Act.

When defining critical habitat boundaries, we made every effort to exclude all developed areas, such as buildings, paved areas, and other lands unlikely to contain primary constituent elements essential for the Riverside fairy shrimp conservation. Any such structures remaining inside of final critical habitat boundaries are not considered part of the units. This also applies to the lands directly on which such structures lie. A brief discussion of each area designated as critical habitat is provided in the unit descriptions below. Additional detailed documentation concerning the essential nature of these areas is contained in our supporting record for this rulemaking.

Special Management Considerations or Protections

When designating critical habitat, we assess whether the areas determined to be essential for conservation may require special management considerations or protections. As we undertake the process of designating critical habitat for a species, we first evaluate lands defined by those physical and biological features essential to the conservation of the species for inclusion in the designation pursuant

to section 3(5)(A) of the Act. Secondly, we evaluate lands defined by those features to assess whether they may require special management considerations or protection.

The areas designated as critical habitat in this final rule face ongoing threats that will require special

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management considerations or protection. These threats are common to all of the areas designated as critical habitat. The threats that require special management considerations or protection are vernal pool elimination due to destruction and development, alterations made to the hydrologic or soil regime of the vernal pools and their associated upslope areas; disturbance to the claypan and hardpan soils within the vernal pools, disturbance or destruction of the vernal pool flora; and the invasion of exotic plant and animal species into the vernal pool basin. Habitat loss continues to be the greatest direct threat to Riverside fairy shrimp.

Changes in hydrology which affect the Riverside fairy shrimp's primary constituent elements are caused by activities that alter the surrounding topography or change historical water flow patterns in the watershed. Even slight alterations of the hydrology can change the depth, volume and duration of ponding inundation, water temperature, soil, mineral and organic matter transport to the pool and thus its water quality and chemistry, which in turn can make these primary constituent elements unsuitable for Riverside fairy shrimp. Activities that impact the hydrology include but are not limited to road building, grading and earth moving, impounding natural water flows, and draining of the pool(s) or of their immediately surrounding upslope areas. Impacts to the hydrology of vernal pools can be managed through avoidance of such activities in and around the pools and the associated surrounding upslope areas.

Disturbance to the impermeable layer of claypan and hardpan soils within vernal pools occupied by the Riverside fairy shrimp may alter the depth, ponding inundation, water temperature, and water chemistry. Physical disturbances to claypan and hardpan soils may be caused by excavation of borrow material, off-road vehicles, military training activities, agricultural disking, drilling, or creation of berms that obstruct the natural hydrological surface or sub-surface flow of water run-off and precipitation. These impacts can be reduced by avoidance of vernal pools.

Invasive plant and animal species may alter the ponding inundation and water temperature by changing the evaporation rate and shading of standing water in vernal pools. Invasive plant species, such as brass-buttons (Cotula coronopifolia) and Pacific bentgrass (Agrostis avenaceae), compete with native vernal plant species and may alter the primary constituent elements in these vernal pools. Invasive plants need to be removed and managed to maintain the primary constituent elements needed by the Riverside fairy shrimp in a manner consistent with the conservation of native vernal pool plants.

Critical Habitat Designation

We are designating four units (5 sub-units) as critical habitat for the Riverside fairy shrimp. The critical habitat areas described below constitute our best assessment at this time of the areas essential for the conservation and provide one or more of the primary constituent elements essential to the species of the Riverside fairy shrimp, and that may require special management. The four map units designated as critical habitat include Riverside fairy shrimp habitat within the species' range in the United States, and are referred to by the following geographic names: (Map Unit 1) Ventura County, (Map Unit 2) Orange County, (Map Unit 3) North San Diego County coastal area, and (Map Unit 4) South San Diego County, Otay Mesa. An overview of the regional units that are designated as critical habitat in this final rule, with the proposed and final sub-unit sizes, are shown in Table 1. Other lands have not been designated critical habitat for the Riverside fairy shrimp because they do not meet the definition of critical habitat under section 3(5)(A), or, although essential, have been exempted under section 4(a)(3) and excluded under section 4(b)(2) of the Act (see Table 2). For a summary of the approximate total critical habitat area designated by county and land ownership, and a summary of the areas of land encompassed by HCPs and NCCPs, see Tables 3 and 4.

Critical habitat units and areas designated for the Riverside fairy shrimp. Also shown are proposed units which were exempted or excluded from the final designation.

Table 1

Critical Habitat Unit	Sub-unit number: proposed rule	Ac (ha) proposed rule (April 28, 2004)	Essential habitat Ac (ha) final rule	Designated Ac (ha) final rule
Ventura County, land in City of Moorpark Greenbelt, north Tierra Rejada Valley.	1A	74 (30)	47 (19)	47 (19)
Ventura County, land south Tierra Rejada Valley.	1B	437 (177)	185 (75)	185 (75)
Ventura County, land on Cruzan Mesa.	1C	534 (216)	0	0
Los Angeles County, Los Angeles Basin--Orange Management Area, land at LAX.	2A 2B	103 (42)	0	0

Orange County, land within former MCAS El Toro.	2C	133 (54)	14 (6)	0
Orange County, land near O'Neill Regional Park.	2D	736 (298)	49 (20)	49 (20)
Orange County, land near Tijeras, Mission Viejo.	2E	321 (130)	101 (41)	0
Orange County, Rancho Mission Viejo, land on Chiquita Ridge.	2F	489 (198)	263 (106)	0
Orange County, Rancho Mission Viejo, land near Radio Tower Road.	2G	736 (298)	417 (169)	0
North San Diego County, State-leased land, Christianitos Creek foothills.	2H	566 (229)	47 (19)	0
Riverside County, lands on March ARB.	3A 3B	44 (18) 101 (41)	101 (41)	0
North coastal San Diego County, land on MCB Camp Pendleton.	4A 4B	254 (103)	226 (91)	0
North coastal San Diego County, Carlsbad HCP, land near Poinsettia Lane Commuter Station.	4C	143 (58)	22 (9)	22 (9)
South San Diego County, land on western Otay Mesa Sweetwater Union High School District lands.	5A	61 (25)	3 (1)	3 (1)
South San Diego County, southwestern Otay Mesa, federal lands adjacent to the U.S.--Mexico border.	5B	194 (79)	147 (59)	0
South San Diego County, southeastern Otay Mesa, land adjacent to the U.S.-Mexico border.	5C	866 (350)	111 (45)	0

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Total area designated in final rule.	.....	.....	.....	306 (124)

Total size of areas designated as critical habitat or as essential to the conservation of the Riverside fairy shrimp, and areas excluded from the final designation.

Table 2

Area determined to be essential to the conservation of the Riverside fairy shrimp.	13,913 ac (5,630 ha)
Essential area exempted pursuant to section 4(a)(3) of the Act due to an INRMP that benefits Riverside fairy shrimp: San Diego County, MCAS Miramar and MCB Camp Pendleton (Sub-units 4A and 4B).	3,053 ac (1,236 ha)
Essential area excluded pursuant to section 4(b)(2) of the Act: Completed and pending HCPs in San Diego MSCP, Orange County Central-Coastal NCCP and Western Riverside County MSHCP: Northern San Diego County, Carlsbad HCP (portion of Sub-unit 3A).	9,354 ac (3,785 ha)
Essential area excluded pursuant to section 4(b)(2) of the Act: Impacts to national security on Department of Defense lands: Riverside County, March Air Reserve Base (Sub-unit 3B); San Diego County (Otay Mesa Sub-unit 5B; portion of Sub-unit 5C); San Onofre State Park.	295 ac (119 ha)
Essential area excluded pursuant to section 4(b)(2) of the Act: Impacts to Economy on privately-owned lands within Sub-units 2C (former MCAS El Toro), 2D (Saddleback Meadows portion), 2E (Tijeras Creek), 2F (Chiquita Ridge), 2G (Radio Tower Road), 5C (Southeastern Otay Mesa).	295 (119)
Designated Critical Habitat.....	306 ac (124 ha)

Approximate designated critical habitat area (ha (ac)) by County and land ownership. Estimates reflect the total area within critical habitat unit boundaries.

Table 3

County	Federal*	Local/State	Private	Total
Ventura.....	0 ac	0 ac	232 ac (94 ha)	232 ac (94 ha)
Orange.....	0 ac	39 ac (16 ha)	10 ac (4 ha)	49 ac (20 ha)
San Diego.....	0 ac	25 ac (10 ha)	0 ac	25 ac (10 ha)

Total.....	0 ac	64 ac (26 ha)	242 ac (98 ha)	306 ac (124 ha)

* Federal lands include Department of Defense, U.S. Forest Service, and other Federal land.

Habitat Conservation Plans (HCPs) and Natural Communities Conservation Program (NCCP) areas within the general area of the designated critical habitat.

Table 4

NCCP/HCP	Planning area	Preserve area
San Diego Multiple Species Conservation Program (MSCP).	582,000 ac (236,000 ha)	171,000 ac (69,573 ha)
Central-Coastal Orange County NCCP/HCP.	208,713 ac (84,463 ha)	38,738 ac (15,677 ha)
Proposed Northwestern San Diego Multiple Habitat Conservation Program (MHCP).	111,908 ac (45,287 ha)	19,928 ac (8,064 ha)
Proposed Southern Sub-region NCCP/HCP Orange County.	128,000 ac (51,800 ha)	14,000 ac (5,666 ha)
Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP).	1,260,000 ac (510,000 ha)	153,000 ac (61,919 ha)

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The critical habitat unit names are based on the county where the vernal pool complexes occur and their geographic location. For the map sub-units, we used the names for the vernal pool complexes that are commonly given in survey reports or development proposals. These various identifiers allow the public to locate the units in the context of past vernal pool mapping efforts. Past mapping may not correspond to current boundaries of critical habitat. Areas proposed for designation are divided into four different units; we present brief descriptions of all units, and reasons why they are essential for the conservation of the Riverside fairy shrimp, below.

Final Unit 1: Tierra Rejada Valley Critical Habitat

Unit 1 contains approximately 1,045 acres. Its habitat sub-regions include Carlsberg Ranch in Ventura County and Cruzan Mesa in Los Angeles County. One portion of the Carlsberg Ranch sub-region, on the edge of the city of Moorpark, has already been largely developed by Lennar Homes. The southeastern portion, Tierra Rajada, lies between the cities of Thousand Oaks and Simi Valley, with a substantial portion falling in Ventura County lands. Cruzan Mesa is on the northeastern edge of the City of Santa Clarita, and contains a residential development by Pardee Homes. Unit 1 represents that northernmost habitat of the RFS habitat.

The vernal pools in this unit (220 ac (89 ha)) lie within the Transverse Range Management Area. Sub-units 1A and 1B occur in the Tierra Rajada Valley in Ventura County, California (220 ac (89 ha)), and represent the currently known northern limit of occupied habitat for the Riverside fairy shrimp and are among the last remaining vernal pools in Ventura County known to support this species. The areas that are designated as critical habitat in Unit 1 provide the primary constituent elements that support the Riverside fairy shrimp as described above, relating to the pooling basins, watersheds, underlying soil substrate and topography. These lands are considered essential to the conservation of the Riverside fairy shrimp.

The Tierra Rajada Valley Critical Habitat Unit has two sub-units located on either side of the Tierra Rajada Valley basin, near the city of Moorpark, west of Simi in Ventura County. The northern Sub-unit 1A includes portions of land within the City of Moorpark, within the City's designated ``Area of Interest'' in the Terra Rajada Greenbelt zone. Thus, this sub-unit lies within an area of land with a formal agreement by the Cities of Moorpark, Thousand Oaks, and Simi Valley, and County of Ventura to be preserved for open space and agricultural uses. Sub-unit 1A contains a large vernal pool in land that was formerly the Carlsberg Ranch. Development has occurred adjacent to this vernal pool, but it is now protected from future development. This pool has been surveyed numerous times, and is characterized as excellent, with 5-10,000 Riverside fairy shrimp recorded within (CNDDB 1998). Sub-unit 1B is located less than a mile to the south, just across the Tierra Rajada valley basin. This sub-unit has not been surveyed for Riverside fairy shrimp; a number of factors strongly suggest it is likely to occur there, including:

(a) The biotic and abiotic conditions of the sub-unit (i.e., its soil type, geology, morphology, local climate, topography, and occurrence of local vernal pool vegetation, such as California orcutt grass (Orcuttia californica)),

(b) The topographic conditions of the sub-unit, which are ideally suited to collect water at the basin center,

(c) The fact that the sub-unit contains several large permanent and semi-permanent pools within its basin,

(d) The fact that the sub-unit is located less than 1 mi (1,500 m) from essential habitat where Riverside fairy shrimp occurrence is known and documented. Because this distance is less than distances between other known occurrences of Riverside fairy shrimp within the same pool

complex, which can occur as much as 1.1-1.9 mi (2,000-3,000 m) apart, this pool complex is within the dispersal distance for this species,

(e) The two sub-units are adjoined, on opposite sides, to a large river basin passing between (the Tierra Rejada Valley river system) which may have historically connected the two pools, or dispersed cysts between the two sub-units.

This 74 ha (184 ac) sub-unit contains the primary constituent elements for Riverside fairy shrimp, and is considered essential habitat for the species. The above factors strongly support the likelihood of the species occurring there. This area is currently in private ownership and we are unaware of any plans to develop this site. The preservation and management of vernal pools in both sub-units in the Transverse Range Management Area are also described by the Recovery Plan as essential for the conservation of the Riverside fairy shrimp.

The occurrences of Riverside fairy shrimp in northern Los Angeles County and in Ventura County (Unit 1 and proposed Sub-units 2A, 2B) represent isolated occurrences at the northernmost extent of the Riverside fairy shrimp's known range. Recent scientific research on desert fishes, a species group similar to the fairy shrimp group in that it is non-mobile and restricted within narrow habitat limits, has found that the risk of extinction among the populations was more closely correlated to range fragmentation than to the number of occurrences (Fagan et al. 2004). This emphasizes the importance of protecting populations of the Riverside fairy shrimp throughout as much of its known range as possible, to minimize range fragmentation and thus obtain maximal conservation efficiency.

Conservation biologists have demonstrated that populations at the edge of a species' distribution can be important sources of genetic variation and represent the best opportunity for colonization or re-colonization of unoccupied essential areas and, thus, for the species' long-term conservation (Gilpin and Soul[eacute] 1986; Lande 1999). These outlying populations may be genetically divergent from populations in the center of the range and, therefore, may have genetic characteristics that would allow adaptation in the face of environmental change. Such characteristics may not be present in other parts of the species' range (Lesica and Allendorf 1995). Research on the San Diego fairy shrimp has shown that geographically distinct populations in various vernal pools are also genetically distinct from each other, to the extent that individuals within populations may be identified at the individual vernal pool complex level based on their genetic make-up (Bohonak 2003). This is likely to be also true of the Riverside fairy shrimp (Bohonak pers. comm.). The preservation of genetic diversity can greatly aid future conservation and recovery efforts of the species populations throughout its range, as well as provide insight into the evolutionary history of a species. For all of these reasons, the lands identified in Unit 1 are essential for the conservation of the Riverside fairy shrimp.

Proposed Unit 2/Final Unit 2: Los Angeles Basin--Orange Management Area Critical Habitat

In the proposed rule, this unit was comprised of the Los Angeles Basin--Orange Management Area, Los Angeles and Orange Counties, California (3,180 ac (1,287 ha)). This area encompassed two distinct regions where Riverside fairy shrimp are known to occur: in vernal pools in coastal Los Angeles

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County, and in vernal pools and vernal pool-like ephemeral ponds located along the foothills of Orange County. These pools are found at the former MCAS El Toro, O'Neill Regional Park which is east of Tijeras Creek at the intersection of Antonio Parkway and the FTC-north segment, and in Rancho Mission Viejo upon Chiquita Ridge and in the Radio Tower Road area, and on lands leased to the California Department of Parks and Recreation by Camp Pendleton. These vernal pools are the last remaining vernal pools in Orange County known to support this species (58 FR 41384). These pools represent a unique type of vernal pool habitat much different from the traditional mima mound vernal pool complexes. They are also different from coastal pools at MCB Camp Pendleton and the inland pools of Riverside County. The Orange County vernal pool habitat and essential associated watershed represent the majority of Riverside fairy shrimp habitat within the Los Angeles Basin--Orange Management Area discussed in the Recovery Plan. The ephemeral pond on the former MCAS El Toro is within the boundary of the Central--Coastal HCP planning area. With the exception of a portion of habitat on Sub-unit 2D (lands within O'Neill Regional Park), critical habitat for the Riverside fairy shrimp has been excluded under section 4(b)(2) of the Act.

In the southern end of proposed Sub-unit 2D lies O'Neill Regional Park, in the vicinity of Trabuco Canyon, where we have determined to designate approximately 49 ac (20 ha) of habitat considered essential to the conservation of the Riverside fairy shrimp (Final Unit 2). This portion of the sub-unit lies at 1,413 ft (431 m), the highest elevation of the occurrences of Riverside fairy shrimp considered in this designation. The habitat consists of several vernal pools surrounded by grassland and coastal sage scrub, and may represent a unique genetic population for this species (CNDDB 2001). The threats to this area consist of, among others, proposed development projects (e.g., possible expansion of a telecommunications facility, and easement for water and sewer construction). These vernal pools have been included in the O'Neill Regional Park Resource Management Plan by the County of Orange (August 1989), which includes efforts to implement restoration and

monitoring plans (for biota species, turbidity, and cattle trespass). These plans include inspection of the vernal pools within the determined sensitive ecological area, restoration (planting of native vernal pool plant species), removal of invasive plants, protection of the watershed and protection from trampling and other sources of habitat damage within the vicinity of the vernal pools.

Proposed Unit 3: Western Riverside County

No critical habitat has been designated in the Western Riverside County Critical Habitat Unit. In accordance with section 4(b)(2) of the Act, we have excluded lands that are encompassed by the Western Riverside County MSHCP (see Relationship of Critical Habitat to Approved Habitat Conservation Plans). We removed from this critical habitat designation the proposed Sub-unit 3A as the area has been modified and no longer contains the primary constituent elements for the Riverside fairy shrimp. We excluded proposed Sub-unit 3B for national security impacts in accordance with section 4(b)(2) of the Act (see Relationship of Critical Habitat to Department of Defense Lands, and Application of Section 4(b)(2) to March Air Reserve Base (March ARB)).

Unit 4: Northern Coastal San Diego County Critical Habitat

Proposed Unit 4/Final Unit 3: Northern Coastal San Diego County Critical Habitat

Approximately 397 ac (161 ha) of habitat were proposed for designation in San Diego County, and included some of the vernal pools found on MCB Camp Pendleton as well as the Poinsettia Lane Train Station vernal pool area in the City of Carlsbad.

The Coastal Northern San Diego County Unit in this final rule consists of a vernal pool complex located on coastal terraces. This unit (8 ac (3 ha), map Sub-unit 4C in the proposed rule) is located along the railroad right-of-way at the Poinsettia Lane Commuter Station and supports populations of the Riverside fairy shrimp. These populations represent the last remnant of the historic distribution of vernal pool on coastal terraces in San Diego County and the northernmost occurrences of the Riverside fairy shrimp within San Diego County (not including MCB Camp Pendleton). As a result of coastal development, the Coastal Northern San Diego County Unit represents the only remnant of the historic distribution of vernal pools supporting the Riverside fairy shrimp along the coastal terraces in San Diego County.

The highly limited distribution and fragmentation of vernal pools on coastal terraces suggests that these populations may be genetically distinct from other populations of the Riverside fairy shrimp as indicated by recent genetic studies that document unique haplotypes between geographically separated populations of the San Diego fairy shrimp (Bohonak 2004). This unit provides space for individual and population growth and reproduction; the soils and surrounding uplands provide food, water, light, minerals, and other nutritional and physiological requirements, and represent the historical geographic distribution of the San Diego fairy shrimp.

The majority of the vernal pool complex along the railroad right-of-way at the Poinsettia Lane Commuter Station is now in a conservation easement managed by the California Department of Fish and Game (CDFG). The lands are owned by the North County Transit District. CDFG is currently in the process of developing a long-term management plan for this area to control non-native weeds and maintain the hydrology of the site. The portion of this vernal pool complex excluded from critical habitat is part of the North San Diego MHCP. Originally included in the proposed rule, the Cocklebur Sensitive Area and other areas on or controlled by MCB Camp Pendleton (proposed map Sub-units 4A and 4B) are exempted from the final designation of critical habitat for the Riverside fairy shrimp under section 4(a)(3) of the Act. For more details, see the sections Relationship of Critical Habitat to Department of Defense Lands and Relationship of Critical Habitat to Approved Habitat Conservation Plans below.

Proposed Unit 5/Final Unit 4: South San Diego County Critical Habitat

In the proposed rule, Unit 5 contained 1,120 acres proposed for designation, all located in the City or County of San Diego. Some of this land is located in the federally owned area known as Arnie's Point along the border with Mexico, and most of the remainder is in East Otay Mesa, an area of major commercial and residential growth. Unit 5 is the southernmost extent of the Riverside fairy shrimp habitat in the U.S.

The vernal pool complexes in this critical habitat map unit are located within a Major/Minor Amendment area within the San Diego MSCP. While these areas are within the San Diego MSCP, Major/Minor Amendment areas do not currently have approved plans that provide conservation measures for the Riverside fairy shrimp. The vernal pool complexes in this unit represent

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the southernmost extent of the Riverside fairy shrimp within the United States. Pools on Otay Mesa are considered San Diego claypan vernal pools. The vernal pool complexes in this unit are the only vernal pools on Huerhuero loam and Linn[eacute] clay loam in this critical habitat designation. This unit is essential in preserving the genetic diversity of this species and in maintaining the historic range of this species.

The majority of vernal pool complexes on Otay Mesa have been severely degraded by numerous activities, including agricultural development, trash-dumping, and vehicle and human traffic, and many pools have been destroyed and removed due to industrial development in the area. This southernmost section is essential to the conservation of the Riverside fairy shrimp because it maintains the ecological distribution and genetic diversity of this species. No Department of Homeland Security lands along the U.S.-Mexico border are designated as critical habitat in this final rule and we have excluded all other lands within Subunit 5C from critical habitat based on section 4(b)(2) of the Act.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7 of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out do not destroy or adversely modify designated critical habitat. In our regulations at 50 CFR 402.2, we define destruction or adverse modification as ``a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to: Alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.'' We are currently reviewing the regulatory definition of adverse modification in relation to the conservation of the species and are relying on the statutory provisions of the Act in evaluating the effects of Federal actions on designated critical habitat, pending further regulatory guidance.

Section 7(a) of the Act requires Federal agencies, including the Service, to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is proposed or designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the agency in eliminating conflicts that may be caused by the proposed action. We may issue a formal conference report if requested by a Federal agency. Formal conference reports on proposed critical habitat contain an opinion that is prepared according to 50 CFR 402.12, as if critical habitat were designated. We may adopt the formal conference report as the biological opinion when the critical habitat is designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)). The conservation recommendations in a conference report are advisory.

If a species is listed or critical habitat is designated, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Through this consultation, the action agency ensures that their actions do not destroy or adversely modify critical habitat.

When we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. ``Reasonable and prudent alternatives'' are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request re-initiation of consultation or conference with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat.

Federal activities that may affect the Riverside fairy shrimp or its critical habitat will require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act, a section 10(a)(1)(B) permit from the Service, or some other Federal action, including funding (e.g., Federal Highway Administration or Federal Emergency Management Agency), will also continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat and actions on non-Federal and private lands that are not federally funded, authorized, or permitted are not subject to section 7 consultations.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation. Activities that may destroy or adversely modify critical habitat may also jeopardize the continued existence of the Riverside fairy shrimp. Federal activities that, when carried out, may adversely affect critical habitat for the Riverside fairy shrimp include, but are not limited to:

(1) Actions that would permanently alter the function of the underlying claypan or hardpan soil layer to hold and retain water. This would affect the duration and extent of inundation, water temperature and chemistry, and other vernal pool features beyond the tolerances of the Riverside fairy shrimp. Damage or alternation of the claypan or hardpan soil layer would eliminate the function of this PCE for providing space for individual and population growth and for normal behavior; water and physiological requirements; and sites for breeding, reproduction and rearing of offspring. Actions that could permanently alter the function of the underlying claypan or hardpan soil layer include, but are not limited to, grading or earthmoving work that disrupts or rips into the claypan or

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hardpan soil layer; or and channelizing, mining, dredging, or drilling into the claypan or hardpan soil layer.

(2) Actions that would permanently reduce the depth of a vernal pool, and the ability of a vernal pool to pond with water, the duration and extent of inundation, water temperature and chemistry, and other vernal pool features beyond the tolerances of the Riverside fairy shrimp. Reducing the depth of the vernal pool would eliminate the function of this PCE for providing space for normal behavior and for individual and population growth, water and physiological requirements, sites for breeding, reproduction and rearing of offspring, and reduce the time available for growth and reproduction as it would accelerate the pool's drying phase. Actions that could permanently reduce the depth of the vernal pool include, but are not limited to, discharge of dredged or fill material into vernal pools and erosion of sediments from fill material, disturbance of soil profile by grading, ditch digging in and around vernal pools, earthmoving work, OHV use, grazing, vegetation removal, or construction of roads, culverts, berms or any other impediment to natural sub-surface or surface hydrological flow within the watershed for the vernal pools. These activities should be carefully planned with hydrology studies and monitored because both increases and decreases to ponding duration can have negative impacts to the Riverside fairy shrimp's ability to persist.

(3) Actions that would substantially alter vernal pool water chemistry to exceed the levels discussed in the ``Primary Constituent Elements'' section. Exceeding these water chemistry parameters would eliminate the function of this PCE for maintaining the water and physiological requirements of the vernal pool habitat for the Riverside fairy shrimp, and beyond the species' tolerances. Actions that could substantially alter vernal pool water chemistry include, but are not limited to, erosion from fill material or soils disturbed by grading within the watershed for the vernal pools, discharge of dredged or fill material into vernal pools, removal of the clay soils underlying vernal pools, and release of chemicals or pollutants.

(4) Actions that would substantially alter vernal pool water temperatures to exceed temperature ranges beyond those discussed in the ``Primary Constituent Elements'' section when juvenile and adult Riverside fairy shrimp are present. Exceeding these water temperature parameters would eliminate the function of this PCE for maintaining the water and physiological requirements of the vernal pool habitat for the Riverside fairy shrimp, and beyond the specie's tolerances. Actions that could substantially alter vernal pool water temperature include, but are not limited to, discharge of heated effluents into the surface water or by dispersed release (non-point source).

If you have questions regarding whether specific activities will constitute destruction or adverse modification of critical habitat, contact the Field Supervisor, Carlsbad Fish and Wildlife Office (see ADDRESSES section). Requests for copies of the regulations on listed wildlife and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Endangered Species, 911 N.E. 11th Ave, Portland, OR 97232 (telephone 503/231-2063; facsimile 503/231-6243).

All lands designated as critical habitat are within the geographical area occupied by the species and are necessary to preserve functioning vernal pool habitat for the Riverside fairy shrimp. Federal agencies already consult with us on activities in areas currently occupied by the species, or if the species may be affected by the action, to ensure that their actions do not jeopardize the continued existence of the species. Thus, we do not anticipate substantial additional regulatory protection will result from critical habitat designation, although there may be consultations that result from Federal actions within critical habitat in the watersheds associated with vernal pools.

Application of Section 4(a)(3) and Exclusions Under Section 4(b)(2) of the Act

Application of Section 4(a)(3) of the Act--Approved and Completed INRMPs

The Sikes Act Improvements Act of 1997 (Sikes Act) (16 U.S.C. 670a) requires each military installation that includes land and water suitable for the conservation and management of natural resources to complete an INRMP by November 17, 2001. An INRMP combines implementation of the military mission of the installation with stewardship of its natural resources. Each INRMP includes an assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species; a statement of goals and priorities; a detailed description of management actions to be implemented to provide for these ecological needs; and a monitoring and adaptive management plan. We consult with the Department of Defense on the development and implementation of INRMPs for installations with federally listed species.

Section 318 of the National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108-136) amended the Act to address the relationship of INRMPs to critical habitat by adding a new section 4(a)(3)(B). This provision prohibits us from designating as critical habitat any lands or other geographical areas owned or controlled by the DOD, or designated for its use, that are subject to an INRMP prepared under section 101 of the Sikes Act (16 U.S.C 670a), if the Secretary of the Interior determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation.

In our April 27, 2004 rule, we proposed critical habitat for the Riverside fairy shrimp for areas containing essential habitat, but not considered mission-critical at MCB Camp Pendleton. We also considered, but did not propose, critical habitat for the Riverside fairy shrimp on mission-essential training areas at MCB Camp Pendleton and at MCAS Miramar (69 FR 23024). For this final rule, we re-evaluated both our exclusions and our proposed designations on MCB Camp Pendleton and on MCAS Miramar based on the completion of their INRMPs, which address the conservation of the Riverside fairy shrimp. We have therefore exempted all areas on MCB Camp Pendleton and on MCAS Miramar from the final critical habitat designation pursuant to section 4(a)(3) of the Act.

Relationship of Critical Habitat to Department of Defense Lands

We received comments regarding the proposed critical habitat designation and economic impact on Department of Defense lands from the Navy at MCB Camp Pendleton and the former MCAS El Toro, and from the Air Force at March ARB. To ensure that the Department of Defense could comment on the proposed rule and its relationship to section 4(a)(3) of the Act, as amended, we specifically requested information from the Department of Defense regarding MCB Camp Pendleton's INRMP to determine if the INRMP provides a benefit to the Riverside fairy shrimp in the proposed rule published on April 27, 2004 (69 FR 23024).

Application of Section 4(a)(3) to MCB Camp Pendleton (Sub-Units 4A, B)

Camp Pendleton completed their INRMP in November 2001, which

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includes the following conservation measures for the Riverside fairy shrimp: (1) Surveys and monitoring, studies, impact avoidance and minimization, and habitat restoration and enhancement, (2) species survey information stored in MCB Camp Pendleton's GIS database and recorded in a resource atlas which is published and updated on a semi-annual basis, (3) application of a 984 ft (300 m) radius to protect the micro-watershed buffers around current and historic Riverside fairy shrimp locations, and (4) use of the resource atlas to plan operations and projects to avoid impacts to the Riverside fairy shrimp and to trigger section 7 consultations if an action may affect the species (R.L. Kelly, in lit. 2003). These measures are established, ongoing aspects of existing programs and/or Base directives (e.g., Range and Training Regulations) or measures that will be implemented when the current section 7 consultation for upland species (Uplands Consultation), including the Riverside fairy shrimp, is completed.

Camp Pendleton implements Base directives to avoid and minimize adverse effects to the Riverside fairy shrimp, such as: (1) Bivouac, command post, and field support activities should be no closer than 984 ft (300 m) to occupied Riverside fairy shrimp habitat year round, (2) limiting vehicle and equipment operations to existing road and trail networks year round, and (3) requiring environmental clearance prior to any soil excavation, filling, or grading. MCB Camp Pendleton has also demonstrated ongoing funding of their INRMP and management of endangered and threatened species. In Fiscal Year 2002, MCB Camp Pendleton spent approximately $1.5 million on the management of federally listed species. In Fiscal Year 2003, MCB Camp Pendleton expended over $5 million to fund and implement their INRMP, including management actions that provided a benefit for the Riverside fairy shrimp. Moreover, in partnership with the Service, MCB Camp Pendleton is funding two Service biologists to assist in implementing their Sikes Act program and buffer lands acquisition initiative.

Based on MCB Camp Pendleton's past funding history for listed species and their Sikes Act program (including the management of the Riverside fairy shrimp), we believe there is a high degree of certainty that MCB Camp Pendleton will implement the INRMP in coordination with the California Department of Fish and Game and with the Service in a manner that provides a benefit to the Riverside fairy shrimp. We also believe that there is a high degree of certainty that the conservation efforts of their INRMP will be effective. Service biologists work closely with MCB Camp Pendleton on a variety of endangered and threatened species issues, including the Riverside fairy shrimp. The

management programs and Base directives to avoid and minimize impacts to the species' are consistent with current and ongoing section 7 consultations with MCB Camp Pendleton.

We are also in the process of completing a section 7 consultation for upland species on MCB Camp Pendleton. Vernal pools and associated species, including the Riverside fairy shrimp, are addressed in the ``Uplands Consultation.'' When this consultation is completed, MCB Camp Pendleton will incorporate the conservation measures from the biological opinion into their INRMP. At that time, MCB Camp Pendleton's INRMP will provide further benefits to the Riverside fairy shrimp. Therefore, we find that the INRMP for MCB Camp Pendleton provides a benefit for the Riverside fairy shrimp and are exempting from critical habitat lands on MCB Camp Pendleton pursuant to section 4(a)(3) of the Act.

Application of Section 4(a)(3) to MCAS Miramar

We reaffirm our exemption of MCAS Miramar under section 4(a)(3) of the Act. MCAS Miramar completed a final INRMP in May 2000 that provides for conservation, management and protection of the Riverside fairy shrimp. The INRMP is in place and is being implemented. With regard to the Riverside fairy shrimp, the INRMP classifies nearly all of the vernal pool basins and watersheds on MCAS Miramar as a Level I Management Area. A Level I Management Area receives the highest conservation priority within the INRMP. Preventing damage to vernal pool resources is the highest conservation priority in MAs with the Level I designation. The conservation of vernal pool basins and watersheds in a Level I Management Area is achieved through education of base personnel, proactive measures to avoid accidental impacts, including signs and fencing, developing procedures to respond to and fix accidental impacts on vernal pools, and maintenance of an updated inventory of vernal pool basins and associated vernal pool watersheds.

Since the completion of MCAS Miramar's INRMP, we have received reports on their vernal pool monitoring and restoration program, and correspondence detailing the installation's expenditures on the objectives outlined in its INRMP. MCAS Miramar continues to monitor and manage its vernal pool resources. Ongoing programs include a study on the effects of fire on vernal pool resources, vernal pool mapping and species surveys, and a study of Pacific bentgrass (Agrostis avenaceae), an invasive nonnative grass found in some vernal pools on MCAS Miramar. Based on the value MCAS Miramar's INRMP assigns to vernal pool basins and watersheds, and the management actions undertaken conserve them, we find that the INRMP provides a benefit for the Riverside fairy shrimp. In accordance with section 4(a)(3) of the Act, MCAS Miramar is exempted from critical habitat designation for the Riverside fairy shrimp.

Application of Section 4(b)(2) of the Act--National Security

Application of Section 4(b)(2) National Security to March Air Reserve Base (Sub-Unit 3B)

March Air Reserve Base (March ARB) is an Air Force Command installation that includes runways, hangars, aircraft parking aprons, taxiways, administrative facilities, billeting facilities, associated road network, landscape areas, and open areas associated with runway threshold and lateral clear zones. March ARB hosts the 452nd Air Mobility Wing and supports an Air National Guard Wing, Headquarters 4th Air Force, and other military and civilian organizations. The 452nd Air Mobility Wing is the primary air mobility organization for supporting the 1st Marine Expeditionary Force for worldwide contingency operations. The Air National Guard Wing includes the 163d Air Refueling Wing and 120th Fighter Wing. March ARB also supports the Department of Homeland Security Riverside Aviation Unit.

(1) Benefits of Inclusion

The primary benefit of designating critical habitat is that Federal agencies would have to consult with us on projects they carry out, fund, or authorize to ensure such activities do not adversely modify or destroy designated critical habitat. Absent the designation of critical habitat, Federal agencies must still consult with us if they determine an action may affect a federally listed species to ensure those actions will not jeopardize the species. We already consult with March ARB on actions that may affect listed species, including the Riverside fairy shrimp. Because protection of vernal pool habitat is key to avoiding jeopardy to the Riverside fairy shrimp, we carefully

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consider the effects on habitat in our evaluation of impacts to the species.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has been achieved, as both the military and civilian managers and users of the area are fully familiar with the existence and needs of the shrimp. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

Under the Gifford Pinchot decision, the designation of critical habitat may provide greater benefits to the recovery of the species than previously believed. However, at this point, it is not possible to quantify that benefit.

In summary, we believe that this proposed unit as critical habitat would provide little additional federal regulatory benefits for the species. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are accomplished.

(2) Benefits of Exclusion

In contrast to the absence of a significant benefit resulting from designating critical habitat for the Riverside fairy shrimp at March ARB, there are substantial benefits to excluding this area from critical habitat. If critical habitat were to be designated on this land the Air Force could be compelled to re-initiate consultations with us under section 7 of the Act on activities that have previously been reviewed but have not yet been implemented, in order to address whether the proposed activities may affect designated critical habitat. In addition, they would be required to consult over possible effects from future activities on the critical habitat. The additional burden of initiating and reinitiating consultations could impede the timely conduct of mission-essential training activities and impair the ability of the Air Force to fully achieve its mission. Moreover, our final Economic Analysis has determined that there could be additional costs of $33 million, including an additional $950,000 for an Environmental Impact Statement to be completed for March ARB to maintain operations of its runway and taxiways. A California Air National Guard heavy equipment unit would require relocation, costing $31.5 million.

(3) Benefits of Exclusion Outweigh the Benefits of Inclusion in Critical Habitat

Because of the relatively limited benefits arising from designation, we believe the role played in supporting overseas Marine Corps operations and the related importance to national security of ensuring March ARB's ability to maintain a high level of military readiness, and the additional cost impacts identified in our economic analysis, we believe the benefits of exclusion outweigh the benefits of inclusion and have excluded this facility pursuant to section 4(b)(2) of the Act.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp must undergo a consultation with the Service under the requirements of section 7 of the Act. The species is protected from take under section 9 of the Act. The exclusions leave these protections unchanged. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

Leased Lands at Marine Corps Base Camp Pendleton (San Onofre State Park)--Exclusions Under Section 4(b)(2)

The Marine Corps operates Camp Pendleton as an amphibious training base that promotes the combat readiness of military forces and is the only West Coast Marine Corps facility where amphibious operations can be combined with air, sea, and ground assault training activities year-round. Currently, the Marine Corps has no alternative installation available for the types of training that occur on Camp Pendleton.

The Marine Corps leases some of the land at Camp Pendleton to the State of California for use as San Onofre State Park. In their comments on the proposed critical habitat for the Riverside fairy shrimp, the Marines noted the adverse impacts to their training abilities which they believe have resulted from various environmental laws, with the Act foremost among these, and provide a study to support their contention. While their comments and the study focused primarily on lands currently used for training, and they supported the Service's stated intent to exempt ``mission-critical'' areas under sections 4(a)(3) or 4(b)(2), they also stated ``simply because some areas of the Base may not be designated as a range or training area, * * * such areas should not be presumed to be unimportant or not useful to support training actions, either today or in the future.'' In the same letter (Bowdon, May 2004, in litt.) the Commanding General said: ``In particular, both the Commandant of the Marine Corps and I have personally expressed deep concerns that the designation of critical habitat aboard Camp Pendleton would impose long term, cumulative and detrimental impacts on the capabilities of the base to perform its military mission, * * *''.

The San Onofre State Park lands are potential training lands that are not covered by the other exemptions provided to Camp Pendleton lands, as they are managed by the State and not covered by the base's INRMP. Based on the comments from the Corps, we are excluding these lands, consisting of approximately 47 acres, on national security grounds, so they could be available quickly to the Marines in the event they were needed for military training.

(1) Benefits of Inclusion

The primary benefit of any critical habitat with regard to activities that require consultation pursuant to section 7 of the Act is to ensure that the activity will not destroy or adversely modify designated critical habitat. However, since this land is managed by the State of California, it is not open to development and is subject to the protective laws and regulations applicable to the State Parks. The educational benefits of critical habitat include informing the Marine Corps and the State of California of areas that are important to the conservation of listed species. However, we are confident both are now aware of this. As long as the land is managed by the State of California, there is not likely to be a Federal nexus which would trigger consultation with us should critical habitat be designated.

Therefore, we do not believe that designation of this area as critical habitat will appreciably benefit the shrimp beyond the protection already afforded the species under the Act.

(2) Benefits of Exclusion

In contrast to the absence of an appreciable benefit resulting from designation of these lands as critical habitat, there is a benefit to excluding them through avoidance of delay should the Corps need the land for military purposes. The Corps' lease agreement with the State provides that the land can be reclaimed with a 90-day notice, and

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if urgently needed for military purpose, the reversion might well be more rapid. However, if the land were designated as critical habitat, the requirement to consult on activities to be conducted there could delay and impair the ability of the Marine Corps to conduct effective training activities and limit Camp Pendleton's utility as a military training installation. We already have consultations with them under section 7 on activities related to the presence of the shrimp, as a result of which we could likely do a consultation related to jeopardy very quickly. However, there has been no consultation on critical habitat for the species, and under the new standard for adverse modification that may result from the Gifford Pinchot decision there is no reason to believe this could be done quickly.

(3) Benefits of Exclusion Outweigh the Benefits of Inclusion

Based on the current world situation, the Marine Corps' need to maintain a high level of readiness and fighting capabilities, and the possible impact on national security if that is obstructed, we believe the benefits of excluding these lands outweigh the benefits of including them.

(4) Exclusion Will Not Result in Extinction of the Species

Because the lands are occupied by the species and the Marine Corps has a statutory duty under section 7 to ensure that its activities do not jeopardize the continued existence of the shrimp, we find that the exclusion of these areas will not lead to the extinction of the Riverside fairy shrimp.

Application of Section 4(b)(2) National Security to U.S. Department of Homeland Security Lands (Sub-Unit 5B and Portions of 5C)

In our previous (69 FR 23024) rule, we proposed to designate as critical habitat lands adjacent to the U.S.-Mexico border under the jurisdiction of the U.S. Department of Homeland Security (DHS), U.S. Border Patrol, San Diego Sector (Sub-unit 5B, portion of Sub-unit 5C). The portion of the lands owned by the DHS that are directly adjacent to the U.S.-Mexico border lands have previously been disturbed and developed by the ongoing construction of the Border Infrastructure System (BIS), and those lands within the constructed portion of the footprint of the BIS do not contain any of the primary constituent elements for the Riverside fairy shrimp. The BIS is considered integral to national security, and therefore, lands owned by DHS along the U.S.-Mexico border have been excluded from the designation under section 4(b)(2) of the Act for national security impacts.

On February 6, 2002, the Service completed a section 7 consultation with the U.S. Army Corps of Engineers (Corps) and the former Immigration and Naturalization Service on the effects of closing a gap in the Border Fence Project's secondary fence at Arnie's Point on three endangered species occurring there, the Riverside fairy shrimp, San Diego fairy shrimp, and San Diego button-celery (Eryngium aristulatum var. parishii; Service 2002). We concluded in our biological opinion that the proposed action, which includes the loss of a linear vernal pool occupied by both the Riverside fairy shrimp and San Diego fairy shrimp, was not likely to jeopardize the continued existence of the three endangered species. On January 9, 2003, the Service completed a section 7 consultation with the former Immigration and Naturalization Service of the effects on the endangered Riverside fairy shrimp and endangered San Diego fairy shrimp from the construction of a secondary border fence and other road and fencing improvements in Area II along the U.S.-Mexico border (Service 2003). We concluded in our biological opinion that the proposed action, which included the loss of three vernal pool basins, was not likely to jeopardize the continued existence of the Riverside fairy shrimp and San Diego fairy shrimp. To offset losses for fairy shrimp, the DHS has conducted two restoration projects and has designated some DHS-owned lands located north of the BIS (at Arnie's Point) as mitigation for completion of the border system. As part of the proposed actions for these two section 7 consultations, DHS committed to implement a variety of conservation measures that would restore and create vernal pool habitats and enhance their watershed, including the commitment to transfer these lands to a conservation resource agency and/or to protect and conserve the lands in perpetuity. We have therefore determined to exclude this area, which contains the remainder of lands within Sub-unit 5B, from the critical habitat designation according to 4(b)(2) of the Act for national security.

(1) Benefits of Inclusion

There is minimal benefit from designating critical habitat for the Riverside fairy shrimp that are already managed for the conservation of vernal pool habitat. One possible benefit of including these lands as critical habitat would be to educate the public regarding the conservation value of these areas and the vernal pool complex they support. However, critical habitat designation provides little gain in the way of increased recognition on lands that are expressly managed to protect and enhance vernal pools for San Diego fairy shrimp. In

addition, the Service has already thoroughly evaluated the impacts of the BIS project on the Riverside fairy shrimp and its vernal pool habitat, determined that the project will not jeopardize the continued existence of the species, and received commitments from INS (now DHS) for restoration, protection and management of nearby Riverside fairy shrimp habitat. Therefore, we believe the designation of areas covered by the project and restoration areas would provide little benefit to the species.

(2) Benefits of Exclusion

The exclusion of the DHS-owned land within the BIS footprint will remove any delay in the BIS project occasioned by the need to reinitiate consultation. Expeditious completion of the BIS project is vital to our country's national security. Exclusion of the restoration areas will also remove any regulatory delay associated with completion of this important habitat restoration project.

(3) Benefits of Exclusion Outweigh Benefits of Inclusion

We conclude that the minimal benefits of designating critical habitat on the BIS project lands, including the 21.8-ac vernal pool restoration area, are far outweighed by the substantial benefits to national security from early completion of this project. Therefore we are excluding the BIS lands within Sub-unit 5B under section 4(b)(2) of the Act (see Relationship of Critical Habitat to Approved Habitat Conservation Plans below). The remaining area within Sub-unit 5B and some lands within Sub-unit 5C owned by the DHS are within the constructed BIS footprint and no longer contain any vernal pool habitat for the Riverside fairy shrimp; those impacts have been offset by the conservation measures to be implemented by DHS at the 21.8-acre vernal pool restoration area at Arnie's Point. Thus, the remaining lands within Sub-unit 5B and some lands within Sub-unit 5C owned by the DHS are not essential to the conservation of the Riverside fairy shrimp and are not designated as critical habitat in this final rule. Thus, no lands owned by the Department of Homeland Security have been designated as critical habitat.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the

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species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of sec. 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species. Moreover, at Arnie's Point, the DHS is restoring habitat for the Riverside fairy shrimp and will transfer that land to a MSCP cooperating agency.

Relationship of Critical Habitat to Economic Impacts--Exclusions Under Section 4(b)(2) of the Act

This section allows the Secretary to exclude areas from critical habitat for economic reasons if she determines that the benefits of such exclusion exceed the benefits of designating the area as critical habitat, unless the exclusion will result in the extinction of the species concerned. This is a discretionary authority Congress has provided to the Secretary with respect to critical habitat. Although economic and other impacts may not be considered when listing a species, Congress has expressly required their consideration when designating critical habitat. Exclusions under this section for non-economic reasons are addressed above.

In general, we have considered in making the following exclusions that all of the costs and other impacts predicted in the economic analysis may not be avoided by excluding the area, due to the fact that the areas in question are currently occupied by the Riverside fairy shrimp and there will be requirements for consultation under Section 7 of the Act, or for permits under section 10 (henceforth ``consultation''), for any take of the species, and other protections for the species exist elsewhere in the Act and under State and local laws and regulations. In addition, some areas are also occupied by other listed species and in some cases are designated as critical habitat for those species. In conducting economic analyses, we are guided by the 10th Circuit Court of Appeal's ruling in the New Mexico Cattle Growers Association case (248 F.3d at 1285), which directed us to consider all impacts, ``regardless of whether those impacts are attributable co-extensively to other causes.'' As explained in the analysis, due to possible overlapping regulatory schemes and other reasons, there are also some elements of the analysis which may overstate some costs.

Conversely, the 9th Circuit has recently ruled (``Gifford Pinchot'', 378 F.3d at 1071) that the Service's regulations defining ``adverse modification'' of critical habitat are invalid because they define adverse modification as affecting both survival and recovery of a species. The court directed us to consider that adverse modification should be focused on impacts to recovery. While we have not yet proposed a new definition for public review and comment, changing the adverse modification definition to respond to the Court's direction may

result in additional costs associated with critical habitat definitions (depending upon the outcome of the rulemaking). This issue was not addressed in the economic analysis for the Riverside fairy shrimp, as this was well underway at the time the decision was issued and we have a court-ordered deadline for reaching a final decision, so we cannot quantify the impacts at this time. However, it is a factor to be considered in evaluating projections of future economic impacts from critical habitat.

We recognize that we have excluded a significant portion of the proposed critical habitat. Congress expressly contemplated that exclusions under this section might result in such situations when it enacted the exclusion authority. House Report 95-1625, stated on page 17:

``Factors of recognized or potential importance to human activities in an area will be considered by the Secretary in deciding whether or not all or part of that area should be included in the critical habitat * * * In some situations, no critical habitat would be specified. In such situations, the Act would still be in force to prevent any taking or other prohibited act * * *''

We accordingly believe that these exclusions, and the basis upon which they are made, are fully within the parameters for the use of section 4(b)(2) set out by Congress.

Application of Section 4(b)(2) Economic Exclusion to Former MCAS El Toro (Sub-Unit 2C)

We have excluded all of proposed Sub-unit 2C, consisting of approximately 133 ac (54 ha; with 14 ac (6 ha) of essential habitat) at the former MCAS El Toro in Orange County, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, since the species is present, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

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(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would be $56.7 million. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat. We also note that the management plans to acquire land off-site, restore vernal pools there, relocate the species to these pools, initiate biological monitoring, and provide for project management.

Designating critical habitat would impose a disincentive for this type of conservation efforts, and add to the costs. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the

Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

Application of Section 4(b)(2) Economic Exclusion to Saddleback Meadows and Other Private Lands (Portion of Sub-Unit 2D)

We have excluded the Saddleback Meadows and other private lands within portion of proposed Sub-unit 2D, consisting of approximately 736 ac (298 ha) with 57 ac (23 ha) of essential habitat near O'Neill Regional Park, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range between over $10 million to nearly $60 million, largely as loss of land value and increased costs to private landowners. These costs range from $14,000 and $79,000 per acre. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that the there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In

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addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

The Service completed a section 7 consultation with the Corps on October 26, 2001 on the impacts of the proposed Saddleback Meadows Residential Development Project (Service 2001). With reference to this critical habitat designation, the consultation addressed the effects of proposed residential development project, on the federally endangered Riverside fairy shrimp and its proposed critical habitat. The project entails a 283-unit residential development on approximately 128 ac within the 225 ac Saddleback Meadows site, in the Foothill Trabuco Specific Plan area of Orange County, and proposed to fill three unbreached vernal pools, and two breached ponds, of the total nine pools in the area that are known to contain Riverside fairy shrimp. Approximately 97 ac of biological open space will be established by the project, including native habitat restoration on areas of the surrounding slopes.

In evaluating the management plan that covers 97 ac of biological open space, we determined that the biological open space area provided by the proposed Saddleback Meadows Residential Development Project would be adequately managed, i.e., the plan or agreement would provide conservation benefits to the species. This is ensured by the following conservation measures to be implemented as part of the proposed action to mitigate impacts and minimize potential adverse effects of the proposed project. These measures include plans to preserve four pools within the open space area, and to create four ephemeral pools onsite to which Riverside fairy shrimp would be introduced (using cysts from impacted vernal pools). Approximately one-fifth of the salvaged soil and cysts will be placed in storage at the San Diego Zoological Society's Center for the Reproduction of Endangered Species until the ponds have met predetermined success criteria. Further, the implementation of a 10-year fairy shrimp pond creation, maintenance and monitoring plan includes success criteria for establishing viable fairy shrimp populations and the hydrology necessary to support them in the created ponds, and measures to ensure avoidance of irrigation water entering the vernal pools and ponds. Reasonable assurances that the management plan will be implemented are provided by the requirement that the proposed project proponent execute and record an irrevocable offer to dedicate over 97 ac of biological open space, including avoided and created pools and their watersheds, accompanied by a perpetual conservation easement for biological conservation purposes. Reasonable assurances that the conservation effort will be effective are given through the Service and Corps-approved plans mentioned above for perpetual maintenance and monitoring, and the non-wasting endowment that will be established to finance it. Further, the easement will state that no other easements, modifications or other activities which would result in disturbance to the pools or their PCEs would be allowed within the biological conservation easement area.

In sum, we believe that these conservation measures identified in the consultation, including the dedication of 97.4 acres of biological open space (including the avoided and created fairy shrimp ponds and their watersheds) and the management, maintenance, and monitoring plans and funding to implement the plans, would provide a conservation benefit to the Riverside fairy shrimp.

Application of Section 4(b)(2) Economic Exclusion to Lands Near Tijeras Creek (Proposed Sub-Unit 2E)

We have excluded all of proposed Sub-unit 2E, consisting of approximately 321 ac (130 ha) with approximately 101 ac (41 ha) of essential habitat near Tijeras Creek, Mission Viejo, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat

designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range from over $5 million to over $30 million, largely as loss of land value and increased costs to private landowners. These costs could exceed $90,000 per acre. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as

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discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that the there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

Application of Section 4(b)(2) Economic Exclusion to Chiquita Ridge (Sub-Unit 2F)

We have excluded all of Sub-unit 2F, consisting of approximately 489 ac (198 ha) and containing approximately 263 ac (106 ha) of essential habitat near Chiquita Ridge, Mission Viejo, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at

present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range from nearly $8 million to nearly $45 million, largely as loss of land value and increased costs to private landowners. These costs range from nearly $16,000 to $89,000 per acre. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that the there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

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Application of Section 4(b)(2) Economic Exclusion to Lands Near Radio Tower Road (Sub-Unit 2G)

We have excluded all of Sub-unit 2G, near Radio Tower Road in Mission Viejo, consisting of approximately 736 ac (298 ha) and containing approximately 417 ac (169 ha) of essential habitat, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished

through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range from $8 million to nearly $45 million, largely as loss of land value and increased costs to private landowners. These costs range from $14,000 and $79,000 per acre. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

Application of Section 4(b)(2) Economic Exclusion to Southeastern Otay Mesa (Sub-Unit 5C)

We have excluded the remainder of Sub-unit 5C, approximately 866 ac (350 ha), and containing approximately 111 ac (45 ha) of essential habitat at Otay Mesa, under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise

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from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range from $5 million to $31 million, largely as loss of land value and increased costs to private landowners. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site.

In addition, landowners in this proposed unit have already incurred approximately $42 million in costs and loss of value as a result of the listing of the Riverside fairy shrimp. Moreover, the analysis showed that, given RFS-related conservation activities, San Diego County may have produced 3,700 fewer housing units, or 4.4 percent of the total built, over the 12-year time period since listing, and that the level of supply reductions in San Diego County suggest that the real estate market and housing prices may have been affected. It found that additional consumers and producers were and are likely affected by the changes in price and quantity, and the magnitude of the total impacts in this instance would surpass the landowner-only cost figures cited above.

Although the analysis considered all of proposed unit in its entirety, it seems clear that the economic impacts to landowners will largely arise from the Sub-unit 5C. Sub-unit 5A (61 ac (25 ha)) is owned by the Sweetwater Union High School District, and Sub-unit 5B by the DHS (see Application of Section 4(b)(2) National Security to U.S. Department of Homeland Security Lands above); real estate development is not a likely event on either set of lands. By excluding Sub-unit 5C, we will avoid some or all of these additional costs to those already incurred by affected landowners. The remaining lands within Subunit 5A are conserved as part of a section 7 consultation and are not available for future residential development.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, on top of the extensive costs they have already incurred, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that the there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of section 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

Relationship of Critical Habitat to Approved Habitat Conservation Plans (HCPs)

We have excluded lands within habitat conservation plans under section 4(b)(2) of the Act. The analysis which led us to the conclusion that the benefits of excluding this area exceed the benefits of designating it as critical habitat, and will not result in the extinction of the species, follows.

(1) Benefits of Inclusion

The areas excluded are currently occupied by the species. If these areas were designated as critical habitat, any actions with a Federal nexus which might adversely modify the critical habitat would require a consultation with us, as explained above, in the section of this notice entitled ``Effects of Critical Habitat Designation.'' However, inasmuch as this area is currently occupied by the species, consultation for activities which might adversely impact the species, including possibly significant habitat modification (see definition of ``harm'' at 50 CFR 17.3) would be required even without the critical habitat designation and without regard to the existence of a Federal nexus.

Another possible benefit of a critical habitat designation is education of landowners and the public regarding the potential conservation value of these areas. This may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved. As explained above, this is the 2nd iteration of the critical habitat process for these lands, which has included both public comment periods and litigation, all with accompanying publicity. Therefore, we believe the education benefits which might arise from a critical habitat designation here have largely already been generated.

In summary, we believe that this proposed unit as critical habitat would provide little additional Federal regulatory benefits for the species. Under the Gifford Pinchot decision, critical habitat designations may provide greater benefits to recovery of a species than was previously believed, but it is not possible to quantify this at present. Because the proposed critical habitat is occupied by the species, there must be consultation with the Service over any action which might impact it. The additional educational benefits which might arise from critical habitat designation are largely accomplished through the multiple notice and

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comments which accompanied the development of this regulation, and publicity over the prior litigation.

(2) Benefits of Exclusion

The economic analysis conducted for this proposal estimates that the costs associated with designating this unit of the proposed critical habitat would range from over $5 million to over $30 million, largely as loss of land value and increased costs to private landowners. These costs could exceed $90,000 per acre. The variability in the impact encompasses a low to high amount of required set aside acreage that depends on vernal pool site geometry, requirements of land use regulations, and planned uses of the site. By excluding this unit, some or all of those costs will be avoided.

(3) The Benefits of Exclusion Exceed the Benefits of Inclusion

We do not believe that the benefits from the designation of critical habitat for lands we have decided to exclude--a limited educational benefit and very limited regulatory benefit, which are largely otherwise provided for, as discussed above--exceed the benefits of avoiding the potential economic costs which could result from including those lands in this designation of critical habitat.

We also believe that excluding these lands, and thus helping landowners and water users avoid the additional costs that would result from the designation, will contribute to a more positive climate for Habitat Conservation Plans and other active conservation measures which provide greater conservation benefits than would result from designation of critical habitat--even in the post-Gifford Pinchot environment--which requires only that the there be no adverse modification resulting from Federally-related actions. We therefore find that the benefits of excluding these areas from this designation of critical habitat outweigh the benefits of including them in the designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these lands will not result in extinction of the species, as they are considered occupied habitat. Any actions which might adversely affect the shrimp, regardless of whether a Federal nexus is present, must undergo a consultation with the Service under the requirements of sec. 7 of the Act. The shrimp is protected from take under section 9. The exclusions leave these protections unchanged from those which would exist if the excluded areas were designated as critical habitat. In addition, as discussed above, there are a substantial number of Habitat Conservation Plans and other active conservation measures underway for the species, which provide greater conservation benefits than would result from a designation. There is accordingly no reason to believe that these exclusions would result in extinction of the species.

As described above, section 4(b)(2) of the Act requires us to consider other relevant impacts, in addition to economic and national security impacts, when designating critical habitat. Section 10(a)(1)(B) of the Act authorizes us to issue permits for the take of listed wildlife species incidental to otherwise lawful activities. Development of an HCP is a prerequisite for the issuance of an incidental take permit pursuant to section 10(a)(1)(B) of the Act. An incidental take permit application must be supported by an HCP that identifies conservation measures that the permittee agrees to implement for the species to minimize and mitigate the impacts of the permitted incidental take.

HCPs vary in size and may provide for incidental take coverage and conservation management for one or many federally listed species. Additionally, more than one applicant may participate in the development and implementation of an HCP. Some areas occupied by, and determined to be essential to, the Riverside fairy shrimp involve complex HCPs that address multiple species, cover large areas, and have many participating permittees. Large regional HCPs expand upon the basic requirements set forth in section 10(a)(1)(B) of the Act because they reflect a voluntary, cooperative approach to large-scale habitat and species conservation planning. Many of the large regional HCPs in southern California have been, or are being, developed to provide for the conservation of numerous federally listed species and unlisted sensitive species and the habitat that provides for their biological needs. These HCPs address impacts within the plan's boundaries area and create a preserve design within the planning area. Over time, areas in the planning area are developed according to the HCP, and the area within the preserve is acquired, managed, and monitored. These HCPs are designed to implement conservation actions to address future projects that are anticipated to occur within the planning area of the HCP, in order to reduce delays in the permitting process.

In the case of approved regional HCPs (e.g., those sponsored by cities, counties, or other local jurisdictions) wherein the conservation of the Riverside fairy shrimp is addressed, a primary goal is to provide for the protection and management of habitat essential for the conservation of the Riverside fairy shrimp while directing

development to non-essential areas. The regional HCP development process provides an opportunity for more intensive data collection and analysis regarding the use of particular habitat areas by the Riverside fairy shrimp. The regional HCP planning process also enables us to construct a habitat preserve system that provides for the biological needs and long-term conservation of the Riverside fairy shrimp. Completed HCPs and their accompanying Implementation Agreements contain management measures and protections for identified preserve areas that protect, restore, and enhance the value of these lands as habitat for the Riverside fairy shrimp. These measures include explicit standards to minimize any impacts to the covered species and its habitat. In general, HCPs are designed to ensure that the value of the conservation lands are maintained, expanded, and improved for the species that they cover.

In approving these HCPs, the Service has provided assurances to permit holders that once the protection and management required under the plans are in place and for as long as the permit holders are fulfilling their obligations under the plans, no additional mitigation in the form of land or financial compensation will be required of the permit holders and, in some cases, specified third parties. Similar assurances will be extended to future permit holders in accordance with the Service's HCP Assurance (``No Surprises'') rule codified at 50 CFR 17.22(b)(5) and (6) and 17.32(b)(5) and (6).

We believe that in most instances, the benefits of excluding legally operative HCPs from the critical habitat designations will outweigh the benefits of including them and would thereby prevent the extinction of the species. The following represents our rationale for excluding essential habitat from critical habitat for lands within approved HCPs.

Orange County Central-Coastal Natural Community Conservation Program/ Habitat Conservation Plan

The Central-Coastal Natural Community Conservation Program/Habitat Conservation Plan (NCCP/HCP) in Orange County was developed in cooperation with numerous local and State jurisdictions and agencies and

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participating landowners, including the cities of Anaheim, Costa Mesa, Irvine, Orange, San Juan Capistrano, and the Southern California Edison and Transportation Corridor Agencies, The Irvine Company, California Department of Parks and Recreation, Metropolitan Water District of Southern California, and the County of Orange. Approved in 1996, the Central-Coastal NCCP/HCP provides for the establishment of approximately 38,738 ac (15,677 ha) of reserve lands for 39 Federal- or State-listed and unlisted sensitive species within the 208,713 ac (84,463 ha) planning area. We issued an incidental take permit under section 10(a)(1)(B) of the Act that provides conditional incidental take authorization for the Riverside fairy shrimp for all areas within the Central-Coastal Sub-region.

Within the Central-Coastal NCCP/HCP, in the North Ranch Policy Plan area, Riverside fairy shrimp are known to occur in a natural vernal pool located on a rock outcropping. The North Ranch Policy Plan area was excluded from the take authorization provided under the Central-Coastal NCCP/HCP. However, in 2002, the owner of lands within the North Ranch Policy Plan area (the Irvine Company), granted a conservation easement to The Nature Conservancy over the portion of the land where this vernal pool is located, and provided a $10 million management endowment. The conservation easement and management endowment provide special management and protection for the Riverside fairy shrimp. Therefore, essential habitat within the North Ranch Policy Plan area and within the other lands covered by the Central-Coastal NCCP/HCP in Orange County (within Map Unit 2) have been excluded from this final critical habitat designation based on section 4(b)(2) of the Act.

Western Riverside County Multiple Species Habitat Conservation Plan

The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) was developed over a period of eight years. Participants in this HCP include 14 cities, the County of Riverside (including the Riverside County Flood Control and Water Conservation Agency, Riverside County Transportation Commission, Riverside County Parks and Open Space District, and Riverside County Waste Department), the California Department of Parks and Recreation, and the California Department of Transportation. The Western Riverside County MSHCP is a sub-regional plan under the State's NCCP and was developed in cooperation with the California Department of Fish and Game. The MSHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values of ``covered species'' and, with regard to covered animal species, their incidental take. The intent of the MSHCP is to provide avoidance, minimization, and mitigation measures for the impacts of proposed activities on covered species and their habitats. Within the 1,260,000 ac (510,000 ha) Plan Area of the MSHCP, approximately 153,000 ac (62,000 ha) of diverse habitats are now being conserved. The conservation of this large area complements other existing natural and open space areas (e.g., State Parks, Forest Service, and County Park lands). Essential habitat for the Riverside fairy shrimp within the Western Riverside County MSHCP area (within Map Unit 3) has been excluded from critical habitat pursuant to section 4(b)(2) of the Act.

In Riverside County, there are 7 naturally occurring populations of

Riverside fairy shrimp (in Skunk Hollow Pool, Field Pool, Scott Pool, Schleuniger Pool, Pechanga Pool, Australia Pool, March Air Reserve Base, and Banning Complex), one population in created pools (Johnson Ranch Created Pools), and one population proposed to be relocated into created pools (Clayton Ranch Proposed Pools), all of which are located within the Plan Area of the Western Riverside County MSHCP (Service 2004). The pools in Riverside County are significant since they represent the most inland extent of the species range (Eriksen and Belk 1999). Also, the type locality for the species, which is of taxonomic significance, was located within Riverside County (Eriksen 1988). Habitat within Riverside County is ideal for the species. Riverside County harbors large vernal pools that persist for long periods of time, allowing this slow-maturing species to reproduce. One of these, the Skunk Hollow Pool, is the largest valley vernal pool remaining in all of southern California (Eriksen and Belk 1999).

Within the Plan Area, four occurrences and their watersheds are protected by existing conservation and management agreements: (1) Skunk Hollow Pool, (2) Field Pool, (3) seven Johnson Ranch Created Pools, and (4) two Clayton Ranch Proposed Pools. A fifth occurrence, Schleuniger Pool, is also protected by existing conservation and management agreements; however, part of its watershed remains unprotected. Under the Western Riverside County MSHCP, the Lake Elsinore Back Basin Core Area will be conserved. The Australia Pool, which is located within this Core Area, will likely have a minimum buffer of 380 feet to a buffer greater than 1,000 feet from the edge of the pool (Service 2004). Three known populations of Riverside fairy shrimp are located outside of the MSHCP Conservation Area including Banning Complex, Pechanga Pool, and Scott Pool. The Scott Pool has recently been impacted by disking, several pipeline projects, and the installation of a telephone pole (Service 2004). The Pechanga Pool has been subject to cultivation (Eriksen 1988). Impacts to these pools will be avoided and minimized through implementation of the Riparian/Riverine Areas and Vernal Pools Policy. Specifically, this policy requires that habitat for this species be mapped throughout the Plan Area and avoided if feasible. If avoidance is not feasible, surveys will be conducted and 90 percent of the occupied area determined to have long-term conservation value for the species will be conserved and managed (Service 2004).

We anticipate the loss of only 10 percent of occupied Riverside fairy shrimp habitats determined to have long-term conservation value for the species. We anticipate that this species will persist in the remaining 90 percent of occupied habitat with long-term conservation value for the species, including the 39 percent of the modeled habitat within both the existing public/quasi-public lands and the Additional Reserve Lands. The MSHCP will further offset the proposed impacts to this species through management and monitoring actions within the Reserve, including the enhancement of historic or vestigial vernal pools within Core Areas. This enhancement will help offset the impacts of the action by increasing the quality of the habitat that is conserved for this species and by allowing the expansion of populations within the Reserve through the enhancement of historic or vestigial vernal pools that do not currently provide habitat for the species (Service 2004). The Western Riverside County MSHCP includes a significant number of local and State partners. Moreover, the County of Riverside and the participating jurisdictions have demonstrated their sustained support for the Western Riverside County MSHCP by the November 5, 2002 passage of a local bond measure to fund the acquisition of land in support of the MSHCP. Excluding critical habitat from the Western Riverside County MSHCP will continue to foster the close partnerships with the local jurisdictions and the State of California.

