Section 4.10
Hydrology and Water Quality

ESA

San Jacinto Groundwater Basin

- Groundwater Basin Number: 8-05
- County: Riverside
- Surface Area: 188,000 acres (293 square miles)

Basin Boundaries and Hydrology

The San Jacinto Groundwater Basin underlies San Jacinto, Perris, Moreno, and Menifee Valleys in western Riverside County. This basin is bounded by the San Jacinto Mountains on the east, the San Timoteo Badlands on the northeast, the Box Mountains on the north, the Santa Rosa Hills and Bell Mountain on the south, and unnamed hills on the west. Lake Perris is located in the eastern part of Perris Valley. The valleys are drained by the San Jacinto River and its tributaries. Average annual precipitation ranges from 10 to 18 inches.

Hydrogeologic Information

Water Bearing Formations

The San Jacinto Groundwater Basin contains sediments that have filled valleys and underlying canyons incised into crystalline basement rock. The valley fill deposits are generally divided into younger and older alluvium (TechLink 2002). Maximum depths of valley fill reach about 900 feet in the western and northern parts of the basin, but may exceed 5,000 feet in the eastern part of the basin between the Casa Loma and Claremont faults (TechLink 2002). Confined groundwater is found in the eastern part of the basin between the Casa Loma and Claremont fault (DWR 1959; TechLink 2002). Wells in this basin produce 200 to 2,600 gpm.

Younger Alluvium. The younger alluvium in the southeastern part of the basin is generally coarse and permeable with specific yield estimated to range from about 12 to 15 percent (TechLink 2002). In other parts of the basin, specific yield is estimated at about 5 to 10 percent.

Older Alluvium. The older alluvium may correlate to sediments of Pleistocene age that are exposed in the San Timoteo Badlands and underlies the San Jacinto River near the confluence of Bautista Creek (DWR 1959). These sediments generally contain more fine material and have lower specific yield and transmissivity values than the younger alluvium.

Restrictive Structures

The San Jacinto fault zone cuts through the eastern part of the basin and is composed of five northwest trending segments: the San Jacinto, Claremont, Hot Springs, Park Hill, and Casa Loma faults (DWR 1978). These active faults are barriers to groundwater movement (DWR 1959; TechLink 2002).

Recharge Areas

Natural recharge to the basin is primarily from percolation of flow in the San Jacinto River and its tributary streams; less recharge is from infiltration of rainfall on the valley floor. The primary recharge area for the confined aquifers is found where the San Jacinto River and Bautista Creek enter the San Jacinto Valley (DWR 1959). Natural recharge is augmented by

spreading of State Water Project (SWP) and reclaimed water through infiltration ponds in the upper reaches of the San Jacinto River (EMWD 2002; TechLink 2002). Percolation of water stored in Lake Perris has been an additional source of recharge since construction of the lake in the 1970s, and reclaimed water percolates through several storage ponds distributed throughout the valley. Artificial recharge can exceed natural recharge, particularly in years with low precipitation (EMWD 2003).

Groundwater Level Trends

Prior to the extraction of groundwater from the basin, groundwater flow was generally toward the course of the San Jacinto River and westward out of the basin (Techlink 2002). High extraction rates have produced groundwater depressions and locally reversed the historical flow pattern (TechLink 2002). During the 1960s, groundwater levels in the western and central parts of the basin declined; whereas, in the south-central part of the basin, they were moderately stable (DWR 1978). During the 1970s through the 1990s, groundwater levels declined about 20 to 40 feet in the northern and southeastern parts of the basin and were relatively stable in the southern part of the basin. During the 1970s through the 1980s, groundwater levels rose 80 to 200 feet in the western part of the basin because of infiltration from Lake Perris (Techlink 2002). During 2001 and 2002, groundwater levels generally rose in the central part of the basin and declined in the northeastern and southern parts of the basin (EMWD 2002; 2003).

Groundwater Storage

Groundwater Storage Capacity. The estimated groundwater storage capacity of the San Jacinto Basin is 3,070,000 af (DWR 1978).

Groundwater in Storage. In 1975, the calculated groundwater in storage was 2,700,000 af (DWR 1978).

Groundwater Budget (Type A)

Eastern Municipal Water District gathers and compiles groundwater production and artificial recharge amounts for this basin and reports these data annually (EMWD 2003). A model of the San Jacinto Valley Groundwater Basin was commissioned by EMWD to study groundwater flow and transport patterns and develop effective management strategies for the basin (TechLink 2002).

Groundwater production in the portion of the basin managed under the West San Jacinto Groundwater Management Plan is estimated at 18,880 af for 2001 and 20,058 af for 2002 (EMWD 2003). Estimates of extraction for the entire basin during 1984 through 1999 range from 60,361 to 100,137 af/yr and average about 78,714 af/yr (TechLink 2002). About 1,260 af of reclaimed water were recharged in 2001 and about 1,052 af in 2002. About 5,811 af of SWP water were recharged in 2002; however, no imported water was recharged in 2001 (EMWD 2003). Estimates of infiltration of San Jacinto River flow for 1984 through 1999 range from 4,504 to 191,590 af/yr and average 46,890 af/yr (TechLink 2002).

Groundwater Quality

Characterization. Historically, groundwater was of good quality for domestic, irrigation and industrial purposes (DWR 1978). The groundwater was typically sodium bicarbonate, calcium bicarbonate, or sodium chloride in character (DWR 1978). In 2002, depending on the part of the basin, average groundwater character was sodium chloride, sodium-calcium chloride, calcium-sodium chloride, or calcium-sodium chloride-bicarbonate (EMWD 2003). Historically, groundwater in the basin typically had a TDS content less than 1,000 mg/L (DWR 1978). In 2002, TDS content ranged from 230 to 12,580 mg/L; maximum TDS content exceeded 1,000 mg/L in most parts of the basin (EMWD 2003). Data from 51 public supply wells show TDS content in the basin ranges from 160 to 1,390 mg/L and averages about 463 mg/L.

Impairments. Historically, high levels of boron and fluoride were found in the central and northwest parts of the basin, and high nitrate-nitrogen concentrations were found in the southeast part of the basin (DWR 1978). In 2002, groundwater exceeding a nitrate-nitrogen concentration of 10 mg/L was found in wells throughout most of the basin (EMWD 2003). Nitrate-nitrogen concentrations as high as 40 mg/L were found in the northern part of the basin in the 1990s and as high as 28 mg/L in the southern part of the basin in 2002 (EMWD 2003). In 2002, TDS content was measured as high as 12,580 mg/L in the basin, and some wells with TDS content exceeding 1,000 mg/L were found throughout most of the basin (EMWD 2003). Pumping is causing groundwater of high TDS content to move from the western part of the basin into groundwater of lower TDS content in the central part of the basin (TechLink 2002; EMWD 2003). Remediation efforts have helped slow the migration of this plume.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	56	3
Radiological	56	2
Nitrates	58	12
Pesticides	55	1
VOCs and SVOCs	54	0
Inorganics – Secondary	56	15

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: to 2,600 gpm	Average:
	Total depths (ft)	
Domestic	Range: to 917 feet	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
EMWD	Groundwater levels	169/ biannually (EMWD 2003)
EMWD	Miscellaneous water quality	113/ annually (EMWD 2003)
Department of Health Services and cooperators	Title 22 water quality	56/ annually

Basin Management

Groundwater management:	Most of the basin is managed under the jurisdiction of the West San Jacinto Groundwater Basin Management Plan, an AB 3030 plan adopted in June 1995.
Water agencies	
Public	Eastern Municipal Water District, Lake Hemet Municipal Water District
Private	

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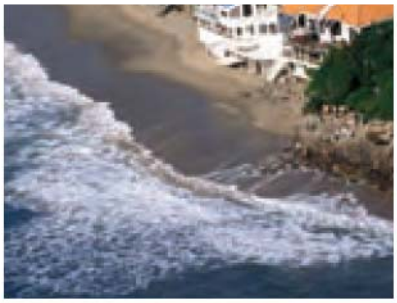
Errata

Updated groundwater management information and added hotlinks to applicable websites. (1/20/06)

California **Water Plan**
Update 2009

South Coast

INTEGRATED WATER MANAGEMENT



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Volume **3**

Regional Reports

Southern Region Office

The Division of Integrated Regional Water Management assists public and private agencies and the general public with water issues throughout the state. Four regional offices are located throughout California to maintain close contact with local interests to facilitate communication and to work on water-related matters. The offices are:

- Northern Region in Red Bluff,
- North Central Region in West Sacramento,
- South Central Region in Fresno, and
- Southern Region in Glendale.

Each of the regional offices offers technical guidance and assistance in water resource engineering, project management, hydrology, groundwater, water quality, environmental analysis and restoration, surveying, mapping, water conservation, and other related areas within the boundaries of their offices. Because of the regional offices' close ties with local interests, DWR regional coordinators in each office facilitate overall communication between DWR divisions and local partners to ensure coordinated efforts throughout all DWR programs and projects.

For more information on DWR and DWR projects, please contact the Regional Coordinators at:
DWR-RC@water.ca.gov

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770 Fairmont Avenue, Suite 102
Glendale, CA 91203-1035
Southern Region Office phone number:
(818) 500-1645
Department of Water Resources' website:
http://www.water.ca.gov/

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South Coast Hydrological Region

Within the South Coast Hydrologic Region, wholesale and retail water agencies, groundwater agencies, and watershed managers are working together to meet current and future demands of municipal, industrial, and agricultural users and the environment and to sustain the region's economy. To achieve this they are planning and implementing large and diverse water supply and water quality projects and water use efficiency projects. Cooperation between agencies and organizations and use of integrated resources planning have improved the flexibility and diversity of the region's water supplies.

Setting

The South Coast Hydrologic Region is California's most urbanized and populous region. More than half of the state's population resides in the region (54 percent), which covers 11,000 square miles or 7 percent of the state's total land. It extends from the Pacific Ocean east to the Transverse and Peninsular Ranges, and from the Ventura-Santa Barbara County line south to the international border with Mexico. The region includes all of Orange County and portions of Ventura, Los Angeles, San Bernardino, Riverside, and Sana Diego counties (see Figure SC-1).

Topographically, most of the South Coast region is composed of several large, undulating coastal and interior plains. Several prominent mountain ranges comprise its northern and eastern boundaries and include the San Gabriel and San Bernardino mountains. Most of the region's rivers drain into the Pacific Ocean, and many terminate in lagoons or wetland areas that serve as important coastal habitat. Many river segments on the coastal plain, however, have been concrete-lined and in other ways modified for flood control operations.

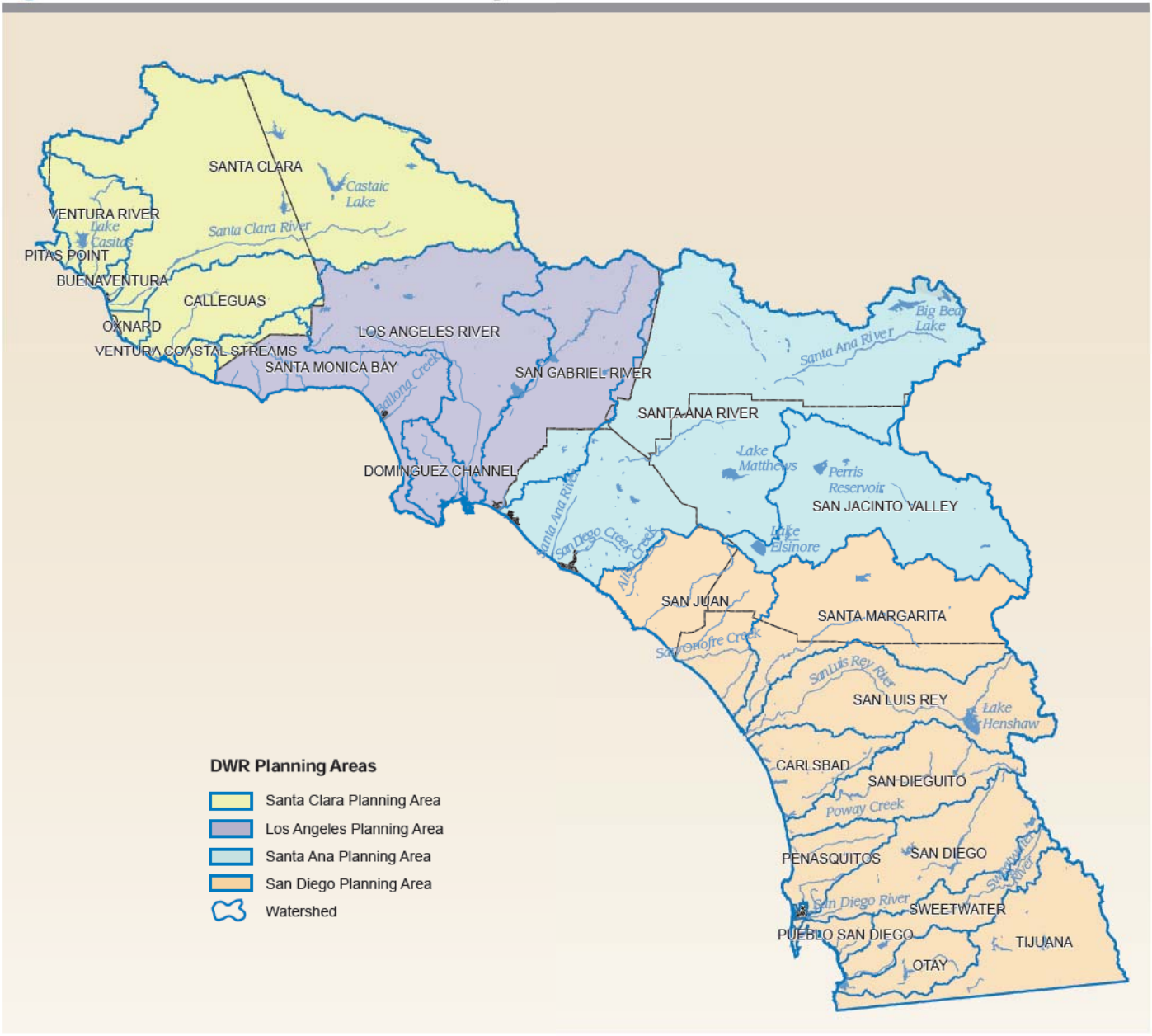
Although much of the land is used for either urban or agricultural land uses, all or portions of several national and State parks are located in the South Coast region. They are the Los Padres, Angeles, San Bernardino, and Cleveland national forests and Cuyamaca-Rancho and Chino Hills State parks.

Watersheds

There are 19 major rivers and watersheds in the South Coast region (Figure SC-2). Many of these watersheds have densely urbanized lowlands with concrete-lined channels and dams controlling floodflows. The headwaters for many rivers, however, are within coastal mountain ranges and have remained largely undeveloped.

Figure SC-1 South Coast Hydrologic Region

Figure SC-2 Watersheds of the South Coast region



Santa Clara Planning Area Watersheds

The watersheds of the Santa Clara Planning Area provide important habitat and water resources within Ventura County and northern Los Angeles County. They are not heavily urbanized and efforts are under way to protect remaining ecosystems and water supplies while providing flood protection to existing developments. The major watersheds are the Ventura River, Santa Clara River, and Calleguas Creek (including Oxnard Plain). Watershed scale planning efforts include the Ventura River Watershed Protection Plan, Santa Clara River Enhancement and Management Plan, and the Calleguas Creek Watershed Management Plan.

Box SC-1 Acronyms and Abbreviations Used in This Report

af	acre-feet
AHPS	Advanced Hydrologic Prediction Service
ALERT	Automated Local Evaluation in Real Time
API	antecedent precipitation index
BDCP	Bay-Delta Conservation Plan
BMPs	best management practices
Cal Fire	California Department of Forestry and Fire Protection
Cal EMA	California Emergency Management Agency
CCP	Conservation Credits Program
CDEC	California Data Exchange Center
CRA	Colorado River Aqueduct
CRS	Community Rating System
DFG	California Department of Fish and Game
cfs	cubic feet per second
CLWA	Castaic Lake Water Agency
CRA	Colorado River Aqueduct
CRS	Community Rating System
CUWCC	California Urban Water Conservation Council
CVWD	Coachella Valley Water District
Delta	Sacramento-San Joaquin Delta
DFG	California Department of Fish and Game
DWR	California Department of Water Resources
EOCWD	East Orange County Water District
FACC	funding area coordinating committee
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GMA	Groundwater Management Agency
IEUA	Inland Empire Utilities Agency
IID	Imperial Irrigation District
IPR	indirect potable reuse
IRWD	Irvine Ranch Water District
IRWM	Integrated Regional Water Management
LAA	Los Angeles Aqueduct
LACDA	Los Angeles County Drainage Area
LACDPW	Los Angeles County Department of Public Works
LACFCD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
LID	Low Impact Development
Metropolitan	Metropolitan Water District of Southern California
MGD	million gallons per day
MSCP	Multiple Species Conservation Plan
MWC	Mutual Water Company
MWD	Municipal Water District
MWDOC	Municipal Water District of Orange County
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint source
NRCS	Natural Resources Conservation Service
OCWD	Orange County Water District
OES	Office of Emergency Services
ppm	parts per million
PUD	Public Utilities District
QSA	Federal Quantification Settlement Agreement 2003
RAP	regional acceptance process
Regional Water Board	Regional Water Quality Control Board
RWMG	Regional Watershed Management Group
SARI	Santa Ana Regional Interceptor
SAROC	Santa Ana River and Orange County
SAWPA	Santa Ana Watershed Project Authority
SC	South Coast
SDCWA	San Diego County Water Authority
SEMS	Standardized Emergency Management System
SGPWA	San Gorgonio Pass Water Agency
SMP	Salinity Management Project
SWP	State Water Project
State Water Board	State Water Resources Control Board
TDS	total dissolved solids
TMDLs	Total Maximum Daily Loads
USACE	US Army Corps of Engineers
USBR	US Bureau of Reclamation
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
VCWPD	Ventura County Watershed Protection District
WRD	Water Replenishment District of Southern California
WSD	Water Storage District
WWTP	wastewater treatment plant

The 228-square mile Ventura River watershed extends from the upper slopes of the Transverse Ranges southward to an estuary north of the City of Ventura. Drainage is provided by the Ventura River and its tributaries which include the Matilija, North Fork Matilija, and San Antonio creeks. The watershed also has one major reservoir, Lake Casitas, which provides water supplies downstream for local urban and agricultural users. The upper portion of the watershed is minimally developed and provides excellent aquatic habitat. Water quality issues from point and nonpoint pollution sources are present in the lower portion.

The 1,600-square mile Santa Clara River watershed extends from the northern slope of the San Gabriel Mountains in Los Angeles County westward to the City of Oxnard in Ventura County. Drainage is provided by the Santa Clara River and its tributaries which include Piru, Sespe, San Francisquito, Castaic, and Santa Paula creeks. The Santa Clara is the largest river in Southern California that remains in a relatively natural state. The upper watershed (portion in Los Angeles County) consists of approximately 680 square mile of mostly undeveloped land. The only urban development in the upper portion is in the Santa Clarita Valley. Agricultural and urban land use activities are more extensive in the lower portion of the watershed. Although the Santa Clara River typically has an intermittent flow regime in the main stem, flows can increase rapidly in response to high intensity rainfall with the potential for severe flooding. Controlled releases of water from Lake Piru supplement surface flows in Ventura County.

The 343-square mile Calleguas Creek watershed drains the Oxnard Plain in Ventura County. Drainage is provided by Calleguas Creek and its tributaries Conejo Creek and Arroyo Santa Rosa. Calleguas Creek begins on the eastern Ventura County, meanders through the cities of Simi Valley, Moorpark, and Camarillo, and drains into the Pacific Ocean at Mugu Lagoon. Along the way it is also known as Arroyo Simi and Arroyo Las Posas. Groundwater supplies are quite extensive in the alluvial aquifers beneath the plain. Urban, industrial, and agricultural land use activities within the watershed have resulted in the degradation of water resources, loss of sensitive ecosystems, flooding, and erosion and sedimentation. Nutrients and other dissolved constituents in irrigation return-flows are seeping into shallow aquifers and degrading groundwater in this basin.

Metropolitan Los Angeles Planning Area Watersheds

The watersheds of the Metropolitan Los Angeles Planning Area have been subjected to some of the densest urbanization in California and have issues associated with urban runoff, groundwater contamination, and the loss of major historical ecosystems. The planning area has four major watersheds: Santa Monica Bay, Los Angeles River, Dominguez Channel, and San Gabriel River. These watersheds begin in the surrounding Santa Monica and San Gabriel Mountains and flow south across the coastal plains into the Pacific Ocean. Extensive watershed scale planning has taken place, including Santa Monica Bay Restoration Plan, Malibu Creek Watershed Management Plan, Los Angeles River Master Plan, Arroyo Seco Watershed Restoration Feasibility Study, Dominguez Watershed Management Master Plan, and San Gabriel River Master Plan.

The 200-square mile North Santa Monica Bay watershed is in the northwest corner of Los Angeles County and comprises several smaller subwatersheds, including Malibu and Topanga creeks. The topography of the watershed is a combination of steep-slope mountains, coastal sand dunes, and several broad, gently sloping alluvial valleys. The coastal margin and portions interior valleys are urbanized. Healthy riparian habitats continue to exist because many of the mountainous canyons remain undeveloped. Malibu Creek drains the southern Simi Hills, western San Fernando Valley, and the western Santa Monica mountains, entering the Pacific Ocean at Malibu Lagoon.

The 130-square mile Ballona Creek watershed extends from downtown Los Angeles westward to the Pacific Ocean. It is bounded to the north by the Santa Monica Mountains and the south by the Baldwin Hills. Drainage is provided by Ballona Creek and two small tributaries. The watershed is heavily urbanized and includes the cities of Beverly Hills, Culver City, and West Hollywood and portions of the cities of Inglewood, Los Angeles, and Santa Monica. Several environmental sites are located in the western margin of the watershed. These are the Ballona Wetlands, Ballona Lagoon, and Oxford Lagoon. Water quality issues in Ballona Creek are caused by industrial effluent, illegal dumping, and nonpoint source pollutants. Upgrades of the Hyperion Sewage Treatment Plant have eliminated the outflow of untreated sewage during storm events.

The 834-square mile Los Angeles River watershed is shaped by the Los Angeles River, which flows from its headwaters in the Santa Monica Mountains, through the San Fernando Valley, south through the Glendale Narrows and across the coastal plain into San Pedro Bay. The river's major tributaries are the Arroyo Calabasas and Bell Creek (at the river's origin), Brown's Canyon Wash, the Burbank Western Channel, Tujunga Wash, Arroyo Seco, Rio Hondo, and Compton Creek. The watershed contains 22 lakes and flood control reservoirs, as well as a number of spreading grounds. The Los Angeles River is hydraulically connected to the San Gabriel River through the Whittier Narrows Reservoir, although this occurs primarily during large storm events. The Los Angeles River, which once flowed freely over the coastal plain, was channelized between 1914 and 1970 to control the runoff and reduce the impacts of major flood events in the region. Today, over 90 percent of the Los Angeles River is concrete-lined. The watershed has impaired water quality in the middle and lower portions of the basin due to urban runoff from dense urbanization.

The 110-square mile Dominguez Channel watershed is in southern Los Angeles County and defined by a complex network of storm drains and smaller flood control channels. The Dominguez Channel extends from the Los Angeles International Airport to the Los Angeles Harbor and drains a large portion, if not all, of the cities of Inglewood, Hawthorne, El Segundo, Gardena, Lawndale, Redondo Beach, Torrance, Carson, and Los Angeles.

The 640-square mile San Gabriel River watershed is in the eastern portion of Los Angeles County and extends from the San Gabriel Mountains to the Pacific Ocean at the City of Seal Beach. Drainage is provided by the San Gabriel River and its

tributaries, which include Coyote Creek. Although the watershed contains portions of 37 incorporated cities, only 26 percent of its total land area is developed. Flows in the San Gabriel River are diverted into four different spreading grounds and impounded behind several rubber dams in order to control flow for groundwater recharge.

Santa Ana Planning Area Watersheds

The Santa Ana Planning Area has experienced some of the most rapid urbanization in the state over the past 10 to 15 years, which has created numerous challenges in balancing growth with water supplies, flood protection, and ecosystem preservation. The planning area consists of one major watershed, the Santa Ana River watershed, and a few subwatershed areas including the San Diego Creek subwatershed and the San Jacinto River subwatershed. Watershed scale planning is provided by the Santa Ana Watershed Project Authority Santa Ana (One Water One Watershed) Integrated Water Resources Management Plan. This plan was supported by a number of subwatershed integrated plans including Central Orange County Integrated Regional and Coastal Watershed Management Plan, North Orange County Integrated Regional and Coastal Watershed Management Plan, Integrated Regional Management Plan for San Jacinto River Watershed, Upper Santa Ana River Watershed Integrated Regional Water Management Plan, and Western Municipal Water District Integrated Regional Water Management Plan.