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Northwestern San Diego Multiple Habitat Conservation Plan

The Northwestern San Diego Multiple Habitat Conservation Plan (MHCP) encompasses approximately 111,939 ac (45,300 ha) and proposes to establish 19,928 ac (8,064 ha) of preserve lands covering Federal or State listed, unlisted, and sensitive species, including the Riverside fairy shrimp. Seven incorporated cities, including Carlsbad, Encinitas, Escondido, Oceanside, San Marcos, Solana Beach, and Vista are participants in this regional NCCP/HCP. Under the broad umbrella of the MHCP, each participating jurisdiction prepares a sub-area plan that complements the goals of the MHCP. The Service consults on each sub-area plan under section 7 of the Act to ensure they are consistent with the aims of the MHCP. For the City of Carlsbad, we approved their sub-area plan for the MHCP, the Habitat Management Plan (HMP), on November 12, 2004. The Riverside fairy shrimp is one of the species covered under the City of Carlsbad's HMP and we have determined the plan will provide for the long-term conservation of the species.

San Diego Multiple Species Conservation Plan

The San Diego Multiple Species Conservation Plan (MSCP) effort encompasses more than 582,000 ac (236,000 ha) and reflects the cooperative efforts of the County and City of San Diego, ten additional city jurisdictions, and several independent special districts, the State, the building industry, and environmentalists. Over the permit term, the San Diego MSCP provides for the establishment of approximately 171,000 ac (69,573 ha) of preserve areas, and provides conservation benefits for 85 federally listed and sensitive species, including the Riverside fairy shrimp. Under the broad umbrella of the

San Diego MSCP, each participating jurisdiction prepares a sub-area plan that implements the goals of the MSCP. The San Diego MSCP and its approved sub-area plans include measures to conserve known Riverside fairy shrimp populations on Otay Mesa. The Service consults on each sub-area plan under section 7 of the Act to ensure they are consistent with the aims of the San Diego MSCP. Currently, the County of San Diego, and the Cities of San Diego, La Mesa, Poway, Chula Vista, and the San Diego Gas and Electric (SDG&E) have approved sub-area plans under the San Diego MSCP. In addition to other Federal or State listed species and sensitive species, these sub-area plans provide long-term conservation for the Riverside fairy shrimp within San Diego County. In addition, surveys for Riverside fairy shrimp are required in suitable habitat (i.e., vernal pools, ephemeral wetlands, and seasonally ponded areas).

The San Diego MSCP provides for avoidance of impacts to vernal pool habitat for the Riverside fairy shrimp both within and outside of existing and targeted reserve areas. These lands are to be permanently maintained and managed for the benefit of the Riverside fairy shrimp and other covered species. However, ``take'' is not included in the MSCP 10(a)(1)(B) permit. Thus, the incidental take permits issued to the City and County of San Diego under this plan do not allow for the take of Riverside fairy shrimp in natural vernal pool habitat. The eastern portion of Otay Mesa includes Major and Minor Amendment Areas, which require a special permitting process. Portions of essential habitat areas which the SDG&E company uses for their operational and maintenance activities that are located within the San Diego MSCP in southwestern San Diego County (Map Units 3 and 4), and within the SDG&E Sub-regional Plan have been excluded from critical habitat based on section 4(b)(2) of the Act. This sub-regional plan and the clarification document (July 2004) defines avoidance, minimization, and offsetting measures to be implemented by SDG&E for the operations and maintenance activities and future construction of new facilities and roads.

Relationship of Critical Habitat to HCPs in Development

There are several HCPs and NCCP/HCPs in development which may ultimately include the Riverside fairy shrimp as a covered species. HCPs and NCCP/HCPs currently being developed include various sub-area plans under the MHCP in northwestern San Diego County, the South Orange County NCCP/HCP, and the Northern San Diego Multiple Species Conservation Program (MSCP North). These aforementioned HCPs, all of which are being prepared in cooperation with the State's NCCP program, have been determined to be significant planning efforts that will require the preparation of an Environmental Impact Report and Environmental Impact Statement, in compliance with the National Environmental Policy Act (40 CFR 1502.3) and the California Environmental Quality Act. Further, none of the HCPs under development have reached a point in their development where conservation measures for the Riverside fairy shrimp have been adequately identified or their adequacy determined by the Service.

Economic Analysis

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific and commercial information available and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species concerned.

Following the publication of the proposed critical habitat designation, we conducted an economic analysis to estimate the potential economic effect of the designation. The draft analysis was made available for public review on October 19, 2004 (69 FR 61461). We accepted comments on the draft analysis until November 18, 2004. The primary purpose of the economic analysis is to estimate the potential economic impacts associated with the designation of critical habitat for the Riverside fairy shrimp. This information is intended to assist the Secretary in making decisions about whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.

This economic analysis considers the economic efficiency effects that may result from the designation, including habitat protections that may be co-extensive with the listing of the species. It also addresses distribution of impacts, including an assessment of the potential effects on small entities and the energy industry. This information can be used by the Secretary to assess whether the effects of the designation might unduly burden a particular group or economic sector. To conduct the analysis, best available data were gathered from a variety of sources, including regional, city, and county planning agencies, land developers and conservancies, and project managers, including those for both preserves and planned developments.

This analysis focuses on the direct and indirect costs of the rule. However, economic impacts to land use activities can exist in the absence of critical habitat. These impacts may result from, for example, local zoning laws, State and natural resource laws, and enforceable management plans and best management practices applied by other State and Federal agencies. Economic impacts that result from these types of

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protections are not included in the analysis as they are considered to be part of the regulatory and policy baseline.

The largest share of economic impacts identified by this analysis is to real estate development. Given the magnitude of forecast real estate development impacts in each category of impact, the analysis performs a screening test for efficiency and distributional effects that go beyond the impact on the project applicant or landowner only. That is, where changes in the regional output of housing, for instance, may be associated with Riverside fairy shrimp-related conservation activities, consumer and producer impacts for the entire housing market may exist. The screening test concludes that the amount of housing potentially removed from the market supply in each county is not a significant amount of the total supply of new housing. Under these conditions, significant consumer or producer surplus losses are not expected. However, for past impacts occurring on lands excluded from designation, the housing market in both San Diego County may have experienced reduced output or increased prices as a result of Riverside fairy shrimp-related conservation activities.

We anticipate no impacts to national security, Tribal lands, partnerships, or habitat conservation plans resulting from this critical habitat designation. Our economic analysis indicates an overall low cost resulting from the designation.

A copy of the final economic analysis with supporting documents are included in our administrative record and may be obtained by contacting U.S. Fish and Wildlife Service, Branch of Endangered Species (see ADDRESSES section), or by downloading it from the Internet at http://carlsbad.fws.gov .

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is a significant rule in that it may raise novel legal and policy issues, but will not have an annual effect on the economy of $100 million or more or affect the economy in a material way. Due to the tight timeline for publication in the Federal Register, the Office of Management and Budget (OMB) has not formally reviewed this rule. As explained above, we prepared an economic analysis of this action. We used this analysis to meet the requirement of Section 4(b)(2) of the Act to determine the economic consequences of designating the specific areas as critical habitat. We also used it to help determine whether to exclude any area from critical habitat, as provided for under section 4(b)(2), if we determine that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless we determine, based on the best scientific and commercial data available, that the failure to designate such area as critical habitat will result in the extinction of the species.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA) (as amended by the Small Business Regulatory Enforcement Fairness Act of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The Small Business Regulatory Enforcement Fairness Act amended the RFA to require Federal agencies to provide a statement of factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities. The Small Business Regulatory Enforcement Fairness Act also amended the RFA to require a certification statement.

Small entities include small organizations, such as independent non-profit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; as well as small businesses. Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we consider the types of activities that might trigger regulatory impacts under this rule, as well as the types of project modifications that may result. In general, the term ``significant economic impact'' is meant to apply to a typical small business firm's business operations.

To determine if the rule could significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities (e.g., housing development, grazing, oil and gas production, timber harvesting). We apply the ``substantial number'' test individually to each industry to determine if certification is appropriate. However, the Small Business Regulatory Enforcement Fairness Act does not explicitly define ``substantial number'' or ``significant economic impact.'' Consequently, to assess whether a ``substantial number'' of small

entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat only affects activities conducted, funded, or permitted by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the species is present, Federal agencies already are required to consult with us under Section 7 of the Act on activities they fund, permit, or implement that may affect Riverside fairy shrimp. Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities.

The draft economic analysis (September 15, 2004) was based on acreages from the proposed rule and predicts potential costs of the proposed designation to small businesses. Based on this analysis, the number of small land development business affected annually would be 7.1 (0.3 percent of total small businesses) for Los Angeles County, 5.6 (0.5 percent of total small businesses) for Orange County, and 8.0 (0.9 percent of total small businesses) for San Diego County. Over 20 years, the total impact on small land development businesses ranged from $3,534,420 to $18,969,901 for Los Angeles County,

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$10,705,409 to $58,439,095 for Orange County, and $2,796,785 to $15,206,384 for San Diego County. The annual impact on revenue per affected business per year ranged from $5,000 to $26,700 for Los Angeles County, $19,000 to $104,700 for Orange County, and $3,500 to $19,000 for San Diego County. Between 2005-2024, the economic analysis predicts potential cost from the designation of critical habitat for the Riverside fairy shrimp on real estate development at Carlsberg Ranch/Tierra Rajada (Sub-Units 1A and 1B) is $376,000; to public park improvements at O'Neill Park (Unit 2) is $28,000; to rail construction at the Poinsettia Lane Train Station (Unit 4) is $28,000; and no additional economic impact on lands owned by the Sweetwater Union High School District (Unit 5) because these lands have already been conserved as an offsetting measure for the development of the Otay Mesa High School. Based on this data from the proposed rule, and the additional exclusions of units made in this final rulemaking, we have determined that this designation would not affect a substantial number of small land development companies. Further, we have determined that this designation would also not result in a significant effect to the annual sales of those small businesses impacted by this designation. As such, we are certifying that this designation of critical habitat would not result in a significant economic impact on a substantial number of small entities.

Small Business Regulatory Enforcement Fairness Act (5 U.S.C. 801 et seq.)

Under the Small Business Regulatory Enforcement Fairness Act, this rule is not a major rule. Our detailed assessment of the economic effects of this designation is described in the economic analysis. Based on the effects identified in the economic analysis, we believe that this rule will not have an annual effect on the economy of $100 million or more, will not cause a major increase in costs or prices for consumers, and will not have significant adverse effects on competition, employment, investment, productivity, innovation, or the ability of U.S.-based enterprises to compete with foreign-based enterprises. Refer to the final economic analysis for a discussion of the effects of this determination.

Executive Order 13211

On May 18, 2001, the President issued Executive Order 13211 on regulations that significantly affect energy supply, distribution, and use. Executive Order 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This final rule to designated critical habitat for the Riverside fairy shrimp is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.), we make the following findings:

(a) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, Tribal governments, or the private sector and includes both ``Federal intergovernmental mandates'' and ``Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)-(7). ``Federal intergovernmental mandate'' includes a regulation that ``would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ``a condition of federal assistance.'' It also excludes ``a duty arising from participation in a voluntary Federal

program,'' unless the regulation ``relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority,'' if the provision would ``increase the stringency of conditions of assistance'' or ``place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding'' and the State, local, or Tribal governments ``lack authority'' to adjust accordingly. (At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children (AFDC) work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement.) ``Federal private sector mandate'' includes a regulation that ``would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance; or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities who receive Federal funding, assistance, permits or otherwise require approval or authorization from a Federal agency for an action may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply. Nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(b) We do not believe that this rule will significantly or uniquely affect small governments because it will not produce a Federal mandate of $100 million or greater in any year, that is, it is not a ``significant regulatory action'' under the Unfunded Mandates Reform Act. The designation of critical habitat imposes no obligations on State or local governments. As such, Small Government Agency Plan is not required.

Federalism

In accordance with Executive Order 13132, the rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with the Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of, this final critical habitat designation with appropriate State resource agencies in California. The designation of critical habitat in areas currently occupied by the Riverside fairy shrimp imposes no additional restrictions to those currently in place and, therefore, has little incremental impact on State and local governments and their activities. The designation may have some benefit to these governments in that the areas essential to the conservation of the species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are specifically identified. While making this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning (rather than waiting for case-by-case section 7 consultations to occur).

Civil Justice Reform

In accordance with Executive Order 12988, the Office of the Solicitor has determined that the rule does not

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unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Endangered Species Act. This final rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of the Riverside fairy shrimp.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (NEPA)

It is our position that, outside the Tenth Circuit, we do not need to prepare environmental analyses as defined by the NEPA in connection with designating critical habitat under the Endangered Species Act of 1973, as amended. We published a notice outlining our reasons for this determination in the Federal Register on October 25, 1983 (48 FR 49244). This assertion was upheld in the courts of the Ninth Circuit

(Douglas County v. Babbitt, 48 F.3d 1495 (9th Cir. Ore. 1995), cert. denied 116 S. Ct. 698 (1996). The final environmental assessment is available upon request from the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 6010 Hidden Valley Road, Carlsbad, California 92009 (telephone 760/431-9440), or on our Web site at http://carlsbad.fws.gov .

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ``Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and the Department of Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis.

Historical records indicate that there were two vernal pools on or near Tribal lands of the Pechanga Band of Luise[ntilde]o Indians that contained Riverside fairy shrimp (Eriksen 1988). After reviewing aerial photographs of the area and meeting with the Tribe's Environmental Coordinator in March 2004, we were unable to confirm these occurrences. It is possible that additional survey work would allow a better documentation of the possible species occurrence. However, at this time we have insufficient information on the occurrence of the Riverside fairy shrimp on Tribal lands of the Pechanga Band of Luise[ntilde]o Indians. Therefore, critical habitat for the Riverside fairy shrimp has not been designated on Tribal lands.

References Cited

A complete list of all references cited in this rulemaking is available upon request from the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 6010 Hidden Valley Road, Carlsbad, California 92009 (telephone 760/431-9440).

Author(s)

The primary author of this package is the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 6010 Hidden Valley Road, Carlsbad, California 92009.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

A Note About Critical Habitat Unit Numbering

A large number of units in the proposed rule have been exempted or excluded from designation in the final rule. In order to understand the relationship between sub-unit and unit numbers in the proposed rule (which have been retained in the preamble of this document), and sub-unit and unit numbers in the final designation (i.e., in the Regulations Promulgation portion of this document), we provide the following crosswalk: Proposed Sub-units 1A and 1B in the proposed rule and preamble remain as Sub-units 1A and 1B in the Regulations Promulgation section. Sub-unit 2D in the proposed rule and preamble is Unit 2 in the Regulations Promulgation section. Sub-unit 4C in the proposed rule and preamble is Unit 3 in the Regulations Promulgation section. Sub-unit 5A in the proposed rule and preamble is Unit 4 in the Regulations Promulgation section.

Regulation Promulgation

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Accordingly, amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17--[AMENDED]

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1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361-1407; 16 U.S.C. 1531-1544; 16 U.S.C. 4201-4245; Pub. L. 99-625, 100 Stat. 3500; unless otherwise noted.

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2. In Sec. 17.95(h), revise the entry for the Riverside fairy shrimp (Streptocephalus woottoni) under ``CRUSTACEANS'' to read as follows:

Sec. 17.95 Critical habitat--fish and wildlife.

* * * * *

(h) Crustaceans.

* * * * *

Riverside Fairy Shrimp (Streptocephalus woottoni)

(1) Critical habitat units for Ventura, Orange, and San Diego Counties, California, are depicted on the maps that follow.

(2) Critical habitat consists of vernal pools, vernal pool complexes, and ephemeral ponds and depressions and their associated surrounding upslope areas with the soil and hydrologic regimes

indicated on the maps below and in the legal descriptions.

(3) Within these areas, the primary constituent elements for the Riverside fairy shrimp are those habitat components that are essential for the primary biological needs of foraging, sheltering, reproduction, and dispersal. The primary constituent elements are found in those areas that support vernal pools or other ephemeral ponds and depressions, and their associated watersheds. The primary constituent elements determined essential to the conservation of Riverside fairy shrimp are:

(i) Small to large pools or pool complexes that have the appropriate size and volume, local climate, topography, water temperature, water chemistry, soil conditions, and length of time of inundation with water necessary for Riverside fairy shrimp incubation and reproduction, as well as dry periods necessary to provide the conditions to maintain a dormant and viable cyst bank. Specifically, the conditions necessary to allow for successful reproduction of Riverside fairy shrimp fall within the following ranges:

(A) Moderate to deep depths ranging from 10 in (25 cm) to 5-10 ft (1.5-3 m);

(B) Pool or pond inundation lasting for a minimum of 2 months to 5-8 months or more, i.e., a sufficient wet period in winter and spring months to allow the Riverside fairy shrimp to hatch, mature, and reproduce, followed

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by a dry period prior to the next winter and spring rains;

(1) Water temperatures within the range of 41-77 degrees F (5-25 degrees C);

(2) Water chemistry with low total dissolved solids and alkalinity (means of 77 and 65 parts per million, respectively); and

(3) Water pH within a range of 6.4-7.1.

(ii) The immediately surrounding upslope area that provides the pool or pool complex with the following:

(A) Hydrologic flows, both above-ground (sheet flow) and sub-surface through soil or sediments, to fill the pools and maintain the seasonal cycle of ponding and drying, at the appropriate rates;

(B) A source of detritus and nutrients;

(C) Sources of soil, ion and mineral transport to the pool or pool complex to provide and maintain the appropriate water chemistry conditions and impermeability of the pool basin(s); and

(D) Habitat for animals that act as dispersers of cysts and vernal pool plant seeds or pollen, as well as habitat for the pollinators of the vernal pool plants that also form an integral part of the vernal pool's ecology.

(iii) The size of the immediately surrounding upslope area varies greatly depending on a number of factors and has been assessed for each sub-unit. Factors that affect the size of the surrounding upslope area include surface and sub-surface hydrology, the topography of the area surrounding the pool or pools, the vegetative coverage, and the soil and bedrock substrate in the area. The upslope areas designated vary from a few acres to over 100 ac (40 ha) in size.

(iv) Soils in the summit, rim and basin geomorphic positions with a clay component and/or an impermeable surface or subsurface layer that provide a unique assemblage of nutrient availability and redox conditions known to support vernal pool habitat. The biogeochemical environment strongly influences hydrologic properties and plays a critical role in nutrient cycling in vernal pool ecosystems (Hobson and Dahlgren 1998).

(v) The matrix of vernal pools/ephemeral wetlands, the immediate upslope areas, upland habitats, and underlying soil substrates form hydrological and ecologically functional units. These features and the lands that they represent are essential to the conservation of the Riverside fairy shrimp. All lands identified as essential and proposed as critical habitat contain one or more of the primary constituent elements for the Riverside fairy shrimp.

(4) Critical habitat does not include man-made structures existing on the effective date of this rule and not containing one or more of the primary constituent elements, such as buildings, aqueducts, airports, and roads, and the land on which such structures are located.

(5) Data layers defining map units were created on a base of USGS 7.5' quadrangles, and critical habitat units were then mapped using Universal Transverse Mercator (UTM) coordinates.

(6) Index map of critical habitat units for the Riverside fairy shrimp follows:

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[GRAPHIC] [TIFF OMITTED] TR12AP05.000

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(7) Unit 1: Ventura County, California.

(i) Sub-unit 1A: City of Moorpark Greenbelt, north Tierra Rejada Valley from USGS 1:24,000 quadrangle map Simi Valley West. Lands bounded by the following UTM NAD27 coordinates (E, N): 329000, 3793300; 329400, 3793300; 329400, 3792900; 329300, 3792900; 329300, 3792800; 329000, 3792800; 329000, 3793300.

(ii) Sub-unit 1B: south Tierra Rejada Valley. Lands bounded by the following UTM NAD27 coordinates (E, N): 330900, 3792500; 331100, 3792500; 331100, 3792300; 331200, 3792300; 331200, 3792200; 331300, 3792200; 331300, 3792100; 331400, 3792100; 331400, 3791400; 331300, 3791400; 331300, 3791500; 331100, 3791500; 331100, 3791400; 331000,

3791400; 331000, 3791300; 330600, 3791300; 330600, 3791900; 330500, 3791900; 330500, 3792000; 330600, 3792000; 330600, 3792100; 330700, 3792100; 330700, 3792300; 330800, 3792300; 330800, 3792400; 330900, 3792400; 330900, 3792500.

(iii) Note: Map of critical habitat Sub-units 1A and 1B for the Riverside fairy shrimp follows:

[GRAPHIC] [TIFF OMITTED] TR12AP05.001

(8) Unit 2: Orange County, California. From USGS 1:24,000 quadrangle map Santiago Peak.

(i) Unit 2: Land within O'Neill Regional Park. Lands bounded by the following UTM NAD27 coordinates (E, N): 443400, 3725300; 443900, 3725300; 443900, 3724900; 443800, 3724900; 443800, 3724800; 443600, 3724800; 443600, 3724900; 443500, 3724900; 443500, 3725100; 443400, 3725100; 443400, 3725300.

(ii) Note: Map of critical habitat Unit 2 for the Riverside fairy shrimp follows:

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[GRAPHIC] [TIFF OMITTED] TR12AP05.002

(9) Unit 3: North San Diego County, San Diego County, California. From USGS 1:24,000 quadrangle map Encinitas.

(i) Unit 3: Land near Poinsettia Lane Commuter Station, Carlsbad Lands bounded by the following UTM NAD27 coordinates (E, N): 470100, 3663600; thence east to the North San Diego County Transit (NSDCT) boundary at UTM NAD27 y-coordinate 3663600; thence south following the NSDCT boundary to UTM NAD27 x-coordinate 470300; thence south to UTM NAD27 coordinates 470300, 3663300; thence east to the NSDCT boundary at UTM NAD27 y-coordinate 3663300; thence southeast following the NSDCT boundary lands to UTM NAD 27 x-coordinate 470400; thence south following UTM NAD27 x-coordinate 470400 to the NSDCT boundary; thence west and south following the NSDCT boundary to UTM NAD27 y-coordinate 3662400; thence west following UTM NAD27 y-coordinate 3662400 to the NSDCT boundary; thence northwest following the NSDCT boundary to UTM NAD27 x-coordinate 470400; thence north along UTM NAD27 x-coordinate 470400 to UTM NAD27 coordinates 470400, 3662900; thence west to NSDCT lands at UTM NAD 27 y-coordinate 3662900; thence northwest following the NSDCT boundary returning to UTM NAD27 coordinates 470100, 3663600.

(ii) Note: Map of critical habitat Unit 3 for the Riverside fairy shrimp follows:

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[GRAPHIC] [TIFF OMITTED] TR12AP05.003

(10) Map Unit 4: South San Diego County, San Diego, California. From USGS 1:24,000 quadrangle map Imperial Beach.

(i) Unit 4: Sweetwater Union High School District lands on Otay Mesa. Lands bounded by the following UTM NAD27 coordinates (E, N): 498000, 3602800; 498100, 3602800; thence south to the Sweetwater Union High School District (SUHSD) boundary at UTM NAD27 x-coordinate 498100; thence west following the SUHSD boundary to UTM NAD27 x-coordinate 498000; thence north following UTM NAD27 x-coordinate 498000 returning to UTM NAD27 coordinates 498000, 3602800.

(ii) Note: Map of critical habitat Unit 4 for the Riverside fairy shrimp follows:

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[GRAPHIC] [TIFF OMITTED] TR12AP05.004

* * * * *

Dated: March 31, 2005.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 05-6825 Filed 4-11-05; 8:45 am]

BILLING CODE 4310-55-C

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AJ11

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), herein address the designation of critical habitat for *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale) pursuant to the Endangered Species Act of 1973, as amended (Act). We are designating zero acres of critical habitat for *A. coronata* var. *notatior*. We identified 15,232 acres (ac) (6,167 hectares (ha)) of habitat with features essential to the conservation of this taxon. However, all habitat with essential features for this taxon is located either within our estimate of the areas to be conserved and managed by the approved Western Riverside MSHCP on existing Public/Quasi-Public Lands (PQP) lands, or within areas where the MSHCP will ensure that future projects will not adversely alter essential hydrological processes, and therefore is excluded from critical habitat under section 4(b)(2) of the Act.

DATES: This rule becomes effective on November 14, 2005.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this final rule, are available for public inspection, by appointment, during normal business hours, at the Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Carlsbad, CA 92011 (telephone 760/431–9440). The final rule, economic analysis, and maps will also be available via the Internet at *http://carlsbad.fws.gov/SJVCDocs.htm.*

FOR FURTHER INFORMATION CONTACT: Field Supervisor, Carlsbad Fish and Wildlife Office, at the above address, (telephone 760/431–9440; facsimile 760/431–9624).

SUPPLEMENTARY INFORMATION:

Designation of Critical Habitat Provides Little Additional Protection to Species

In 30 years of implementing the Act, the Service has found that the designation of statutory critical habitat provides little additional protection to most listed species, while consuming significant amounts of available conservation resources. The Service's present system for designating critical habitat has evolved since its original statutory prescription into a process that provides little real conservation benefit, is driven by litigation and the courts rather than biology, limits our ability to fully evaluate the science involved, consumes enormous agency resources, and imposes huge social and economic costs). The Service believes that additional agency discretion would allow our focus to return to those actions that provide the greatest benefit to the species most in need of protection.

Role of Critical Habitat in Actual Practice of Administering and Implementing the Act

While attention to and protection of habitat is paramount to successful conservation actions, we have consistently found that, in most circumstances, the designation of critical habitat is of little additional value for most listed species, yet it consumes large amounts of conservation resources. Sidle (1987) stated, ''Because the Act can protect species with and without critical habitat designation, critical habitat designation may be redundant to the other consultation requirements of section 7.'' Currently, only 473 species, or 38 percent of the 1,253 listed species in the U.S. under the jurisdiction of the Service, have designated critical habitat.

We address the habitat needs of all 1,253 listed species through conservation mechanisms such as listing, section 7 consultations, the Section 4 recovery planning process, the Section 9 protective prohibitions of unauthorized take, Section 6 funding to the States, and the Section 10 incidental take permit process. The Service believes that it is these measures that may make the difference between extinction and survival for many species.

We note, however, that two courts found our definition of adverse modification to be invalid (March 15, 2001, decision of the United States Court Appeals for the Fifth Circuit, *Sierra Club* v. *U.S. Fish and Wildlife Service et al.*, F.3d 434, and the August 6, 2004, Ninth Circuit judicial opinion, *Gifford Pinchot Task Force* v. *United States Fish and Wildlife Service*). On December 9, 2004, the Director issued guidance to be used in making section 7 adverse modification determinations.

Procedural and Resource Difficulties in Designating Critical Habitat

We have been inundated with lawsuits for our failure to designate critical habitat, and we face a growing number of lawsuits challenging critical habitat determinations once they are made. These lawsuits have subjected the Service to an ever-increasing series of court orders and court-approved settlement agreements, compliance with which now consumes nearly the entire listing program budget. This leaves the Service with little ability to prioritize its activities to direct scarce listing resources to the listing program actions with the most biologically urgent species conservation needs.

The consequence of the critical habitat litigation activity is that limited listing funds are used to defend active lawsuits, to respond to Notices of Intent (NOIs) to sue relative to critical habitat, and to comply with the growing number of adverse court orders. As a result, listing petition responses, the Service's own proposals to list critically imperiled species, and final listing determinations on existing proposals are all significantly delayed.

The accelerated schedules of court ordered designations have left the Service with almost no ability to provide for adequate public participation or to ensure a defect-free rulemaking process before making decisions on listing and critical habitat proposals due to the risks associated with noncompliance with judicially-imposed deadlines. This in turn fosters a second round of litigation in which those who fear adverse impacts from critical habitat designations challenge those designations. The cycle of litigation appears endless, is very expensive, and in the final analysis provides relatively little additional protection to listed species.

The costs resulting from the designation include legal costs, the cost of preparation and publication of the designation, the analysis of the economic effects and the cost of requesting and responding to public comment, and in some cases the costs of compliance with the National Environmental Policy Act (NEPA). None of these costs result in any benefit to the species that is not already afforded by the protections of the Act enumerated earlier, and they directly reduce the funds available for direct and tangible conservation actions.

Background

It is our intent to discuss only those topics directly relevant to the subject of this final rule. For more information on

the biology, ecology, and distribution of this taxon, refer to the proposed listing rule published in the **Federal Register** on December 15, 1994 (59 FR 64812), the final listing rule published in the **Federal Register** on October 13, 1998 (63 FR 54975), and the proposed critical habitat rule published in the **Federal Register** on October 6, 2004 (69 FR 59844).

Previous Federal Actions

Please see the final rule listing *Atriplex coronata* var. *notatior* as endangered for a description of previous Federal actions through October 13, 1998 (63 FR 54975). At the time of the final listing rule, the Service determined designation of critical habitat was not prudent because such designation would not benefit the species.

On November 15, 2001, a lawsuit was filed against the Department of the Interior (DOI) and the Service by the Center for Biological Diversity and California Native Plant Society, challenging our ''not prudent'' determinations for eight plants including *Atriplex coronata* var. *notatior* (*CBD, et al.* v. *Norton*, No. 01–CV–2101 (S.D. Cal.)). A second lawsuit asserting the same challenge was filed against DOI and the Service by the Building Industry Legal Defense Foundation (BILD) on November 21, 2001 (*BILD* v. *Norton*, No. 01–CV–2145 (S.D. Cal.)). The parties in both cases agreed to remand the critical habitat determinations to the Service for additional consideration. In an order dated July 1, 2002, the U.S. District Court for the Southern District of California directed us to reconsider our not prudent finding and publish a proposed critical habitat rule for *A. coronata* var. *notatior*, if prudent, on or before January 30, 2004. In a motion to modify the July 1, 2002 order, the DOI and the Service requested that the due date for the proposed and final rules for *A. coronata* var. *notatior* be extended until October 1, 2004 and October 1, 2005, respectively. This motion was granted on September 9, 2003. The proposed rule was signed September 30, 2004 and published in the **Federal Register** October 6, 2004 (69 FR 59844). This final rule complies with the court's ruling.

Summary of Comments and Recommendations

We requested written comments from the public on the proposed designation of critical habitat for *Atriplex coronata* var. *notatior* and on the draft economic analysis of the proposed designation during two comment periods. We also contacted appropriate Federal, State, and local agencies; scientific organizations; and other interested parties and invited them to comment on the proposed rule and the draft economic analysis.

During the comment period that opened on October 6, 2004, and closed December 6, 2004, we received 5 comment letters directly addressing the proposed critical habitat designation: 3 from peer reviewers, and 2 from organizations or individuals. During the comment period that opened on August 31, 2005, and closed on September 15, 2005, we received 6 comment letters directly addressing the proposed critical habitat designation and the draft economic analysis: 3 were from a peer reviewer, and 3 were from organizations. One commenter supported our decision not to designate critical habitat for *Atriplex coronata* var. *notatior* and five opposed our decision. Comments received were grouped into 18 general issues specifically relating to the proposed critical habitat designation for *A. coronata* var. *notatior*, and are addressed in the following summary and incorporated into the final rule as appropriate. We did not receive any requests for a public hearing. We reviewed all comments received from the peer reviewers and the public for substantive issues and new information regarding critical habitat for *A. coronata* var. *notatior*. All comments are addressed in the following summary and incorporated into the final rule as appropriate.

Peer Review

In accordance with our policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from three knowledgeable individuals with scientific expertise that included familiarity with the species, the geographic region in which the species occurs, and conservation biology principles. We received responses from all three peer reviewers. The peer reviewers were generally supportive of the designation of critical habitat. However, they did not support the exclusion of critical habitat for *Atriplex coronata* var. *notatior* based on the presence of an existing habitat conservation plan (HCP).

Peer Reviewer Comments on the Proposed Rule

1. *Comment:* The three peer reviewers submitted 26 comments on how to: reduce the redundancy and length of the rule; edit punctuation, wording, and terminology: and incorporate citations to help the rule be more clear and succinct.

Our Response: We have incorporated these comments into the final rule as appropriate.

2. *Comment:* The three peer reviewers submitted 38 comments on *Atriplex coronata* var. *notatior* and the Western Riverside MSHCP. These comments emphasized the importance of including in the final rule a clear, detailed explanation of the Western Riverside MSHCP, its associated Implementing Agreement (IA), the Service's formal section 7 consultation for the MSHCP, and the Service's responsibilities and authority under the MSHCP as they relate to *A. coronata* var. *notatior.*

Our Response: We appreciate the peer reviewers' concerns regarding the MSHCP and its associated documents, and we have incorporated detailed information on these as they relate to *Atriplex coronata* var. *notatior* under the section titled ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan.'' The MSHCP and its associated IA are available via the Internet at *http://rcip.org/conservation.htm,* and the Service's formal section 7 consultation and Conceptual Reserve Design map are available via the Internet at *http://www.fws.gov/pacific/carlsbad/WRV_MSHCP_BO.htm.*

3. *Comment:* The three peer reviewers submitted 12 comments that disagreed with our decision to exclude critical habitat based on the presence of an existing habitat conservation plan. Specific comments included: (1) The statement that the Service had failed to provide an adequate basis for the exclusion of lands from critical habitat; (2) that our decision to exclude lands from critical habitat based on the MSHCP's ability to protect the taxon's habitat was not adequately supported; and (3) that not all agencies are signatory to the MSHCP and therefore critical habitat should be identified for those projects and agencies operating outside the MSHCP.

Our Response: Section 4(b)(2) of the Act allows us to consider the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such an area as critical habitat will result in the extinction of the species. We have determined that benefits of exclusion of areas covered by the Western Riverside MSHCP outweigh the benefits of inclusion, and have included a more detailed analysis of the benefits of the MSHCP in this final rule

under the section titled ''Exclusions Under Section 4(b)(2) of the Act''.

4. *Comment:* The three peer reviewers submitted four comments that disagreed with the Service's statement in the rule that designation of critical habitat provides little additional protection to species (see **SUPPLEMENTARY INFORMATION** section above). Concern was expressed that a critical habitat proposal was not the appropriate venue for a discussion of the resource and procedural difficulties in designating critical habitat. It was suggested that critical habitat could be used as a tool to manage or end threats to the species, such as manure dumping. Additionally, it was suggested that the designation of critical habitat would give more recognition and attention to the habitat of *Atriplex coronata* var. *notatior.*

Our Response: As discussed in the **SUPPLEMENTARY INFORMATION** section and other sections of this and other critical habitat designations, we believe that (in most cases) various conservation mechanisms provide greater incentives and conservation benefits than designation of critical habitat. These include section 7 consultations, the section 4 recovery planning process, the section 9 protective prohibitions of unauthorized take, section 6 funding to the States, the section 10 incidental take permit process, and cooperative programs with private and public landholders and tribal nations.

While we concur that critical habitat designation can provide some level of species protection, this can only be provided if there is a Federal nexus for those agencies planning actions that may impact the designated habitat. We are unaware of any Federal nexus that would generally apply to application of soil amendments, such as the dumping of manure.

5. *Comment:* Two peer reviewers submitted two comments that disagreed with the Service's statement that the exclusion of critical habitat based on existing HCPs offers ''unhindered, continued ability to seek new partnerships with future HCP participants.'' They commented that the Service should be able to continue working cooperatively with partners on HCPs and other conservation efforts once critical habitat has been designated, and asked that we provide further explanation of how the designation of critical habitat may impede cooperative conservation efforts, such as the MSHCP.

Our Response: Both HCPs and critical habitat designations are designed to provide conservation measures to protect species and their habitats. The advantage of seeking new conservation partnerships (through HCPs or other means) is that they can offer active management and other conservation measures for the habitat on a full-time and predictable basis. Critical habitat designation only prevents adverse modification of the habitat where there is a Federal nexus to the modifying activity. The designation of critical habitat may remove incentives to participate in the HCP processes, in part because of added regulatory uncertainty, increased costs to plan development and implementation, weakened stakeholder support, delayed approval and development of the plan, and greater vulnerability to legal challenge. We have in the past received direct statements of intent to withdraw from other forms of cooperative efforts beneficial to the conservation of listed species if those landowners' property was included in pending critical habitat designations. We work with HCP applicants to ensure that their plans meet the issuance criteria and that the designation of critical habitat on lands where an HCP is in development does not delay the approval and implementation of their HCP. Additionally, HCPs offer conservation of covered species whether or not the area is designated as critical habitat.

6. *Comment:* The three peer reviewers submitted five comments that recommended that the reader be referred, under the ''Previous Federal Actions'' section, to both the proposed listing rule published on December 15, 1994 (59 FR 64812), which included proposed critical habitat, and the final listing rule published on October 13, 1998 (63 FR 54975), which withdrew the 1994 critical habitat proposal due to the severe decline of the species.

Our Response: This reference has been incorporated into the Previous Federal Actions section above.

7. *Comment:* The three peer reviewers submitted four comments that recommended that the discussion on Special Management Considerations be expanded. Recommendations include citing specific language from the Act to support our statement that occupied habitat may be included in critical habitat only if the essential features thereon may require special management or protection, and clarifying the extent and limitations of management measures proposed under the MSHCP. The reviewers were concerned that the MSHCP had not yet resulted in the implementation of management actions that would address threats to the species, such as soil chemistry alteration resulting from manure dumping.

Our Response: In the ''Critical Habitat'' section of the proposed rule we provided a definition of critical habitat pursuant to section 3(5)(A) of the Act. Within the ''Special Management Considerations'' section below, we have expanded our discussion to address this comment. We have also provided a more detailed discussion of the management measures proposed under the MSHCP (see ''Exclusions Under Section 4(b)(2) of the Act'' section).

8. *Comment:* Two peer reviewers submitted seven comments that recommended that we incorporate changes into the final rule to better address the unique status of plants under the Act, including the limited protection plants are provided under section 9 of the Act, and the assistance critical habitat could provide to the protection and recovery of Atriplex coronata var. notatior.

Our Response: As stated in the ''Effects of Critical Habitat Designation'' section of the proposed rule, Section 7 of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. Federal actions not affecting listed species or critical habitat and actions on non-Federal and private lands that are not federally funded, authorized, or permitted do not require section 7 consultation. The designation of critical habitat would not change this. *Atriplex coronata* var. *notatior* is currently known to occur exclusively on private lands. If occupied private lands were designated as critical habitat, any actions with a Federal nexus that might adversely affect the critical habitat would require a consultation with us. However, consultation for activities (e.g., habitat modification) with a Federal nexus which might adversely impact the species in occupied habitat would be required even without the critical habitat designation. Since there is no prohibition against take of listed plants on private lands, activities without a Federal nexus which might adversely impact the species or its habitat would not require consultation with us even with a critical habitat designation.

9. *Comment:* The three peer reviewers submitted nine comments that stated that threats to the species were not adequately addressed in the proposed rule. Additional threats to discuss included the following: (1) Manure spreading which buries the seed bank, introduces vast quantities of organic material and nutrients, and alters soil composition and chemistry allowing for the invasion of alkali intolerant weeds; (2) activities posed by MSHCP covered

projects such as the State Route 79 Realignment Project, the Ramona Expressway, and the San Jacinto River Flood Control Project; and, (3) non-seasonal flows which may result from future development.

Our Response: We address the threats of manure spreading, MSHCP covered projects, and non-seasonal flows in the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' and ''Special Management Considerations or Protections'' sections of this final rule.

10. *Comment:* One peer reviewer suggested expanding the discussion of the species conservation needs to include *Atriplex coronata* var. *notatior's* requirement for a functioning hydrologic system, both in terms of local and riverine flooding.

Our Response: We have expanded our discussion of the reliance of *Atriplex coronata* var. notatior on functioning hydrologic systems under the ''Water and Physiological Requirements'' section of this final rule.

11. *Comment:* One peer reviewer stated that restoration of plant communities is essential to the recovery of *Atriplex coronata* var. *notatior,* noting the Service's role in evaluating proposed efforts to restore disturbed alkali habitats within the species range. The reviewer suggested addressing whether critical habitat would allow additional review of the success of restoration efforts.

Our Response: There are two ways in which restoration actions will be accomplished for the species under the MSHCP, and the Service is included in the review process for both. First, reserve managers are responsible for the maintenance and enhancement of floodplain processes of the San Jacinto River, Mystic Lake, and upper Salt Creek under the MSHCP. We anticipate that these actions will be addressed in Reserve Management Plans (RMPs) which are controlled and implemented through the Reserve Management Oversight Committee (RMOC) and coordinated with Reserve Managers. The Service is a member of the RMOC. Within 5 years of significant acquisition of new reserve lands in a management unit, RMPs must be submitted to the RMOC.

Second, several MSHCP policies require that if avoidance of certain sensitive habitats and species is not feasible, to ensure adequate replacement of lost functions and values, the MSHCP Permittee must make a Determination of Biologically Equivalent or Superior Preservation (DBESP) that demonstrates that a proposed action, including design features to minimize impacts and compensation measures, will provide equal or better conservation than avoidance of the sensitive habitats and species. The Service has a 60-day review and comment period for any DBESP prepared under the MSHCP. To date, two DBESPs have been submitted that will result in restoration activities that may benefit *Atriplex coronata* var. *notatior* (Lockhart 2004; LSA Associates Inc. 2005). Project proponents have elected to introduce the species into restored and created vernal pool habitat north of the upper Salt Creek populations once initial success criteria have been met, even though the proposed actions that resulted in impacts to vernal pool habitat did not directly affect *A. coronata* var. *notatior.*

Finally, and more directly, the designation of critical habitat provides only restrictions on adverse modification to that habitat where there is a Federal nexus for the modification. It provides no mechanism for positive conservation actions that might be beneficial to the species, such as additional review of or increased efforts toward restoration and recovery.

12. *Comment:* The three peer reviewers submitted six comments that pointed out inherent problems with censusing an annual plant such as *Atriplex coronata* var. *notatior,* which is only visible seasonally and is subject to changing rainfall conditions. The reviewers believe that population estimates provided in the proposed rule are confusing and should be presented in context.

Our Response: Because information on this narrow endemic species is very limited, we presented all census information we were aware of in the 2004 proposed critical habitat rule. However, it is important to recognize that numbers for this annual plant vary greatly in response to changing rainfall conditions. Additionally, the seasonally-flooded alkali vernal plain habitat which the species occupies is a very dynamic system. Areas that are suitable for the species within this dynamic habitat matrix change from year to year resulting in more variation in census numbers. We have expanded our description of the species habitat under the ''Water and Physiological Requirements'' and ''Sites for Reproduction, Germination, and Seed Dispersal'' sections of this final rule.

13. *Comment:* Two peer reviewers submitted four comments that stated that population estimates presented in the proposed rule are out of date and conflicting information is presented on the amount of alkali habitat available for the species. One peer reviewer has observed large fluctuations in significant populations of the species, and attributes impacts to heavy discing and manure dumping. This reviewer recommended that we use current GIS capabilities to produce a single habitat model for the species and monitor populations more frequently. Another peer reviewer recommended that the final rule incorporate the most recent estimates for the species which were submitted to our office by two of the peer reviewers on January 14, 2004 (Table 2, Bramlet and White 2004).

Our Response: In our 2004 proposed critical habitat rule, we included population and habitat estimates for the species from many sources, including our 1998 final rule, Bramlet's 1996 estimates, and Glenn Lukos Associates estimates from 2000. There is variation between these estimates, which has led to confusion regarding how much suitable habitat currently exists for the species. In addition, as discussed in our response to comment 12 above, populations of this annual plant fluctuate greatly from year to year. When conducting our analysis of the MSHCP, we used current GIS capabilities to model suitable habitat for the species. This is discussed in the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section of this final rule. We address impacts to the species from manure dumping in the ''Special Management Considerations or Protections'' section of this final rule.

Population estimates submitted by Bramlet and White (2004) are summarized as follows: (1) San Jacinto River populations (Habitat with Essential Features—Unit 1), 115,544 individuals, 9,141 ac (3699 ha) of suitable habitat; (2) Upper Salt Creek populations (Habitat with Essential Features—Unit 2), 51,996 individuals, 1,200 ac (486 ha) of suitable habitat; and, (3) Alberhill populations (Habitat with Essential Features—Unit 3), 185 individuals, 160 ac (65 ha) of suitable habitat. The total population and habitat estimates are 167,725 individuals and 10,501 ac (4250 ha) of suitable habitat, respectively. We are unable to compare these estimates with our habitat model or with the Units of habitat with essential features because Bramlet and White (2004) did not include a map of suitable habitat.

14. *Comment:* One peer reviewer commented on the differences in alkali soil types at different population centers. For example, the San Jacinto Wildlife Area (SJWA) has Willows, Traver, Chino, Waukena and Domino soils, the upper Salt Creek area has Willows, Traver, and Domino soils, and the Alberhill population is located on

Willows soils. The reviewer stated that approximately 80 percent of the individuals in the SJWA were on Willows soils, and approximately 99 percent of Glenn Lukos Associates records were on Willows soil. However, there is a more even distribution of the species across soil types at upper Salt Creek.

Our Response: We appreciate the peer reviewer's comments regarding alkali soils types at the different population centers and will take the information into account when working with the species and during our MSHCP implementation processes. See also our discussion of ''Primary Constituent Elements.''

15. *Comment:* Two peer reviewers submitted two comments that stated that *Atriplex coronata* var. *notatior* occurs in soils that are naturally nutrient poor. The reviewers believe that if natural runoff has been documented to provide essential minerals not otherwise available in the soil, the source should be cited.

Our Response: We appreciate the peer reviewers' comments on this matter. We have removed from the final rule our undocumented statement that natural runoff provides essential minerals to *Atriplex coronata* var. *notatior.*

16. *Comment:* The three peer reviewers submitted seven comments that recommended including in the final rule a better explanation of the importance of hydrological processes to *Atriplex coronata* var. *notatior.* The reviewers stated that stands of plants vary in size and location with rainfall and inundation of alkali habitat. Additionally, the species is not usually found in inundated areas but on small mounds within the floodplain and along the upper margins of normalized local flooding. The reviewers stated that both seasonal localized flooding and occasional large-scale flooding are important to the species. Seasonal localized flooding would distribute seeds locally, while large-scale flooding (which occurs every 20 to 50 years) would distribute seeds throughout the habitat, resetting the system by killing alkali scrub and erasing the impact of discing and other activities.

Our Response: We have expanded our discussion on the importance of hydrological processes to *Atriplex coronata* var. *notatior* under the ''Water and Physiological Requirements'' and ''Sites for Reproduction, Germination, and Seed Dispersal'' sections of this final rule.

17. *Comment:* Two peer reviewers submitted two comments that stated that removal of habitat and plants may be mandated in some portions of the species' range by local fire control ordinances, and that discing in crownscale habitat, if it is related to fire at all, is for fire prevention rather than fire suppression.

Our Response: Discing for fire prevention may currently occur within the species' range. However, as discussed under the Fuels Management section of the MSHCP (section 6.4), the impacts of fuels management on the MSHCP Conservation Area will be minimized as new reserve lands and new developments are proposed within the MSHCP plan area. The MSHCP requires that Conservation Area boundaries be established to avoid encroachment by the brush management zone in areas where Reserves are created adjacent to existing developed areas. Additionally, brush management zones must be incorporated into the development boundaries when new development is planned adjacent to the MSHCP Conservation Area or other undeveloped areas.

18. *Comment:* One peer reviewer stated that, based on general observations, seeds of the species are viable for greater than 5 years.

Our Response: In our 2004 proposed rule, we stated that ''Preliminary studies indicate that *Atriplex coronata* var. *notatior* seeds retain a relatively high viability for at least several seasons (Ogden Environmental and Energy Services Corporation 1993).'' We appreciate the peer reviewer's comment on this matter and will take the information into account when working with the species.

19. *Comment:* One peer reviewer recommended that we review the most current California Natural Diversity Database (CNDDB) records and herbarium specimens from the Rancho Santa Ana Botanic Garden and the University of California, Riverside, before finalizing boundaries of habitat with essential features.

Our Response: We have reviewed the most current CNDDB records and herbarium specimens from these two organizations. No new records have been submitted to these agencies since the publication of our proposed rule.

20. *Comment:* Two peer reviewers submitted seven comments that suggested alterations to Unit 1 of Habitat with Essential Features. The reviewers recommended defining the Unit to exclude upland and watershed areas that are not suitable for the species, as well as some heavily disced, irrigated agricultural fields that no longer support the species. One peer reviewer provided a detailed map showing upland and agricultural areas that are not suitable habitat for the species and thus should not be considered habitat with essential features. Two peer reviewers recommended making it clear in the text of the final rule that habitat for *Atriplex coronata* var. *notatior* does not extend into Railroad Canyon. The peer reviewers expressed concern that the Service may have excluded occupied habitat southwest of Interstate 215 based on future projects rather than known biological or soils data. Additionally, they recommended that Unit 1 be expanded to incorporate occupied habitat southwest of Interstate 215.

Our Response: We appreciate the peer reviewers' area-specific expertise and their recommendation not to include as habitat with essential features specific upland areas and heavily disced, irrigated agricultural fields. We concur with their recommendation that these areas should not be considered essential for the species and we will make use of their comments and map when working with the species and during our MSHCP implementation processes. Additionally, we concur with the peer reviewers that habitat for the species does not extend into Railroad Canyon. As explained in greater detail in the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section of this final rule, the occupied habitat areas southwest of Interstate 215 that are outside of our Units of habitat with essential features do not fall within our interpretation of the MSHCP Conservation Area. However, in accordance with the Additional Survey Needs and Procedures section of the MSHCP (section 6.3.2), property owners within the MSHCP Criteria Area must avoid 90 percent of those portions of the property that provide long-term conservation value for the species until the permitees have demonstrated that conservation goals for the species have been met. Additionally, the requirements of the Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools section of the MSHCP (section 6.1.2) may result in additional conservation for this species.

21. *Comment:* One peer reviewer advised the Service to check the ownership of the San Jacinto Wildlife Area (SJWA) and stated that the SJWA is likely owned by the State of California or the Wildlife Conservation Board (WCB) rather than the California Department of Fish and Game (CDFG).

Our Response: We have been informed by the CDFG that legal title to all state lands is taken in the name of the State of California. The CDFG is the State Trustee Agency for the management of the fish and wildlife

resources of the State of California. As such, the CDFG is the State agency responsible for the management of the State lands comprising the SJWA. The WCB is the State agency responsible for the acquisition of lands in the name of the State of California for purposes of wildlife conservation and public access. Over the years the WCB has acquired virtually all the formerly private lands now comprising the state public lands of the SJWA (Paulek 2005 *in litt.*).

22. *Comment:* Two peer reviewers submitted two comments asking that the final rule explain that the SJWA was purchased and is managed by the CDFG primarily for waterfowl conservation. The reviewers stated that most of the conservation management implemented on the SJWA, such as flooding ponds in March when *Atriplex coronata* var. *notatior* blooms, is beneficial to waterfowl but not to *A. coronata* var. *notatior.* The reviewers further recommended describing any management obligations the CDFG may have for rare plants, including *A. coronata* var. *notatior,* citing the Wildlife Area's management plan where appropriate.

Our Response: We have been informed by the CDFG that the SJWA was established in the early 1980's as a mitigation site for the direct impacts of the State Water Project (SWP) which was completed in the mid-1970's. Management objectives for the original 4,800 ac (1,942 ha) of land acquired for SWP mitigation were directed towards habitat conservation and the restoration of historic habitat values associated with the San Jacinto Valley of Western Riverside County. To that end, initial habitat restoration efforts included the development of freshwater wetlands and extensive restoration of willow-cottonwood riparian habitat. Wildlife habitats conserved in public ownership include Riversidian Sage Scrub, annual grasslands, Alkali Sink Scrub, and virtually the entirety of the historic Mystic Lake floodplain. The placement of the Mystic Lake floodplain in public ownership represents the most important *A. coronata* var. *notatior* conservation action realized to date.

In 1995, the SJWA was included in the reserve lands for the Stephens' Kangaroo Rat (SKR) pursuant to the SKR Habitat Conservation Plan. More recently the SJWA has been designated a principal reserve for the MSHCP adopted in June 2004. Over the years and with the recent acquisition of the Potrero Unit, the SJWA has grown to nearly 20,000 ac (8,094 ha). Pursuant to the conservation mandates above, the management objectives for the SJWA continue to seek the conservation of multiple species of plants and animals by maintaining and restoring a diversity of habitat types.

As to the conservation of *A. coronata* var. *notatior,* the draft management plan for the SJWA designates the habitat of *A. coronata* (Alkali Sink Scrub) a Special Ecological Community. The plan recognizes the need for additional survey of the distribution of the species on the SJWA, and provides for the incorporation of appropriate impact analysis for this sensitive plant in future project environmental review procedures. The plan also recognizes the need to initiate additional species-specific research efforts with the goal of formulating a management prescription for this endangered plant (Paulek 2005 *in litt.*).

23. *Comment:* One peer reviewer stated that there appears to have been an overestimate in the proposed rule of the total acreage of *Atriplex coronata* var. *notatior* habitat that is located within waterfowl ponds. The reviewer requested that we review this information and correct the text in the final rule.

Our Response: In our 2004 proposed critical habitat rule, we wrote that within the SJWA/Mystic Lake area, approximately 470 ac (190 ha) of habitat consist of duck ponds, 250 ac (100 ha) of which fall within the SJWA (Roberts and McMillan 1997). We have been informed by the CDFG that wetland habitat (freshwater marsh) on the 10,000-ac (4,047-ha) Davis Road Unit of the SJWA includes approximately 470 ac (190 ha) of marsh habitat managed under a moist soil management regimen. Typically these wetlands are flooded in the fall and the water is drawn off in the spring. In addition, up to 500 ac (202 ha) of semi-permanent wetland at other locations on the Wildlife Area can be flooded in the early spring and maintained into the summer months. The moist soil management regimen (fall flooding) at several locations on the SJWA has been found to promote the germination of *Atriplex coronata* var. *notatior* after the spring drawdown (Paulek 2005 *in litt.*).

24. *Comment:* Two peer reviewers submitted two comments that noted that the proposed rule states that CNDDB Element Occurrence 12 is outside of the SJWA, but that was incorrect and that the occurrence was added to the SJWA in 1996.

Our Response: We appreciate the peer reviewer's comment on this matter and will take the information into account when working with the species in this area.

25. *Comment:* One peer reviewer stated that the survey conducted by Glenn Lukos Associates in 2000 was conducted under special circumstances. The reviewer stated that landowners suspended discing and manure dumping for a spring census at the request of their biological consultants. Additionally, discing and manure dumping resumed following the census, with significant impact to the populations. This further illustrated both the impact of these activities on the species and the species resilience to temporary disturbance.

Our Response: We appreciate the peer reviewers' comments with regard to the Glenn Lukos Associates 2000 survey, and we will take this information into account when working with the species and during our MSHCP implementation processes. We address impacts to the species from manure dumping, and how the MSHCP can address this threat, in the ''Special Management Considerations or Protections'' section of this final rule.

26. *Comment:* Two peer reviewers submitted three comments that suggested some alterations to Unit 2 of Habitat with Essential Features. They recommended that the Unit be better defined to exclude upland and watershed areas that are not suitable for the species, including habitat north of Florida Avenue and upland slopes west of the San Diego Canal. One peer reviewer provided a detailed map to show which upland and agricultural areas are not suitable habitat for the species and should be excluded from Unit 2. Additionally, the peer reviewers expressed that occupied habitat known to occur south of the railroad tracks at the southern end of the Unit, and south of the intersection of Warren Road and Esplanade Avenue north of the Unit, should be included in Unit 2. Additionally, one peer reviewer expressed that occupied habitat known to occur south of the railroad tracks at the southern end of the Unit, and between Devonshire Road and Tres Cerritos Road within the Metropolitan Water District right-of-way for the San Diego Canal, should be included in Unit 2.

Our Response: We appreciate the peer reviewers' comments with regard to excluding upland and watershed areas from habitat with essential features. We will take this information into account when working with the species and during our MSHCP implementation processes. As is explained in greater detail in the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section of this final rule, the occupied habitat area south of the railroad tracks at the southern end of the

unit that is outside of our Unit does not fall within our interpretation of the MSHCP Conservation Area. However, in accordance with the Additional Survey Needs and Procedures section of the MSHCP (section 6.3.2), property owners must avoid 90 percent of those portions of the property within the MSHCP Criteria area that provide long-term conservation value for the species until the permitees have demonstrated that conservation goals for the species have been met. Additionally, the Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools section of the MSHCP (*i.e.*, section 6.1.2) may result in additional conservation for this species.

Because we have no source on file for the population reported by one peer reviewer between Devonshire Road and Tres Cerritos Road within the Metropolitan Water District right-of-way for the San Diego Canal, we requested that the peer reviewer provide a source. The peer reviewer said that the surveys that detected these individuals were conducted this year and collections are forthcoming (David Bramlet 2005 pers. comm. with USFWS). This area also does not fall within our interpretation of the MSHCP Conservation Area.

27. *Comment:* One peer reviewer recommended that the Service review the study of the Unit 2 area conducted by Recon in 1995, and incorporate information into the final rule to provide a more complete overview of the Unit.

Our Response: The 1995 study by Recon is a fairly comprehensive survey of the Unit 2 area, excluding watershed areas to the north and west. *Atriplex coronata* var. *notatior* was found to be locally common within the study area. Survey results indicate a total of 33 data points for the species, with numbers of individuals at each point ranging from 2 to 10,000 plants.

28. *Comment:* One peer reviewer recommended the Service closely examine the survey methodology of the 2001 Amec Earth and Environmental, Inc. census. The reviewer believes the estimate of 136,000 plants on 40 ac (16 ha) in the Upper Salt Creek Wetland Preserve is extremely high.

Our Response: According to the Amec Earth and Environmental, Inc. (2001) study, ''methodologies were consistent from year to year * * * population estimates based on average plant densities were calculated for [*Atriplex coronata* var. *notatior*]. Ten-meter-square quadrats were randomly placed within a stand of [*A. coronata* var. *notatior*] and average plant density was then multiplied by the population area to arrive at the estimated number of plants per population.'' Please also see our response to comment 12 above.

29. *Comment:* One peer reviewer stated that habitat restoration is needed in the Upper Salt Creek Area due to significant hydrological impacts from ground surface alterations. For example, the reviewer explained that a drainage ditch was constructed in 1989 that drains water off of the surrounding flats, and has led to a reduction of *Juncus* sp. and *Eleocharis* sp. which were once abundant in the area.

Our Response: We appreciate the peer reviewer's comment and we will take this information into account when working with the species in this area and during our MSHCP implementation processes.

30. *Comment:* One peer reviewer recommended documenting in the final rule instances where storm flows are allowed to reach *Atriplex coronata* var. *notatior* habitat rather than being collected in storm drains and directed into stormwater channels. The reviewer further explained that land conversion to large developed areas with storm drain systems fundamentally changes the natural hydrology within watersheds supporting *A. coronata* var. *notatior*.

Our Response: We have participated in three informal consultations in the watershed area of Unit 2 of Habitat with Essential Features which have resulted in the maintenance of clean water flows to the seasonally flooded alkali vernal plain habitat at upper Salt Creek. Clean water flows from Reinhardt Canyon and hillside areas west of the Heartland Project are collected in a detention basin located northwest of the California Avenue and Florida Avenue intersection. These flows are then pumped out of the detention basin and travel by sheet flow to the seasonally flooded alkali vernal plain habitat (Heartland Project Description 2000; Heartland Memorandum of Understanding 2000). Once construction is completed for these projects, clean water flows from the Tres Cerritos hills north of the JP Ranch and Tres Cerritos West Projects will be collected in a system of pipes which will direct the clean water flows under the project sites to a spreader located south of Devonshire Avenue between Warren Road and Old Warren Road (Lockhart and Associates 2004; LSA Associates, Inc. 2004). Through informal consultation, the City of Hemet has agreed to maintain these clean water delivery systems.

31. *Comment:* One peer reviewer stated that dryland farming has not been conducted in Hemet on any scale for over a decade. Additionally, the reviewer believed that discing conducted in Hemet is for fire prevention rather than dryland farming.

Our Response: We have been informed by the City of Hemet that weed abatement notifications for fire prevention are not sent to properties within the MSHCP Criteria Area (Masyczek 2005 *in litt.*).

32. *Comment:* Two peer reviewers submitted four comments that suggested alterations to Unit 3 of Habitat with Essential Features. They recommended that the unit be better defined to exclude the area north of Nichols Road and include the field west and southwest of the unit due to the presence of Willows soils. One peer reviewer provided a detailed map to show these recommended changes.

Our Response: First, we appreciate the peer reviewers' comments with regard to excluding the area north of Nichols Road from habitat with essential features. The text in our proposed rule stated that ''the northern boundary [of Unit 3] is defined by Nichols Road.'' The inclusion of the area north of Nichols Road in the critical habitat unit was a mapping error resulting from the presence of mapped Willows soils in that area. Due to the presence of dense riparian habitat, we concur with the peer reviewers that habitat for the species does not extend north of Nichols Road. Second, we have reviewed the map provided by peer reviewers of the field in question located west and southwest of the Unit of habitat with essential features. According to official soil survey data (United States Department of Agriculture Soil Conservation Service 1971), the soil types in this area are Garretson very fine sandy loam and Arbuckle loam. However, this area is included in our interpretation of the MSHCP Conservation Area (as described in greater detail in the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section of this final rule) and should be conserved under the MSHCP.

33. *Comment:* Two peer reviewers submitted two comments that recommended adding to the final rule that it is likely the Alberhill Creek population is larger than currently known. Additionally, the reviewer stated that information for this occurrence is limited to a few collections and no surveys of potential habitat have been conducted.

Our Response: We appreciate the peer reviewer's comment and we will take this information into account when working with the species in this area and during our MSHCP implementation processes.

Public Comments

34. *Comment:* One commenter submitted four comments that supported our decision to exclude critical habitat based on the presence of an existing HCP. The commenter stated that the MSHCP provides protection for covered species and sensitive habitats, including *Atriplex coronata* var. *notatior* and its habitat. The commenter expressed concern that the designation of critical habitat within HCP boundaries would undermine partnerships with landowners that were developed during the planning process. The commenter further stated that landowners participated in the regional MSHCP planning effort in part to prevent the inefficient and ineffective project-by-project regulation that is associated with designated critical habitat, and that designating critical habitat in this area would subject landowners to two different regulatory processes that would be a financial burden.

Our Response: As stated in the ''Exclusions Under Section 4(b)(2) of the Act'' section of the proposed rule, we agree that the MSHCP benefits the conservation of *Atriplex coronata* var. *notatior* and that the benefits of excluding lands covered under the MSHCP outweigh the benefits of including such lands. We also recognize that the designation of critical habitat may remove incentives to participate in the HCP processes, in part because of added regulatory uncertainty, increased costs to plan development and implementation, weakened stakeholder support, delayed approval and development of the plan, and greater vulnerability to legal challenge. We believe HCPs are one of the most important tools for reconciling land use with the conservation of listed species on non-Federal lands. We look forward to working with HCP applicants to ensure that their plans meet the issuance criteria and that the designation of critical habitat on lands where an HCP is in development does not delay the approval and implementation of their HCP.

35. *Comment:* One commenter submitted two comments that disagreed with our decision to exclude critical habitat based on the presence of an existing HCP. The commenter stated that all agencies are not signatories to the MSHCP, and therefore critical habitat should be identified for those projects and agencies operating outside the MSHCP. The commenter was concerned that the reason for habitat exclusions did not have a scientific basis.

Our Response: See the response to Peer Reviewer Comment 3 above.

36. *Comment:* One commenter submitted two comments stating that threats to the species were not adequately addressed in the proposed rule and the MSHCP. The commenter recommended additional discussion on the threats of manure spreading and non-seasonal flows which may result from future development.

Our Response: See the response to Peer Reviewer Comment 9 above.

37. *Comment:* One commenter stated that failure to designate critical habitat within HCP boundaries would be a disincentive to the participation of their organizations in the development of future HCPs.

Our Response: It has been our experience that many different stakeholders participate in the creation of an HCP. We appreciate the commenter's participation in HCP planning efforts and urge them to continue to participate in future HCP efforts. However, it has been our experience that the designation of critical habitat in HCP areas removes incentives for most stakeholders to participate in the HCP process due to added regulatory uncertainty, increased costs to plan development and implementation, delayed approval and development of the plan, and greater vulnerability to legal challenge.

38. *Comment:* One commenter stated that it is incumbent upon the Service to designate areas as critical habitat if they are identified as ''essential habitat,'' based on the definition of critical habitat.

Our Response: Section 4(b)(2) of the Act allows us to consider the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. Areas identified as having features essential for the conservation of the taxon may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such an area as critical habitat will result in the extinction of the species. We have determined that the benefits of exclusion of habitat with essential features covered by the MSHCP outweigh the benefits of inclusion. See ''Exclusions Under Section 4(b)(2) of the Act'' section for a detailed discussion.

In addition, the Service in this and other notices has been using the term ''essential habitat'' as shorthand for ''areas eligible for designation as critical habitat''. We recognize that this might cause confusion with the provisions of the Act that areas unoccupied at the time of listing may be designated by the Secretary as ''essential to the conservation of the species'' and so included in a critical habitat designation. The use of the term ''essential habitat'' in this and past notices is not a determination by the Service or the Secretary that this habitat is, within the terms of the Act, essential to the conservation of the species, unless the use of the term is accompanied by an express statement that the Secretary has made such a determination. In either event, however, we have authority under section 4(b)(2) of the Act to exclude any such area.

39. *Comment:* One commenter stated that the reserves proposed under the MSHCP are fragmented and the connectivity between units of habitat with essential features is lacking.

Our Response: The three Units of Habitat with Essential Features for *Atriplex coronata* var. *notatior* include areas of seasonally-flooded alkali vernal plain habitat that are currently naturally isolated from each other. The MSHCP provides for a connection through different habitat types between Units 1 and 3. Unit 2 falls within proposed MSHCP noncontiguous habitat block 7 which is not connected to the larger MSHCP Conservation Area. However, this habitat block is currently isolated from other natural areas by existing development and agricultural lands. Efforts are being made on a local level in order to prevent fragmentation of habitat within MSHCP noncontiguous habitat block 7. For example, the City of Hemet has adopted an Interim Urgency Ordinance to ensure that development efforts within the MSHCP Criteria Area are coordinated such that habitat conserved within the criteria area does not become fragmented, thereby allowing the City to meet their obligations under the MSHCP (Ordinance No. 1742).

40. *Comment:* One commenter stated that the Service should consider multiple variables (*e.g.*, life strategy, disturbance probability, potential habitat, population size, recovery from disturbance, habitat suitability, predation, and competition) when determining the size of plant conservation areas and critical habitat units. Additionally, this commenter stated that the purpose of critical habitat designation is not only to prevent extinction but to facilitate recovery, as supported by case law. The commenter stated that the critical habitat proposal failed to include areas of unoccupied suitable habitat that would provide for recovery opportunities, including

genetic exchange and migration in response to climate change.