The 2,800-square mile Santa Ana River watershed is the largest coastal stream system in Southern Ca1ifornia including parts of Orange, Riverside, San Bernardino, and Los Angeles counties. The principle river in the watershed is 96-mile long Santa Ana River. The river has its headwaters in the San Bernardino Mountains, and it meanders through the San Bernardino Valley, Chino Basin, and the coastal plain of Orange County before it drains into the Pacific Ocean near the City of Newport Beach. Most of the river channel in Orange County has been altered for flood management purposes including a section that has been concrete-lined. Upstream, the river is in its natural state. Flows in the river are perennial. The watershed also contains several human-made water storage facilities, including Lake Perris, Lake Mathews, and Big Bear Lake. Other flood control facilities along the river are Prado and Seven Oaks dams. Most of the watershed has both urban and agricultural land use activities. In the upper portion of the watershed, urbanization is a factor in the degradation of sensitive aquatic and riparian habitats and has impacted local water quality. The watershed continues to have riparian, wetland, and other wildlife habitat.

The 112-square mile San Diego Creek subwatershed is in central Orange County, and drains a portion of the area into Upper Newport Bay. It is a subwatershed to the Santa Ana River watershed. Erosion of the creek channels in the watershed have resulted in the sedimentation of the bay and channel basins. For years there have been concerns about declining water quality from sediments, nutrients, pathogens, and toxics. Habitats for many wildlife species are being isolated by new construction that cuts off long-used wildlife corridors.

The 765-square mile San Jacinto River subwatershed is in western Riverside County and is a subwatershed to the Santa Ana River watershed. It extends from the San Bernardino National Forest in the San Jacinto Mountains to Lake Elsinore in the west. Drainage is provided by the San Jacinto River. The lower portion of the watershed is being urbanized while the upper portion is a mixture of high- and low-density urbanization, agriculture, and undeveloped lands.

San Diego Planning Area Watersheds

The watersheds of the San Diego Planning Area are generally smaller than in other areas of the South Coast Hydrologic region. These watersheds are being urbanized, resulting in local water quality issues and loss of ecosystems. Local water supplies are limited in these watersheds. The planning area has nine major watersheds: San Juan, Santa Margarita, San Luis Rey, Carlsbad, San Dieguito, San Diego River, Sweetwater, Otay, and Tijuana. These watersheds generally flow east to west, a majority discharging into lagoons that been designated as ecological reserves. Watershed-scale planning efforts include Santa Margarita Watershed Management Plan, San Dieguito Watershed Management Plan, San Diego River Watershed Management Plan, Otay River Watershed Management Plan, and Tijuana River Bi-national Vision.

The 134-square mile San Juan Creek watershed extends from the Cleveland National Forest in the Santa Ana Mountains of eastern Orange County to the lagoon at the Pacific Ocean near the City of Dana Point. Drainage is provided by San Juan Creek and its tributaries, which include Trabuco and Oso creeks. Modifications have been made for flood control. Urbanization of the watershed is more extensive on the lower end of the watershed. Issues include channelization and poor surface water quality from urban runoff, loss of floodplain and riparian habitat, decline of water supply and flows, invasive species, and erosion.

The 750-square mile Santa Margarita River watershed resides in both Riverside and San Diego counties. It extends southwestward from the confluence of Temecula and Murrieta creeks in southern Riverside County to the Pacific Ocean at the US Marine Corps Base Camp Pendleton, north of the City of Oceanside. The lower portion of the watershed and estuary has largely escaped the development typical of the South Coast and are, therefore, able to support a relative abundance of functional habitats and wildlife. The upper portion is one of the fastest growing areas in California. Issues that have arisen include excessive nutrient inputs, erosion and sedimentation, groundwater degradation and contamination with nitrates and other salts, habitat loss, channelization, and flooding.

The 562-square mile San Luis Rey River watershed is in San Diego County and extends westward from the Palomar and Hot Springs Mountains in the Cleveland National Forest to the Pacific Ocean near the City of Oceanside. Drainage is provided by the San Luis Rey River and its tributaries. Most of the river channel remains in its natural state. The river is generally dry but can carry floodflows during winter storms. The other major water feature in the watershed is Lake Henshaw, which impounds water on the San Luis

Rey River near its headwater. Water supplies from the dam are used downstream for urban uses in the City of Escondido and Vista Irrigation District. The eastern portion of the watershed is owned and managed by governmental agencies, local districts, and Native American Tribes. Urban and agricultural land uses occur throughout much of the watershed, with the urban uses concentrated in the lower portion. Agricultural and livestock operations, urban runoff, and sand mining operations, and septic tanks are among the factors in local surface water quality issues. They include high chloride, total dissolved solids (TDS), and bacteria levels.

The 210-square mile Carlsbad watershed is in the coastal margin of San Diego County and has six smaller watersheds that all drain separately to the Pacific Ocean. The watershed is extensively urbanized and includes the cities of Oceanside, Carlsbad, Encinitas, Solana Beach, Vista, San Marcos, Rancho Santa Fe, and Escondido. Water quality issues include toxic substances, nutrients, bacteria and pathogens, and sedimentation. The Agua Hedionda, Buena Vista, and San Elijo lagoons are experiencing excessive coliform bacteria and sediment loading from upstream sources.

The 346-square mile San Dieguito River watershed extends westward from the Volcan Mountains to its outlet to the Pacific Ocean, San Dieguito Lagoon near the City of Del Mar. Drainage is provided by the San Dieguito River and its tributaries which include Santa Ysabel and Santa Maria creeks. Over half of the watershed is vacant or undeveloped; however, much of this is zoned for future residential development. There are several important natural areas within the watershed that sustain a number of threatened and endangered species. Among these are the 55-mile-long, 80,000-acre San Dieguito River Park, the 150-acre San Dieguito Lagoon, and five water storage reservoirs including Lake Hodges, Lake Sutherland, and Lake Poway. The San Dieguito Lagoon is especially sensitive to the effects of pollutants and oxygen depletion from restricted or intermittent tidal flushing.

The 440-square mile San Diego River watershed extends westward from the Volcan and Cuyamaca Mountains through the San Diego urban area to the Pacific Ocean at Ocean Beach. Drainage is provided by the San Diego River and its tributaries which include San Vicente and Boulder creeks. There are four imported-water storage reservoirs within the watershed: El Capitan, San Vicente, Lake Jennings, and Cuyamaca. Famosa Slough is a tidal salt water marsh, which receives water via the San Diego River Flood Control Channel. Beach postings and closures from elevated levels of coliform bacteria were common in the last 10 years due to urban runoff and sewage spills. Excessive groundwater extraction, increasing TDS, and MTBE contamination threatens this limited resource.

The 230-square mile Sweetwater River watershed extends westward from the Cuyamaca Mountains to the San Diego Bay. Drainage is provided by the Sweetwater River. The San Diego Bay, which constitutes the largest estuary along the San Diego coastline, has been extensively developed with port facilities. Similar to other major bays of the region, 90 percent of the original salt marshes have been filled or dredged. Construction of Loveland and Sweetwater reservoirs, as well as extensive local groundwater

pumping, has substantially reduced freshwater input to San Diego Bay. Storm water outfalls provide some flows and nutrients to the bay, but not with natural seasonality, timing, frequency, or content.

The 160-square mile Otay River watershed extends westward from the San Miguel Mountains to San Diego Bay. Drainage is provided by the Otay River which flows through the Upper and Lower Otay lakes. These lakes provide water supply, wildlife habitat, and recreational opportunities. Approximately 36 square mile of the watershed are part of the San Diego Multiple Species Conservation Plan (MSCP) effort that provides habitat for endangered plant and animal species. Other important conservation areas include the San Diego National Wildlife Refuge, Rancho Jamul Ecological Reserve, and vernal pools. Water quality concerns include elevated coliform bacteria in the Pacific Ocean receiving waters near Coronado.

The 1,700-square mile Tijuana River watershed is a bi-national watershed (455 square miles in the United States and 1,245 square miles in Mexico) on the westernmost portion of the US/Mexico border. The watershed contains three surface water reservoirs, various flood control works, and a National Estuarine Sanctuary. Major drainages include Cottonwood and Campo creeks in the United States, and the Rio Las Palmas system in Mexico. Cottonwood Creek begins about 20 miles north of the international boundary in the Laguna Mountains. Numerous tributaries come together near Barrett Lake, where the creek continues, entering Mexico west of Tecate. The main river returns to the United States near San Ysidro and joins the Pacific Ocean south of Imperial Beach. Poor water quality is a major issue in the Tijuana River watershed. Although discharges from the Tijuana River account for only a small percentage of total gaged runoff to the ocean, it contains the highest concentrations of suspended solids and heavy metals among the eight largest creeks and rivers in Southern California. Surface water quality has been affected by urban runoff from Mexico, and groundwater contamination has occurred as a result of seawater intrusion and waste discharges.

Ecosystems

Ecosystems in the South Coast region are host to a wide diversity of special status plants and wildlife. Despite their exceptional value, many of the region's ecosystems have suffered from over 100 years of human development activities. Rivers, streams, and wetlands have been diked, ditched, filled, and channelized. Dams and flood control channels have been built to contain and direct waterways, fundamentally altering their natural processes. Various flood, vector, and fire districts frequently enter streambeds, wetlands, or riparian buffers to remove vegetation from channels and adjacent habitats. Riparian vegetation is not only important for raptor nesting and other bird species, but vegetation within streambeds and along the edge of streams provides essential cover for aquatic species and fish fry. Removal of riparian vegetation eliminates essential habitat, degrades water quality, causes scour and erosion, and affects the natural flow regime. Loss of vernal pools, seasonally flooded depressions found on hardpan soils, has been extensive; the largest remnant patch in San Diego County occurs on the US Marine Corps Air Station Miramar (Bauder and McMillan 1998). Much of the historical coastal

dunes, wetlands, and estuary ecosystems in the region have also been degraded by declines in water quality and ecosystem functionality. The introduction of invasive Quagga mussels in Lake Havasu, the Colorado River Aqueduct (CRA), and multiple San Diego reservoirs threatens to both disrupt the food chain within those aquatic ecosystems and impede the flow of water supply to users. Finally, invasive plant species, such as *Arundo donax*, have further impaired local ecosystems by choking out native plants and competing with other plant and animal species for limited available water.

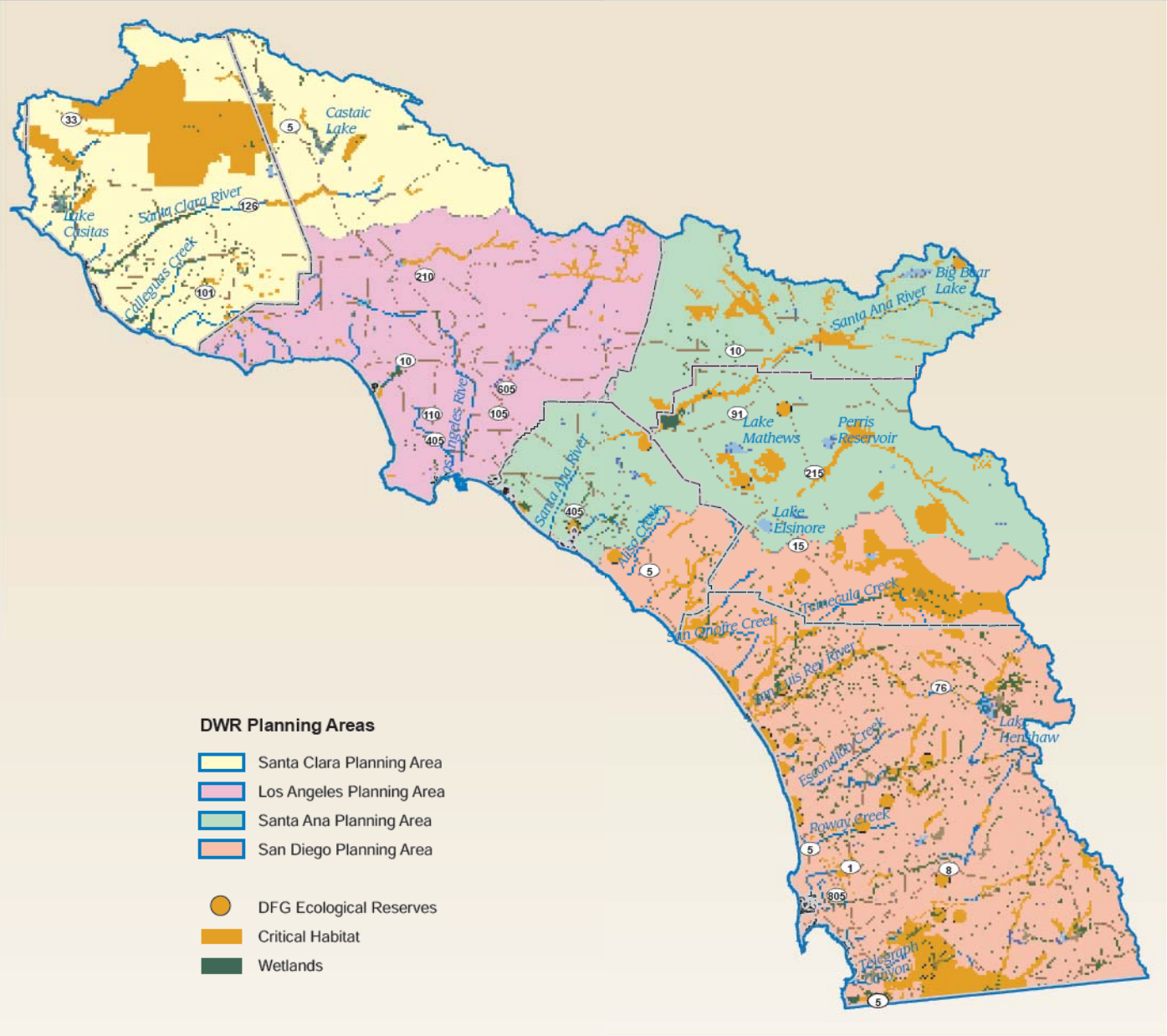
In recent decades, however, concerted planning efforts and technologies have emerged to restore function and productivity to degraded or destroyed ecosystems. Additionally, important ecological areas have been set aside and designated for protection including Significant Ecological Areas by county governments; Environmentally Sensitive Habitat Areas by the Coastal Commission; State Water Quality Protected Areas (formerly Areas of Special Biological Significance) by the State Water Resources Control Board (State Water Board); Ecological Reserves by the California Department of Fish and Game (DFG); and Critical Habitat by the US Fish and Wildlife Service (USFWS). See Figure SC-3 Wetlands and critical habitat in the South Coast Region.

Key ecosystems in the Santa Clara Planning Area include the aquatic and riparian habitats along Ventura and Santa Clara rivers and their tributaries and estuaries. The primary goal of the Watersheds Coalition of Ventura County is to bring together stakeholders to develop integrated watershed management strategies and coordinate ecosystem restoration efforts to achieve long term sustainability of local water resources. Ongoing projects and programs include land acquisition for protection and restoration of habitat areas; ecosystem restoration projects to remove barriers to steelhead passage, restore sediment transport and natural hydrologic regimes on the river, and restore riparian and wetland habitats; and remove the invasive giant reed (*Arundo donax*) from local rivers and tributaries.

Key ecosystems in the Metropolitan Los Angeles Planning Area include intermittent canyons in the inland San Gabriel Mountains and coastal Santa Monica Mountains. Because of extensive development in the Los Angeles area, the physical and hydrologic landscape has been irreversibly altered. Nevertheless, opportunities for aquatic and riparian restoration, wetlands enhancement, and habitat creation are being actively pursued. Ecosystem protection efforts are under way in the San Gabriel River headwaters in Angeles National Forest.

Key ecosystems in the Santa Ana Planning Area include the upper Newport Bay and the constructed wetlands behind Prado Dam. Seven Oaks Dam, and Hemet/San Jacinto. The Santa Ana Watershed Project Authority (SAWPA) is responsible for many impressive projects underway or under development within the Santa Ana watershed, including its 93-mile Santa Ana Regional Interceptor (SARI) pipeline designed to convey non-reclaimable, high-saline brine out of the watershed, non-native plant removal program, constructed wetlands, wetland expansion, habitat restoration, and wildlife conservation and enhancement. Environmental groups such as the Orange County Coastkeeper are working to restore ecosystem function and improve water quality within coastal

Figure SC-3 Wetlands and critical habitat in the South Coast Region



marshes. In Orange County's developed watersheds, restoration activities include the removal of debris and trash, reversion to natural channel configuration, revegetation with native species, and a regional invasive species removal program. Many projects contain a public education component intended to integrate public outreach and education of outlying neighborhoods, as well as of visitors to the restoration site.

Key ecosystems in the San Diego Planning Area include the coastal lagoons and wetlands, protected reservoir lands, and the San Dieguito River Park area. The San Diego area's vegetation communities support a wide array of wildlife species and are

Table SC-1 Representative climate data for South Coast planning areas

	Planning areas			
	Santa Clara	Metropolitan LA	Santa Ana	San Diego
Rainfall (inches per year)[1]	10 to 46	12 to 47	10 to 53	8 to 38
Minimum Temperature (°F)[1]	29 to 54	35 to 55	23 to 54	37 to 54
Maximum Temperature (°F)[1]	55 to 78	52 to 79	48 to 81	63 to 81
Average Eto (feet per year)[2]	4.6	4.3	4.4	4.5

1. PRISM Group 2008. Averages calculated from 1971 to 2000.
2. California Irrigation Management Irrigation System 2008. Reference Evapotranspiration.

home to hundreds of native plant species. However, invasive species are a major threat to native species in the area. The San Diego County MSCP effort is implementing comprehensive programs to protect these resources.

Climate

The coastal and interior valleys of the South Coast region feature Mediterranean climates characterized by mild, wet winters and warm, dry summers. See Table SC-1 for climate data by planning area. The bordering mountains have climates that range from Mediterranean to subtropical steppe, with a greater range of maximum and minimum temperatures and higher precipitation amounts for all seasons. Most of the region's precipitation (75 percent) falls between December and March. Average precipitation can vary greatly along the South Coast, ranging from over 40 inches annually in the mountains to less than 10 inches annually in the valleys. Although generally dry, the eastern and southern portions of the region may be impacted in the late summer by monsoonal thunderstorms which result from low pressure cells in the Southwest. The region generally experiences substantial climactic variability, with periods of higher than normal precipitation followed by lower than normal precipitation. Periodic drought conditions present a challenge to water providers throughout the region as they attempt to meet growing demands for water.

Precipitation extremes were experienced in the South Coast region between 2000 and 2005. Very dry conditions were experienced in 2002 in the region. At the Los Angeles Civic Center, 4.4 inches was recorded in water year 2002, which was 30 percent of normal. At the San Diego Airport, 3.3 inches was recorded, which is 33 percent of normal. Above average precipitation was recorded in 2005. At the Los Angeles Civic Center, 37.5 inches was recorded in water year 2005, which was 254 percent of normal. At the San Diego Airport, 22.6 inches was recorded, which is 222 percent of normal.

Population

In 2005, South Coast Hydrologic Region had the largest population of the state's 10 hydrologic regions with 19.6 million people. About 54 percent of the state's total

Box SC-2 California Native American Tribal Information, South Coast Hydrologic Region

- Demographics: Tribes with historic or cultural ties to the Central Cost region are primarily the Cahuilla, Cupeno, Diegueno, Gabrieleno, Kumeyaay, Luiseno, Serrano, and Tongva (previously referred to collectively as the Mission Indians).
  - Currently, Tribal landholdings located in this region include the Barona, Campo, Capitan Grande, Highland (Serrano), Inaja-Cosmit, Jamul, La Jolla, La Posta, Mesa Grande, Pechanga, Pala, Pauma-Yuima, Poway (San Luis Rey), Ramona, Rincon, Riverside (Sherman Indian Museum), San Fernando (Fernando Tataviam), San Manuel, San Pasqual, Santa Ana (Juaneno/ Acjachemem), Santa Ysabel, Soboba, Sycuan, and Viejas reservations, rancherias, and communities. On the boundary with the Colorado River region are the Cahuilla, Ewiiaapaayp (Cuyapaipe), Los Coyotes, Manzanita, and Santa Rosa reservations.
- Collaborative Efforts:
  - Through an agreement with the US Bureau of Reclamation, the La Jolla Band of Luiseno Mission Indians received funding to support fire suppression, increased storage, and the development a drought contingency plan.
  - Pechanga established a full response fire department and has mutual and autoaid agreements with the City of Temecula and the California Department of Forestry, including access to Pechanga's two artificial lakes for supplying aerial water drops in fighting wild fires.
  - The Pala Band, San Luis Rey Indian Water Authority, and the Native American Environmental Protection Coalition participate on the San Luis Rey Watershed Council, working with local jurisdictions, water districts, and non-profit organizations.
- Concerns and Priorities:
  - Tribal water rights are often "paper water" and are not linked to actual water deliveries or supplies.
  - Water quality for surface and groundwater resources along the Mexico border.
- Accomplishments:
  - The San Luis Rey Indian Water Authority is close to completing a 40-year effort to restore and perfect senior water rights that were bypassed in 1895 with the diversion of San Luis Rey River waters into the Escondido Canal. A 1969 lawsuit led to the 1988 San Luis Rey Indian Water Rights Settlement Act. The lining of the All-American Canal, completed in May of 2009, and the settlement agreement provides the necessary supplemental water. Funding options are currently being explored for construction of a pipeline, an important component of actual water deliveries to the reservations. At present, the final settlement agreement is in a period of review by the parties.

NOTE: Above information was gathered from Tribal input at the California Water Plan Update regional workshops and the Tribal water plenary sessions that are supporting the California Tribal Water Summit.

population lives in this region, and 88 percent of the region's population lives in incorporated cities. Between 2000 and 2005, the region grew by 1,414,691 people, a growth of 8 percent over the 5-year period. For historical population data, 1960–2005, see Volume 5, The Technical Guide.

In Water Plan Update 2009, we project population growth based on the assumptions of future scenarios. Discussion of the three scenarios used in this Water Plan and how the region's population may change through 2050 can be found later in this report under Looking to the Future.

Senate Bill 18 (Chapter 905, Statutes of 2004) requires cities and counties to consult with Native American Indian Tribes during the adoption or amendment of local general plans or specific plans. A contact list of appropriate Tribes and representatives within a region is maintained by the Native American Heritage Commission. Box SC-2 lists information about regional Tribal concerns.

Economic Drivers

Historically dominated by the aerospace and defense industries, the South Coast region has diversified into multiple technological fields. Research and development activities are concentrated within the region's universities, including UC Los Angeles, University of Southern California, Caltech, UC Irvine, UC Riverside, and UC San Diego, and their associated research institutes, as well as countless technology-based companies. The top industries in the South Coast, according to the US Census Bureau (2006), are: manufacturing (computers and electronics, transportation equipment, metal fabrication, food, and apparel); healthcare and social assistance; professional, scientific and technical services (legal, accounting, architectural/engineering services); and wholesale trade (grocery, professional and commercial equipment, apparel, machinery).

The tourism industry, which is supported by coastal and beach ecosystems, is a key economic driver in the South Coast region. The region also includes the largest port complex in the United States, the adjacent 7,500-acre Port of Los Angeles and 3,200-acre Port of Long Beach, as well as several smaller ports and harbors. In 2003, merchandise trade passing through the Port of Long Beach was valued at $96 billion: 12 percent of the value of total US international waterborne trade. Coastal and channel erosion, polluted runoff, and sea level rise are all water resources issues that affect these important industries.

Though not as high in value as the above industries, the agricultural industry still plays an important role in the South Coast economy. The top agricultural products in 2005 include: strawberries, assorted nursery products, and citrus.

Land Use Patterns

With over half of the State's population, urbanization and its associated impacts are key challenges to future land use and water resources planning. The mild climate and gentle hillscapes in the South Coast region have encouraged growth since the first great development boom of the late 1880s. Typical land use patterns include urban development in the coastal plains and interior valleys, with open space maintained in the mountains. Nearly 40 percent of the South Coast's land area is urban and suburban use, which has led to fragmentation of wildlife habitats by urban sprawl and freeways. Recent urban development has occurred on the coastal plains, valleys, and hillsides of Ventura, Orange, and San Diego counties and on the remaining undeveloped land in the Inland Empire. Managed wetlands, reservoirs, and riparian corridors provide pockets of open space within the urban grid. Historical agricultural areas are giving way to urbanization. There are numerous Native American reservations in the South Coast region. See Table SC-2 for information on Tribal lands.