Our Response: As described in the ''Critical Habitat'' portion of this final rule, a number of policy and regulatory guidelines and standards provide the Service with criteria, procedures, and guidance to ensure that decisions made by the Service represent the best scientific data available. They require Service biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information is generally the listing package for the species. Additional information sources include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials, expert opinions, or personal knowledge.

Section 4 of the Act requires that we designate critical habitat on the basis of what we know at the time of designation. Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery. Moreover, we believe this HCP, and HCPs generally, offer greater benefits to all aspects of the conservation of listed species, including to recovery, than a critical habitat designation. We also believe that this action complies with all applicable laws.

Public Comments on the Draft Economic Analysis

41. *Comment:* Three commenters state that the Draft Economic Analysis (DEA) quantifies costs for projects that do not contain occupied habitat for *Atriplex coronata* var. *notatior*. Two of the commenters also question why costs not related to protection of *A. coronata* var. *notatior* or its habitat are presented in Table 6 in Section 5.1.

Our Response: As described in Section 5.1, Table 6 of the DEA, past development projects outside of the footprint of the proposed critical habitat designation have impacted the species habitat within the lands proposed for designation. In this scenario, the DEA appropriately quantifies the costs of the project modifications implemented at the offsite development projects to protect the species and habitat within the proposed designation. This is consistent with the scope of analysis as described in Section 1.2: the analysis considers the cost of species and habitat conservation, not just impacts to projects located within occupied habitat.

The information on the costs of vernal pool conservation not related to protecting *Atriplex coronata* var. *notatior* or habitat are provided in Section 5.1, Table 6 as these activities provide insight into the types and costs of project modifications implemented to protect vernal pool species and habitat in general. The conservation activities and associated dollar amounts described in the table, however, are provided only for context and are not captured in the quantitative results of the DEA.

42. *Comment:* Two commenters question the framework for development effects, as discussed in Section 2.2.2.1 of the DEA. These commenters state that the DEA is an analysis of the impacts of the California Environmental Quality Act (CEQA) and the Western Riverside County MSHCP, not solely of designating critical habitat.

Our Response: Coextensive effects, as defined in Section 1.2 of the DEA, may include impacts associated with overlapping protective measures of other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. Because habitat conservation efforts affording protection to a listed species likely contribute to the efficacy of the critical habitat efforts, the impacts of these actions are considered relevant for understanding the full effect of the proposed critical habitat designation.

43. *Comment:* One commenter suggests that information on specific, planned development projects should be reviewed.

Our Response: Throughout the development of the DEA, past and current development projects within the potential critical habitat area were researched. As described in Table 6 of Section 5.1, two development projects are currently in progress and the development companies were contacted to determine the details and status of the projects. The DEA captures the impacts of mitigating these projects based on information obtained. Data are not available on all potential development projects that may occur during the 20-year forecast period; thus, the analysis estimates and applies average costs of impacts to development on a per-acre rather than per-project basis where specific information is unavailable.

44. *Comment:* Multiple comments state that the DEA fails to evaluate the cost of property for conservation acquisition or the costs of implementing and maintaining of conservation easements. Specifically, one comment asserts that the methodology used to quantify development impacts is questionable as it does not quantify the cost of purchasing reserves for the MSHCP. The comment further states that while the MSHCP reserve boundaries are not yet proposed, land will have to be purchased or obtained through mitigation dedication and projects may have to be modified to avoid impacts to vernal pools and vernal pool watersheds. The comment also states the DEA fails to analyze the potential loss of developable private lands or the potential cost of transfer of ownership of lands for mitigation.

Our Response: As acknowledged by the commenter, the MSHCP does not describe the exact location or timing of each acre of private land to be acquired for the MSHCP reserve. However, as described in Section 5.2.4.1 of the DEA, current land use and population growth rates were available from the Riverside County to spatially forecast future development within the proposed critical habitat units. Section 2.2.2.1 of the DEA describes the model applied to estimate impacts to development using these data. The DEA assumes that development is permitted in potential critical habitat areas if appropriate project modifications and/or mitigation activities are undertaken, and/or mitigation fees paid. That is, the analysis does not assume that land is lost to development, but instead that development occurs with mitigation.

Quantified mitigation efforts include the collection of a mitigation fee from future development within the boundaries of the MSHCP. These funds will be used by the County to finance the future acquisition of lands for the MSHCP reserve. The impact of these fees is captured in the DEA (Section 5.2.5). Further, as outlined in Section 5.2.2, other conservation efforts associated with development projects have been quantified in the DEA, including purchase of on-site or off-site mitigation lands through restoration and enhancement; habitat creation; purchasing preservation credits from a conservation bank; or purchasing vernal pool habitat from a private land owner and preserving wetted acreage. To account for a variety of potential mitigation ratios and mitigation measures, the DEA presents impacts of *Atriplex coronata* var. *notatior*

conservation efforts on development projects as a range. That is, the DEA reports the full range of costs associated with a combination of mitigation ratios and conservation efforts that may be recommended to offset impacts of development to the species and habitat.

45. *Comment:* One commenter states the DEA should justify why it assumes that habitat protection under the MSHCP will not affect existing development patterns. The comment also questions how the habitat with essential features will be conserved if all of the potential developments are approved.

Our Response: It is uncertain which specific areas of the habitat with essential features may be developed during the forecast period, when those areas may be developed, what mitigation would be recommended, and if the County would be interested in acquiring a portion of that area for the MSHCP reserve. By assuming that all future development is allowed in habitat areas with appropriate project modifications and/or mitigation activities, the DEA captures the cost of modifying development projects to protect the plant and its habitat.

46. *Comment:* According to one comment, the DEA fails to include impacts to the proposed expansion of the Ramona Expressway and the construction of a dam across the San Jacinto River.

Our Response: The DEA quantifies economic impacts to specific road projects where information is available (Section 6.1.1.1) and applies a generic impact estimate future road projects for periods where project-specific information is not known. California Department of Transportation (Cal Trans) was contacted during the development of the DEA to identify future transportation projects planned in and around the essential habitat areas. While the proposed expansion of the Ramona Expressway was not explicitly identified by Cal Trans as a project during its 2006–2009 planning period, the DEA captures the economic impacts associated with future project in its generic forecast of impacts to road projects generally if the Ramona Expressway expansion occurs during the 2010–2025 period.

47. *Comment:* One commenter states that the DEA fails to consider that the main purpose of the SJWA is waterfowl management. The comment further suggests that the Reserve Manager should have been contacted to determine the budget for *Atriplex coronata* var. *notatior* conservation efforts and opines that these costs should be offset by the benefits of maintaining these sites. In addition, the California Native Plant Society (CNPS) and Center for Biological Diversity (CBD) state *A. coronata* var. *notatior* conservation is not explicitly considered in the operating budget of the Wildlife Area and therefore, costs of Wildlife Area management should not be included in the DEA. The commenters further state that, while the operation of the Wildlife Area benefits some *A. coronata* var. *notatior* populations, management has also damaged the species in the past, for example, inundating habitat, which reduces the potential for recovery. The DEA fails to evaluate these damages.

Our Response: As described in Section 6.6, the DEA acknowledges that the SJWA was established as mitigation for the State Water Project, and that the primary purpose of the Wildlife Area was to conserve the floodplain ecosystem and species' habitat. In addition, the manager of the Wildlife Area was contacted regarding costs of conservation activities specifically benefiting *A. coronata* var. *notatior.* As quantified in the DEA, the SJWA spends approximately $5,000 every other year to protect vernal playa habitat. Information was also provided on the annual number of recreational user days, which were valued and used to quantify the net economic impacts of Wildlife Area management in the DEA. No information was identified regarding the impact of past damages to *A. coronata* var. *notatior* habitat resulting from Wildlife Area management. The DEA does, however, capture the costs of monitoring and maintaining the habitat, which is assumed to include avoiding such damages in the future.

48. *Comment:* Two commenters state the cost model used in the DEA to estimate the administrative cost of section 7 consultation is highly inflated.

Our Response: As described in Section 2.2 of the DEA, the cost model is based on a survey of Federal agencies and Service Field Offices across the country and the costs are believed to be representative of the typical range of costs of the section 7 consultation process. Throughout the development of the DEA, stakeholders were asked whether the range of estimated consultation costs was reasonable. In the case that stakeholders anticipated higher or lower costs, this improved information would be applied in the DEA. No stakeholders indicated, however, that the range of costs applied in the DEA was inappropriate.

49. *Comment:* A comment provided by the CNPS and CBD states that the cost estimates of species conservation as provided in the DEA conflict with the cost estimated in the Western Riverside MSHCP for this species alone, which is much less. Therefore, either the DEA or the MSHCP contain errors in its impact estimates.

Our Response: Section 8.2.1 of the MSHCP describes the costs of implementing the plan, including costs to acquire reserve lands, manage and monitor the reserve area, and general administration of the MSHCP. The County estimates these costs will total almost $1 billion during the first 25 years of the MSHCP. This impact estimate, however, is not directly comparable to that in the DEA as the policy actions being analyzed are different. The MSHCP estimates the cost of acquiring and managing its reserve area and conservation actions for the multiple species covered under the plan. Further, the geographic scope of the MSHCP and the potential critical habitat for *A. coronata* var. *notatior* are different.

50. *Comment:* Two commenters question the use of ''low income farmers'' as an example of a group that may be adversely affected by species conservation in Section 1.1. Another comment states that the report appears biased because it implies that low income farmers are the principal landowners within the habitat with essential features being reviewed, and that the report does not provide a review of the economic status of the private landowners in the affected areas.

Our Response: The DEA considers the status of public and private land ownership; however, the identity of every private landowner within the 15,232 acres of essential habitat is unknown. As described in Section 6.8, approximately one-half of all habitat with essential features is classified as agriculture land, and this agriculture land represents 60 percent of the developable acres. Considering farmers comprise a large percentage of landowners within the habitat with essential features and developable land, the use of farmers as an example of a group of individuals that could be impacted in Section 1.1 is considered appropriate.

51. *Comment:* One commenter requests that more detail be provided on local regulations that protect *A. coronata* var. *notatior* within the County.

Our Response: Section 4 of the DEA includes discussion of the relevant Federal, State, and local regulations that provide protection to the species and its habitat.

52. *Comment:* One commenter states that the description of the Clean Water Act in Section 4.2.1 does not include

the proposed Special Area Management Plan (SAMP) for the San Jacinto River watershed.

Our Response: Section 4.0 provides a summary of important regulations that provide protection for the plant and its habitat but does not provide an exhaustive list of all regulatory protection. The proposed SAMP may streamline the Section 404 permitting process in the future, but it is not expected to influence the types of project modifications and mitigation implemented to protect *A. coronata* var. *notatior* and its habitat as quantified in the DEA.

53. *Comment:* Four commenters stated that the DEA should include an analysis of benefits, such as flood protection, watershed management, and open space. The commenters further stated that there is a benefit of having critical habitat in place should the Western Riverside MSHCP falter in its conservation mandate. Two of the commenters also stated the DEA fails to consider non-market values. One comment noted that large portions of the existing occupied habitat outside of the San Jacinto Valley Wildlife Area are being disked and that this will result in considerable costs to restore the habitat for this species. Thus, the beneficial costs of extant habitat that will not require restoration should be carefully evaluated.

Our Response: In the context of a critical habitat designation, the primary purpose of the rulemaking is to designate areas in need of special management that are essential to the conservation of listed species.

The designation of critical habitat may result in two distinct categories of benefits to society: (1) Use; and (2) non-use benefits. Use benefits are simply the social benefits that accrue from the physical use of a resource. Visiting critical habitat to see endangered species in their natural habitat would be a primary example. Non-use benefits, in contrast, represent welfare gains from ''just knowing'' that a particular listed species' natural habitat is being specially managed for the survival and recovery of that species. Both use and non-use benefits may occur unaccompanied by any market transactions. In addition, there is no general agreement on how to value ''just knowing'' benefits.

A primary reason for conducting this analysis is to provide information regarding the economic impacts associated with a proposed critical habitat designation. Section 4(b)(2) of the Act requires the Secretary to designate critical habitat based on the best scientific data available after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. Economic impacts can be both positive and negative and by definition, are observable through market transactions.

Where data are available, this analysis attempts to recognize and measure the net economic impact of the proposed designation. For example, if the fencing of a species' habitat to restrict motor vehicles results in an increase in the number of individuals visiting the site for wildlife viewing, then the analysis would recognize the potential for a positive economic impact and attempt to quantify the effect (*e.g.*, impacts that would be associated with an increase in tourism spending by wildlife viewers). In this particular instance, the DEA quantified the net economic impact of the proposed designation taking into account additional recreation activities. This is described in Section 6.6 (CDFG, San Jacinto Wildlife Area) of the DEA.

While the Act requires us to specifically consider the economic impact of a designation, it does not require us to explicitly consider in economic terms, or in an economic analysis, any broader social benefits (or costs) that may be associated with the designation where these are not readily monetized.

54. *Comment:* Four commenters stated that costs should be allocated among all the threatened and endangered species that benefit from the efforts.

Our Response: Coextensive effects as quantified in the DEA may also include impacts associated with overlapping protective measures of other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. We note that in past instances, some of these measures have been precipitated by the listing of the species and impending designation of critical habitat. Because habitat conservation efforts affording protection to a listed species likely contribute to the efficacy of the critical habitat designation efforts, the impacts of these actions are considered relevant for understanding the full effect of the proposed critical habitat designation. Enforcement actions taken in response to violations of the Act, however, are not included.

55. *Comment:* Two commenters stated that the DEA does not make a distinction between the cost of listing the species under the ESA versus the cost of designating critical habitat.

Our Response: This analysis identifies those economic activities believed to be most likely to threaten *Atriplex coronata* var. *notatior* and its habitat and, where possible, quantifies the economic impact to avoid, mitigate, or compensate for such threats within the boundaries of the essential habitat area. In instances where critical habitat is being proposed after a species is listed, some future impacts may be unavoidable, regardless of the final designation and exclusions under 4(b)(2). However, due to the difficulty in making a credible distinction between listing and critical habitat effects within critical habitat boundaries, this analysis considers all future conservation-related impacts to be coextensive with the designation.

56. *Comment:* Four commenters suggested that the economic analysis should be limited to the proposed critical habitat designation, zero acres, rather than the 15,232 acres of essential habitat, which comprise lands excluded from designation.

Our Response: In the proposed critical habitat rule we considered 15,232 acres of habitat essential for *Atriplex coronata* var. *notatior*, but we excluded that habitat from designation due to the presence of an existing habitat conservation plan under section 4(b)(2) of the Act. However, we recognized that we might receive comments on the proposed rule that would cause us to reassess our exclusions, and for this reason we conducted an economic analysis on the essential habitat. In addition, the Act requires us to consider economic impacts. The fact that we have proposed in advance to exclude areas for other reasons does not exempt us from this requirement.

57. *Comment:* Three commenters submitted requests that the 14 day comment period on the Draft Economic Analysis be extended to 30 or 60 days and four commenters stated that the Service did not offer a reasonable time period for review of the Draft Economic Analysis.

Our Response: We were unable to extend the comment period on the Draft Economic Analysis due to the lawsuit settlement deadline for the publication of the final critical habitat rule.

58. *Comment:* Two commenters stated that the essential habitat areas are not protected by the MSHCP but are within the MSHCP Criteria Area which directs potential conservation. They further stated that a full year after the issuance of the section 10(a)(1)(B) permit for the MSHCP, manure dumping and habitat conversion such as sod farming, continues to directly impact the species.

Our Response: The MSHCP is a large and complex habitat conservation plan, and its implementation is expected to take time. In its first year of

implementation, the MSHCP has already resulted in conservation and management actions that address threats to *Atriplex coronata* var. *notatior* on private lands. We address this issue further under the ''Special Management Considerations or Protections'' section of this final rule.

59. *Comment:* One commenter stated that although the Service mapped 15,232 acres of essential habitat for the species, the MSHCP proposes the conservation of only 6,900 acres of suitable habitat for the species. Moreover, our essential habitat coincided with the lands already conserved (Public/Quasi-Public Lands (PQP) and lands to be conserved (conceptual reserve design) under the MSHCP. The watershed lands in Salt Creek identified as essential habitat are expected to be developed and the MSHCP provides guidelines to maintain water quality and quantity to occupied seasonal wetlands. Thus, there is not a conflict between the proposed conservation of *Atriplex coronata* var. *notatior* under the MSHCP and the essential habitat identified in the proposed rule for the following reasons: (1) Although we did not use the habitat model used in the MSHCP, all essential habitat is protected by the MSHCP; (2) the 6,900 acres of suitable habitat for *Atriplex coronata* var. *notatior* is embedded within the much larger MSHCP Conservation Area; (3) approximately 77 percent of the essential habitat for *Atriplex coronata* var. *notatior* (11,760 acres of the 15,232 acres of essential habitat) would be protected on existing PQP lands and conceptual reserve design lands within the Western Riverside County MSCHP at San Jacinto River, Mystic Lake, Salt Creek, and Alberhill Creek, and (4) approximately 23 percent of the essential habitat (3,473 ac, 1405 ha) provides the watershed for the MSHCP Conservation Area at Unit 2. These watershed lands are not part of the MSHCP Conservation Area and are not known to be occupied by *A. coronata* var. *notatior*. The MSHCP species-specific Objectives for *A. coronata* var. *notatior* and the Guidelines Pertaining to the Urban/Wildlands Interface will ensure that floodplain processes will be maintained and the quantity and quality of runoff discharged to the MSHCP Conservation Area will not be altered in an adverse way when compared with existing conditions such that the essential functions and values that these watershed areas provide for the species will be maintained.

Our Response: When we mapped essential habitat for *Atriplex coronata* var. *notatior*, we did not use the habitat model used in the MSHCP for the species. The MSHCP defines suitable habitat for the species as consisting of grasslands on alkali soils, playas, and vernal pools within the Mystic Lake, San Jacinto River, and Salt Creek areas. When we mapped essential habitat for the species, we looked at habitat as described in the primary constituent elements of this rule, and our essential habitat includes watershed areas that were not captured in the MSHCP's definition of suitable habitat for *Atriplex coronata* var. *notatior*.

60. *Comment:* One commenter stated that in the MSHCP's proposal to conserve 6,900 acres of suitable habitat for the species, there is no consideration of conserving occupied versus potential habitat and asked for an explanation of how the MSHCP will conserve essential habitat for the species.

Our Response: MSHCP species-specific objective 2 for *Atriplex coronata* var. *notatior* requires that the locality at Alberhill creek and the three Core Areas for the species located along the San Jacinto River from the vicinity of Mystic Lake southwest to the vicinity of Perris and in the upper Salt Creek drainage west of Hemet, be included within the MSHCP Conservation Area. For further explanation of how the MSHCP will conserve essential habitat for the species, see the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section below.

61. *Comment:* One commenter expressed concern that the Conservation Areas are the only areas that will be conserved through the MSHCP and that all habitat enhancement, revegetation, and restoration will occur only within these areas.

Our Response: The ''Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools'' and ''Additional Survey Needs and Procedures'' sections of the MSHCP may result in additional conservation and habitat enhancement, revegetation, and restoration for *Atriplex coronata* var. *notatior*. To date, these policies have resulted in the submittal of two DBESPs that will result in conservation and restoration activities that may benefit *A. coronata* var. *notatior* (Lockhart 2004; LSA Associates Inc. 2005). For these two projects, the DBESPs propose to introduce the species into restored and created vernal pool habitat north of the upper Salt Creek populations once initial success criteria have been met, even though the proposed actions that resulted in impacts to vernal pool habitat did not directly affect *A. coronata* var. *notatior*.

Summary of Changes From Proposed Rule

We have reviewed public comments received on the proposed designation of critical habitat for *Atriplex coronata* var. *notatior* and the related draft economic analysis. While we have made no major changes to the rule, we have made a minor administrative change: Instead of adding text pertaining to *A. coronata* var. *notatior* to 50 CFR 17.97 as proposed, we are adding text to 50 CFR 17.96 instead. Since publication of the proposed rule, we have used § 17.97 for a different purpose. Consistent with the proposed rule, no lands are being designated as critical habitat for *A. coronata* var. *notatior* because all habitat with features essential to the conservation of this taxon are within the conservation area of the approved Western Riverside MSHCP, and are excluded pursuant to section 4(b)(2) of the Act. However, we have incorporated detailed information on the MSHCP and its associated documents as they relate to *A. coronata* var. *notatior* into this rule under the section titled ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan.''

Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. ''Conservation'' means the use of all methods and procedures that are necessary to bring an endangered or a threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through the prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 requires consultation on Federal actions that are likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such

designation does not allow government or public access to private lands.

To be included in a critical habitat designation, the habitat within the area occupied by the species must first have features that are ''essential to the conservation of the species.'' Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species (*i.e.*, areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)).

Habitat occupied at the time of listing may be included in critical habitat only if the essential features thereon may require special management or protection. Thus, we do not include areas where existing management is sufficient to conserve the species. (As discussed below, such areas may also be excluded from critical habitat pursuant to section 4(b)(2).) Accordingly, when the best available scientific data do not demonstrate that the conservation needs of the species so require, we will not designate critical habitat in areas outside the geographic area occupied by the species at the time of listing. An area currently occupied by the species but was not known to be occupied at the time of listing will likely be considered essential to the conservation of the species and, therefore, included in the critical habitat designation.

Our Policy on Information Standards Under the Endangered Species Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), and Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (P.L. 106–554; H.R. 5658) and the associated Information Quality Guidelines issued by the Service, provide criteria, establish procedures, and provide guidance to ensure that decisions made by the Service represent the best scientific data available. They require Service biologists to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat. When determining which areas are critical habitat, a primary source of information is generally the listing package for the species. Additional information sources include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge. All information is used in accordance with the provisions of Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (P.L. 106–554; H.R. 5658) and the associated Information Quality Guidelines issued by the Service.

Section 4 of the Act requires that we designate critical habitat on the basis of what we know at the time of designation. Habitat is often dynamic, and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for recovery.

Areas that support populations, but are outside the critical habitat designation, will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best available information at the time of the action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Methods

As required by section 4(b)(1)(A) of the Act, we used the best scientific data available in determining those areas that contain the features essential to the conservation of *Atriplex coronata* var. *notatior*. We utilized data and information contained in, but not limited to, the proposed critical habitat rule (69 FR 59844), the proposed listing rule (59 FR 64812), the final listing rule (63 FR 54975), CNDDB, reports submitted by biologists holding section 10(a)(1)(A) recovery permits, reports and documents on file in the Service's field offices, and communications with experts outside the Service who have extensive knowledge of the species and its habitat. Additionally, we used information contained in comments received by December 6, 2004, which were submitted on the proposed critical habitat designation (69 FR 59844), and comments received by September, 14, 2005, submitted on the draft economic analysis (70 FR 51739).

After all the information about the known occurrences of *Atriplex coronata* var. *notatior* was compiled, we created maps indicating the habitat areas with essential features associated with each of the occurrences. We used the information outlined above to aid in this task. Theses areas were mapped using GIS and refined using topographical and aerial map coverages. These areas were further refined by discussing each area with Service biologists familiar with each area, and by site visits to all three areas. After creating GIS coverage of the areas, we created legal descriptions of those areas. We used a 100-meter grid to establish Universal Transverse Mercator (UTM) North American Datum 27 (NAD 27) coordinates which, when connected, provided the boundaries of the areas.

Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, in determining which areas to propose as critical habitat, we are required to base critical habitat determinations on the best scientific data available and to consider those physical and biological features (primary constituent elements (PCEs)) that are essential to the conservation of the species, and that may require special management considerations and protection. These include, but are not limited to: space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; and habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The biological and physical features which are essential to the conservation of *Atriplex coronata* var. *notatior, i.e.,* the PCEs, are based on specific components that provide for the essential biological requirements of the species as described below.

Space for Individual and Population Growth, and for Normal Behavior

Atriplex coronata var. *notatior* occupies seasonally-flooded alkali vernal plain habitat, which includes alkali playa, alkali scrub, alkali vernal pool, and alkali annual grassland components (Interface Between Ecology and Land Development in California 1993, Service 1994, Madrono 1996). The species occurs in areas where this habitat is associated with the Willows soil series, and to a lesser extent, the

Domino, Traver, Waukena, and Chino soils series (Service 1994, Knecht 1971). Seasonal wetlands that the species occupies are dependent upon adjacent transitional wetlands and marginal wetlands within the watershed (Service 1994). These areas do not occur in great abundance, and in recent years have been degraded and lost to agriculture, soil chemistry alteration resulting from the dumping of manure, discing for fire prevention, off-road vehicle use, grazing, flood control projects, and development, including pipeline projects, transportation projects, and residential development projects (Service 1994).

The four locations where the taxon is known to occur are no longer pristine and undisturbed. However, the wetlands and associated hydrology continue to provide essential biological and physical features necessary for this taxon at all four locales. All remaining occurrence complexes have been impacted by agricultural activities (Bramlet 1993, CNDDB 2003, Roberts and McMillan 1997, Service 1998). The taxon is also affected by nonagricultural related clearing activities (Bramlet 1993, CNDDB 2003, Roberts and McMillan 1997, Service 1998). Farming continues today on a portion of the lands that make up the SJWA. The occurrence complex that occupies the floodplain of the San Jacinto River between the Ramona Expressway and the mouth of Railroad Canyon has been severely degraded during recent years by soil chemistry alteration resulting from the dumping of manure (Roberts 2003 and 2004). Habitat at the Salt Creek Vernal Pool Complex has been degraded as a result of dry land farming. Finally, the occurrence within the Alberhill Creek floodplain is adjacent to a plowed field. This population may have previously extended into the adjacent agricultural area. Additionally, the population may be affected by agricultural runoff and sediment.

Atriplex coronata var. *notatior* can persist in the seed bank within disturbed lands, including agricultural areas. Therefore, the species is expected to re-establish itself from the seed bank once lands are restored. Restoration of these disturbed areas is necessary for the conservation of this taxon.

Water and Physiological Requirements

Atriplex coronata var. *notatior* requires a hydrologic regime that includes sporadic flooding in combination with slow drainage in alkaline soils and habitats. The duration and extent of flooding or ponding can be extremely variable from one year to the next. Both localized and large-scale flooding are important to the survival of *A. coronata* var. *notatior.*

Local flooding occurs on a seasonal basis and large-scale flooding occurs less frequently, approximately every 20 to 50 years (Roberts 2004). *Atriplex coronata* var. *notatior* occupies the margins of flooded areas on dry mounds and banks within seasonally-flooded alkali vernal plain habitat. This annual species may be abundant during average and dry years due to the increased presence of floodplain margins. However, alkali scrub habitat expands and crowds out habitat for annuals such as *A. coronata* var. *notatior* under normal circumstances (Roberts 2004, Bramlet 2004).

When large-scale flooding occurs, standing and slow moving water is present for weeks or months and results in the death of submerged alkali scrub. Large-scale flooding will also naturally restore areas that have been degraded by discing or other activities. Because *Atriplex coronata* var. *notatior* occupies the margins of flooded areas, populations may be reduced during very wet years when most of the species habitat is underwater (Bramlet 2004). However, large-scale flooding is essential to the continued survival of the species due to its ability to restore and maintain this habitat in a successional state. Irreversible actions that alter the hydrology of the seasonal wetlands or infringe upon the wetlands may threaten the survival of *A. coronata* var. *notatior.*

All four occurrence complexes rely on seasonal localized flooding and ponding from surrounding watershed areas (Roberts 2004, Bramlet 2004). Less frequent large-scale flooding is provided by the San Jacinto River at the SJWA/Mystic Lake occurrence complex and the occurrence complex located between the Ramona Expressway and the mouth of Railroad Canyon. Alberhill Creek would provide large-scale flooding for the occurrence complex at that location. Finally, the Upper Salt Creek Vernal Pool Complex is in a natural depression where rainfall from the surrounding area flows across the land and pools within the complex, in addition to flooding received from an unnamed tributary to Salt Creek. While some of the localized flooding for the Upper Salt Creek Vernal Pool Complex comes from undeveloped hillsides, much of the watershed has been developed, and the flows traveling to the vernal pools include a large amount of urban runoff. The maintenance of clean, seasonal flows from the surrounding watershed, as well as natural floodplain processes, is necessary for the conservation of all four occurrence complexes.

Sites for Reproduction, Germination, and Seed Dispersal

Both localized and large-scale flooding are important to the reproduction, germination, and seed dispersal of *Atriplex coronata* var. *notatior* (Roberts 2004, Bramlet 2004). *A. coronata* var. *notatior* produces floating seeds (A. Sanders, June 4, 2004, University of California, Riverside, pers. comm. to S. Brown, USFWS) that are likely dispersed during local and large scale flooding by slow-moving flows within the floodplains and vernal pools where the species occurs. Natural floodplain processes are integral to the biotic processes this species uses to disperse and reproduce.

Local flooding allows for the distribution and germination of seeds within a localized area. Large scale flooding widely distributes seed of *Atriplex coronata* var. *notatior,* allowing the taxon to colonize favorable sites and retreat from less favorable sites in response to disturbance and variations in annual rainfall (Service 1994, Roberts 2004, Bramlet 2004). Natural hydrological processes must be maintained in these areas to allow for the reproduction and dispersal of the species.

Primary Constituent Elements for Atriplex coronata var. notatior

Based on our current knowledge of the life history, biology, and ecology of the taxon and the requirements of the habitat to sustain the essential life history functions of the species, we have determined that *Atriplex coronata* var. *notatior's* primary constituent elements are:

(1) Seasonal wetlands, including floodplains and vernal pools, and the natural hydrologic processes upon which these areas depend;

(2) Natural communities, including seasonally-flooded alkali vernal plain, alkali playa, alkali scrub, and alkali grassland, within which the taxon is known to occur; and,

(3) Slow-draining alkali soils with a hard pan layer that provides for a perched water table, including the Willows, Domino, Traver, Waukena, and Chino Soils Series.

Criteria Used To Identify Habitat Areas With Essential Features

In our proposed critical habitat designation (69 FR 59844), we delineated three Units of habitat with features essential to the conservation of *Atriplex coronata* var. *notatior* encompassing the four occurrence

complexes where the taxon is known to occur. These Units encompass a total of approximately 15,232 ac (6,167 ha) of habitat.

All four of the occurrence complexes are within the geographic area occupied by the species, are known to have been occupied at the time of listing, and contain one or more PCEs (*e.g.*, soil type, habitat type). The four occurrence complexes are: (1) Floodplain of the San Jacinto River at the SJWA/Mystic Lake; (2) Floodplain of the San Jacinto River between the Ramona Expressway and Railroad Canyon Reservoir; (3) Upper Salt Creek Vernal Pool Complex; and (4) Alberhill Creek. Each of these four occurrence complexes is essential to the conservation of the species, although not all known populations within these complexes are considered essential to the conservation of the species. We included those populations which are considered essential to the conservation of the species within the essential habitat units delineated in the proposed critical habitat designation (69 FR 59844). The significance of each occurrence complex is described in detail in the proposed rule (69 FR 59844).

These complexes are mapped as three Units in Map 1 in the proposed rule (69 FR 59844): Unit 1—San Jacinto River; Unit 2—Salt Creek (Hemet); and Unit 3—Alberhill. *Unit 1—San Jacinto River* includes the first two occurrence complexes (the floodplain of the San Jacinto River at the San Jacinto Wildlife Area/Mystic Lake and the floodplain of the San Jacinto River between the Ramona Expressway and Railroad Canyon Reservoir) and comprises 12,046 acres, 6,535 ac (2,645 ha) of which are privately owned and 5,511 ac (2,230 ha) of which are owned by the California Department of Fish and Game. *Unit 2—Salt Creek (Hemet)* includes the third occurrence complex (Upper Salt Creek Vernal Pool Complex) and comprises 3,154 ac (1,277 ha), all of which are privately owned. *Unit 3—Alberhill* includes the fourth occurrence complex and comprises 32.3 ac (13.1 ha), all of which are privately owned.

Special Management Considerations or Protections

When designating critical habitat, we assess whether the areas determined to be occupied at the time of listing and contain the primary constituent elements may require special management considerations or protections. Within the areas of habitat with essential features occupied by *Atriplex coronata* var. *notatior,* we believe special management considerations or protections may be needed to maintain the physical and biological features that the species requires. Threats to the species habitat include habitat destruction and fragmentation resulting from urban and agricultural development, manure dumping, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, off-road vehicle activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from non-native plant species (Bramlet 1993, Roberts and McMillan 1997, Service 1998). Each of these threats render the habitat less suitable for *A. coronata* var. *notatior,* and special management may be needed to address them.

The occurrence complex that occupies the floodplain of the San Jacinto River between the Ramona Expressway and Railroad Canyon Reservoir is threatened by non-agriculture related clearing, agricultural activity, including irrigated crops and alfalfa farming, and a proposed flood control project (Bramlet 1996, Roberts and McMillan 1997, Dudek and Associates 2003). The occurrence complex that occupies the San Jacinto Wildlife Area/Mystic Lake is threatened by invasive and weedy plant species introduced as food sources for waterfowl and also remaining from historical agricultural production (Bramlet 1996). Alteration of habitat for duck ponds (Roberts and McMillan 1997) and off-road vehicle activity (CNDDB 2003) are also management concerns in this area. The occurrence complex located within the Salt Creek Vernal Pool Complex is threatened by agricultural activities, including dry-land farming, weed abatement and fire suppression practices, grazing, invasion of non-native plant species, alteration of hydrology, fragmentation, and a proposed road realignment project (CNDDB 2003, Bramlet 1996, Roberts and McMillan 1997, Dudek and Associates 2003). The occurrence complex at Alberhill Creek is located in a rapidly urbanizing area and is subject to the threat of increased human-associated disturbance. Actions that alter habitat suitable for the species or affect the natural hydrologic processes upon which the species depends could threaten the species in this area.

In our proposed critical habitat designation (69 FR 59844), we delineated essential habitat units to provide for the conservation of *Atriplex coronata* var. *notatior* at the four occurrence complexes where it is known to occur. These essential areas total approximately 15,232 ac (6,167 ha) of habitat. Although all four complexes are considered essential to the conservation of *A. coronata* var. *notatior,* not all known populations within these complexes are considered essential to the conservation of the species. We included those populations which are considered essential to the conservation of the species within the essential habitat units delineated in the proposed critical habitat designation (69 FR 59844).

Section 10(a)(1)(B) of the Act authorizes us to issue permits for the take of listed species incidental to otherwise lawful activities. An incidental take permit application must be supported by an HCP that identifies conservation measures that the permittee agrees to implement for the species to minimize and mitigate the impacts of the requested incidental take. We often exclude non-Federal public lands and private lands that are covered by an existing operative HCP and executed IA under section 10(a)(1)(B) of the Act from designated critical habitat because the benefits of exclusion outweigh the benefits of inclusion as discussed in section 4(b)(2) of the Act.

The Western Riverside MSHCP species specific conservation objectives and written criteria provide for the conservation of the species within all four delineated essential habitat units. Therefore, no lands are being designated as critical habitat for this species. Please refer to the proposed rule (69 FR 59844) for details on how we determined the boundaries of the essential habitat units. Peer Reviewers provided comments regarding their recommendations for revisions to the essential habitat unit boundaries during the public comment period for this final rule. We have addressed their recommendations in the ''Peer Reviewer Comments'' section of this final rule and incorporated their recommendations throughout the rule as appropriate.

Permittees under the Western Riverside MSHCP are obligated to adopt and maintain ordinances or resolutions as necessary, and amend their general plans as appropriate, to implement the requirements and to fulfill the purposes of the MSHCP and its associated IA and Permit (see IA for the MSHCP, page 41). In its first year of implementation, the MSHCP has already resulted in conservation and management actions that address threats to *Atriplex coronata* var. *notatior* on private lands. For example, the City of Hemet has adopted two ordinances that have halted manure dumping within the City, and allowed the conditioning and coordination of development efforts such that habitat necessary for the conservation of

MSHCP Covered Species within the Criteria Area is protected and will not become fragmented (Ordinance No. 1666 and Ordinance No. 1742). For further information on management actions proposed for *A. coronata* var. *notatior* under the MSHCP see the ''Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan'' section below.

Critical Habitat Designation

We evaluated all 3 Units (four occurrence complexes) with features essential for the conservation of *Atriplex coronata* var. *notatior* for exclusion from critical habitat pursuant to section 4(b)(2) of the Act. All three Units are within the conservation area of the approved Western Riverside MSHCP in Riverside County. On the basis of our evaluation of the conservation measures afforded *A. coronata* var. *notatior* under the MSHCP, we have concluded that the benefit of excluding the lands covered by this MSHCP outweighs the benefit of including them as critical habitat (see discussion in section entitled ''Exclusions Under Section 4(b)(2) of the Act''). Thus, we are excluding the lands covered by this MSHCP from the designation of critical habitat for this taxon, pursuant to section 4(b)(2) of the Act. Because we have excluded all areas of habitat with essential features from the proposal, we are designating zero acres (0 ac) (0 ha) of critical habitat in this final rule for *A. coronata* var. *notatior.*

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7 of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. In our regulations at 50 CFR 402.2, we define destruction or adverse modification as ''a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to: Alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.'' The Service uses the guidance issued in the Director's December 9, 2004, memorandum when making adverse modification determinations under section 7 of the Act.

Section 7(a) of the Act requires Federal agencies, including the Service, to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened and with respect to its critical habitat, if any is proposed or designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402.

Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the agency in eliminating conflicts that may be caused by the proposed action. We may issue a formal conference report if requested by a Federal agency. Formal conference reports on proposed critical habitat contain an opinion that is prepared according to 50 CFR 402.14, as if critical habitat were designated. We may adopt the formal conference report as the biological opinion when the critical habitat is designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)). The conservation recommendations in a conference report are advisory.

If a species is listed or critical habitat is designated, section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Through this consultation, the action agency ensures that their actions do not destroy or adversely modify critical habitat.

When we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. ''Reasonable and prudent alternatives'' are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request reinitiation of consultation or conference with us on actions for which formal consultation has been completed, if those actions may affect designated critical habitat or adversely modify or destroy proposed critical habitat.

Federal activities that may affect *Atriplex coronata* var. *notatior* will continue to require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act, a section 10(a)(1)(B) permit from the Service, or some other Federal action, including funding (e.g., Federal Highway Administration or Federal Emergency Management Agency funding), will also continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat and actions on non-Federal and private lands that are not federally funded, authorized, or permitted do not require section 7 consultation.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation. However, no lands are being designated as critical habitat for *Atriplex coronata* var. *notatior* because all habitat areas with essential features are within the conservation area of the approved Western Riverside MSHCP.

If you have questions regarding whether specific activities would require consultation under section 7 of the Act, contact the Field Supervisor, Carlsbad Fish and Wildlife Office (see **ADDRESSES** section). Requests for copies of the regulations on listed wildlife and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Portland Regional Office, 911 NE. 11th Avenue, Portland, OR 97232 (telephone 503/231–6131; facsimile 503/231–6243).

Exclusions Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data available after taking into consideration the economic impact, impact on national security, and any other relevant impact, of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of such exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species. Consequently, we may exclude an area from critical habitat based on economic impacts, impacts on national security, or other relevant impacts such as preservation of conservation partnerships, if we determine the benefits of excluding an area from critical habitat outweigh the benefits of including the area in critical habitat, provided the action of excluding the area will not result in the extinction of the species.

Relationship of Critical Habitat to the Western Riverside Multiple Species Habitat Conservation Plan

We are excluding critical habitat from approximately 15,232 ac (6,167 ha) of non-Federal lands within the Western Riverside County MSHCP under section 4(b)(2) of the Act. *Atriplex coronata* var. *notatior* is a covered species under the Western Riverside County MSHCP. We completed our section 7 consultations on the issuance of the section 10(a)(1)(B) permit for the Western Riverside County MSHCP on June 22, 2004. This approved and legally operative HCP provides special management and protection for the physical and biological features essential for the conservation of *A. coronata* var. *notatior* that exceed the level of regulatory control that would be afforded this species by the designation of critical habitat. We have determined that the benefits of excluding critical habitat within this HCP from the critical habitat designation will outweigh the benefits of including them as critical habitat and this exclusion will not result in the extinction of *A. coronata* var. *notatior*.

Below we first provide general background information on the Western Riverside County MSHCP, followed by an analysis pursuant to section 4(b)(2) of the Act of the benefits of including HCP lands within the critical habitat designation, an analysis of the benefits of excluding HCP lands, and an analysis of why we believe the benefits of exclusion are greater than the benefits of inclusion. Finally, we provide a determination that exclusion of the HCP lands will not result in extinction of *Atriplex coronata* var. *notatior*.

The Western Riverside County MSHCP establishes a multiple species conservation program to minimize and mitigate the expected loss of habitat values and, with regard to ''covered'' animal species, the incidental take of such species. The MSHCP Plan Area encompasses approximately 1.26 million ac (509,900 ha) in western Riverside County, including the entire range of *Atriplex coronata* var. *notatior*, which is a covered species under this plan. The Western Riverside County MSHCP is a subregional plan under the State's Natural Communities Conservation Plan (NCCP) and was developed in cooperation with the California Department of Fish and Game. The Service concluded that the MSHCP would not jeopardize the continued existence of *Atriplex coronata* var. *notatior* in its Biological and Conference Opinion (Service 2004).

The MSHCP has five species-specific conservation objectives to conserve and monitor *Atriplex coronata* var. *notatior* populations: (1) Include within the MSHCP Conservation Area at least 6,900 acres of suitable habitat (grassland and playas and vernal pools within the San Jacinto River, Mystic Lake and Salt Creek portions of the MSHCP Conservation Area); (2) include within the MSHCP Conservation Area the Alberhill Creek locality as well as the three Core Areas, located along the San Jacinto River from the vicinity of Mystic Lake southwest to the vicinity of Perris and in the upper Salt Creek drainage west of Hemet; (3) conduct surveys for *Atriplex coronata* var. *notatior* as part of the project review process for public and private projects within the Criteria Area where suitable habitat is present. *Atriplex coronata* var. *notatior* located as a result of survey efforts shall be conserved in accordance with procedures described within the MSHCP; (4) include within the MSHCP Conservation Area the floodplain along the San Jacinto River consistent with Objective 1. Floodplain processes will be maintained along the river in order to provide for the distribution of the species to shift over time as hydrologic conditions and seed bank sources change; and (5) include within the MSHCP Conservation Area the floodplain along Salt Creek generally in its existing condition from Warren Road to Newport Road and the vernal pools in Upper Salt Creek west of Hemet. Floodplain processes will be maintained in order to provide for the distribution of the species to shift over time as hydrologic conditions and seed bank sources change.

Approximately 77 percent of the essential habitat for *Atriplex coronata* var. *notatior* (11,760 acres of the 15,232 acres of essential habitat) would be protected on existing Public/Quasi-Public Lands (PQP) lands and conceptual reserve design lands within the Western Riverside County MSCHP (MSHCP Conservation Area) (see objectives 1 and 2). This essential habitat is located at Alber Hill Creek, San Jacinto Wildlife Area, along the floodplain of the San Jacinto River, and upper Salt Creek west of Hemet and includes many occurrences of *A. coronata* var. *notatior* (see objectives 1, 2 and 4). The assembly of the MSHCP Conservation Area is anticipated to occur over the life of the permit. The MSHCP also includes monitoring and management requirements for *A. coronata* var. *notatior*. Known localities within the MSHCP Conservation Area will be monitored every eight years. Under the MSHCP, reserve managers are responsible for the maintenance and enhancement of floodplain processes on the San Jacinto River and Upper Salt Creek. Particular management emphasis will be given to preventing alteration of hydrology and floodplain dynamics, farming, fire and fire suppression activities, off-road vehicle use, and competition from non-native plant species. Thus, a significant amount of essential habitat and occurrences of *Atriplex coronata* var. *notatior* are expected to be conserved and managed in the MSHCP Conservation Area.

Approximately 14 percent of the essential habitat (2,202 acres of the 15,232 acres of essential habitat) provides the watershed for the MSHCP Conservation Area at upper Salt Creek west of Hemet. These watershed lands are not part of the MSHCP Conservation Area and are not known to be occupied by *Atriplex coronata* var. *notatior*. The Guidelines Pertaining to the Urban/Wildlands Interface is to ensure that the quantity and quality of runoff discharged to the MSHCP Conservation Area is not altered in an adverse way when compared with existing conditions. The function of these lands would be to maintain the quantity and quality of runoff discharged to the MSHCP Conservation Area. While these lands are expected to be developed, this guideline would ensure that future urbanization would maintain the existing water quality and quantity needed to sustain the seasonal wetlands occupied by *Atriplex coronata* var. *notatior*.

Numerous processes are incorporated into the MSHCP that allow for Service oversight of MSHCP implementation. These processes include (1) annual reporting requirements; joint review of projects proposed within the Criteria Area; participation on the Reserve Management Oversight Committee; and a Reserve Assembly Accounting Process which will be implemented to ensure that conservation of lands occurs in rough proportionality to development, are assembled in the configuration as generally described in the MSHCP, and that conservation goals and objectives are being achieved. The Service is also responsible for reviewing Determinations of Biologically Equivalent or Superior Preservation that are proposed under the Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools policy and for reviewing minor amendment projects, such as the State Route 79 Realignment project and the San Jacinto River Flood Control project, for consistency with the requirements of the MSHCP.

Thus, the Western Riverside County MSHCP provides significant conservation benefits to *Atriplex coronata* var. *notatior.* These benefits include a MSHCP Conservation Area that protects a significant percentage of the essential habitat and occurrences for *Atriplex coronata* var. *notatior* and long-term management of the preserve areas. The MSHCP also provides avoidance and minimization measures, under the Guidelines Pertaining to the Urban/Wildlands Interface that provide benefits to the species and watershed for *Atriplex coronata* var. *notatior.* Finally, the MSHCP provides oversight to ensure effective implementation.

(1) Benefits of Inclusion

Overall, we believe that there is minimal benefit from designating critical habitat for *Atriplex coronata* var. *notatior* within the Western Riverside County MSHCP because, as explained above, these lands are already managed or will be managed for the conservation of *Atriplex coronata* var. *notatior.* Below we discuss benefits of inclusion of these HCP lands.

A benefit of including an area within a critical habitat designation is the protection provided by section 7(a)(2) of the Act that directs Federal agencies to ensure that their actions do not result in the destruction or adverse modification of critical habitat. The designation of critical habitat and the analysis to determine if the proposed Federal action may result in the destruction or adverse modification of critical habitat for *Atriplex coronata* var. *notatior* may provide a different level of protection under section 7(a)(2) of the Act that is separate from the obligation of a Federal agency to ensure that their actions are not likely to jeopardize the continued existence of *Atriplex coronata* var. *notatior.* Under the *Gifford Pinchot* decision, critical habitat designations may provide greater benefits to the recovery of a species than was previously believed, but it is not possible to quantify this benefit at present. However, the protection provided under section 7(a)(2) of the Act is still a limitation on the harm that occurs to the species or critical habitat as opposed to a requirement to provide a conservation benefit.

The inclusion of these 15,232 ac (6,167 ha) of non-Federal land as critical habitat may provide some additional Federal regulatory benefits for the species consistent with the conservation standard based on the Ninth Circuit Court's decision in *Gifford Pinchot.* A benefit of inclusion would be the requirement of a Federal agency to ensure that their actions on these non-Federal lands do not likely result in the destruction or adverse modification of critical habitat. This additional analysis to determine destruction or adverse modification of critical habitat is likely to be small because the lands are not under Federal ownership and any Federal agency proposing a Federal action on these 15,232 ac (6,167 ha) of non-Federal lands would likely consider the conservation value of these lands as identified in the Western Riverside County MSHCP and take the necessary steps to avoid jeopardy or the destruction or adverse modification of critical habitat. In any event, they will still need to consult with us to avoid jeopardy to the species, and we generally consider habitat impacts in such jeopardy consultations.

The areas excluded as critical habitat include the seasonal wetlands that are occupied by *Atriplex coronata* var. *notatior* and the surrounding watershed (the watershed is not occupied by *A. coronata* var. *notatior*). If these areas were designated as critical habitat, any actions with a Federal nexus, such as the issuance of a permit under section 404 of the Clean Water Act, which might adversely affect critical habitat would require a consultation with us, as explained previously, in Effects of Critical Habitat Designation. However, inasmuch as portions of these areas are currently occupied by the species, consultation for Federal activities which might adversely impact the species would be required even without the critical habitat designation. For the surrounding watershed not occupied by *A. coronata* var. *notatior,* the Federal action agency would need to determine if the proposed action would affect the species rather than making a determination if the proposed action would cause destruction or adverse modification of critical habitat. A potential benefit of critical habitat would be to signal the importance of the surrounding watershed not occupied by *A. coronata* var. *notatior* to Federal agencies and to ensure their actions do not result in the destruction or adverse modification of critical habitat pursuant to section 7(a)(2) of the Act.

This potential benefit of critical habitat is reduced by the measures contained in the HCP to maintain watersheds for endangered species and seasonal wetlands. The Western Riverside County MSHCP provides Guidelines Pertaining to the Urban/Wildlands Interface. Under this guideline, proposed developments in proximity to MSHCP Conservation Areas shall incorporate measures, including measures required through the National Pollutant Discharge Elimination System requirements, to ensure that the quantity and quality of runoff discharged to the MSHCP Conservation Area is not altered in an adverse way when compared with existing conditions. In particular, measures shall be put in place to avoid discharge of untreated surface runoff from developed and paved areas into the MSHCP Conservation Area. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials or other elements that might degrade or harm biological resources or ecosystem processes within the MSHCP Conservation Area. Thus, this HCP provide a greater level of protection and management for the watersheds of seasonal wetlands occupied by *Atriplex coronata* var. *notatior* than the simple avoidance of adverse effects to critical habitat.

If these areas were included as critical habitat, primary constituent elements would be protected from destruction or adverse modification by federal actions using a conservation standard based on the Ninth Circuit Court's decision in *Gifford Pinchot.* This requirement would be in addition to the requirement that proposed Federal actions avoid likely jeopardy to the species' continued existence. However, for those seasonal wetland areas occupied by *Atriplex coronata* var. *notatior* and the surrounding watershed, consultation for activities which may adversely affect the species, would be required even without the critical habitat designation.

In *Sierra Club* v. *Fish and Wildlife Service,* 245 F.3d 434 (5th Cir. 2001), the Fifth Circuit Court of Appeals stated that the identification of habitat areas essential to the conservation of the species can provide informational benefits to the public, State and local governments, scientific organizations, and Federal agencies. The court also noted that heightened public awareness of the plight of listed species and their habitats may facilitate conservation efforts. The inclusion of an area as critical habitat may focus and contribute to conservation efforts by other parties by clearly delineating areas of high conservation values for certain species. However, we believe that this educational benefit has largely been achieved for *Atriplex coronata* var. *notatior.* The public outreach and environmental impact reviews required under the National Environmental Policy Act for the Western Riverside County MSHCP provided significant opportunities for public education regarding the conservation of the areas occupied by *Atriplex coronata* var. *notatior* and the surrounding watershed. In addition, there has been public notice and opportunity for comment on this proposal, which identified lands eligible for designation as critical habitat, and on the economic analysis for the proposal, which also identified those lands. There would be little additional informational benefit gained from including these lands as critical habitat because of the level of information that has been made available to the public as part of these regional planning efforts. Consequently, we believe that the informational benefits are already provided even though this area is not designated as critical habitat. Additionally, the purpose of the Western Riverside County MSHCP to provide protection and enhancement of habitat for *Atriplex coronata* var. *notatior* is already well established among State and local governments, and Federal agencies.

As discussed below, however, we believe that designating any non-Federal lands within the Western Riverside County MSHCP as critical habitat would provide little additional educational and Federal regulatory benefits for the species. Because portions of the excluded seasonal wetlands are occupied by the species, there must be consultation with the Service over any action which may affect these populations. For the surrounding watershed not occupied by *Atriplex coronata* var. *notatior,* the Western Riverside County MSHCP provide management measures to protect the watershed for these seasonal wetlands. The additional educational benefits that might arise from critical habitat designation have been largely accomplished through the public review and comment of the environmental impact documents which accompanied the development of the Western Riverside County MSHCP, the public notice and comment period on this proposal, which identified lands eligible for designation as critical habitat, and on the economic analysis for the proposal, which also identified those lands, and the recognition by the County of Riverside of the presence of *Atriplex coronata* var. *notatior* and the value of their lands for the conservation and recovery of the species. The areas identified for conservation in the Western Riverside County MSHCP under the species-specific conservation objectives (San Jacinto River, Mystic Lake, Salt Creek, and Alberhill Creek portions of the MSHCP Conservation Area) are the same lands we have identified as providing the physical and biological features essential to the conservation of this species.

For 30 years prior to the Ninth Circuit Court's decision in *Gifford Pinchot,* the Fish and Wildlife Service equated the jeopardy standard with the standard for destruction or adverse modification of critical habitat. However, in *Gifford Pinchot* the court noted the government, by simply considering the action's survival consequences, was reading the concept of recovery out of the regulation. The court, relying on the CFR definition of adverse modification, required the Service to determine whether recovery was adversely affected. The *Gifford Pinchot* decision arguably made it easier to reach an ''adverse modification'' finding by reducing the harm, affecting recovery, rather than the survival of the species. However, there is an important distinction: section 7(a)(2) limits harm to the species either through jeopardy or destruction or adverse modification of its habitat where there is a Federal nexus to the potential harm. It does not affect purely State or private actions on State or private land, nor does it require positive habitat improvements or enhancement of the species status. Thus, any management plan which has enhancement or recovery as the management standard will almost always provide more benefit than the critical habitat designation.

(2) Benefits of Exclusion

As mentioned above, the Western Riverside County MSHCP provide for the conservation of *Atriplex coronata* var. *notatior* through avoidance, minimization, and/or mitigation of impacts, management of habitat, and maintenance of watershed. The Western Riverside County MSHCP provides for protection of the PCEs, and addresses special management needs such as edge effects and maintenance of hydrology. Designation of critical habitat would therefore not provide as great a benefit to the species as the positive management measures provided in this HCP.

The benefits of excluding lands within HCPs from critical habitat designation include relieving landowners, communities, and counties of any additional regulatory burden that might be imposed by a critical habitat designation consistent with the conservation standard based on the Ninth Circuit Court's decision in *Gifford Pinchot.* Many HCPs, particularly large regional HCPs take many years to develop and, upon completion, become regional conservation plans that are consistent with the recovery objectives for listed species that are covered within the plan area. Additionally, many of these HCPs provide conservation benefits to unlisted, sensitive species. Imposing an additional regulatory review after an HCP is completed solely as a result of the designation of critical habitat may undermine conservation efforts and partnerships in many areas. In fact, it could result in the loss of species' benefits if participants abandon the voluntary HCP process because the critical habitat designation may result in additional regulatory requirements than faced by other parties who have not voluntarily participated in species conservation. Designation of critical habitat within the boundaries of approved HCPs could be viewed as a disincentive to those entities currently developing HCPs or contemplating them in the future.

Another benefit from excluding these lands is to maintain the partnerships developed among the County of Riverside, State of California, and the Service to implement the Western Riverside County MSHCP. Instead of using limited funds to comply with administrative consultation and designation requirements which cannot provide protection beyond what is currently in place, the partners could instead use their limited funds for the conservation of this species.

A related benefit of excluding lands within HCPs from critical habitat designation is the unhindered, continued ability to seek new partnerships with future HCP participants including States, Counties, local jurisdictions, conservation organizations, and private landowners,

which together can implement conservation actions that we would be unable to accomplish otherwise. If lands within HCP plan areas are designated as critical habitat, it would likely have a negative effect on our ability to establish new partnerships to develop HCPs, particularly large, regional HCPs that involve numerous participants and address landscape-level conservation of species and habitats. By excluding these lands, we preserve our current partnerships and encourage additional conservation actions in the future.

Furthermore, an HCP or NCCP/HCP application must itself be consulted upon. While this consultation will not look specifically at the issue of adverse modification to critical habitat, unless critical habitat has already been designated within the proposed plan area, it will determine if the HCP jeopardizes the species in the plan area. In addition, Federal actions not covered by the HCP in areas occupied by listed species would still require consultation under section 7 of the Act. HCP and NCCP/HCPs typically provide for greater conservation benefits to a covered species than section 7 consultations because HCPs and NCCP/HCPs assure the long-term protection and management of a covered species and its habitat, and funding for such management through the standards found in the 5 Point Policy for HCPs (64 FR 35242) and the HCP ''No Surprises'' regulation (63 FR 8859). Such assurances are typically not provided by section 7 consultations that, in contrast to HCPs, often do not commit the project proponent to long-term special management or protections. Thus, a consultation typically does not accord the lands it covers the extensive benefits a HCP or NCCP/HCP provides. The development and implementation of HCPs or NCCP/HCPs provide other important conservation benefits, including the development of biological information to guide the conservation efforts and assist in species conservation, and the creation of innovative solutions to conserve species while allowing for development. In the biological opinions for the Western Riverside County MSHCP, the Service concluded that issuance of section 10(a)(1)(B) permit for this plan is not likely to result in jeopardy to the species.

(3) Benefits of Exclusion Outweigh the Benefits of Inclusion

We have reviewed and evaluated the exclusion of critical habitat for *Atriplex coronata* var. *notatior* from approximately 15,232 ac (6,164 ha) of non-Federal lands within the Western Riverside County MSHCP and based on this evaluation, we find that the benefits of exclusion (avoid increased regulatory costs which could result from including those lands in this designation of critical habitat, ensure the willingness of existing partners to continue active conservation measures, maintain the ability to attract new partners, and direct limited funding to conservation actions with partners) of the lands containing features essential to the conservation of *Atriplex coronata* var. *notatior* within the Western Riverside County MSHCP outweigh the benefits of inclusion (limited educational and regulatory benefits, which are largely otherwise provided for under the HCP) of these lands as critical habitat. The benefits of inclusion of these 15,232 ac (6,164 ha) of non-Federal lands as critical habitat are lessened because of the significant level of conservation provided *Atriplex coronata* var. *notatior* under the Western Riverside County MSHCP (conservation of occupied and potential habitat, monitoring, and providing hydrology). In contrast, the benefits of exclusion of these 15,232 ac (6,164 ha) of non-Federal lands as critical habitat are increased because of the high level of cooperation by the County of Riverside, State of California, and the Service to conserve this species and these partnerships exceed any conservation value provided by a critical habitat designation.

(4) Exclusion Will Not Result in Extinction of the Species

We believe that exclusion of these 15,232 ac (6,164 ha) of non-Federal lands will not result in extinction of *Atriplex coronata* var. *notatior* since these lands are conserved or will be conserved and managed for the benefit of this species pursuant to the Western Riverside County MSHCP. This HCP includes specific conservation objectives, avoidance and minimization measures, and management that exceed any conservation value provided as a result of a critical habitat designation. The Service concluded that the Western Riverside County MSHCP would not jeopardize the continued existence of *N. fossalis Atriplex coronata* var. *notatior* in our Biological and Conference Opinion because of the management measures and level of conservation.

The jeopardy standard of section 7 and routine implementation of habitat conservation through the section 7 process also provide assurances that the species will not go extinct. The exclusion leaves these protections unchanged from those that would exist if the excluded areas were designated as critical habitat.

Additionally, the species within the Western Riverside County MSHCP occurs on lands protected and managed either explicitly for the species or indirectly through more general objectives to protect natural values. These factors acting in concert with the other protections provided under the Act, lead us to find that exclusion of these 15,232 ac (6,164 ha) within the Western Riverside County MSHCP will not result in extinction of *Atriplex coronata* var. *notatior.*

Economic Analysis

Section 4(b)(2) of the Act requires us to designate critical habitat on the basis of the best scientific data information available and to consider the economic and other relevant impacts of designating a particular area as critical habitat. We may exclude areas from critical habitat upon a determination that the benefits of such exclusions outweigh the benefits of specifying such areas as critical habitat. We cannot exclude such areas from critical habitat when such exclusion will result in the extinction of the species concerned.

Following the publication of the proposed critical habitat designation, we conducted an economic analysis to estimate the potential economic effect of the designation. The draft analysis was made available for public review on August 31, 2005, (70 FR 51739). We accepted comments on the draft analysis until September 14, 2005.

The primary purpose of the economic analysis is to estimate the potential economic impacts associated with the designation of critical habitat for *A. coronata* var. *notatior.* This information is intended to assist the Secretary in making decisions about whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation. This economic analysis considers the economic efficiency effects that may result from the designation, including habitat protections that may be co-extensive with the listing of the species. It also addresses distribution of impacts, including an assessment of the potential effects on small entities and the energy industry. This information can be used by the Secretary to assess whether the effects of the designation might unduly burden a particular group or economic sector.

This analysis focuses on the direct and indirect costs of the rule. However, economic impacts to land use activities can exist in the absence of critical habitat. These impacts may result from, for example, local zoning laws, State and natural resource laws, and

enforceable management plans and best management practices applied by other State and Federal agencies. Economic impacts that result from these types of protections are not included in the analysis as they are considered to be part of the regulatory and policy baseline.

There is no economic impact within the final designation because the Service has not designated any lands as critical habitat for *Atriplex coronata* var. *notatior.*

A copy of the final economic analysis and supporting documents are included in our administrative record and may be obtained by contacting U.S. Fish and Wildlife Service, Branch of Endangered Species (see **ADDRESSES** section) or by download from the Internet at *http://carlsbad.fws.gov.*

Required Determinations

Regulatory Planning and Review

In accordance with Executive Order 12866, this document is a significant rule in that it may raise novel legal and policy issues. However, because we are designating zero acres of critical habitat, this rule would not have an annual effect on the economy of $100 million or more or affect the economy in a material way. Due to the time line for publication in the **Federal Register**, the Office of Management and Budget (OMB) did not formally review this rule. As explained above, we prepared an economic analysis of this action. We used this analysis to meet the requirement of section 4(b)(2) of the Act to determine the economic consequences of designating the specific areas as critical habitat. We also used it to help determine whether to exclude any area from critical habitat, as provided for under section 4(b)(2), if we determine that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless we determine, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (*i.e.*, small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. In our proposed rule, we withheld our determination of whether this designation would result in a significant effect as defined under SBREFA until we completed our draft economic analysis of the proposed designation so that we would have the factual basis for our determination.

According to the Small Business Administration (SBA), small entities include small organizations, such as independent nonprofit organizations, and small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents, as well as small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term significant economic impact is meant to apply to a typical small business firm's business operations.

To determine if this rule would affect a substantial number of small entities, we considered the number of small entities affected within particular types of economic activities (*e.g.*, residential and commercial development). We considered each industry or category individually to determine if certification is appropriate. In estimating the numbers of small entities potentially affected, we also considered whether their activities have any Federal involvement; some kinds of activities are unlikely to have any Federal involvement and so will not be affected by the designation of critical habitat. Designation of critical habitat only affects activities conducted, funded, permitted, or authorized by Federal agencies; non-Federal activities are not affected by the designation. Typically, when proposed critical habitat designations are made final, Federal agencies must consult with us if their activities may affect that designated critical habitat. Consultations to avoid the destruction or adverse modification of critical habitat would be incorporated into the existing consultation process. However, since no critical habitat is being designated, no consultations would be necessary.

In our economic analysis of this proposed designation, we evaluated the potential economic effects on small business entities resulting from conservation actions related to the listing of this species and proposed designation of its critical habitat. Because zero acres of critical habitat are being designated, there would be no additional costs to small businesses, and, thus, this rule would not result in a ''significant effect'' for the small business entities in Riverside County. As such, we are certifying that this rule will not result in a significant economic impact on a substantial number of small entities.

Executive Order 13211

On May 18, 2001, the President issued Executive Order (E.O.) 13211 on regulations that significantly affect energy supply, distribution, and use. E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. This rule is considered a significant regulatory action under E.O. 12866 because it raises novel legal and policy issues, but it is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant action under E.O. 13211, and no Statement of Energy Effects is required. Please refer to Appendix A of our draft economic analysis of this proposed designation for a more detailed discussion of potential effects on energy supply.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501), the Service makes the following findings:

(a) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, tribal governments, or the private sector and includes both ''Federal intergovernmental mandates'' and ''Federal private sector mandates.'' These terms are defined in 2 U.S.C. 658(5)–(7). ''Federal intergovernmental mandate'' includes a regulation that ''would impose an enforceable duty upon State, local, or tribal governments'' with two exceptions. It excludes ''a

condition of federal assistance.'' It also excludes ''a duty arising from participation in a voluntary Federal program,'' unless the regulation ''relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and tribal governments under entitlement authority,'' if the provision would ''increase the stringency of conditions of assistance'' or ''place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding'' and the State, local, or tribal governments ''lack authority'' to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; AFDC work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. ''Federal private sector mandate'' includes a regulation that ''would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance; or (ii) a duty arising from participation in a voluntary Federal program.''

The designation of critical habitat does not impose a legally binding duty on non-Federal government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. Non-Federal entities that receive Federal funding, assistance, permits, or otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat. However, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply; nor would critical habitat shift the costs of the large entitlement programs listed above on to State governments.

(b) We do not believe that this rule will significantly or uniquely affect small governments, because we are designating zero acres of critical habitat. Consequently, we do not believe that critical habitat designation would significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

Takings

In accordance with Executive Order 12630 (''Government Actions and Interference with Constitutionally Protected Private Property Rights''), we have analyzed the potential takings implications of desinating critical habitat for *Atriplex coronata* var. *notatior*. Critical habitat designation does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. Because we are designating zero acres of critical habitat for *Atriplex coronata* var. *notatior*, this rule does not pose significant takings implications.

Federalism

In accordance with Executive Order 13132, the rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with DOI and Department of Commerce policy, we requested information from, and coordinated development of, this final critical habitat designation with appropriate State resource agencies in California. The designation of zero acres of critical habitat in areas currently occupied by *Atriplex coronata* var. *notatior* would have no impact on State and local governments and their activities. The process of identifying habitat with essential features may have some benefit to State and local governments in that the areas essential to the conservation of these species are more clearly defined, and the primary constituent elements of the habitat necessary to the survival of the species are identified. While this definition and identification does not alter where and what federally sponsored activities may occur, it may assist these local governments in long-range planning (rather than making them wait for case-by-case section 7 consultation to occur).

Civil Justice Reform

In accordance with Executive Order 12988, the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating zero acres of critical habitat in accordance with the provisions of the Endangered Species Act. This final rule uses standard property descriptions and identifies the primary constituent elements within the designated areas to assist the public in understanding the habitat needs of *Atriplex coronata* var. *notatior.*

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act

It is our position that, outside the Tenth Circuit, we do not need to prepare environmental analyses as defined by the NEPA in connection with designating critical habitat under the Endangered Species Act of 1973, as amended. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This assertion was upheld in the courts of the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. Ore. 1995), cert. denied 116 S. Ct. 698 (1996).]

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, ''Government-to-Government Relations with Native American Tribal Governments'' (59 FR 22951), Executive Order 13175, and the Department of Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. We have determined that there are no tribal lands with features essential for the conservation of *Atriplex coronata* var. *notatior*. Critical habitat for *A. coronata* var. *notatior* has not been designated on Tribal lands.

References Cited

A complete list of all references cited in this rulemaking is available upon request from the Field Supervisor, Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

Author(s)

The primary author of this package is the Carlsbad Fish and Wildlife Office (see **ADDRESSES** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

■ Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

■ 2. In § 17.12(h), in the List of Endangered and Threatened Plants, revise the entry for ''*Atriplex coronata* var. *notatior*'' under ''FLOWERING PLANTS'' to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
FLOWERING PLANTS							
*	*	*	*		*	*	*
Atriplex coronata var. *notatior*.	San Jacinto Valley crownscale.	U.S.A. (CA)	*Chenopodiaceae—Goosefoot Family*.	E	650	17.96 (a) (No areas designated)	NA
*	*	*	*		*	*	*

■ 3. In § 17.96, amend paragraph (a) by adding an entry for *Atriplex coronata* var. *notatior* in alphabetical order under Family Chenopodiaceae to read as follows:

§ 17.96 Critical habitat—plants.

(a) *Flowering plants.*

* * * * *

Family Chenopodiaceae: *Atriplex coronata* var. *notatior* (San Jacinto Valley crownscale)

Pursuant to section 4(b)(2) of the Act, we have excluded all areas determined to meet the definition of critical habitat under section 3(5)(A) of the Act for *Atriplex coronata* var. *notatior.* Therefore, no specific areas are designated as critical habitat for this species.

* * * * *

Dated: September 30, 2005.

Craig Manson,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 05–20146 Filed 10–12–05; 8:45 am]

BILLING CODE 4310–55–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2009–0073; MO 92210–0–0009]

RIN 1018–AW54

Endangered and Threatened Wildlife and Plants; Final Revised Critical Habitat for Brodiaea filifolia (Thread-Leaved Brodiaea)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service, are designating revised critical habitat for *Brodiaea filifolia* (thread-leaved brodiaea) under the Endangered Species Act of 1973, as amended (Act). Approximately 2,947 acres (ac) (1,193 hectares (ha)) in 10 units are being designated as revised critical habitat for *B. filifolia* in Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California.

DATES: This rule becomes effective on March 10, 2011.

ADDRESSES: The final rule, final economic analysis, and map of revised critical habitat will be available on the Internet at *http://www.regulations. gov* at Docket No. FWS–R8–ES–2009–0073. Supporting documentation we used in preparing this final rule will be available for public inspection, by appointment, during normal business hours, at the U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office, 6010 Hidden Valley Road, Suite 101, Carlsbad, CA 92011; telephone 760–431–9440; facsimile 760–431–5901.

FOR FURTHER INFORMATION CONTACT: Jim Bartel, Field Supervisor, U.S. Fish and Wildlife Service, Carlsbad Fish and Wildlife Office (*see* **ADDRESSES**). If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service (FIRS) at 800–877–8339.

SUPPLEMENTARY INFORMATION:

Background

We intend to discuss only those topics directly relevant to the designation of revised critical habitat for *Brodiaea filifolia* under the Endangered Species Act (Act), as amended (16 U.S.C. 1531 *et seq.*), in this final rule. For information on the taxonomy, biology, and ecology of *B. filifolia,* refer to the final listing rule published in the **Federal Register** on October 13, 1998 (63 FR 54975), the designation of critical habitat for *B. filifolia* published in the **Federal Register** on December 13, 2005 (70 FR 73820), the proposed revised designation of critical habitat published in the **Federal Register** on December 8, 2009 (74 FR 64930), and the Notice of Availability (NOA) of the draft economic analysis (DEA) published in the **Federal Register** on July 20, 2010 (75 FR 42054). Additionally, more information on this species can be found in the five-year review for *B. filifolia* signed on August 13, 2009, which is available on our Web site at: *http//:www.fws.gov/Carlsbad.*

New Information on Species' Description, Life History, Ecology, Habitat, and Geographic Range and Status

We received no new information pertaining to the description, life history, ecology, habitat, geographic range, or status of *Brodiaea filifolia* following the 2009 proposed revised critical habitat designation (74 FR 64930).

Previous Federal Actions

We published our final designation of critical habitat for *Brodiaea filifolia* on December 13, 2005 (70 FR 73820). The Center for Biological Diversity filed a complaint in the U.S. District Court for the Southern District of California on December 19, 2007, challenging our designation of critical habitat for *B. filifolia* and *Navarretia fossalis* (*Center for Biological Diversity* v. *United States Fish and Wildlife, et al.,* Case No. 07–CV–02379–W–NLS). In a settlement agreement dated July 25, 2008, we agreed to reconsider the critical habitat designation for *B. filifolia.* The settlement stipulated that the U.S. Fish and Wildlife Service (Service) shall submit a proposed revised critical habitat designation for *B. filifolia* to the **Federal Register** by December 1, 2009, and submit a final revised critical habitat designation to the **Federal Register** by December 1, 2010. The proposed revised critical habitat designation was published in the **Federal Register** on December 8, 2009 (74 FR 64930). On November 19, 2010, the U.S. District Court granted a motion to modify the settlement agreement to extend to January 31, 2011, submittal of a final revised critical habitat designation to the **Federal Register**.

Summary of Changes From the Proposed Revised Rule and the Previous Critical Habitat Designation

Summary of Changes From the 2005 Critical Habitat Rule

The areas identified in this rule constitute a revision from the areas we designated as critical habitat for *Brodiaea filifolia* on December 13, 2005 (70 FR 73820). In cases where we have new information or information that was not available for the previous designation, we made changes to the critical habitat for *B. filifolia* to ensure that this rule reflects the best scientific data available.

In the 2005 rule, we excluded subunits under section 4(b)(2) of the Act within the planning boundaries for the Villages of La Costa Habitat Conservation Plan (HCP). The Villages of La Costa HCP is now included within (considered part of) the City of Carlsbad's Habitat Management Plan (Carlsbad HMP) under the Multiple Habitat Conservation Plan (MHCP); therefore, all revised critical habitat that overlaps with the Villages of La Costa HCP was analyzed under section 4(b)(2) of the Act as part of the Carlsbad HMP discussion. These areas have again been excluded from this revised designation under section 4(b)(2) of the Act (*see* Exclusions Under Section 4(b)(2) of the Act section below).

In the 2005 rule, we identified areas covered by HCPs that provided protections for *Brodiaea filifolia,* and excluded those areas because we concluded they did not require special management considerations or protection. We are not using this approach in this rule. In this rule, we identified areas covered by HCPs that are conserved and managed and have weighed the benefits of exclusion against the benefits of including these areas in the revised critical habitat designation pursuant to section 4(b)(2) of the Act.

This rule uses a new economic analysis to identify and estimate the potential economic effects resulting from implementation of conservation actions associated with the revised critical habitat. The analysis is based on estimated incremental impacts associated with critical habitat.

We made changes to the primary constituent elements (PCEs) and our criteria used to identify critical habitat. We incorporated information related to the taxonomy of the species including the change in plant family for *Brodiaea filifolia.* We redefined the boundaries of each subunit proposed as revised critical habitat to more accurately reflect the areas that include the features that

are essential to the conservation of *B. filifolia,* and we analyzed new distribution data (in the 2009 proposed revised critical habitat rule) that has become available to us following the 2005 designation. Table 1 shows the progression of each subunit of critical habitat from the 2005 final critical habitat designation to this final revised critical habitat designation. Table 2 includes name changes that we made for some of the subunits where the old names were ambiguous or do not reflect the current name used to refer to these areas; although the names of these units changed, the locations of these units have not changed. Following Tables 2 and 3, we provide a detailed description of each change made in this revised rule and point to new information that precipitated the change.

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
Unit 1: Los Angeles County:			
1a. Glendora	96 ac (39 ha)	67 ac (27 ha)	67 ac (27 ha).
1b. San Dimas	198 ac (80 ha)	138 ac (56 ha)	138 ac (56 ha).
Unit 2: San Bernardino County:			
2. Arrowhead Hot Springs	Not designated, wrong location.	61 ac (25 ha)	61 ac (25 ha).
Unit 3: Central Orange County:			
3. Aliso Canyon	Not designated, did not meet the definition of critical habitat.	113 ac (46 ha)	11 ac (4 ha); partially excluded under section 4(b)(2).
Unit 4: Southern Orange County:			
4a. Arroyo Trabuco	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4b. Caspers Wilderness Park	Excluded under section 4(b)(2).	205 ac (83 ha)	12 ac (5 ha); partially excluded under section 4(b)(2).
4c. Cañada Gobernadora/Chiquita Ridgeline.	Excluded under section 4(b)(2).	133 ac (54 ha)	133 ac (54 ha).
4d. Prima Deschecha	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4e. Forster Ranch	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4f. Talega/Segunda Deshecha	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4g. Cristianitos Canyon	Excluded under section 4(b)(2).	587 ac (238 ha)	587 ac (238 ha).
4h. Cristianitos Canyon South	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
4i. Blind Canyon	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
Unit 5: Northern San Diego County:			
5a. Miller Mountain	Not designated, mostly hybrid plants.	Not proposed, only *Brodiaea santarosae* present.	N/A.
5b. Devil Canyon	249 ac (101 ha)	274 ac (111 ha)	274 ac (111 ha).
Unit 6: Oceanside:			
6a. Alta Creek	Not designated, did not meet the definition of critical habitat.	72 ac (29 ha)	72 ac (29 ha).
6b. Mesa Drive	Excluded under section 4(b)(2).	17 ac (7 ha)	17 ac (7 ha).
6c. Mission View/Sierra Ridge	Not designated, did not meet the definition of critical habitat.	12 ac (5 ha)	12 ac (5 ha).
6d. Taylor/Darwin	Excluded under section 4(b)(2).	35 ac (14 ha)	35 ac (14 ha).
6e. Arbor Creek/Colucci	N/A	94 ac (38 ha)	94 ac (38 ha).
Unit 7: Carlsbad			
7a. Letterbox Canyon	Excluded under section 4(b)(2).	57 ac (23 ha)	43 ac (17 ha); partially excluded under section 4(b)(2); 2 ac (1 ha) removed—do not meet the definition of critical habitat.
7b. Rancho Carrillo	Not designated, did not meet the definition of critical habitat.	37 ac (15 ha)	37 ac (15 ha).

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *—Continued

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
7c. Calavera Hills Village H	Excluded under section 4(b)(2).	71 ac (29 ha)	26 ac (11 ha); partially excluded under section 4(b)(2).
7d. Villages of La Costa (Rancho La Costa)	Excluded under section 4(b)(2).	98 ac (40 ha)	Excluded under section 4(b)(2).
Carlsbad Oaks	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Carlsbad Highlands	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Poinsettia	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Unit 8: San Marcos and Vista:			
8a. Rancho Santa Fe Road North	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8b. Rancho Santalina/Loma Alta	Not included under section 3(5)(A).	47 ac (19 ha)	47 ac (19 ha).
8c. Grand Avenue	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8d. Upham	54 ac (22 ha)	54 ac (22 ha)	54 ac (22 ha).
8e. Linda Vista	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
8f. Oleander/San Marcos Elementary	N/A	7 ac (3 ha)	7 ac (3 ha).
Unit 9:			
9. Double LL Ranch	Not designated, did not meet the definition of critical habitat.	N/A	N/A.
Unit 10:			
10. Highland Valley	Not designated; could not verify occurrence.	N/A	N/A.
Unit 11: Western Riverside County:			
11a. San Jacinto Wildlife Area	Excluded under section 4(b)(2).	401 ac (162 ha)	401 ac (162 ha).
11b. San Jacinto Avenue/Dawson Road	Excluded under section 4(b)(2).	117 ac (47 ha)	117 ac (47 ha).
11c. Case Road	Excluded under section 4(b)(2).	180 ac (73 ha)	180 ac (73 ha).
11d. Railroad Canyon	Excluded under section 4(b)(2).	257 ac (104 ha)	257 ac (104 ha).
11e. Upper Salt Creek (Stowe Pool)	Excluded under section 4(b)(2).	145 ac (59 ha)	145 ac (59 ha).
11f. Santa Rosa Plateau—Mesa de Colorado.	Excluded under section 4(b)(2).	234 ac (95 ha)	13 ac (5 ha); partially excluded under section 4(b)(2).
Santa Rosa Plateau—Tenaja Rd	Excluded under section 4(b)(2).	Not proposed; only *Brodiaea santarosae* present.	N/A.
11g. Santa Rosa Plateau—South of Tenaja Rd.	Excluded under section 4(b)(2).	117 ac (47 ha)	Excluded under section 4(b)(2).
11h. Santa Rosa Plateau—North of Tenaja Rd.	Excluded under section 4(b)(2).	44 ac (18 ha)	Excluded under section 4(b)(2).
East of Tenaja Guard Station	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
N. End Redondo Mesa	Excluded under section 4(b)(2).	Not proposed, does not meet the definition of critical habitat.	N/A.
Corona (north)	Not designated, could not verify occurrence.	N/A	N/A.
Corona (south)	Not designated, could not verify occurrence.	N/A	N/A.
Moreno Valley	Not designated, could not verify occurrence.	N/A	N/A.
Unit 12: San Diego County:			

TABLE 1—CHANGES BETWEEN THE DECEMBER 13, 2005, FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA, THE DECEMBER 8, 2009, PROPOSED REVISED CRITICAL HABITAT DESIGNATION, AND THIS FINAL REVISED CRITICAL HABITAT DESIGNATION *—Continued

Unit/Subunit No. and name **	2005 fCH	2009 prCH	2011 frCH
12. Artesian Trails	N/A	109 ac (44 ha)	105 ac (43 ha); partially excluded under section 4(b)(2).
TOTAL FOR NON-MILITARY LANDS	**597 ac (242 ha)**	**3,786 ac (1,532 ha)**	**2,945 ac (1,193 ha)**.
Marine Corps Base Camp Pendleton:			
Cristianitos Canyon Pendleton	N/A	4(a)(3) exemption	4(a)(3) exemption.
Bravo One	4(a)(3) exemption	4(a)(3) exemption	4(a)(3) exemption.
Bravo Two South	N/A	4(a)(3) exemption	4(a)(3) exemption.
Alpha One/Bravo Three	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Basilone/San Mateo Junction	N/A	4(a)(3) exemption	4(a)(3) exemption.
Camp Horno	4(a)(3) exemption	4(a)(3) exemption	4(a)(3) exemption.
SE Horno Summit	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Kilo One	4(a)(3) exemption	Does not meet the definition of critical habitat.	N/A.
Pilgrim Creek	N/A	4(a)(3) exemption	4(a)(3) exemption.
South White Beach	N/A	4(a)(3) exemption	4(a)(3) exemption.
TOTAL FOR MILITARY LANDS***	**0 ac (0 ha)**	**0 ac (0 ha)**	**0 ac (0 ha)**.
TOTALS	**597 ac (242 ha)**	**3,786 ac (1,532 ha)**	**2,947 ac (1,193 ha)**.

* This table does not include all locations that are occupied by *Brodiaea filifolia.* It includes only those locations that have met the definition of critical habitat in this or one of the past proposed or final critical habitat rules for *B. filifolia.*

** Values in this table and the following text may not sum due to rounding.

*** Military Lands are exempt from this rule under section 4(a)(3) of the Act.

TABLE 2—NAME CHANGES FROM THE 2005 FINAL CRITICAL HABITAT DESIGNATION FOR BRODIAEA FILIFOLIA TO THIS FINAL REVISED CRITICAL HABITAT DESIGNATION

Subunit No.	Previous name	Current name	Reason for change
6c	Oceanside East/Mission Ave	Mission View/Sierra Ridge	Not the eastern most occurrence in Oceanside.
7a	Fox-Miller	Letterbox Canyon	Includes more properties than just Fox-Miller.
7c	Calavera Heights	Calavera Hills Village H	New name is more specific.
11b	San Jacinto Floodplain	San Jacinto Avenue/Dawson Road	New name is more specific.
11c	Case Road Area	Case Road	New name is more specific.

Summary of Changes From the 2009 Proposed Revised Critical Habitat Rule

The most significant changes between the December 2009 proposed revision and this final revised rule are outlined in Table 1 above and include:

(1) In the proposed revised rule, we considered lands covered by the Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan, now known as the Orange County Southern Subregion HCP, for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the Orange County Southern Subregion HCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 192 ac (78 ha) of proposed revised critical habitat in Subunit 4b that are covered by the Orange County Southern Subregion HCP and are conserved and managed. We also determined that exclusion of these areas will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(2) In the proposed revised rule, we considered lands covered by the Carlsbad Habitat Management Plan (HMP) under the San Diego Multiple Habitat Conservation Program (MHCP) for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the Carlsbad HMP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 156 ac (63 ha) of proposed revised critical habitat in Subunits 7a, 7c, and 7d that are covered by the Carlsbad HMP under the MHCP and are conserved and managed. We also determined that exclusion of these areas will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(3) We have determined that 2 ac (1 ha) of land in Subunit 7a do not meet the definition of critical habitat for *Brodiaea filifolia* because they do not contain habitat suitable for the species. We are therefore not including these areas in the revised critical habitat designation.

(4) In the proposed revised rule, we considered lands within the Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP) planning area for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion

under the Western Riverside County MSHCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 381 ac (154 ha) of proposed revised critical habitat in Subunits 11g, 11h, and a portion of Subunit 11f that are covered by the Western Riverside County MSHCP and are conserved and managed. We also determined that exclusion of these lands will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(5) In the proposed revised rule, we considered lands covered by the San Diego Multiple Species Conservation Program (MSCP) for exclusion under section 4(b)(2) of the Act. We have now analyzed each of the areas considered for exclusion under the MSCP, and have determined that the benefits of exclusion outweigh the benefits of inclusion for approximately 4 ac (2 ha) of proposed revised critical habitat in Unit 12 that are under the County of San Diego Subarea Plan and are conserved and managed. We also determined that exclusion of these lands will not result in extinction of the species. Therefore, we are exercising our delegated discretion to exclude these lands from this revised critical habitat designation under section 4(b)(2) of the Act. For a complete discussion of the benefits of inclusion and exclusion, *see* Exclusions Under Section 4(b)(2) of the Act section below.

(6) A number of comments we received suggested editorial changes and technical corrections to sections of the rule pertaining to the Background and Criteria Used To Identify Critical Habitat sections of the proposed revised rule. These changes were recommended to improve clarity, include additional information, and correct minor errors. They have been incorporated into this final rule, where appropriate.

Critical Habitat

Background

Critical habitat is defined in section 3(5)(A) of the Act as: (1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features:

(a) Essential to the conservation of the species and

(b) Which may require special management considerations or protection; and (2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Conservation, as defined under section 3 of the Act, means the use of all methods and procedures that are necessary to bring any endangered or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management, such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot otherwise be relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the prohibition against Federal agencies carrying out, funding, or authorizing activities that are likely to result in the destruction or adverse modification of critical habitat. Section 7(a)(2) of the Act requires consultation on Federal actions that may affect critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by private landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) would apply, but even in the event of a destruction or adverse modification finding, the landowner's obligation is not to restore or recover the species, but to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

For inclusion in a critical habitat designation, the habitat within the geographical area occupied by the species at the time of listing must contain physical or biological features that are essential to the conservation of the species, and be included only if those features may require special management considerations or protection. The physical and biological features are the primary constituent elements (PCEs) laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species. Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species (*i.e.,* areas on which are found the PCEs laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species). Under the Act and regulations at 50 CFR 424.12, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed as critical habitat only when we determine that those areas are essential for the conservation of the species and that designation limited to the geographical area occupied at the time of listing would be inadequate to ensure the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific and commercial data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (44 U.S.C. 3516), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific and commercial data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific and commercial data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information developed during the listing process for the species. Additional information sources may include the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, or other unpublished materials and expert opinion or personal knowledge. Substantive comments received in response to proposed critical habitat designations are also considered.

Habitat is often dynamic, and species may move from one area to another over time. Climate change will be a particular challenge for biodiversity because the interaction of additional stressors associated with climate change and current stressors may push species beyond their ability to survive (Lovejoy 2005, pp. 325–326). The synergistic

implications of climate change and habitat fragmentation are the most threatening facet of climate change for biodiversity (Hannah *et al.* 2005, p. 4). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field *et al.* 1999, pp. 1–3; Hayhoe *et al.* 2004, p. 12422; Cayan *et al.* 2005, p. 6; Intergovernmental Panel on Climate Change (IPCC) 2007, p. 11; Cayan *et al.* 2009, p. xi). Additionally, the southwestern region of the country is predicted to become drier and hotter overall (Hayhoe *et al.* 2004, p. 12424; Seager *et al.* 2007, p. 1181). Climate change may also affect the duration and frequency of drought and these climatic changes may become even more dramatic and intense (Graham 1997). Documentation of climate-related changes that have already occurred in California (Croke *et al.* 1998, pp. 2128, 2130; Brashears *et al.* 2005, p. 15144), and future drought predictions for California (*e.g.,* Field *et al.* 1999, pp. 8–10; Lenihen *et al.* 2003, p. 1667; Hayhoe *et al.* 2004, p. 12422; Brashears *et al.* 2005, p. 15144; Seager *et al.* 2007, p. 1181) and North America (IPCC 2007, p. 9) indicate prolonged drought and other climate-related changes will continue in the foreseeable future.

We anticipate these changes could affect a number of native plants, including *Brodiaea filifolia* habitat and occurrences. For example, if the amount and timing of precipitation or the average temperature increases in southern California, the following four changes may affect the long-term viability of *B. filifolia* occurrences in their current habitat configuration:

(1) Drier conditions may result in a lower germination rate and smaller population sizes;

(2) A shift in the timing of annual rainfall may favor nonnative species that impact the quality of habitat for this species;

(3) Warmer temperatures may affect the timing of pollinator life-cycles causing pollinators to become out-of-sync with timing of flowering *B. filifolia;* and

(4) Drier conditions may result in increased fire frequency, making the ecosystems in which *B. filifolia* currently grows more vulnerable to the threats of subsequent erosion and nonnative or native plant invasion.

At this time, we are unable to identify the specific ways that climate change may impact *Brodiaea filifolia;* therefore, we are unable to determine if any additional areas may be appropriate to include in this revised critical habitat designation. Additionally, we recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not promote the recovery of the species.

Areas that support occurrences of the species, but are outside the critical habitat designation, will continue to be subject to conservation actions we and other Federal agencies implement under section 7(a)(1) of the Act. In these areas, the species is also subject to the regulatory protections afforded by the section 7(a)(2) jeopardy standard, as determined on the basis of the best scientific and commercial information available at the time of the agency action. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, HCPs, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Primary Constituent Elements

Physical and Biological Features

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas occupied by the species at the time of listing to designate as critical habitat, we consider those physical or biological features that are essential to the conservation of the species that may require special management considerations or protection. We consider the physical or biological features to be the PCEs laid out in the appropriate quantity and spatial arrangement essential to the conservation of the species. The PCEs include, but are not limited to:

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, and rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

We derive the PCEs required for *Brodiaea filifolia* from its biological needs. The areas included in our revised critical habitat for *B. filifolia* contain the appropriate soils and associated vegetation at suitable elevations, and adjacent areas necessary to maintain associated physical processes such as a suitable hydrological regime. The areas provide suitable habitat, water, minerals, and other physiological needs for reproduction and growth of *B. filifolia,* as well as habitat that supports pollinators of *B. filifolia.* The PCEs and the resulting physical and biological features essential to the conservation of *B. filifolia* are derived from studies of this species' habitat, ecology, and life history as described in the **Background** section of the proposed revised rule (74 FR 64930; December 8, 2009), the previous critical habitat rule (70 FR 73820; December 13, 2005), and in the final listing rule (63 FR 54975; October 13, 1998).

Space for Individual and Population Growth and for Normal Behavior

Habitats that provide space for growth and persistence of *Brodiaea filifolia* include areas: (1) With combinations of appropriate elevation and clay or clay-associated soils, on mesas or low to moderate slopes that support open native or annual grasslands within open coastal sage scrub or coastal sage scrub-chaparral communities; (2) in floodplains or in association with vernal pool or playa complexes that support various grassland, scrub, or riparian herb communities; (3) on soils derived from olivine basalt lava flows on mesas and slopes that support vernal pools within grassland, oak woodland, or savannah communities; or (4) on sandy loam soils derived from basalt and granodiorite parent material with deposits of cobbles and boulders supporting intermittent seeps, and open marsh communities. Despite the wide range of habitats where *B. filifolia* occurs, this species occupies a specific niche of habitat that is moderately wet to occasionally wet.

Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements

All members of the genus *Brodiaea* require full sun and many tend to occur on only one or a few soil series (Niehaus 1971, pp. 26–27). *Brodiaea filifolia* occurs on several formally named soil series, but most (if not all) of these are primarily clay soils with varying amounts of sand and silt. In this rule, we listed all the mapped soils that

overlap with the distribution of *B. filifolia.* Sometimes clay soils occur as inclusions within other soil series; as such, we have named those other soil series in this rule. Another reason that there are many differently named soil series is because this species occurs in five counties, each of which has uniquely named soils. In some areas in northern San Diego County and southwestern Riverside County, the species is identified with mapped soils with no known clay component; however, closer study and sight specific sampling may show these soils contain clay in the specific areas supporting *B. filifolia.* Despite this issue and the diversity in named soil series, *B. filifolia* is considered a clay soils endemic.

In San Diego, Orange, and Los Angeles Counties, occurrences of *Brodiaea filifolia* are highly correlated with specific clay soil series such as, but not limited to: Alo, Altamont, Auld, and Diablo or clay lens inclusions in a matrix of loamy soils such as Fallbrook, Huerhuero, and Las Flores series (63 FR 54975, p. 54978; CNDDB 2009, pp. 1–76; Service Geographic Information System (GIS) data 2009; USDA 1994). These soils generally occur on mesas and hillsides with gentle to moderate slopes, or in association with vernal pools. These soils are generally vegetated with open native or nonnative grassland, open coastal sage scrub, or open coastal sage scrub-chaparral communities. In San Bernardino County, the species is associated with Etsel family-Rock outcrop-Springdale and Tujunga-Urban land-Hanford soils (Service 2009a, Service GIS data). These soils are generally vegetated with open native and nonnative grassland, open coastal sage scrub, or open coastal sage scrub-chaparral communities.

In western Riverside County, the species is often found on alkaline silty-clay soil series such as, but not limited to, Domino, Grangeville, Waukena, and Willows underlain by a clay subsoil or caliche (a hardened gray deposit of calcium carbonate). These soils generally occur in low-lying areas and floodplains or are associated with vernal pool or playa complexes. These soils are generally vegetated with open native and nonnative grassland, alkali grassland, or alkali scrub communities. Also in western Riverside County, the species is found on clay loam soils underlain by heavy clays derived from basalt lava flows (*i.e.,* Murrieta series on the Santa Rosa Plateau) (Bramlet 1993, p. 1; CNDDB 2009, pp. 1–76; Service 2009a, Service GIS data). These soils generally occur on mesas and gentle to moderate slopes or are associated with basalt vernal pools. These soils are vegetated with open native or nonnative grassland or oak woodland savannah communities.

In some areas in northern San Diego County and southwestern Riverside County, the species is found on sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps. These soils and deposits are generally vegetated by open riparian and freshwater marsh communities associated with intermittent drainages, floodplains, and seeps. These soils facilitate the natural process of seed dispersal and germination, cormlet disposition or movement to an appropriate soil depth, and corm persistence through seedling and adult phases of flowering and fruit set.

Habitats That Are Protected From Disturbance or Are Representative of the Historical, Geographical, and Ecological Distributions of the Species

The conservation of *Brodiaea filifolia* is dependent on several factors including, but not limited to, maintenance of areas of sufficient size and configuration to sustain natural ecosystem components, functions, and processes (such as full sun exposure, natural fire and hydrologic regimes, adequate biotic balance to prevent excessive herbivory); protection of existing substrate continuity and structure, connectivity among groups of plants of this species within geographic proximity to facilitate gene flow among the sites through pollinator activity and seed dispersal; and sufficient adjacent suitable habitat for vegetative reproduction and population expansion.

A natural, generally intact surface and subsurface soil structure, perhaps lightly impacted, but not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), and associated physical processes such as a natural hydrological regime is necessary to provide water, minerals, and other physiological needs for *Brodiaea filifolia.* A natural hydrological regime includes seasonal hydration followed by drying out of the substrate to promote growth of plants and new corms for the following season. These conditions are also necessary for the normal development of seedlings and young vegetative cormlets.

Habitat for Pollinators of *Brodiaea filifolia*

Cross-pollination is essential for the survival and recovery of *Brodiaea filifolia* because this species is self-incompatible and it cannot sexually reproduce without the aid of insect pollinators. A variety of insects are known to cross-pollinate *Brodiaea* species, including tumbling flower beetles (Mordellidae, Coleoptera) and sweat bees (Halictidae, Hymenoptera; Niehaus 1971, p. 27). Bell and Rey (1991, p. 3) report that native bees observed pollinating *B. filifolia* on the Santa Rosa Plateau in Riverside County include *Bombus californicus* (Apidae, Hymenoptera), *Hoplitus* sp. (Megachilidae, Hymenoptera), *Osmia* sp. (Megachilidae, Hymenoptera), and an unidentified Anthophorid (digger-bee). Anthophoridae and Halictidae are important pollinators of *B. filifolia,* as shown at a study site in Orange County (Glenn Lukos Associates 2004, p. 3). Supporting and maintaining pollinators and pollinator habitat is essential to the conservation of *B. filifolia* because this species cannot set viable seed without cross-pollination.

Of primary concern to the conservation of *Brodiaea filifolia* are solitary bees (such as sweat bees (*Hoplitus* sp. and *Osmia* sp.)) because these are the pollinators that have the most specific habitat requirements (such as nesting requirements) and are impacted by fragmentation and reduced diversity of natural habitats at a small scale (Gathmann and Tscharntke 2002, p. 757; Steffan-Dewenter 2003, p. 1041; Shepherd 2009, pers. comm.). Due to the focused foraging habits of solitary bees, we believe that these insects may be the most important to the successful reproduction of *B. filifolia.* To sustain an active pollinator community for *B. filifolia,* alternative pollen or food source plants may be necessary for the persistence of these insects when *B. filifolia* is not in flower. It is also necessary for nest sites for pollinators to be located within flying distance of *B. filifolia* occurrences.

Bombus spp. (bumblebees) may also be important to the pollination of *Brodiaea filifolia,* however, these insects may be able to travel greater distances and cross fragmented landscapes to pollinate *B. filifolia.* In a study of experimental isolation and pollen dispersal of *Delphinium nuttallianum* (Nuttall's larkspur), Schulke and Waser (2001, pp. 242–243) report that adequate pollen loads were dispersed by bumblebees within control populations and in isolated experimental "populations" from 164 to 1,312 feet (ft) (50 to 400 meters (m)) from the control populations. One of several pollinator taxa effective at 1,312 ft (400 m) was *Bombus californicus* (Schulke and Waser 2001, pp. 240–243), which was also one of four bee species observed

pollinating *B. filifolia* by Bell and Rey (1991, p. 2). Studies by Steffan-Dewenter and Tscharntke (2000, p. 293) demonstrated that it is possible for bees to forage as far as 4,920 ft (1,500 m) from a colony, and at least one study suggests that bumblebees may forage many kilometers away (Sudgen 1985, p. 308). Bumblebees may be effective at transferring pollen between occurrences of *B. filifolia* because they are larger and have been found pollinating plants at distances of 1,312 to 4,920 ft (400 to 1,500 m). However, the visits and focused effort of bumblebees may be less frequent than ground-nesting bees.

Ground-nesting solitary bees appear to have limited dispersal and flight abilities (Thorp and Leong 1995, p. 7). Studies have shown that as areas are fragmented by development, remaining habitat areas have reduced pollinator diversity (Steffan-Dewenter 2003, p. 1041). If pollinators are eliminated from an occurrence, *Brodiaea filifolia* will no longer be able to reproduce sexually. Of the native bees that have been observed pollinating *B. filifolia,* solitary ground-nesting bees are the most sensitive to habitat disturbance and the most likely to be lost from an area. Sweat bees, *Holitus,* and Osmia (mason bees), fly approximately 900 to 1,500 ft (274 to 457 m), 600 to 900 ft (183 to 274 m), and 600 to 1,800 ft (183 to 549 m), respectively (Shepherd 2009, pers. comm.). *Bombus californicus* (family Apidae) and digger bees (family Apidae) fly further, generally more than 2,640 ft (804 m) (Shepherd 2009, pers. comm.). These flight distances are important in determining what habitat associated with *B. filifolia* occurrences provides habitat for this species' pollinators. Conserving habitat where these pollinators nest and forage will sustain an active pollinator community and provide for the cross-pollination of *B. filifolia.*

In our review of the data on pollinators of *Brodiaea filifolia* in the 2005 critical habitat rule, we determined that an 820-ft (250-m) area around each occurrence identified in the critical habitat would provide adequate space to support *B. filifolia's* pollinators. In the 2005 critical habitat rule, we based the 820-ft (250-m) distance on a conservative estimate for the mean routine flight distance for bees. This distance represents an estimate of flight distance for pollinators that fly an average of less than 1,800 ft (549 m) (*i.e.,* the maximum distance observed by known pollinators of *B. filifolia* except *Bombus californicus*). Research supports this distance, as studies looking at areas with a radius of 820 ft (250 m) have found that solitary bees forage at this scale and that if fragmentation occurs at this scale the presence of solitary bees will decrease (Steffan-Dewenter *et al.* 2002, pp. 1027–1029; Shepherd 2009, pers. comm.). Insects that travel greater distances than 1,800 ft (549 m) on average may also find habitat within 820 ft (250 m) of *B. filifolia* occurrences. It is also possible that insects flying greater than 1,800 ft (549 m) are flying in from greater distances (*Bombus californicus* and *Anthophora*) and are living in habitats that are not directly connected with areas supporting *B. filifolia.* Delineating a pollinator use area larger than 820 ft (250 m) around *B. filifolia* would capture habitat that may not directly contribute to the conservation of *B. filifolia.* Including habitat extending beyond the perimeters of mapped occurrences of *B. filifolia* by up to 820 ft (250 m) in the PCEs is necessary to support pollinator activity in critical habitat, support the sexual reproduction of *B. filifolia,* and provide for gene flow, pollen dispersal, and seed dispersal.

Primary Constituent Elements for Brodiaea filifolia

Under the Act and its implementing regulations, we are required to identify the physical or biological features essential to the conservation of *Brodiaea filifolia* and that may require special management considerations or protection. The physical or biological features essential to the conservation of the species are those PCEs laid out in an appropriate quantity and spatial arrangement determined to be essential to the conservation of the species. All final revised critical habitat areas for *B. filifolia* are currently occupied, are within the geographical area occupied by the species at the time of listing, and contain sufficient PCEs to support at least one life history function of the species (*see* the Spatial Distribution and Historical Range section of the proposed revised rule).

Based on our current knowledge of the life history, biology, and ecology of *Brodiaea filifolia,* and the requirements of the habitat to sustain the life-history traits of the species, we determined that the PCEs specific to *B. filifolia* are:

(1) PCE 1—Appropriate soil series at a range of elevations and in a variety of plant communities, specifically:

(A) Clay soil series of various origins (such as Alo, Altamont, Auld, or Diablo), clay lenses found as unmapped inclusions in other soils series, or loamy soils series underlain by a clay subsoil (such as Fallbrook, Huerhuero, or Las Flores) occurring between the elevations of 100 and 2,500 ft (30 and 762 m).

(B) Soils (such as Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils) altered by hydrothermal activity occurring between the elevations of 1,000 and 2,500 ft (305 and 762 m).

(C) Silty loam soil series underlain by a clay subsoil or caliche that are generally poorly drained, moderately to strongly alkaline, granitic in origin (such as Domino, Grangeville, Traver, Waukena, or Willows) occurring between the elevations of 600 and 1,800 ft (183 and 549 m).

(D) Clay loam soil series (such as Murrieta) underlain by heavy clay loams or clays derived from olivine basalt lava flows occurring between the elevations of 1,700 and 2,500 ft (518 and 762 m).

(E) Sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps occurring between 1,800 and 2,500 ft (549 and 762 m).

(2) PCE 2—Areas with a natural, generally intact surface and subsurface soil structure, not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), extending out up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide for space for individual population growth, and space for pollinators.

This revision to the previous critical habitat designation is designed for the conservation of those areas containing PCEs necessary to support the species' life history traits. All units/subunits of the revised critical habitat contain one of the specific soil components identified in PCE 1, which facilitate the natural process of seed dispersal and germination, cormlet disposition or movement to an appropriate soil depth, and corm persistence through seedling and adult phases of flowering and fruit set (*see* Habitat section of the proposed revised critical habitat rule for this species (74 FR 64932)), and have natural, generally intact surface and subsurface soil structure necessary to provide water, minerals, and other physiological needs for the species and support habitat for pollinators, which facilitate reproduction, as identified in PCE 2. These two factors are sufficient to support life-history traits of *Brodiaea filifolia* in the units/subunits we designate as revised critical habitat. In general, we designate units/subunits based on the presence of the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of the species. In the case of this designation, all of the units/subunits contain both of the PCEs.

Special Management Considerations or Protection

When designating critical habitat within the geographical area occupied by the species at the time of listing, we assess whether the physical or biological features essential to the conservation of the species may require special management considerations or protection. In all units/subunits, special management considerations or protection of the essential features may be required to provide for the growth, reproduction, and sustained function of the habitat on which *Brodiaea filifolia* depends.

The lands designated as revised critical habitat represent our best assessment of the habitat that meets the definition of critical habitat for *Brodiaea filifolia* at this time. The essential physical or biological features within the areas designated as revised critical habitat may require some level of management to address current and future threats to *B. filifolia,* including the direct and indirect effects of habitat loss and degradation from urban development; the introduction of nonnative invasive plant species; recreational activities; discing and mowing for agricultural practices or fuel modification for fire management; dumping of manure and sewage sludge; and hybridization with other species of *Brodiaea.*

Loss and degradation of habitat from development was cited in the final listing rule as a primary cause for the decline of *Brodiaea filifolia.* Most of the populations of this species are located in San Diego, Orange, and Riverside counties. These counties have had (and continue to have) increasing human populations and attendant housing pressure. Natural areas in these counties are frequently near or bounded by urbanized areas. Urban development removes the plant community components and associated clay soils identified in the PCEs, which eliminates or fragments the populations of *B. filifolia.* Grading, discing, and scraping areas in the preparation of areas for urbanization also directly alters the soil surface as well as subsurface soil layers to the degree that they will no longer support plant community types and pollinators associated with *B. filifolia* (PCE 2). Conservation and management of *B. filifolia* habitat and adjacent pollinator habitat is needed to address the threat of development.

Nonnative invasive plant species may alter the vegetation composition or physical structure identified in the PCEs to an extent that the area does not support *Brodiaea filifolia* or the plant community that it inhabits. Additionally, invasive species may compete with *B. filifolia* for space and resources by depleting water that would otherwise be available to *B. filifolia.* Management activities including (but not limited to) nonnative plant removal and control are needed to reduce this threat.

Unauthorized recreational activities may impact the vegetation composition and soil structure that supports *Brodiaea filifolia* to an extent that the area will no longer have intact soil surfaces or the plant communities identified in the PCEs. Off-highway vehicle (OHV) activity is an example of this type of activity. Management activities such as (but not limited to) fencing or other barriers to unauthorized access, signage, and monitoring are needed to address this threat.

Some methods of mowing or discing for agricultural purposes or fuel modification for fire management may preclude the full and natural development of *Brodiaea filifolia* by adversely affecting the PCEs. Mowing may preclude the successful reproduction of the plant, or alter the associated vegetation needed for pollinator activity (PCE 2). Dumping of sewage sludge can cover plants as well as the soils they need. Additionally, this practice can alter the chemistry of the substrate and lead to alterations in the vegetation supported at the site (PCE 1). Management activities such as (but not limited to) fencing, signage, and education of landowners and land managers about the detrimental effects that mowing, discing, and dumping sewage have on *B. filifolia* and its habitat are needed to address this threat.

Manure dumping on private property along the San Jacinto River area is impacting habitat within the Western Riverside County MSHCP plan area. These impacts are occurring despite identification of these areas as important for the survival and recovery of *Brodiaea filifolia* in the Western Riverside County MSHCP. Manure dumping is not a covered activity under the Western Riverside County MSHCP and was not discussed as an impact to *B. filifolia* in the Biological Opinion on the Western Riverside County MSHCP (Service 2004b, pp. 378–386). As outlined in the Western Riverside County MSHCP, we have been working with permittees to implement additional ordinances that will help to control activities (such as manure dumping) that may impact the implementation of the Western Riverside County MSHCP conservation objectives. To date, the City of Hemet is the only Western Riverside County MSHCP permittee that has addressed the negative impacts that manure dumping has on species such as *B. filifolia* and *Navarretia fossalis* and their habitats through the enactment of Ordinance 1666 (*i.e.,* the ordinance that prevents manure dumping activities and educates its citizens). We will continue to work with Riverside County and permittees of the Western Riverside County MSHCP to address activities that may impact the species within the Western Riverside County MSHCP plan area.

The Service is aware of occurrences of some hybrids within the range of *Brodiaea filifolia* in Subunit 5b (Devil Canyon) in northwestern San Diego County (Chester et al. 2007, p. 193). The presumed parent taxa of these hybrids are considered to be *B. filifolia* and *B. orcuttii* because of the apparent morphological intermediacy of the individuals and proximity of their ranges. This is supported by the close relationship of the two species noted above. Although there are some hybrids of *B. filifolia* and *B. orcuttii* in this subunit, it is likely that a minimum of 850 plants are pure *B. filifolia* (Service 2009b, p. 15) (we consider occurrences that have between 850 and 3,000 flowering stems observed in multiple years to be stable and persistent because we expect these occurrences to have a sufficient amount of corms to sustain the occurrence for a number of years if the habitat remains unaltered (see *Criteria Used* section below)). Plants of hybrid origin have also been reported in Subunit 8d (Upham) in the City of San Marcos (Chester *et al.* 2007, p. 191). Chester *et al.* (2007) only found a few hybrid specimens at this location, therefore it is likely that a minimum of 850 plants are pure *B. filifolia.* Hybridization could result in the loss of portions of *B. filifolia* occurrences if other *Brodiaea* species are transplanted adjacent to existing *B. filifolia* occurrences, or if existing *B. filifolia* occurrences are transplanted adjacent to other *Brodiaea* species and the two species are able to hybridize. Informing biological resource managers of the existence of this threat will help to keep human-mediated hybridization from occurring.

In summary, we find that the areas we are designating as revised critical habitat contain the physical or biological features essential to the conservation of *Brodiaea filifolia,* and that these features may require special management considerations or protection. Special management considerations or protection may be required to eliminate, or reduce to negligible level, the threats affecting each unit/subunit and to preserve and

maintain the essential features that the revised critical habitat units/subunits provide to *B. filifolia.* Additional discussions of threats facing individual sites are provided in the individual unit/subunit descriptions.

The designation of critical habitat does not imply that lands outside of critical habitat may not play an important role in the conservation of *Brodiaea filifolia.* In the future, and with changed circumstances, these lands may become essential to the conservation of *B. filifolia.* Activities with a Federal nexus that may affect areas outside of revised critical habitat, such as development, agricultural activities, and road construction, are still subject to review under section 7 of the Act if they may affect *B. filifolia* because Federal agencies must consider both effects to the plant and effects to critical habitat independently. The prohibitions of section 9 of the Act applicable to *B. filifolia* under 50 CFR 17.71 (*e.g.,* the prohibition against reducing to possession or maliciously damaging or destroying listed plants on Federal lands) also continue to apply both inside and outside of designated critical habitat.

Criteria Used To Identify Critical Habitat

We determined that all areas we are designating as final revised critical habitat are within the geographical area occupied by *Brodiaea filifolia* at the time of listing and are currently occupied (*see* the Spatial Distribution and Historical Range section of the proposed revised critical habitat rule (74 FR 64929; December 8, 2009) for more information). We considered the areas outside the geographical area occupied by the species at the time of listing, but are not designating any areas outside the geographical area occupied by *B. filifolia* at the time of listing because we determined that a subset of occupied lands within the species' historical range are adequate to ensure the conservation of *B. filifolia.* Occupied areas exist throughout this species' historical range, and through the conservation of a subset of occupied habitats (35 of 68 extant occurrences, *see* Table 1), we will be able to stabilize and conserve *B. filifolia* throughout its current and historical range. All units/subunits designated as revised critical habitat contain the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of this species and support multiple life-history traits for *B. filifolia.*

As required by section 4(b) of the Act, we use the best scientific and commercial data available in determining areas that contain the physical or biological features that are essential to the conservation of *Brodiaea filifolia.* The data used for this revised critical habitat are summarized below. This rule reflects the best available scientific and commercial information and thus differs from our 2005 final critical habitat rule.

This section provides details of the process we used to delineate critical habitat. This final rule reflects a progression of conservation efforts for *Brodiaea filifolia* that is largely based on the past analysis of the areas identified as meeting the definition of critical habitat for *B. filifolia* as identified in the 2004 proposed critical habitat rule, the 2005 final critical habitat designation, and new information we obtained on the species' distribution since listing. For some areas that were analyzed in 2005 but determined not to meet the definition of critical habitat, we received new distribution information for the proposed revised rule that resulted in determining that those areas do meet the definition of critical habitat. There are also some areas identified as meeting the definition of critical habitat in the 2005 critical habitat designation that we did not include in the proposed revised rule and this final revised critical habitat designation because we determined, based on a review of the best available information, that they do not meet the definition of critical habitat. The specific differences from the 2005 designation of critical habitat are summarized in the Summary of Changes from the Proposed Revised Rule and the Previous Critical Habitat Designation section of this rule.

Species and plant communities that are protected across their ranges are expected to have lower likelihoods of extinction (Soule and Simberloff 1986, p. 35; Scott *et al.* 2001, pp. 1297–1300). Genetic variation generally results from the effects of population isolation and adaptation to locally distinct environments (Lesica and Allendorf 1995, pp. 754–757; Hamrick and Godt 1996, pp. 291–295; Fraser 2000, pp. 49–51). We sought to include the range of ecological conditions in which *Brodiaea filifolia* is found to preserve the genetic variation that may reflect adaptation to local environmental conditions, as documented in other plant species (such as in Millar and Libby 1991, pp. 150, 152–155; or Hamrick and Godt 1996, pp. 299–301). A suite of locations that possess unique ecological characteristics will represent more of the environmental variability under which *B. filifolia* has evolved. Protecting these areas will promote the adaptation of the species to different environmental conditions and contribute to species recovery.

We also determined that habitat for pollinators is essential to the survival and recovery of this species because *Brodiaea filifolia* is self-incompatible (genetically similar individuals are not able to produce viable seeds). Sexual reproduction, facilitated through pollination, is necessary for the long-term conservation of this species.

All critical habitat discussed in this final revised critical habitat designation is occupied by the species at the subunit level, meaning that each subunit contains at least one known occurrence of *Brodiaea filifolia.* Occupied areas were determined from survey data and element occurrence data in the California Natural Diversity Database (CNDDB) (CNDDB 2009, pp. 1–76). Using GIS data in the areas identified as occupied by this species as a guide, we identified the areas that contain the physical and biological features essential to the conservation of *B. filifolia.* The essential features in each subunit are necessary for the conservation of the occurrence within the subunit, which contributes to the overall conservation of the species.

To map the areas that meet the definition of critical habitat, we identified areas that contain the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of this species using the following criteria: (1) Areas supporting occurrences on rare or unique habitat within the species' range; (2) areas supporting the largest known occurrences of *Brodiaea filifolia;* or (3) areas supporting stable occurrences of *B. filifolia* that are likely to be persistent. These criteria are explained in greater detail below and a summary of our analysis of all current and past areas supporting *B. filifolia* is presented in Table 3.

We determined that the areas supporting 36 of the 68 extant occurrences meet the definition of critical habitat; of these 36 occurrences, 7 are on Marine Corps Base Camp Pendleton (MCB Camp Pendleton) and the areas are exempt from critical habitat under section 4(a)(3) of the Act (*see* Exemptions under Section 4(a)(3) of the Act section below). Of the 29 occurrences in areas proposed as revised critical habitat (74 FR 64930; December 8, 2009), four are in areas excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (Subunits 7d, 8f, 11g, and 11h), and eight are in areas partially excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (portions of Subunits 6a, 6d,

7a, 7c, 8b, 11f, and Units 3 and 12) (*see* Exclusions under Section 4(b)(2) of the Act section below). Areas containing the PCEs and that meet at least one of the above criteria are considered to contain the physical and biological features essential to the conservation of the species and, therefore, meet the definition of critical habitat. Included in PCE 2 are areas up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide adequate space to support the habitat and alternate food sources needed for pollinators of *B. filifolia.* The 820-ft (250-m) distance for determining the pollinator use area is based on a conservative estimate for the mean routine flight distance for ground-nesting solitary bees that pollinate *B. filifolia.* This distance is not meant to capture all habitat that is potentially used by pollinators, but it is meant to capture a sufficient area to allow for pollinators to nest, feed, and reproduce in habitat that is adjacent and connected to the areas where *B. filifolia* grows (see Habitat for Pollinators of *Brodiaea filifolia* section above for a more detailed explanation of pollinator requirements and our derivation of the 820-ft (250-m) distance used to determine the pollinator use area).

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Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
Los Angeles County, California						
1	Glendora	20	X	--	X	1a
2	San Dimas/Gordon Highlands	40	X	X	--	1b
San Bernardino County, California						
3	Arrowhead Hot Springs	7	X	--	X	2
4	Waterman Canyon	8	--	--	--	N/A
Riverside County, California						
5	San Jacinto Wildlife Area	43 27	X	--	X	11a
6**	San Jacinto Ave/Dawson Rd	65	X	--	--	11b
7	Case Road	2	X	X	--	11c
X	Goetz Road	1	--	--	--	extirpated
8	Railroad Canyon	25	--	X	--	11d
9	Upper Salt Creek (Stowe Pool)	26	X	--	--	11e

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
10	Santa Rosa Plateau - Tenaja Rd.	3	--	--	--	*B. santarosae*
11	Santa Rosa Plateau - North of Tenaja Rd.	31	X	--	--	11h
12	Santa Rosa Plateau - South of Tenaja Rd.	30	X	--	--	11g
13	Santa Rosa Plateau - Mesa de Colorado	5	X	X	--	11f
14	East of Tenaja Guard Station	29	--	--	--	N/A
15	Redonda Mesa	52	--	--	--	N/A
16**	Corona Cala Camino	N/A	--	--	--	N/A
Orange County, California						
17	Edison Viejo	55	--	--	--	N/A
18	Aliso and Wood Canyons Wilderness Park	56	--	X	--	3
19	Cañada Gobernadora/Chiquita Ridgeline	64	--	--	X	4c
20**	Trampas Canyon	N/A	--	--	--	N/A
21**	Middle Gabino	N/A	--	--	--	N/A
22	Cristianitos Canyon	N/A	X	X	--	4g
	Cristianitos Canyon/Lower Gabino Canyon	62				
23**	East Talega/Blind Canyon	N/A	--	--	--	N/A
24	Caspers Wilderness Park	24	--	--	X	4b
25	Arroyo Trabuco Golf Course/Lower Arroyo Trabuco	N/A	--	--	--	N/A
x**	Prima Deshecha****	61	--	--	--	extirpated
26	Talega/Segunda Deshecha***	57	--	--	--	N/A

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
27	Forster Ranch***	58	--	--	--	N/A
		59				
		60				
28	Cristianitos Canyon South	63	--	--	--	N/A
San Diego County, California						
29	Miller Mountain	37	--	--	--	*B. santarosae*
	Devil Canyon	39	X	--	X	5b
30	Tributary off of Talega Canyon	N/A	--	--	--	N/A
31**	Cristianitos Canyon Pendleton	N/A	--	--	X	exempt
32**	San Mateo Creek	N/A	--	--	--	N/A
33	Bravo One	45	--	--	X	exempt
34**	Bravo Two North	N/A	--	--	--	N/A
35	Bravo Two South	N/A	--	--	X	exempt
36	Alpha One/Bravo Three	44	--	--	--	N/A
37**	Basilone/San Mateo Junction	N/A	--	--	X	exempt
38	Camp Horno	46,47, 48,49	--	X	--	exempt
39	Southeast of Horno Summit	50	--	--	--	N/A
40**	Top of Las Pulgas Canyon/Roblar Rd	N/A	--	--	--	N/A
41**	Top of Aliso Canyon/Roblar Rd	N/A	--	--	--	N/A

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
42	Basilone/Roblar Junction	51	--	--	--	N/A
43	East of I-5/South of Las Flores Creek	67	--	--	--	N/A
		68				
44**	Pilgrim Creek	N/A	--	--	X	exempt
45	Pueblitos Canyon	N/A	--	--	--	N/A
46**	West of Whelan Lake	N/A	--	--	--	N/A
47**	South of French Creek	N/A	--	--	--	N/A
48**	South White Beach	N/A	--	--	X	exempt
49	Taylor***	41	--	X	--	6d
	Undeveloped parcel between Darwin properties					
	Darwin Knolls and Darwin Glen					
50**	Arbor Creek/Colucci	N/A	X	--	X	6e
51	Mission View/Sierra Ridge	53	--	--	X	6c
52	Mesa Drive, SDG&E Substation		--	--	X	6b
53	Eternal Hills/Alta Creek	N/A	--	--	X	6a
	Cornerstone Community Church/Oceanside Blvd & El Camino Real					
54**	Vista Pacific	N/A	--	--	--	N/A
55**	Buena Vista Creek preserve	N/A	--	--	--	N/A
56	Calavera Heights Mitigation Site	N/A	--	--	--	N/A
57	Calavera Hills Village H	23	--	--	X	7c

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
58**	Calavera Hills Village X		--	--	--	N/A
59	Letterbox Canyon - Taylor Made***	N/A	--	X	--	7a
	Letterbox Canyon - Salk/Fox-Miller***	N/A				
	Letterbox Canyon - Newton Business Center	16				
X	North of Carlsbad dragstrip	14	--	--	--	extirpated
60**	Carlsbad Oaks	N/A	--	--	--	N/A
61	Rancho Carrillo	22	--	X	--	7b
	Rancho Santa Fe Rd North		--	--	--	N/A
62	Rancho La Costa	33	--	X	--	7d
		34				
63	La Costa Town Square	N/A	--	--	--	N/A
	Park View West/La Costa Ave & Rancho Santa Fe Rd****	21	--	--	--	extirpated
64	Poinsettia	N/A	--	--	--	N/A
X	Shelley Property/Olivenhein & Rancho Santa Fe Rd junction	32	--	--	--	extirpated
X	Calle Tres Vistas	54	--	--	--	extirpated
X	Vista	15	--	--	--	extirpated
X	Brengle Terrace	18	--	--	--	extirpated

Occurrence Number in 5-Year Review	Location Description	CNDDB* Element Occurrence Number (EO)	Criterion 1: Unique or Rare Habitat	Criterion 2: Largest Occurrences	Criterion 3: Stable and Persistent Occurrence	Critical Habitat Unit/Subunit
X	Vista, east of South Melrose Ave****	17	--	--	--	extirpated
X	North of Carlsbad dragstrip	13	--	--	--	extirpated
X	SSE of Buena, near Mission Rd & RR tracks	12	--	--	--	extirpated
65	Rancho Santalina***	11	--	X	--	8b
	Loma Alta					
	Rancho Santalina/Loma Alta					
	Las Posas Road Extension Project****		--	--	--	extirpated
66	Grand Avenue/Las Posas Rd pools***	36	X	X	--	8d
	Upham/Pacific St/Superior Ready Mix	10				
67**	Oleander/San Marcos Elementary***	N/A	--	X	--	8f
68**	Artesian Trails	70	--	--	X	12
		66				
X	4S Ranch****	N/A	--	--	--	extirpated

* California Department of Fish and Game, Natural Diversity Database
** New occurrence since listing, but determined to be occupied at the time of listing
*** Partially translocated (some plants currently exist at the original location)
**** Completely translocated (no plants currently exist at the original location)

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We identified habitat containing the features essential to the conservation of *Brodiaea filifolia* by using data from the following GIS databases: (1) Species occurrence information in Los Angeles, San Bernardino, Orange, Riverside, and San Diego Counties from the CNDDB and from survey reports; (2) vegetation data layers from Orange, Riverside, and San Diego Counties and vegetation data layers from the U.S. Forest Service's Cleveland National Forest (CNF) for Los Angeles and San Bernardino Counties; and (3) Natural Resources Conservation Service's Soil Survey Geographic Database (SSURGO) soil data layers for Orange, Riverside, and San Diego Counties, and State Soil Geographic Database (STATSGO) soil data layers for Los Angeles and San Bernardino Counties.

Criteria Used

If habitat areas met one or more of the following criteria, they were determined to meet the definition of critical habitat under section 3(5)(A)(i) of the Act.

(1) The first criterion is any area that supports an occurrence in rare or unique habitat within the species' range. We evaluated all occurrences of *Brodiaea filifolia* under this criterion, regardless of occurrence size. We identified four main factors that

constitute rare or unique habitat for *B. filifolia:*

(a) Occurrences in habitat types that are uncommon such as grassland habitat that occurs intermixed with chaparral, grassland habitat that is associated with vernal pools, or large areas of native grassland;

(b) Occurrences on uncommon soil types such as clay soils that are altered by hydrothermal activity;

(c) Occurrences that grow along ephemeral drainages in seep-type habitats; and

(d) Occurrences that grow in gravel, cobbles, and small boulder substrate.

These four unique situations differ from the majority of occurrences of this species, which are found on clay soils intermixed with coastal sage scrub habitat. The conservation of *Brodiaea filifolia* occurring in these rare or unique situations will preserve the diversity of habitats where this species is found.

(2) The second criterion is any area that supports one of the largest known populations of *Brodiaea filifolia.* Occurrences of this species range from just a few plants to several thousand plants, while the majority of the known occurrences are under 3,000 plants (*see* the **Background** section of the 2009 proposed revised critical habitat rule for a discussion on how occurrences of *B. filifolia* are grouped and counted). However, there are 13 occurrences that stand out as the largest, each having greater than 3,000 plants. Occurrences supporting large numbers of plants (3,000 or more) are noted in Table 1 and are found in the following areas:

(a) Los Angeles County: Subunit 1b-San Dimas;

(b) Riverside County: Subunit 11c-Case Road, Subunit 11d-Railroad Canyon, and Subunit 11f-Santa Rosa Plateau-Mesa de Colorado;

(c) Orange County: Unit 3–Aliso Canyon, and Subunit 4g-Cristianitos Canyon; and

(d) San Diego County: Subunit 6d-Taylor/Darwin, Subunit 7a-Letterbox Canyon, Subunit 7b-Rancho Carrillo, Subunit 7d-Rancho La Costa, Subunit 8b-Rancho Santalina/Loma Alta, Subunit 8d-Upham, and Subunit 8f-Oleander/San Marcos Elementary (*See* Table 1).

These large occurrences are present in habitat areas that contain the physical and biological features essential to the conservation of this species. These areas generally represent large contiguous blocks of intact habitat. The conservation of these large populations will increase the resilience of the species across its range and contribute to the overall recovery of this species.

(3) The third criterion is any area that supports an occurrence considered to be stable and persistent. We consider occurrences that have between 850 and 3,000 flowering stems that have been observed in multiple years to be stable and persistent because we expect these occurrences to have a sufficient number of corms to sustain the occurrence for a number of years if the habitat remains unaltered. These areas contribute to the conservation of *Brodiaea filifolia* by providing resilience for the species by decreasing the probability of the species becoming extinct, and by contributing to the genetic diversity of the species. The conservation of these areas helps *B. filifolia* to maintain its current geographic distribution, since these resilient occurrences are found throughout the range of the species. This is particularly important for *B. filifolia* because this species relies on outcrossing for successful reproduction.

To determine if any additional areas met the third criterion, we looked at all occurrences with fewer than 850 flowering stalks to determine if any of these exhibited the same persistence and stability characteristics to provide similar conservation value as the other identified occurrences with greater than 850 flowering stalks (since the counts for an occurrence vary from year to year). We found that one occurrence with fewer than 850 flowering stalks (at the Arbor Creek/Colucci site) exhibited characteristics of a stable, persistent occurrence (*i.e.,* an occurrence of consistent size not substantially less than 850 flowering stalks); therefore, this occurrence fulfills the ecological role of sites we are interested in identifying through this criterion, even though the high count at this site is 620 flowering stalks.

Of the 68 occurrences of *Brodiaea filifolia* that we identified as being extant in our 5-year review for this species (Service 2009b), areas supporting 36 occurrences meet one or more of the 3 criteria outlined above. Seven of these areas are exempt from this critical habitat designation under section 4(a)(3) of the Act (*see* Exemptions Under Section 4(a)(3) of the Act section), and the remaining 29 areas were proposed as revised critical habitat (74 FR 64930; December 8, 2009). Of these 29 areas, 14 fit into one of the 4 reasons that areas meet the "rare or unique habitat" criterion, 13 meet the "largest occurrences" criterion, and 13 meet the "stable and persistent occurrences" criterion. Of these 29 areas, 3 are excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (Subunits 7d, 11g, and 11h), and 5 are partially excluded from this final revised critical habitat designation under section 4(b)(2) of the Act (portions of Subunits 7a, 7c, 11f, and Units 3 and 12) (*see* Exclusions under Section 4(b)(2) of the Act section below).

The habitat areas that meet one or more of the criteria represent the historical range of the species, and are adequate to provide for this species' conservation. Habitat areas and the occurrences they support that do not meet any of the three criteria may still be important to the conservation of this species, but without the conservation of the habitat areas and occurrences identified through this process, the recovery effort for this species may be impaired.

Other Factors Involved With Delineating Critical Habitat

Following the identification of areas supporting 36 occurrences of the 68 extant occurrences that met one of the 3 criteria listed above, we mapped the area that contained the PCEs at each occurrence including habitat extending beyond the perimeters of mapped occurrences of *Brodiaea filifolia* by up to 820 ft (250 m) to provide adequate space to support the habitat and alternate food sources needed for pollinators of *B. filifolia* (see Habitat for Pollinators of *Brodiaea filifolia* section).

Areas that did not provide habitat for *Brodiaea filifolia* or potential pollinators were removed from the 820-ft (250-m) zone of mapped occurrences of *B. filifolia,* such as areas that were developed or severely altered by grading. Our mapping methodology captures the PCEs in the appropriate quantity and spatial arrangement essential to the conservation of the species, and encompasses the range of environmental variability for this species.

When determining the final revised critical habitat boundaries for *Brodiaea filifolia,* we made every effort to map precisely the areas that contain the physical or biological features essential to the conservation of the species. However, we cannot guarantee that every fraction of revised critical habitat contains the PCEs due to the mapping scale that we use to draft critical habitat boundaries. Additionally, we made every attempt to avoid including developed areas such as lands underlying buildings, pavement, and other structures because such lands lack PCEs for *B. filifolia.* The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any

such lands inadvertently left inside critical habitat boundaries shown on the maps of this revised critical habitat are excluded by text in this rule and are not designated critical habitat. Therefore, Federal actions involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification, unless the specific actions may affect adjacent critical habitat.

Revised Critical Habitat Designation

We are designating 2,947 ac (1,193 ha) in 10 units, subdivided into 23 subunits as revised critical habitat for *Brodiaea filifolia.* The unit numbers in this rule correspond to those used in the 2004 proposed rule and the 2005 final rule; however, Units 9 and 10 were not proposed and Units 11 and 12 are new to this revised rule. Unit 11 represents lands in Riverside County excluded from the 2005 designation of critical habitat, and Unit 12 represents the Artesian Trails area in San Diego County that is now partially included based on new occurrence data in this area. To minimize confusion with the previous proposal and designation we are not using Unit numbers 9 and 10 in this rule (*see* Table 2 and Summary of Changes from the Proposed Revised Rule and the Previous Critical Habitat Designation section).

The areas we describe below constitute our best assessment of areas that meet the definition of critical habitat for *Brodiaea filifolia.* We determined these areas are within the geographical area occupied at the time of listing, and contain the physical and biological features essential to the conservation of *B. filifolia* that may require special management considerations or protection. We are not designating any areas outside the geographical area occupied by the species at the time of listing because we determined that the lands we are designating as revised critical habitat are adequate to ensure conservation of *B. filifolia.* The lands designated as revised critical habitat represent a subset of the total lands occupied by *B. filifolia.* Table 4 identifies the approximate area of each designated critical habitat subunit by land ownership. These subunits, which generally correspond to the geographic area of the subunits delineated in the 2005 designation (see Table 2 for a detailed comparison of this rule and the 2005 designation), replace the 2005 critical habitat designation for *B. filifolia* in 50 CFR 17.96(a).

TABLE 4—AREA ESTIMATES IN ACRES (AC) AND HECTARES (HA), AND LAND OWNERSHIP FOR BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT

Location	Ownership				Total area **
	Federal *	State government	Local government	Private	
Unit 1: Los Angeles County					
1a. Glendora	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	67 ac (27 ha)	67 ac (27 ha).
1b. San Dimas	13 ac (5 ha)	0 ac (0 ha)	0 ac (0 ha)	125 ac (51 ha)	138 ac (56 ha).
Unit 2: San Bernardino County					
2. Arrowhead Hot Springs	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	61 ac (25 ha)	61 ac (25 ha).
Unit 3: Central Orange County					
3. Aliso Canyon	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	11 ac (4 ha)	11 ac (4 ha).
Unit 4: Southern Orange County					
4b. Caspers Wilderness Park	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	12 ac (5 ha)	12 ac (5 ha).
4c. Cañada Gobernadora/Chiquita Ridgeline.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	133 ac (54 ha)	133 ac (54 ha).
4g. Cristianitos Canyon	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	587ac (238 ha)	587ac (238 ha).
Unit 5: Northern San Diego County					
5b. Devil Canyon	266 ac (108 ha)	0 ac (0 ha)	0 ac (0 ha)	8 ac (3 ha)	274 ac (111ha).
Unit 6: Oceanside					
6a. Alta Creek	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	72 ac (29 ha)	72 ac (29 ha).
6b. Mesa Drive	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	17 ac (7 ha)	17 ac (7 ha).
6c. Mission View/Sierra Ridge	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	12 ac (5 ha)	12 ac (5 ha).
6d. Taylor/Darwin	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	35 ac (14 ha)	35 ac (14 ha).
6e. Arbor Creek/Colucci	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	94 ac (38 ha)	94 ac (38 ha).
Unit 7: Carlsbad					
7a. Letterbox Canyon	0 ac (0 ha)	1 ac (<1 ha)	0 ac (0 ha)	41 ac (17 ha)	43 ac (17 ha).
7b. Rancho Carrillo	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	37 ac (15 ha)	37 ac (15 ha).
7c. Calavera Hills Village H	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	26 ac (11 ha)	26 ac (11 ha).
Unit 8: San Marcos and Vista					
8b. Rancho Santalina/Loma Alta	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	47 ac (19 ha)	47 ac (19 ha).
8d. Upham	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	54 ac (22 ha)	54 ac (22 ha).
8f. Oleander/San Marcos Elementary.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	7 ac (3 ha)	7 ac (3 ha).
Unit 11: Western Riverside County					
11a. San Jacinto Wildlife Area	0 ac (0 ha)	366 ac (148 ha)	17 ac (7 ha)	18 ac (7 ha)	401 ac (162 ha).
11b. San Jacinto Avenue/Dawson Road.	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	117 ac (47 ha)	117 ac (47 ha).
11c. Case Road	0 ac (0 ha)	0 ac (0 ha)	11 ac (5 ha)	169 ac (68 ha)	180 ac (73 ha).
11d. Railroad Canyon	53 ac (21 ha)	0 ac (0 ha)	1 ac (<1 ha)	204 ac (83 ha)	257 ac (104 ha).
11e. Upper Salt Creek (Stowe Pool)	0 ac (0 ha)	0 ac (0 ha)	0 ac (0 ha)	145 ac (59 ha)	145 ac (59 ha).
11f. Santa Rosa Plateau—Mesa de Colorado.	0 ac (0 ha)	0 ac (0 ha)	5 ac (2 ha)	8 ac (3 ha)	13 ac (5 ha).
Unit 12: Central San Diego County					
12. Artesian Trails	0 ac (0 ha)	0 ac (0 ha)	7 ac (3 ha)	98 ac (40 ha)	105 ac (43 ha).