Agricultural land uses remain important in the South Coast region. Important agricultural areas are the Oxnard Plain and Santa Clara River and Santa Rosa valleys in Ventura County and several coastal and interior valleys of San Diego County. Other notable locations include the Chino, Perris, and San Jacinto valleys and near the

Table SC-2 Tribal lands with acreage, South Coast Hydrologic Region

Federal Trust Lands	Acres	Tribal owners
Campo Reservation (Splits with CR Region, but mostly in SC)	16,512	Kumeyaay (Diegueño) Indians
La Posta Reservation	3,556	Kumeyaay (Diegueño) Indians
Manzanita Reservation (Splits with CR Region, but mostly in CR)	See CR Region for acres	
Cuyapaipe Reservation (Splits with CR Region, but mostly in CR)	See CR Region for acres	
Santa Ysabel Reservation (Splits with CR Region, but almost entirely in SC Region)	15,526	Diegueño Indians
Los Coyotes Reservation (Splits with CR Region, but mostly in SC Region)	25,050	Cahuilla and Cupeño Indians
Pala Reservation (2 separate locations – one large and one really small a distance away).	11,893	Cupeño and Luiseño
Cabazon Reservation	1,706	Cahuilla Indians of the Cabazon Reservation.
Santa Rosa Reservation (Splits with CR Region, but almost entirely in CR Region)	See CR Region for acres	
Morongo Reservation (Splits with CR Region, but is almost entirely in CR Region except for one small parcel)	See CR Region for acres	
San Manuel Reservation	658	Serrano Indians
Soboba Reservation	5,915	Luiseño Indians
Ramona Reservation	560	Cahuilla Indians
Pechanga Reservation	4,394	Luiseño Indians
Pauma-Yuima Reservation	5,877	Luiseño Indians
La Jolla Reservation	8,541	Luiseño Indians
Reservation Rincon	4,275	Luiseño Indians
San Pasqual Reservation	1,380	Kumeyaay (Diegueño) Indians
Mesa Grande Reservation	1,803	Diegueño Indians
Inaja - Cosmit Reservation	880	Diegueño Indians
Barona Reservation	5,903	Barona Band of Mission Indians
Capitan Grande Reservation	15,753	Today, the Capitan Grande Reservation is owned by Viejas, Barona, and other non-reservation groups.
Reservation Viejas	1,609	Kumeyaay (Diegueño) Indians
Sycuan Reservation	640	Kumeyaay (Diegueño) Indians
Jamul Village	Unknown at this time	

*Data taken from the San Diego State University's online library and information access (http://infodome.sdsu.edu/research/guides/calindians/calinddict.shtml#a)

cities of Irvine, Redlands, and Riverside. Total crop acres in 2005 for the region was 242,000 acres; a decrease from 2000 when 280,000 acres was harvested.

In the major agricultural areas, the emphasis was on growing high market value crops. The Oxnard Plain is still recognized for fresh market vegetables. Citrus and subtropical fruits are produced in the Santa Clara River Valley and the interior valleys of San Diego County. Forage crops are still grown in the Chino, Perris, and San Jacinto Valleys in support of the dairy industry in Chino.

The South Coast's watersheds typically do not resemble their natural state due to urbanization and agricultural practices that have modified waterways and surrounding habitats. Numerous waterways have been impacted by hydromodification and channelization. Many streambeds have been lined with concrete to facilitate flood management, thereby decreasing groundwater recharge. This is a particular problem for those groundwater basins which have historically been over-pumped, such as in the Los Angeles River watershed. Bridges and other structures over channelized streams can slow flow velocity and cause adjacent flood damage, as seen in the Calleguas Creek watershed. Due to intense urbanization and loss of natural habitat, there is a focus on conserving the natural areas that remain within the region.

Concern over effective land use planning for reducing wildfire risk and ensuring rapid response strategies have become more urgent as development continues to move into urban interface areas. Brush fires in San Diego County in October 2003 burned about 265,000 acres (Cal Fire 2003). Not only was the loss to wildlands severe during this nightmare, including devastating nearly all of Cuyamaca Rancho State Park, but more than 5,000 homes and other structures were damaged or completely destroyed. San Diego County burned again in October 2007, losing 347,000 acres and damaging 2,600 structures (Cal Fire 2007). In 2009, a brush fire in the Angeles National Forest in Los Angeles County burned over 160,000 acres and damaged 89 structures. Fires have always been a component of life in California, but the likelihood of fire causing profound damage for local residents has increased with ongoing urbanization. Planners and legislators are increasingly looking to understand and manage the South Coast landscape to reduce such losses.

Regional Water Conditions

The region has developed a diverse mix of local and imported water supply sources, available in differing amounts throughout the South Coast region. The following sections provide an overview of regional water conditions.

Environmental Water

Given the arid nature of the region and the flashy nature of storm events, the native South Coast environment is generally very sensitive to water. Although numerous structures have been built to alter the natural flows of local water bodies, many efforts

are under way to restore these damaged environments, protect existing ones, and develop new ones to replace those that have been lost.

Water supply dedicated to environmental management includes instream flows for fisheries, aquatic vegetation, and water quality protection. Although environmental water use is limited in the South Coast region, local agencies have developed beneficial reuse programs for reclaimed water. Managed wetlands—e.g., Balboa Lake in the Sepulveda Basin area of Los Angeles County, Hemet/San Jacinto Multi-Purpose Constructed Wetlands in Riverside County, San Jacinto Wildlife Area in Riverside County, San Joaquin Marsh along San Diego Creek in Orange County, and Santee Lakes in San Diego—are maintained through discharge of reclaimed water supplies. Discharges from upstream wastewater treatment plants (WWTPs) contribute inflows to many of the region's coastal lagoons and estuaries. Constructed wetlands along the Santa Ana River, including lands behind Prado Dam, have effectively demonstrated the ability to reduce nitrogen levels and recharge the groundwater aquifer. These managed wetlands, fed by Santa Ana River flows, provide for migratory and resident waterfowl and shorebird habitat, wildlife diversity, and public education and recreation opportunities. The source of the wetland flows is assured by the Santa Ana River Stipulated Judgment (overseen by the Santa Ana River Watermaster) which requires minimum average annual flows and guaranteed TDS concentrations within the river.

A 31-mile section of Sespe Creek in the Los Padres National Forest (Ventura County) was designated by USFWS as a Wild and Scenic River in 1992. Unusual geologic formations, gorges, and riparian vegetation provide excellent scenic diversity and recreation opportunities. This stream is considered a rainbow trout fishery and provides critical habitat for the endangered California condor. Sespe Creek and Bear Creek/Bear Valley Dam (impounding Big Bear Lake) are both designated as "wild trout waters" by DFG and are further regulated to maintain appropriate instream habitat conditions (DFG 2008). These South Coast fisheries are limited by diversions and dams that have cut off important spawning areas through diminished flows and poor water quality.

Water Supplies

To meet current and growing demands for water, the South Coast region is leveraging all available water resources: imported water, water transfers, conservation, captured surface water, groundwater, recycled water, and desalination. Given the level of uncertainty about water supply from the Delta and Colorado River, local agencies have emphasized diversification. Local water agencies now utilize a diverse mixture of local and imported sources and water management strategies to adequately meet urban and agricultural demands each year. For example, San Diego is projected to produce approximately 185,000 acre-feet per year of local supplies through water recycling, desalination, groundwater, and surface storage programs by 2030. By 2021, the area will receive an additional 277,000 acre-feet per year due to San Diego County Water Authority-Imperial Irrigation District (SDCWA-IID) water conservation, transfer, and canal-lining programs. This diverse mix of sources provides flexibility in managing resources in wet and dry years.

Imported Water

Water is brought into the South Coast region from three major sources: the Sacramento-San Joaquin Delta, Colorado River, and Owens Valley/Mono Basin. All three are facing water supply cutbacks due to climate change and environmental issues. Although historically imported water served to help the South Coast region grow, it is today relied upon to sustain the existing population and economy. As such, parties in the South Coast region are working closely with other regions, the State, and federal agencies to address the challenges facing these imported supplies. Meanwhile, the South Coast region is working to develop new local supplies to meet the needs of future population and economic growth.

State Water Project

The State Water Project (SWP) is an important source of water for the South Coast region wholesale and retail suppliers. SWP contractors in the region take delivery of and convey the supplies to regional wholesalers and retailers. Contractors in the region are the Metropolitan Water District of Southern California (Metropolitan), Castaic Lake Water Agency (CLWA), San Bernardino Valley Municipal Water District (MWD), Ventura County Watershed Protection District (VCWPD) (formerly Ventura County Flood Control District), San Gorgonio Pass Water Agency (SGPWA), and San Gabriel Valley Municipal Water District. Metropolitan's contract with the California Department of Water Resources (DWR) is for 1.91 million acre-feet annually—about half the total project (see more discussion in Appendix B).

Colorado River System

Another key imported water supply source for the South Coast region is the Colorado River. California water agencies are entitled to 4.4 million acre-feet annually of Colorado River water. Of this amount, 3.85 million acre-feet are assigned in aggregate to agricultural users; 550,000 acre-feet is Metropolitan's annual entitlement. Until a few years ago, Metropolitan routinely had access to 1.2 million acre-feet annually because Arizona and Nevada had not been using their full entitlement and the Colorado River flow was often adequate enough to yield surplus water. Metropolitan delivers the available water via the 242-mile CRA and the regional conveyance system. (See more discussion in Appendix B.)

Owens Valley/Mono Basin

High-quality water from the Mono Basin and Owens Valley is delivered through the Los Angeles Aqueduct (LAA) to the City of Los Angeles. Construction of the original 233-mile aqueduct from the Owens Valley was completed in 1913, with a second aqueduct completed in 1970 to increase capacity. Approximately 480,000 acre-feet per year of water can be delivered to the City of Los Angeles each year; however the amount the aqueducts deliver varies from year to year due to fluctuating precipitation in the Sierra Nevada Mountains and mandatory instream flow requirements.

For more information on Water Supply and Suppliers in the South Coast Region, see Appendix B.

Diversion of water from Mono Lake has been reduced following State Water Board Decision 1631 and exportation of water from the Owens Valley is limited by the Inyo-Los Angeles Long Term Water Agreement (and related MOU) and the Great Basin Air Pollution Control District/City of Los Angeles MOU (to reduce particulate matter air pollution from the Owens Lake bed).

Other Water Transfers

Prior to 1991, water transfers within the South Coast region had been limited to transfers of annual groundwater basin rights (which continue to occur). Recently, municipal population growth and the need for water supply reliability have resulted in the growth of water transfer agreements. Metropolitan participates in multiple water exchange and storage programs, including agreements with Semitropic Water Storage District (WSD), Arvin-Edison WSD, San Bernardino Valley MWD, Kern-Delta Water District, Mojave Water District, and the Governor's Water Bank. CLWA has executed long-term transfer agreements with the Buena Vista and Rosedale-Rio Bravo WSDs (see Section, Relationship with Other Regions).

In 1998, SDCWA entered into a transfer agreement with Imperial Irrigation District (IID) to purchase conserved agricultural water. Through the agreement, SDCWA received 50,000 acre-feet in 2007. This quantity will increase in 10,000 acre-feet increments annually up to 200,000 acre-feet per year in 2021 and then remain fixed for the duration of the 75-year agreement. Metropolitan conveys the transfer water to SDCWA via an exchange agreement.

The Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003 (QSA) has resulted in the movement of supplies between the Colorado River and South Coast regions.

Local Surface Water

Local surface capture plays an important water resource role in the South Coast region. More than 75 impound structures are used to capture local runoff for direct use or groundwater recharge, operational or emergency storage for imported supplies, or flood protection. While precipitation contributes most of the annual volume of streamflow to the region's waterways, urban runoff, wastewater discharges, agricultural tailwater, and surfacing groundwater are the prime sources of surface flow during non-storm periods. The South Coast has experienced a trend of increasing dry weather flows during the past 30 years as the region has developed, due to increased imported water use and associated urban runoff. (See more discussion in Appendix B.)

Groundwater

During the first half of the 20th century, groundwater was important factor in the expansion of the urban and agricultural sectors in the South Coast region. Today,

it remains important for the Santa Clara, Metropolitan Los Angeles and Santa Ana planning areas, but only a small source for San Diego. Court adjudications, recharge operations, and other management programs are helping to maintain the supplies available from many of the region's groundwater basins. Since the 1950s, conjunctive management and groundwater storage has been utilized to increase the reliability of supplies, particularly during droughts. Using the region's other water resources, groundwater basins are being recharged through spreading basins and injection wells. During water shortages of the imported supplies, more groundwater would be extracted to make up the difference. Water quality issues have impacted the reliability of supplies from some basins. However, major efforts are underway to address the problems and increase supplies for these basins. (See more discussion in Appendix B.)

Recycled Water

In the South Coast region, recycled water is becoming increasingly valuable given its reliability and cost-effectiveness as compared to tapping other water supplies. In addition to extending conveyance systems to deliver recycled water for non-potable uses (i.e., purple pipe), the region is leading implementation of groundwater recharge and reservoir augmentation with recycled water (i.e., indirect potable reuse, IPR). (See more discussion in Appendix B.)

Desalination

Desalination is being implemented in the South Coast region not only to help meet local water supply needs, but also to manage salinity levels and associated impacts on the environment. In the Santa Clara and Santa Ana planning areas, desalination is focused on brackish groundwater treatment. Large-scale seawater desalination facilities are moving through the approval process in the Santa Ana Planning Area. A large-scale seawater desalination facility has recently been approved in the San Diego Planning Area, and seawater desalination is being pursued in earnest in the Metropolitan Los Angeles Planning Area. (See more discussion in Appendix B.)

Urban Water Conservation

Water conservation is a fundamental component of the South Coast region's water management planning. Water agencies in the South Coast have been aggressively implementing water conservation since the 1990s. Many local water agencies are signatories to the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding (MOU) for urban water conservation and also have adopted Urban Water Management Plans to ensure water supply reliability during normal, dry, and multiple dry years. These agencies implement the best management practices (BMPs) and demand management measures contained in those documents. The backbone of Metropolitan's conservation program is the Conservation Credits Program (CCP), initiated in 1988, that contributes $195 per acre-foot of water conserved to assist member agencies in pursuing urban BMPs and other demand management

opportunities. All of the region's water suppliers have water conservation programs for their customers which feature residential and commercial water saving tips, rebates for water efficient purchases (e.g., low-flow toilets, high-efficiency clothes washers, weather-based irrigation controllers), and tools for implementing landscape/garden improvements. Local agencies are also developing water conservation master plans and conservation rate structures as well as working closely through Integrated Regional Water Management (IRWM) planning efforts to develop coordinated water efficiency programs. (See more discussion in Appendix B.)

Water Uses

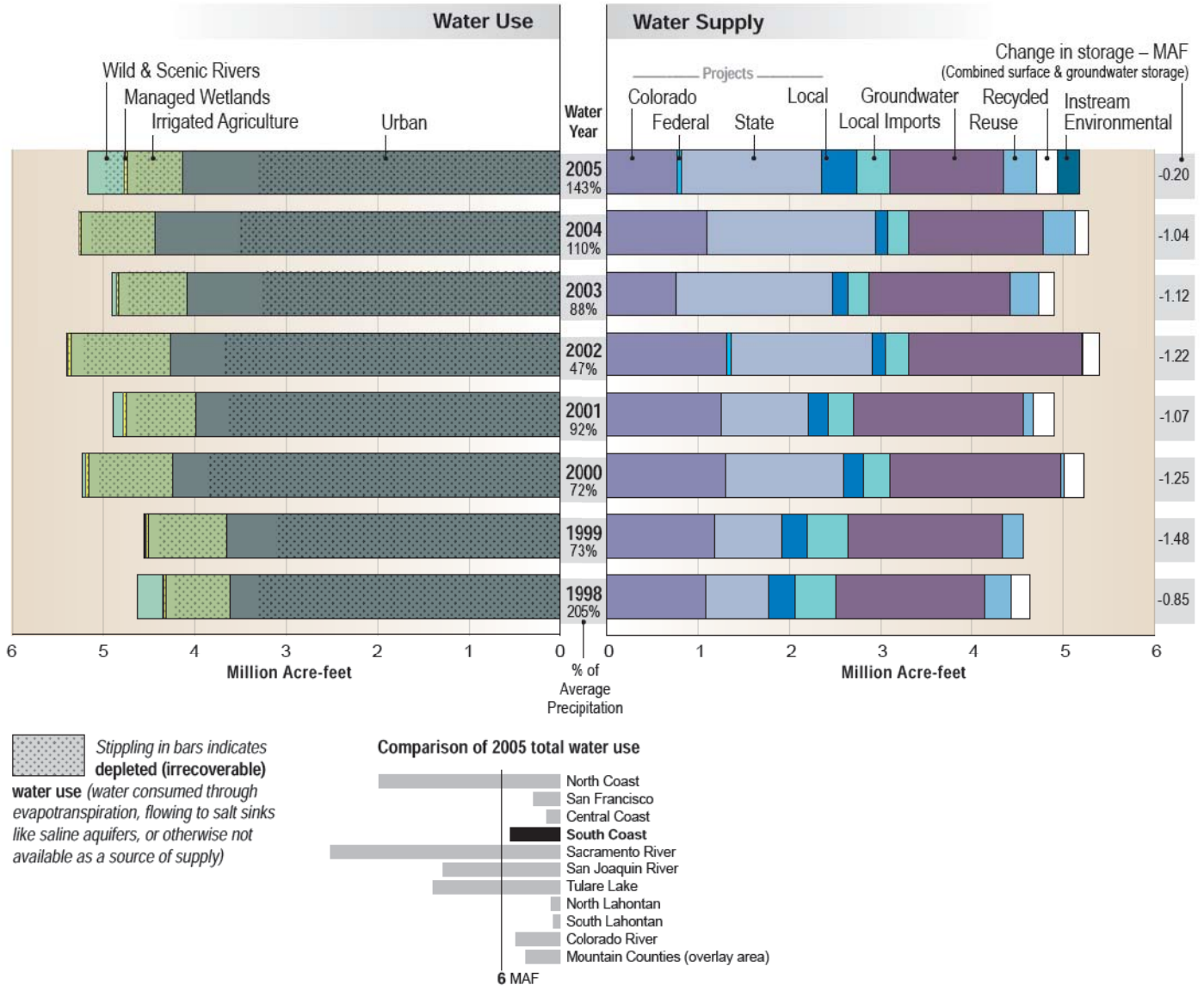
Urban Water Use

The South Coast Hydrologic Region is the most populous and urbanized region in California. In some portions of the region, water users consume more water than is locally available, which has resulted in an overdraft of groundwater resources and increasing dependence on imported water supplies. The distribution of water uses, however, varies dramatically across the South Coast's planning areas. As a result of recent droughts, South Coast water users have generally become more water efficient. Municipal water agencies are engaged in aggressive water conservation and efficiency programs to reduce per capita water demand. As a result of changes in plumbing codes, energy and water efficiency innovations in appliances, and trends toward more water efficient landscaping practices, urban water demand has become more efficient. (Read about the region's urban water conservation above under Water Supply and in Appendix B.)

Agricultural Water Use

Despite vast urbanization within the South Coast, about 240,000 acres of irrigated crops were harvested in 2005. Agricultural activities accounted for approximately 12 percent of the overall use in the region. In the main agricultural areas on the South Coast, growers are very conscious about the amount of water needed to produce a marketable crop and strive to be as efficient as possible. The largest area of concentrated row crops (35,000 acres of harvest produce) is in Ventura County. Although sprinkler and furrow irrigation is still used on several truck crops (celery, cabbage and broccoli), drip irrigation is used almost exclusively for other kinds of vegetable crops (lettuce, peppers, and tomatoes). In recent years, improvements in surface drip technology have permitted growers to use drip tape for consecutive years without a decrease in effectiveness. Additionally, many of the large-scale citrus and avocado operations in Ventura and San Diego counties are irrigated with micro-sprinkler systems. Improved technology has allowed growers to more accurately distribute water to the individual trees; pressure compensating valves and emitters have enabled growers to irrigate on steep slopes with better precision. Maximizing agricultural irrigation systems lowers the growers' irrigation demands.

Figure SC-4 South Coast Hydrologic Region water balance summary, 1998-2005



Water Balance Summary

Figure SC-4 summarizes the total developed water supplies and distribution of the dedicated water uses within this hydrologic region for the eight years from 1998 through 2005. As indicated by the variation in the horizontal bars for wet (1998) and dry (2002) years, the distribution of the dedicated supply sources (right side of Figure SC-4) can change significantly based on the wetness or dryness of the water year. The more detailed numerical information about the developed water supplies and uses is presented in Volume 5 Technical Guide, which provides a breakdown of the components of developed supplies used for agricultural, urban, and environmental purposes and Water Portfolio data.

For the South Coast region, urban water uses are the largest component of the developed water supply, while agricultural water use is a smaller but significant portion of the total. There is very little dedicated water required for instream flows within this region. The water supply portion of Figure SC-4 also indicates that imported water supplies and groundwater are the major components of the water supply for this region, with minor supplies from local surface waters and recycled water.

Table SC-3 presents information about the total water supply available to this region for the eight years from 1998 through 2005, and the estimated distribution of these water supplies to all uses. The annual change in the region's surface and groundwater storage is also estimated, as part of the balance between supplies and uses. In wetter water years, water will usually be added to storage, while during drier water years storage volumes may be reduced. Of the total water supply to the region, more than half is either used by native vegetation; evaporates to the atmosphere; provides some of the water for agricultural crops and managed wetlands (effective precipitation); or flows to other states, the Pacific Ocean, and salt sinks like saline groundwater aquifers. The remaining portion, identified as consumptive use of applied water, is distributed among urban and agricultural uses and for diversions to managed wetlands. For some of the data values presented in Table SC-3, the numerical values were developed by estimation techniques, because actual measured data are not available for all categories of water supply and use.

Water Quality

Water quality is a key issue in the South Coast region. Population and economic growth not only affect water demand, but add contamination challenges from increases in wastewater and industrial discharges, urban runoff, agricultural chemical usage, livestock operations, and seawater intrusion. Urban and agricultural runoff can contribute to local surface water sediment from disturbed areas; oil, grease, and toxic chemicals from automobiles; nutrients and pesticides from turf and crop management; viruses and bacteria from failing septic systems and animal waste; road salts; and heavy metals. Three areas that are receiving intense interest are nonpoint source (NPS) pollution control, salinity management, and emerging contaminants.

Three Regional Water Quality Control Boards (Regional Water Boards) have jurisdiction in the South Coast: Los Angeles (Region 4), Santa Ana (Region 8), and San Diego (Region 9). Each Regional Water Board identifies impaired water bodies, establishes priorities for the protection of water quality, issues waste discharge requirements, and takes appropriate enforcement actions within in its jurisdiction (Figure SC-5). Specific water quality issues within the South Coast include beach closures, contaminated sediments, agricultural discharges, salinity management, and port and harbor discharges. Outside the region, high salinity levels and perchlorate contamination contribute to degraded Colorado River supplies, while seawater intrusion and agricultural drainage threaten SWP supplies.

Table SC-3 South Coast Hydrologic Region water balance for 1998-2005 (thousand acre-feet)

South Coast	Water Year (Percent of Normal Precipitation)							
	1998 (205%)	1999 (73%)	2000 (72%)	2001 (92%)	2002 (47%)	2003 (88%)	2004 (110%)	2005 (143%)
Water Entering the Region								
Precipitation*	20,873	7,803	7,522	9,327	5,034	9,468	11,807	15,344
Inflow from Oregon/Mexico	0	0	0	0	0	0	0	0
Inflow from Colorado River	1,081	1,176	1,296	1,250	1,313	760	1,100	773
Imports from Other Regions	1,286	2,361	1,695	1,255	3,093	2,740	3,137	2,331
Total	**23,240**	**11,340**	**10,513**	**11,832**	**9,440**	**12,968**	**16,044**	**18,448**
Water Leaving the Region								
Consumptive Use of Applied Water ** (Ag, M&I, Wetlands)	1,468	1,585	1,819	1,628	1,887	1,651	1,739	1,515
Outflow to Oregon/Nevada/Mexico	0	0	0	0	0	0	0	0
Exports to Other Regions	0	0	0	0	0	0	0	0
Statutory Required Outflow to Salt Sink	0	0	0	0	0	0	0	202
Additional Outflow to Salt Sink	2,110	2,153	2,498	2,325	2,617	2,101	2,347	2,128
Evaporation, Evapotranspiration of Native Vegetation, Groundwater Subsurface Outflows, Natural and Incidental Runoff, Ag Effective Precipitation & Other Outflows	20,514	9,086	7,441	8,947	6,160	10,333	12,994	14,803
Total	**24,092**	**12,823**	**11,758**	**12,900**	**10,664**	**14,085**	**17,080**	**18,648**
Storage Changes in the Region [+] Water added to storage [–] Water removed from storage								
Change in Surface Reservoir Storage	372	-237	128	332	53	-81	-102	509
Change in Groundwater Storage ***	-1,224	-1,246	-1,373	-1,400	-1,276	-1,035	-934	-709
Total	**-852**	**-1,483**	**-1,245**	**-1,068**	**-1,223**	**-1,116**	**-1,036**	**-200**
Applied Water ** (compare with Consumptive Use).	4,184	4,386	5,041	4,633	5,173	4,676	5,068	4,564

* The percent precipitation is based upon a running 30 year average of precipitation for the region and discrepancies can occur between information calculated for Update 2009 and earlier published data.