TABLE 4—AREA ESTIMATES IN ACRES (AC) AND HECTARES (HA), AND LAND OWNERSHIP FOR BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT—Continued

Location	Ownership				Total area **
	Federal *	State government	Local government	Private	
Total**	332 ac (134 ha)	367 ac (148 ha)	41 ac (17 ha)	2,205 ac (894 ha)	2,947 ac (1,193 ha).

* 1,531 ac (620 ha) of federally owned land on MCB Camp Pendleton is exempt from this revised critical habitat (*see* Exemptions Under Section 4(a)(3) of the Act section).
** Values in this table and the following text may not sum due to rounding.

Presented below are brief descriptions of all subunits and reasons why they meet the definition of critical habitat for *Brodiaea filifolia.* The subunits are listed in order geographically north to south and west to east.

Unit 1: Los Angeles County

Unit 1 is located in Los Angeles County, and consists of two subunits totaling 206 ac (83 ha). This unit contains 13 ac (5 ha) of federally owned land and 192 ac (78 ha) of private land.

Subunit 1a: Glendora

Subunit 1a consists of 67 ac (27 ha) of private land in the City of Glendora, in the foothills of the San Gabriel Mountains in Los Angeles County. Lands within this subunit contain Cieneba-Exchequer-Sobrante soils, a type of silty loam, and consist primarily of northern mixed chaparral and coastal sage scrub habitat. Subunit 1a contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of two occurrences located in the foothills of the San Gabriel Mountains which are part of the Transverse Ranges where the species was historically found, and is also significant because it is the northernmost occurrence known; and (3) supports a stable, persistent occurrence of approximately 2,000 plants. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. The site is protected from development and is owned by the Glendora Community Conservancy (GCC). The GCC has expressed interest in creating a management plan for their land; however, a comprehensive management plan that would specifically address the control of nonnative plants has not been completed at this time. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 1b: San Dimas

Subunit 1b consists of 13 ac (5 ha) of Federal land (Angeles National Forest) and 125 ac (51 ha) of private land near the City of San Dimas in the foothills of the San Gabriel Mountains in Los Angeles County. Lands within this subunit contain Cieneba-Exchequer-Sobrante soils, a type of silty loam, and consist primarily of northern mixed chaparral and coastal sage scrub habitat. Subunit 1b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of two occurrences located in the foothills of the San Gabriel Mountains which are part of the Transverse Ranges where the species was historically found, and represents the only likely genetic connection to plants in the Glendora subunit; and (3) supports two significant populations totaling about 6,000 individuals of *B. filifolia,* as documented in 1990 (CNDDB 2009, p. 37). Several proposals for development of this area have been reviewed by the City of Glendora (D. Walter, Senior Planner City of Glendora pers. comm. to G. Wallace, Service 2005). Additionally, illegal grading has occurred on the northern portion of this subunit (grading was halted by the City of Glendora). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from urban development on private lands, including minimizing disturbance to the surface and subsurface structure, and to maintain pollinator habitat. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 2: San Bernardino County—Arrowhead Hot Springs

Unit 2 is located in San Bernardino County, California, and consists of 61 ac (25 ha) of private land at the southwestern base of the San Bernardino Mountains. This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this unit contain Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils altered by hydrothermal activity, some of which are considered alluvial, and consist primarily of coastal sage scrub habitat. Unit 2 contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including soils altered by hydrothermal activity (PCE 1B) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing the only occurrence of this plant in the foothills of the San Bernardino Mountains part of the Transverse Ranges where the species was historically found, and representing the type locality for *B. filifolia* (Niehaus 1971, p. 57; CNDDB 2009, p. 7); and (3) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 3: Central Orange County—Aliso Canyon

Unit 3 is located in central Orange County, California, and consists of 11 ac (4 ha) of private land in the City of Laguna Niguel, southwestern Orange County. These totals do not include 102 ac (42 ha) of land in Unit 3 that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this unit contain clay loam or other types of loam and consist of annual and needlegrass grassland. Unit 3 contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 5,000 individuals of *B. filifolia,* as documented in 2001 (CNDDB 2009, p. 51). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from fuel management activities (annual mowing) and pipeline work. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 4: Southern Orange County

Unit 4 is located in southern Orange County, California, and consists of 3 subunits totaling 732 ac (297 ha) of private land. These totals do not include portions of Subunit 4b (192 ac (78 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). Subunits 4a, 4d, 4e, 4f, 4h, and 4i as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and were not proposed for revised designation.

Subunit 4b: Wilderness Park

Subunit 4b consists of 12 ac (5 ha) of private land in the City of San Juan Capistrano and the Audubon California Starr Ranch Sanctuary, in the southwestern region of the Santa Ana Mountains, southern Orange County. Lands within this subunit contain clay loam, sandy loam, or rocky outcrop, and consist primarily of grassland and sagebrush-buckwheat scrub habitat. Subunit 4b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. This subunit is located in the foothills of the Santa Ana Mountains and represents the highest elevation and northernmost occurrence in Orange County. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 4c: Cañada Gobernadora/Chiquita Ridgeline

Subunit 4c consists of 133 ac (54 ha) of private land in and around Cañada Gobernadora on Rancho Mission Viejo in southern Orange County. Lands within this subunit contain clay, clay loam, or sandy loam and consist primarily of dry-land agriculture and sagebrush-buckwheat scrub habitat. Subunit 4c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 4g: Cristianitos Canyon

Subunit 4g consists of 587 ac (238 ha) of privately owned land in Cristianitos Canyon on Rancho Mission Viejo in southern Orange County. Lands within this subunit are underlain by clay and sandy loam soils and consist primarily of annual grassland and needlegrass grassland. Subunit 4g contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay soils and loamy soils underlain by a clay subsoil (PCE 1A), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports an occurrence in rare and unique habitat, representing one of the few places where this species occurs in needlegrass grassland in Orange County; and (3) supports an occurrence of at least 6,505 individuals of *B. filifolia,* as documented in 2003 (Dudek & Associates, Inc. 2006, Chapter 3 pp. 73–74, 83; Service 2007, pp. 149–150). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 5: Northern San Diego County

Unit 5 is located in northern San Diego County, and consists of one subunit totaling 274 ac (111 ha). This unit contains 266 ac (108 ha) of Federal Government land and 8 ac (3 ha) of private land. This unit is located entirely within the boundary of the CNF. Subunit 5a as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and was not proposed for revised designation.

Subunit 5b: Devil Canyon

Subunit 5b consists of 266 ac (108 ha) of Federal land (CNF) and 8 ac (3 ha) of private land in northern San Diego County. Hybrids between *Brodiaea filifolia* and *B. orcuttii* have been reported from the Devil Canyon site, however, we believe *B. filifolia* occurs in sufficient numbers in this area to meet the criteria for critical habitat designation (*see* the Special Management Considerations or Protection section of this rule for a discussion of *Brodiaea* hybridization). Lands within this subunit contain Cieneba Very Rocky Coarse Sandy Loam, Fallbrook Sandy Loam, and Cieneba Coarse Sandy Loam soils and

consist primarily of chaparral and oak woodland vegetation. Subunit 5b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including sandy loam soils (PCE 1E) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports an occurrence in rare and unique habitat, representing one of the few places where this species occurs in a drainage in oak woodland habitat and occurring in unusual seeps and drainages on low granitic outcrops; and (3) supports a stable, persistent occurrence. The CNF does not currently have a management plan specific to *B. filifolia.* The 2005 critical habitat rule for *B. filifolia* and the 2009 proposed revised critical habitat rule erroneously stated that grazing occurs in this area; this area is in fact not subjected to cattle grazing (Winter 2004, pers. comm.). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. Please see the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 6: Oceanside, San Diego County

Unit 6 is located in Oceanside, San Diego County, California, and consists of five subunits totaling 230 ac (93 ha) of private land.

Subunit 6a: Alta Creek

Subunit 6a consists of 72 ac (29 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine sandy loam, loam, or loamy fine sand and consist primarily of coastal sage scrub habitat. Subunit 6a contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,500 individuals of *B. filifolia* (Affinis 2005, pp. 1–3; AMEC 2005 pp. 3–18). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6b: Mesa Drive

Subunit 6b consists of 17 ac (7 ha) of private land in the City of Oceanside, in northern coastal San Diego County. Lands within this subunit contain loamy fine sands and consist primarily of grassland habitat. Subunit 6b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,500 individuals of *B. filifolia* (Roberts 2005a, pp.1–2). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and habitat disturbance on local government lands (Roberts 2005, pp. 1–3). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6c: Mission View/Sierra Ridge

Subunit 6c consists of 12 ac (5 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine loamy sands and consist primarily of coastal sage scrub habitat. Subunit 6c contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 1,300 individuals of *B. filifolia* (Roberts 2005b, p. 1). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6d: Taylor/Darwin

Subunit 6d consists of 35 ac (14 ha) of private land in the City of Oceanside, in northern coastal San Diego County. Lands within this subunit contain clay soil and fine loamy sands and consist primarily of annual and needlegrass grassland. Subunit 6d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 6,200 individuals of *B. filifolia,* as documented in 2005 (CNDDB 2009, p. 38). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 6e: Arbor Creek/Colucci

Subunit 6e consists of 94 ac (38 ha) of private land in the City of Oceanside, in northern coastal San Diego County. This subunit was not included in the 2005 final critical habitat designation but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay soil and fine loamy sands and consist primarily of annual and needlegrass grassland. Subunit 6e contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2);

and (2) supports a stable, persistent occurrence; and (3) consists primarily of annual and needlegrass grassland and occurs in the largest continuous block of grassland habitat remaining in the City of Oceanside. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants and urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 7: Carlsbad, San Diego County

Unit 7 is located in Carlsbad, San Diego County, California, and consists of three subunits totaling 105 ac (43 ha). This unit contains 1 ac (<1 ha) of State land and 104 ac (43 ha) of private land. These totals do not include Subunit 7d (98 ac (40 ha)) and portions of Subunit 7a (13 ac (5 ha)) and Subunit 7c (45 ac (18 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule), or 2 ac (<1 ha) that were proposed as revised critical habitat but are not included in this final revised critical habitat designation because they do not support suitable habitat for the species.

Subunit 7a: Letterbox Canyon

Subunit 7a consists of 1 ac (<1 ha) of State land and 41 ac (17 ha) of private land in the City of Carlsbad, in northern coastal San Diego County, California. Lands within this subunit contain heavy clay soils and consist primarily of annual grassland. Subunit 7a contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 39,500 individuals of *B. filifolia,* as documented in 2005 (CNDDB 2009, p. 15). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 7b: Rancho Carrillo

Subunit 7b consists of 37 ac (15 ha) of private land in the City of Carlsbad, in northern coastal San Diego County, California. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay or sandy loam soils and consist primarily of annual grasslands and coastal sage scrub habitat. Subunit 7b contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 797,000 individuals of *B. filifolia,* as documented in 2005 (this estimate was of vegetative plants and not flowering plants) (Scheidt and Allen 2005, p. 1). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 7c: Calavera Hills Village H

Subunit 7c consists of 26 ac (11 ha) of private land in the City of Carlsbad, in northern coastal San Diego County. Lands within this subunit contain clay soil and consist primarily of annual and needlegrass grassland. Subunit 7c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence of at least 2,243 plants, as documented in 2008 (McConnell 2008, p. 9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 8: San Marcos, San Diego County

Unit 8 is located in San Marcos, northern San Diego County, California, and consists of three subunits totaling 108 ac (44 ha) of private land. Subunits 8a, 8c, and 8e as proposed in the December 8, 2004, rule (69 FR 71283) did not meet the definition of critical habitat and were not proposed for revised designation.

Subunit 8b: Rancho Santalina/Loma Alta

Subunit 8b consists of 47 ac (19 ha) of private land in the City of San Marcos, northern San Diego County, California. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay, loam, or loamy fine sand soils and consist primarily of annual and needlegrass grassland. Subunit 8b contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 5,552 individuals of *B. filifolia,* as documented in 2000, and approximately 12,000 *B. filifolia* corms were transplanted to the area in 2004 (CNDDB 2009, p. 10). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, unauthorized recreational activities, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 8d: Upham

Subunit 8d consists of 54 ac (22 ha) of private land in the City of San Marcos, northern San Diego County. Hybrids between *Brodiaea filifolia* and *B. orcuttii* have been reported from the Upham site (Chester *et al.* 2007, p. 188),

however, based on the best scientific information available to us at this time, we believe *B. filifolia* occurs in sufficient numbers in this area to meet the criteria for critical habitat designation (*see* the Special Management Considerations or Protection section of this rule for a discussion of *Brodiaea* hybridization). Lands within this subunit contain clay soils and consist primarily of annual and needlegrass grassland and vernal pool habitat. Subunit 8d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat; and (3) supports an occurrence of at least 342,000 individuals of *B. filifolia,* as documented in 1993 (CNDDB 2009, p. 9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, unauthorized recreational activities, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 8f: Oleander/San Marcos Elementary

Subunit 8f consists of 7 ac (3 ha) of land owned by the San Marcos Unified School District near the City of San Marcos, in northern San Diego County. This subunit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain clay, loam, or loamy fine sand soils and consist primarily of annual grassland. Unit 8f contains the physical and biological features essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 3,211 individuals of *B. filifolia,* as documented in 2005 (Dudek and Associates, Inc. 2007, p.9). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 11: Western Riverside County

Unit 11 is located in western Riverside County, California, and consists of 6 subunits totaling 1,113 ac (450 ha). This unit contains 53 ac (21 ha) of Federal land, 366 ac (148 ha) of State land, 33 ac (13 ha) of local government land, and 661 ac (267 ha) of private land. These totals do not include Subunits 11g (117 ac (47 ha)), 11h (44 ac (18 ha)) and portions of Subunit 11f (221 ac (89 ha)) that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule).

Subunit 11a: San Jacinto Wildlife Area

Subunit 11a consists of 366 ac (148 ha) of State land (California Department of Fish and Game (CDFG)), 17 ac (7 ha) of local government land, and 18 ac (7 ha) of private land at the San Jacinto Wildlife Area, in western Riverside County. Lands within this subunit contain Willows silty clay, Waukena loam and Waukena fine sandy loam, Traver fine sandy loam and Traver loamy fine sand, and Hanford coarse sandy loam soils and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11a contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of four occurrences associated with alkali playa habitat; and (3) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants and construction of new roads or improvements to existing roadways (Service 2004b, pp. 137–189). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11b: San Jacinto Avenue/ Dawson Road

Subunit 11b consists of 117 ac (47 ha) of private land near San Jacinto Avenue and Dawson Road, in western Riverside County. Lands within this subunit contain Willows silty clay and Domino silt loam soils and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11b contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a rare or unique occurrence, representing one of four occurrences that are associated with alkali playa habitat. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from discing, grazing, manure dumping, and nonnative invasive plants (CNDDB 2009, p. 60). *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11c: Case Road

Subunit 11c consists of 11 ac (4 ha) of local government land and 169 ac (68 ha) of private land near the City of Perris, in western Riverside County. Lands within this subunit contain Willows silty clay and Domino silt loam soils and consist primarily of agricultural land, floodplain habitat, alkali scrub habitat, and alkali playa habitat. Subunit 11c contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and

pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of four occurrences that are associated with alkali playa habitat; and (3) supports an occurrence of at least 4,555 individuals of *B. filifolia,* as documented in 2000 (Glenn Lukos Associates, Inc. 2000a, Map of San Jacinto River Stage 3 Project Impacts Version 2 Alignment; Glenn Lukos Associates, Inc. 2000b, pp. 17–18; CNDDB 2009, p. 2). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from OHV activity, encroaching urban development, manure dumping, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11d: Railroad Canyon

Subunit 11d consists of 53 ac (21 ha) of Federal land owned by the Bureau of Land Management, 1 ac (<1 ha) of local government land, and 204 ac (83 ha) of private land north of Kabian County Park and southwest of the City of Perris, in western Riverside County. Lands within this subunit contain Lodo rocky loam, Garretson gravelly very fine sandy loam and Garretson very fine sandy loam, Escondido fine sandy loam, and Grangeville fine sandy loam soils and consist primarily of annual grassland. Subunit 11d contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports an occurrence of at least 3,205 individuals of *B. filifolia,* as documented in 2000 (Glenn Lukos Associates 2000a, pp. 13, 24; CNDDB 2009, p. 23). The occurrence in Railroad Canyon is at risk from the San Jacinto River Flood Control Project. That project includes channelization of the river, which may result in changes in floodplain process essential to the species persistence in this subunit (Service 2004b, p. 382). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development, river channelization for flood control, and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11e: Upper Salt Creek (Stowe Pool)

Subunit 11e consists of 145 ac (59 ha) of private land in the Upper Salt Creek drainage west of Hemet, in western Riverside County. Lands within this subunit contain Willows silty clay, Chino silt loam, Honcut loam, and Wyman loam and consist primarily of annual grassland, alkali scrub habitat, and alkali playa habitat. Subunit 11e contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including silty loam soils underlain by a clay subsoil or caliche that are generally poorly drained and moderately to strongly alkaline (PCE 1C), and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat. This subunit is crossed by roadways that, if altered (widened or realigned), could change the topography and thereby negatively affect the hydrologic integrity of the pool complexes and favor the growth of nonnative invasive plant species (CNDDB 2009, p. 24; Service 2004b, p. 382). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from nonnative invasive plants (such as *Hordeum marinum* subsp. *gussoneanum*) and transportation projects. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Subunit 11f: Santa Rosa Plateau—Mesa de Colorado

Subunit 11f consists of 5 ac (2 ha) of local government land and 8 ac (3 ha) of private land in southwestern Riverside County. Lands within this subunit contain Murrieta stony clay loam, and Las Posas rocky loam and Las Posas loam soils and consist primarily of annual and needlegrass grassland and vernal pool habitat. Subunit 11f contains the physical and biological features essential to the conservation of *Brodiaea filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including clay loam soil series underlain by heavy clay loams or clays derived from olivine basalt lava flows that generally occur on mesas and gentle to moderate slopes (PCE 1D) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); (2) supports a rare or unique occurrence, representing one of three occurrences that are associated with vernal pool habitat; and (3) supports an occurrence of at least 31,725 individuals of *B. filifolia,* as documented in 1990 (CNDDB 2009, p. 5). The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Unit 12: Central San Diego County—Artesian Trails

Unit 12 is located in central San Diego County, California, and consists of 105 ac (43 ha). This unit contains 7 ac (3 ha) of local government land and 98 ac (40 ha) of private land. These totals do not include 4 ac (2 ha) of land in Unit 12 that we are exercising our delegated discretion to exclude from this revised designation under section 4(b)(2) of the Act (*see* the Exclusions under Section 4(b)(2) of the Act section of this rule). This unit was not included in the 2005 final critical habitat designation, but is included in this rule based on new information related to the distribution of *Brodiaea filifolia.* Lands within this subunit contain fine loamy sands and consist primarily of coastal sage scrub habitat and annual grassland. Unit 12 contains physical and biological features that are essential to the conservation of *B. filifolia* because it: (1) Contains the PCEs for *B. filifolia,* including loamy soils underlain by a clay subsoil (PCE 1A) and areas with a natural, generally intact surface and subsurface soil structure that support *B. filifolia* and pollinator habitat (PCE 2); and (2) supports a stable, persistent occurrence. The physical and biological features essential to the conservation of the species in this subunit may require special management considerations or

protection to address threats from the indirect effects associated with urban development and nonnative invasive plants. *Please see* the Special Management Considerations or Protection section of this rule for a discussion of the threats to *B. filifolia* habitat and potential management considerations.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out are not likely to destroy or adversely modify critical habitat. Decisions by the 5th and 9th Circuit Courts of Appeals have invalidated our definition of "destruction or adverse modification" (50 CFR 402.02) (*see Gifford Pinchot Task Force* v. *U.S. Fish and Wildlife Service,* 378 F. 3d 1059 (9th Cir 2004) and *Sierra Club* v. *U.S. Fish and Wildlife Service et al.,* 245 F.3d 434, 442F (5th Cir 2001)), and we do not rely on this regulatory definition when analyzing whether an action is likely to destroy or adversely modify critical habitat. Under the statutory provisions of the Act, we determine destruction or adverse modification on the basis of whether, with implementation of the Federal action, the affected critical habitat would remain functional (or retain the current ability for the PCEs to be functionally established) to serve its intended conservation role for the species (Service 2004c, p. 3).

Section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us in most cases. As a result of this consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or designated critical habitat; or

(2) A biological opinion for Federal actions that are likely to adversely affect listed species or designated critical habitat.

An exception to the concurrence process referred to in (1) above occurs in consultations involving National Fire Plan projects. In 2004, the U.S. Forest Service (USFS) and the U.S. Bureau of Land Management (BLM) reached agreements with the Service to streamline a portion of the section 7 consultation process (BLM–ACA 2004, pp. 1–8; FS–ACA 2004, pp. 1–8). The agreements allow the USFS and the BLM the opportunity to make "not likely to adversely affect" (NLAA) determinations for projects implementing the National Fire Plan. Such projects include prescribed fire, mechanical fuels treatments (thinning and removal of fuels to prescribed objectives), emergency stabilization, burned area rehabilitation, road maintenance and operation activities, ecosystem restoration, and culvert replacement actions. The USFS and the BLM must ensure staff are properly trained, and both agencies must submit monitoring reports to the Service to determine if the procedures are being implemented properly and that effects on endangered species and their habitats are being properly evaluated. As a result, we do not believe the alternative consultation processes being implemented as a result of the National Fire Plan will differ significantly from those consultations being conducted by the Service.

If we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species or destroy or adversely modify critical habitat, we also provide reasonable and prudent alternatives to the project, if any are identifiable. We define "Reasonable and prudent alternatives" at 50 CFR 402.02 as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Director's opinion, avoid jeopardizing the continued existence of the listed species or destroying or adversely modifying its critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where we have listed a new species or subsequently designated critical habitat that may be affected and the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law). Consequently, Federal agencies may sometimes need to request reinitiation of consultation with us on actions for which formal consultation has been completed, if those actions with discretionary involvement or control may affect subsequently listed species or designated critical habitat.

Federal activities that may affect *Brodiaea filifolia* or its designated critical habitat will require section 7 consultation under the Act. Activities on State, tribal, local, or private lands requiring a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq.*) or a permit under section 10 of the Act from the Service) or involving some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency) will also be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat, and actions on State, tribal, local, or private lands that are not federally funded, authorized, or permitted, do not require section 7 consultations.

Application of the "Adverse Modification" Standard

The key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would continue to serve its intended conservation role for the species, or would retain its current ability for the primary constituent elements to be functionally established. Activities that may destroy or adversely modify critical habitat are those that alter the physical and biological features to an extent that appreciably reduces the conservation value of critical habitat for *Brodiaea filifolia.* As discussed above, the role of critical habitat is to support the life-history needs of the species and provide for the conservation of the species. Generally, the conservation role of the *B. filifolia* critical habitat units is to support viable occurrences in appropriate habitat areas.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe in any proposed or final regulation that designates critical habitat those activities involving a Federal action that may destroy or adversely modify such habitat, or that may be affected by such designation.

Activities that, when carried out, funded, or authorized by a Federal agency, may adversely affect critical habitat and, therefore, should result in consultation for *Brodiaea filifolia* include, but are not limited to (*please see* Special Management Considerations or Protection section for a more detailed discussion on the impacts of these actions to the listed species):

(1) Actions that result in ground disturbance. Such activities could include (but are not limited to) residential or commercial development, OHV activity, pipeline construction, new road construction or widening, existing road maintenance, manure dumping, and grazing. These activities potentially impact the habitat and PCEs of *Brodiaea filifolia* by damaging, disturbing, and altering soil composition through direct impacts, increased erosion, and increased nutrient content. Additionally, changes in soil composition may lead to changes in the vegetation composition, thereby changing the overall habitat type.

(2) Actions that result in alteration of the hydrological regimes typically associated with *Brodiaea filifolia* habitat. Such activities could include residential or commercial development, OHV activity, pipeline construction, new road construction or widening, existing road maintenance, and channelization of drainages. These activities could alter surface layers and the hydrological regime in a manner that promotes loss of soil matrix components and moisture necessary to support the growth and reproduction of *B. filifolia.*

(3) Actions that would disturb the existing vegetation communities adjacent to *Brodiaea filifolia* habitat prior to annual pollination and seed set (reproduction). Such activities could include (but are not limited to) grazing, mowing, grading, or discing habitat in the spring and early summer months. These activities could alter the habitat for pollinators leading to potential decreased pollination and reproduction.

(4) Road construction and maintenance, right-of-way designation, and agricultural activities, or any activity funded or carried out, permitted, or regulated by the Department of Transportation or Department of Agriculture that could result in excavation, or mechanized land clearing of *Brodiaea filifolia* habitat. These activities could alter the habitat in such a way that soil, seeds, and corms of *B. filifolia* are removed and which permanently alter the habitat or the species' presence.

(5) Licensing or construction of communication sites by the Federal Communications Commission or funding of construction or development activities by the U.S. Department of Housing and Urban Development that could result in excavation, or mechanized land clearing of *Brodiaea filifolia* habitat. These activities could alter the habitat in such a way that soil, seeds, and corms of *B. filifolia* are removed and that permanently alter the habitat or the species' presence.

Exemptions Under Section 4(a)(3) of the Act

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108–136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) now provides: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act [Improvement Act of 1997 (Sikes Act)] (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

The Sikes Act required each military installation that includes land and water suitable for the conservation and management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

(1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;

(2) A statement of goals and priorities;

(3) A detailed description of management actions to be implemented to provide for these ecological needs; and

(4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

We consult with the military on the development and implementation of INRMPs for installations with federally listed species. Only one military installation with a Service-approved INRMP, MCB Camp Pendleton, is located within the range of *Brodiaea filifolia* and supports the physical and biological features essential to the conservation of the species. We analyzed MCB Camp Pendleton's INRMP to determine if the lands subject to the INRMP should be exempted under the authority of section 4(a)(3)(B) of the Act.

MCB Camp Pendleton has committed to work closely with us, CDFG, and California Department of Parks and Recreation to continually refine the existing INRMP as part of the Sikes Act's INRMP review process. Based on the considerations discussed below and in accordance with section 4(a)(3)(B)(i) of the Act, we determined that conservation efforts identified in the INRMP provide a benefit to *Brodiaea filifolia* occurring in habitats within or adjacent to MCB Camp Pendleton. Therefore, approximately 1,531 ac (620 ha) of habitat on MCB Camp Pendleton subject to the INRMP is exempt from critical habitat designation under section 4(a)(3) of the Act, and is not included in this final revised critical habitat designation.

In the previous final critical habitat designation for *Brodiaea filifolia,* we exempted lands determined to contain features essential to the conservation of species on MCB Camp Pendleton from the designation of critical habitat (70 FR 73820; December 13, 2005). We based this decision on the conservation benefits to *B. filifolia* identified in the INRMP developed by MCB Camp Pendleton in November 2001. A revised and updated INRMP was prepared by MCB Camp Pendleton in March 2007 (MCB Camp Pendleton 2007). We determined that conservation efforts identified in the INRMP provide a benefit to the populations of *B. filifolia* and this species' habitat occurring on MCB Camp Pendleton (MCB Camp Pendleton 2007, Section 4, pp. 51–76). The INRMP provides measures that promote the conservation of *B. filifolia* within the 1,531 ac (620 ha) of habitat that we determined contain the physical or biological features essential to the conservation of *B. filifolia* on MCB Camp Pendleton within the following areas: Cristianitos Canyon, Bravo One, Bravo Two South, Basilone/San Mateo Junction, Camp Horno, Pilgrim Creek, and South White Beach.

Measures included for *Brodiaea filifolia* in the MCB Camp Pendleton INRMP require ongoing efforts to survey and monitor the species, and provide this information to all necessary personnel through MCB Camp

Pendleton's GIS database on sensitive resources and in their published resource atlas. The updated INRMP includes the following conservation measures for *B. filifolia:*

(1) Surveys and monitoring, studies, impact avoidance and minimization, and habitat restoration and enhancement;

(2) Species survey information stored in MCB Camp Pendleton's GIS database and recorded in a resource atlas that is published and updated on a semi-annual basis;

(3) Use of the resource atlas to plan operations and projects to avoid impacts to *B. filifolia* and to trigger section 7 consultation if an action may affect the species; and

(4) Transplantation when avoidance is not possible.

These measures are established and represent ongoing aspects of existing programs that provide a benefit to *B. filifolia.* MCB Camp Pendleton also has Base directives and Range and Training Regulations that are integral to their INRMP and provide benefits to *B. filifolia.* MCB Camp Pendleton implements Base Directives to avoid and minimize adverse effects to *B. filifolia,* such as: (1) Limit bivouac, command post, and field support activities such that they are no closer than 164 ft (50 m) to occupied habitat year round; (2) limit vehicle and equipment operations to existing road and trail networks year round; and (3) require environmental clearance prior to any soil excavation, filling, or grading. Finally, MCB Camp Pendleton contracted and funded surveys for *B. filifolia* in the summer of 2005 and the development of a GIS-based monitoring system that will provide improved management of natural resources on the installation, including for *B. filifolia.*

Additionally, MCB Camp Pendleton's environmental security staff review projects and enforce existing regulations and orders that, through their implementation, avoid and minimize impacts to natural resources, including *Brodiaea filifolia* and its habitat. As a result, activities occurring on MCB Camp Pendleton are currently being conducted in a manner that minimizes impacts to *B. filifolia* habitat. Finally, MCB Camp Pendleton provides training to personnel on environmental awareness for sensitive resources on the Base, including *B. filifolia* and its habitat.

Based on MCB Camp Pendleton's Sikes Act program (including the management of *Brodiaea filifolia*), there is a high degree of certainty that MCB Camp Pendleton will continue to implement their INRMP in coordination with the Service and the CDFG in a manner that provides a benefit to *B. filifolia,* coupled with a high degree of certainty that the conservation efforts of their INRMP will be effective. Service biologists work closely with MCB Camp Pendleton on a variety of issues relating to endangered and threatened species, including *B. filifolia.* The management programs, Base Directives, and Range and Training Regulations that avoid and minimize impacts to *B. filifolia* are consistent with section 7 consultations with MCB Camp Pendleton. Therefore, the Secretary determined that the INRMP for MCB Camp Pendleton has and will continue to provide a benefit for *B. filifolia,* and lands subject to the INRMP for MCB Camp Pendleton containing the physical and biological features essential to the conservation of the species are exempt from critical habitat designation pursuant to section 4(a)(3) of the Act. As a result, we are not including approximately 1,531 ac (620 ha) of habitat for *B. filifolia* on MCP Camp Pendleton in this final revised critical habitat designation.

Exclusions Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary must designate and revise critical habitat on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the legislative history is clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

In the following paragraphs, we address a number of general issues that are relevant to our analysis under section 4(b)(2) of the Act.

Under section 4(b)(2) of the Act, we must consider the economic impact, national security impact, or any other relevant impact of specifying any particular area as critical habitat. In considering whether to exclude a particular area from the designation, we must identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and determine whether the benefits of exclusion outweigh the benefits of inclusion. If based on this analysis, we make this determination, then we can exclude the area only if such exclusion would not result in the extinction of the species.

We consider a number of factors in a section 4(b)(2) analysis. For example, we consider whether there are lands owned or managed by the Department of Defense (DOD) where a national security impact might exist. We also consider whether the landowners have developed any conservation plans for the area, or whether there are conservation partnerships that would be encouraged by designation of, or exclusion from, critical habitat. Additionally, we look at any tribal issues, and consider the government-to-government relationship of the United States with tribal entities. We also consider the economic impacts, environmental impacts, and social impacts that might occur because of the designation.

When considering the benefits of inclusion for an area, we consider the additional regulatory benefits that area would receive from the protection from adverse modification or destruction as a result of actions with a Federal nexus; the educational benefits of mapping essential habitat for recovery of the listed species; and any benefits that may result from a designation due to State or Federal laws that may apply to critical habitat.

In considering the benefits of including in a designation lands that are covered by a current HCP or other management plan, we evaluate a number of factors to help us determine if the plan provides equivalent or greater conservation benefit than would likely result from designation of critical habitat. Specifically, when evaluating a conservation plan we consider, among other factors: whether the plan is finalized; how it provides for the conservation of the essential physical and biological features; whether the conservation management strategies and actions contained in a management plan are in place and there is a strong likelihood they will be implemented into the future; whether the conservation strategies in the plan are likely to be effective; and whether the plan contains a monitoring program or adaptive management to ensure that the conservation measures are effective and can be adapted in the future in response to new information.

When considering the benefits of exclusion, we consider, among other things, whether exclusion of a specific area is likely to result in long-term conservation; the continuation, strengthening, or encouragement of partnerships that result in conservation

of listed species; or implementation of a management plan that provides equal to or more conservation than a critical habitat designation would provide.

We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion.

After evaluating the benefits of inclusion and the benefits of exclusion, we carefully weigh the two sides to determine whether the benefits of exclusion outweigh those of inclusion. If we determine that they do, we then determine whether exclusion would result in extinction. If exclusion of an area from critical habitat will result in extinction, we will not exclude it from the designation.

In the case of *Brodiaea filifolia,* this revised critical habitat designation does not include any tribal lands or tribal trust resources. However, this revised critical habitat designation does include some lands covered by the Western Riverside County MSHCP, City and County of San Diego Subarea Plans under the MSCP, Orange County Central-Coastal NCCP/HCP, Orange County Southern Subregion HCP, and Carlsbad HMP under the MHCP. No additional HCPs or conservation plans covering *B. filifolia* were finalized since the proposed revised designation published in the **Federal Register** on December 8, 2009 (74 FR 64930).

Benefits of Excluding Lands With HCPs

The benefits of excluding lands with approved HCPs from critical habitat designation, such as HCPs that cover listed plant taxa, include relieving landowners, communities, and counties of any additional regulatory burden that might be imposed as a result of the critical habitat designation. Many HCPs take years to develop, and upon completion, are consistent with the recovery objectives for listed taxa that are covered by the plan. Many conservation plans also provide conservation benefits to unlisted sensitive species.

A related benefit of excluding lands covered by approved HCPs from critical habitat designation is the unhindered, continued ability it gives us to seek new partnerships with future plan participants, including States, counties, local jurisdictions, conservation organizations, and private landowners, which together can implement conservation actions that we would be unable to accomplish otherwise. Habitat Conservation Plans often cover a wide range of species, including listed plant species and species that are not State and federally listed and would otherwise receive little protection from development. By excluding these lands, we preserve our current partnerships and encourage additional conservation actions in the future.

We also note that permit issuance in association with HCP applications requires consultation under section 7(a)(2) of the Act, which would include the review of the effects of all HCP-covered activities that might adversely impact the species under a jeopardy standard, including possibly significant habitat modification (see definition of "harm" at 50 CFR 17.3), even without the critical habitat designation. In addition, all other Federal actions that may affect the listed species would still require consultation under section 7(a)(2) of the Act, and we would review these actions for possibly significant habitat modification in accordance with the definition of harm referenced above.

The information provided above applies to the following discussions of exclusions under section (4)(b)(2) of the Act. *Brodiaea filifolia* is covered under the Orange County Central-Coastal NCCP/HCP, Orange County Southern Subregion HCP, Carlsbad HMP under the MHCP, Western Riverside County MSHCP, and the City and County of San Diego Subarea Plans under the MSCP. Brief descriptions of each plan, and lands excluded from revised critical habitat covered by each plan, are described below. The areas where we determined the benefits of exclusion outweigh the benefits of inclusion are listed in Table 5. Additional details on these areas can be found in the proposed revised critical habitat rule 74 FR 64930 (December 8, 2009) and the NOA (75 FR 42054, dated July 20, 2010).

San Diego Multiple Species Conservation Plan (MSCP)—City of San Diego Subarea Plan

We analyzed the benefits of including lands covered by the City of San Diego Subarea Plan under the MSCP in the final revised critical habitat designation and the benefits of excluding those lands from the designation. The plan has established valuable partnerships that are intended to implement conservation actions for *Brodiaea filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding portions of Unit 12 under the City of San Diego MSCP Subarea Plan from revised critical habitat outweighs the benefits of inclusion. Therefore, we are not exercising our delegated discretion to exclude any of the 7 ac (3 ha) within the City of San Diego Subarea Plan from this final revised critical habitat designation.

TABLE 5—AREAS EXCLUDED FROM BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT DESIGNATION UNDER SECTION 4(b)(2) OF THE ACT

HCP or management plan and associated subunit	Area excluded (acres/hectares) *
Aliso and Wood Canyons Wilderness Park Resource Management Plan (Orange County Central-Coastal NCCP/HCP)	
Unit 3. Central Orange County—Aliso Canyon	102 ac (42 ha).
Orange County Southern Subregion HCP	
Subunit 4b. Caspers Wilderness Park	192 ac (78 ha).

TABLE 5—AREAS EXCLUDED FROM BRODIAEA FILIFOLIA FINAL REVISED CRITICAL HABITAT DESIGNATION UNDER SECTION 4(b)(2) OF THE ACT—Continued

HCP or management plan and associated subunit	Area excluded (acres/hectares) *
Carlsbad HMP Under the San Diego MHCP	
Subunit 7a. Letterbox Canyon	13 ac (5 ha).
Subunit 7c. Calavera Hills Village H	45 ac (18 ha).
Subunit 7d. Villages of La Costa (Rancho La Costa)	98 ac (40 ha).
Subtotal Carlsbad HMP under the San Diego MHCP	*156 ac (63 ha).*
Western Riverside County MSHCP	
Subunit 11f. Santa Rosa Plateau—Mesa de Colorado	221 ac (89 ha).
Subunit 11g. Santa Rosa Plateau—South of Tenaja Road	117 ac (47 ha).
Subunit 11h. Santa Rosa Plateau—North of Tenaja Road	44 ac (18 ha).
Subtotal for Western Riverside County MSHCP	*381 ac (154 ha).*
County of San Diego Subarea Plan Under the San Diego MSCP	
Unit 12. Central San Diego County—Artesian Trails	4 ac (2 ha).
Total	837 ac (339 ha).

* Values in this table may not sum due to rounding.

Aliso and Wood Canyons Wilderness Park Resource Management Plan (AWCWP Resource Management Plan), Orange County Central-Coastal NCCP/HCP

We determined that approximately 113 ac (46 ha) in Unit 3 meet the definition of critical habitat under the Act. Of this area, 102 ac (42 ha) are covered by the Aliso and Wood Canyons Wilderness Park Resource Management Plan (AWCWP Resource Management Plan), and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. In making our final decision with regard to these lands, we considered several factors including our relationship with stakeholders, existing consultations, beneficial conservation measures that are in place on these lands (including preservation and long-term management), and impacts to current and future partnerships. As described in our section 4(b)(2) analysis below, we reached the determination to exclude these lands in consideration of the benefits of exclusion balanced against the benefits of inclusion in the final revised critical habitat designation.

The AWCWP is a preserve area that covers approximately 3,873 ac (1,567 ha) of land in Aliso and Wood Canyons and portions of Laguna Canyon in the cities of Laguna Niguel, Laguna Hills, Aliso Viejo, Laguna Beach, and Dana Point, Orange County, California. The AWCWP is located within the Nature Reserve of Orange County (which is part of a larger 17,000-ac (6,880-ha) regional coastal canyon ecosystem comprised of Laguna Coast Wilderness Park, Crystal Cove State Park, and City of Irvine Open Space) and is subject to the Orange County Central-Coastal NCCP/HCP and associated implementing agreement (R.J. Meade Consulting 1996a, pp. 1–567; The California Resources Agency et al., 1996, pp. 1–217; LSA Associates 2009, p. 25). Orange County Parks owns and operates the AWCWP, which is designated as a wilderness park (according to the Orange County General Plan) and encompasses a large island of habitat (coastal sage scrub, chaparral, native grassland, and oak woodland) that is almost entirely surrounded by urban development (LSA Associates 2009, p. 1).

The AWCWP Resource Management Plan provides comprehensive, long-term management for the preserve area, including those lands represented in Unit 3 of this rule. The fundamental objective for the AWCWP Resource Management Plan is to identify the best way to manage, protect, and enhance the natural resource values of the park while providing safe recreational and educational opportunities to the public (LSA Associates 2009, p. 25). As required by the Orange County Central-Coastal NCCP/HCP Implementing Agreement, the AWCWP Resource Management Plan includes policies for managing and monitoring the park, conducting research, conducting habitat restoration and enhancement, implementing fire management, and managing public access, recreation, and infrastructure (LSA Associates 2009, p. 26). The management regime addresses active management of resources with flexibility for adaptive management strategies, including the gradual modification of management techniques based on the results of ongoing management, research, and monitoring activities.

The most significant threats for the AWCWP include habitat fragmentation, invasive plant species, existing fuels and fire hazard conditions, urban edge effects, public use, and erosion. The AWCWP Resource Management Plan is designed to address these issues and threats, and minimize impacts while supporting the intent of a county wilderness park (LSA Associated 2009, p. 94). General management strategies for the park's biological resources that would benefit *Brodiaea filifolia* and its habitat identified in Unit 3 include:

(1) Protecting and maintaining populations of native plant and wildlife with an emphasis on managing Orange County Central-Coastal NCCP/HCP covered species;

(2) Improving biological productivity and diversity through protection, enhancement, and restoration activities consistent with the adaptive management strategy of the Orange County Central-Coastal NCCP/HCP;

(3) Monitoring enhancement and restoration activities as part of the adaptive management program to evaluate effectiveness and progress. Through monitoring, seek to identify

new enhancement and restoration opportunities and priorities within the park; and

(4) Implementing and coordinating with adjacent landowners to determine fire management methods that cause the least damage to park resources while providing effective fire control to protect human life and property (LSA Associates 2009, p. 103).

In addition to the preservation and management of the AWCWP as described above, management zones were created to allow for describing management goals by area or showing relationships between one area and another in terms of land use and management strategies, and are based on: (1) Geographic relationships; (2) resource values; (3) ecological parameters; (4) management issues, goals, or objectives; (5) types and intensities of land use; or (6) visitor use and experiences (LSA Associates 2009, p. 105). Unit 3 for *Brodiaea filifolia* occurs in the Lower Aliso Canyon Management Zone, which is managed to provide access into the park to communities at the southernmost segment of Lower Aliso Canyon, enhance recreation use, and improve riparian habitat and water quality in Aliso Creek (LSA Associated 2009, p. 109). Specific management strategies in the Lower Aliso Canyon Management Zone that would benefit *B. filifolia* and the habitat identified in Unit 3 include protecting and restoring riparian habitat along Aliso Creek through habitat restoration efforts and control of invasive, nonnative species, and continuing to participate in and support Aliso Creek Watershed planning efforts to improve water quality and review all watershed practices within the AWCWP (LSA Associates 2009, p. 109).

Approximately 102 ac (42 ha) of lands that meet the definition of critical habitat within Unit 3 are conserved and managed by Orange County Parks at the AWCWP. These conserved lands in Unit 3 are part of the large, interconnected network of conserved lands that make up the AWCWP, including areas that encompass occupancy records for *Brodiaea filifolia* and lands adjacent to the occurrences that will conserve and manage habitat that supports pollinators of *B. filifolia* and provide for habitat connectivity between *B. filifolia* populations. Thus, the AWCWP and associated management plan provides protection to the park's *B. filifolia* habitat through the conservation and management of an area that may otherwise be left unprotected without the wilderness park.

Benefits of Inclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; The regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas where the species occurs would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have a regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat in wetland areas. However, because all areas within the AWCWP are already conserved and managed under the AWCWP Resource Management Plan, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur, and if such actions do occur, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the AWCWP Resource Management Plan. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including the areas proposed for designation in the portion of Unit 3 covered by the AWCWP Resource Management Plan in revised critical habitat would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the B. filifolia proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. Because the habitat identified in the portion of Unit 3 covered by the AWCWP Resource Management Plan is already conserved and managed under the AWCWP Resource Management Plan, no educational benefits would be realized in this instance.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA). These laws analyze the potential for projects to significantly affect the environment. In Orange County, additional protections associated with critical habitat may be beneficial in areas not currently conserved. However, in the case of *B. filifolia,* all areas within the AWCWP

are conserved and managed under the AWCWP Resource Management Plan. Therefore, *B. filifolia* critical habitat designation in this area would not signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas meeting the definition of critical habitat that are conserved and managed by the AWCWP Resource Management Plan, nor would any additional educational benefits be realized under these circumstances.

Benefits of Exclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the AWCWP Resource Management Plan including: (1) Continuance and strengthening of our effective working relationships with Orange County Parks and with all Orange County Central Coastal NCCP/HCP jurisdictions and stakeholders to promote voluntary, proactive conservation of *B. filifolia* and its habitat as opposed to reactive regulation; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; and (3) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in Orange County, the partnership and commitment by the Orange County Central-Coastal NCCP/HCP jurisdictions (and specifically Orange County Parks) resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

We developed close partnerships with all participating entities through the development of the Orange County Central-Coastal NCCP/HCP, including Orange County Parks through the development of the AWCWP Resource Management Plan, which incorporates substantial protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. By excluding 102 ac (42 ha) of lands in Unit 3 from this revised critical habitat designation, we eliminate an essentially redundant layer of regulatory review for projects covered by the AWCWP Resource Management Plan, which helps preserve our ongoing partnership with participating entities of the Orange County Central-Coastal NCCP/HCP (such as Orange County Parks), supporters/contributors to the long-term preservation of AWCWP, and encourages new partnerships with other landowners and jurisdictions and establishment of conservation and management for the benefit of *B. filifolia* and other sensitive species on additional lands; these partnerships and conservation actions are crucial for proactive conservation of *B. filifolia,* as opposed to the reactive, regulatory approach of consultation.

The Orange County Central-Coastal NCCP/HCP and the AWCWP Resource Management Plan address conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 or section 10 of the Act for smaller-scale management plans or HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex management plans or regional and jurisdiction-wide HCPs (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section).

In summary, we believe excluding land covered by the AWCWP Resource Management Plan (which is subject to the Orange County Central-Coastal NCCP/HCP) from revised critical habitat could provide the significant benefit of maintaining existing regional management plan and HCP partnerships, and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands covered by the AWCWP Resource Management Plan proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands covered by the AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Currently, all (approximately 102 ac (42 ha), or 91 percent of lands in Unit 3) lands that meet the definition of critical habitat within the AWCWP Resource Management Plan are conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within the AWCWP, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because this species has been a focus of conservation in Orange County for more than 10 years (as indicated by those measures evaluated and addressed by the Orange County Central-Coastal NCCP/HCP), we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnerships and conservation and management we developed with Orange County Parks and other local stakeholders in the development of the AWCWP Resource Management Plan and other management plans subject to the Orange County Central-Coastal NCCP/HCP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation for conserved and managed lands.

Exclusion Will Not Result in Extinction of the Species—AWCWP Resource Management Plan, Orange County Central-Coastal NCCP/HCP

We determined that the exclusion of approximately 102 ac (42 ha) of land covered by the AWCWP Resource Management Plan in Unit 3 from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. The AWCWP Resource Management Plan and associated Orange County Central-Coastal NCCP/HCP provides a framework for long-term management and continued conservation of excluded lands that meet the definition of critical habitat in Unit 3. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude

approximately 102 ac (42 ha) or 91 percent of lands in Unit 3 from this final revised critical habitat designation.

Orange County Southern Subregion HCP

We determined that approximately 925 ac (375 ha) of land in Subunits 4b, 4c, and 4g owned by or under the jurisdiction of the permittees of the Orange County Southern Subregion HCP meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 192 ac (78 ha) of land conserved and managed by Orange County Southern Subregion HCP permittees within a portion of Subunit 4b from this final revised critical habitat designation. We are not exercising our delegated discretion to exclude 732 ac (297 ha) of land within the Orange County Southern Subregion HCP in Subunits 4c and 4g and a portion of Subunit 4b, and these lands are included in this revised critical habitat designation. As described in our section 4(b)(2) analysis below, we reached this determination in consideration of the benefits of exclusion balanced against the benefits of including an area in the final revised critical habitat designation.

The Orange County Southern Subregion HCP is a large-scale HCP encompassing approximately 86,021 ac (34,811 ha) in southern Orange County (including lands within Subunits 4b, 4c, and 4g). Originally developed as the Southern Subregion Natural Community Conservation Plan/Master Streambed Alteration Agreement/Habitat Conservation Plan, we now refer to the plan as the Orange County Southern Subregion HCP. Although the plan is intended to be a subregional plan under the State of California's Natural Community Conservation Planning (NCCP) Act of 2001, the NCCP has not yet been permitted by the California Department of Fish and Game. On January 10, 2007, the Service approved the Habitat Conservation Plan and issued incidental take permits (TE144105–0, TE144113–0, and TE144140–0) under section 10(a)(1)(B) of the Act to the three permittees for a period of 75 years. The Orange County Southern Subregion HCP was developed by the County of Orange (County), Rancho Mission Viejo, LLC (Rancho Mission Viejo), and the Santa Margarita Water District (Water District) to address impacts resulting from residential and associated infrastructure development to 32 species including *Brodiaea filifolia.* The Orange County Southern Subregion HCP is a multi-species conservation program that minimizes and mitigates expected habitat loss and associated incidental take of covered species.

The Orange County Southern Subregion HCP addresses development and associated infrastructure on Rancho Mission Viejo lands, installation and maintenance of infrastructure by the Water District, expansion of Prima Deshecha Landfill by the County, and monitoring and adaptive management of covered species on reserve lands.

The Orange County Southern Subregion HCP will establish approximately 30,426 ac (12,313 ha) of habitat reserve, which will consist primarily of land owned by Rancho Mission Viejo and three pre-existing County parks (Service 2007, pp. 10 and 19). The HCP provides for a large, biologically diverse and permanent habitat reserve that will protect: (1) Large blocks of natural vegetation communities that provide habitat for the covered species; (2) "important" and "major" populations of the covered species in key locations; (3) wildlife corridors and habitat linkages that connect the large habitat blocks and covered species populations to each other, the Cleveland National Forest, and the adjacent Orange County Central-Coastal NCCP/HCP; and (4) the underlying hydrogeomorphic processes that support the major vegetation communities providing habitat for the covered species (Service 2007, p. 10).

The overall habitat reserve will be managed and monitored according to the collective Habitat Reserve Management and Monitoring Program (Habitat Reserve Management Program). The Habitat Reserve Management Program focuses on the development and implementation of a coordinated monitoring and management program to sustain and enhance species populations and their habitats over the long term, while adapting management actions to new information and changing habitat conditions. The management program comprises two components: (1) An ongoing management program on County park lands within the habitat reserve; and (2) an adaptive management program that will be implemented on the Rancho Mission Viejo portion of the habitat reserve and on selected portions of the County park lands within the habitat reserve (Service 2007, p. 12).

In addition to the creation of a habitat reserve, the following conservation measures specific to *Brodiaea filifolia* and its habitat include:

(1) Avoid and minimize potential impacts to *B. filifolia* associated with construction activities on Rancho Mission Viejo through preparation of Biological Resources Construction Plans in coordination with the Service.

(2) Removal and control of the nonnative artichoke thistle (*Cynara cardunculus*). This invasive plant species may compete with *B. filifolia* for space and resources, and alter habitat in an area to the extent that it no longer supports *B. filifolia.* Removal and control of artichoke thistle occurs on Rancho Mission Viejo and is expected to continue into the future as the Invasive Species Control Plan is implemented within the reserve.

(3) Translocate and propagate *B. filifolia* under the Translocation, Propagation and Management Plan for Special-Status Plants to the extent feasible and appropriate, when impacts to *B. filifolia* are unavoidable. Potential translocation and associated restoration areas will be focused in areas that are also targeted for coastal sage scrub and coastal sage scrub/valley needlegrass grassland restoration, including Chiquita Ridge and Chiquadora Ridge (Subunit 4c). The plan also provides success criteria to evaluate the effectiveness of the restoration of *B. filifolia* in areas of temporary impacts.

(4) Monitor *B. filifolia* populations, focusing on the Cañada Gobernadora/Chiquita Ridgeline (Subunit 4c) and Cristianitos Canyon populations (Subunit 4g). Additionally, information will be gathered regarding nonnative species, observations of pollinators, and signs of disturbance. Annual monitoring will occur every year for the first 5 years after dedication to the reserve and thereafter in intervals as determined by the Reserve Manager and Science Panel.

Below is a brief analysis of the lands in Subunit 4b that are currently conserved and managed consistent with the Orange County Southern Subregion HCP.

Approximately 192 ac (78 ha) of Subunit 4b within the Ronald W. Caspers Wilderness Park (Caspers Wilderness Park) is covered by the Ronald W. Caspers Wilderness Park General Development Plan Phase III Habitat Conservation Program (Caspers Wilderness Park Program). The Caspers Wilderness Park Program functions as an operational program under the Orange County Southern Subregion HCP to ensure protection of existing biological communities and sensitive plant and animal species through

implementation of, at minimum: (1) An ongoing review of sensitive habitat areas; and (2) identification of site-specific operational directives for the protection of habitats, which include a mechanism for review and adjustment of directives in light of new information (Lewis 1987, pp. 1–1 and 2–11). Thus, the Caspers Wilderness Park Program provides protection to *Brodiaea filifolia* proposed revised critical habitat through the conservation and management of this area that may otherwise be left unprotected.

Benefits of Inclusion—Orange County Southern Subregion HCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat, the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat. However, because areas proposed for designation within Caspers Wilderness Park in Subunit 4b are already conserved and managed under the Caspers Wilderness Park Program, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur in these areas. If such actions do occur, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the Caspers Wilderness Park Program. Therefore, we expect the regulatory benefit of including this area in revised critical habitat would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to land owners and managers in prioritizing conservation and management of identified areas. Because the habitat identified in Caspers Wilderness Park within Subunit 4b is already conserved and managed under the Caspers Wilderness Park Program, no educational benefits would be realized in this area.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In Orange County, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas meeting the definition of critical habitat that are conserved and managed under the Orange County Southern Subregion HCP, nor would any additional educational benefits be realized under these circumstances. In areas that are not currently conserved and managed, we believe there may be significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—Orange County Southern Subregion HCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the Orange County Southern Subregion HCP including: (1) Continuance and strengthening of our effective working relationships with all Orange County Southern Subregion HCP stakeholders to promote conservation of *B. filifolia* and its habitat; (2) allowance for continued meaningful collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; and (3) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species, which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in Orange County, the partnership and commitment by the County resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

The Orange County Southern Subregion HCP addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under sections 7 of the Act or through smaller HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical

habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex regional and jurisdiction-wide HCPs, such as the Orange County Southern Subregion HCP (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section of this rule). Exclusion of Orange County Southern Subregion HCP lands would help preserve the partnership we developed with the County of Orange and other permittees in the development of the HCP, and foster future partnerships and development of future HCPs.

In summary, we believe excluding land covered by the Orange County Southern Subregion HCP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Orange County Southern Subregion HCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands owned by or under the jurisdiction of Orange County Southern Subregion HCP permittees as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands already conserved and managed in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 192 ac (78 ha) of land in Subunit 4b at Caspers Wilderness Park are conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within Caspers Wilderness Park, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because the habitat identified in Caspers Wilderness Park within Subunit 4b is already conserved and managed under the Caspers Wilderness Park Program, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Caspers Wilderness Park Program (under the Orange County Southern Subregion HCP) from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with Orange County and other local stakeholders in the development of the Orange County Southern Subregion HCP and the Caspers Wilderness Park Program, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation. We analyzed the benefits of including lands within Subunits 4c, 4g, and the reminder of 4b (that is not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the plan has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding Subunits 4c, 4g, and the remainder of 4b (that is not conserved and managed) from revised critical habitat outweighs the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunit 4b, Orange County Southern Subregion HCP

We determined that the exclusion of approximately 192 ac (78 ha) of land in Subunit 4b owned by or under the jurisdiction of Orange County Southern Subregion HCP permittees from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 192 ac (78 ha) of land conserved and managed by Orange County Southern Subregion HCP permittees in Subunit 4b from this final revised critical habitat designation.

San Diego Multiple Habitat Conservation Program (MHCP)—Carlsbad Habitat Management Plan (Carlsbad HMP)

We determined approximately 261 ac (106 ha) of land in Subunits 7a, 7b, 7c, and 7d within the Carlsbad HMP planning area meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors, including conservation measures and management that are in place on these lands, our relationship with the participating MHCP jurisdiction, our relationship with other MHCP stakeholders, existing consultations, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 156 ac (63 ha) of land within Subunit 7d and portions of Subunits 7a and 7c from this final revised critical habitat designation. We are including approximately 106 ac (43 ha) of land within Subunit 7b and portions of Subunits 7a and 7c in this revised critical habitat designation. As described in our section 4(b)(2) analysis below, we reached this determination in consideration of the benefits of exclusion balanced against the benefits of including the areas in the final revised critical habitat designation.

The Carlsbad HMP is a subarea plan under the purview of the San Diego MHCP. The San Diego MHCP is a comprehensive, multi-jurisdictional planning program designed to create, manage, and monitor an ecosystem preserve in northwestern San Diego County. The San Diego MHCP is also a subregional plan under the State of California's Natural Communities Conservation Plan (NCCP) program and was developed in cooperation with CDFG. The MHCP preserve system is intended to protect viable occurrences of native plant and animal species and their habitats in perpetuity, while accommodating continued economic development and quality of life for residents of northern San Diego County. The MHCP includes an approximately 112,000-ac (45,324-ha) plan area within the cities of Carlsbad, Encinitas, Escondido, San Marcos, Oceanside, Vista, and Solana Beach. At this time, only the City of Carlsbad has completed its Subarea Plan (Carlsbad HMP). The section 10(a)(1)(B) permit for the City of Carlsbad HMP was issued on November 9, 2004 (Service 2004a).

Brodiaea filifolia is a covered species under the Carlsbad HMP. Nine occurrences of *B. filifolia* exist within the City of Carlsbad. We proposed 4 of these 9 occurrences as revised critical habitat in Subunits 7a, 7b, 7c, and 7d. Under the Carlsbad HMP, all known occurrences of *B. filifolia* within existing preserve areas (7 of 9 known occurrences) will be conserved at 100 percent. All covered activities impacting *B. filifolia* outside of already preserved areas are required to be consistent with the MHCP's narrow endemic policy, which requires mitigation for unavoidable impacts and management practices designed to achieve no net loss of narrow endemic populations, occupied acreage, or population viability within Focused Planning Areas (planning areas within which preserves may be designated by city subarea

plans). Additionally, cities cannot permit more than 5 percent gross cumulative loss of narrow endemic populations or occupied acreage within the Focused Planning Areas, and no more than 20 percent cumulative loss of narrow endemic locations, population numbers, or occupied acreage outside of Focused Planning Areas (AMEC 2003, pp. 2–14, D–1). All conserved populations of *B. filifolia* will be incorporated into the Carlsbad HMP's preserve areas. The Carlsbad HMP includes provisions to manage the populations within the preserve areas in order to provide for the long-term conservation of the species. Portions of Subunits 7a and 7c, and Subunit 7b in its entirety are within pre-existing open space easements owned by private landowners outside Focused Planning Areas and are not yet incorporated into the Carlsbad HMP's preserve. Therefore, additional regulatory protection could provide significant conservation benefits to *B. filifolia* and its habitat in portions of Subunits 7a and 7c, and the entirety of Subunit 7b.

At the time the Carlsbad HMP permit was issued (November 9, 2004), *Brodiaea filifolia* was a conditionally covered species under the Carlsbad HMP, as the proposed reserve on the Fox-Miller property within Subunit 7a did not meet the conditions for coverage of the species under the Carlsbad HMP. The project was subsequently redesigned to meet the narrow endemic standards by impacting less than five percent of the known population, and a long-term management plan was submitted. On December 2, 2005, the Service and CDFG concluded that the City of Carlsbad would receive full coverage for *B. filifolia* under the Carlsbad HMP (CDFG and Service 2005, p. 1).

Approximately 13 ac (5 ha), of lands that meet the definition of critical habitat within Subunit 7a are conserved and managed under the Long-Term Management Plan for Fox-Miller Property Open Space (Fox-Miller Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. The approximately 13 ac (5 ha) have been conserved and managed in a preserve to mitigate impacts to the biological resources associated with the development of the Fox-Miller property (RECON 2005, p. 1). The Fox-Miller Management Plan provides a framework for the enhancement and management of *Brodiaea filifolia,* its habitat, and other habitats within the preserve. The preserve will be managed in perpetuity to maintain and improve the habitat quality on-site. Scheduled management activities include: (1) Vegetation mapping performed at a minimum of every five years; (2) annual exotic species removal and control within the preserve; (3) preserve signage creation, installation, and monitoring; (4) monthly site visits to check fencing and identify any threats to the habitat, such as unauthorized access to the site; (5) annual monitoring of the *B. filifolia* population and its habitat; (6) annual publication of an educational newsletter to surrounding businesses; and (7) preparation of annual reports to the City of Carlsbad, CDFG, and the Service (RECON 2005, pp. 12–13, 16, 18, 24).

Approximately 45 ac (18 ha), or 63 percent, of Subunit 7c is covered by the Calavera Hills Phase II Final Habitat Management Plan (Calavera Hills Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. Within this area is a population of *Brodiaea filifolia* that is conserved and managed within a 144 ac (58 ha) habitat preserve set aside by the developer of Calavera Hills Phase II (Planning Systems 2002, pp. 1, 4). The purpose of the Calavera Hills Management Plan is to establish parameters for the permanent protection and management of the preserve (Planning Systems 2002, p. 3). Scheduled management activities include, but are not limited to: (1) Habitat monitoring and mapping; (2) patrolling for signs of trespassing, dumping, vandalism, off-road vehicle use, homeowner encroachment, and any other disturbances by humans; (3) trash removal conducted at a minimum of every six months; (4) publication of an educational flyer for distribution to surrounding property owners; (5) photograph documentation of site conditions; (6) monitoring of preserve signage and fencing; (7) exotic species removal and control; (8) erosion control; and (9) preparation of annual reports to the City of Carlsbad, CDFG, and the Service (Planning Systems 2002, pp. 9–14, 16, 25–26). In addition to routine monitoring of the preserve, specific management strategies that benefit *B. filifolia* and its proposed revised critical habitat include: (1) Annual mapping and counting of the *B. filifolia* population; and (2) protection from human trampling or other potential threats to the degree feasible (Planning Systems 2002, p. 11).

Approximately 98 ac (40 ha), or 100 percent, of Subunit 7d is covered by the Habitat Management Plan for the Rancho La Costa Habitat Conservation Area (Rancho La Costa Management Plan) in conformance with the Carlsbad HMP, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. Within this area is a population of *Brodiaea filifolia* and its habitat that is conserved and managed in its entirety within a 1,400 ac-(565-ha) habitat preserve set aside by the property owners as mitigation for impacts to natural habitat as part of the Villages of La Costa and University Commons developments (CNLM 2005, pp. 1, 5). Management strategies outlined in the plan include: (1) Annual counts of the *B. filifolia* population; (2) exotic species removal and control; (3) regular patrolling of the preserve to monitor public use; (4) maintenance of access control (*e.g.,* fencing and signage) and trails; (5) informing and educating the local residents through publication of outreach information, guided nature walks, and annual publication of educational newsletters; and (6) preparation of annual reports to the Cities of Carlsbad and San Marcos, CDFG, and the Service (CNLM 2005, pp. 28, 32–34, 36, 38). In addition to routine monitoring of the preserve, specific management strategies that would benefit *B. filifolia* and its proposed revised critical habitat include monitoring percent cover of native and nonnative annual plant species within its habitat and removing nonnative plant species (CNLM 2005, p. 21).

Benefits of Inclusion—Carlsbad HMP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects

to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7 of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation could have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat. However, the probability of a project with a Federal nexus occurring in land covered by the Carlsbad HMP within Subunits 7a, 7b, 7c, and 7d is low, as the areas are outside any wetland areas, and are privately owned; the probability of a project with a Federal nexus occurring in Subunit 7d (which is conserved and managed) or the conserved and managed portions of Subunits 7a and 7c is further lessened by the fact that these areas are protected from development and other potential impacts. If such actions do occur in the conserved and managed portions of Subunits 7a, 7c, or 7d, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by conservation under the Carlsbad HMP. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including the conserved and managed areas proposed for designation in Subunits 7a, 7c, and 7d in revised critical habitat would be minimal. However, we expect the regulatory benefit to the conservation of *B. filifolia* of including areas proposed for designation that are not conserved and managed in Subunits 7a, 7b, and 7c in revised critical habitat would be greater than the benefit to the conserved and managed areas.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. However, we do not believe critical habitat designation for *B. filifolia* will provide significant additional educational benefits in areas that are already conserved and managed because this species has been a focus of conservation in the City of Carlsbad for several years.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In the City of Carlsbad, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas that meet the definition of critical habitat and are currently conserved and managed under the Carlsbad HMP. We also believe no significant educational benefits will be realized in areas that meet the definition of critical habitat and are currently conserved and managed under the Carlsbad HMP because this species has been a focus of conservation in the City of Carlsbad for many years. In areas that are not currently conserved and managed, we believe there may be more significant regulatory benefits of critical habitat designation.

Benefits of Exclusion—Carlsbad HMP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat on lands covered by the Carlsbad HMP including: (1) Continuance and strengthening of our effective working relationships with all MHCP jurisdictions and stakeholders to promote conservation of *Brodiaea filifolia* and its habitat; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; (3) encouragement of other jurisdictions to complete subarea plans under the MHCP (*i.e.,* the cities of Encinitas, Escondido, San Marcos, Oceanside, Vista, and Solana Beach); and (4) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species, which is voluntary because the Act does not prohibit take of plant species.

The Carlsbad HMP addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 of the Act or through smaller HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex regional and jurisdiction-wide HCPs, such as the Carlsbad HMP (as discussed further in Comments 57 and 75 below in the Summary of Comments and Recommendations section of this rule). Exclusion of Carlsbad HMP lands would help preserve the partnership we developed with the City of Carlsbad in the development of the HMP, and foster

future partnerships and development of future HCPs.