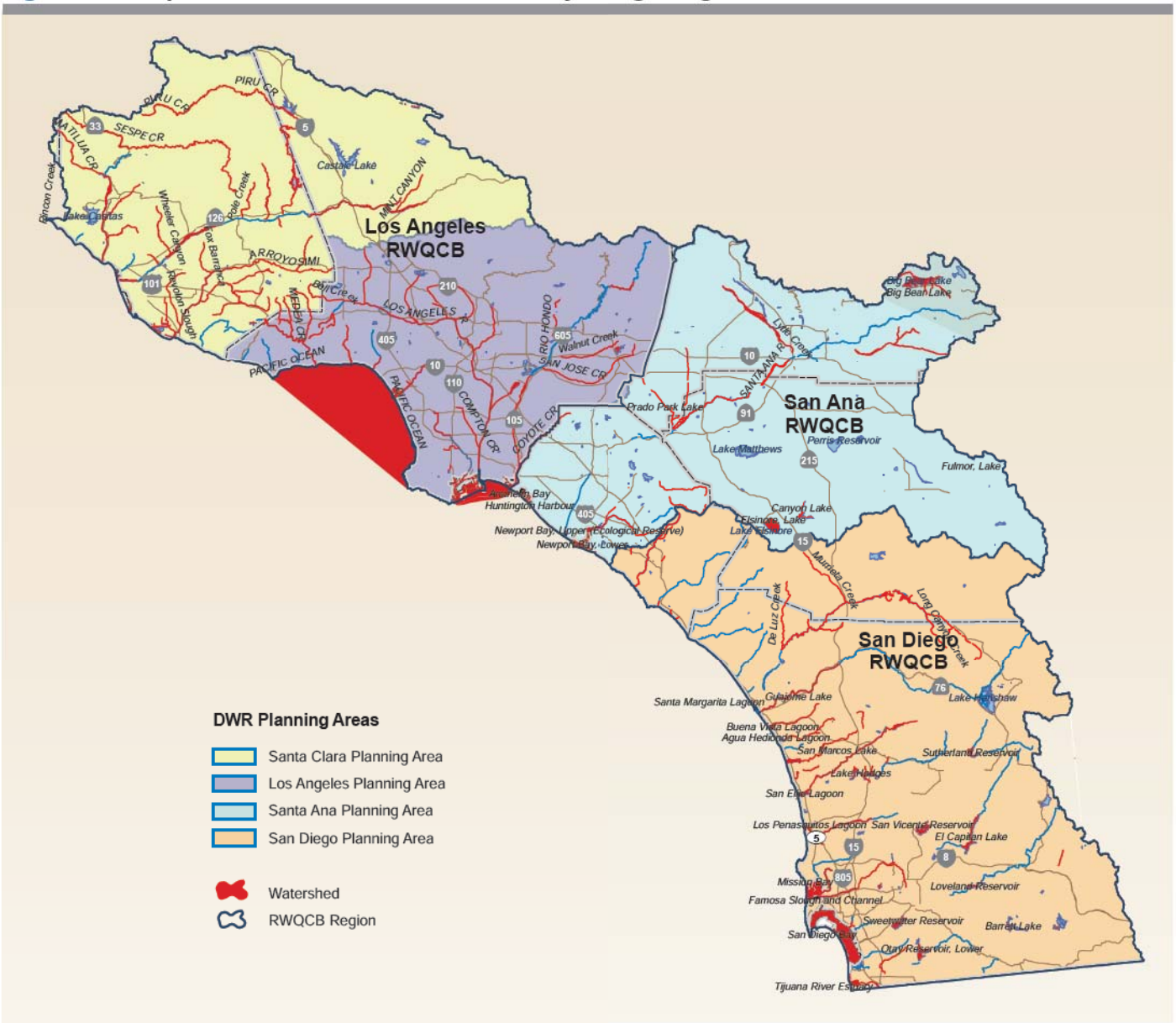
** Consumptive use is the amount of applied water used and no longer available as a source of supply. Applied water is greater than consumptive use because it includes consumptive use, reuse, and outflows

*** Change in Groundwater Storage is based upon best available information. Basins in the north part of the state (North Coast, San Francisco, Sacramento River and North Lahontan regions and parts of Central Coast and San Joaquin River Regions) were modeled - spring 1997 to spring 1998 for the 1998 water year and spring 1999 to spring 2000 for the 2000 water year. All other regions and years were calculated using the following equation:

GW change in storage = intentional recharge + deep percolation of applied water + conveyance deep percolation and seepage - withdrawals

This equation does not include the unknown factors such as natural recharge and subsurface inflow and outflow.

Figure SC-5 Impaired water bodies in South Coast Hydrologic Region



Nonpoint Source Pollution Control

All NPS pollution is currently regulated through either the National Pollutant Discharge Elimination System (NPDES) Permitting Program or the Coastal Non-point Pollution Control Program. All three Regional Water Boards issue municipal, industrial, and construction NPDES permits with the goal of reducing or eliminating the discharge of pollutants into the storm water conveyance system. The coastal program requires the US Environmental Protection Agency and National Oceanic and Atmospheric Administration to develop and implement enforceable BMPs to control non-point source pollution in coastal waters. Further, the Los Angeles and San Diego Regional Water Boards have adopted conditional waivers for discharges from irrigated agricultural lands, which require farmers to measure and control discharges from their property.

South Coast agencies have recently begun to implement Low Impact Development (LID) as a way of improving water quality through sustainable urban runoff management. LID practices include: bioretention and rain gardens, rooftop gardens, vegetated swales and buffers, roof disconnection, rain barrels and cisterns, permeable pavers, soil amendments, impervious surface reduction, and pollution prevention (SWRCB 2008). The Los Angeles and San Diego Regional Water Boards have both incorporated LID language into Standard Urban Storm Water Mitigation Plan requirements for municipal NPDES permits.

Salinity Management

Surface and groundwater salinity is an ongoing challenge for South Coast water supply agencies. Higher levels of treatment are needed following long-range import of water supplies, as TDS levels are increased during conveyance. Salinity sources in local supplies include concentration from agricultural irrigation, seawater intrusion, discharge of treated wastewater, and recycled water. Metropolitan depends on blending the higher salinity CRA supply at Parker Dam with the lower salinity SWP supply to maintain 500 milligrams per liter (mg/L) TDS or lower. The City of San Diego 2006 Water Quality Report shows average TDS for three water treatment plants using blended supplies ranging from 442 to 465 parts per million (ppm). Further, seawater intrusion and agricultural drainage threatens to increase the salinity of SWP supplies. Reduced surface water quality would require additional or upgraded demineralization facilities. Increased salinity also reduces the life of plumbing fixtures and consequently increases replacement costs to customers.

Groundwater quality has also been degraded by a long history of groundwater overdrafting and subsequent seawater intrusion. Orange County Water District (OCWD), Water Replenishment District of Southern California (WRD), and Los Angeles County Department of Public Works (LACDPW) operate groundwater injection programs to form hydraulic barriers that protect aquifers from seawater intrusion. Brackish groundwater treatment occurs throughout the Santa Clara and Santa Ana planning areas. Various local agencies have developed salinity and nutrient management plans to reduce salt loading. For example, the Chino Basin Watermaster developed an Optimum Basin Management Plan (1999) to develop the maximum yield of the basin while protecting water quality. Further development of IPR/groundwater recharge programs within the South Coast may exacerbate groundwater salinity and require additional technological advances in desalination.

Potential Contaminants

Chemical and microbial constituents that have not historically been considered as contaminants are increasingly present in the environment due to municipal, agricultural, and industrial wastewater sources and pathways. Established and emerging contaminants of concern to the region's drinking water supplies include pharmaceuticals and personal care products; disinfection byproducts; those associated with the production of rocket fuel, such as perchlorate and nitrosodimethylamine; those that occur naturally, such

as arsenic; those associated with industrial processes, such as hexavalent chromium; and methyl tertiary butyl ether (MTBE), a gasoline additive. WWTPs are not currently designed to remove these emerging contaminants. However, Metropolitan, the National Water Resources Institute, and OCWD are studying the occurrence of emerging constituents in the Santa Ana River, SWP, and Colorado River water. Also, SAWPA is facilitating a task force of watershed stakeholders that is investigating emerging constituents as part of a voluntary cooperative agreement with the Santa Ana Regional Water Quality Control Board.

Planning Area Impairments

Water quality issues within the Santa Clara and Metropolitan Los Angeles planning areas (Los Angeles Regional Water Board) stem from a range of sources, including industrial and municipal operations, flow diversion, channelization, introduction of non-native species, sand and gravel operations, natural oil seeps, dredging, spills from ships, transient camps, and illegal dumping. Over time, these practices have resulted in the bioaccumulation of toxic compounds in fish and other aquatic life, instream toxicity, eutrophication, beach closures, and a number of Clean Water Act 303(d) listings. Water bodies within this planning area have been listed for metals, pesticides, nitrates, trash, salinity, and pH. The Regional Water Board is developing Total Maximum Daily Loads (TMDLs) for nutrients, pathogens, trash, toxic organic compounds, and metals (Los Angeles Regional Water Board 1994; 2007).

Key issues within the Santa Ana Planning Area (Santa Ana Regional Water Board) include: nitrogen/TDS due to flow diversion; nitrogen/TDS associated with past agricultural activities and dairies in the Chino Basin; and pathogen issues from urbanization impacting river and coastal beaches, and past contamination of groundwater basins from perchlorate which is related to rocket fuel disposal and fertilizer use. Water bodies within this planning area typically have nutrient issues, including organic enrichment, low dissolved oxygen, and algal blooms. These are particular problems in Big Bear Lake and Lake Elsinore. Water quality issues also include pathogens, metals, and toxic organic compounds in the lower watershed due to urbanization and agricultural activities. TMDLs have been developed throughout the Santa Ana River and San Jacinto River watersheds for nutrients and pathogens. Along the Newport coast, TMDLs are in place for metals, nutrients, pathogens, pesticides/ priority organics, and siltation (Santa Ana Regional Water Board 1994; 2001).

The Chino Basin maintains a large concentration of dairy operations along with livestock. Runoff from the dairies contributes nitrate, salts, and microorganisms to both surface water and groundwater. Since 1972, the Santa Ana Regional Water Board has issued waste discharge requirements to the dairies in this basin. Groundwater quality in this basin is integrally related to the surface water quality downstream in the Santa Ana River, which in turn serves as a source for groundwater recharge in Orange County.

The San Diego Planning Area (San Diego Regional Water Board) is primarily concerned with the quality of coastal water bodies. Agricultural operations, urban runoff, marinas

and boating, and hydromodification all pose a threat to coastal water quality. Several shorelines within this region are Clean Water Act 303(d) listed for pathogens, and a number of estuaries and lagoons are listed for nutrients, sediments, pathogens, and metals. TMDLs are under development for several lagoons for nutrients/eutrophication, sedimentation/siltation, TDS, and bacteria. A shoreline TMDL is being created for indicator bacteria as well. The bays and harbors in the region are Clean Water Act 303(d) listed for sediment toxicity, pathogens, pesticides, benthic community effects, copper, lead, and toxic organics. As with the rest of the South Coast, the lakes and reservoirs within the region are affected by nutrients, metals and pH, and rivers are streams are commonly listed for nutrients, pathogens, metals, pesticides, toxic organics, and salinity (San Diego Regional Water Board 1994; 2002).

The Tijuana River watershed poses a unique challenge water quality control as the upper watershed lies within Mexico. Urban runoff and untreated wastewater discharges from Mexico have created significant water quality impacts within the lower watershed. The river and its estuary have issues with nutrients, debris, bacteria, low dissolved oxygen, synthetic organics, pesticides, and metals. The Tijuana River Bi-national Vision is a project meant to identify these water quality issues and define ways to bring the watershed to an ideal state.

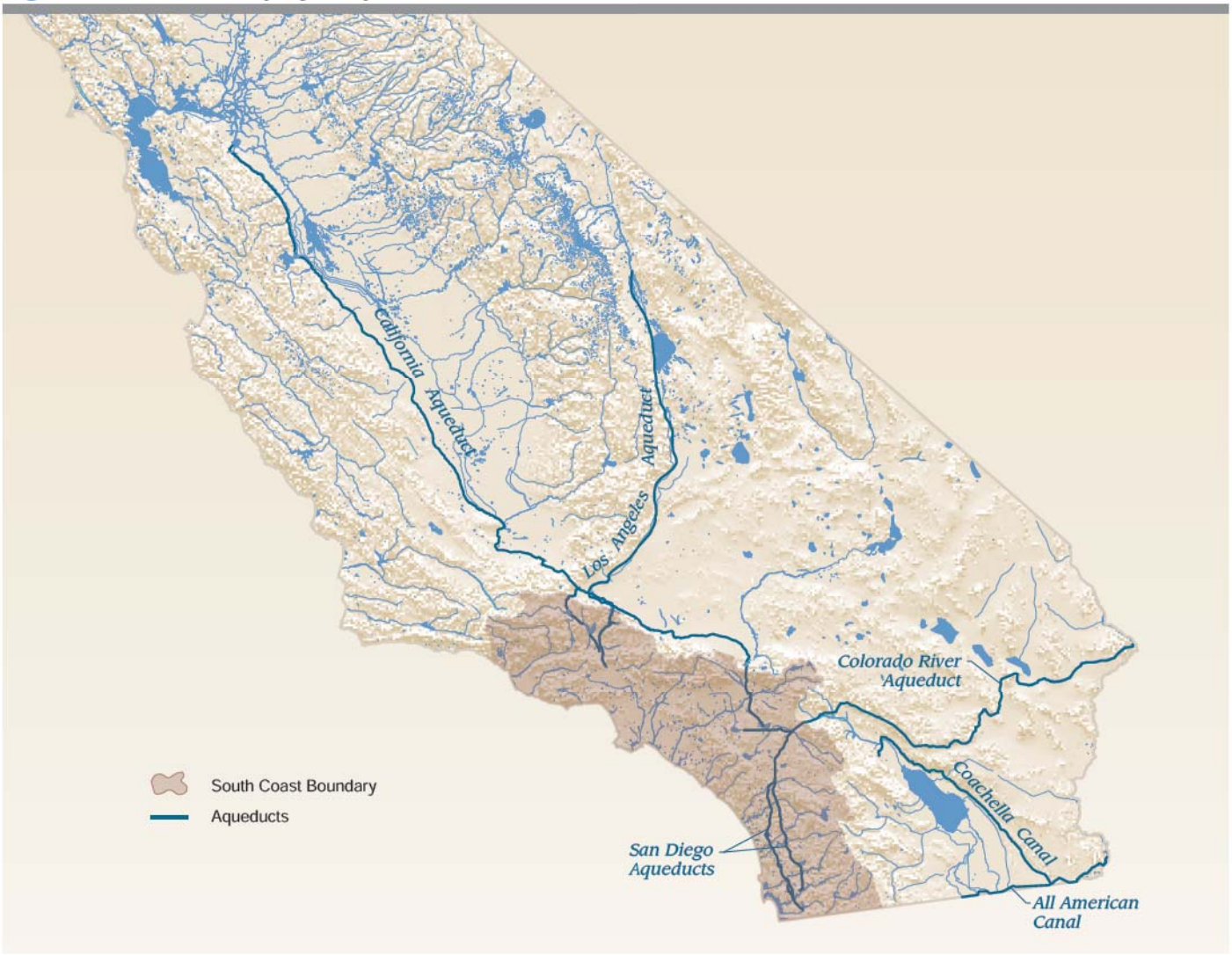
Project Operations

The South Coast region maintains one of the most far-reaching systems of water management in the world. This includes facilities to convey imported water to the region; capture, store, and treat water supplies within the region; and deliver water throughout the region. The following paragraphs describe major water supply infrastructure that deliver imported water to the South Coast region (Figure SC-6). Protection of this infrastructure from earthquakes and other major catastrophes is an essential component of water management.

The California Aqueduct is 444 miles long, owned and operated by DWR, and carries SWP supplies to water agencies throughout California. The aqueduct begins at the Delta and flows by gravity south through the Central Valley to the Edmonston Pumping Plant, where it is pumped 1,926 feet over the Tehachapi Mountains. Once it has crossed the Tehachapis, the aqueduct divides into two branches—the West and the East. The East Branch feeds Lake Palmdale, Lake Perris, and the San Gorgonio Pass area, and the West Branch heads toward Pyramid Lake and Castaic Lake in the Angeles National Forest to supply the western Los Angeles basin. The SWP consists of pumping and power plants (6.5 billion KWh generated annually); 21 reservoirs (5.8 million acre-feet capacity); storage tanks; and canals, tunnels, and pipelines (DWR 2008b).

The CRA is 242 miles long, owned and operated by Metropolitan, and conveys Colorado River water to Southern California. The CRA diverts water from the Colorado River at Lake Havasu on the California-Arizona border and conveys it west across the Mojave and Colorado deserts to Lake Mathews in western Riverside County. The CRA

Figure SC-6 Statewide project operations



was constructed between 1933 and 1941 to ensure a steady supply of drinking water to Los Angeles. The aqueduct consists of 2 reservoirs, 5 pumping plants, 63 miles of canals, 92 miles of tunnels, and 84 miles of buried conduit and siphons.

The Los Angeles Aqueducts comprise two aqueducts. The first LAA (or the Owens Valley aqueduct) was completed 1913 and the second LAA was completed 1970. The first LAA was designed to deliver water from the Owens River near Independence to the City of Los Angeles. The second LAA, which added transport capacity in order to exhaust the city's water rights from the Mono Basin, starts at the Haiwee Reservoir just south of Owens Lake. Running roughly parallel to the first aqueduct, it carries water 137 miles to the City of Los Angeles.

The San Diego Aqueducts, with two branch lines, make up the backbone of the SDCWA system. The five pipelines in the two aqueducts have a combined capacity of 826 cubic

feet per second (cfs). The first aqueduct (Pipelines 1 and 2) extends 70 miles from the CRA near San Jacinto to San Vicente Reservoir. Constructed by the Navy Department and US Bureau of Reclamation (USBR) from 1945 to 1954, the two pipelines share common tunnels and inverted siphons. The 94-mile second aqueduct (Pipelines 3 and 4) were constructed from 1957 to 1979 and are operated separately. Pipeline 3 extends from the CRA to Lower Otay Reservoir, and Pipeline 4 terminates at San Diego's Alvarado Treatment Plant near Lake Murray. Metropolitan owns and operates the northern portions of the pipelines; the delivery point to SDCWA is located six miles south of the San Diego-Riverside county line (USBR 2008a).

Water Governance

Water governance is undertaken by various federal and State agencies, the courts, and sanctioned regional organizations to manage critical imported water and groundwater supplies, as well as coordinate flood management. As described in this report, there are hundreds of water supply agencies within the South Coast region. In addition, regional partnerships have been established by South Coast agencies to further collaborate on strategic water resources planning and implementation.

DWR administers long-term imported water supply contracts with 29 agencies for SWP supplies. In return for State financing, operation, and maintenance of SWP facilities, the agencies contractually agree to repay all associated capital and operating costs. The Colorado River is managed and operated by USBR under numerous compacts, federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River" (Table SC-4). This collection of documents apportions the water and regulates the use and management of the Colorado River among the seven basin states and Mexico. LADWP owns and operates the LAAs for conveyance of imported water from the Owens Valley to the City of Los Angeles. Metropolitan, the largest SWP contractor and primary South Coast wholesaler, delivers an average of 1.4 million acre-feet or more of SWP and CRA supplies (depending on the availability of surplus water) to its 26 cities, water districts, and a county authority. In fiscal year 2007-2008, SDCWA, the largest of Metropolitan's members, purchased about 593,500 acre-feet, or about 25 percent of Metropolitan's deliveries.

Groundwater adjudication limits the amount of groundwater that can be extracted by all parties based on a court-determined safe yield of the basin. A watermaster is then appointed by the court to administer the judgment. There are 13 court adjudications for groundwater basins in the South Coast, including Central Basin, Chino Basin, Cucamonga Basin, Goleta Basin, Main San Gabriel Basin, Puente Basin, Raymond Basin, San Bernardino Basin Area, Santa Margarita River watershed, Santa Paula Basin, Six Basins, Upper Los Angeles River, and the West Coast Basin.

Three Regional Water Boards manage water quality for the region by setting standards, issuing waste discharge requirements, determining compliance with those requirements, and taking appropriate enforcement actions. Each Regional Water Board

Table SC-4 Key elements of the Law of the Colorado River

Document	Date	Main Purpose
Colorado River Compact	1922	The Upper and Lower Basin are each provided a basic apportionment of 7.5 MAF annually of consumptive use. The Lower Basin is given the right to increase its consumptive use by an additional 1.0 MAF annually.
Boulder Canyon Project Act	1928	Authorized USBR to construct Hoover Dam and the All-American Canal (including the Coachella Canal), and gave congressional consent to the Colorado River Compact. Apportioned the Lower Basin's 7.5 MAF among the states of Arizona (2.8 MAF), California (4.4 MAF), and Nevada (0.3 MAF). Provided that all users of Colorado River water stored in Lake Mead must enter into a contract with USBR for use of the water.
California Limitation Act	1929	Confirmed California's share of the 7.5 MAF Lower Basin allocation to 4.4 MAF annually, plus no more than half of any surplus waters.
California Seven-Party Agreement	1931	An agreement among seven California water agencies/districts to recommend to the Secretary of Interior how to divide use of California's apportionment among the California water users.
US-Mexican Water Treaty	1944	Apportions Mexico a supply of 1.5 MAF annually of Colorado River water, except under surplus or extraordinary drought conditions.
US Supreme Court Decree in Arizona v. California, et al.	1964, supplemented 1979	Rejected California's argument that Arizona's use of water from the Gila River, a Colorado River tributary, constituted use of its Colorado River apportionment. Ruled that Lower Basin states have a right to appropriate and use tributary flows before the tributary co-mingles with the Colorado River. Mandated the preparation of annual reports documenting the uses of water in the three Lower Basin states. Quantifies tribal water rights for specified tribes, including 131,400 afy for diversion in California. Quantified Colorado River mainstream present perfected rights in the Lower Basin states.
Colorado River Basin Project Act	1968	Authorized construction of the Central Arizona Project. Requires Secretary of the Interior to prepare long-range operating criteria for major Colorado River reservoirs.
Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs	1970, amended 2005	Provided for the coordinated operation of reservoirs in the Upper and Lower Basins and set conditions for water releases from Lake Powell and Lake Mead.
Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003	2003	Complex package of agreements that, in addition to many other important issues, further quantifies priorities established in the 1931 California Seven-Party Agreement and enables specified water transfers (such as the water conserved through lining of the All-American and Coachella canals to SDCWA) in California.

Source: Adapted from USBR 2008c

identifies impaired water bodies and establishes priorities for the protection of surface water quality.

Regional planning has been advanced by IRWM introduced by DWR and the State Water Board. Regional planning efforts bring together water supply, wastewater, flood control, and environmental stakeholders to identify water management challenges, reduce conflicts, and develop the region's diversified water management portfolios.

Flood Management

Flood Hazards

Flooding in the South Coast region is predominately from winter storms. Precipitation over short periods can produce large amounts of water in the steep upper watersheds, often leading to very sudden and severe flooding of developed lowland areas. Debris flows are also a common occurrence during the winter months. Seasonal fires denude the watersheds of their vegetation, and can leave steep terrain vulnerable to winter storms. Thunderstorms are infrequent in the region and typically only occur at lower elevations during the winter months. Very little snow makes its way into this region and therefore has a marginal impact on flood events.

Representative hazards currently facing the region are listed below (for specific instances, see Challenges).

- Some existing culverts and channels do not have sufficient capacity to carry flow resulting from the event having 1 percent probability of occurrence in any year.
- Flood infrastructure is aging, leading to deterioration and costly maintenance.
- Population growth and the ensuing development increase the area of impervious surface without sufficient mitigation, increasing peak runoff.
- Development occurs in the floodplain of the 1 percent event without sufficient mitigation, causing increased flood damage risk.
- Development has resulted in poorly placed, flood-vulnerable structures.
- Unmanaged vegetation has reduced flood flow capacity at some locations.
- Clogged rivers, channels, and conveyance structures exacerbate flood risk.
- Existing properties are vulnerable to uncontrolled hillside sheet flow.
- Reservoir siltation has reduced flood storage capacity.
- Some debris basins do not have adequate capacity to capture the anticipated mudflows.
- Some dams do not meet current State seismic, spillway or other structural requirements.
- Wildfires may denude steep slopes, which are then vulnerable to increased runoff and debris flow during ensuing storms.

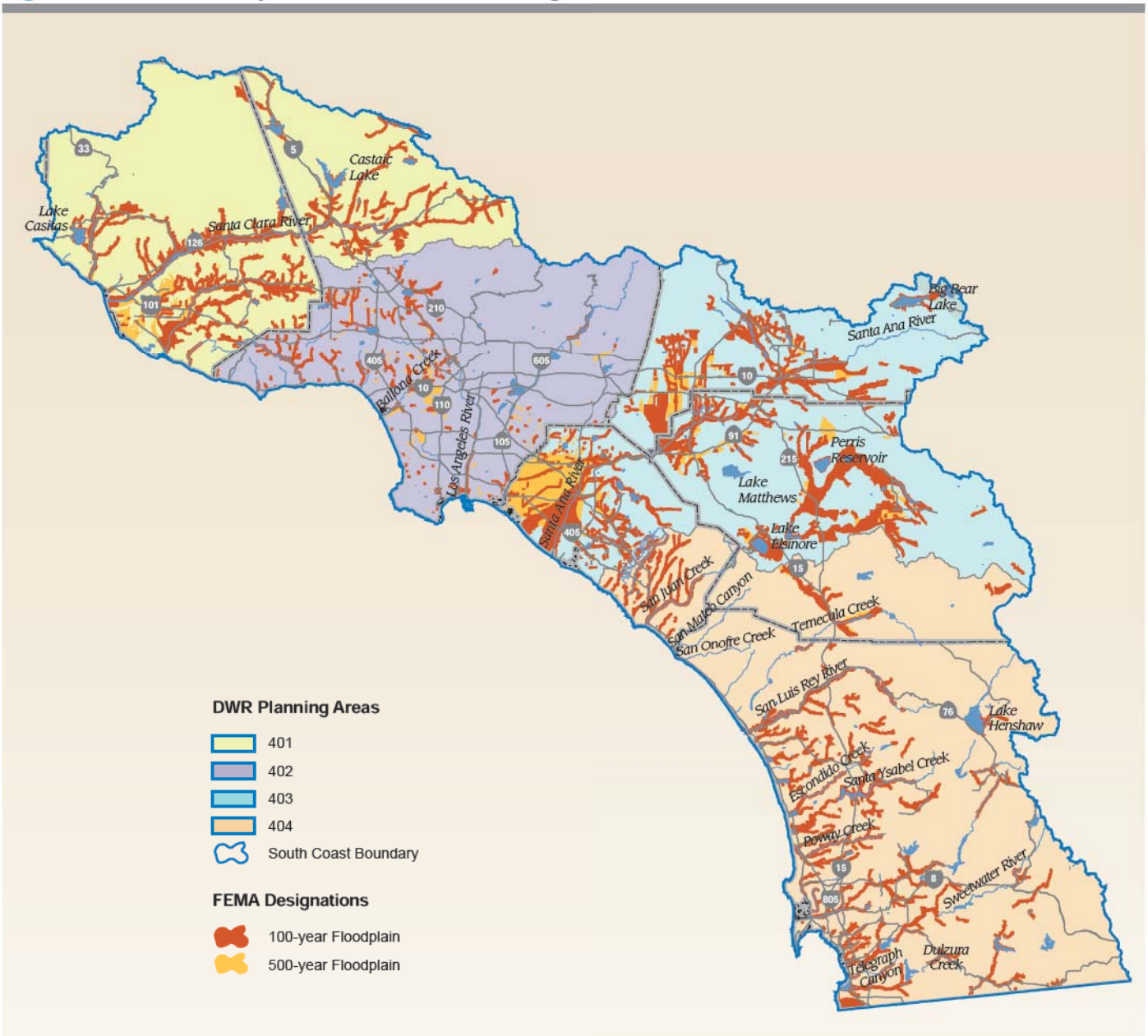
Figure SC-7 illustrates the 100- and 500-year floodplains identified by the Federal Emergency Management Agency (FEMA).

Historic Floods

The South Coast region has experienced many floods over the past 200 years. Significant floods occurred in 1810, 1861-62, 1884, 1914, 1916, 1925, 1928, 1938, 1969, 1978, 1980, and 1992.

The highest storm discharges on record have occurred on the Los Angeles River at Long Beach (128,700 cfs), the Santa Clara River at Montalvo (165,000 cfs), the Santa Ana River at Prado Dam (100,000 cfs), the San Diego River at Fashion Valley (75,000 cfs), and Sespe Creek near Fillmore (85,300 cfs).

Figure SC-7 FEMA floodplains in the South Coast region



For more information on these floods see Appendix A, Flood Management. Flood records for selected flood-producing streams are listed in Appendix A in Table SCA-1, Record floods for selected streams.

Flood Governance

Flood management is a cooperative effort in which federal, tribal, state, and local governments all play significant parts. The principal participants are listed in Box SC-3 Flood Management Agencies. For more information on the agencies' roles, see Table SCA-2, Flood management participants, in Appendix A.

Box SC-3 Flood Management Agencies

Federal

- Federal Emergency Management Agency
- National Weather Service
- Natural Resources Conservation Service
- US Geological Survey
- US Army Corps of Engineers

Tribal

- Tribal governments of the region

State

- California Conservation Corps
- California Emergency Management Agency
- Department of Corrections
- Department of Forestry and Fire Protection
- Department of Water Resources

Local

- Los Angeles County Department of Public Works—Watershed Management Division
- Los Angeles County Flood Control District
- Orange County Flood Control District
- Riverside County Flood Control and Water Conservation District
- San Bernardino County Flood Control District
- San Diego County Flood Control District
- Ventura County Watershed Protection District
- County and city emergency services units
- County and city planning departments
- County and city building departments
- Local flood maintenance organizations
- Local conservation corps
- Local emergency response agencies
- Local initial responders to emergencies

Flood Risk Management

Flood risk management includes a wide variety of projects and programs, which may be grouped as Structural Approaches (constructed facilities, coordination and reservoir operations, maintenance), Land Use Management (regulation, flood insurance), and Disaster Preparedness, Response, and Recovery (information and education, event management).

Structural Approaches

Constructed Facilities. The urban development that supports the South Coast's vast population produces many challenges for local flood control agencies. Flood control projects accommodate changing conditions by protecting life, property, public infrastructure, and watercourses from potential damage associated with storm flows and floods. County flood control districts in each of the six counties accomplish these goals through floodplain management, construction of flood control infrastructure, mapping, and development of flood control ordinances. Replenishment of local groundwater aquifers is also a major activity of the flood management agencies. Federal support for these efforts comes through project financing and construction by the US Army Corps of Engineers (USACE). Smaller watershed-related projects often have the support of Natural Resources Conservation Service (NRCS).

The South Coast region has one of the highest densities of flood control and water conservation structures in the state. Channels have been modified and realigned on many of the waterways to provide improved conveyance for floodflows. There is an extensive network of flood storage facilities throughout the region. Debris basins along many of the waterways provide protection against sedimentation, a major cause of flood damage. Many miles of levees provide flood protection to areas historically inundated by floodwaters.

The USACE Santa Clara River Project in the Santa Clara Planning Area includes levees on the Santa Clara River protecting Oxnard and Port Hueneme, and an improved channel on Santa Paula Creek at Santa Paula. Other USACE projects include levees on the Ventura River at Ventura and a debris basin and channel on Stewart Creek near Ojai. NRCS has provided construction funding for projects including a debris basin, spillways and channel work at Beardsley Wash and channel improvements on Revolon Slough, both in the Oxnard Plain and owned by Ventura County Watershed Management District; and sediment basins, debris dams, levees, channels, and spillways on Calleguas and Conejo creeks, Arroyo Simi, Arroyo Las Posas, and tributaries near Camarillo, Somis, Moorpark, and Simi Valley, all part of another project of Ventura County Watershed Management District.

In the Metropolitan Los Angeles Planning Area, the LACDPW, in cooperation with USACE, constructed one of the largest flood control projects ever built for a metropolitan area. The Los Angeles County Drainage Area Project includes 20 reservoirs, 90 debris basins, 458 miles of improved channels, and 1,424 separate storm drains. Included in the Los Angeles County Drainage Area (LACDA) project are the Sepulveda Dam on the Los Angeles River, Hansen Dam on Tujunga Wash, Santa Fe Dam on the San Gabriel River, Lopez Dam on Pacoima Wash, and the Whittier Narrows Dam on the San Gabriel River and Rio Hondo. Apart from LACDA, LACDPW also operates and maintains Big Dalton, Santa Anita, Big Tujunga, Cogswell, Devil's Gate, Live Oak, Eaton Wash, Pacoima, San Dimas, Puddingstone, Puddingstone Diversion, San Gabriel, and Thompson Creek reservoirs, all providing flood protection for the greater Los Angeles area.

USACE constructed conduit and channel at Kenter Canyon near Santa Monica. NRCS provided construction funding for many LADPW channel projects in the San Fernando Valley, including Aliso Creek, Arroyo Calabasas, Bell Creek, Browns Creek, Bull Creek, Limekiln Creek, Lower East Canyon, Santa Susana Creek, Upper East Canyon, and Wilbur Creek.

The USACE collaborated with the Orange County Flood Control District to develop major flood protection systems collectively called the Santa Ana River Basin and Orange County (SAROC) projects in the Santa Ana Planning Area. The SAROC projects include seven dams, one dam enlargement, ten channel modifications, three new channels, levees on five waterways, and bank protection. Dams include Brea and Fullerton protecting Fullerton, Prado and Seven Oaks protecting urban Orange County, and Carbon Canyon protecting Anaheim and Los Alamitos. USACE also constructed

San Antonio Dam, protecting the Ontario-Pomona area, and Orange County Flood Control District built Villa Park Dam for Orange County urban areas. SAROC also includes levees, improved channels, bypasses, debris basins, detention basins, groins, revetment, bank stabilization and floodplain management. Separately from SAROC, Riverside County Flood Control and Water Conservation District constructed, operates and maintains Allesandro, Box Springs, Harrison Street, Prenda, Sycamore, and Woodcrest dams to reduce flood risk in Riverside; and Pigeon Pass Dam to protect Moreno Valley. The City of Riverside contributed Mockingbird Dam. At Lake Elsinore, USACE constructed facilities to increase flood control storage in the lake.

USACE also constructed improved channels and a storage basin on Santiago Creek at Santa Ana and levees, an improved channel, and revetment on City Creek at San Bernardino.

In the San Diego Planning Area there is substantial investment in non-storage flood control projects. USACE has constructed levees or improved channels on the San Diego River, the Sweetwater River, and Rose Creek at San Diego, the San Luis Rey River in the San Luis Rey Valley, Los Coches Creek at Lakeside, and Telegraph Canyon Creek at Chula Vista. Internationally, a USACE project on the Tijuana River in the San Diego area protects property in Tijuana, Mexico. NRCS has provided construction funds for City of Vista channel improvements on Buena Vista Creek near Vista and a City of Escondido flood control reservoir and channels on Escondido Creek near Escondido.

Local sponsors and descriptions for reservoirs and non-storage flood control facilities in the region are listed in Appendix A in Table SCA-3, Flood control facilities. Also in Appendix A, Figure SCA-1 is a schematic of the LACDA project, and Figure SCA-2 depicts the SAROC projects.

Coordination and Reservoir Operations. There are no formal overall agreements for operation of flood protection facilities in the region. However, major drainage areas often drain separately to the ocean and are served by coordinated systems developed by USACE and a single local flood control entity. LADPW and USACE coordinate closely on the operation of the LACDA project and upstream reservoirs. Orange County Flood Control District and USACE also coordinate closely for operation of the SAROC system. In Riverside County, most flood control reservoirs are operated by a single agency, Riverside County Flood Control and Water Conservation District.

For most larger flood control reservoirs in California, USACE has participated with a federal contribution to the cost of the flood control space. Whether federally financed or not, the reserved space in multipurpose reservoirs is most often defined by a trapezoidal diagram of volume required versus date, modified by conditions in the latter part of flood season. Generally, the diagrams require a flood space reservation increasing from zero from the beginning of the flood season, invariant with date during mid-season, and decreasing to zero again at season's end. Superimposed on these diagrams are modifications based on either an antecedent precipitation index (API) or a runoff forecast. The index-controlled diagrams are usually decreased from the trapezoid and

shortened in time during drier years, beginning in mid-season. The runoff-controlled diagrams increase the trapezoid and extend it in time for the greater runoff forecasts. Single-purpose flood control reservoirs are kept as low as possible. For any reservoir, there are usually downstream controls of various kinds on evacuation rates.

For more information on flood control reservoirs, see Table SCA-3, Flood control facilities, in Appendix A.

Maintenance. Maintenance of flood control works is a critical activity which preserves the integrity of the facilities, ensuring continued protection for the public. This effort is made more difficult by two factors: (1) Lack of adequate financing for many installations is the result of tax-management efforts of the late 20th century that have placed controls on former sources of revenue, and (2) Heightened public awareness of the environment has resulted in new regulations making the permitting process lengthy and expensive. Compounding the problem, deferred maintenance can cause establishment of new habitat which then must be protected.

Maintenance of flood control facilities is usually the responsibility of the local maintaining agency, which is usually the local sponsor; or if there is none, the constructing agency. Most USACE projects are maintained by the sponsoring local maintenance agency, but dams in particular may be exceptions. In this region, Hansen Dam, Lopez Dam, Santa Fe Dam, Sepulveda Dam, Whittier Narrows Dam, Prado Dam, Carbon Canyon Dam, San Antonio Dam, and the international Tijuana River levees and channel improvements are maintained directly by the USACE. NRCS projects follow a pattern of close cooperation with a local sponsor, with NRCS providing maintenance standards and the local sponsor performing the maintenance. The local constructing agency maintains non-federal projects in this region.

Land Use Management

Regulation. Counties are the main agencies responsible for designating and regulating floodways. Land development within the floodplains of the South Coast is primarily regulated by local building codes, subdivision regulations, and zoning ordinances. These ordinances regulate development and construction within flood-prone areas to minimize losses due to flood events. Floodplain ordinances are one of the key legislative tools used to regulate development within floodplains in the South Coast region. All counties and many cities have adopted such ordinances to protect their communities from flood hazards. All local land use jurisdictions must adopt a floodplain management ordinance identifying 1 percent floodplains and floodways, in order to qualify for FEMA flood insurance.

Flood Insurance. The National Flood Insurance Program is administered by FEMA. It enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. About 97 percent of California communities participate in the National Flood Insurance Program. Of

those, approximately 12 percent participate in the Community Rating System (CRS) Program, which encourages communities to go beyond minimum program requirements in return for reduced insurance rates. Quality mapping is critical to administering an effective flood insurance program, developing hydrologic and hydraulic information for determining floodplain boundaries, and allocating flood protection project funds.

FEMA has provided Flood Insurance Rate Maps (FIRMs) for all areas within the region. CRS rates communities from 1 to 10 on the effectiveness of flood protection activities. The lower ratings bring larger discounts on flood insurance. Of the six counties and 179 cities in the hydrologic region, 5 counties and 17 cities participate in CRS. As of May 2009, Orange County, Huntington Beach, Long Beach, and Los Angeles are in Class 7; Los Angeles County, San Diego County, Anaheim, Fountain Valley, Irvine, Moreno Valley, Newport Beach, Oceanside, Poway, and San Juan Capistrano, Class 8; and Mission Viejo, Murrieta, Orange, Redlands, Santa Clarita, and Simi Valley, Class 9. See http://www.fema.gov/business/nfip/crs.shtm for more information on the CRS system.

Disaster Preparedness, Response, and Recovery

Information and Education. The California Data Exchange Center (CDEC) provides real-time and historical hydrometeorological data for hundreds of stations statewide, as well as real-time data on releases, spill rates, and elevations of many reservoirs. For this region, CDEC provides gage data from several federal, State, and local agencies, a total of 186 gages, and real-time flow and stage data for the Santa Clara, San Luis Rey, and San Diego rivers and Piru Creek. For access to CDEC data, see http://cdec.water.ca.gov.

The US Geological Survey maintains and publishes statistics for stream gages nationwide. USGS gages are the source of data for 28 of the 32 stations listed in Appendix A, Table SCA-1, Flood parameters for principal streams. For access to USGS gage data, see http://waterdata.usgs.gov/nwis.

DWR's Awareness Floodplain Mapping program provides an easy-to-use computer interface for viewing areas vulnerable to flooding by the flood event having a 1 percent probability of occurrence. The program applies to areas not already covered by FEMA Flood Insurance Rate Maps. For this region, maps have been drawn for all counties, but coverage of some areas may have been deferred. By 2015, all areas expected to develop over the next 25 years will have mapped floodplains.

Accurate hydrologic and hydraulic models inform the design of effective flood control structures and emergency actions before, during, and after floods. The National Weather Service's Advanced Hydrologic Prediction Service uses historical hydrologic data, current river and watershed conditions, and near-term meteorological outlooks to forecast river flows. The service is publicly available for certain streams of the South Coast region. Locations are given in Appendix A, Table SCA-5, AHPS stream forecast points.

Event Management. Under the Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS), initial flood emergency response is made by the responsible party at the site. When its resources are exhausted, the county emergency management organization (Operational Area) provides support. If necessary, additional support is coordinated by Southern Region or Inland Region of the California Emergency Management Agency (Cal EMA), formerly California Office of Emergency Services. Through the Cal EMA region and Cal EMA headquarters, help can be obtained from any State agency. Cal EMA coordinates with federal agencies and private organizations as well. The State-federal Flood Operations Center (a joint facility of DWR and the Sacramento Weather Office and California-Nevada River Forecast Center, both units of National Weather Service) is normally called early in the event to provide weather and river forecasts, facilitate information flow, provide field situation analysis, and give flood fight expertise. Severe situations that require Cal EMA involvement may also require emergency response by USACE, which is obtained by request of DWR. Table SCA-4, Flood emergency response organizations, in Appendix A, is a listing of specific response organizations.

Recovery after a flood event may involve the funding and construction services of USACE if the facilities are parts of federal projects. Availability of resources to repair local and private facilities; remove flood waters; and restore housing, businesses, and infrastructure often depends on the severity of the event and the allocation of event-specific federal or State funds.

Flood preparedness and mitigation efforts are promoted and funded by many organizations, including city and county governments, Cal EMA, DWR, National Weather Service, and USACE.

Relationship with Other Regions

The South Coast region is a major importer of water supplies from other regions both within and outside of the state. Because these supplies are vital to sustaining the South Coast region, local representatives work closely with other regions to ensure that their local resource needs are met while ensuring the reliability of supply to the South Coast region.

Within this region, water supply agencies have undertaken strategic regional planning to increase the reliability of local water supplies during normal and dry hydrologic conditions. This effort has resulted in the preparation and execution of water transfer and banking agreements both within and outside of the region. Outside of the South Coast region, environmental and water resource management in the Delta, Colorado River, and Owens River systems affect imported water supply reliability and quality. However, these inter-regional and inter-state linkages go well beyond direct water use. The overall planning direction (i.e., land use development patterns, economic drivers, agricultural production) established in other regions effect water resources available to the South

Coast. As a region dependent on others, the South Coast agencies recognize the need to invest in water management strategies in these other regions in order to provide coordinated benefits.

Sacramento-San Joaquin Delta

SWP contractors in the South Coast region—including Metropolitan, CLWA, San Bernardino Valley MWD, VCWPD, SGPWA, and San Gabriel Valley MWD—work with DWR to coordinate delivery of SWP supplies. Due to a series of short-term ecosystem collapses in 2007, including declines in native species and significant loss of habitat, Metropolitan also participates with DWR and other State, federal, and local agencies and environmental organizations in the development of the Bay-Delta Conservation Plan (BDCP). Metropolitan further maintains individual relationships with each of its 26 member agencies for sale and conveyance of SWP supplies, as well as adjacent agencies with which it has storage and transfer agreements (see discussion below).

Significant restrictions were placed on SWP pumping in accordance with the December 2007 federal court imposed interim rules to protect the Delta smelt (*Hypomesus transpacificus*). Additionally, the inherent annual variability in location, timing, and amount of precipitation in California introduces uncertainty to the availability of future SWP deliveries. In June 2008, the Governor issued Executive Order S-06-08 declaring a statewide drought, which directed State agencies and departments to take immediate action to address serious drought conditions and water delivery reductions. Solutions developed to address environmental and drought-related concerns, including conservation and restoration efforts associated with the BDCP, will continue to impact future SWP exports. Other important factors that impact supply reliability include the vulnerability of Delta levees to failure due to floods and earthquakes, as well as long-term management and maintenance of SWP conveyance infrastructure. As the regional SWP wholesaler, Metropolitan is continuing to develop closer relationships with DWR and other State agencies to deal with fundamental Delta issues including environmental protection and levee rehabilitation.

Colorado River System

Metropolitan and USBR have been working together for many decades to manage Colorado River deliveries, including drought allocation planning and salinity management. Allocations and diversions of Colorado River water function within the legal and administrative rules known as the "Law of the River" (see Table SC-4). With full implementation of the programs identified in the QSA, Metropolitan expects to be able to annually divert 852,000 acre-feet of Colorado River water plus any unused agricultural water that may be available. With continuation of the current drought, however, the South Coast's reliance on diversions of excess Colorado River water (such as wet-year flows and allocated but unused supplies) will place substantial pressure on regional water availability.

Metropolitan will continue to collaborate with USBR to ensure the reliability and quality of Colorado River supplies. Although agricultural water conservation and transfer agreements (described below) will increase the volume of water available to the South Coast region via the CRA, further development of local supplies will be necessary to defend against future shortages.

Owens Valley and Mono Basin

In 1991, LADWP entered into the Inyo/Los Angeles Long Term Water Agreement to address impacts from groundwater pumping in the Owens Valley. In 1994, the State Water Board ruled on decision 1631, restricting exports from the Mono Basin to protect the basin and the tributaries feeding into Mono Lake. As a result of these measures and other commitments to protecting and enhancing the environment, approximately half of the historical average annual LAA supplies are being diverted for environmental enhancement projects.

The Lower Owens River Project, considered one of the most ambitious river restoration projects in the West, is in operation with 62 miles of the Lower Owens River having been rewatered. LADWP is working with Inyo County and other stakeholders on numerous restoration projects, including instream flow management in Rush, Lee Vining, Walker, and Parker creeks, restoration of Mono Lake water surface elevation, riparian restoration on the Upper Owens River, Convict, Mammoth, and McGee creeks, and dust mitigation measures on the Owens Lake bed.

Other Water Storage and Transfers

South Coast agencies continue to build relationships with other areas of the state via various storage and transfer programs. Under many of the storage and exchange agreements, imported water supplies are banked in groundwater aquifers in neighboring regions. These agreements are an essential component of the region's overall strategic planning to meet peak demand during the dry season.

Metropolitan has agreements with the Semitropic and Arvin-Edison Water Storage Districts which can result in the delivery of 197,000 acre-feet to Metropolitan over a 10-month period. Metropolitan can store portions of its SWP entitlements in the groundwater basins managed by these agencies during wet hydrologic conditions and retrieve the supplies when conditions are dry. Metropolitan's program with the San Bernardino Valley MWD yields between 20,000-80,000 acre-feet during dry years and permits Metropolitan to store up to 50,000 acre-feet of transfer water supplies in its groundwater basin. Metropolitan's programs with the Kern-Delta Water District and Mojave Water District operate in a similar manner. Dry-year yields for Metropolitan are 50,000 acre-feet and 35,000 acre-feet, respectively.

Some excess floodwater can be routed into the California Aqueduct through the Kern River Intertie. This water is transported from the Tulare Lake Hydrologic Region to the

South Coast Hydrologic Region for water supply. Quantities are limited by the flow capability of the aqueduct and by available space in the SWP reservoirs in Southern California.

In addition to exchange agreements, Metropolitan is partnering with the Coachella Valley Water District (CVWD) and Desert Water Agency on an advance delivery agreement. The agreement allows Metropolitan to deliver exchange water in advance of receiving CVWD's and Desert Water Agency's SWP water. Metropolitan releases Colorado River water into the Whitewater River in Riverside which flows into the Coachella Valley and deep percolates in the groundwater basin. During dry hydrologic conditions, Metropolitan can take the CRA and SWP supplies for its partners until the banked water supplies are used. Through 2004, 177,400 acre-feet was banked in the groundwater basin.

CLWA has executed a long-term transfer agreement for 11,000 acre-feet per year with the Buena Vista and Rosedale-Rio Bravo water storage districts (WSD). These two districts, both in Kern County, joined to develop a program that provides a firm water supply and a water banking component. The supply is based on existing long-standing Kern River water rights, which would be delivered by exchange of SWP supplies.