In summary, we believe excluding land covered by the Carlsbad HMP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Carlsbad HMP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for all lands covered by the Carlsbad HMP proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including lands covered by the Carlsbad HMP that are conserved and managed in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 13 ac (5 ha) of land in Subunit 7a at Fox-Miller, approximately 45 ac (18 ha) of land in Subunit 7c at Calavera Hills, and all of the approximately 98 ac (40 ha) of land in Subunit 7d at Rancho La Costa are already conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within these areas, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because this species has been a focus of conservation in the City of Carlsbad for several years, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits in areas that are already conserved and managed.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Carlsbad HMP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with the City of Carlsbad and other local stakeholders in the development of the Carlsbad HMP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation. We analyzed the benefits of including lands within Subunit 7b and portions of Subunits 7a and 7c (that are not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the Carlsbad HMP has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas that are not conserved and managed (Subunit 7b and portions of Subunits 7a and 7c) from revised critical habitat outweigh the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunits 7a, 7c, and 7d, Carlsbad HMP

We determined that the exclusion of approximately 156 ac (63 ha) of land covered by the Carlsbad HMP in Subunit 7d and a portion of Subunits 7a and 7c from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 156 ac (63 ha) of conserved and managed land in Subunit 7d and portions of Subunits 7a and 7c from this final revised critical habitat designation.

Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)

We determined that approximately 1,494 ac (604 ha) of land in Subunits 11a, 11b, 11c, 11d, 11e, 11f, 11g, and 11h that are within the Western Riverside County MSHCP planning area meet the definition of critical habitat under the Act. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. Under section 4(b)(2) of the Act, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude 381 ac (154 ha) of land within Subunits 11g, 11h, and a portion of Subunit 11f from this final revised critical habitat designation. We are including 1,113 ac (450 ha) of land within Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f in this revised critical habitat designation. As described in our analysis below, we reached this conclusion by weighing the benefits of exclusion balanced against the benefits of including an area in the final revised critical habitat designation.

The Western Riverside County MSHCP is a regional, multi-jurisdictional HCP encompassing approximately 1.26 million ac (510,000 ha) of land in western Riverside County. The Western Riverside County MSHCP addresses 146 listed and unlisted "covered species," including *Brodiaea filifolia.* The Western Riverside County MSHCP includes a multi-species conservation program designed to minimize and mitigate the effects of expected habitat loss and associated incidental take of covered species. On June 22, 2004, the Service issued a single incidental take permit under section 10(a)(1)(B) of the Act to 22 permittees under the Western Riverside County MSHCP for a period of 75 years (Service 2004b, TE–088609–0). We concluded in our biological opinion (Service 2004b, p. 386) that implementation of the plan, as proposed, was not likely to jeopardize the continued existence of *B. filifolia.* Our determination was based on our conclusion that 78 percent of *B. filifolia* suitable habitat and at least 76 percent of the extant occurrences known at that time would be protected or will remain within the Western Riverside County MSHCP Conservation Area.

The Western Riverside County MSHCP, when fully implemented, will establish approximately 153,000 ac (61,917 ha) of new conservation lands (Additional Reserve Lands) to complement the approximately 347,000 ac (140,426 ha) of pre-existing natural and open space areas (Public/Quasi-Public (PQP) lands). These PQP lands include those under ownership of public or quasi-public agencies, primarily the United States Forest Service (USFS) and Bureau of Land Management (BLM), as well as permittee-owned or controlled open-space areas managed by the State of California and Riverside County. Collectively, the Additional Reserve Lands and PQP lands form the overall Western Riverside County MSHCP Conservation Area. The configuration of the 153,000 ac (61,916 ha) of Additional Reserve Lands is not mapped or precisely identified ("hard-lined") in the Western Riverside County MSHCP. Rather, it is based on textual descriptions of habitat conservation necessary to meet the conservation goals for all covered species within the bounds of the approximately 310,000-ac (125,453-ha) Criteria Area and is determined as implementation of the Western Riverside County MSHCP takes place. In an effort to predict one possible future configuration of the Additional Reserve Lands, we internally

mapped a "Conceptual Reserve Design" based on our interpretation of the textual descriptions of habitat conservation necessary to meet conservation goals.

Specific conservation objectives in the Western Riverside County MSHCP for *Brodiaea filifolia* include providing 6,900 ac (2,786 ha) of occupied or suitable habitat for the species in the MSHCP Conservation Area along portions of San Jacinto River (Subunits 11a, 11b, 11c, 11d), Mystic Lake, and Salt Creek (Subunit 11e) (Service 2004b, p. 384). This acreage can be attained through acquisition or other dedications of land assembled from within the Criteria Area (as these lands are acquired they become part of the Additional Reserve Lands). Floodplain processes along the San Jacinto River and along Salt Creek will be maintained to provide for persistence of the species. Additionally, at least 76 percent of the known *B. filifolia* occurrences as of 2004 will remain on existing PQP lands or be conserved within the Additional Reserve Lands. Finally, areas within the Criteria Area where there is potential suitable habitat for *B. filifolia* that is not yet protected are subject to the Additional Survey Needs and Procedures Policy (see Additional Survey Needs and Procedures, Western Riverside County MSHCP, Volume 1, section 6.3.2 in Dudek & Associates, Inc. 2003b). In these areas, surveys for *B. filifolia* are required as part of the project review process for public and private projects where suitable habitat is present (see Criteria Area Species Survey Area (CASSA) Map, Figure 6–2 of the Western Riverside County MSHCP, Volume I in Dudek & Associates, Inc. 2003b). For locations with positive survey results, 90 percent of those portions of the property that provide long-term conservation value for the species will be avoided until it is demonstrated that the conservation objectives for the species are met. Once species-specific objectives are met, avoided areas would be evaluated to determine whether they should be released for development or included in the MSHCP Conservation Area.

Preservation and management of approximately 6,900 ac (2,786 ha) of *Brodiaea filifolia* habitat under the Western Riverside County MSHCP will contribute to the conservation and ultimate recovery of this species. *Brodiaea filifolia* is threatened primarily by habitat destruction and fragmentation from urban and agricultural development, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, OHV activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from nonnative plant species (Service 2004b, p. 380). The Western Riverside County MSHCP will remove and reduce threats to *B. filifolia* and the physical and biological features essential to the conservation of the species as the plan is implemented by preserving large blocks of suitable habitat throughout the Conservation Area. The plan also generates funding for long-term management of conserved lands for the benefit of the species they protect.

Below is a brief analysis of the lands in Subunits 11g, 11h, and a portion of Subunit 11f that we are exercising our delegated discretion to exclude under section 4(b)(2) of the Act, and how these areas are conserved and managed consistent with the Western Riverside County MSHCP.

Approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f are conserved and managed on PQP lands at the Santa Rosa Plateau Ecological Reserve (Santa Rosa Plateau). This reserve has four landowners: CDFG, the County of Riverside, the Metropolitan Water District of Southern California, and The Nature Conservancy. The landowners and the Service (which owns no land on the Santa Rosa Plateau) signed a cooperative management agreement on April 16, 1991 (Dangermond and Associates, Inc. 1991), and meet regularly to work on the management of the reserve (Riverside County Parks 2009, p. 2). These conserved lands in Subunits 11g, 11h, and a portion of Subunit 11f are part of the large, contiguous area of approximately 8,500 ac (3,432 ha) that make up the Santa Rosa Plateau, including areas that provide for habitat connectivity between *B. filifolia* populations. Thus, the Santa Rosa Plateau and associated management plan provides protection to the reserve's *B. filifolia* proposed revised critical habitat through the conservation and management of an area that may otherwise be left unprotected without the reserve.

Benefits of Inclusion—Western Riverside County MSHCP

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat: the regulatory standard of section 7(a)(2) of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify revised critical habitat. Specifically, we expect projects in wetland areas would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation will have an additional regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat.

As discussed above, the Western Riverside County MSHCP provides for protection of *Brodiaea filifolia* habitat considered necessary for survival and recovery of the species. For locations with positive survey results, impacts to 90 percent of portions of the property that provide long-term conservation value for the species will be avoided until it is demonstrated that the conservation objectives for the species

have been met. The Western Riverside County MSHCP does not include dumping of manure and other soil amendments as a covered activity, and thus does not include measures to minimize or mitigate impacts from that activity. However, the activity is occurring in some habitat areas that have not yet been conserved. As discussed in Comment 28 below, this threat is significant and ongoing within the Western Riverside County MSHCP plan area (specifically in Subunits 11b, 11c, and 11e) in habitat that is not yet conserved and managed to benefit the species. Therefore, for activities covered under the plan, we believe that protections provided by the designation of revised critical habitat will be partially redundant with protections provided by the HCP; however, additional regulatory protection from manure dumping could provide significant conservation benefits to *B. filifolia* in Subunits 11b, 11c, and 11e.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed rule identifies those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas. In general, we believe the designation of critical habitat for *B. filifolia* will provide to the public additional information not already sufficiently emphasized through meetings, and educational materials provided to the general public by the County of Riverside.

The benefit of educating the public about *Brodiaea filifolia* habitat may be significant because the distribution of *B. filifolia* habitat in Riverside County is not well known and the importance of these habitat areas may not be known to the public. Activities are taking place that harm habitat where *B. filifolia* occurs (including the associated local watershed areas) in Riverside County possibly due to the lack of public awareness. For example, manure dumping on private property along the San Jacinto River is impacting habitat within the Western Riverside County MSHCP plan area. These impacts are occurring despite identification of these areas as important for the survival and recovery of *B. filifolia* in the Western Riverside County MSHCP and the critical habitat designation published in the **Federal Register** on December 13, 2005 (70 FR 73820) (*see* Comment 27 in the Summary of Comments and Recommendations section below). Manure dumping was not discussed as an impact to *B. filifolia* in the Biological Opinion on the Western Riverside County MSHCP (Service 2004b, pp. 378–386). We have been working with permittees to implement additional ordinances that will help to control activities (such as manure dumping) that may impact the implementation of the Western Riverside County MSHCP conservation objectives. To date, the City of Hemet is the only Western Riverside County MSHCP permittee that has addressed the negative impacts that manure dumping has on vernal pool habitat through the enactment of Ordinance 1666 (*i.e.,* the ordinance that prevents manure dumping activities and educates its citizens). We believe including areas in the *B. filifolia* revised critical habitat designation where manure dumping still occurs on non-conserved land will provide information to the public and local jurisdictions regarding the importance of addressing this threat, which alters the physical and biological features essential to the conservation of *B. filifolia.* Therefore, we believe there is a significant educational conservation benefit of critical habitat designation in areas where manure dumping occurs within the Western Riverside County MSHCP plan area. However, no educational benefits would be realized in the approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f that are already conserved and managed on PQP lands at the Santa Rosa Plateau Ecological Reserve.

The designation of *Brodiaea filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In Riverside County, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe that designating revised critical habitat will provide minimal regulatory benefits under section 7(a)(2) of the Act in areas currently conserved and managed, and no additional educational benefits would be realized under these circumstances. In areas that are not currently conserved or where no local ordinance exists to protect *Brodiaea filifolia* habitat from manure dumping activities (*i.e.,* impacts that are not a covered activity under the Western Riverside County MSHCP), we believe that there are significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—Western Riverside County MSHCP

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the Western Riverside County MSHCP including:

(1) Continuance and strengthening of our effective working relationships with all Western Riverside County MSHCP jurisdictions and stakeholders to promote conservation of the *B. filifolia,* its habitat, and 145 other species covered by the HCP and their habitat;

(2) Allowance for continued meaningful proactive collaboration and cooperation in working toward protecting and recovering this species and the many other species covered by the HCP, including conservation benefits that might not otherwise occur;

(3) Encouragement for local jurisdictions to fully participate in the Western Riverside County MSHCP; and

(4) Encouragement of additional HCPs and other conservation and management activities in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species.

We developed a close partnership with the permittees of the Western Riverside County MSHCP through the development of the HCP, which incorporates protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in

developing and implementing complex regional and jurisdiction-wide HCPs, such as the Western Riverside County MSHCP (as discussed further in Comments 57 and 75 below in the Summary of Comments and Recommendations section of this rule). Exclusion of Western Riverside County MSHCP lands would help preserve the partnerships we developed with the County of Riverside and other local jurisdictions in the development of the HCP, and foster future partnerships and development of future HCPs, and encourage the establishment of future conservation and management of habitat for *B. filifolia* and other sensitive species.

In summary, we believe excluding land covered by the Western Riverside County MSHCP from revised critical habitat could provide the significant benefit of maintaining existing regional HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP

We reviewed and evaluated the benefits of inclusion and benefits of exclusion for lands covered by the Western Riverside County MSHCP proposed as revised critical habitat for *Brodiaea filifolia.* The benefits of including conserved and managed lands under the Western Riverside County MSHCP in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 381 ac (154 ha) of lands that meet the definition of critical habitat within Subunits 11g, 11h, and a portion of Subunit 11f are conserved and managed on PQP lands at the Santa Rosa Plateau. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within these areas, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. Because these areas are conserved and managed, we do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the Western Riverside County MSHCP from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with Western Riverside County and other permitees and stakeholders in the development of the Western Riverside County MSHCP, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the significant benefits of exclusion outweigh the minor benefits of critical habitat designation for lands that are conserved and managed. We analyzed the benefits of including lands within Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f (that are not conserved and managed) in the final designation and the benefits of excluding those lands from the designation. We recognize that the Western Riverside County MSHCP has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas that are not conserved and managed (Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f) from revised critical habitat outweigh the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Subunits 11f, 11g, and 11h, Western Riverside County MSHCP

We determined exclusion of 381 ac (154 ha) of land in Subunits 11g, 11h, and a portion of 11f within the Western Riverside County MSHCP planning area from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 381 ac (154 ha) of conserved and managed land in Subunits 11g, 11h, and 11f from this final revised critical habitat designation.

San Diego Multiple Species Conservation Plan (MSCP)—County of San Diego Subarea Plan

The MSCP is a subregional HCP (one of multiple subregional HCPs in the San Diego County region) made up of several subarea plans. The MSCP has been in place for more than a decade. The subregional plan area encompasses approximately 582,243 ac (235,626 ha) (MSCP 1998, p. 2–1) and provides for conservation of 85 federally listed and sensitive species ("covered species"). The conservation of these species is being achieved through the establishment and management of approximately 171,920 ac (69,574 ha) of preserve lands within the Multi-Habitat Planning Area (MHPA) (City of San Diego Subarea Plan), Pre-Approved Mitigation Areas (PAMA) (County of San Diego Subarea Plan), and Mitigation Area (City of Poway Subarea Plan). The MSCP was developed in support of applications for incidental take permits by 12 participating jurisdictions in southwestern San Diego County. Under the umbrella of the MSCP, each of the 12 participating jurisdictions is required to prepare a subarea plan that implements the goals of the MSCP within that particular jurisdiction. *Brodiaea filifolia* was evaluated in the MSCP subregional plan, and is a covered species under the County of San Diego MSCP Subarea Plan. The Service issued the County of San Diego a single incidental take permit (TE–840414) under section 10(a)(1)(B) of the Act for the County of San Diego Subarea Plan under the MSCP for a period of 50 years on March 17, 1998.

The County of San Diego has both "hardline" boundaries as well as preserve areas that do not have "hardline" boundaries. In areas where the "hardlines" are not defined, the County's subarea plan identifies areas where mitigation activities should be focused to assemble its preserve areas or the PAMA. Those areas of the County of San Diego Subarea preserve, and other MSCP subarea preserves that are either conserved or designated for inclusion in the preserves under the plan are referred to as the "MSCP preserve" in this discussion. When the preserve is completed, the public sector (Federal, State, and local government) and private landowners will have contributed 108,750 ac (44,010 ha) (63 percent) to the preserve, of which 81,750 ac (33,083 ha) (48 percent) was existing public land when the MSCP was established and 27,000 ac (10,927 ha) (16 percent) will have been acquired. At completion, the private sector will have contributed 63,170 ac (25,564 ha) (37 percent) to the preserve as part of the development process, either through avoidance of impacts or as compensatory mitigation for impacts to biological resources outside the preserve. Currently and in the future, Federal and State governments, local jurisdictions and special districts, and managers of privately owned lands will manage and monitor their lands in the preserve for species and habitat protection (MSCP 1998, p. 2–1).

At the time the permit was issued for the County of San Diego subarea plan, no occurrences of *Brodiaea filifolia* were known to exist within the MSCP. As *B. filifolia* is on the MSCP's list of narrow

endemic species, each subarea plan specifies conservation measures for the species if an occurrence is newly identified. Occurrences within the County of San Diego Subarea will be avoided to the maximum extent practicable. Where complete avoidance is infeasible, encroachment may be authorized but will not exceed 20 percent.

As discussed under the *Benefits of Excluding Lands with HCPs* section of this rule, we considered excluding lands under the County of San Diego Subarea Plan. After reviewing the areas covered by the County of San Diego Subarea Plan, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude approximately 4 ac (2 ha) in Unit 12. We determined that approximately 109 ac (44 ha) of land in Unit 12 within the County of San Diego Subarea Plan meet the definition of critical habitat under the Act. We are including 105 ac (43 ha) of land within Unit 12 (within the County of San Diego Subarea Plan) in this revised critical habitat designation. In making our final decision with regard to these lands, we considered several factors including our relationships with participating jurisdictions and other stakeholders, existing consultations, conservation measures and management that are in place on these lands, and impacts to current and future partnerships. As described in our analysis below, we reached this conclusion by weighing the benefits of exclusion against the benefits of including an area in the final revised critical habitat designation.

Approximately 4 ac (2 ha), or 9 percent, of Unit 12 is covered by the Artesian Trails Resource Management Plan (Artesian Trails Management Plan) in conformance with the County of San Diego MSCP Subarea Plan, and, for the reasons discussed in the following sections, we are exercising our delegated discretion to exclude these lands from this final revised critical habitat designation pursuant to section 4(b)(2) of the Act. In this area, a population of *Brodiaea filifolia* is conserved and managed within a preserve set aside by the property owners consistent with a biological mitigation ordinance as part of the Artesian Trails Minor Subdivision project (Tierra Environmental 2007, pp. 1–2). The Artesian Trails Management Plan provides an overview of the property's operation, maintenance, and personnel requirements to implement management goals in perpetuity (Tierra Environmental 2007, pp. 1, 3). Planned management activities include: (1) Annual monitoring of the *B. filifolia* population; (2) exotic species removal and control; (3) maintenance of access control (such as fencing and signage); (4) site assessments with photo documentation; (5) trash removal; (6) notifying property owners of conditions degrading habitat; (7) maintaining community awareness of sensitive habitat and protection of area; and (8) preparation of annual reports to the County of San Diego, CDFG, and the Service (Tierra Environmental 2007, pp. 11–15, 17).

Benefits of Inclusion—County of San Diego Subarea Plan

The principal benefit of including an area in a critical habitat designation is the requirement of Federal agencies to ensure actions they fund, authorize, or carry out are not likely to result in the destruction or adverse modification of any designated critical habitat; the regulatory standard of section 7 of the Act under which consultation is completed. Federal agencies must consult with the Service on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Federal agencies must also consult with us on actions that may affect a listed species and refrain from undertaking actions that are likely to jeopardize the continued existence of such species. The analysis of effects to critical habitat is a separate and different analysis from that of the effects to the species. Therefore, the difference in outcomes of these two analyses represents the regulatory benefit of critical habitat. For some species (including *Brodiaea filifolia*), and in some locations, the outcome of these analyses will be similar, because effects to habitat will often also result in effects to the species. However, the regulatory standard is different, as the jeopardy analysis investigates the action's impact to survival and recovery of the species, while the adverse modification analysis investigates the action's effects to the designated habitat's contribution to conservation. This will, in many instances, lead to different results and different regulatory requirements. Thus, critical habitat designations may provide greater benefits to the recovery of a species than would listing alone.

Any protections provided by critical habitat that are redundant with protections already in place reduce the benefits of inclusion in critical habitat. The consultation provisions under section 7(a)(2) of the Act constitute the regulatory benefits of designating lands as critical habitat. As discussed above, Federal agencies must consult with us on actions that may affect critical habitat and must avoid destroying or adversely modifying critical habitat. Critical habitat may provide a regulatory benefit for *Brodiaea filifolia* when there is a Federal nexus present for a project that might adversely modify revised critical habitat. Specifically, we expect projects in wetland areas where the species occurs would require a 404 permit under the Clean Water Act from the Army Corps of Engineers. Therefore, critical habitat designation would have a regulatory benefit to the conservation of *B. filifolia* by prohibiting adverse modification of revised critical habitat in wetland areas. In areas within Unit 12 that are not conserved and managed, we believe critical habitat designation would have a significant regulatory benefit to the conservation of *B. filifolia* due to the presence of a potential Federal nexus, and because the regulatory protections afforded by the designation of critical habitat would not be entirely redundant with protections already in place. However, in areas within the Artesian Trails Resource Management Plan area which are conserved and managed under the Artesian Trails Resource Management Plan, Federal actions that could adversely affect *B. filifolia* or its habitat are unlikely to occur. If such actions do occur in conserved and managed areas, it is likely that the protections provided the species and its habitat under section 7(a)(2) of the Act would be largely redundant with the protections offered by the Artesian Trails Resource Management Plan. Thus, we expect the regulatory benefit to the conservation of *B. filifolia* of including areas proposed for designation in revised critical habitat in Unit 12 that have not been conserved and managed could be significant, while the regulatory benefit of including areas that have been conserved and managed would be minimal.

Another possible benefit of including lands in critical habitat is public education regarding the potential conservation value of an area that may help focus conservation efforts on areas of high conservation value for certain species. Any information about *Brodiaea filifolia* and its habitat that reaches a wide audience, including parties engaged in conservation activities, is valuable. The inclusion of lands in the *B. filifolia* proposed and final revised critical habitat designation that are not conserved and managed is beneficial to the species because the proposed and final rules identify those lands that require management for the conservation of *B. filifolia.* The process of proposing and finalizing revised critical habitat provided the opportunity for peer review and public comment on

habitat we determined meets the definition of critical habitat. This process is valuable to landowners and managers in prioritizing conservation and management of identified areas that are not already conserved and managed. No educational benefits would be realized in portions of Unit 12 that are already conserved and managed under the Artesian Trails Resource Management Plan. However, the inclusion of lands in the *B. filifolia* revised critical habitat designation that are not conserved and managed could be beneficial to the species because designation will identify lands that require conservation and management for the recovery of *B. filifolia.*

The designation of *B. filifolia* critical habitat may also strengthen or reinforce some of the provisions in other State and Federal laws, such as CEQA or NEPA. These laws analyze the potential for projects to significantly affect the environment. In the County of San Diego, the additional protections associated with revised critical habitat may be beneficial in areas not currently conserved. Critical habitat may signal the presence of sensitive habitat that could otherwise be missed in the review process for these other environmental laws.

In summary, we believe designating revised critical habitat would provide minimal regulatory benefits under section 7(a)(2) of the Act in areas that meet the definition of critical habitat currently conserved and managed under the County of San Diego Subarea Plan, nor would any additional educational benefits be realized under these circumstances. In areas that are not expected to be conserved, we believe there are significant regulatory and educational benefits of critical habitat designation.

Benefits of Exclusion—County of San Diego Subarea Plan

We believe conservation benefits would be realized by forgoing designation of revised critical habitat for *Brodiaea filifolia* on lands covered by the County of San Diego Subarea Plan including: (1) Continuance and strengthening of our effective working relationships with all MSCP jurisdictions and stakeholders; (2) allowance for continued meaningful proactive collaboration and cooperation in working toward species recovery, including conservation benefits that might not otherwise occur; (3) the encouragement for local jurisdictions to fully participate in the MSCP; and (4) encouragement of additional conservation and management in the future on other lands for this and other federally listed and sensitive species, including incorporation of protections for plant species which is voluntary because the Act does not prohibit take of plant species. In the case of *B. filifolia* in San Diego County, the partnership and commitment by the County of San Diego resulted in lands being conserved and managed for the long-term that will contribute to the recovery of the species.

We developed a close partnership with the County of San Diego through the development of the subregional MSCP and the County of San Diego MSCP Subarea Plan, which incorporates substantial protections (conserved lands) and management for *Brodiaea filifolia,* its habitat, and the physical and biological features essential to the conservation of this species. By excluding approximately 4 ac (2 ha) of Unit 12 from this revised critical habitat designation, we eliminate an essentially redundant layer of regulatory review for projects covered by the Artesian Trails Management Plan (in conformance with the County of San Diego MSCP Subarea Plan), which helps preserve our ongoing partnership with the County of San Diego, supporters/contributors to the long-term preservation of the Artesian Trails preserve area, and encourages new partnerships with other landowners and jurisdictions and establishment of conservation and management for the benefit of *B. filifolia* and other sensitive species on additional lands; these partnerships and conservation actions are crucial for proactive conservation of *B. filifolia,* as opposed to the reactive, regulatory approach of consultation.

The County of San Diego MSCP Subarea Plan addresses conservation issues from a coordinated, integrated perspective rather than a piecemeal, project-by-project approach (as would occur under section 7 or section 10 of the Act for smaller scale management plans or HCPs), thus resulting in coordinated landscape-scale conservation that can contribute to genetic diversity by preserving covered species populations, habitat, and interconnected linkage areas that support recovery of *Brodiaea filifolia* and other listed species. Additionally, many landowners perceive critical habitat as an unfair and unnecessary regulatory burden given the expense and time involved in developing and implementing complex management plans or regional and jurisdiction-wide HCPs (as discussed below in Comments 57 and 75 of the Summary of Comments and Recommendations section).

In summary, we believe excluding land covered by the County of San Diego Subarea Plan from revised critical habitat could provide the significant benefit of maintaining existing regional management plan and HCP partnerships and fostering new ones.

Weighing Benefits of Exclusion Against Benefits of Inclusion—County of San Diego Subarea Plan

We reviewed and evaluated the benefits of inclusion and benefits of exclusion from revised critical habitat for *Brodiaea filifolia* for lands under the County of San Diego Subarea Plan. The benefits of including conserved and managed lands covered by the Artesian Trails Resource Management Plan in the revised critical habitat designation are relatively small compared to the benefits of exclusion. Approximately 4 ac (2 ha), of land in Unit 12 at the Artesian Trails Minor Subdivision is already conserved and managed. Thus, it is unlikely that Federal actions that would adversely affect *B. filifolia* or its habitat will occur within this area, and any regulatory benefits provided by section 7(a)(2) of the Act would be minimal and largely redundant with the protections already in place for this habitat. We do not believe critical habitat designation for *B. filifolia* will provide additional educational benefits for conserved and managed portions of Unit 12 since these benefits (protection and management of the habitat area) have already been realized. However for the portions of Unit 12 that have not been conserved and managed, we believe inclusion in the revised critical habitat designation could have significant regulatory and educational benefits due to the existence of a potential Federal nexus, the lack of existing protections that would diminish the likelihood of development or other impacts and that would be redundant with additional regulatory protection, and the need for additional protection and management that may be brought about through public education.

In contrast to the benefits of inclusion, the benefits of excluding conserved and managed land covered by the County of San Diego MSCP Subarea Plan from revised critical habitat are significant. The exclusion of these lands from revised critical habitat will help preserve the partnership and conservation and management we developed with the County of San Diego and other local stakeholders in the development of the County of San Diego MSCP Subarea Plan and the Artesian Trails Resource Management Plan, and foster additional partnerships for the benefit of *Brodiaea filifolia* and other species. Therefore, in consideration of the relevant impact to current and future partnerships, we determined the

significant benefits of exclusion outweigh the minor benefits of critical habitat designation for lands that are conserved and managed. We analyzed the benefits of including lands within Unit 12 that are not conserved and managed in the final revised designation and the benefits of excluding those lands from the designation. We recognize that the County of San Diego MSCP Subarea Plan has established valuable partnerships that are intended to implement conservation actions for *B. filifolia.* However, in conducting our evaluation of the conservation benefits to *B. filifolia* and its proposed revised critical habitat that have resulted to date from these partnerships, we did not conclude that the benefits of excluding areas in Unit 12 that are not conserved and managed from revised critical habitat outweighs the benefits of inclusion.

Exclusion Will Not Result in Extinction of the Species—Unit 12, County of San Diego Subarea Plan

We determined that the exclusion of approximately 4 ac (2 ha) of land covered by the County of San Diego Subarea Plan in Unit 12 from the final revised critical habitat designation for *Brodiaea filifolia* will not result in extinction of the species. These areas are permanently conserved and managed to provide a benefit to *B. filifolia* and its proposed revised critical habitat. Therefore, based on the above discussion, we are exercising our delegated discretion to exclude approximately 4 ac (2 ha) of conserved and managed land in Unit 12 from this final revised critical habitat designation.

Economics

An analysis of the economic impacts for the previous proposed critical habitat designation for *Brodiaea filifolia* was conducted and made available to the public on October 6, 2005 (70 FR 58361). That economic analysis was finalized for the final rule to designate critical habitat for *B. filifolia* published in the **Federal Register** on December 13, 2005 (70 FR 73820). The analysis determined that the costs associated with critical habitat for *B. filifolia* across the entire area considered for designation (across designated and excluded areas) were primarily a result of the potential effects of critical habitat designation on residential, industrial, and commercial development; water supply; flood control; transportation; agriculture; the development of HCPs; and the management of military bases, other Federal lands, and other public or conservation lands. After excluding land in Riverside, Orange, and San Diego counties from the 2004 proposed critical habitat (December 8, 2004 (69 FR 71284)), the economic impact was estimated to be between $1.0 and $3.3 million over the next 20 years expressed in undiscounted dollars. Based on the 2005 economic analysis, we concluded that the designation of critical habitat for *B. filifolia,* as proposed in 2004, would not result in significant small business impacts. This analysis is presented in the NOA for the economic analysis published in the **Federal Register** on October 6, 2005 (70 FR 58361).

We prepared a new economic impact analysis associated with this revised critical habitat designation for *Brodiaea filifolia.* In the revised DEA, we evaluated the potential economic effects on small business entities resulting from implementation of conservation actions related to the proposed revision to critical habitat for *B. filifolia.* The analysis is based on the estimated incremental impacts associated with the proposed rulemaking as described in Chapters 2 through 6 of the analysis. We announced the availability of the draft economic analysis in the **Federal Register** on July 20, 2010 (75 FR 42054).

The final economic analysis determined that the costs associated with revised critical habitat for *Brodiaea filifolia,* across the entire area considered for designation (both designated and excluded areas), are primarily a result of residential and commercial development, transportation, utility, and flood control projects, and public and conservancy lands management. The incremental economic impact of designating revised critical habitat was estimated to be between $500 and $600 thousand over the next 20 years using a 7 percent discount rate (Industrial Economics, Inc. (IEc) 2010, p. ES–7). The difference between the economic impacts projected with this designation compared to those in the 2005 designation are due to the use of an incremental analysis in this designation rather than the broader coextensive analysis used in the 2005 designation. Based on the 2010 final economic analysis, we concluded that the designation of revised critical habitat for *B. filifolia,* as proposed in 2009, would not result in significant small business impacts. This analysis is presented in the Economic Analysis of Revised Critical Habitat Designation for Thread-Leaved Brodiaea (IEc 2010).

Summary of Comments and Recommendations

We requested written comments from the public on the proposed rule to designate revised critical habitat for *Brodiaea filifolia* during two comment periods. The first comment period opened with the publication of the proposed revised rule in the **Federal Register** on December 8, 2009 (74 FR 64930), and closed on February 8, 2010. The second comment period opened with the publication of the notice of availability of the Draft Revised Economic Analysis (DEA) in the **Federal Register** on July 20, 2010 (75 FR 42054), and closed on August 19, 2010. During both public comment periods, we contacted appropriate Federal, State, and local agencies; scientific organizations; and other interested parties and invited them to comment on the proposed revised rule to designate critical habitat for *B. filifolia* and the associated revised DEA. During the comment periods, we requested that all interested parties submit comments or information related to the proposed revised critical habitat, including (but not limited to) the following: reasons why we should or should not designate habitat as "critical habitat"; information that may assist us in clarifying or identifying more specific PCEs; the appropriateness of designating critical habitat for this species; the amount and distribution of *B. filifolia* habitat included in this proposed rule; what areas are essential to the conservation of the species; unit boundaries and methodology used to delineate the areas proposed as revised critical habitat; land use designations and current or planned activities in the areas proposed as revised critical habitat; special management considerations; economic, national security, or other relevant impacts of designating any area; the exclusions being considered under section 4(b)(2) of the Act; whether the benefit of an exclusion of any particular area outweighs the benefit of inclusion under section 4(b)(2) of the Act; and how to improve public outreach during the critical habitat designation process.

During the first comment period, we received 11 comment letters-3 from peer reviewers and 8 from public organizations or individuals. During the second comment period we received 6 comment letters addressing the proposed revised critical habitat designation and the DEA. Of these latter comments, 1 was from a peer reviewer and 5 from public organizations or individuals. We did not receive any requests for a public hearing. We appreciate all peer reviewer and public comments submitted and their contributions to the improvement of the content and accuracy of this document.

Peer Review

In accordance with our Policy for Peer Review in Endangered Species Act Activities, published on July 1, 1994 (59 FR 34270), we solicited expert opinions from four knowledgeable individuals with scientific expertise that included familiarity with *Brodiaea filifolia,* the geographic region in which it occurs, and conservation biology principles pertinent to the species. Three peer reviewers submitted responses that included additional information, clarifications, and suggestions that we incorporated into this final revised critical habitat rule.

We reviewed all comments received from the peer reviewers and the public for substantive issues and new information regarding the designation of revised critical habitat for *Brodiaea filifolia.* All comments are addressed in the following summary and incorporated into this final revised rule as appropriate.

Peer Reviewer's Comments

Comment 1: Two peer reviewers expressed the opinion that the methods, analysis, and results of the proposed revised critical habitat for *Brodiaea filifolia* were careful, thoughtful, and in strict adherence to the requisite methodology to define and designate critical habitat. The peer reviewers also stated that the best available science and methodology was used to arrive at the conclusions in the proposed revised rule, and that the proposed revised critical habitat designation encompasses a representative range of habitat types, geographic distribution, and population sizes that meet the requirements of the Act (59 FR 34270, July 1, 1994) for designation of critical habitat. The peer reviewers believe the proposed revised critical habitat for *B. filifolia* is more comprehensive and more accurate than the December 13, 2005, final critical habitat rule for *B. filifolia* (70 FR 73820).

Our Response: We appreciate the peer reviewers' critical reviews.

Comment 2: One peer reviewer expressed confusion and concern with the Service's use of number of flowering stalks of *Brodiaea filifolia* as a measure of occurrence size, as discussed on page 64932 of the December 8, 2009, proposed revised rule (74 FR 64930). The peer reviewer stated that the number of flowering stalks does not provide a maximum number of *B. filifolia* in an occurrence and believed the Service should instead compare numbers of non-flowering plants between occurrences, which presents a more accurate estimate of relative size between populations. The peer reviewer believes that densities of *B. filifolia* are larger than reported based on flowering stalk counts, and appear to be dependent on soil types and geographical location.

A second peer reviewer believes that we did not clearly state that the locality counts used to determine the importance of each locality were based on stem counts. The second peer reviewer also questioned our reasoning concerning how to determine which occurrences should be considered the largest for this species, since any locality may in fact contain many more *Brodiaea filifolia* plants than surveys might indicate.

Our Response: As stated in the December 8, 2009, proposed revised rule (74 FR 64930) on page 64932, the Service considers the number of flowering *Brodiaea filifolia* stalks at a site to be an estimate of the minimum number of *B. filifolia* plants present, not a maximum number or an exact count. We understand that the number of *B. filifolia* individuals in a population is larger than the number of flowering stalks; thus, we only used the number of flowering stalks as an estimate useful in comparing the relative abundance of *B. filifolia* at various sites across the species' range. We thank the peer reviewer for the information regarding soil type and geographic location.

In response to the issues brought up by the second peer reviewer; we stated plainly in the Criteria Used To Identify Critical Habitat section—rather than being buried in a discussion of various survey methods—that we are using counts of flowering stalks to estimate relative *Brodiaea filifolia* population sizes. It is possible that a very large population of the species could be mistakenly recorded as having an average or low number of plants if only a few individuals flower and the vegetative portions of the plants are difficult to see. It seems unlikely, however, that the largest occurrences would be so cryptic as to appear to be average or small occurrences.

Comment 3: One peer reviewer asked if it is known whether the field study on Santa Rosa Plateau that noted the 8:1 ratio of corms to flowering stems might have been conducted using *Brodiaea santarosae* instead of *B. filifolia.*

Our Response: Comparing the description of the occurrence used in the field study (EO 5 in Morey (1995, p. 2)) and the description of the only known occurrence of *Brodiaea filifolia* within the range of *B. santarosae* in Chester *et al.* (2007, p. 195), it appears the two are the same occurrence. The field study was conducted on an occurrence of *B. filifolia;* although some individuals of *B. santarosae* may have been present as well.

Comment 4: One peer reviewer noted that the text in the "*Taxonomy andFamily Placement—Movement of Brodiaea From Liliaceae (Lily Family) to Themidaceae (Cluster Lily Family)*" section of the proposed revised rule describing hybrids being described as *Brodiaea santarosae* should have cited Chester *et al.* (2007), since this reference provides the original description for this species.

Our Response: We thank the peer reviewer for this observation; Chester *et al.* (2007) is cited later in the passage, but should have been cited at the first mention of *Brodiaea santarosae* in that section of the text.

Comment 5: One peer reviewer suggested that the term "systematic surveys" should be replaced with "comprehensive surveys" at the top of page 64933 in the proposed revised rule, stating that in close proximity with the discussion on taxonomy, the use of the term "systematic surveys" suggests a study of the relationship of species within the genus *Brodiaea.*

Our Response: We appreciate the peer reviewer's critical review, and will note the potential for confusion when using the word "systematic" when we mean "methodical" when drafting future rules.

Comment 6: One peer reviewer recommended revision to a sentence on page 64933 in the **Background** section of the proposed revised rule to read, "Additionally, plants that were previously identified as hybrids and not pure *B. filifolia* have now been described as *B. santarosae* (Chester *et al.* 2007). Pires (2007.1) and Preston (2007, pers. comm.) intend to include *B. santarosae* as a separate species in their treatment of the genus *Brodiaea* for the revision of the Jepson Manual that is now in progress." The peer reviewer felt the passage was awkward as written in the proposed rule. Pires (2007.1) refers to J.C. Pires, Assistant Professor of Biological Sciences, University of Missouri-Columbia, pers. comm. to G. Wallace, Service September 17, 2007; Preston (2007, pers. comm.) refers to R. Preston, Senior Botanist, IFC Jones and Stokes, Sacramento, California, pers. comm. to G. Wallace, Service September 17, 2007.

Our Response: We agree that the revision provided by the peer reviewer communicates the information in question more clearly; however, we could not revise this passage for the final revised rule because the **Background** section is not repeated in the final revised rule.

Comment 7: Two peer reviewers expressed concern regarding the

Service's argument that adding an 820-ft (250-m) radius area around populations of *Brodiaea filifolia* to provide adequate habitat for pollinators based on flight distances for the pollinators is the best way to determine critical habitat subunit boundaries. Both peer reviewers believe the arguments behind this methodology are speculative in part because studies have not established what species is or are the most important pollinators for *B. filifolia* or the pollinator's conservation requirements. One peer reviewer reported speaking with a local insect expert who believes bumblebees cannot pollinate *B. filifolia* because they are too heavy.

Our Response: On page 64936 of the December 8, 2009, proposed revised rule (74 FR 64930), we outline a number of insects known to pollinate *Brodiaea filifolia* and cite documented observations of these insects pollinating *B. filifolia,* including bumblebees (*Bombus californicus*). While we may not know what species is the most frequent pollinator of *B. filifolia,* we do know that the majority of species that have been observed pollinating *B. filifolia* have flight distances that fall within the 820-ft (250-m) range; therefore, we believe using this measurement to define critical habitat boundaries is appropriate and not speculative.

Comment 8: One peer reviewer believes that the critical habitat boundaries should not be limited to the 820-ft (250-m) pollinator area if there is additional contiguous suitable or restorable habitat, or if the population is within a larger landscape feature such as a floodplain with an ecology that relies upon a suite of characters such as hydrology and soils to support *Brodiaea filifolia.* According to the peer reviewer, this is because there is much scientific information indicating that soils, hydrology, and plant community structure are the most important factors in plant distribution; because if there are additional populations separated by 300 to 1,000 meters within a contiguous block of suitable habitat it is not always certain additional *B. filifolia* populations could not exist in the intervening habitat; and because habitat conservation works more effectively with larger conservation areas than in small areas. The peer reviewer suggests that soil type boundaries (recommends using the boundaries of the Willows soils unit, at least from San Jacinto Ave. south), changes in plant community type, drainage watershed boundaries, or barriers such as roads and existing development may make more appropriate critical habitat boundary limits. A second peer reviewer was in agreement, stating that developing critical habitat based on pollinator dispersal does not appear to be as valid as a basic habitat approach in conserving the PCEs for *B. filifolia* at critical localities. The second peer reviewer suggested that the determination of the critical habitat for this species should be based on potential habitat that could be occupied by this species in the vicinity of occupied habitat, and should also consider the basics of reserve design, and developing more consolidated critical habitat areas rather than fragmented and isolated pockets of habitat.

Our Response: To include areas in the revised critical habitat designation that are contiguous suitable or restorable unoccupied habitat between areas occupied by *Brodiaea filifolia* at the time of listing, we need evidence that these areas are essential for the conservation of the species. Additionally, our regulations at 50 CFR 424.12(e) state that we "shall designate as critical habitat areas outside the geographical area presently occupied by a species only when a designation limited to its present range would be inadequate to ensure the conservation of the species." Based on the best scientific information available to us at this time, we believe that limiting the designation to the species' present range is adequate to ensure the conservation of *B. filifolia,* and except for unoccupied habitat areas within the geographical area occupied by the species at the time of listing needed to sustain pollinators of the species, unoccupied habitat, in and of itself, is not essential for the conservation of *B. filifolia.*

Comment 9: One peer reviewer stated that pollinators should only be one element considered in drawing critical habitat unit boundaries, and noted that many populations of *B. filifolia* reproduce largely by clone and some (*e.g.,* the Glendora population) appear to have been isolated from cross-pollination for some time and continue to persist as significant contributors to the species.

Our Response: In addition to identifying undisturbed habitats able to support pollinators as a criterion for determining the revised critical habitat boundaries we used numerous other criteria such as: (1) Areas supporting occurrences on rare or unique habitat within the species' range; (2) areas supporting the largest known occurrences of *Brodiaea filifolia;* or (3) areas supporting stable occurrences. We thank the peer reviewer and have taken into consideration *B. filifolia* population dynamics and other interactions through the use of the above criteria as identified in the Criteria Used To Identify Critical Habitat section of this rule.

Comment 10: One peer reviewer recommended altering PCE 2 to read "Areas with a natural, generally intact or lightly disturbed surface * * *" According to the peer reviewer *B. filifolia* can persist in areas that have been disked, especially if the subsoil structure is intact. A second peer reviewer also felt PCE 2 should be eliminated or altered to reduce its significance for the same reasons.

Our Response: We appreciate the suggestion, but do not believe this change is necessary since "generally intact" was meant to indicate that the surface could be lightly disturbed as long as the disturbance did not result in permanent alteration of the surface or subsurface soil structure.

Comment 11: One peer reviewer asked how an intact soil surface provides habitat for pollinators, and whether this was an error and we meant "intact plant community."

Our Response: The passage actually reads, "* * * generally intact surface and subsurface soil structure and support habitat for pollinators * * *" In other words, the soil surface should be able to support pollinator habitat, not the pollinators themselves.

Comment 12: One peer reviewer suggested that the Special Management Considerations or Protection section of the revised critical habitat rule should discuss potential gaps in the conservation or management of localities that could be considered critical habitat for *Brodiaea filifolia* within existing or proposed HCPs. The peer reviewer goes on to state that some HCPs have little control over current land use practices on lands proposed for inclusion into the reserve system, and some HCPs have limited control on agricultural conversion of these lands.

Our Response: We appreciate the peer reviewer's suggestion, however the appropriate place for this discussion is in the Exclusions under Section 4(b)(2) of the Act section of the rule. In this section, we discuss the protections afforded the species and its habitat by various relevant HCPs and management plans.

Comment 13: One peer reviewer asked whether extremely large localities, *e.g.*, over 10,000 plants, should be given a higher priority as a factor in determining occurrences being determined for critical habitat.

Our Response: It is unclear what the peer reviewer means by giving occurrences 'priority.' All occurrences

that met one or more of the criteria were proposed as critical habitat in the proposed revised critical habitat designation. Critical habitat designation acreage is not limited; therefore, there was no need to prioritize or rank occurrences to make sure those with the highest conservation value were included in the proposal.

Comment 14: One peer reviewer felt that Criterion 3 was inconsistently applied to *Brodiaea filifolia* occurrences in the proposed revised critical habitat rule. According to the peer reviewer, it is unclear whether the Service intended Criterion 3 to mean that the population is stable and persistent despite recent losses, stable and persistent because it is in protected habitat without immediate future threat, or has not suffered declines in recent years.

Our Response: We meant "stable and persistent" in the ecological sense, *i.e.,* to mean that a population is resilient—it contains enough individuals to sustain the population over time. We did not consider impacts or threats when evaluating *Brodiaea filifolia* occurrences in the context of this criterion.

Comment 15: One peer reviewer pointed out that, according to Table 1 of the December 8, 2009, proposed revised critical habitat rule (74 FR 64930), the *Brodiaea filifolia* occurrence in Subunit 11a does not meet Criterion 2, but according to the text on page 64942 this occurrence does meet Criterion 2.

Our Response: We thank the peer reviewer for this observation. The text on page 64942 of the December 8, 2009, proposed revised rule (74 FR 64930) is incorrect; this occurrence does not meet criterion 2. Table 1 in the proposed revised rule (Table 3 in this final revised rule) is correct.

Comment 16: One peer reviewer suggested that we confirm the *Brodiaea filifolia* occurrence in Corona Cala Camino is in fact *B. filifolia.* According to the peer reviewer, this area is within the general range of *B. santarosae,* and the plants may actually be affiliated with that taxon.

Our Response: We will attempt to verify this occurrence as time permits. The data reported in the proposed revised critical habitat rule represents the best data available to us at the time the proposed revision was written. Because this occurrence does not meet any of the criteria for designation as *Brodiaea filifolia* critical habitat, this uncertainty is outside the scope of this critical habitat analysis and will not be addressed here.

Comment 17: One peer reviewer stated that the Cristianitos Canyon Pendleton occurrence is actually within San Onofre State Beach, therefore, it would appear that this occurrence would not be exempt from critical habitat designation under section 4(a)(3) of the Act.

Our Response: According to the GIS data provided to us by MCB Camp Pendleton, the Cristianitos Canyon Pendleton occurrence is located on the northern end of MCB Camp Pendleton.

Comment 18: One peer reviewer pointed out that Devil Canyon (Subunit 5b) is noted as both occurrence 38 and 39 in CNDDB. The reviewer suggests noting in the revised rule whether this subunit includes both occurrences or is limited to occurrence 39. The peer reviewer adds that since CNDDB notes this site as a hybrid population, additional citations should be provided in the revised rule, noting the current opinion on the species of *Brodiaea* found at this locality.

Our Response: Subunit 5b includes occurrence 39 only. We see the reviewer's point regarding adding a note to the revised rule to indicate that Subunit 5b does not contain CNDDB occurrence 38; however, we feel this may cause unnecessary confusion for readers who are not familiar with the situation. Our understanding at this point is that occurrence 39 (Subunit 5b) does not entirely comprise hybrids (Chester 2007, p. 191).

Comment 19: One peer reviewer asked how areas with PCEs were mapped if there was no actual field review of the localities being considered for critical habitat. According to the peer reviewer, a more precise mapping would require actual field examinations of the localities being mapped.

Our Response: We used GIS data from multiple sources as well as other resources outlined in the Criteria Used To Identify Critical Habitat section of this revised final rule to map the areas containing PCEs. We do not have staffing or resources to field identify each occurrence; therefore, we must rely on the best information available.

Comment 20: According to one peer reviewer, the *Brodiaea filifolia* occurrence in Subunit 11e meets Criterion 1 because it is the only remaining occurrence known to be associated with relatively high-quality annual alkali grassland. This occurrence is also unique because it persists in a more mesic habitat than is typically found along the San Jacinto River.

Our Response: Our analysis found the *Brodiaea filifolia* occurrence in Subunit 11e to meet Criterion 1 (see Table 3 above).

Comment 21: One peer reviewer pointed out that some of the survey results used to determine whether a population of *Brodiaea filifolia* had sufficient number of plants to be considered stable (850 flowering plants) were counts of non-flowering plants while others were counts of flowering plants.

Our Response: We consider the number of flowering *Brodiaea filifolia* stalks at a site to be an estimate of the minimum number of *B. filifolia* plants present. We understand that the number of *B. filifolia* individuals in a population is larger than the number of flowering stalks, thus we only used the number of flowering stalks as an estimate useful in comparing the relative abundance of *B. filifolia* at various sites across the species' range. If survey results for a site are reported in counts of non-flowering plants, and the numbers exceeded 850 plants, we could say with confidence that the site contained a sufficient number of plants to meet Criterion 3; if survey results reported in counts of non-flowering plants and were less than 850 plants, we would take into consideration the fact that non-flowering plant counts were used and also examine other characteristics of the occurrence to determine whether the occurrence met the stability standards of Criterion 3: "Additionally, we looked at all occurrences with fewer than 850 flowering stalks to determine if any of these exhibited the same persistence and stability characteristics to provide similar conservation value as the other identified occurrences with greater than 850 flowering stalks (since the counts for an occurrence vary from year to year)" (*see* Criteria Used To Identify Critical Habitat section above).

Comment 22: One peer reviewer suggested that the "2005 fCH" box for Unit 10 in Table 2 of the proposed revised critical habitat rule should read "Not designated; based on misidentification of *Brodiaea orcuttii*" rather than "Not designated, did not meet the definition of critical habitat" because the suggested revision more accurately reflects the situation. The peer reviewer feels it is important to separate such reports from those that actually support *B. filifolia* but did not meet the criteria for critical habitat.

Our Response: We have changed the entry in the "2005 fCH" box for Unit 10 in Table 2 of the proposed revised critical habitat rule to "Not designated; could not verify occurrence", because that is the language used in the 2005 final critical habitat rule (see 70 FR 73834).

Comment 23: Two peer reviewers suggested that Table 2 should indicate that the Corona North, Corona South, and Moreno Valley occurrences were not designated as critical habitat in 2005

because they were based on unsubstantiated claims that the locations were occupied by *Brodiaea filifolia.* The peer reviewers feel it is important to separate such reports from those that actually support *B. filifolia* but did not meet the criteria for critical habitat.

Our Response: We have changed the entry in the "2005 fCH" box for the Corona North, Corona South, and Moreno Valley occurrences to "Not designated, could not verify occurrence" as suggested by the peer reviewer.

Comment 24: One peer reviewer recommended the Service verify the number of *Brodiaea filifolia* plants found in Unit 3. The peer reviewer is not aware of any reports substantiating this number, and other sources (including the peer reviewer's own survey data) indicate a much smaller number of *B. filifolia* in this area. The peer review added that the population should be considered stable and persistent.

Our Response: We will attempt to verify these data as time permits. The data reported in the proposed revised critical habitat rule represents the best data available to us at the time the proposed revision was written. Because this occurrence meets Criterion 1 and thus qualifies for designation as *Brodiaea filifolia* critical habitat regardless of the accuracy of the survey data in question, this uncertainty is outside the scope of this critical habitat analysis and will not be addressed here.

Comment 25: One peer reviewer stated that the unit descriptions in the proposed revised rule generally provide a good overview of each locality proposed for critical habitat. However, the reviewer recommended that the Service add more information regarding the plant communities that occur in each of the units/subunits. The peer reviewer believes the unit descriptions are overly repetitive, and that these descriptions should focus on the existing plant communities, soils, and unique features of each locality. According to the reviewer, these descriptions should also provide more information on sites with large *Brodiaea filifolia* populations, noting the total number and distribution of plants within the unit or subunit of critical habitat. The reviewer then provides specific suggestions along these lines for a number of units/subunits as well as proposing instances where subunits could be expanded into adjacent unoccupied habitat, providing corrections where inaccurate information is given for an occurrence.

Our Response: We appreciate the peer reviewer's thorough review, suggestions, and information provided to improve this revised critical habitat rule and associated designation. We have incorporated the reviewer's suggested edits where appropriate.

Comment 26: One peer reviewer noted that many of the *Brodiaea* plants in Subunit 8b could be *B. orcuttii* or *B. filifolia* x *B. orcuttii* hybrids; however, the peer reviewer agrees with the Service that there is a sizable population of *B. filifolia* at this site and that the site qualifies for critical habitat based on supporting a persistent population. The reviewer also added that recent evidence suggests that *B. filifolia* and *B. orcuttii* do not hybridize readily, so hybridization may not be a long-term concern.

Our Response: We thank the peer reviewer for this information. *Please see* the Special Management Considerations Or Protection section above for further discussion of hybridization among species of *Brodiaea.*

Comment 27: One peer reviewer argued that in cases where conservation for species facing significant threats is not a priority of landowners, designating critical habitat will probably have little additional negative impact on either the condition of habitat or the willingness of landowners to participate in conservation because landowners are already actively degrading the habitat on their properties and are already unwilling to participate in conservation activities.

According to the peer reviewer, in Western Riverside County in particular, there are many examples indicating that designation of critical habitat would likely not make the conservation situation any worse than it is, or make the private stakeholders any less willing to participate in conservation actions than they have historically been. The peer reviewer believes that landowners in Western Riverside County are aware of the conservation value of lands such as the areas along the San Jacinto River and at Hemet that are necessary to the conservation of *Brodiaea filifolia* and other sensitive species, and are purposely working to eradicate resources via increases in discing frequency, early season discing, manure dumping, and irrigated cultivation rather than partner with regulators.

Because of this, the peer reviewer believes that in Western Riverside County there is no merit to the Service's argument that designating critical habitat on lands already covered by HCPs discourages landowners from participating in conservation actions and makes landowners believe having endangered species on their property is a liability because it has been clearly demonstrated that the landowners hold these views regardless. Thus Service should employ all regulatory mechanisms available including critical habitat designations to protect biological resources in these areas.

Our Response: Section 4(b)(2) of the Act authorizes the Secretary to designate critical habitat after taking into consideration the economic impacts, national security impacts, and any other relevant impacts of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of designating a particular area as critical habitat, unless the failure to designate will result in the extinction of the species. We believe the exclusions made in this final revised rule are legally supported under section 4(b)(2) of the Act and scientifically justified. After analyzing the benefits of inclusion and exclusion of proposed revised critical habitat units and subunits on lands covered under the Western Riverside County MSHCP, we determined that the benefits of exclusion outweighed the benefits of inclusion of lands already conserved and managed in Subunits 11g, 11h, and portions of 11f (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above). Service biologists continue to work with the County of Riverside and permittees of the HCP to ensure *B. filifolia* and its habitat receive the full extent of protections anticipated by the Western Riverside County MSHCP.

Comment 28: One peer reviewer stated that manure dumping is probably the most significant and immediate threat to the seasonally flooded alkali vernal plains habitat and *B. filifolia* along the San Jacinto River. The peer reviewer further stated that the Western Riverside County MSHCP appears to have provided no mechanism to stop the manure dumping.

Our Response: We realize that manure dumping is not a covered activity under the Western Riverside County MSHCP. Because of the lack of protection afforded to biological resources against manure dumping by the Western Riverside County MSHCP, we have not excluded any areas that are subject to this activity from this revised critical habitat designation.

Comment 29: One peer reviewer expressed doubt that the partnership between the Service and the County of Riverside provides enough conservation potential to warrant excluding lands covered under the Western Riverside County MSHCP from critical habitat

designation in order to preserve this partnership. The peer reviewer believes that preserving this partnership is important, but if the partnership does not result in significant conservation benefits and does little to offset immediate and clearly identifiable threats, it should not preclude the introduction of additional regulatory conservation tools (such as critical habitat designations).

The peer reviewer goes on to state that the partnerships between the Service and the City of Carlsbad and the County of San Diego are more meaningful, making the argument in favor of excluding lands covered under the Carlsbad HMP and the County of San Diego MSCP Subarea Plan in order to preserve these partnerships more valid.

Our Response: Although we are striving to maintain and improve our partnerships with the Western Riverside County MSHCP permittees, they do not restrict the Service from designating critical habitat on lands covered by the Western Riverside County MSHCP. In this revised critical habitat designation for *Brodiaea filifolia,* we have not concluded that the partnership benefits of excluding lands in areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including those lands in Subunits 11a, 11b, 11c, 11d, 11e, and a portion of 11f that are not currently conserved and managed (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

We also agree with the peer reviewer that the conservation actions taken by the City of Carlsbad over time, and the willingness of the County of San Diego to work toward species conservation, serve to support the argument in favor of excluding under section 4(b)(2) of the Act lands covered under the Carlsbad HMP and the County of San Diego MSCP Subarea Plan. However, in our balancing analysis under section 4(b)(2) of the Act, we relied more heavily on the presence of conservation and management on lands considered for exclusion than partnership benefits. As a result, we are only exercising our delegated discretion to exclude lands covered by the Carlsbad HMP (in Subunit 7d, and portions of Subunit 7a and 7c) and the County of San Diego MSCP Subarea Plan (portion of Unit 12), which are conserved and managed (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Carlsbad HMP and Weighing Benefits of Exclusion Against Benefits of Inclusion—County of San Diego Subarea Plan sections above).

Comment 30: One peer reviewer stated that although the Orange County Southern Subregion HCP is untested at this point, the 2006 Environmental Impact Report/Environmental Impact Statement for the HCP proposed significant impacts to rare plants, including *Brodiaea filifolia,* suggests that while the plan will not jeopardize *B. filifolia,* it could significantly reduce recovery options within Orange County. The peer reviewer believes that the proposed revised rule did not offer enough specifics in its discussion of this HCP to support an exclusion of lands that are covered under the Orange County Southern Subregion HCP under section 4(b)(2).

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. The areas covered by the Orange County Southern Subregion HCP in Subunits 4c, and 4g, and approximately 12 ac (5 ha) in Subunit 4b, are not currently conserved and managed for the benefit of *Brodiaea filifolia,* and we have not concluded that the partnership benefits of excluding these areas outweigh the benefits of including these areas in the final revised designation. We are not exercising our delegated discretion to exclude these areas under section 4(b)(2) of the Act in this the final revised critical habitat designation (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Orange County Southern Subregion HCP section).

Comment 31: One peer reviewer discussed numerous problems he believes exist within the Western Riverside County MSHCP that may impede *Brodiaea filifolia* conservation or even contribute to the decline of the species:

- There is no guarantee that many of the MSHCP goals will be achieved.
- Establishment of baseline populations, monitoring, and management take place only after the County of Riverside has acquired lands for conservation or when an environmental review is triggered for a specific development project.
- There are no hard-line conservation goals. Criteria Areas are merely guidelines for where conservation will take place but do not assure that the most suitable habitat is set aside in an appropriate configuration.
- The goals of the Western Riverside County MSHCP may be irrelevant to occurrences of *B. filifolia* along the San Jacinto River that could be extirpated or near extirpation before conservation triggers are activated within the HCP. If impacts continue at the current rate, there will be almost no *B. filifolia* habitat remaining along the San Jacinto River outside of the San Jacinto Wildlife Area within another 5 years.
- There has been no effort to stop land use activities that are greatly reducing the viability of habitats, such as proposed flood control projects along the San Jacinto River.
- The requirement that 90 percent of those portions of a property with long-term conservation value within the Criteria Area Species Survey Area will be avoided until the species conservation objectives are met is (1) unachievable relative to historic baseline conditions because over 10 percent of the original habitat has been degraded or developed, and (2) ineffective relative to a baseline established after habitat has been degraded.
- The current rate of acquiring land and implementing management on these lands is too slow to appreciably contribute to the stabilization and recovery of *B. filifolia.*
- Contradicting designations and directives within the Western Riverside County MSHCP undermine the effectiveness of proposed conservation measures.
- The Western Riverside County MSHCP calls for 6,900 ac (2,792 ha) of *B. filifolia* habitat to be set aside to provide adequate conservation and contribute to the recovery of the species. However, the Santa Rosa Plateau, which was likely expected to constitute a significant portion of this conservation area, can no longer contribute much acreage to the conservation area as only a small portion of the Santa Rosa Plateau is occupied by *B. filifolia.*

Our Response: The Western Riverside County MSHCP has provided an opportunity for valuable partnerships to be established and conservation measures for *Brodiaea filifolia* to be

implemented. Although we are striving to maintain and improve our partnerships with the Western Riverside County MSHCP permittees, they do not restrict the Service from designating critical habitat on lands covered by the Western Riverside County MSHCP. In this revised critical habitat designation for *Brodiaea filifolia,* in evaluating the partnership benefits contributed by the Western Riverside County MSHCP in the context of the current status the species and its habitat, we have not concluded that the benefits of excluding areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including those lands in Subunits 11a, 11b, 11c, 11d, 11e, and a portion of 11f that are not currently conserved and managed (*see* Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

Comment 32: One peer reviewer stated that HCPs are required only to meet an extinction (*i.e.,* jeopardy) standard, and because recovery is not a requirement of HCPs, Section 10/HCP requirements to avoid jeopardy could result in reducing a species to a minimal existence that contributes little to the overall biotic community, and could also leave a species at perpetual risk of extinction from a variety of factors, while technically not qualifying as a jeopardy.

Our Response: We appreciate the peer reviewer's concerns regarding the long-term recovery of *Brodiaea filifolia.* Although not specifically stated by the peer reviewer, their comment indicates they believe that lands covered under an HCP should not be a basis for exclusion from a critical habitat designation because the plans do not protect a listed species to the level beyond that evaluated in a jeopardy analysis under section 7 of the Act. We do not agree that protections given to listed species under HCPs are necessarily limited to avoidance of jeopardy; we believe the protections afforded by each HCP for each species differ and need to be assessed on a case-by-case basis, which is what we have done in our exclusion analysis. *See* the Exclusions under Section 4(b)(2) of the Act section above for a detailed discussion.

Section 4(b)(2) of the Act states that critical habitat shall be designated, and revised, on the basis of the best available scientific data after taking into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. An area may be excluded from critical habitat if it is determined that the benefits of exclusion outweigh the benefits of specifying a particular area as critical habitat, unless the failure to designate such area as critical habitat will result in the extinction of the species. Consequently, we may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act based on economic impacts, impacts on national security, or other relevant impacts, such as preservation of conservation partnerships, if we determine the benefits of excluding an area from critical habitat outweigh the benefits of including the area in critical habitat, provided the action of excluding the area will not result in the extinction of the species. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. *See* Exclusions under Section 4(b)(2) of the Act and *Benefits of Excluding Lands with HCPs* section for further discussion.

We found the benefits of excluding lands that are both conserved and managed under the Western Riverside County MSHCP, the County of San Diego MSCP Subarea Plan, the Carlsbad HMP, and the Orange County South and Central-Coastal HCPs to be greater than the benefits of including these lands. *See* the Exclusions under Section 4(b)(2) of the Act section above for a detailed discussion.

Comment 33: One peer reviewer stated that critical habitat is intended to provide for the conservation of the species (*i.e.,* to go beyond just preventing extinction and achieve a status where the protections afforded by the Act are no longer necessary); and that critical habitat designations within the context of regional HCPs could assure that the intent of the Act is achieved and improve the opportunity for recovery. The peer reviewer stated that relinquishing an important tool for conservation (*i.e.,* critical habitat) in cases where a Federal nexus would otherwise exist because of the HCP overlay is not wise if the overall strategic goal is to recover or stabilize an endangered species.

Our Response: Please see our response to Comment 32.

Comment 34: One peer reviewer stated that critical habitat is a tool that Federal agencies can use for conservation and by excluding lands within HCP boundaries other Federal agencies may miss opportunities to conserve species and their critical habitat.

Our Response: As a conservation tool, a critical habitat designation ensures that when actions with a Federal nexus may impact critical habitat, the Federal action agency consults with the Service to determine if the action will adversely modify critical habitat. Critical habitat does not require a Federal agency to perform any additional conservation actions nor does it direct conservation actions. With regard to areas that are within the boundaries of an HCP, each exclusion is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of an area will not result in extinction of a species. For the areas that we are exercising our delegated discretion to exclude under section 4(b)(2) of the Act from this final rule, we have evaluated the benefits of highlighting the importance of these areas for Federal agencies and the public, but found that the benefits of exclusion outweigh the benefits of inclusion for the areas we are excluding (*see* the Exclusions under Section 4(b)(2) of the Act section above for details).

Comment 35: One peer reviewer submitted numerous comments requesting additions to the text of the revised critical habitat rule regarding the life history, ecology, and habitat of *Brodiaea filifolia:*

- More information should have been presented on the significance of the clonal populations, even if seed production is a rare occurrence.
- More information on the population biology of monocots in this genus would be very helpful in determining the needs for habitat conservation.
- Any known information on seed viability in this or related species of *Brodiaea* should also be presented. Seed viability should provide some information on the rate of successful out-crossing in known occurrences of this species.
- The recorded localities of the two *Brodiaea* species on or near Santa Rosa Plateau need to be carefully reviewed to determine the actual remaining localities of *Brodiaea filifolia* found on the plateau or adjacent areas.

Our Response: We agree with the peer reviewer that having more information on the species would be helpful. We

have based our determinations in this revised critical habitat designation on the best available information, and have addressed the need for further information in our five-year review of the species (Service 2009a, pp. 35–36).

Comment 36: One peer reviewer stated that the description of *Brodiaea filifolia* habitat should also include riparian habitats, specifically riparian herb communities.

Our Response: We thank the peer reviewer for this information, and have added this to the text of the final revised critical habitat rule.

Comment 37: One peer reviewer suggested that the text of the rule be expanded to note that all areas excluded from the revised critical habitat designation under section 4(b)(2) of the Act are found within the Western Riverside County MSHCP Criteria Area cells or CASSA survey areas.

Our Response: We are exercising our delegated discretion to exclude only those areas that are both conserved and managed from this revised designation. These areas are protected from development impacts. Therefore, whether or not excluded areas under the Western Riverside County MSHCP fall within the Criteria Area or CASSA survey areas is not relevant.

Comment 38: One peer reviewer submitted a number of comments recommending edits or changes to the *Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)* section of the revised critical habitat rule to correct or clarify information presented in the proposed revised rule, or add information the peer reviewer felt was relevant but missing from the rule.

Our Response: The *Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP)* section of the final revised rule includes the changes and additional information suggested by the peer reviewer as appropriate.

Comment 39: One peer reviewer requested additional explanation detailing why *Brodiaea filifolia* occurrences in San Diego and Riverside counties have been excluded from this revised critical habitat designation when more protected occurrences of the species are needed to offset the loss of many "secure" *B. filifolia* locations on Santa Rosa Plateau which were to be an important component of the recovery strategy for the species.

Our Response: Only units/subunits protected by conservation and management have been excluded from this revised critical habitat designation; the peer reviewer's issue is therefore moot. The Exclusions under Section 4(b)(2) of the Act and *Benefits of Excluding Lands with HCPs* sections of this revised critical habitat rule explain in detail our exclusion analyses and the outcomes thereof.

Comment 40: One peer reviewer expressed dissatisfaction with the Service's practice of not publishing "literature cited" sections with the text of **Federal Register** rules or on-line following the publication of a rule in the **Federal Register**.