In 1998, SDCWA entered into a transfer agreement with IID to purchase conserved agricultural water. Through the agreement, SDCWA will receive an annually increasing volume up to 200,000 acre-feet by 2021. The volume then remains fixed for the duration of the 75-year agreement.

In 2003, the QSA resulted in the movement of supplies between the Colorado River and South Coast regions. SDCWA was assigned rights to 77,000 acre-feet per year of water that will be conserved through lining of the All-American and Coachella canals in Imperial County. Another 16,000 acre-feet per year of water conserved with the lining of the All-American Canal will go the San Luis Rey Indian Water Rights Settlement Parties.

Regional Water and Flood Planning and Management

Integrated Regional Water Management

The IRWM Planning Act, signed by the Governor as part of SB 1 in 2008 (CWC Sec 10530 et seq), provides a general definition of an IRWM plan as well as guidance to DWR as to what IRWM program guidelines must contain. The Act states that the guidelines shall include standards for identifying a region for the purposes of developing or modifying an IRWM plan. The first regional acceptance process (RAP) spanned 2008-2009. Final decisions were released in fall 2009. The region acceptance process is used to evaluate and accept an IRWM region into the IRWM grant program. See

Figure SC-8 for map for regions in the South Coast Hydrologic Region's three funding areas: Los Angeles-Ventura, Santa Ana, and San Diego. Find more information on the DWR IRWM Web site: http://www.water.ca.gov/irwm/integregio_rap_summary2.cfm.

See Appendix A for discussion of flood control in the region's IRWM plans. The South Coast region implements to some extent nearly all of the resource management strategies in the Water Plan's Volume 2. Some regional projects in the South Coast region are highlighted here.

Los Angeles Subregion

Calleguas Regional Salinity Management Project. The Calleguas Regional Salinity Management Project (SMP) is a regional pipeline that will collect salty water generated by groundwater desalting facilities and excess recycled water and convey that water for reuse elsewhere. Any unused salty water will be safely discharged to the ocean, where natural salt levels are much higher. The SMP will improve water supply reliability by facilitating the development of up to 40,000 acre feet of new, local water supplies each year and expanding the distribution and use of recycled water from areas with abundant supplies to areas of need.

***Arundo* Removal.** *Arundo* (giant reed) removal projects have been completed in several watersheds in Ventura County and in the San Gabriel Valley of Los Angeles County. The objectives of removing the non-native invasive giant reed are to restore biological habitat, reduce flood hazards, reduce fire risks, improve water quality, and enhance water supply reliability and groundwater recharge.

Las Virgenes Creek Restoration. More than 1,500 tons of concrete and other non-native material were removed from a portion of the creek between Highway 101 and the Agoura Road Bridge. Native vegetation was planted where litter used to accumulate on concrete, and a walkway and gazebo were built along the creek's bank.

Joint Water Pollution Control Plant Marshland Enhancement (Bixby Marshland). Marshland conditions before restoration and enhancement included stagnant water pools and an abundance of non-native plants. A viewing and educational area was added to the marshland to provide the public with the opportunity to enjoy this green gem set amidst an industrial area. Open water pools were added to the marshland, which is located on the Pacific Flyway, to increase the habitat value for birds.

Santa Ana Subregion

Arlington Desalter. The Arlington Desalter, operated by Western Municipal Water District and constructed by the Santa Ana Watershed Project Authority in 1989, was the first operating groundwater desalter in the Upper Santa Ana River Watershed.

Orange County Groundwater Replenishment System. Orange County Groundwater Replenishment System produces 70 million gallons per day (MGD) of highly treated wastewater for groundwater recharge and a seawater intrusion barrier. Located in the lower Santa Ana River Watershed, it is one of the largest water reclamation facilities west of the Mississippi River.

Solar Array at RP-5 WWTP. The solar array at RP-5 WWTP, operated by Inland Empire Utilities Agency, produces 1 megawatt of power and is an example of sustainability efforts in the Santa Ana River Watershed.

San Diego Subregion

Tri-County Funding Area Coordinating Committee. The Upper Santa Margarita Regional Watershed Management Group (RWMG), San Diego RWMG, and South Orange County RWMG collaborate in the San Diego Funding Area through a joint Memorandum of Understanding that established the inter-regional body known as the Tri-County Funding Area Coordinating Committee (Tri- County FACC). The group is enthusiastically working together on common and long-term water quality issues and aim to improve planning across regional boundaries and identify opportunities to support common goals and projects. One example of this partnership is the Stormwater Monitoring Coalition, which enables the Tri-County FACC members to jointly address water quality concerns.

El Monte Valley Groundwater Recharge and River Restoration Project. The El Monte Valley Groundwater Recharge and River Restoration Project will recharge the El Monte Valley Basin using highly treated recycled water, raise the groundwater level to support habitat restoration, and subsequently withdraw up to 2,240 AFY of groundwater to supply the R.M. Levy Water Treatment Plant.

Carlsbad Desalination Project Local Conveyance. The Carlsbad Desalination Project Local Conveyance project will provide 56,000 acre-feet per year of new water supply for the San Diego region through the design and construction of pipelines and facilities to serve local desalinated water from the Carlsbad Desalination Plant to Water Authority member agencies, including Carlsbad Municipal Water District, City of Oceanside, Olivenhain Municipal Water District, Vallecitos Water District, Vista Irrigation District, and Santa Fe Irrigation District.

Santa Margarita Conjunctive Use Project. The Santa Margarita Conjunctive Use Project provides for enhanced recharge of the groundwater basin underlying US Marine Corps Base Camp Pendleton in northern San Diego County. The project also includes a seawater intrusion barrier using recycled water, a distribution system, and advanced water treatment facilities. This project will provide a water supply for both Camp Pendleton and Fallbrook as resolution of a long-standing water rights dispute.

Accomplishments

The South Coast has a long history of regional water management and planning that has helped form the backbone of its current system. As the state's water resources continue to become more precious, the South Coast has continued to make significant regional accomplishments. These include the following.

Integrating Water Management Efforts. Recent developments in IRWM planning and collaboration have expanded the development of strategic, multi-benefit projects that meet regional water demands, improve water quality, and enhance environmental functions. Coordination of numerous stakeholders in development of the IRWM plans has been one of the biggest successes in the region. As a result, South Coast agencies acquired $135 million in Proposition 50 grant funding for local water resources projects.

Diversifying Supplies. The South Coast has succeeded in diversifying its water supply sources over the last decade. Environmental and drought concerns have reduced imported water supplies, while local agencies have expanded local groundwater production, water recycling, and surface storage. Water transfers, banking, and conservation programs have further contributed to supply reliability.

Reducing Water Demands. DWR, State Water Board, and USBR are making major statewide investments in urban and agricultural water conservation programs, which regional and local agencies leverage with their own investments to reduce demands. Metropolitan and its member agencies have developed a robust interregional water conservation and efficiency program, and the CCP further assists member agencies in pursuing urban BMPs and other demand management opportunities. The 2007 Blueprint for Water Conservation was a San Diego regional partnership for increasing conservation. In tandem with these urban conservation efforts, Metropolitan and IID entered into an agricultural water savings program. In August 2008, the City of Los Angeles amended its conservation ordinance by expanding the prohibited uses of water and curtailing outdoor irrigation in conservation phases based on reduced water supply conditions.

Increasing Local Surface Storage. South Coast agencies are developing partnerships for reservoir construction, reoperation, and maintenance in order to meet water demands. The Carryover Storage and San Vicente Dam Raise project is a joint project by SDCWA and the City of San Diego to raise the existing dam at San Vicente Reservoir to provide additional capacity.

Replenishing Groundwater. A groundwater conjunctive use program is a storage program to provide dry-year yield. Fourteen conjunctive use programs are implemented by local water agencies. Metropolitan has 10 conjunctive use programs within its service area.

Eleven dams were constructed as part of the San Gabriel River and Montebello Forebay water conservation system to impound storm water runoff for groundwater

recharge. The Vern Freeman Diversion and Pumping Trough Pipeline in Ventura County provides a means to capture high flows in the Santa Clara River and provide recharge to groundwater basins on the Oxnard Plain.

Desalting Brackish Supplies. Nineteen brackish groundwater recovery programs are being implemented in the region. Some of these programs have multiple facilities in operations. The Calleguas MWD Salinity Management Project is a 35-mile brine pipeline that provides disposal of tertiary treated effluent for five WWTPs and brine disposal for seven groundwater desalters. SAWPA's 30-MGD capacity SARI pipeline conveys desalter brine to Orange County Sanitation District for treatment and then discharges to the ocean. Further, several agencies within the South Coast are pursuing design, engineering, and environmental review for seawater desalination facilities.

Recycling Water. Progress continues on the start-up or augmentation of water recycling programs in the region. The Inland Empire Utilities Agency (IEUA) has completed and is on track in implementing a five-year business plan to expand the use of recycled water supplies within its service area to 50,000 acre-feet per year by 2015 (70,000 acre-feet per year by 2025). West Basin MWD's Edward Little Water Recycling Facility in El Segundo recently completed its Phase IV Expansion, which increased production of recycled water. LADWP has begun development of a Recycled Water Master Plan to expand its existing recycled water deliveries for an estimated $1 billion in construction cost. Irvine Ranch Water District (IRWD) is planning for expansion of its recycled water treatment and delivery system to meet expected recycled water demand at buildout. Further, IPR is being pioneered through various groundwater recharge and reservoir augmentation projects—the San Diego City Council recently authorized a demonstration IPR/reservoir augmentation project.

Controlling NPS Pollution. Local agencies are continuing to collaborate with Regional Water Boards on NPS pollution prevention, including development of public outreach campaigns to reduce pollutant loading as well as LID for more sustainable storm water management.

Hazard Mitigation Plans. The federal Disaster Mitigation Act of 2000 amended existing law with regards to hazard mitigation planning. The Act emphasizes pre-disaster mitigation and mitigation planning. In order to receive federal hazard mitigation funds in the future, all local jurisdictions must now adopt a hazard mitigation plan identifying hazards, risks, mitigation actions and priority and providing technical support for those efforts. Between 2004 and 2007, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura counties adopted hazard mitigation plans and subsequently received Cal EMA approval.

Challenges

With the South Coast region, population growth, water supply availability and reliability, water quality, and drought will continue to be key issues for the future.

Resource Development. Water districts throughout the South Coast are engaged in integrated urban water management and groundwater planning. Decisions regarding development and expansion of other water supplies, such as recycled water and ocean desalination, will require more rigorous analysis of costs and tradeoffs between options.

Drought. Drought is a constant concern for water districts in the South Coast region. A drought simulation developed by Harding et al. (1995) indicated that, under current management practices, a severe sustained drought would heavily impact the Colorado River. In some months, stretches of river would be completely dry in order to maintain reservoir storage elsewhere in the system. Potential repercussions of drought on imported water supply reliability have led to an emphasis on the development of local supplies and implementation of demand management strategies. Further, given the uncertainty of water imports in the future, local agencies are aggressively developing local alternatives and transfer agreements.

Climate Change. Climate change is expected to impact the South Coast region through changes in Statewide precipitation and surface runoff volume. More extreme storm events may exceed reservoir storage capacity and therefore result in allocated water supplies discharged to the ocean. Sea level rise may impact local aquifers and Delta water quality through seawater intrusion, as well as impact local coastal water and wastewater infrastructure. All of these uncertainties related to climate change could potentially reduce delivery of imported supplies and the ability of local agencies to meet South Coast water demand.

Sustainability. With the recognition that water resources management is a major component to sustainable development for the State, an overarching emphasis must be placed on the concept of integration in all water resource planning efforts. As water supply development is considered, the energy and greenhouse gas emission impacts must be addressed to assure that proposed water development projects are sustainable for the future.

Environmental Concerns in Delta. Uncertainty about the availability of imported water supplies from the Delta through the SWP is of primary concern to the South Coast region. A federal court found that a 2004 biological opinion by the USFWS does not adequately protect sensitive fish populations when authorizing long-term operations of the State and federal water projects. Further, significant restrictions were placed on SWP and Central Valley Project pumping in accordance with the December 2007 federal court imposed interim rules to protect the Delta smelt (*Hypomesus transpacificus*). Metropolitan and other stakeholders are reviewing the impact of the ruling and possible future solutions.

Groundwater Overdraft. Groundwater overdraft and lower groundwater levels are further water supply challenges to the region. Historically, agricultural, industrial, and urban development has led to increased groundwater pumping from many of the region's basins. Natural recharge is typically insufficient to maintain basin water levels

and current pumping levels due to the extent of impervious surfaces and the presence of clay soils. In some basins, over-extraction of groundwater has caused lowering of groundwater tables and seawater intrusion, contributed to land subsidence, and resulted in legal solutions, adjudication, to resolve disputes over pumping rights within specific basins.

Runoff Management. Surface water quality issues in the region are dominated by storm water and urban runoff, which contribute contaminants to local creeks and rivers, lagoons, beaches, and bays. Shipping can also influence water quality, especially in San Diego Bay and the Long Beach and Los Angeles harbors, where there are toxic sediment hot spots. The Chino Basin faces substantial nutrient loading impacts from dairy farming, thereby impacting groundwater quality and downstream Santa Ana River quality.

Salinity. Salinity in both local and imported supplies will continue to be a challenge for local water agencies. Salinity sources in local groundwater supplies include concentration from agricultural tailwater, imported water, seawater intrusion, discharge of treated wastewater, and recycled water. Higher levels of treatment are also needed following long-range import of water supplies, as TDS levels are increased during conveyance. High salinity levels and perchlorate contamination contribute to degraded Colorado River supplies. Seawater intrusion and agricultural drainage threatens to increase the salinity of SWP supplies. The long-term salt balance of the region's groundwater basins is an increasingly critical management issue. Abandoned groundwater basins, due to high salinity levels, have only recently been restored through brackish water desalting projects.

Water Recycling. With its expansion of water recycling programs, the region continues to work to address issues related to TDS levels and constituents of emerging concern like pharmaceuticals, household products, and other products in treated wastewater that are not known to be harmful or are not regulated. The high salinity of imported Colorado River water limits the number of times water can be reused and wastewater can only be discharged to the ocean. Additionally, some inland water districts that use recycled water also have salt accumulation problems in their groundwater basins because they lack an ocean outfall or stream discharge.

Flood Control Infrastructure. Major challenges include maintenance of 100-year flood protection where it has been provided throughout the South Coast in light of continued urbanization and climate change. Major flood control projects in the Los Angeles, San Gabriel, and Santa Ana areas are threatened as urbanization in the upper watersheds adds to storm volumes. Local funding for flood maintenance and construction projects has become less effective in recent years because of several factors: Laws enacted in response to heightened public awareness of the need to protect the environment have increased the cost of upkeep and improvement; concern for endangered species has made scheduling more complex; both environmental and endangered species conditions have made permits more difficult to obtain; measures to reduce taxation, especially

on property, have rendered revenue increases difficult to achieve, and inflation has increased costs. Meeting the requirements of these new restraints has become a high-profile local challenge. Concerns related to funding include invasive species, sediment in channels and reservoirs, decreasing levels of protection as runoff rates increase with urbanization and climate change, aging infrastructure, structural deficiencies of dams, and debris basins that are too small. Finally, adequate evaluation is needed of the long-term secondary impacts of environmental enhancements proposed for integration into flood control projects.

Water Costs. SWP contractors pay for the cost of constructing and operating facilities which store and convey SWP water supply, plus a transportation charge which covers the cost of delivery facilities. Thus, contractors in the South Coast pay higher transportation charges than those near the Delta. Metropolitan's 2009 Tier 1 rates for treated water total $579 per acre-foot and recovers the costs of purchasing, pumping, and delivering SWP and CRA supplies, as well as a surcharge for purchase of additional water transfers.

Local Flooding Impacts. Recurrent flooding is a problem in many places in the South Coast region. At many locations, lives, homes, business, farm lands, and infrastructure are frequently at risk. Providing better protection for lives and property remains the definitive flood management challenge. Solutions may range from governmental regulation of occupancy and building in flood-prone areas through local or watershed-based non-structural measures to infrastructure such as levees and reservoirs, constructed with consideration of environmental needs. Development of a discharge-based standard, such as protection from the flood having a 0.5 percent, 1 percent, or 2 percent probability of occurrence (or such a standard in conjunction with land use type or other pertinent factor) would facilitate equitable distribution of State and federal support funding.

San Jacinto River. Excessive sedimentation in the San Jacinto River causes breaching onto agricultural lands in the "gap" area of the river. There are many challenges in the Upper San Jacinto Watershed area with flooding along the San Jacinto gap area. Initial feasibility studies have been completed. Additional studies will be needed to resolve this major flooding issue.

Effects of Urbanization. Throughout the state, including this region, urbanization continues. It brings greater runoff due to increases of impervious area making retention of flood protection levels a challenging issue. Urbanization often causes increases in erosion and sedimentation. Construction of flood infrastructure or changes in land use may cause subsequent undesirable vegetation growth, whether of native or invasive species. Regulation of occupancy and land use is critical for reducing the number and severity of flood damage occurrences in an era of population growth. In this region, hillside flooding and flooding of developed low areas are special concerns, as is flooding in disadvantaged communities. Increased agricultural activity, an adjunct of population growth, may also increase erosion. Another particular concern in this region is flash flooding from steep watersheds, which has increasing impact as the population grows.

Preparedness for and Response to Flood Events. Effective preparedness for flood events depends on accurate evaluation of the risk, adequate measures for mitigation of flood damage, sufficient preparation for response and recovery activities and coordination among local, State, and federal agencies. Completion of floodplain mapping, both the FEMA Flood Insurance Rate Maps and the State's complementary Awareness Floodplain Mapping, will provide much needed information for evaluating flood risk. Mitigation may take many forms, including restriction of use, floodproofing, or structural protection of vulnerable sites. Some actions that help meet the challenge of response and recovery preparedness are organization for emergency management, formal agreement on responsibilities for emergency actions and funding, and use of warning systems.

Debris Flows. Wildfires may denude steep erodible slopes in canyons and upland areas above urban development below. Ensuing winter rains may threaten these areas not only with high water, but also with debris flows. In these situations, flooding may cause greatly increased damages to structures and other installations and may leave large amounts of sediment and other detritus.

Storm Water Capture. The region's flood control systems are designed to quickly move storm flow through to the ocean. Managing these systems to retain flows to recharge aquifers where soft channel bottoms exist or diverting flow to off channel recharge basins provides an opportunity to enhance the supply of local water.

Invasive Species. Invasive species disrupt natural ecosystems by competing with native flora for limited resources and generally providing poor quality habitat for native fauna. The removal of Arundo and other invasive species offers numerous direct and indirect benefits to landowners, land managers, public agencies, and other Watershed residents. These benefits include reduction in risk of flooding and fire, improvements in water quality, increased water conservation, and restoration of habitat for native species, including several threatened and endangered species.

Drought and Flood Planning

The South Coast region is subject to severe repercussions from extreme weather events. Drought conditions both within and outside of the region can substantially limit water availability to urban and agricultural users. In contrast, extreme precipitation events can result in sudden and severe flooding and mud flows. This unusual paradox of concurrent drought and flooding is being addressed by the South Coast region's integrated regional planning efforts.

Drought Planning

Drought planning in the South Coast region is being conducted in coordination with State agencies, per the Governor's Executive Order S-06-08 declaring a statewide drought. Metropolitan's Water Supply Allocation Plan (2007) provides a formula and implementation plan for equitable regional allocation of water supplies during times

of shortage. The objectives, mechanics, and policy aspects of the Allocation Plan were developed in coordination with member agencies.

In 2007, SDCWA adopted a Drought Management Plan that outlined a series of potential actions to take when faced with a shortage of imported water supplies from Metropolitan due to drought conditions. Further, SDCWA adopted a model Drought Response Ordinance in March 2008. A Drought Management Committee has been formed in the Upper Santa Clara watershed to address the need to comprehensively respond to the current drought. Water agencies and cities within Ventura County are working together to coordinate their disaster and drought preparedness efforts.

In 2008, LADWP developed a Water Supply Action Plan for creating sustainable sources of water for the future demands of Los Angeles. As a result of water shortages, Los Angeles implemented Phase III of its Emergency Water Conservation Plan Ordinance, which added restrictions on outdoor water use to existing prohibitions on water waste.

Flood Planning

Most flood control districts in the South Coast region incorporate flood planning as a component in their flood management strategy. As described above, regional flood protection is sustained through an extensive network of flood control reservoirs, debris basins, flood channels, and levees; land use regulations, flood forecasting, and SEMS; and flood insurance. All counties in the region use the Automated Local Evaluation in Real Time (ALERT) system to notify the public of impending flood hazards. The Disaster Mitigation Act of 2000 required development of Hazard Mitigation Plans, which emphasize community partnerships in planning for and responding to disasters; assessing strategies for reducing risks; and identifying capabilities and resources for addressing various hazards. Each county in the South Coast region has an adopted Hazard Mitigation Plan.

Several other groups in the South Coast are addressing flood management programs and issues at the local level. VCWPD staff is looking into an integrated surface water and groundwater model of the entire county as an element of the IRWM Plan. The model would facilitate implementation of real-time flood forecasting, alert emergency personnel on impending floodflows, and calculate the water budget for all of the county's rivers/creeks and aquifers.

All counties in this region have adopted hazard mitigation plans. For more information, see "Challenges" in this report.

FloodSAFE is a DWR strategic initiative that seeks a sustainable integrated flood management and emergency response system throughout California that improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding. FloodSAFE is

guiding development of regional flood management plans. These plans will encourage regional cooperation in identifying and addressing flood hazards, and will include flood-hazard identification, risk analyses, review of existing measures, and identification of potential projects and funding strategies. The plans will emphasize multiple objectives, system resiliency, and compatibility with State goals and IRWM plans.

Looking to the Future

With a growing population, drought conditions in many parts of the West, and an aging infrastructure system, water resource managers will be focusing on three important areas: protection of imported water supplies; increased development of local water resources; and creation of integrated flood control projects.

Protection of Imported Supplies. Protection of imported water supplies is essential for South Coast agencies. Continued partnerships with DWR, USBR, and other State and regional agencies are necessary to ensure that the Delta, Colorado River basin, and Owens Valley ecosystems are managed in such a way that allows for successful allocation of water supplies. Effective salinity and water quality management will also be necessary to ensure that imported supplies are usable. Further, South Coast agencies are moving forward with plans to operate conjunctive use programs in local groundwater basins. South Coast water agencies are storing discount-priced imported water during winter months into groundwater basins and increasing their groundwater use during summer and drought periods.

Development of Local Supplies. Due to uncertainties related to imported supplies, South Coast agencies are also aggressively pursuing development of local supplies. In 2002 and again in 2006, California's voters approved water bond packages to help address the state's water crisis and ensure clean, safe water for generations to come. Funding from these bonds will support a variety of local water management efforts including implementation of water conservation programs, expansion of water reclamation plants and conveyance systems, construction of desalination facilities, and restoration of streams, wetlands, and lagoons. Metropolitan and five member agencies are planning for the potential development of up to 300 MGD of desalinated seawater. Further, the Southern California Water Recycling Initiative—a joint effort by DWR, USBR, and 10 local agencies—will continue a multi-year planning study that evaluates the feasibility of a regional water-recycling plan and identifies short-term projects to increase recycled water supplies. The initiative projects recycled water demand to increase between 615,700 acre-feet in moderate reuse conditions and 1.0 million acre-feet under maximum reuse conditions by 2040.

Desalination Projects. Brackish groundwater and ocean desalination will likely serve an important role in the solution to southern California's water supply shortfall. In the Santa Clara Planning Area, the Calleguas MWD Salinity Management Project serves as a regional conveyance facility that moves saline water from areas where it is a nuisance

to areas where it can be an asset for salt tolerant crops and wetlands restoration (see earlier discussion under Integrated Regional Water Management).

There are proposals for a number of desalination projects in the Metropolitan Los Angeles Planning Area. West Basin MWD is proposing to co-locate a 20 MGD desalination plant at the El Segundo Power Plant in El Segundo. The district has operated a 40 gallons-per-minute pilot plant and was awarded Proposition 50 grant funding to build a 0.5 MGD demonstration facility in May 2005 (WBMWD 2005). The Long Beach Water Department is considering a 9 MGD seawater desalination plant in Long Beach. The department, in partnership with LADWP and USBR, began operating a 0.30 MGD prototype plant at the Haynes Generating Station in early 2006. Operation of the full-scale facility is expected to commence no earlier than 2015 if the project proves to be economically, technically, and environmentally feasible (LBWD 2005b).

Poseidon Resources is proposing to co-locate a 50 MGD seawater desalination plant with the AES Power Plant in Huntington Beach. Municipal Water District of Orange County (MWDOC) is also considering building a 25 MGD seawater desalination plant in Dana Point.

SDCWA and MWDOC are considering building a 50- to 100-MGD seawater desalination plant at Camp Pendleton, using the intake and outfall structure from Unit 1 of the San Onofre Nuclear Generating Station, which is being decommissioned. A public-private partnership between the City of Carlsbad and Poseidon Resources, the 50-MGD seawater desalination plant at the Encina Power Station in Carlsbad will begin construction in 2009 and be on line by 2011. Nine water agencies have entered into long-term water purchase agreements with the Carlsbad desalination plant (Poseidon Resources 2008).

Creation of Integrated Flood Control Projects. The South Coast will continue pursuing development of integrated projects that achieve flood management, improve runoff water quality, and protect environmental resources. Flood control reservoirs are becoming valuable for their potential to provide all three benefits, as well as water supply benefits through reoperation to enhance groundwater recharge. LACDPW is completing a study, in cooperation with the USACE, to reauthorize four USACE flood control facilities in Los Angeles County for the purpose of capturing storm water and then slowly releasing the water to downstream groundwater recharge facilities after storm events. The Water Augmentation Study is a long-term research project led by the Los Angeles and San Gabriel Rivers Watershed Council to explore the challenge of capturing storm water for infiltration, in terms of groundwater quality and quantity.

Most of the South Coast's future supply projects will be designed to improve water quality as the means to develop new water supplies. These include watershed protection activities, groundwater desalination, use of highly treated recycled water, reduction of sewage spills and storm water runoff through water conservation, and surface and groundwater storage projects that implement blending and treatment strategies to reduce

contaminants in treated drinking water supplies. Ground and surface water treatment and reuse are the future of water management in the South Coast.

Climate Change

Climate change is expected to impact the South Coast region through changes in statewide precipitation and surface runoff volumes, and therefore availability of local surface and imported water supplies. Additionally, sea level rise is expected to degrade Delta water quality and impact coastal water and wastewater infrastructure, requiring substantial capital investments by local agencies. All of these uncertainties related to climate change could potentially reduce the ability of local agencies to meet South Coast water demand.

Model simulations using the Intergovernmental Panel on Climate Change's 21st century climate scenarios suggest increasing temperatures in California, with greater increases in the summer (Cayan 2008). Changes in annual precipitation across California may result in changes to surface runoff timing, volume, and form. By the end of the century, the Sierra Nevada snowpack is expected to decline as warmer temperatures raise the elevation of snow levels, reduce spring snowmelt, and increase winter runoff. Locally, climate change is expected to result in hotter summer months and more extreme winter storms. Winter runoff may result in flashier flood hazards, with flows potentially exceeding reservoir storage capacity and resulting in discharges to the ocean. Higher flow volumes may scour stream and flood control channels, degrading aquatic and riparian habitats already impacted by shifts in climate. Further, hotter summer temperatures would increase wildfire hazards in the arid South Coast region. Additionally, changes in climate and runoff patterns may create competition between sectors. The agricultural industry's demand could increase due to higher evapotranspiration rates caused by increased temperatures. Environmental water supplies would need to be retained in reservoirs for management of instream flows necessary to maintain habitat for aquatic species throughout the dry season. For the South Coast, this would likely result in reduced supplies available for import through the SWP during the non-winter months (California Climate Change Portal 2008; Cayan 2008; Hayhoe 2004).

LADWP has initiated a climate change study to evaluate the effects of climate change on the LAA watershed. This study will identify possible adaptation measures that can be implemented to mitigate the potential negative effects of climate change on the hydrology of the region as well as the potential negative impact to water quality.

Impacts resulting from extreme sea levels associated with tides, winter storms, and other episodic events would be superimposed on the higher sea level. This rise could heavily impact the South Coast through inundation of low lying areas, causing severe coastal flooding and erosion, increased salinity in the Delta, damage to coastal structures, and damage to coastal marshes and wildlife reserves (Cayan 2008; California Climate Change Portal 2008). Additionally, higher sea levels would exacerbate current seawater

Box SC-4 Scenario Descriptions

Update 2009 uses three baseline scenarios to better understand the implications of future conditions on water management decisions. The scenarios are referred to as baseline because they represent changes that are plausible and could occur without additional management intervention beyond those currently planned. Each scenario affects water demands and supplies differently.

- **Scenario 1 – Current Trends.** For this scenario, recent trends are assumed to continue into the future. In 2050, nearly 60 million people live in California. Affordable housing has drawn families to the interior valleys. Commuters take longer trips in distance and time. In some areas where urban development and natural resources restoration has increased, irrigated crop land has decreased. The state continues to face lawsuits: from flood damages to water quality and endangered species protections. Regulations are not comprehensive or coordinated, creating uncertainty for local planners and water managers.
- **Scenario 2 – Slow & Strategic Growth.** Private, public, and governmental institutions form alliances to provide for more efficient planning and development that is less resources intensive than current conditions. Population growth is slower than currently projected—about 45 million people live here. Compact urban development has eased commuter travel. Californians embrace water and energy conservation. Conversion of agricultural land to urban development has slowed and occurs mostly for environmental restoration and flood protection. State government implements comprehensive and coordinated regulatory programs to improve water quality, protect fish and wildlife, and protect communities from flooding.
- **Scenario 3 – Expansive Growth.** Future conditions are more resource intensive than existing conditions. Population growth is faster than currently projected with 70 million people living in California in 2050. Families prefer low-density housing, and many seek rural residential properties, expanding urban areas. Some water and energy conservation programs are offered but at a slower rate than trends in the early century. Irrigated crop land has decreased significantly where urban development and natural restoration have increased. Protection of water quality and endangered species is driven mostly by lawsuits, creating uncertainty.

intrusion issues in South Coast groundwater aquifers. A USGS study on the vulnerability of the West Coast to sea level rise shows the South Coast area as being in the moderate to very high vulnerability range (Thieler 2001).

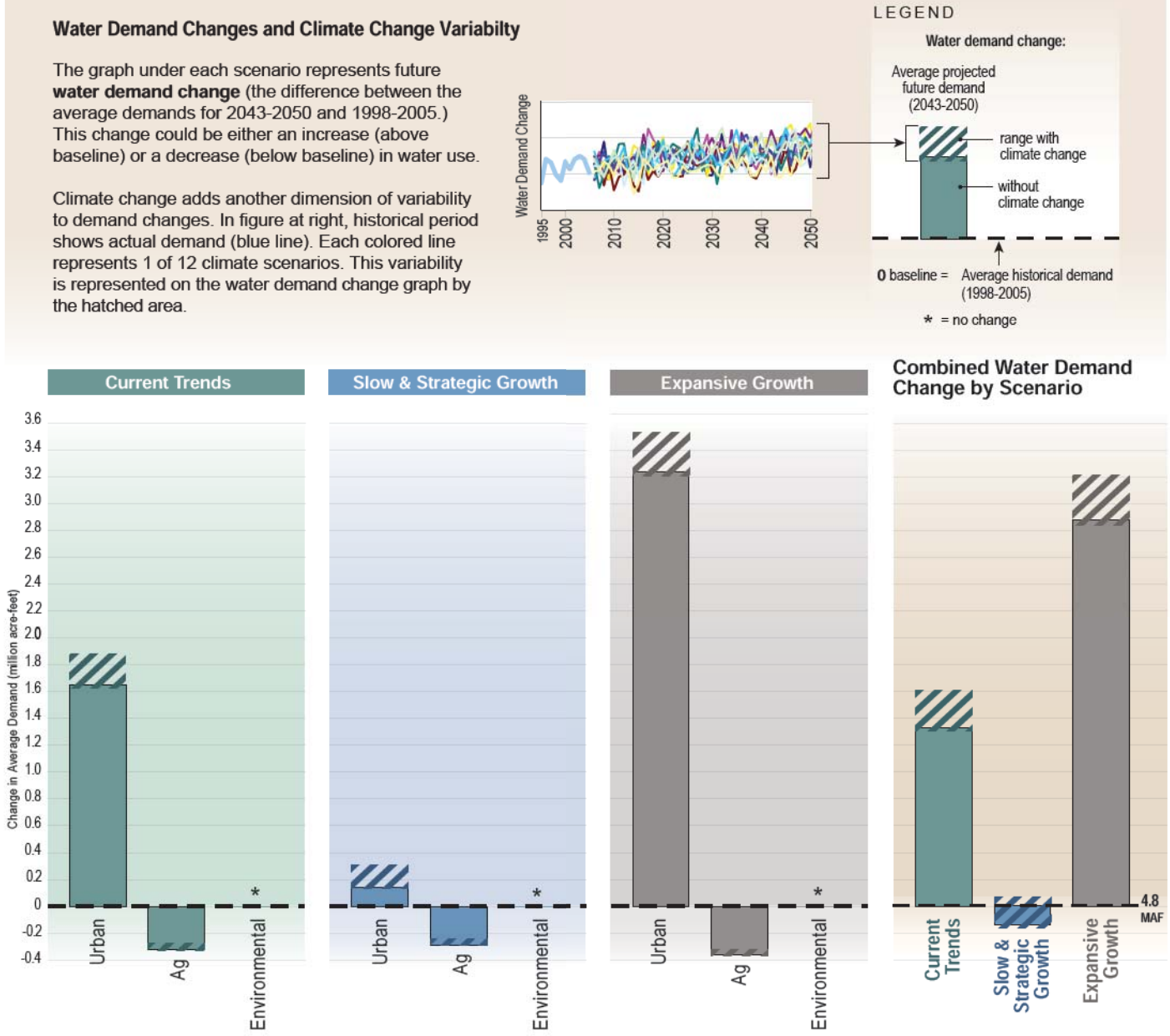
Future Scenarios

For Update 2009, we evaluated different ways of managing water in California depending on alternative future conditions and different regions of the state. The ultimate goal is to evaluate how different regional response packages, or combinations of resource management strategies from Volume 2, perform under alternative possible future conditions. The alternative future conditions are described as future scenarios. Together the response packages and future scenarios show what management options could provide for sustainability of resources and ways to manage uncertainty and risk at a regional level. See Box SC-4 scenario descriptions.

Total Demand

Change in total water demand in the South Coast Hydrologic Region for the three scenarios, Current Trends, Slow & Strategic Growth and Expansive Growth is shown in Figure SC-9. The change in water demand is based on the difference between the historical average (1998-2005) and future average (2043-2050) water demands. Future demand is shown with and without climate change. The change in water demand

Figure SC-9 Water demand changes by scenario, South Coast Hydrologic Region



without climate change is shown with solid bars and those with climate change is shown with hatched bars. As shown in the figure, there is considerable variation in the magnitude in demand increases across the three scenarios. Equally noticeable, Slow & Strategic Growth shows a dramatic reduction in demand when compared with Current Trends; from 1,325 thousand acre-feet down to a reduction of 140 thousand acre-feet. Considering 12 climate change alternatives (hatched bar), pronounced range of water demand change are observed under all three scenarios.

Urban Demand Change

Figure SC-9 shows urban water demand change in the South Coast region with and without climate under the Current Trends, Slow & Strategic Growth, and Expansive Growth scenarios. Without climate change, all three scenarios show an increase in urban water demand. Expansive Growth, however, shows marked increase in water demand when compared with Current Trends; an increase from 1,645 thousand acre-feet with Current Trends to 3,240 thousand acre-feet with Expansive Growth scenario. This shows urban growth and expansion in the South Coast area dramatically increases demand for water. The Slow & Strategic Growth scenario, however, shows a smaller relative increase in water demand (145 thousand acre-feet). When climate change is considered, all three scenarios showed an increase in urban water demand across most future climate sequences.

Agricultural Demand Change

Change in agricultural water demand in the South Coast region is shown in Figure SC-9. Future agricultural water demand is generally reduced due to reduction in irrigated acreage from urbanization and increased background water conservation. Without climate change (solid bar), Expansive Growth shows a slightly larger reduction (360 thousand acre-feet), followed by Current Trends scenario (320 thousand acre-feet). Under the Slow & Strategic Growth scenario, however, agricultural demand shows a slightly lower reduction of about 285 thousand acre-feet. When climate change is considered (hatched bar), water demand reductions are the same or less than demand reductions without climate change.

Environmental Demand Change

Figure SC-9 shows a base environmental water demand of about 130 thousand acre-feet in South Coast region. No additional environmental water demands are assumed for the South Coast beyond current commitments.

Appendix A. Flood Management

Historic Floods

Flood Parameters

Table SCA-1, Record floods for selected streams, is based on US Geological Survey records. The stations were selected from all USGS gaging stations in the hydrologic region, according to the criteria in Box SCA-1. (The table is supplemented with four additional sites. See Table note 6.)

Box SCA-1 Selection Criteria

- The watercourse must be a natural stream with a watershed of at least 100 square miles.
- The station must have a reasonably continuous record of discharge from 1996 to the present.
- The station must be far enough from other stations on the same river to reasonably represent a separate condition.
- Stations in well defined watercourse locations such as deep canyons are omitted, unless particularly important to the overall flood situation.

Flood Descriptions

Early Floods. The South Coast region has seen many floods over the past 198 years. One of the earliest recorded floods occurred along the Santa Ana River in 1810 and washed away adobes.

One of the more prominent floods in California history was the "Great Flood" of 1861-62. Heavy flooding during this event inundated large areas of the west coast and transformed much of Orange County into an inland sea. This flood event was unusual in that it occurred during the severe drought of 1856-64 and floodwaters did not recede for 20 days.

In 1884 the region experienced an unusually long wet season, receiving rains well into June and more than doubling the seasonal average. The second of two floods that occurred inundated the towns of Santa Ana and Orange, and caused the Santa Ana River to cut a new channel to the sea.

Two floods occurring in 1914 and 1916 provided significant insight on the relationship between urban development in the Los Angeles Basin and the flood damage potential of the surrounding rivers. In 1914 floodwaters caused over $10 million in damages and took the lives of many people. In 1916 a similar flood event caused significant damage to the Los Angeles area when inadequately sized bridges acted as debris plugs. Following these floods in 1920 the Los Angeles County Flood Control District built Devil's Gate Dam, the first flood control dam in Los Angeles County.

Another significant flood in 1925 was so severe that it altered the course of both the Santa Ana and Los Angeles rivers.

In 1928, the St. Francis Dam, located 40 miles northwest of Los Angeles, catastrophically failed and the resulting flood killed more than 600 people. The collapse of the St. Francis Dam remains the second-greatest loss of life in California's history, after the 1906 San Francisco earthquake and fire. The concrete dam was part of the Los Angeles Aqueduct system.

Table SCA-1 Record floods for selected streams, South Coast Hydrologic Region

Stream	Location	Mean annual runoff (taf)	Peak stage of record (ft)	Peak discharge of record (cfs)
Cottonwood Cr.	above Tecate Creek, near Dulzura[5]	11	11.2	11,700
San Diego R.	at Fashion Valley, at San Diego	28[2]	13.5	9,430
San Diego R.	at Mast Road, near Santee	18	18.1	45,400
Santa Ysabel Cr.	near Ramona	8	14.3	28,400
San Luis Rey R.	at Oceanside	26	21.7	25,700
Santa Margarita R.	at Ysidora	45[2]	20.5	44,000
Santa Margarita R.	near Temecula	21[2]	22.5	31,000
Temecula Cr.	near Aguanga	6	14.6	8,100
Murrieta Cr.	at Temecula	15[2]	17.2	25,000
San Juan Cr.	at La Novia Street Bridge, at San Juan Capistrano	16	20.7[1]	28,500
Santa Ana R.	at Santa Ana	57[2]	9.0	31,700
Temescal Cr.	above Main Street, at Corona	24[2]	6.7	4,720
San Jacinto R.	near Elsinore	12	11.8	16,000
Salt Cr.	at Murrieta Road, near Sun City	2	11.23[1]	4,120
San Jacinto R.	near San Jacinto	14	5.3[1]	45,000
Santa Ana R.	at MWD Crossing, near Arlington	115[2]	16.6	47,800
Lytle Cr.	at Colton	6	14.8	17,500
San Timoteo Cr.	near Loma Linda	3	8.2	15,000
San Gabriel R.	below Santa Fe Dam, near Baldwin Park	47	22.2	30,900
Rio Hondo	below Whittier Narrows Dam	125	13.8	38,800
Rio Hondo	at South Gate[6]	38	15.4	48,100
Big Tujunga Cr.	below Hansen Dam	18[2]	7.6	15,200
Los Angeles R.	at Long Beach[6]	194	18.3	128,700
Los Angeles R.	at Sepulveda Dam	39	12.1[1]	14,700
Ballona Cr.	at Culver City[6]	36	16.0	32,500
Malibu Cr.	at Malibu Canyon[6]	21	21.4	33,800
Calleguas Cr.	near Camarillo	37	10.5[1]	25,900
Santa Clara R.	at Montalvo[3]	122	17.4	165,000
Sespe Cr.	near Fillmore	93	25.0[1,4]	85,300
Piru Cr.	above Frenchmans Flat	31	n/a	36,000
Santa Clara R.	near Piru	55	12.7[1]	32,000
Ventura R.	near Ventura	51[2]	29.3[1]	63,600

Note: taf = thousand acre-feet; ft = feet; cfs = cubic feet per second

1 Different date than peak discharge

2 Most recent but less than period of record

3 Gage discontinued 2004

4 Resulting from a debris wave

5 Gage discontinued 2007

6 Data source not USGS

In 1938 a flood inundating over 250,000 acres in Orange, Riverside, San Bernardino, Los Angeles, and Ventura Counties caused an estimated $78.5 million in damages and killed 87 people.

1969. Flooding in 1969 took the lives of 103 people and caused more than $160.1 million in damages to the South Coast Hydrologic Region. Due to increased development, the 1969 flood was the worst on record for the counties of Ventura, Orange, San Bernardino, and Riverside.

1978. In 1978 intense storms combined with inadequate drainage systems caused widespread street flooding and forced the evacuation of homes and businesses residing in lower elevations in Ventura, Los Angeles, Orange, San Bernardino, and Riverside counties. Damages caused by this event were estimated to be $86 million.

1980. In 1980 a powerful series of storms left the region with destroyed homes, washed out bridges and roads, and disrupted utilities. Thousands of people were evacuated from the area, and 29 people lost their lives. Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties were declared disaster areas by President Carter.

1992. A heavy downpour led to spill at the Las Llajas Dam near Simi Valley, resulting in considerable erosion on Las Llajas Creek and bridge damage in Moorpark.

Flood Governance

Many federal, State, and local agencies have responsibilities in the overall effort to manage floods. The principal participants in the South Coast Hydrologic Region and their activities are listed in Table SCA-2, Flood management participants. Most listed activities are self-explanatory. Descriptions of some are:

- **Flood project development.** Performing feasibility studies, planning, and design of constructed facilities.
- **Encroachment control.** Establishing, financing, and operating a system of permitting and enforcing permits to encroach on constructed facilities.
- **Floodplain conservation or restoration.** Any overt activity causing part of a floodplain to remain in effect or to be reinstated as a watercourse overflow area.
- **Flood insurance administration or participation.** Contribution to the management of or acting as a sponsor and cooperator in the National Flood Insurance Program including the Community Rating System.
- **Hydrologic analysis.** Hydrologic or statistical analysis of collected hydrometeorological data.
- **Flood education.** Informing the general public about any aspect of flood management; publishing or broadcasting collected hydrometeorological data or other flood-related material.
- **Recovery operations.** Financing or performing any activity intended to return flood-impacted facilities or persons to normal status.

- **Event management system administration.** Oversight of the National Incident Management System/Standardized Emergency Management System (NIMS/SEMS) as applied to California.

In the Santa Clara, the Ventura County Watershed Protection District provides flood management to 1,670 square miles. The agency divides the county into four zones; each zone is managed separately to protect aquatic ecosystems, human life and health, and other natural resources.

In the Metropolitan Los Angeles Planning Area, the Los Angeles County Flood Control District (LACFCD) was created in 1915 to provide for the control and conservation of flood, storm, and other waste waters. LACDPW's Watershed Management Division was created in 2000 to evaluate and address flood control needs from an integrated watershed management approach taking into account flood protection, water quality and conservation, and enhancement of habitat, open space, and recreational opportunities.

In the Santa Ana Planning Area, the Orange County Flood Control District manages 790 square miles and more than 350 miles of flood channels, dams, pump stations, flood control basins and other infrastructure. The San Bernardino County Flood Control District is responsible for providing flood protection, water conservation, and storm drain construction. The district is divided into six planning zones that cover an area of 21,105 square miles; each zone functions independently. The Riverside County Flood Control and Water Conservation District provides flood management to 2,700 square miles in the western region of the county. The district divides its jurisdiction into seven management zones; each zone is managed separately.

In the San Diego Planning Area, the San Diego County Flood Control District is responsible for flood management in 4,200 square miles of unincorporated San Diego County. Individual municipalities are responsible for flood management within their jurisdictions. Although flood management is a top priority, the agency's other responsibilities include water supply, watershed-based recreation, water quality enforcement, and watershed rehabilitation.

Flood Risk Management

Structural Approaches

Construction of several major flood control projects in the South Coast region has been the responsibility of US Army Corps of Engineers with the Natural Resources Conservation Service and other public agencies participating on a much smaller scale. Maintenance of these flood control facilities is primarily left to local agencies, with the exception of a few structures under the purview of the USACE.

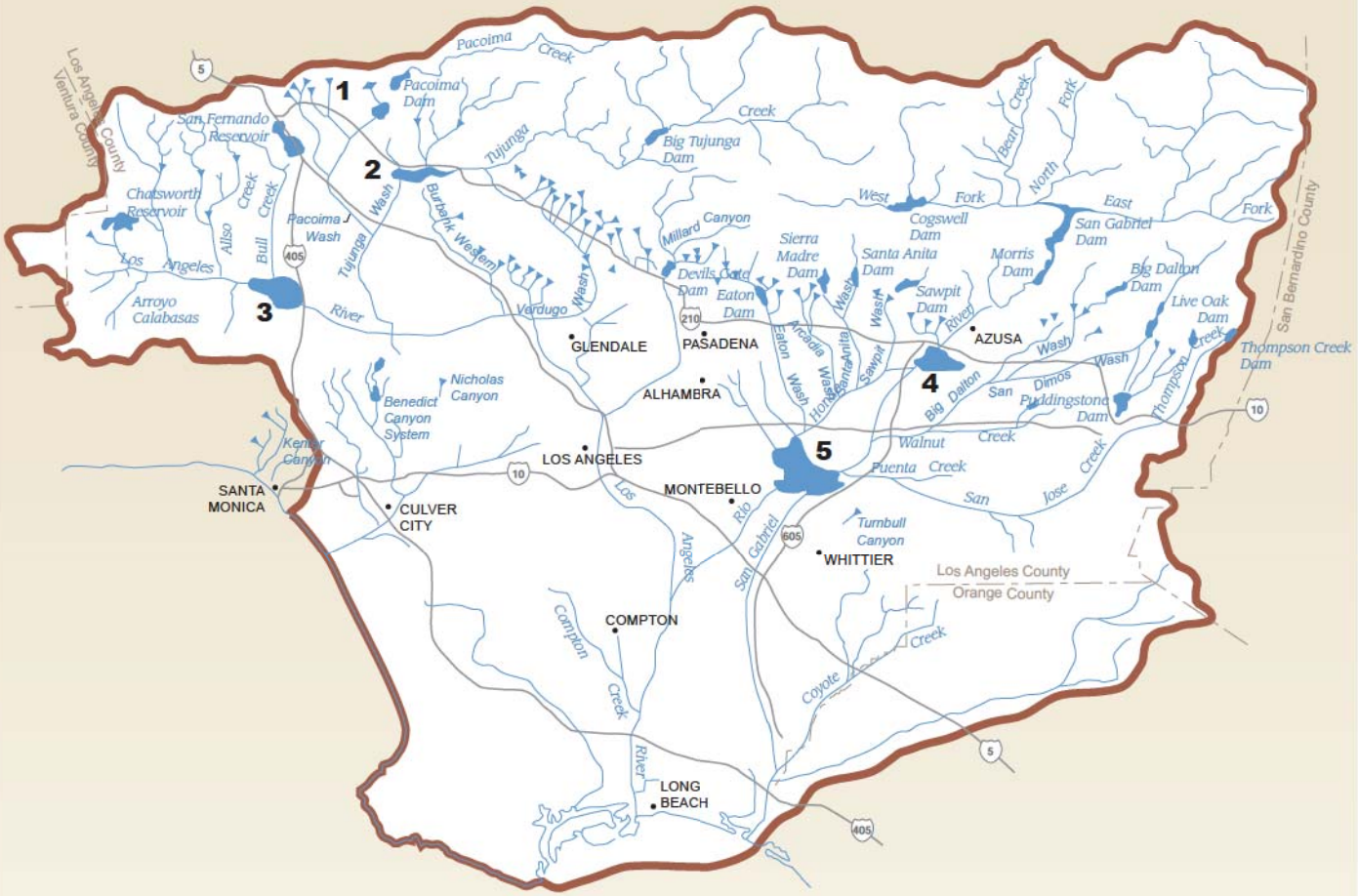
Two of the most extensive individual flood control systems in California are found in the region. These are:

- The Los Angeles County Drainage Area Project, principally in the watersheds of Los Angeles and San Gabriel Rivers and the Rio Hondo. The local sponsor is the

Table SCA-2 Flood management participants, South Coast Hydrologic Region

	Structural approaches						Land use management							Preparedness, response and recovery									
	Flood projects						Floodplains			Flood insurance			Regulation	Data management				Event management						
	Financing	Development	Construction	Operation	Encroachment control	Maintenance	Conservation	Restoration	Delineation	Administration	Participation	FIRM mapping	Building permits	Designated floodways	Data collection	Hydrologic analysis	Data station maintenance	Flood education	Preparedness	Response management	Response personnel	System administration	Recovery funding	Recovery operations	Mitigation
Federal agencies																									
Federal Emergency Management Agency										●		●											●		●
National Weather Service															●	●	●	●	●	●	●				
Natural Resources Conservation Service	●	●	●															●							
US Geological Survey															●	●	●								
US Army Corps of Engineers	●	●	●	●	●	●									●	●	●	●	●	●	●		●	●	●
State agencies																									
California Conservation Corps																				●	●				
Department of Corrections																					●				
Department of Forestry and Fire Protection																				●					
Department of Water Resources	●	●	●	●	●	●			●	●		●			●	●	●	●	●	●	●		●	●	
Office of Emergency Services																			●	●	●	●	●		●
Local agencies																									
County emergency services units																			●	●	●				
County planning departments														●											
County building departments													●												
Local flood maintenance organizations				●	●	●																			
Local conservation corps																				●	●				
Local initial responders to emergencies																			●	●	●				
Los Angeles County Flood Control District	●	●	●	●	●	●	●	●	●			●													
Orange County Flood Control District	●	●	●	●	●	●	●	●	●			●													
Riverside County Flood Control and Water Conservation District	●	●	●	●	●	●	●	●	●			●													
San Bernardino County Flood Control District	●	●	●	●	●	●	●	●	●			●													
San Diego County Flood Control District	●	●	●	●	●	●	●	●	●			●													
Ventura County Watershed Protection District	●	●	●	●	●	●	●	●	●		●	●							●	●					

Figure SCA-1 Los Angeles County Drainage Area Project



Multipurpose Projects

1 Lopez Dam
2 Hansen Dam
3 Sepulveda Dam
4 Santa Fe Dam
5 Whittier Narrows

— Drainage area boundary
Debris basin

Los Angeles County Flood Control District (LACFCD). The project, depicted in Figure SCA-1, Los Angeles County Drainage Area Project, includes 20 dams, 90 debris basins, and 458 miles of improved channels.