Our Response: Complete lists of all references cited in any Service rulemaking are made available on-line at *http://www.regulations.gov* following publication of a rule. For rules written by the Carlsbad Fish and Wildlife Office, reference cited lists are also available upon request from the Field Supervisor of the Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section of the rule).

Comment 41: One peer reviewer pointed out that apparently some previous summaries of location information on *Brodiaea filifolia* prepared by Service staff (Roberts 1997, Roberts and Vanderwier 1997) were overlooked in the preparation of the proposed revised critical habitat rule. The peer reviewer believes that this material should have been used as the basis for the information in the text of the proposal and could have potentially eliminated some of the errors in the proposed revised rule. The peer reviewer added that other important updates provided to the Service by the California Native Plant Society (CNPS) (Roberts 2002a and 2002b) were also not reviewed in the preparation of the proposed revised critical habitat rule.

Our Response: We do have copies of the references the peer reviewer referred to in his comment. We used information from these resources to complete the 5-year review for *Brodiaea filifolia;* much of the occurrence information in this revised critical habitat rule was derived from the 5-year review.

Public Comments

Comment 42: One commenter expressed agreement with the Service's proposed exclusion of all lands covered by the Western Riverside County MSHCP from the revised critical habitat designation for *Brodiaea filifolia* (Subunits 11a, 11b, 11c, 11d, 11e, 11f, 11g, and 11h). The commenter stated that under provisions in section 6.9 of the Western Riverside County MSHCP and section 14.10 of the Implementing Agreement for the Western Riverside County MSHCP, no critical habitat for *Brodiaea filifolia* should be designated in the Western Riverside County MSHCP plan area; that the proposed exclusion of lands covered by the Western Riverside MSHCP was consistent with the United States District Court's (E.D.Cal. Nov. 11, 2006) Case No. 05–629–WBS–KJMA, which upheld the Service's decision to exclude the Western Riverside County MSHCP from the designation of critical habitat for the 15 vernal pool species, finding that this exclusion was a reasonable exercise of the Service's discretion; and that the Western Riverside County MSHCP already adequately provides for the survival and recovery of the species.

Our Response: With regard to the commenter's assertion that lands owned or under the jurisdiction of the Western Riverside County MSHCP should be excluded because the HCP provides adequate protection for the species, the adequacy of an HCP to protect a species and its essential habitat is one consideration taken into account in our evaluation under section 4(b)(2). Exclusion of an area from critical habitat is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of an area will not result in extinction of a species, which is a more complex analysis process. We have examined the protections afforded *Brodiaea filifolia* by the Western Riverside County MSHCP during our exclusion analysis in this revised critical habitat designation for *B. filifolia,* and have not concluded that the benefits of excluding areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees outweigh the benefits of including Subunits 11a, 11b, 11c, 11d, 11e, and a portion of Subunit 11f that are not currently conserved and managed, and we are not exercising our delegated discretion to exclude these lands under section 4(b)(2) of the Act in this final revised critical habitat rule. Our determination not to exercise our delegated discretion to exclude areas from critical habitat designation under section 4(b)(2) of the Act is committed to agency discretion by law and is not reviewable (see *Home Builders Ass'n of N. Cal.* v. *U.S. Fish & Wildlife Serv.,* 2006 U.S. Dist. LEXIS 80255 at *66 (E.D. Cal. Nov. 2, 2006); *Cape Hatteras Access Preservation Alliance et al.* v. *U.S. Dept. of the Interior,* 2010 U.S. Dist. LEXIS 84515 ** 36–38 (D.D.C. August 17, 2010)). We did, however, determine that the benefits of excluding lands in areas owned by or under the jurisdiction of Western Riverside County MSHCP permittees that are conserved and managed (Subunits 11g, 11h, and a portion of Subunit 11f) outweigh the

benefits of including those lands as revised critical habitat for *B. filifolia* (see Weighing Benefits of Exclusion Against Benefits of Inclusion—Western Riverside County MSHCP section above).

With regard to the commenter's belief that critical habitat should not be designated in the Western Riverside County MSHCP Plan Area based on language in section 6.9 of the HCP and the associated Implementing Agreement, section 14.10 of the Implementing Agreement does not preclude critical habitat designation within the plan area (Dudek & Associates 2003b, p. 6–109; Western Riverside County Regional Conservation Authority *et al.,* p. 51). Consistent with our commitment under the Implementing Agreement, and after public review and comment on the proposed revised critical habitat for *Brodiaea filifolia,* we determined through our analysis under section 4(b)(2) of the Act that the maximum extent of allowable exclusions under the Western Riverside County MSHCP is limited to the exclusion of lands owned by or under the jurisdiction of the permittees of the Western Riverside County MSHCP that are both conserved and managed (Subunits 11g, 11h, and a portion of Subunit 11f) (see Benefits of Exclusion—Western Riverside County MSHCP section above for a detailed discussion of the exclusion analysis).

Comment 43: Two commenters stated that the Orange County Southern Subregion Habitat Conservation Plan provides for the conservation and management of *Brodiaea filifolia.* One of the commenters requested that the Secretary exercise his discretion under section 4(b)(2) of the Act to exclude the Orange County Southern Subregion Subarea 1 lands from the revised critical habitat designation for *B. filifolia,* and provided a number of reasons in support of a 4(b)(2) exclusion of the Orange County Southern Subregion Subarea 1 lands.

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. However, in reviewing the specific circumstances of *Brodiaea filifolia,* we have not concluded that the partnership benefits of excluding lands covered by the Orange County Southern Subregion HCP, the Western Riverside County MSHCP, the Carlsbad HMP, and the City and County of San Diego MSCP Subarea Plans that are not currently conserved and managed outweigh the regulatory and educational benefits afforded under section 7 of the Act as a consequence of designating critical habitat in these areas (*see* Exclusions under Section 4(b)(2) of the Act section above for details), and we are not exercising our delegated discretion to exclude these lands under section 4(b)(2) of the Act in this final revised critical habitat rule. Our determination not to exercise our delegated discretion to exclude areas from critical habitat designation under section 4(b)(2) of the Act is committed to agency discretion by law and is not reviewable (see *Home Builders Ass'n of N. Cal.* v. *U.S. Fish & Wildlife Serv.,* 2006 U.S. Dist. LEXIS 80255 at *66 (E.D. Cal. Nov. 2, 2006); *Cape Hatteras Access Preservation Alliance et al.* v. *U.S. Dept. of the Interior,* 2010 U.S. Dist. LEXIS 84515 ** 36–38 (D.D.C. August 17, 2010)).

Comment 44: Two commenters stated that the Service should have conducted the 4(b)(2) analysis in the proposed revised critical habitat rule and based its proposed revision on that analysis, because deferral of this analysis deprives the commenting public of information that is necessary to review and to provide meaningful comments on the proposed revised rule.

Our Response: Generally, it is our practice to include a discussion of areas we are considering for exclusion in proposed critical habitat rules in order to inform the commenting public of what areas may be excluded from the final designation under section 4(b)(2) of the Act and why, and allow the public opportunity to comment on potential exclusions prior to conducting a final exclusion analysis under section 4(b)(2) of the Act.

Comment 45: Two commenters stated that the Service should exclude the proposed 241 Completion Project right-of-way from Subunit 4c of the revised critical habitat designation. One of the commenters also pointed out that the Service issued a biological opinion finding that the construction of the 241 Completion Project would not appreciably reduce the likelihood of the survival and recovery of *Brodiaea filifolia.*

Our Response: Please see our response to Comment 43. While the 241 Completion Project did not specifically factor into our exclusion analysis, it is within the plan boundaries of the Orange County Southern Subregion HCP and our section 4(b)(2) analysis for the HCP covers this area.

Comment 46: One commenter expressed a belief that the proposed revised critical habitat rule for *Brodiaea filifolia* is flawed because it does not include all areas of occupied habitat. The commenter believes that at least 33 extant populations of *B. filifolia* that were present at the time of listing were arbitrarily dismissed from the proposed revised designation because they do not meet the criteria. According to the commenter, at least one of these populations is at the edge of the species range, and may thus have unique genetic characteristics that can impart novel evolutionary potential that may be particularly important under climate change scenarios.

Our Response: All currently occupied and formerly occupied habitat (including all extant CNDDB Element Occurrences) was considered for designation as revised critical habitat for *Brodiaea filifolia,* and all occurrences were included in the proposed revised critical habitat unless they were known to have been extirpated, presumed to have been extirpated based on documented negative survey results, are not natural occurrences (transplants or plants moved from their natural location with fill soil), or did not meet the criteria used to identify critical habitat (*see* Criteria Used To Identify Critical Habitat section above).

While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to *B. filifolia* at this time. However, the revised critical habitat subunits have been designed to capture the areas we believe to support the most stable and persistent populations, unique and rare habitat, and the largest populations of the species (*see* Criteria Used To Identify Critical Habitat section above). We believe these areas will be important to the conservation of *B. filifolia* under climate change scenarios.

Comment 47: One commenter expressed a belief that the Service failed to justify why the three criteria used to define revised critical habitat for *Brodiaea filifolia* are the only criteria

used to identify habitat critical for the survival and recovery of the species. The commenter believes that the three criteria fail to incorporate the effect of global climate change on the persistence of *B. filifolia* and that many more criteria are needed to identify essential plant habitat.

Our Response: We believe the three criteria used to define revised critical habitat for *Brodiaea filifolia* were broad enough to result in the proposal of a wide range of occurrences of the species. As a result, we expect the revised designation will afford protections to the species that will enhance its overall stability and persistence as well as providing for conservation. Because we cannot predict what effects global climate change may have on *B. filifolia,* its habitat, or distribution of the species and its habitat, we are unable to craft criteria that specifically address this issue.

Comment 48: One commenter expressed a belief that the proposed revised rule is flawed because it does not include unoccupied habitat that the commenter considers essential to the recovery of the species. The commenter further states that not including additional habitat that may not be occupied currently but was occupied in the recent past and where field conditions have not changed precludes the opportunity for species recovery in these areas, which the commenter considers essential.

Our Response: Critical habitat designation is a different process than development of recovery goals and objectives that are outlined in a recovery plan (which has not yet been developed for *Brodiaea filifolia*). A critical habitat designation is a regulatory action that defines specific areas that are essential to the conservation of the species in accordance with the statutory definition. A recovery plan (and the associated recovery goals and objectives) is a guidance document developed in cooperation with partners, which provides a roadmap with detailed site-specific management actions to help conserve listed species and their ecosystems. Recovery plans provide important information about the species and the actions that are needed to bring about a species' recovery.

We believe we have, to the best of our ability and based on the best available scientific and commercial information, identified all habitat areas that are essential to the conservation of *Brodiaea filifolia.* We recognize that the designation of revised critical habitat may not include all of the habitat that may eventually be determined to be necessary for the recovery of *B. filifolia,* and critical habitat designations do not signal that habitat outside the designation is unimportant or may not contribute to recovery. Areas outside the revised critical habitat designation will continue to be subject to conservation actions implemented under section 7(a)(1) of the Act and regulatory protections afforded by the section 7(a)(2) jeopardy standard and the prohibitions of section 9 of the Act if actions occurring in these areas may affect *B. filifolia;* these protections and conservation tools will continue to contribute to recovery of this species.

Comment 49: One commenter stated that species with designated critical habitat are more likely to be recovering than species that lack the designation, citing Taylor *et al.* 2005. This commenter believes that without critical habitat, *Brodiaea filifolia* has a reduced chance of persisting and recovering. This commenter goes on to state that the Service should consider and evaluate the recovery benefits of critical habitat designation in order to promulgate a legally valid critical habitat rule (which the commenter believes was not done in the proposed revised rule).

Our Response: Taylor *et al.* (2005) did not evaluate the effects of the conservation benefits provided by HCPs, long-term management plans, or INRMPs on the population trends of the species they evaluated in their study. We believe that the conservation benefits provided by critical habitat designation in areas we have included in the revised designation and by INRMPs, long-term management plans, and HCPs in areas exempted or excluded from the designation will provide the protection to *Brodiaea filifolia* anticipated by section 4 of the Act. Please see the response to comment 49 regarding recovery benefits to the species.

Comment 50: One commenter expressed opposition to any exclusions from the proposed revised critical habitat of areas that may be covered by other management plans, HCPs or INRMPs, pursuant to section 3(5)(A) under the logic that they do not need "special management" or under section 4(b)(2). The commenter believes that all *Brodiaea filifolia* essential habitat needs special management because of the variety of direct and indirect impacts to the habitat. The commenter stated that areas that require special management considerations but which are covered or will be covered in the future by management plans or conservation plans should not be excluded pursuant to ESA section 3(5)(A) or 4(b)(2) from the protection that a designation of critical habitat provides. The commenter went on to state that, in *Center for Biological Diversity, et al.* v. *Norton,* 240 F. Supp. 2d 1090, 1099 (D. Az. 2003), the court found that the existence of a management plan, far from being a reason to exclude an area from critical habitat, is indisputable proof that the area qualifies as critical habitat. An additional comment states that the Service fails to conduct the required 4(b)(2) analysis of the benefits of exclusion versus inclusion of lands covered by the existing HCPs.

Our Response: The Service does not interpret the definition of critical habitat (section 3(5)(A) of the Act) to mean that areas receiving protection or management do not meet the definition of critical habitat. We agree with the commenter that prong one of the definition of critical habitat in section 3(5)(A) of the Act requires only that an area contain a physical or biological feature essential to the conservation of the species that "may require" special management considerations or protection; it does not require an absolute finding that the area requires special management considerations or protection. Prong two of the definition of critical habitat does not require a finding that special management considerations or protection may be required.

Under section 4(b)(2) of the Act, exclusion of an area from critical habitat designation is based on our determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of the area will not result in extinction of a species, which is a complex analysis process. We found the benefits of exclusion of lands that are both conserved and managed under HCPs or long-term management plans to be greater than the benefits of including these lands in the revised critical habitat designation in large part because the associated HCPs and management plans afford protection to the excluded areas, and due to the benefits of preserving partnerships and encouraging development of additional HCPs and other conservation plans in the future. We believe we appropriately applied our exclusion analysis as required by section 4(b)(2) of the Act for existing HCPs. For more information, *see* the Exclusions under Section 4(b)(2) of the Act section for a detailed discussion.

Section 4(a)(3)(B)(i) of the Act states: "The Secretary shall not designate as critical habitat any lands or other geographical areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources

management plan prepared under section 101 of the Sikes Act [Improvement Act of 1997 (Sikes Act)] (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

We determined that conservation efforts identified in the INRMP provide a benefit to the populations of *Brodiaea filifolia* and this species' habitat occurring on MCB Camp Pendleton (the only military lands on which the species is known to occur) (MCB Camp Pendleton 2007, Section 4, pp. 51–76). The INRMP provides measures that promote the conservation of *B. filifolia* within the 1,531 ac (620 ha) of habitat that we believe contain the features essential to the conservation of *B. filifolia* on MCB Camp Pendleton, which are subject to the INRMP, within the following areas: Cristianitos Canyon, Bravo One, Bravo Two South, Basilone/San Mateo Junction, Camp Horno, Pilgrim Creek, and South White Beach. As a result, we are not including these areas in this final revised critical habitat designation.

Comment 51: One commenter stated that whether habitat does or does not require special management is not determinative on whether or not that habitat is "critical" to a threatened or endangered species; what is determinative is whether or not the habitat is "essential to the conservation of the species" and special management of that habitat is possibly necessary (16 U.S.C. 1532(5)(A)(i)). Thus, according to the commenter, the fact that a particular habitat does, in fact, require special management is demonstrative evidence that the habitat is "critical."

Our Response: We agree with the commenter that prong one of the definition of critical habitat in section 3(5)(A) of the Act requires only that an area contain a physical or biological feature essential to the conservation of the species that "may require" special management considerations or protection; it does not require an absolute finding that the area requires special management considerations or protection. Prong two of the definition of critical habitat does not require a finding that special management considerations or protection may be required. *Please see* the Criteria Used To Identify Critical Habitat and Exclusions Under Section 4(b)(2) of the Act sections for a detailed discussion of the process followed to delineate critical habitat for this revised designation.

Comment 52: One commenter stated that any exclusion of critical habitat that relies on not yet adopted, preliminary and not publicly reviewed plans for conservation is unacceptable and provides only a highly speculative conservation benefit at best. The commenter does not believe that the proposed revised critical habitat rule demonstrates unequivocally that the benefits of excluding these areas from the revised critical habitat designation for *Brodiaea filifolia* outweigh the benefits of including them in the designation.

Our Response: We did not exclude any habitat from this revised critical habitat designation that falls within the plan area of an HCP permit that has not yet been issued. *Please see* the Exclusions Under Section 4(b)(2) of the Act section for a detailed discussion on our exclusion analyses of those areas we considered for exclusion in the proposed revised critical habitat designation (74 FR 64292).

Comment 53: One commenter recommended that the revised critical habitat designation carefully consider all of the existing conservation investments through mitigation of impacts to *Brodiaea filifolia* and support those investments so that they can succeed. The commenter expressed concern that withdrawing these lands from the revised critical habitat designation would undermine and devalue the previous conservation investments because the surrounding land would no longer be highly valued for conservation, which would lead to isolation and fragmentation of adjacent areas which would degrade the mitigation lands, and ultimately make irrelevant the mitigation.

Our Response: We have excluded only lands that are both conserved and managed from this revised designation. Some of these excluded areas include lands set aside as mitigation or as a result of consultations under section 7 of the Act to offset project impacts. We do not agree with the commenter's assertion that not designating revised critical habitat would decrease the perceived conservation value of mitigation areas because these lands are understood to have high conservation value due to their conserved status.

Comment 54: One commenter asserted that the Service needs to include all occupied and suitable unoccupied habitat in the revised final economic analysis (FEA) and final revised critical habitat rule, and not rely on the proposed revised critical habitat rule as the basis for the economic analysis.

Our Response: The purpose of the economic analysis is to identify and analyze the potential incremental economic impacts associated with the revised designation of critical habitat for *Brodiaea filifolia.* Occupied areas not proposed as revised critical habitat are outside the scope of the Economic Analysis, as they are not expected to be impacted by the designation.

Comment 55: One commenter noted that Subunit 8f is in unincorporated San Diego County, not the City of San Marcos as indicated in the proposed revised critical habitat rule. It is within the County of San Diego MSCP North County Plan, but owned by the San Marcos Unified School District. School districts are their own jurisdiction and not subject to the County plans and regulations. The commenter does not object to the designation of this area as critical habitat for *Brodiaea filifolia.*

Our Response: We thank the commenter for this information and have incorporated it into the final revised critical habitat rule.

Comment 56: One commenter noted that Unit 12 is in a Minor Amendment area of the County of San Diego MSCP Subarea Plan; therefore, proposed projects require Service concurrence of proposed impacts and mitigation to move forward. Because Service concurrence is required, the commenter believes there will be no additional benefit from critical habitat. Approximately 28 ac (11 ha) of the southern portion of Unit 12 are Take Authorized and approximately 3.5 ac (1.4 ha) are hardline preserve. Mitigation for the Take Authorized area was coordinated with the Service prior to the approval of the Subarea Plan; therefore these areas should not be included in the revised critical habitat designation for *Brodiaea filifolia* according to this commenter.

Our Response: We may exercise our delegated discretion to exclude an area from critical habitat under section 4(b)(2) of the Act if we conclude that the benefits of exclusion of the area outweigh the benefits of its designation. We do not exclude areas based on the mere existence of management plans or other conservation measures. The existence of a plan may reduce the benefits of inclusion of an area in critical habitat to the extent the protections provided under the plan are redundant with conservation benefits of the critical habitat designation. In particular, we believe that the exclusion of lands may be justified when they are managed and conserved in perpetuity. Thus, in some cases the benefits of exclusion in the form of sustaining and encouraging partnerships that result in on the ground conservation of listed species may outweigh the incremental benefits of inclusion. Only a portion of the Minor Amendment area of the

County of San Diego MSCP Subarea Plan is both conserved and managed, and we have not concluded that the partnership benefits of excluding all lands within the Minor Amendment area under section 4(b)(2) of the Act outweigh the benefits of including these areas in the final revised critical habitat designation. Based on the results of our exclusion analysis for proposed lands covered under the County of San Diego MSCP Subarea Plan, we did determine that the benefits of exclusion outweighed the benefits of inclusion in the area already conserved and managed under the Artesian Trails Management Plan, and this is the only portion of the Minor Amendment area of the County of San Diego MSCP Subarea Plan that has been excluded from this revised designation.

Comment 57: One commenter suggested we exclude the Metropolitan Water District right-of-way from Unit 11a of the revised critical habitat designation. According to the commenter, the right-of-way includes the shoulders of Davis Road, which are highly disturbed and not suitable for sensitive plants. Alternatively, the commenter suggests we exclude all of Subunit 11a under 4(b)(2) of the Act because it is within the area covered by the Western Riverside County MSHCP. The commenter further expressed concern that the designation of revised critical habitat for *Brodiaea filifolia* may delay, limit, or impede access needed to ensure safe and effective operation of critical infrastructure (Metropolitan Water District) facilities in Subunit 11a. The commenter is concerned that maintenance activities in these areas could be delayed or prevented by additional permitting requirements of regulatory agencies due to the revised critical habitat designation.

Our Response: When determining the revised critical habitat boundaries, we made every effort to map precisely only the areas that contain the PCEs and provide for the conservation of *Brodiaea filifolia.* However, we cannot guarantee that every fraction of critical habitat contains the PCEs due to the mapping scale we use to draft critical habitat boundaries. We made every attempt to avoid including developed areas such as lands underlying buildings, paved areas, and other structures that lack PCEs for *B. filifolia.* The scale of maps prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed areas. Any developed structures and the land under them inadvertently left inside critical habitat boundaries shown on the maps of this final revised critical habitat designation are excluded by text in this rule and are not designated as critical habitat. Therefore, Federal actions involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific actions may affect the species or PCEs in adjacent critical habitat.

Please see our response to Comment 42 for a discussion regarding our 4(b)(2) analysis for areas covered by the Western Riverside County MSHCP. We are not exercising our delegated discretion under section 4(b)(2) of the Act to exclude Subunit 11a from this final revised critical habitat designation. Therefore, any Metropolitan Water District activities that might impact lands in Subunit 11a outside of the Davis Road right-of-way will require consultation with the Service if there is a Federal nexus; this may result in project delays.

Comment 58: One commenter pointed out that Metropolitan Water District purchased 74 ac (30 ha) of land and funded research to conserve and enhance populations of *Brodiaea filifolia* as part of the consultation under section 7 of the Act for the Inland Feeder Project (Service 1999 (1–6–99–F–18)). The commenter stated that these lands should be excluded from the revised critical habitat designation for *B. filifolia* because they have been conferred to CDFG for inclusion into the San Jacinto Wildlife Area, and are protected and managed by CDFG as part of the wildlife area.

Our Response: Please see our response to Comment 42 for a discussion regarding our 4(b)(2) analysis for areas covered by the Western Riverside County MSHCP. We are not exercising our delegated discretion under section 4(b)(2) of the Act to exclude lands within the San Jacinto Wildlife Area from this final revised critical habitat designation. Therefore, any Metropolitan Water District activities that might impact lands in Subunit 11a outside of the Davis Road right-of-way will require consultation with the Service if there is a Federal nexus.

Comment 59: One commenter submitted several comments describing needed and planned research activities for the Devil's Canyon (Subunit 5b) occurrence of *Brodiaea filifolia.*

Our Response: We thank the commenter for this information. We will consider this information in our next 5-year review for this species.

Economic Analysis Comments

General Comments About Framework, Assumptions, and Economic Benefits

Comment 60: Two commenters stated the discount rate applied and the development projections should be reevaluated given current economic conditions. The next few years will have far lower economic activity than expected, and should be reevaluated given current economic conditions.

Our Response: The U.S. Office of Management and Budget (OMB) requires Federal agencies to report results using discount rates of three and seven percent (see OMB, Circular A–4, 2003). The DEA relies on growth projections at the census tract level provided by the San Diego Association of Governments (SANDAG) and the Southern California Association of Governments (SCAG). These projections forecast growth over a 20-year period; however, they generally do not provide information about the percent of this growth occurring in intermediate time periods. It is possible that, given current economic conditions, development activity will be slower in the early part of this timeframe and more aggressive during the latter half. However, lacking specific data on which to base assumptions about a variable growth rate, we assume linear growth between 2010 and 2030. A note has been added to Exhibit 3–13 of the FEA to draw attention to this assumption (IEc 2010, p 3–20).

Comment 61: One commenter stated that as a result of decreased development and associated construction spending, it appears that there may not be funding available for many of the conservation efforts included in the HCPs. Therefore, the DEA's assumptions regarding the implementation of conservation measures under the HCPs and the availability of funds to carry out these measures are flawed.

Our Response: The DEA does not evaluate the broader goals of the regional HCPs and whether they will be achieved. The costs of implementing the HCPs outside of proposed revised critical habitat are not estimated. Rather, the DEA identifies development that is likely to occur over the next 20 years based on data obtained from regional planning agencies and uses the conservation and mitigation requirements defined in the HCPs as proxies for the best estimate of the outcome of future section 7 consultations. Specifically, the DEA assumes that 95 percent of critical habitat acres overlapping a development project must be preserved and salvaging

and transplantation of plants occurs on the remaining 5 percent. We agree that if a developer does not have the funds to carry out these measures, then the project is unlikely to move forward. However, the loss in land value that occurs as a result of these requirements is real, regardless of whether the individual projects actually take place.

Comment 62: One commenter stated that the DEA does not clearly define how it estimates potential cost associated with time delays, regulatory uncertainty, and stigma.

Our Response: Chapter 2 defines these categories of cost for the purposes of the analysis (IEc 2010, pp. 2–1–2–22). Data are not readily available to quantify potential impacts from regulatory uncertainty and stigma, thus they are discussed qualitatively.

Comment 63: One commenter stated that because all units within the proposed revised critical habitat are currently occupied by *Brodiaea filifolia,* no additional expenses would be incurred during section 7 consultation to address adverse modification of critical habitat.

Our Response: As is described in Chapter 2, new consultations taking place after critical habitat designation must include additional analysis and text to address whether the action will adversely modify critical habitat (IEc 2010, pp. 2–12–2–14). The Service, relevant action agencies, and third party participants in section 7 consultations have provided information for this and other economic analyses of critical habitat designation estimating the additional regulatory and administrative burdens imposed by this requirement. These costs are incremental because absent designation, no requirement to evaluate, comment on, or address the potential for adverse modification exists.

Comment 64: One commenter stated that including the cost of considering additional land for pollinators as an incremental cost of the designation is inappropriate because the Service must consider pollinators in consultations for impacts to the species regardless of designation of critical habitat.

Our Response: This assumption is explained in detail in the incremental effects memorandum from the Service provided in Appendix D (IEc 2010, p. D–1). It represents the professional judgment of Service staff and represents the best available information.

Comment 65: One commenter stated that no data are presented to justify the assumption that in areas greater than 50 ft (15 m) of a known *Brodiaea filifolia* occurrence, 20 percent of the time the action agency would not have been aware of the need to consult on potential effects to *B. filifolia.* Furthermore, relying upon this assumption to assign all costs associated with these consultations to the designation of critical habitat is not accurate. The commenter argues that these consultations should be required under the listing of the species and thus should be considered a baseline cost.

Our Response: The incremental effects memorandum provided in Appendix D justifies this assumption (IEc 2010, p. D–1). The Service relies upon consultation data for the San Diego fairy shrimp to determine the number of consultations which would not have occurred absent critical habitat. The Service states that "similar to [*Brodiaea filifolia*], impacts to lands adjacent to the habitat physically occupied by San Diego fairy shrimp (*i.e.,* the local watershed that surrounds a vernal pool) were not necessarily addressed through consultation with the Service prior to critical habitat designation" (Service 2010, *in litt.*). The Service determines that the designation of critical habitat for the fairy shrimp resulted in a 20 percent increase in the number of consultations and believes that it may see a comparable increase in the number of consultations for *B. filifolia* after the designation of revised critical habitat. This behavioral change is directly attributable to the designation of revised critical habitat; thus we count the costs of this new behavior as incremental. This assumption represents the professional judgment of Service staff and represents the best available information.

Comment 66: Two commenters stated that the administrative costs of consultation used in the analysis are underestimated. One commenter suggested that based on personal experience, the cost for technical assistance varies from $5,000 to $10,000 and can be more if outside legal counsel is necessary. Similarly, the costs for preparing a biological assessment are also underestimated; a more accurate figure would be $10,000 to $25,000. Another commenter suggested that the cost of preparing a biological assessment for a new consultation considering only adverse modification should be 5–10 times higher than the amount given in Exhibit 2–3 ($4,200). Additionally, the commenter believes that third party costs of consultation are substantially underestimated.

Our Response: We have reviewed the cost estimates presented by the commenters and find that they fall within acceptable range limits identified through discussions with other project proponents and as a result, have adjusted the FEA to reflect this new information on administrative costs associated with the designation. The FEA uses an administrative cost of preparing a biological assessment of $25,000; this estimate reflects the high-end estimate provided by one commenter and falls within the range provided by another commenter. The FEA uses an administrative cost to third parties of $10,000 for all types of consultation. It should be noted that a cost of $250,000 for a programmatic consultation and CEQA review of the Inland Feeder Project is used in place of the costs provided in Exhibit 2–3; because a cost estimate specific to the project was provided by the stakeholder (IEc 2010, p. 2–15).

Comment 67: One commenter stated that the Service's methodological approach of separately estimating incremental impacts of the designation relative to existing baseline protections omits substantial economic impacts resulting from the proposed rule.

Our Response: The identification and estimation of incremental impacts is consistent with direction provided by OMB to Federal agencies for the estimation of the costs and benefits of Federal regulations (*see* OMB, Circular A–4, 2003). It is also consistent with several recent court decisions, including *Cape Hatteras Access Preservation Alliance* v. *U.S. Department of the Interior,* 344 F. Supp. 2d 108 (D.D.C.) and *Center for Biological Diversity* v. *U.S. Bureau of Land Management,* 422 F. Supp. 2d 1115 (N.D. Cal. 2006). Those decisions found that estimation of incremental impacts stemming solely from the designation is proper.

Comment 68: One commenter stated that the Service's framework ignores indirect and cumulative effects of the designation of critical habitat. The measurement of these types of impacts is required under another Federal environmental law, the National Environmental Policy Act (NEPA).

Our Response: Executive Order 12866, Regulatory Planning and Review, and OMB's Circular A–4, which provides direction to Federal agencies on the implementation of Executive Order 12866, represent the framework used to estimate the costs and benefits of regulations promulgated by all Federal agencies. They do not require the estimation of indirect or cumulative impacts. Furthermore, section 4(b)(2) of the ESA is silent on the definition of "economic impacts" to be considered prior to the designation of critical habitat. Thus, the Service relies on the well-established and universally followed principles laid out in Circular A–4.

Also it is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA (42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. *See National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.)* section below.

Comment 69: One commenter stated that the DEA does not consider added environmental reviews by other regulatory agencies that could trigger more complex permits and more mitigation measures. Nor did it assess the costs of consultation under section 10 of the Act.

Our Response: Chapter 2 of the DEA explains that critical habitat designation may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under State or local laws, such as CEQA (IEc 2010, pp. 2-1–2-22). Where appropriate the DEA includes costs associated with CEQA review. We are not aware of any new HCPs likely to be prepared under section 10 of the Act to cover *Brodiaea filifolia.* The HCPs currently in place were developed prior to the designation of critical habitat for *B. filifolia* and thus are outside of the scope of this analysis. Additionally, HCPs are usually not prepared for plant species because there is no prohibition against take of plants. In general, plant species will be covered by an HCP only if a listed animal species is present in the area.

Comment 70: One commenter stated that the DEA should consider cumulative effects (defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)) of the revised critical habitat designation for *Brodiaea filifolia* and other existing or pending critical habitat designations in Southern California. The commenter stated NEPA and its implementing regulations require Federal agencies to evaluate these cumulative impacts.

Our Response: It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA in connection with designating critical habitat under the Act, including the economic analyses performed as part of the critical habitat designation process. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). The Ninth Circuit of the U.S. Court of Appeals upheld this position (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Comment 71: One commenter stated that the DEA fails to include consideration of all the benefits resulting from the designation, such as the positive impact on property values in the surrounding community due to the designation and non-development of open space; protection of clean water and clean air; preservation of natural habitat for other species which may alleviate the need for listing species in the future; and maintaining a mosaic of habitat types that native species use as movement corridors in arid southern California. The commenter asserts that these benefits should be assessed and quantified where possible or otherwise included in a detailed qualitative analysis.

Our Response: As described in Chapter 6 of the DEA, the purpose of critical habitat is to support the conservation of *Brodiaea filifolia* (IEc 2010, pp. 6-1–6-4). The data required to estimate and value in monetary terms the incremental changes in the probability of conservation resulting from the designation are not available. Depending on the project modifications ultimately implemented as a result of the regulation, other ancillary benefits that are not the stated objective of critical habitat (such as increasing the value of homes adjacent to preserved habitat or preserving habitat for other non-listed species) may occur. These benefits are discussed qualitatively. The DEA includes a discussion of the potential benefits to property values as well as the overall benefit to ecosystem health that is shared by other, coexisting species. The FEA has been revised to include discussion of the new ancillary benefit categories referenced in the comment (see Exhibit 6–1 of the FEA) (IEc 2010, p. 6-4).

Impacts to Residential and Commercial Development Activities

Comment 72: One commenter stated that the DEA's assertion that the areas proposed for designation covered by the Orange County Southern Subregion HCP are within lands mapped as Reserves and Open Space Areas is incorrect. The commenter calculates that the proposed revised critical habitat designation covers 43.8 ac (17.7 ha) of land designated for development in Planning Area 2. This land falls within Subunit 4c.

Our Response: Chapter 3 of the DEA states that 90 ac (36 ha) out of a total 133 ac (54 ha) in Subunit 4c is or will be conserved under the Orange County Southern Subregion HCP (see Exhibit 3–2) (IEc 2010, p. 3–4). This leaves 43 ac (17 ha) of land that is not within lands mapped as Reserves and Open Space. The text on page 2–18 has been revised to clarify that only a portion of the land covered by the Orange County Southern Subregion HCP is within lands mapped as Reserves and Open Space (IEc 2010, p. 2–18).

Comment 73: One commenter stated that acres of private developable land attributable to Subunit 4c should be 43.8 ac (17.7 ha), not 18.53 ac (7.49 ha) set forth in Exhibit 3–3.

Our Response: The DEA characterizes potentially developable land as that where development is not currently restricted (*e.g.,* lands not conserved under an HCP) that has been categorized as "vacant" by SCAG or SANDAG. The FEA has been revised to reflect the information about potentially developable land in Subunit 4c provided by this comment. The FEA considers 25.01 ac (10.12 ha) categorized as "non-irrigated cropland and improved pastureland" as potentially developable land in addition to the 18.53 ac (7.49 ha) of vacant land. Exhibit 3–3 has been revised to reflect this new information and the economic impact estimates in the FEA have been revised accordingly (IEc 2010, p. 3–6).

Impacts to Transportation, Utility, and Flood Control Activities

Comment 74: One commenter stated that the DEA should include an evaluation of the impacts of designating revised critical habitat on the 241 Completion Project and all other transportation projects including project delays, the economic impact of designing, refining, and negotiating a preferred alternative to avoid *Brodiaea filifolia* critical habitat, costs associated with mitigation measures, and impacts arising from reduction in housing supply.

Our Response: The FEA evaluates potential economic impacts of this revised critical habitat designation on all known transportation projects within the areas proposed as revised critical habitat. Regarding the 241 Completion Project, we have become aware that the proposed project does not meet the requirements of the Coastal Zone Management Act and the California Coastal Commission (CCC) has denied a permit for this project as currently planned based on concerns related to a portion of the project located outside of revised critical habitat. Based on the

CCC's concerns, it appears that no viable project alternatives exist at this time and the proposed project as currently designed cannot move forward without project modification. Because the issues related to the CCC's permit denial concern areas not proposed as revised critical habitat, we consider these costs to be baseline and have identified these costs in the FEA (see 241 Completion Project in the FEA) (IEc 2010, p. 4-3). All other impacts on known transportation projects as a result of the designation are identified in Chapter 4 of the FEA (IEc 2010, pp. 4-1–4-3).

Comment 75: One commenter stated that designation of revised critical habitat for *Brodiaea filifolia* may result in increased economic burden to the Metropolitan Water District in Subunit 11a due to increased number of consultations with permitting agencies including consultations under section 10 of the Act where there is no Federal nexus (technically referred to as issuing an incidental take permit; the term 'consultation' refers to the process under section 7 of the Act, not under section 10 of the Act), increased environmental compliance costs for mitigation and CEQA documentation, and increased time and cost to obtain permits for maintenance operations.

Our Response: The FEA evaluated potential economic impacts of this revised critical habitat designation on all landowners and project proponents within the designated area. Regarding Metropolitan Water District activities, the FEA assumes that a programmatic consultation resulting entirely from the designation of revised critical habitat and CEQA review will occur in 2011. The FEA estimated the incremental costs to Metropolitan Water District to be $250,000. Additionally, according to the FEA, any project modifications that are requested as a result of the consultation are also considered incremental costs of the designation. However, because specific project modifications likely to be requested were not known at the time the FEA was completed, project modification costs have not been quantified for this project. Also, note that if there is no Federal nexus, issuing an incidental take permit under section 10 of the Act is not required for plant species.

Comment 76: One commenter stated that during consultation for the Inland Feeder project in Subunit 11A additional mitigation requirements may be imposed increasing the cost of compliance with the Act.

Our Response: The DEA includes the costs of a programmatic consultation resulting entirely from the designation of revised critical habitat and CEQA review for this project. Because this consultation would not have occurred absent critical habitat, any project modification costs would be considered incremental impacts of the designation. At this time we do not know specific project modifications that may be requested and thus cannot estimate potential costs. A qualitative discussion of the potential for additional project modification costs has been added to Chapter 4.

Comment 77: One commenter stated that the DEA should have included transportation projects in the regional and interregional transportation plans prepared for regional and Federal transportation planning and Federal air quality conformity such as the Regional Transportation Plans and Regional Transportation Improvement Plans.

Our Response: The SCAG and SANDAG Regional Transportation Plans and Regional Transportation Improvement Plans have been reviewed for the FEA. This review identified two projects that may occur within Subunit 11c: the widening of Case Road between Goetz Road and I–215 and construction of a two-lane arterial and two-lane grade separation on Ellis Avenue. These projects are identified as "financially constrained projects" that are subject to available funding. Because these projects are not yet funded and are, therefore, uncertain they will not be included in this analysis. A footnote to this effect has been added to Chapter 4 of the FEA.

Comment 78: One commenter stated that the DEA improperly and in violation of the requirement to use the "best scientific data available" excludes the 241 Completion Project from consideration of economic impacts resulting from the proposed rule. The commenter states that: the Service's conclusion that no viable alternatives exist for the 241 Completion Project is outside of the scope of the agency's expertise; new information alone is not a trigger for re-initiation of consultation; and the Service cannot determine at this time whether the 2008 biological opinion is no longer valid.

Our Response: As is described in the text box on page ES–11 and in Chapter 4 of the DEA the Service believes that no viable alternative exists for this project (IEc 2010, pp. ES–11, 4–2). The Service maintains that the Foothill/Eastern Transportation Corridor Agency would need to engage in additional consultation under section 7 of the Act for a redesigned project.

Required Determinations

Regulatory Planning and Review—Executive Order 12866

The Office of Management and Budget (OMB) has determined that this rule is not significant and has not reviewed this proposed rule under Executive Order 12866 (E.O. 12866). OMB bases its determination upon the following four criteria:

(1) Whether the rule will have an annual effect of $100 million or more on the economy or adversely affect an economic sector, productivity, jobs, the environment, or other units of the government.

(2) Whether the rule will create inconsistencies with other Federal agencies' actions.

(3) Whether the rule will materially affect entitlements, grants, user fees, loan programs, or the rights and obligations of their recipients.

(4) Whether the rule raises novel legal or policy issues.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.,* as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (*i.e.,* small businesses, small organizations, and small government jurisdictions), as described below. However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. In this final rule, we are certifying that the revised critical habitat designation for *Brodiaea filifolia* will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

According to the Small Business Administration, small entities include small organizations, such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and

heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term "significant economic impact" is meant to apply to a typical small business firm's business operations.

To determine if the designation of revised critical habitat for *Brodiaea filifolia* would significantly affect a substantial number of small entities, we consider the number of small entities affected within particular types of economic activities, such as residential and commercial development. We apply the "substantial number" test individually to each industry to determine if certification is appropriate. However, the SBREFA does not explicitly define "substantial number" or "significant economic impact." Consequently, to assess whether a "substantial number" of small entities is affected by this designation, this analysis considers the relative number of small entities likely to be impacted in an area. In some circumstances, especially with critical habitat designations of limited extent, we may aggregate across all industries and consider whether the total number of small entities affected is substantial. In estimating the number of small entities potentially affected, we also consider whether their activities have any Federal involvement.

Designation of critical habitat affects only activities conducted, funded, permitted, or authorized by Federal agencies. Some kinds of activities are unlikely to have any Federal involvement and so will not be affected by critical habitat designation. In areas where the species is present, Federal agencies already are required to consult with us under section 7 of the Act on activities they fund, permit, or implement that may affect *Brodiaea filifolia.* Federal agencies also must consult with us if their activities may affect critical habitat. Designation of critical habitat, therefore, could result in an additional economic impact on small entities due to the requirement to reinitiate consultation for ongoing Federal activities (*see Application of the* "*Adverse Modification*" *Standard* section).

In our final economic analysis of the revised critical habitat designation, we evaluated the potential economic effects on small business entities resulting from implementation of conservation actions related to the revised designation of critical habitat for *Brodiaea filifolia.* The analysis is based on the estimated impacts associated with the rulemaking as described in sections 3 through 5 of the analysis and evaluates the potential for economic impacts related to: Commercial and residential development; transportation, utility, and flood control; and public and conservancy lands management (IEc 2010, p. 1–5). The FEA estimates the total incremental impacts associated with development as a whole to be $280,000 to $384,000 over the 20-year timeframe of the FEA. The FEA identifies incremental impacts to small entities to occur only due to residential and commercial development (IEc 2010, p. A–4). The other categories of projects either will have no impacts (transportation, utility, and flood control; management of public and conservation lands) or are Federal, State, or public entities not considered small or exceed the criteria for small business status (IEc 2010, p. A–4). Of the approximately 1,025 ac (415 ha) of land considered developable in the designation, only 132 ac (53 ha) have been forecasted to be developed over the next 20-year timeframe (IEc 2010, p. A–5). The FEA equates this acreage to 23 projects, with one developer per project (IEc 2010, p. A–6). The FEA summarizes that less than one new project is likely to occur annually that may be affected by the designation of revised critical habitat resulting in total annualized incremental impacts to small entities of $24,700 to $33,900 (IEc 2010, p. 3–19). The FEA assumes all developers are considered small; this estimate may overstate impacts if not all of the developers are small. Please refer to our final economic analysis of the revised critical habitat designation for *B. filifolia* for a more detailed discussion of potential economic impacts.

In summary, we considered whether this designation would result in a significant economic effect on a substantial number of small entities. The total number of small businesses impacted annually by the designation is estimated to be fewer than one, with an annualized impact of approximately $24,700 to $33,900. This impact is less than 10 percent of the total incremental impact identified for development activities. Based on the above reasoning and currently available information, we concluded this rule would not result in a significant economic impact on a substantial number of small entities for transportation, development, and flood control impacts as identified in the FEA (IEc 2010, p. A–1–A–6). Therefore, we are certifying that the designation of revised critical habitat for *Brodiaea filifolia* will not have a significant economic impact on a substantial number of small entities, and a regulatory flexibility analysis is not required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act, we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)–(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or Tribal governments," with two exceptions. First, it excludes "a condition of federal assistance." Second, it also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding" and the State, local, or Tribal governments "lack authority" to adjust accordingly. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance; or (ii) a duty arising from participation in a voluntary Federal program."

Critical habitat designation does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. Designation of critical habitat may indirectly impact non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency. However, the legally binding duty to avoid destruction or adverse

modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above on to State governments.

(2) As discussed in the FEA of the proposed designation of revised critical habitat for *Brodiaea filifolia,* we do not believe that this rule would significantly or uniquely affect small governments because it would not produce a Federal mandate of $100 million or greater in any year; that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. The FEA concludes incremental impacts may occur due to administrative costs of section 7 consultations for development activities; however, these are not expected to affect small governments. Incremental impacts stemming from various species conservation and development control activities are expected to be borne by the Federal Government, California Department of Transportation, CDFG, Riverside County, Riverside County Flood Control and Water Conservation District, and City of Perris, which are not considered small governments. Consequently, we do not believe that the revised critical habitat designation would significantly or uniquely affect small government entities. As such, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 ("Government Actions and Interference with Constitutionally Protected Private Property Rights"), we analyzed the potential takings implications of designating revised critical habitat for *Brodiaea filifolia* in a takings implications assessment. Critical habitat designation does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits. The designation of revised critical habitat for *B. filifolia* does not pose significant takings implications for the above reasons.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior policy, we requested information from, and coordinated development of this proposed revised critical habitat designation with, appropriate State resource agencies in California. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the PCEs of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist these local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), it has been determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have designated critical habitat in accordance with the provisions of the Act. This rule uses standard property descriptions and identifies the PCEs within the designated areas to assist the public in understanding the habitat needs of *Brodiaea filifolia.*

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq.*). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses as defined by NEPA (42 U.S.C. 4321 *et seq.*) in connection with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt,* 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we have a responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We determined that there are no tribal lands occupied at the time of listing that contain the features essential to the conservation of the species, nor are there any unoccupied tribal lands that are essential for the conservation of *Brodiaea filifolia.* Therefore, critical habitat for *B. filifolia* is not being designated on tribal lands.

Energy Supply, Distribution, or Use—Executive Order 13211

E.O. 13211 requires agencies to prepare Statements of Energy Effects when undertaking certain actions. OMB has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute "a significant adverse effect" when compared to not taking the regulatory action under consideration. The economic analysis finds that none of these criteria are relevant to this analysis. Thus, based on information in the economic analysis, energy-related

impacts associated with *Brodiaea filifolia* conservation activities within revised critical habitat are not expected. As such, the designation of revised critical habitat for *Brodiaea filifolia* is not expected to significantly affect energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

References Cited

A complete list of all references cited in this rulemaking is available on *http://www.regulations.gov* at Docket No. FWS–R8–ES–2009–0073 and upon request from the Field Supervisor, Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section).

Author(s)

The primary author of this notice is the staff from the Carlsbad Fish and Wildlife Office (*see* **FOR FURTHER INFORMATION CONTACT** section).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

■ 2. In § 17.12(h), revise the entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under family Themidaceae to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(h) * * *

Species		Historic range	Family	Status	When listed	Critical habitat	Special rules
Scientific name	Common name						
*	*	*	*	*	*		*
FLOWERING PLANTS							
*	*	*	*	*	*		*
Brodiaea filifolia	Thread-leaved brodiaea.	U.S.A. (CA)	Themidaceae	T	650	17.96(a)	NA
*	*	*	*	*	*		*

■ 3. Amend § 17.96(a) by:

■ a. Removing the entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under Family Liliaceae; and

■ b. Adding a new entry for "*Brodiaea filifolia* (thread-leaved brodiaea)" under Family Themidaceae in alphabetic order by family name to read as follows:

§ 17.96 Critical habitat—plants.

(a) *Flowering plants.*

* * * * *

Family Themidaceae: *Brodiaea filifolia* (thread-leaved brodiaea)

(1) Critical habitat units are depicted for Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties, California, on the maps below.

(2) Within these areas, the primary constituent elements (PCE) for *Brodiaea filifolia* consist of two components:

(i) PCE 1—Appropriate soil series at a range of elevations and in a variety of plant communities, specifically:

(A) Clay soil series of various origins (such as Alo, Altamont, Auld, or Diablo), clay lenses found as unmapped inclusions in other soils series, or loamy soils series underlain by a clay subsoil (such as Fallbrook, Huerhuero, or Las Flores) occurring between the elevations of 100 and 2,500 ft (30 and 762 m).

(B) Soils (such as Cieneba-rock outcrop complex and Ramona family-Typic Xerothents soils) altered by hydrothermal activity occurring between the elevations of 1,000 and 2,500 ft (305 and 762 m).

(C) Silty loam soil series underlain by a clay subsoil or caliche that are generally poorly drained, moderately to strongly alkaline, granitic in origin (such as Domino, Grangeville, Traver, Waukena, or Willows) occurring between the elevations of 600 and 1,800 ft (183 and 549 m).

(D) Clay loam soil series (such as Murrieta) underlain by heavy clay loams or clays derived from olivine basalt lava flows occurring between the elevations of 1,700 and 2,500 ft (518 and 762 m).

(E) Sandy loam soils derived from basalt and granodiorite parent materials; deposits of gravel, cobble, and boulders; or hydrologically fractured, weathered granite in intermittent streams and seeps occurring between 1,800 and 2,500 ft (549 and 762 m).

(ii) PCE 2—Areas with a natural, generally intact surface and subsurface soil structure, not permanently altered by anthropogenic land use activities (such as deep, repetitive discing, or grading), extending out up to 820 ft (250 m) from mapped occurrences of *Brodiaea filifolia* to provide for space for individual population growth, and space for pollinators.

(3) Critical habitat does not include manmade structures existing on the effective date of this rule and not containing one or more of the primary constituent elements, such as buildings, aqueducts, airports, and roads, and the land on which such structures are located.

(4) *Critical habitat map units.* Data layers defining map units were created using a base of U.S. Geological Survey 7.5' quadrangle maps. Critical habitat units were then mapped using Universal Transverse Mercator (UTM) zone 11, North American Datum (NAD) 1983 coordinates.

(5) *Note:* Index map of critical habitat units for *Brodiaea filifolia* (thread-leaved brodiaea) follows:

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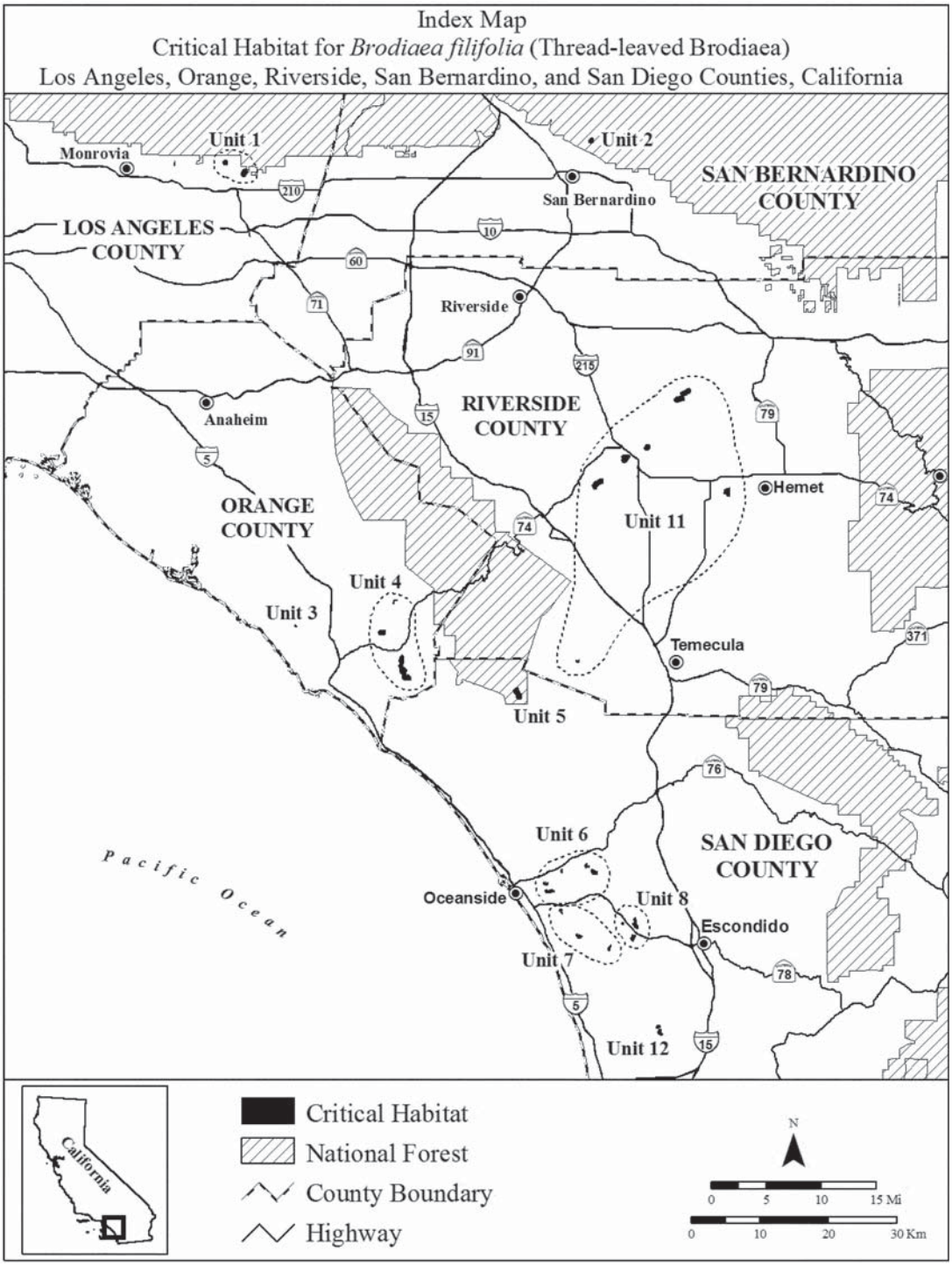


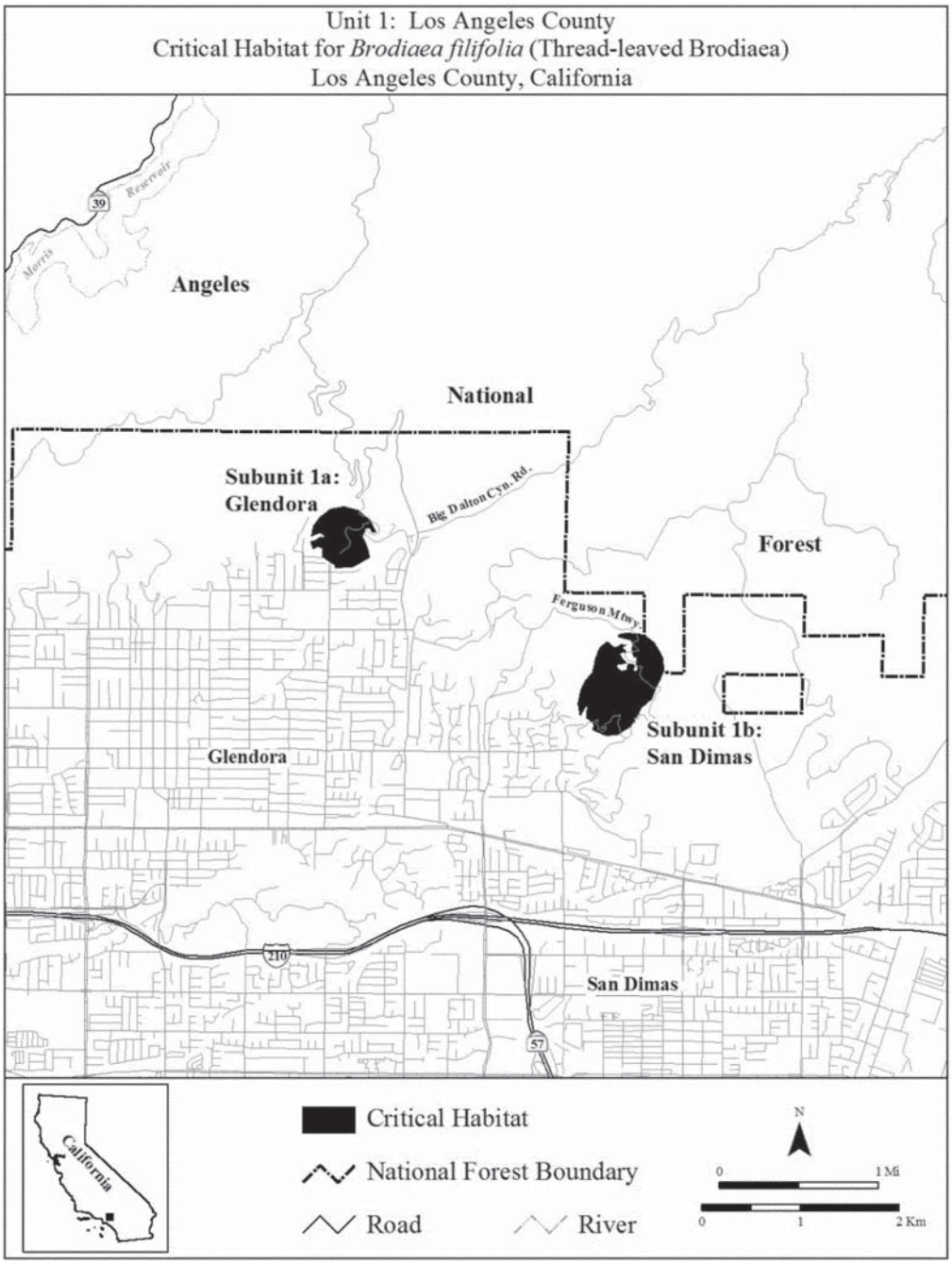
(6) Unit 1: Los Angeles County. From USGS 1:24,000 quadrangle map Glendora, Los Angeles County, California.

(i) Subunit 1a: Glendora. Land bounded by the following Universal Transverse Mercator (UTM) Zone 11, North American Datum of 1983 (NAD83) coordinates (E, N): 422408, 3779882; 422462, 3779764; 422424, 3779771; 422405, 3779809; 422356, 3779811; 422323, 3779723; 422353, 3779662; 422391, 3779567; 422397, 3779509; 422224, 3779417; 422051, 3779401; 422039, 3779437; 422008, 3779452; 421977, 3779480; 421925, 3779519; 421920, 3779598; 421883, 3779624; 421826, 3779599; 421803, 3779670; 421860, 3779684; 421896, 3779720; 421919, 3779713; 421945, 3779727; 421896, 3779760; 421809, 3779730; 421815, 3779760; 421829, 3779825; 421899, 3779920; 422002, 3779999; 422139, 3780025; 422294, 3779985; thence returning to 422408, 3779882.

(ii) Subunit 1b: San Dimas. Land bounded by the following UTM NAD83 coordinates (E, N): 425325, 3778572; 425359, 3778490; 425367, 3778364; 425315, 3778234; 425284, 3778164; 425246, 3778076; 425149, 3777990; 425092, 3777884; 425044, 3777802; 424905, 3777719; 424787, 3777708; 424656, 3777764; 424662, 3777823; 424647, 3777849; 424590, 3777886;

424590, 3777928; 424597, 3778011; 424571, 3777991; 424529, 3777914; 424515, 3777936; 424506, 3778028; 424518, 3778113; 424537, 3778181; 424582, 3778271; 424644, 3778345; 424667, 3778401; 424676, 3778492; 424719, 3778597; 424795, 3778660; 424826, 3778640; 424843, 3778626; 424851, 3778608; 424889, 3778602; 424920, 3778616; 424940, 3778637; 424968, 3778629; 424993, 3778622; 424973, 3778619; 424951, 3778602; 424961, 3778582; 424985, 3778568; 424985, 3778557; 424964, 3778557; 424936, 3778546; 424928, 3778529; 424953, 3778490; 424979, 3778462; 424990, 3778449; 424984, 3778438; 424930, 3778435; 424896, 3778429; 424896, 3778402; 424908, 3778387; 424931, 3778378; 424945, 3778359; 425004, 3778379; 425004, 3778413; 425016, 3778438; 425027, 3778427; 425044, 3778433; 425072, 3778426; 425076, 3778399; 425064, 3778387; 425066, 3778358; 425087, 3778364; 425112, 3778384; 425097, 3778407; 425089, 3778424; 425098, 3778441; 425095, 3778477; 425095, 3778509; 425067, 3778508; 425052, 3778572; 425058, 3778633; 425038, 3778671; 424916, 3778705; 424914, 3778733; 425001, 3778749; 425169, 3778727; 425271, 3778648; thence returning to 425325, 3778572.

(iii) *Note:* Map of Unit 1, Los Angeles County, follows:

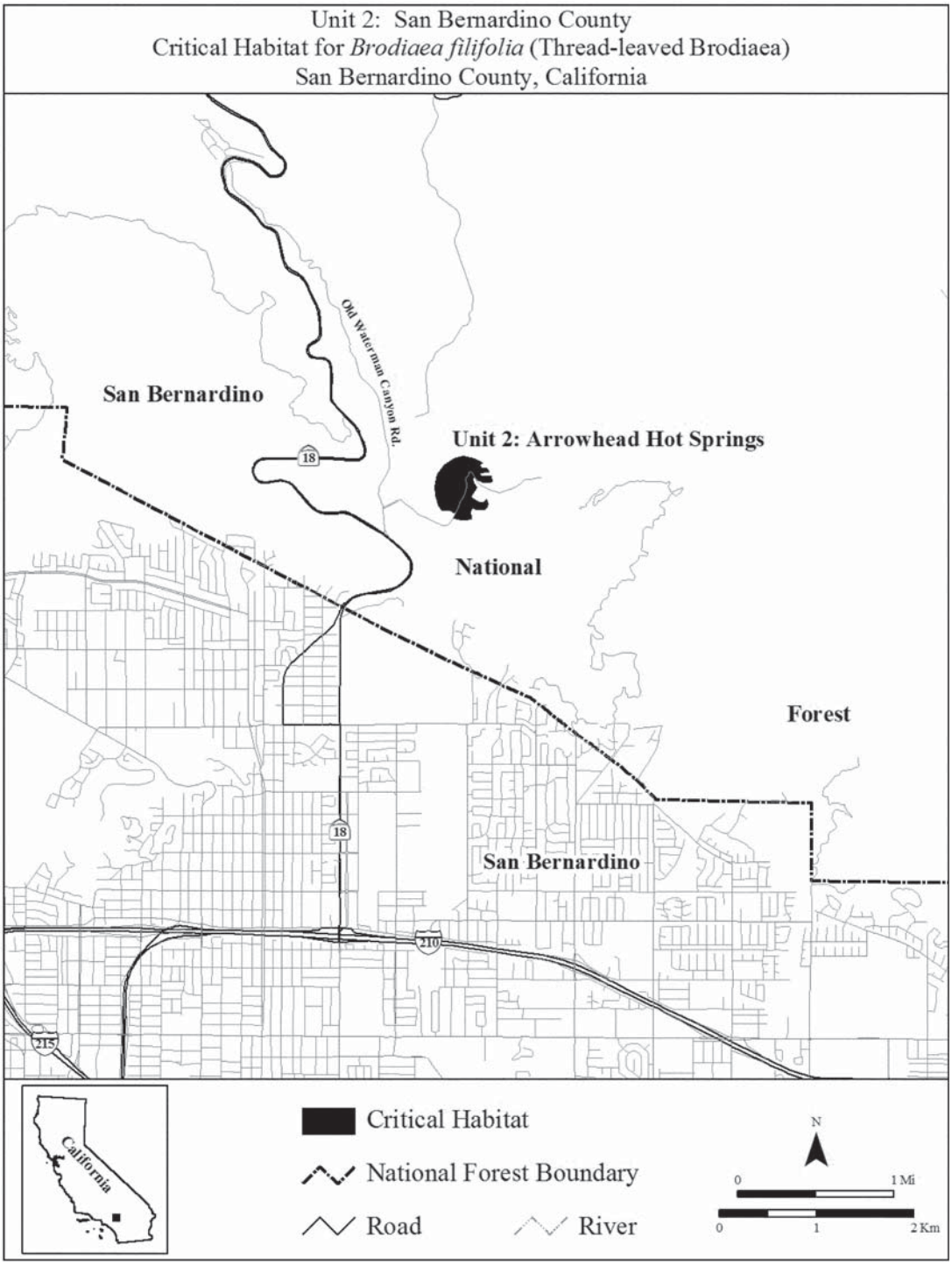


(7) Unit 2: San Bernardino County. From USGS 1:24,000 quadrangle map San Bernardino North, San Bernardino County, California.

(i) Arrowhead Hot Springs. Land bounded by the following UTM NAD83

coordinates (E, N): 475756, 3783146; 475763, 3783104; 475808, 3783104; 475830, 3783096; 475842, 3783067; 475744, 3783060; 475761, 3783023; 475827, 3783025; 475863, 3783021; 475876, 3782965; 475854, 3782962; 475836, 3782958; 475800, 3782956; 475773, 3782962; 475744, 3782971; 475721, 3782983; 475709, 3783006; 475684, 3783005; 475682, 3782992; 475686, 3782947; 475711, 3782920; 475716, 3782905; 475709, 3782895; 475705, 3782874; 475681, 3782844; 475668, 3782829; 475666, 3782807; 475682, 3782791; 475714, 3782768; 475748, 3782753; 475784, 3782755; 475820, 3782787; 475838, 3782735; 475827, 3782707; 475801, 3782677; 475790, 3782677; 475744, 3782680; 475705, 3782677; 475677, 3782696; 475654, 3782661; 475660, 3782581; 475612, 3782573; 475545, 3782573; 475482, 3782592; 475504, 3782635; 475472, 3782646; 475440, 3782672; 475403, 3782667; 475358, 3782674; 475324, 3782715; 475290, 3782821; 475289, 3782917; 475311, 3783037; 475380, 3783142; 475483, 3783208; 475584, 3783230; 475689, 3783208; 475767, 3783164; 475773, 3783155; thence returning to 475756, 3783146.

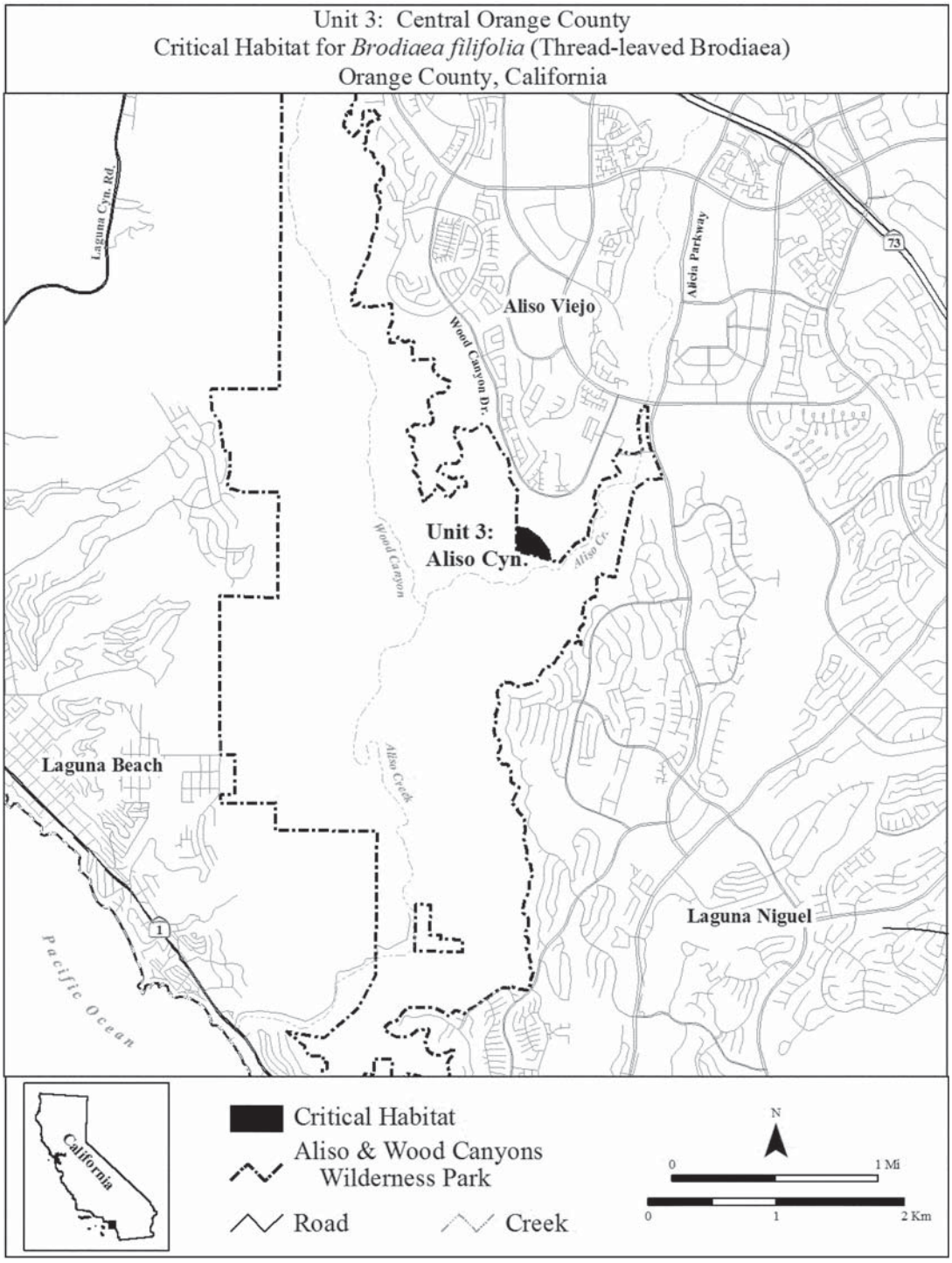
(ii) *Note:* Map of Unit 2, San Bernardino County, follows:



(8) Unit 3: Central Orange County. From USGS 1:24,000 quadrangle map San Juan Capistrano, Orange County, California.

(i) Aliso Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 432560, 3711875; 432501, 3711891; 432471, 3711899; 432436, 3711909; 432389, 3711922; 432289, 3711950; 432288, 3712146; 432371, 3712127; 432467, 3712061; 432539, 3711960; thence returning to 432560, 3711875.

(ii) *Note:* Map of Unit 3, Central Orange County, follows:



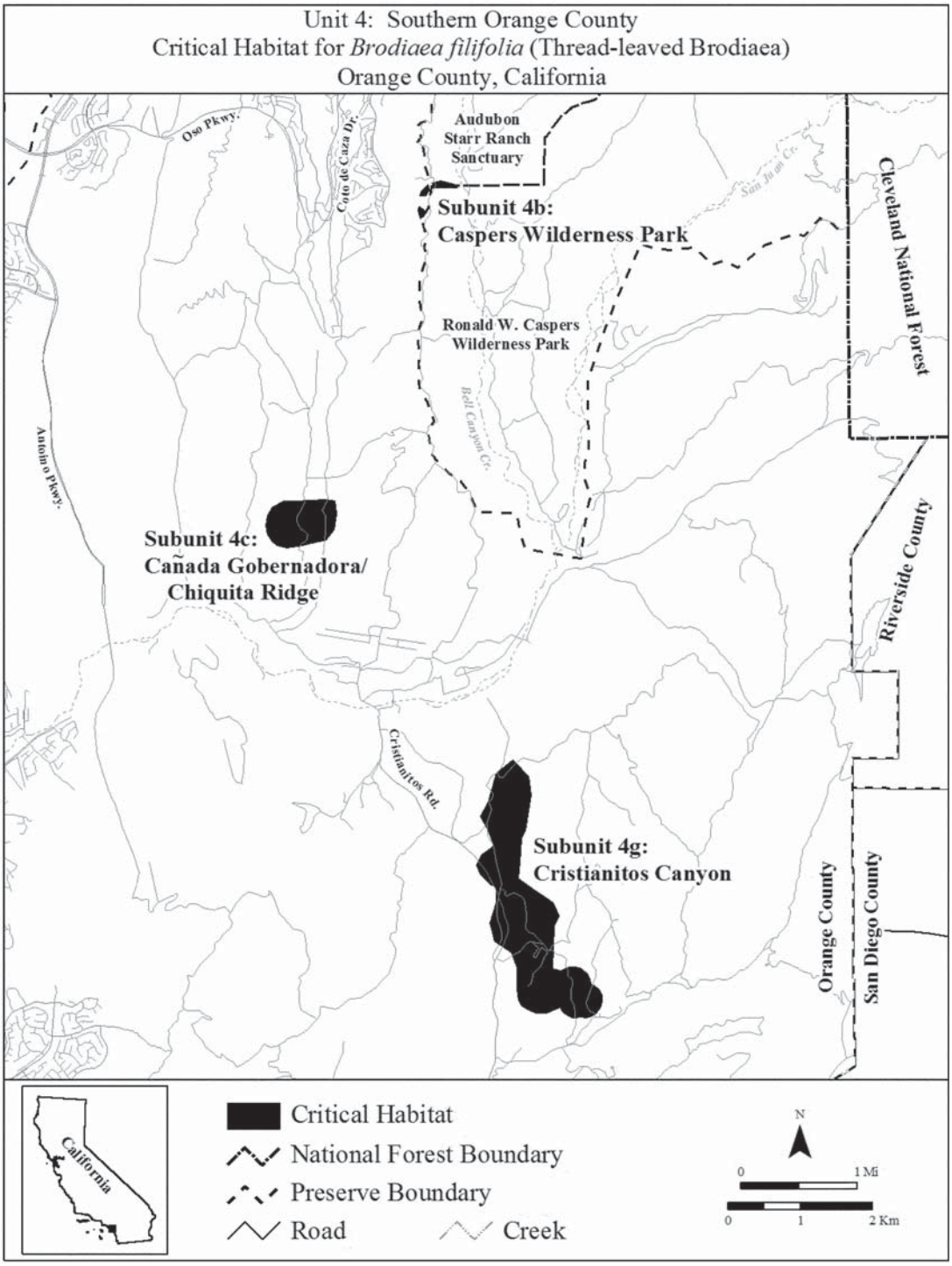
(9) Unit 4: Southern Orange County. From USGS 1:24,000 quadrangle map Cañada Gobernadora, Orange County, California.

(i) Subunit 4b: Caspers Wilderness Park. Land bounded by the following UTM NAD83 coordinates (E, N): 446657, 3715594; 446679, 3715660; 446777, 3715754; 446787, 3715756; 446802, 3715670; 446787, 3715650; 446749, 3715599; thence returning to 446657, 3715594. Continue to 446672, 3715282; 446635, 3715383; 446634, 3715424; 446664, 3715452; 446750, 3715379; 446725, 3715324; thence returning to 446672, 3715282. Continue to 447195, 3715710; 446853, 3715710; 446834, 3715765; 446831, 3715772; 446952, 3715811; 447141, 3715767; thence returning to 447195, 3715710.

(ii) Subunit 4c: Cañada Gobernadora/Chiquita Ridgeline. Land bounded by the following UTM NAD83 coordinates (E, N): 444988, 3710736; 444822, 3710714; 444688, 3710749; 444620, 3710811; 444555, 3710909; 444525, 3711030; 444549, 3711176; 444622, 3711280; 444769, 3711366; 444952, 3711370; 445174, 3711382; 445357, 3711387; 445494, 3711375; 445509, 3711195; 445478, 3710975; 445371, 3710832; 445127, 3710778; thence returning to 444988, 3710736.

(iii) Subunit 4g: Cristianitos Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 448505, 3704899; 448619, 3704865; 448693, 3704908; 448753, 3704920; 448807, 3704923; 448869, 3704911; 448913, 3704891; 448985, 3704826; 449023, 3704752; 449034, 3704695; 449095, 3704664; 449153, 3704605; 449187, 3704527; 449193, 3704439; 449172, 3704362; 449116, 3704286; 449051, 3704239; 448973, 3704215; 448885, 3704225; 448831, 3704215; 448781, 3704219; 448727, 3704235; 448660, 3704282; 448631, 3704315; 448603, 3704363; 448423, 3704282; 448272, 3704282; 448162, 3704323; 448074, 3704378; 448026, 3704460; 448012, 3704611; 448012, 3704741; 448012, 3704830; 448012, 3704912; 447930, 3705117; 447800, 3705206; 447704, 3705275; 447635, 3705535; 447717, 3705816; 447724, 3706014; 447635, 3706076; 447505, 3706199; 447444, 3706336; 447519, 3706480; 447684, 3706606; 447615, 3706809; 447498, 3707014; 447615, 3707206; 447724, 3707603; 447950, 3707795; 448176, 3707567; 448204, 3707309; 448128, 3706809; 448073, 3706701; 448057, 3706368; 448033, 3706154; 448231, 3706001; 448430, 3705877; 448512, 3705802; 448594, 3705631; 448525, 3705487; thence returning to 448505, 3704899.

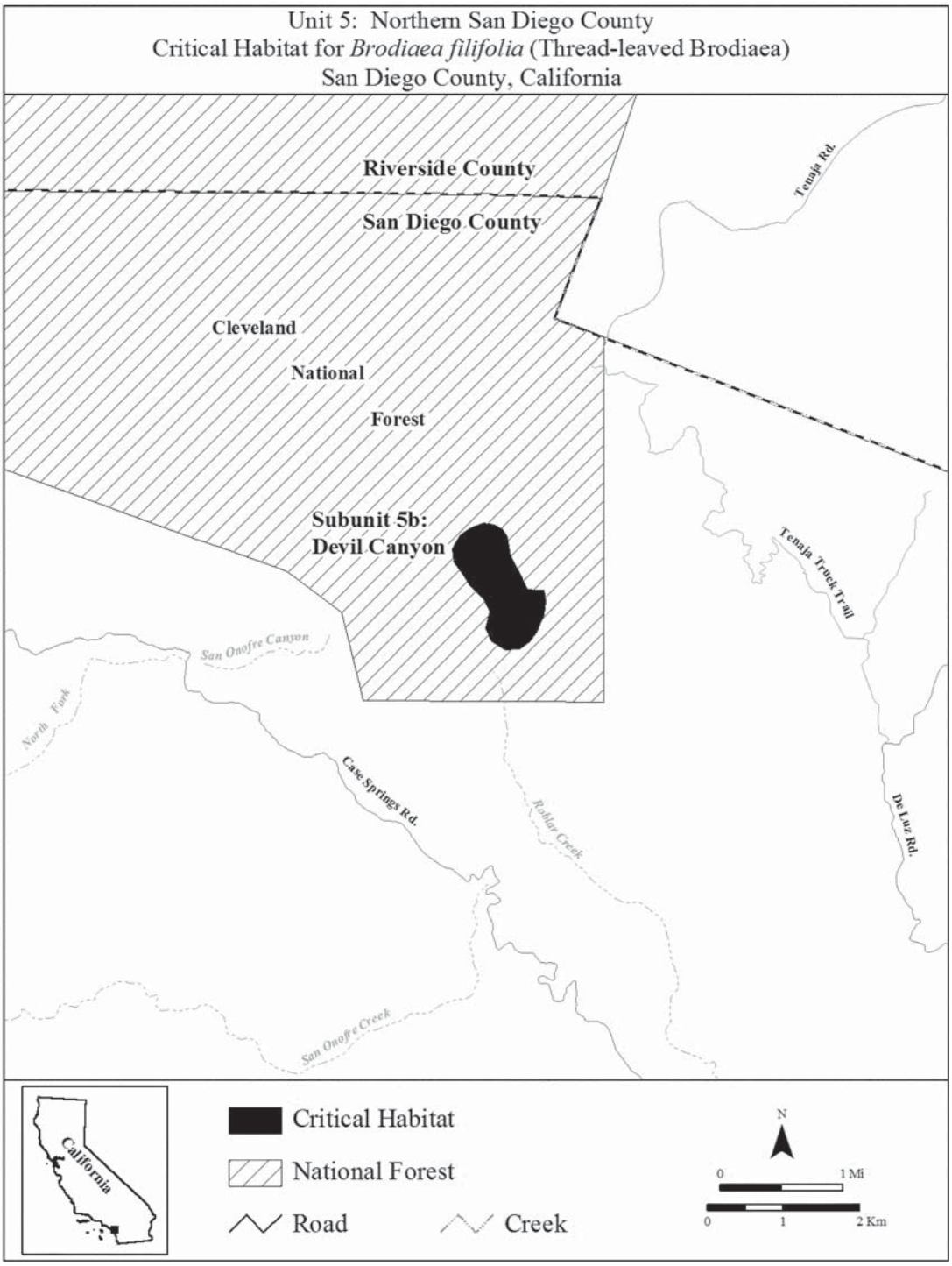
(iv) *Note:* Map of Unit 4, Southern Orange County, follows:



(10) Unit 5: Northern San Diego County. From USGS 1:24,000 quadrangle maps Fallbrook and Margarita Peak, San Diego County, California.

(i) Subunit 5b: Devil Canyon. Land bounded by the following UTM NAD83 coordinates (E, N): 465203, 3702184; 465318, 3702168; 465420, 3702168; 465439, 3702023; 465428, 3701850; 465333, 3701622; 465239, 3701500; 465113, 3701402; 464908, 3701394; 464732, 3701504; 464665, 3701669; 464716, 3701889; 464645, 3702050; 464448, 3702235; 464342, 3702416; 464248, 3702534; 464228, 3702719; 464323, 3702888; 464464, 3702990; 464633, 3703049; 464775, 3703026; 464885, 3702963; 464948, 3702872; 464964, 3702739; 464987, 3702616; 465070, 3702463; 465144, 3702322; thence returning to 465203, 3702184.

(ii) *Note:* Map of Unit 5, Northern San Diego County, follows:



(11) Unit 6: Oceanside, San Diego County, California. From USGS 1:24,000 quadrangle map San Luis Rey, San Diego County, California.

(i) Subunit 6a: Alta Creek. Land bounded by the following UTM NAD83 coordinates (E, N): 470033, 3673422; 470028, 3673364; 470103, 3673390; 470049, 3673279; 469947, 3673268; 469933, 3673297; 469861, 3673292; 469765, 3673271; 469754, 3673290; 469733, 3673288; 469694, 3673241; 469647, 3673203; 469340, 3673150; 469290, 3673280; 469454, 3673280; 469472, 3673385; 469461, 3673464; 469459, 3673517; 469775, 3673595; 469819, 3673600; 469861, 3673591; 469965, 3673540; 469936, 3673513; 469941, 3673452; thence returning to 470033, 3673422. Continue to 469160, 3673457; 469299, 3673146; 469251, 3673150; 469207, 3673154; 469101, 3673149; 469028, 3673175; 468994, 3673187; 468917, 3673248; 468862, 3673350; 468862, 3673358; 468853, 3673464; 468852, 3673477; thence returning to 469160, 3673457.

(ii) Subunit 6b: Mesa Drive. Land bounded by the following UTM NAD83 coordinates (E, N): 468915, 3674517; 468893, 3674517; 468892, 3674526; 468877, 3674541; 468863, 3674561; 468863, 3674587; 468857, 3674609; 468848, 3674625; 468844, 3674648; 468835, 3674670; 468864, 3674678; 468878, 3674689; 468899, 3674707;

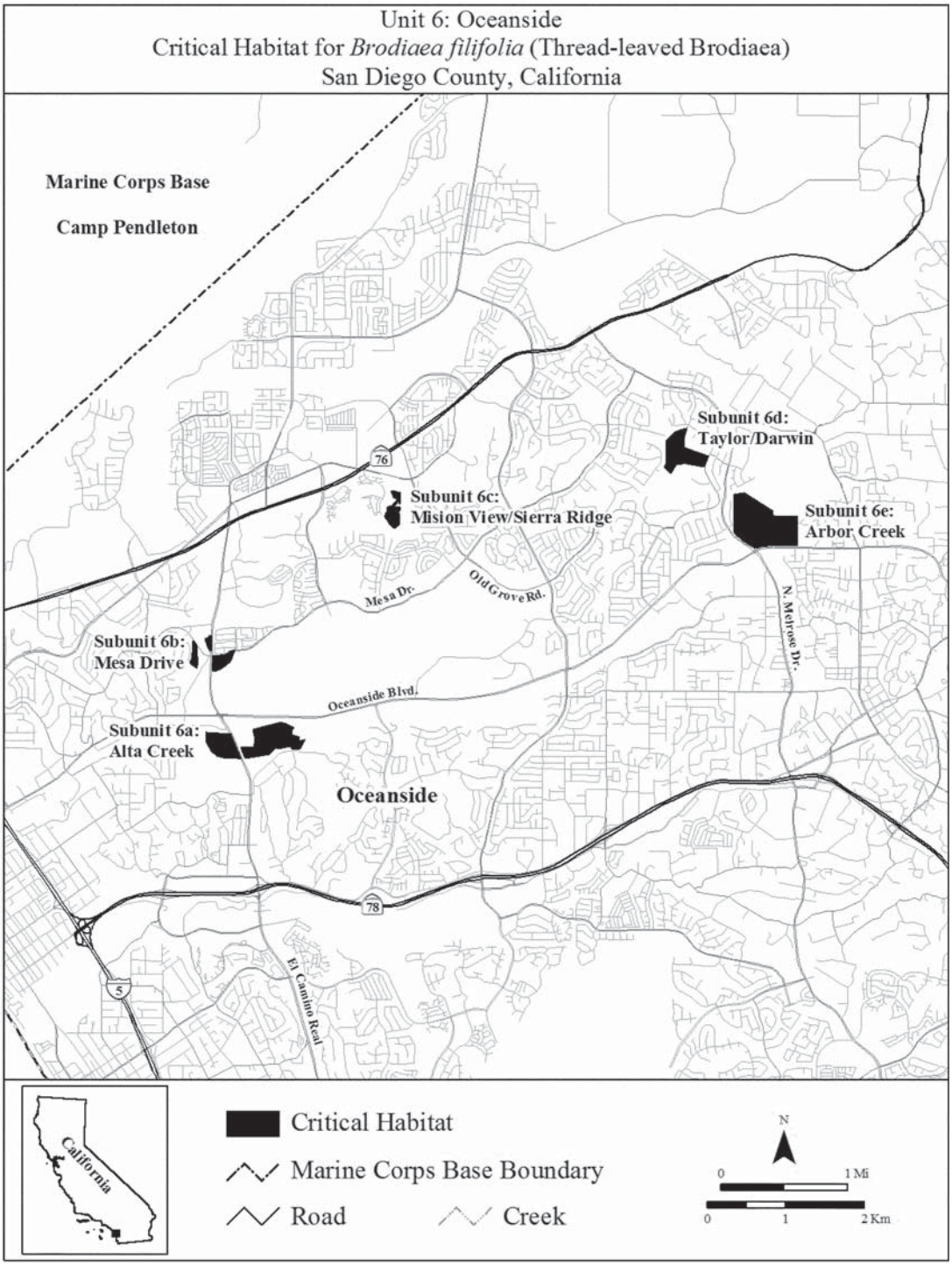
468918, 3674700; thence returning to 468915, 3674517. Continue to 468732, 3674337; 468733, 3674299; 468680, 3674337; 468641, 3674369; 468652, 3674387; 468664, 3674416; 468674, 3674490; 468682, 3674548; 468687, 3674609; 468687, 3674641; 468711, 3674605; 468736, 3674562; 468736, 3674526; 468736, 3674474; 468739, 3674441; 468749, 3674423; 468750, 3674395; 468750, 3674374; 468743, 3674350; thence returning to 468732, 3674337. Continue to 468977, 3674272; 468936, 3674260; 468942, 3674457; 469035, 3674460; 469086, 3674475; 469154, 3674504; 469216, 3674523; 469195, 3674471; 469172, 3674417; 469150, 3674383; 469103, 3674339; 469064, 3674311; 469028, 3674288; thence returning to 468977, 3674272.

(iii) Subunit 6c: Mission View/Sierra Ridge. Land bounded by the following UTM NAD83 coordinates (E, N): 471256, 3676540; 471308, 3676525; 471322, 3676525; 471325, 3676497; 471325, 3676436; 471323, 3676399; 471318, 3676384; 471293, 3676426; 471285, 3676401; 471265, 3676381; 471248, 3676356; 471263, 3676342; 471293, 3676341; 471310, 3676341; 471323, 3676329; 471323, 3676322; 471306, 3676295; 471293, 3676269; 471310, 3676248; 471318, 3676235; 471312, 3676210; 471305, 3676181; 471313, 3676166; 471313, 3676151; 471313, 3676137; 471301, 3676117; 471275, 3676100; 471265, 3676085; 471241, 3676075; 471182, 3676137; 471149, 3676188; 471137, 3676205; 471137, 3676236; 471145, 3676267; 471167, 3676279; 471167, 3676346; 471182, 3676354; 471228, 3676354; 471236, 3676386; 471263, 3676413; 471280, 3676418; 471288, 3676440; 471253, 3676466; 471234, 3676476; 471226, 3676502; 471216, 3676525; 471216, 3676540; thence returning to 471256, 3676540.

(iv) Subunit 6d: Taylor/Darwin. Land bounded by the following UTM NAD83 coordinates (E, N): 475246, 3676994; 475198, 3676860; 474920, 3676914; 474920, 3676911; 474917, 3676900; 474843, 3676895; 474840, 3676895; 474762, 3676777; 474688, 3676855; 474720, 3676903; 474720, 3677197; 474818, 3677296; 474888, 3677325; 474968, 3677352; 474925, 3677213; 474936, 3677192; 474928, 3677106; thence returning to 475246, 3676994.

(v) Subunit 6e: Arbor Creek/Colucci. Land bounded by the following UTM NAD83 coordinates (E, N): 475917, 3675848; 475854, 3675822; 475695, 3675915; 475579, 3676018; 475583, 3676501; 475701, 3676520; 476070, 3676287; 476071, 3676228; 476380, 3676221; 476380, 3675858; 476001, 3675858; thence returning to 475917, 3675848.

(vi) *Note:* Map of Unit 6, Oceanside, follows:



(12) Unit 7: Carlsbad, San Diego County, California.

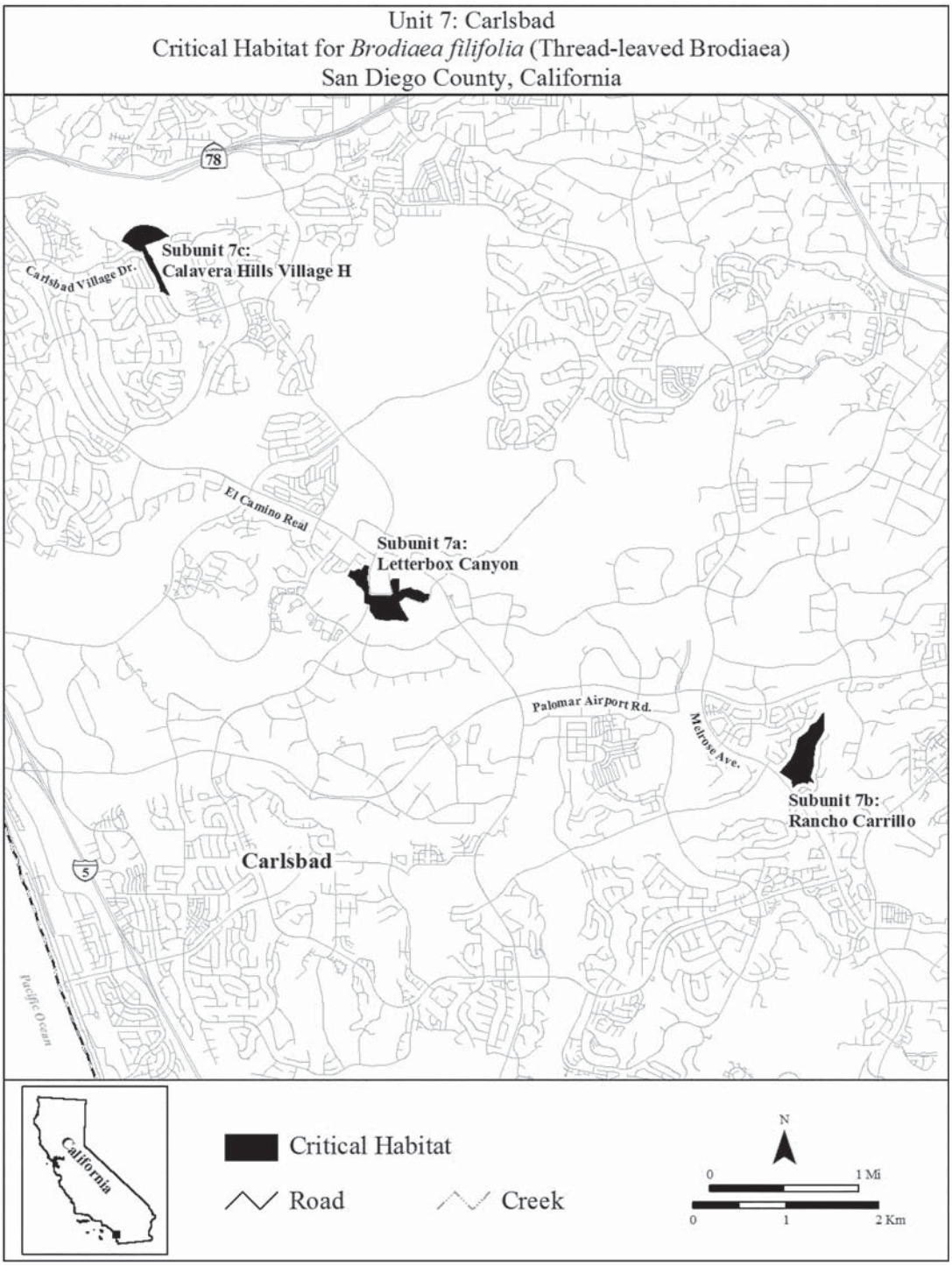
(i) Subunit 7a: Letterbox Canyon. From USGS 1:24,000 quadrangle map San Luis Rey, land bounded by the following UTM NAD83 coordinates (E, N): 473516, 3667072; 473504, 3666941; 473516, 3666839; 473519, 3666765; 473558, 3666762; 473635, 3666758; 473759, 3666758; 473782, 3666785; 473756, 3666880; 473761, 3666926; 473777, 3666940; 473845, 3666935; 473846, 3666935; 473847, 3666778; 473848, 3666778; 473849, 3666778; 473850, 3666781; 473860, 3666822; 473904, 3666832; 473971, 3666844; 473968, 3666840; 473973, 3666838; 473978, 3666836; 474005, 3666824; 474011, 3666821; 474033, 3666818; 474036, 3666817; 474081, 3666811; 474121, 3666781; 474134, 3666779; 474136, 3666779; 474149, 3666777; 474151, 3666777; 474156, 3666777; 474159, 3666776; 474161, 3666776; 474167, 3666775; 474173, 3666774; 474160, 3666727; 474159, 3666726; 474159, 3666724; 474155, 3666721; 474153, 3666720; 474120, 3666699; 474118, 3666698; 474112, 3666694; 474100, 3666695; 474099, 3666695; 474098, 3666695; 474095, 3666695; 474090, 3666695; 474087, 3666695; 474061, 3666696; 473920, 3666753; 473848, 3666694; 473861, 3666635; 473890, 3666593; 473952, 3666506; 473930, 3666483; 473810, 3666500;

473706, 3666498; 473599, 3666515; 473533, 3666593; 473539, 3666667; 473480, 3666686; 473474, 3666798; 473441, 3666848; 473394, 3666880; 473370, 3666918; 473297, 3666974; 473330, 3667034; 473360, 3667013; 473404, 3667041; 473441, 3667031; 473480, 3667085; thence returning to 473516, 3667072.

(ii) Subunit 7b: Rancho Carrillo. From USGS 1:24,000 quadrangle maps Rancho Santa Fe and San Marcos, land bounded by the following UTM NAD83 coordinates (E, N): 478285, 3664797; 478307, 3664759; 478307, 3664749; 478251, 3664772; 478244, 3664745; 478200, 3664753; 478146, 3664747; 478085, 3664702; 478076, 3664774; 477946, 3664862; 477994, 3664920; 478066, 3664996; 478104, 3665067; 478117, 3665119; 478147, 3665221; 478249, 3665297; 478278, 3665368; 478339, 3665400; 478409, 3665501; 478419, 3665498; 478419, 3665496; 478419, 3665309; 478383, 3665244; 478345, 3665196; 478327, 3665137; 478319, 3665051; 478304, 3665021; 478303, 3664935; 478270, 3664821; thence returning to 478285, 3664797.

(iii) Subunit 7c: Calavera Hills Village H. From USGS 1:24,000 quadrangle map San Luis Rey, land bounded by the following UTM NAD83 coordinates (E, N): 471354, 3670039; 471355, 3670036; 471357, 3670032; 471361, 3670025; 471364, 3670018; 471374, 3669997; 471361, 3669999; 471345, 3669999; 471310, 3670039; 471282, 3670039; 471271, 3670102; 471257, 3670129; 471225, 3670198; 471181, 3670281; 471131, 3670366; 471109, 3670410; 471099, 3670466; 471068, 3670472; 471018, 3670480; 470999, 3670495; 470982, 3670510; 470940, 3670542; 470876, 3670576; 470871, 3670578; 470893, 3670639; 470935, 3670684; 471000, 3670729; 471009, 3670731; 471066, 3670749; 471099, 3670749; 471119, 3670749; 471188, 3670741; 471258, 3670710; 471348, 3670646; 471362, 3670634; 471362, 3670629; 471351, 3670626; 471252, 3670590; 471219, 3670578; 471107, 3670536; 471141, 3670460; 471150, 3670442; 471154, 3670434; 471156, 3670431; 471158, 3670429; 471161, 3670426; 471163, 3670423; 471165, 3670421; 471168, 3670418; 471170, 3670416; 471172, 3670413; 471174, 3670410; 471176, 3670408; 471178, 3670405; 471180, 3670402; 471182, 3670399; 471183, 3670396; 471185, 3670393; 471187, 3670390; 471189, 3670387; 471190, 3670384; 471192, 3670381; 471193, 3670378; 471195, 3670375; 471262, 3670230; 471322, 3670100; 471325, 3670092; 471328, 3670086; 471332, 3670079; 471335, 3670072; 471339, 3670065; 471344, 3670056; 471350, 3670046; thence returning to 471354, 3670039.

(iv) *Note:* Map of Unit 7, Carlsbad, follows:



(13) Unit 8: San Marcos and Vista. From USGS 1:24,000 quadrangle map San Marcos, San Diego County, California.

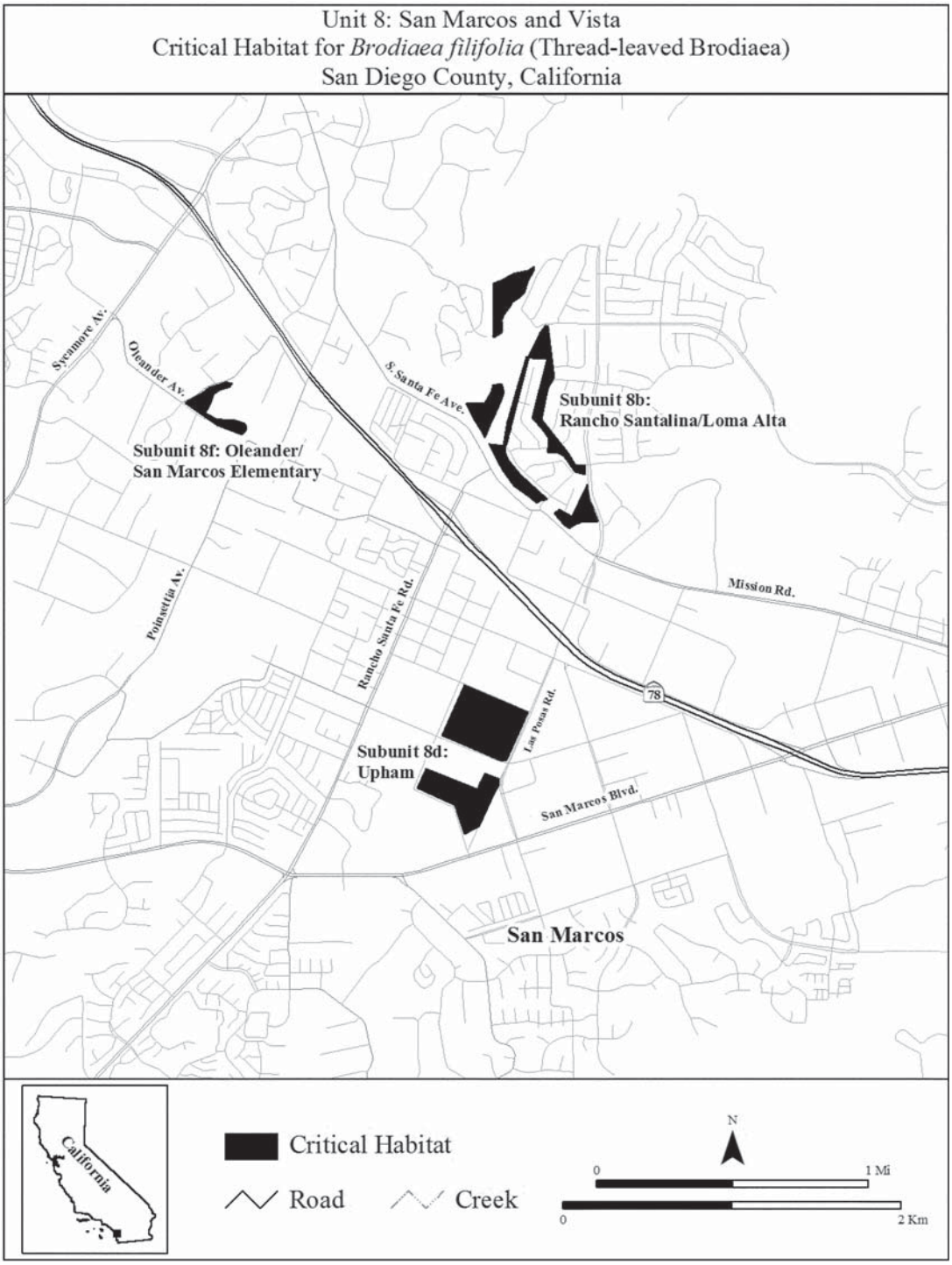
(i) Subunit 8b: Rancho Santalina/Loma Alta. Land bounded by the following UTM NAD83 coordinates (E, N): 482357, 3668036; 482390, 3667949; 482348, 3667946; 482282, 3667946; 482244, 3667925; 482220, 3667908; 482187, 3667931; 482127, 3667997; 482157, 3668021; 482235, 3667976; 482324, 3668168; 482336, 3668078; thence returning to 482357, 3668036. Continue to 481816, 3669068; 481771, 3669038; 481765, 3669046; 481771, 3669329; 481771, 3669358; 481807, 3669373; 481891, 3669418; 481974, 3669435; 482013, 3669456; 482007, 3669432; 481974, 3669373; 481953, 3669307; 481921, 3669274; 481879, 3669244; 481870, 3669223; 481865, 3669217; 481831, 3669175; 481819, 3669136; 481822, 3669089; thence returning to 481816, 3669068. Continue to 481753, 3668523; 481720, 3668446; 481689, 3668496; 481648, 3668562; 481604, 3668646; 481714, 3668649; 481723, 3668661; 481756, 3668718; 481768, 3668756; 481816, 3668766; 481831, 3668715; 481819, 3668670; 481786, 3668595; thence returning to 481753, 3668523. Continue to 482091, 3669106; 482121, 3668876; 482130, 3668802; 482091, 3668736; 482052, 3668553; 482214, 3668350; 482258,

3668281; 482312, 3668281; 482315, 3668230; 482258, 3668242; 482253, 3668242; 482187, 3668338; 482154, 3668356; 482091, 3668356; 482091, 3668386; 482097, 3668443; 482052, 3668502; 481995, 3668562; 482085, 3668912; 482000, 3668916; 481989, 3668917; 481980, 3668918; 481877, 3668514; 481876, 3668512; 481872, 3668496; 481872, 3668494; 481862, 3668457; 481861, 3668453; 481852, 3668416; 481837, 3668383; 481840, 3668353; 481841, 3668350; 481861, 3668308; 481933, 3668224; 482085, 3668084; 482064, 3668072; 482046, 3668072; 482025, 3668060; 481986, 3668093; 481888, 3668164; 481819, 3668260; 481809, 3668280; 481786, 3668323; 481783, 3668329; 481741, 3668407; 481828, 3668398; 481852, 3668541; 481915, 3668751; 481962, 3668927; 481974, 3668923; 482046, 3669067; 482062, 3669090; 482076, 3669110; thence returning to 482091, 3669106.

(ii) Subunit 8d: Upham. Land bounded by the following UTM NAD83 coordinates (E, N): 481849, 3666534; 481819, 3666534; 481462, 3666688; 481594, 3666985; 481973, 3666823; thence returning to 481849, 3666534. Continue to 481372, 3666489; 481677, 3666364; 481689, 3666409; 481719, 3666459; 481804, 3666429; 481801, 3666386; 481779, 3666359; 481687, 3666147; 481597, 3666102; 481550, 3666247; 481535, 3666274; 481320, 3666376; thence returning to 481372, 3666489.

(iii) Subunit 8f: Oleander/San Marcos Elementary. Land bounded by the following UTM NAD83 coordinates (E, N): 480307, 3668488; 480280, 3668462; 480137, 3668521; 480047, 3668580; 479946, 3668654; 480044, 3668711; 480087, 3668741; 480190, 3668776; 480226, 3668765; 480210, 3668748; 480149, 3668728; 480117, 3668702; 480092, 3668639; 480066, 3668592; 480125, 3668556; 480158, 3668554; 480241, 3668547; 480297, 3668531; 480310, 3668511; thence returning to 480307, 3668488.

(iv) *Note:* Map of Unit 8, San Marcos and Vista, follows:



(14) Unit 11: Western Riverside County, Riverside County, California.

(i) Subunit 11a: San Jacinto Wildlife Area. From USGS 1:24,000 quadrangle maps Lakeview and Perris, land bounded by the following UTM NAD83 coordinates (E, N): 488983, 3745493; 489065, 3745348; 489100, 3745144; 489088, 3745019; 489008, 3744998; 488955, 3744984; 488940, 3744982; 488834, 3744968; 488827, 3744966; 488803, 3744959; 488696, 3744929; 488626, 3744907; 488610, 3744902; 488565, 3744888; 488532, 3744878; 488500, 3744869; 488441, 3744853; 488363, 3744831; 488314, 3744794; 488285, 3744772; 488171, 3744760; 487999, 3744760; 487873, 3744819; 487818, 3744885; 487811, 3744894; 487796, 3744916; 487773, 3744954; 487767, 3744964; 487765, 3744983; 487756, 3745058; 487756, 3745172; 487783, 3745258; 487846, 3745333; 487948, 3745395; 487978, 3745412; 488042, 3745450; 488050, 3745454; 488159, 3745489; 488289, 3745470; 488336, 3745470; 488438, 3745517; 488563, 3745603; 488728, 3745658; 488786, 3745693; 488724, 3745740; 488677, 3745854; 488669, 3745964; 488692, 3746105; 488739, 3746179; 488783, 3746226; 488785, 3746227; 488803, 3746231; 488885, 3746250; 488990, 3746269; 489131, 3746336; 489273, 3746420; 489374, 3746481; 489511, 3746574; 489547, 3746598;

489652, 3746637; 489668, 3746643; 489719, 3746661; 489876, 3746657; 489895, 3746633; 489982, 3746517; 490025, 3746461; 490033, 3746371; 490018, 3746275; 490013, 3746242; 489983, 3746214; 489951, 3746183; 489637, 3745987; 489425, 3745858; 489198, 3745787; 489096, 3745677; 488998, 3745634; thence returning to 488983, 3745493.

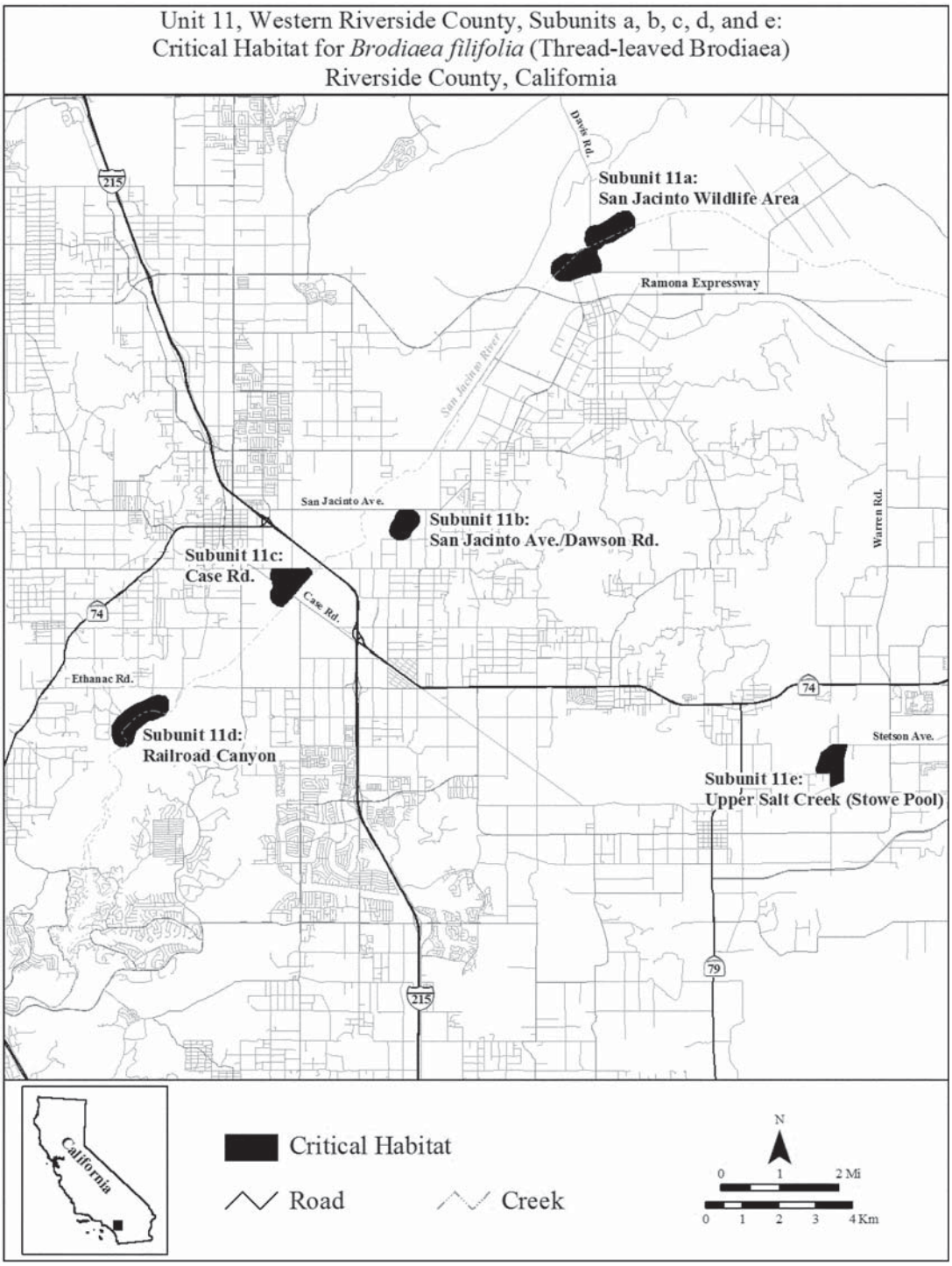
(ii) Subunit 11b: San Jacinto Avenue/Dawson Road. From USGS 1:24,000 quadrangle map Perris, land bounded by the following UTM NAD83 coordinates (E, N): 483682, 3737705; 483570, 3737705; 483524, 3737712; 483463, 3737755; 483380, 3737824; 483344, 3737895; 483344, 3737975; 483366, 3738075; 483387, 3738129; 483423, 3738183; 483470, 3738269; 483491, 3738345; 483538, 3738434; 483621, 3738506; 483983, 3738506; 484059, 3738445; 484127, 3738348; 484145, 3738186; 484116, 3738104; 484023, 3738021; 483965, 3737949; 483922, 3737867; 483865, 3737777; 483789, 3737741; thence returning to 483682, 3737705.

(iii) Subunit 11c: Case Road. From USGS 1:24,000 quadrangle map Perris, land bounded by the following UTM NAD83 coordinates (E, N): 481228, 3736775; 480714, 3736203; 480100, 3736631; 480093, 3736652; 480100, 3736807; 480139, 3736897; 481124, 3736908; 481192, 3736854; thence returning to 481228, 3736775. Continue to 480689, 3736146; 480416, 3735873; 480258, 3735905; 480121, 3736024; 480082, 3736139; 480100, 3736315; 480172, 3736390; 480157, 3736473; 480150, 3736548; thence returning to 480689, 3736146.

(iv) Subunit 11d: Railroad Canyon. From USGS 1:24,000 quadrangle maps Lake Elsinore and Romoland, land bounded by the following UTM NAD83 coordinates (E, N): 476192, 3732071; 476177, 3732058; 476095, 3732067; 476092, 3732068; 476075, 3732070; 475968, 3732083; 475828, 3732198; 475767, 3732413; 475789, 3732650; 475922, 3732859; 475949, 3732877; 476026, 3732931; 476086, 3732989; 476141, 3733042; 476417, 3733214; 476590, 3733286; 476816, 3733401; 476878, 3733419; 476891, 3733423; 476983, 3733450; 477099, 3733465; 477223, 3733446; 477305, 3733326; 477300, 3733201; 477280, 3733049; 477274, 3733042; 477252, 3733009; 477230, 3732975; 477227, 3732972; 477210, 3732947; 477204, 3732938; 477090, 3732890; 477055, 3732876; 476892, 3732809; 476888, 3732808; 476755, 3732787; 476694, 3732744; 476583, 3732650; 476410, 3732510; 476367, 3732352; 476342, 3732230; 476335, 3732194; 476265, 3732134; 476216, 3732091; thence returning to 476192, 3732071.

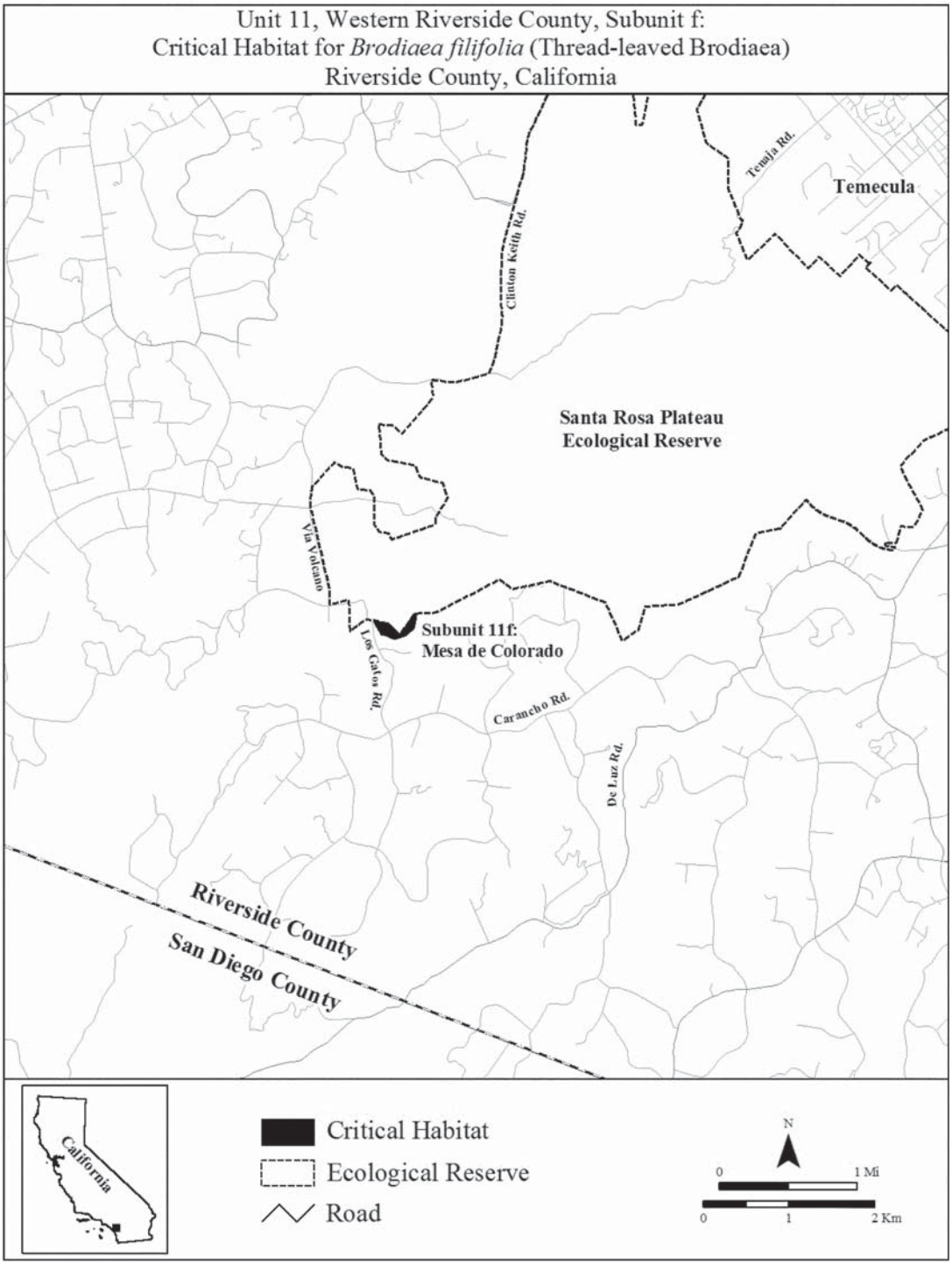
(v) Subunit 11e: Upper Salt Creek (Stowe Pool). From USGS 1:24,000 quadrangle map Winchester, land bounded by the following UTM NAD83 coordinates (E, N): 495693, 3731707; 495719, 3731126; 495375, 3730970; 495372, 3731340; 494997, 3731340; 494979, 3731381; 494982, 3731490; 495018, 3731613; 495074, 3731735; 495112, 3731898; 495260, 3732003; 495334, 3732070; 495421, 3732105; 495811, 3732113; thence returning to 495693, 3731707.

(vi) *Note:* Map of Unit 11, Western Riverside County, Subunits a, b, c, d, and e, follows:



(vii) Subunit 11f: Santa Rosa Plateau—Mesa de Colorado. From USGS 1:24,000 quadrangle maps Wildomar, land bounded by the following UTM NAD83 coordinates (E, N): 473758, 3706932; 473672, 3706842; 473581, 3706815; 473540, 3706803; 473426, 3706843; 473384, 3706858; 473296, 3706997; 473298, 3707017; 473454, 3706981; 473594, 3706853; 473766, 3707097; 473785, 3707063; thence returning to 473758, 3706932.

(viii) *Note:* Map of Unit 11, Western Riverside County, Subunit 11f, follows:

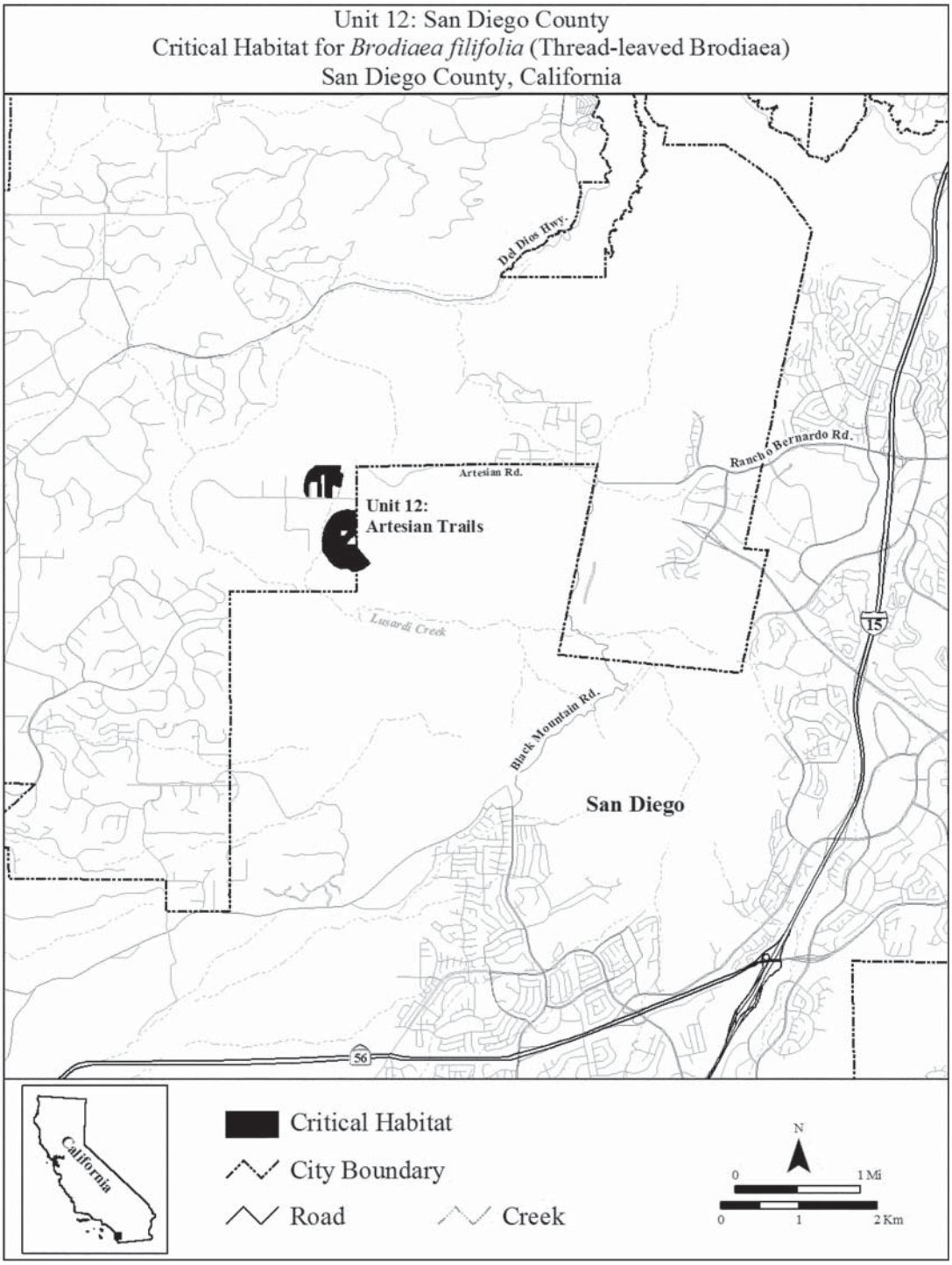


(15) Unit 12: San Diego County. From USGS 1:24,000 quadrangle map Rancho Santa Fe, San Diego County, California.

(i) Artesian Trails. Land bounded by the following UTM NAD83 coordinates (E, N): 485589, 3653612; 485575, 3653542; 485571, 3653524; 485570, 3653490; 485569, 3653489; 485569, 3653487; 485569, 3653486; 485569, 3653474; 485565, 3653471; 485564, 3653470; 485563, 3653469; 485543, 3653449; 485537, 3653450; 485493, 3653460; 485462, 3653486; 485459, 3653480; 485448, 3653449; 485448, 3653343; 485448, 3653326; 485448, 3653319; 485444, 3653319; 485370, 3653319; 485356, 3653325; 485354, 3653500; 485354, 3653526; 485354, 3653577; 485354, 3653610; 485332, 3653612; 485299, 3653597; 485307, 3653383; 485307, 3653327; 485255, 3653327; 485256, 3653411; 485257, 3653522; 485169, 3653522; 485164, 3653522; 485146, 3653473; 485144, 3653466; 485146, 3653323; 485112, 3653325; 485086, 3653397; 485086, 3653470; 485096, 3653542; 485114, 3653602; 485146, 3653657; 485216, 3653715; 485227, 3653725; 485557, 3653721; 485556, 3653713; 485554, 3653696; 485551, 3653660; 485549, 3653645; 485550, 3653644; thence returning to 485589, 3653612. Continue to 485700, 3653157; 485748, 3653150; 485750, 3653151; 485754, 3652943; 485754, 3652911; 485759, 3652710;

485760, 3652681; 485761, 3652680; 485768, 3652672; 485939, 3652471; 485934, 3652466; 485932, 3652465; 485925, 3652459; 485863, 3652401; 485766, 3652366; 485761, 3652364; 485748, 3652359; 485702, 3652364; 485668, 3652395; 485636, 3652403; 485583, 3652399; 485569, 3652394; 485477, 3652439; 485406, 3652509; 485400, 3652515; 485324, 3652630; 485319, 3652795; 485346, 3652902; 485396, 3653009; 485458, 3653090; 485468, 3653103; 485481, 3653110; 485495, 3653117; 485496, 3653118; 485529, 3653134; 485557, 3653142; 485581, 3653148; 485652, 3653163; thence returning to 485700, 3653157; excluding land bounded by 485555, 3652857; 485555, 3652822; 485572, 3652827; 485610, 3652827; 485613, 3652829; 485651, 3652882; 485667, 3652882; 485667, 3652899; 485556, 3652899; 485555, 3652857; and land bounded by 485629, 3652710; 485749, 3652710; 485749, 3652807; 485746, 3652807; 485745, 3652820; 485744, 3652822; 485723, 3652822; 485717, 3652810; 485708, 3652806; 485690, 3652791; 485679, 3652788; 485671, 3652784; 485670, 3652780; 485665, 3652765; 485663, 3652761; 485649, 3652754; 485648, 3652750; 485635, 3652718; 485629, 3652710.

(ii) *Note:* Map of Unit 12, San Diego County, follows:



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Dated: January 25, 2011.

Thomas L. Strickland,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 2011–2403 Filed 2–7–11; 8:45 am]

BILLING CODE 4310–55–C

California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

WHITE-TAILED KITE *Elanus leucurus*
Family: ACCIPITRIDAE Order: FALCONIFORMES Class: AVES
B111

Written by: C. Polite
Reviewed by: S. Bailey
Edited by: S. Bailey, P. Bloom
Updated by: CWHR Program Staff, February 2005

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Common to uncommon, yearlong resident in coastal and valley lowlands; rarely found away from agricultural areas. Inhabits herbaceous and open stages of most habitats mostly in cismontane California. Has extended range and increased numbers in recent decades.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Preys mostly on voles and other small, diurnal mammals, occasionally on birds, insects, reptiles, and amphibians. Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands. Soars, glides, and hovers less than 30 m (100 ft) above ground in search of prey. Slowly descends vertically upon prey with wings held high, and legs extended; rarely dives into tall cover (Thompson 1975).

Cover: Uses trees with dense canopies for cover. In southern California, also roosts in saltgrass and Bermudagrass.

Reproduction: Makes a nest of loosely piled sticks and twigs and lined with grass, straw, or rootlets. Nest placed near top of dense oak, willow, or other tree stand; usually 6-20 m (20-100 ft) above ground (Dixon et al. 1957). Nest located near open foraging area.

Water: Probably meets water requirements from prey.

Pattern: Uses herbaceous lowlands with variable tree growth and dense population of voles (Waian and Stendell 1970). Substantial groves of dense, broad-leafed deciduous trees used for nesting and roosting.

SPECIES LIFE HISTORY

Activity Patterns: Yearlong diurnal, and crepuscular activity.

Seasonal Movements/Migration: Apparently not migratory, but Binford (1979) found some movements in coastal California. May become nomadic in response to prey abundance (Dunk and Cooper 1994).

Home Range: Forages from a central perch over areas as large as 3 sq km (1.9 sq mi) Warner and Rudd 1975). Seldom hunts more than 0.8 km (0.5 mi) from nest when breeding (Hawbecker 1942). Henry (1983) found mean breeding home range to be 0.57 sq km (0.2 mi).

Territory: Generally not territorial, but nest site may be defended against crows, other hawks, and eagles (Pickwell 1930, Dixon et al. 1957). Defended foraging territories of about 0.10 sq km (.04 sq mi) in winter from red-tailed hawks and northern harriers (Bammann 1975).

Communal roost used in nonbreeding seasons (Waian and Stendell 1970). Territory size a function of prey and competitor abundance (Dunk and Cooper 1994).

Reproduction: Monogamous; breeds from February to October, with peak from May to August. Average clutch 4-5 eggs, range 3-6. Female only incubates, for about 28 days. Young fledge in 35-40 days. During incubation and nestling period, male feeds female, and supplies her with food to feed the young. Usually single brooded; occasionally 2 broods.

Niche: Preys on rodents that may be harmful to agricultural crops. Nest may be robbed by jays, crows yellow-billed magpies, raccoons, and opossums. Great horned owls may prey on adults and young.

REFERENCES

Bammann, A. R. 1975. Ecology, predation and social interactions of wintering white-tailed kites. M.S. Thesis, Humboldt State Univ., Arcata, CA. 81pp.

Bent, A. C. 1937. Life histories of North American birds of prey. Part 1. U.S. Natl. Mus. Bull. 167. 409pp.

Bent, A. C. 1938. Life histories of North American birds of prey. Part 2. U.S. Natl. Mus. Bull. 170. 482pp.

Binford, L. C. 1979. Fall migration of diurnal raptors at Pt. Diablo, California. West. Birds 10:1-16.

Brown, L., and D. Amadon. 1968. Eagles, hawks and falcons of the world. 2 Vols. Country Life Books, London. 945pp.

Dixon, K. L., R. E. Dixon, and J. E. Dixon. 1957. Natural history of the white-tailed kite in San Diego County, California. Condor 59:156-165.

Dunk, J. R. and R. J. Cooper. 1994. Territory size regulation in Black-shouldered Kites. Auk 111:588-595.

Eisenmann, E. 1971. Range expansion and population increase in North and Middle America of the white-tailed kite (Elanus leucurus). Amer. Birds 25:529-536.

Grinnell, J., and A. H. Miller. 1944. The distribution of the birds of California. Pac. Coast Avifauna No. 27. 608pp.

Grossman, M. L., and J. Hamlet. 1964. Birds of prey of the world. Clarkson Potter, Inc., New York. 496pp.

Hawbecker, A. C. 1942. A life history study of the white-tailed kite. Condor 44:267- 276.

Henry, M. E. 1983. Home range and territoriality in breeding White-tailed Kites. Master's Thesis, San Diego State University, San Diego, CA.

Pickwell, G. 1930. The white-tailed kite. Condor 32:221-239.

Thompson, B. C. 1975. A new prey-pursuit behavior by white-tailed hawks. Auk 92:395.

Waian, L. B., and R. C. Stendell. 1970. The white-tailed kite in California with observations of the Santa Barbara population. Calif. Fish and Game 56:188-198.

Warner, J. S., and R. L. Rudd. 1975. Hunting by the white-tailed kite (Elanus leucurus). Condor 77:226-230. status in western North America II: the Oregon population. Murrelet 59:14-25.

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.

California Wildlife Habitat Relationships System
California Department of Fish and Game
California Interagency Wildlife Task Group

STEPHENS' KANGAROO RAT *Dipodomys stephensi*
Family: HETEROMYIDAE Order: RODENTIA Class: MAMMALIA
M108

Written by: P. Brylski
Reviewed by: H. Shellhammer
Edited by: R. Duke

DISTRIBUTION, ABUNDANCE, AND SEASONALITY

Known from 16 localities in and around San Jacinto Valley from Riverside, Riverside Co., south to vicinity of Vista, San Diego Co. (Thomas 1975). The number of verified localities has declined over the past half century, due mainly to urbanization and cultivation of suitable habitat. Occurs primarily in annual and perennial grassland habitats, but may occur in coastal scrub or sagebrush with sparse canopy cover, or in disturbed areas. Preferred perennials are buckwheat and chamise; preferred annuals are brome grass and filaree.

SPECIFIC HABITAT REQUIREMENTS

Feeding: Granivorous. Known to eat filaree and brome grass and other annual grasses and forbs (Thomas 1975).

Cover: Sparse perennial plant cover is preferred (Thomas 1975). Burrows may be excavated in firm soil that is "neither extremely hard nor sandy" (Lackey 1967a), but Thomas (1975) found most individuals occupying abandoned pocket gopher burrows.

Reproduction: Young are born in nest burrow with bedding of dried plants such as mustard (Thomas 1975). Nest building was observed in captive, pregnant individuals (Lackey 1967a).

Water: No data found. Probably obtains water from food.

Pattern: Sparse perennial vegetation with firm soil, "neither hard nor sandy" (Lackey 1967a).

SPECIES LIFE HISTORY

Activity Patterns: Nocturnal. Active year-round (Bleich 1977).

Seasonal Movements/Migration: None.

Home Range: Home range varied from 0.06 ha (0.14 ac) to 0.10 ha (0.24 ac). Density varied from 40/ha (16.4/ac) to 58/ha (23.7/ac). Home range size appears to be a function of population density (Thomas 1975).

Territory: No data found. Aggressively solitary. Territory size probably somewhat less than home range.

Reproduction: Little information available. Probably breeds from April into June. Litter size averages 2.5 (Lackey 1967a).

Niche: Stephens' kangaroo rat is a moderate-sized granivore. Main competitors for food resources probably are cricetid rodents, although there also is some niche overlap with D. agilis. D. agilis, however, tends to occur in areas of moderate to dense chaparral cover. Predators include snakes, owls, and predatory mammals.

Comments: The Stephens' kangaroo rat is a Threatened and Endangered species. Habitat loss, through urbanization and cultivation, is responsible for the reduction in range over the last half century. The population studied by Thomas (1975) exists in healthy abundance, but may change rapidly in the face of development.

REFERENCES

Bleich, V. C. 1977. Dipodomys stephensi. Mammal. Species No. 73. 3pp.

Grinnell, J. 1922. A geographical study of the kangaroo rats of California. Univ. Calif. Publ. Zool. 24:1-124.

Lackey, J. A. 1967a. Growth and devlopement of Dipodomys stephensi. J. Mammal. 48:624-632.

Lackey, J. A. 1967b. Biosystematics of heermanni group kangaroo rats in southern California. Trans. San Diego Soc. Nat. Hist. 14:313-344.

Thomas, J. R., Jr. 1973. Stephens' kangaroo rat survey, 1972-1973. Calif. Dept. Fish and Game, Spec. Wildl. Invest., Sacramento. Final Rep. Job II-5.6. 10pp.

Thomas, J. R., Jr. 1975. Distribution, population densities, and home range requirements of the Stephens' kangaroo rat (Dipodomys stephensi). M.S. Thesis, California State Polytechnic Univ., Ponoma. 64pp.

Life history accounts for species in the California Wildlife Habitat Relationships (CWHR) System were originally published in: Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California. Updates are noted in accounts that have been added or edited since original publication.