- The Santa Ana River Project and Santa Ana Main Stem Project, implemented successively on the Santa Ana River, also include multiple dams and many miles of new or improved channels. Figure SCA-2, Santa Ana River Basin and Orange County projects, illustrates these facilities.

The principal reservoirs and non-storage facilities contributing to flood control are listed in Table SCA-3, Flood control facilities.

Disaster Preparedness, Response, and Recovery

Management of flood emergencies is the responsibility of many organizations and individuals. Response is required by law to conform to the Standardized Emergency Management System, under which action is taken by levels of organization. It is begun by the person or organization on the site. That entity resists personal injury and property damage to the best of its ability, only calling on the next level when its resources become insufficient, and succeeding levels follow the same procedure. Table SCA-4, Flood emergency responders indicates the responsible entities at successive levels of response.

Table SCA-5, Advanced Hydrologic Prediction Service stream forecast points, is a list of forecast points that can be used in the Advanced Hydrologic Prediction Service of NWS.

Integrated Regional Water Management

The South Coast Region has a high density of integrated regional water management plans covering the hydrologic region. Of 14 plans, five have incorporated flood control and/or floodplain management components. The San Diego IRWMP discusses the integration of floodplain management into the plan, but does not elaborate on specific projects. The Central Orange County IRWMP discusses the Orange County Flood Control District and the role it serves as a participating flood control entity in the plan. The Watersheds Coalition of Ventura County IRWMP is coordinated with the Integrated Watershed Protection Program, allowing for county-wide planning of flood reduction measures over a 20 year horizon. For example, in the Calleguas Creek basin, which is a 341 square mile watershed, one of the ongoing projects is the Calleguas Creek IWPP Phase II Management Strategy Study. This project will provide multi-purpose outcomes including flood control, sedimentation balance and control, water quality improvement, land use management, groundwater recharge, ecosystem mitigation and restoration, and recreational opportunities. When and where opportunities become available, projects of this type will be proposed, planned, and implemented on a collaborative basis in all four zones within Ventura County. The San Jacinto River Watershed Management Plan discusses a strategy that incorporates multi-objective projects for storm water and flood management. The RCWD/Upper Santa Margarita plan discusses floodplain management and the important role it plays in protecting public and private property.

Figure SCA-2 Santa Ana River Basin and Orange County projects

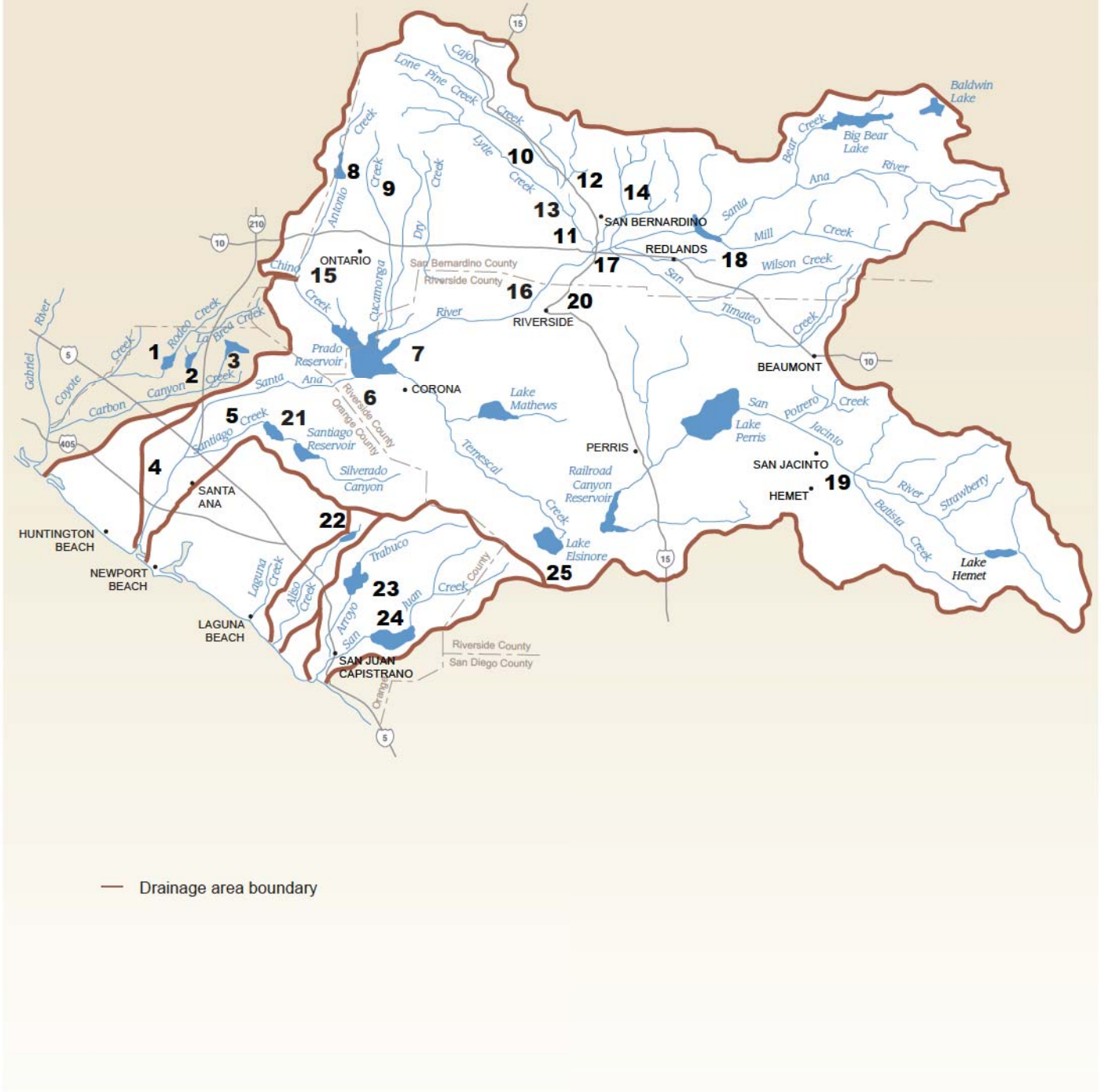


Table SCA-3 Flood control facilities, South Coast Hydrologic Region

Facility	Stream	Owner (Sponsor)	Description	Protects
RESERVOIRS AND LAKES				
Big Dalton Res.	Big Dalton Cr.	LA Co. DPW	1,000 AF flood control	Cities of eastern Los Angeles Co.
Santa Anita Res.	Trib. Rio Hondo	LA Co. DPW	800 AF	Cities of eastern Los Angeles Co.
Big Tujunga Res.	Big Tujunga Cr.	LA Co. DPW	6,000 AF flood control	Urban areas in Tujunga Canyon
Cogswell Res.	W. Fork San Gabriel R.	LA Co. DPW	11.100 AF flood control	Urban areas in W. Fork San Gabriel R.
Devils Gate Res.	Arroyo Seco	LA Co. DPW	1600 AF flood control	Pasadena, Alhambra & E. Los Angeles
Live Oak Res.	Live Oak Cr.	LA Co. DPW	200 AF flood control	Cities of E. Los Angeles Co.
Eaton Wash Res.	Eaton Wash	LA Co. DPW	900 AF flood control	Pasadena. ther cities of metro Los Angeles
Pacoima Res.	Pacoima Cr.	LA Co. DPW	3,600 AF flood control	Cities of San Fernando Valley
San Dimas Res.	San Dimas Wash	LA Co. DPW	1,300 AF flood control	Cities of eastern Los Angeles Co.
Puddingstone Diversion Res.	San Dimas Wash	LA Co. DPW	200 AF flood control	Cities of eastern Los Angeles Co.
Puddingstone Res.	Walnut Cr.	LA Co. DPW	16,400 AF flood control	Cities of eastern Los Angeles Co.
San Gabriel Res.	San Gabriel R.	LA Co. DPW	43,600 AF flood control	Cities of eastern Los Angeles Co.
Thompson Creek Res.	Thompson Cr.	LA Co. DPW	500 AF flood control	Cities of eastern Los Angeles Co.
Hansen Dam (LACDA project)	Tujunga Wash	USACE	29,700 AF flood control	Lower Part of San Fernando Valley & City of Los Angeles
Sepulveda Dam (LACDA project)	Los Angeles R.	USACE	17,300 AF flood control	Cities in western Los Angeles Co.
Lopez Dam (LACDA project)	Pacoima Wash	USACE	200 AF flood control	Cities in San Fernando Valley
Santa Fe Dam (LACDA project)	San Gabriel R.	USACE	32,600 AF flood control	Cities of eastern Los Angeles Co.
Whittier Narrows Dam (LACDA project)	Rio Hondo San Gabriel R.	USACE	36,200 AF flood control	Cities in central Los Angeles metro area
Alessandro Dam	Alessandro Cr.	RCFCWCD	400 AF flood control	City of Riverside
Box Springs Dam	Box Springs Cr.	RCFCWCD	400 AF flood control	City of Riverside
Harrison Street Dam	Harrison Cr.	RCFCWCD	200 AF flood control	City of Riverside
Pigeon Pass Dam	Pigeon Pass Cr.	RCFCWCD	1,400 AF flood control	City of Moreno Valley
Prenda Dam	Prenda Cr.	RCFCWCD	200 AF flood control	City of Riverside
Sycamore Dam	Sycamore Cyn.	RCFCWCD	900 AF flood control	City of Riverside
Woodcrest Dam	Woodcrest Cr.	RCFCWCD	400 AF flood control	City of Riverside
Mockingbird Dam	Mockingbird Cyn.	City of Riverside	1,000 AF flood control	City of Riverside
Lake Elsinore Res.	L. Elsinore	USACE (EVMWD)	61,200 AF flood control	City of Lake Elsinore
Brea Dam (SAROC projects)	Brea Cr.	USACE (OCFCD)	4,000 AF flood control	Fullerton & Buena Park
Fullerton Dam (SAROC projects)	East Fullerton Cr.	USACE (OCFCD)	800 AF flood control	Fullerton, Buena Park, and La Palma
Prado Dam (SAROC projects)	Santa Ana R.	USACE	196 taf flood control	Urban areas in Lower Orange County

Table SCA-3 Flood control facilities, South Coast Hydrologic Region (continued)

Facility	Stream	Owner (Sponsor)	Description	Protects
Villa Park Dam (SAROC projects)	Santiago Cr.	OCFCD	15,600 AF flood control	Cities of Orange, Santa Ana and other urban areas of Orange County
Seven Oaks Dam (SAROC projects)	Santa Ana R.	OCFCD, RCFCWCD, SBCFCD, USACE	146 taf flood control	Urban Orange County
Carbon Canyon Dam (SAROC projects)	Carbon Canyon Cr.	USACE	6,600 AF flood control	Anaheim, Los Alamitos, Placentia Naval Air Station
San Antonio Dam (SAROC projects)	San Antonio Cr.	USACE	7,600 AF flood control	Pomona, Claremont, Chino, Ontario & Upland
Beardsley Wash	Beardsley Wash	Ventura Co. Watershed Mgmt. Dist. (NRCS)	Debris basin, drop spillways, channels	Oxnard plain
NON-STORAGE FLOOD CONTROL FACILITIES				
Los Angeles County Drainage Area (LACDA) project	Los Angeles R., San Gabriel R., Rio Hondo, Ballona Cr., and tributaries	USACE (LA Co. DPW)	Improved channels	Los Angeles metropolitan area, San Fernando Valley
Santa Ana River Basin and Orange County (SAROC) projects	Santa Ana R., San Jacinto R., Carbon Cr., Cucamonga Cr. and tributaries, Devil Cr., East Twin Cr., Warm Cr., Lytle Cr., Cajon Cr., Mill Cr., Chino Cr., San Antonio Cr., Bautista Cr.	USACE (OCFCD, SBCFCD, RCFCWCD)	Levees, improved channels, bypasses, debris basins, detention basins, revetment, groins, floodplain management, bank stabilization	Anaheim, Los Alamitos, Upland, Ontario, Cucamonga, Alta Loma, San Antonio Heights, San Bernardino and vicinity, Rialto, Bloomington, Colton, Redlands, Mentone, Corona, Rubidoux, Pomona, Claremont, Chino, San Jacinto, Hemet, Valle Vista
Kenter Canyon Conduit and Channel	Local drainage	USACE (LA Co. DPW)	Conduit and channel	Los Angeles, Santa Monica
San Diego River	San Diego R.	USACE (City of San Diego)	Levee, channel improvements	San Diego
Santa Clara River Basin	Santa Clara R., Santa Paula Cr.	USACE (Ventura Co. WPD)	Levees, improved channel	Oxnard, Port Hueneme, Santa Paula
Stewart Canyon	Stewart Cr.	USACE (Ventura Co. WPD)	Debris basin, channel	Ojai
Sweetwater River	Sweetwater R.	USACE (Caltrans, San Diego Co. FCD)	Improved channel	San Diego, Chula Vista, National City
Tijuana River	Tijuana R.	USACE	Levees. Improved channel	Tijuana. Mexico
Ventura River	Ventura R.	USACE (Ventura Co. WPD)	Levee	Ventura and vicinity
San Luis Rey River	San Luis Rey R.	USACE (San Diego Co. FCD)	Levee	San Luis Rey River valley
Santiago Creek	Santiago Cr.	USACE (OCFCD)	Improved channel, storage basin	Santa Ana
City Creek	City Cr.	USACE (SBCFCD)	Levee, revetment, improved channel	San Bernardino
Los Coches Creek	Los Coches Cr.	USACE (San Diego Co. FCD)	Channel	Lakeside

Table SCA-3 Flood control facilities, South Coast Hydrologic Region (continued)

Facility	Stream	Owner (Sponsor)	Description	Protects
Rose Creek	Rose Cr.	USACE San Diego Co. FCD)	Improved channel	San Diego
Telegraph Canyon Creek	Telegraph Canyon Cr.	USACE (San Diego Co. FCD)	Channels, culverts	Chula Vista
Aliso Creek	Aliso Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Arroyo Calabasas	Arroyo Calabasas	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Bell Creek	Bell Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Browns Creek	Browns Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Bull Creek	Bull Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Limekiln Creek	Limekiln Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Lower East Canyon	Lower East Canyon	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Santa Susana Creek	Santa Susana Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Upper East Canyon	Upper East Canyon	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Wilbur Creek	Wilbur Cr.	Los Angeles CO. DPW (NRCS)	Channels	San Fernando Valley
Main Street Canyon	Main Street Canyon	Riverside Co. FCWCD (NRCS)	Small flood control project	Riverside Co.
Buena Vista Creek	Buena Vista Cr.	City of Vista (NRCS)	Channels	Vista
Beardsley Wash	Beardsley Wash	Ventura Co. Watershed Mgmt. Dist. (NRCS)	Debris basin, drop spillways, channels	Oxnard plain
Revolon Slough	Revolon Slough	Ventura Co. Watershed Mgmt. Dist. (NRCS)	Channels	Oxnard Plain

taf = thousand acre-feet

Table SCA-4 Flood emergency responders

Responder	Level	Comment
Person(s) or organization(s) on the site	0	Any emergency
Emergency services units of the 179 cities in the region	1	Any emergency
Emergency services units of the eight counties in the region	1 or 2	Any emergency, and by request from Level 1 responders
Department of Water Resources	2	Flood Operations Center, flood fight and Corps liaison
Office of Emergency Services, Inland Region	3	Any emergency, Kern County, by request of county (operational area)
Office of Emergency Services, Southern Region	3	Any emergency, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura Counties, by request of county (operational area)
U. S. Army Corps of Engineers	3	Specified water-related emergencies, by request of DWR
California Conservation Corps	3	Personnel and equipment for flood fight
Department of Forestry and Fire Protection	3	Personnel and equipment for flood fight
Office of Emergency Services Headquarters	4	All emergencies, entire hydrologic region, by request of OES Region

Table SCA-5 Advanced Hydrologic Prediction Service stream forecast points

River Basin	Stream	Location
Calleguas Creek	Calleguas Creek	CSU Channel Islands
San Diego River	San Diego River	El Capitan Reservoir
San Luis Rey River	San Luis Rey River	Lake Henshaw
San Luis Rey River	San Luis Rey River	Oceanside
San Diego River	San Vicente Creek	San Vicente Reservoir
Santa Ana River	Santa Ana River	Seven Oaks Reservoir
Santa Clara River	Santa Clara River	Freeman Diversion
Santa Clara River	Santa Clara River	Piru
Santa Margarita River	Santa Margarita River	Ysidora
Santa Clara River	Sespe Creek	Fillmore
Ventura River	Ventura River	Foster Park

Appendix B. Water Quality

Water Supplies

State Water Project

Legal decisions regarding environmental concerns in the Delta, however, have recently limited the volume of water that can be delivered south of the Sacramento-San Joaquin Bay Delta through the State Water Project (SWP). The potential impact of further declines in ecological indicators in the Delta system on SWP water deliveries is unclear. Additionally, the SWP is subject to extreme variability in hydrology due to a lack of storage, with full deliveries in only the wettest years. Other obstacles that must be overcome in importing water through the SWP include limitations on the movement of water across the Delta system, constraints related to water quality, and the cost of the water. The Governor's Delta Vision Strategic Plan (2008) recently recommended two co-equal goals and associated actions: (1) restore the Delta ecosystem and (2) create a reliable water supply for California. The plan recommends improving the existing channel through the Delta, developing a second conveyance channel, increasing storage capacity, and expanding local supplies to reduce dependence on imports. The Bay-Delta Conservation Plan, under development by a collaboration of State, federal, and local water agencies, will further address the recovery of endangered and sensitive fisheries in the Delta.

Colorado River System

The Metropolitan Water District of Southern California (Metropolitan) diverts Colorado River supplies based on the agreements in the 1931 California Seven-Party Agreement and the Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement of 2003 (QSA), which further quantifies priorities established in the 1931 document. Metropolitan's diversions, although within its legal entitlements, are less now than they were in the early 2000s. Surplus supplies which existed then have been reduced as other states increased their diversions in accord with their authorized entitlements. Since 2003, Metropolitan's annual deliveries have varied from a low of 633,000 acre-feet in 2006 to a high of 897,000 acre-feet in 2005. The QSA also identifies measures to conserve and transfer water through the lining of existing earthen canals. The San Diego County Water Authority has further developed conservation and transfer agreements with Imperial Irrigation District to augment its Colorado River Aqueduct supply. With full implementation of the programs identified in the QSA, Metropolitan plans to divert 852,000 acre-feet per year of Colorado River water annually plus any unused agricultural water that may be available. Additional conjunctive use agreements that Metropolitan have in operation to manage its Colorado River Aqueduct supply include the Hayfield, Chuckwalla, and Lower Coachella Valley groundwater storage programs.

Local Surface Water

Surface water in the Santa Clara Planning Area is obtained from Lake Casitas (254,000 acre-feet), Lake Piru (100,000 acre-feet), and from diversion projects along the Santa Clara River, Ventura River, Santa Paula Creek, Piru Creek, Sespe Creek, and Conejo Creek. Natural surface flows from these diversions are also directed to spreading basins to replenish local aquifers. Local surface water provides approximately 8.5 percent of the total water utilized in Ventura County. The most southern reservoir on the West Branch of the SWP California Aqueduct is Castaic Lake (320,000 acre-feet). Metropolitan and CLWA both receive water from Castaic Lake and distribute it to retail water purveyors following treatment. Bouquet Reservoir (33,000 acre-feet) is a part of the Los Angeles Aqueduct (LAA) system built by the City of Los Angeles in 1934.

Originally, the Los Angeles River was the primary water source for the Metropolitan Los Angeles Planning Area. Following several catastrophic floods, the U.S. Army Corps of Engineers (USACE) lined most of the riverbed with concrete and constructed several dams to manage storm flows. The USACE continues to oversee Hansen, Lopez, and Sepulveda Dams in the Los Angeles River watershed, as well as Santa Fe and Whittier Narrows Dams in the San Gabriel River watershed. LACDPW oversees several surface water storage facilities, including Big Tujunga and Pacoima dams, which further improve flood protection and store runoff for subsequent diversion to 27 groundwater spreading basins. Eleven dams were constructed as part of the San Gabriel River and Montebello Forebay water conservation system to impound runoff for groundwater recharge. Three dams in San Gabriel Canyon (Cogswell, San Gabriel, and Morris dams) capture runoff for diversion to the Santa Fe, Rio Hondo, or San Gabriel Coastal Basin spreading grounds. Las Virgenes MWD uses Las Virgenes Reservoir (9,800 acre-feet) to store treated water it has purchased from Metropolitan. The Los Angeles Reservoir (10,000 acre-feet), operated by the LADWP, is a primary water source of the San Fernando Valley area.

The Santa Ana Planning Area has water storage reservoirs, including Lake Perris (124,000 acre-feet), which stores State Water Project water Lake Mathews (182,000 acre-feet) which stores Colorado River water, and Big Bear Lake (74,000 acre-feet). Additionally, several flood control projects, including Prado Dam (383,500 acre-feet) and Seven Oaks Dam (145,600 acre-feet) have been created to retain surface water during storm season. Although not a drinking water supply, Lake Elsinore is the only natural freshwater lake in the watershed with a surface area of five square miles. Surface water accounts for approximately five-percent of the total water supply to serve demands in the Santa Ana watershed.

In the San Diego Planning Area, a total of 25 reservoirs with a combined capacity of 594,000 acre-feet are located within the SDCWA's service territory. Major supply reservoirs include San Vicente (90,200 acre-feet), El Capitan (112,800 acre-feet), Lake Henshaw (50,000 acre-feet), and Lake Morena (50,200 acre-feet). Seventeen (17) of these reservoirs are connected to the SDCWA's aqueduct system. SDCWA plans to raise the existing dam at San Vicente Reservoir from 220 feet to 337 feet to provide an additional 100,000 acre-feet capacity for carryover storage (63 feet per Carryover

Storage Project) and 52,000 acre-feet capacity for emergency storage (54 feet per Emergency Storage Project). The increased reservoir capacity will also require construction of two auxiliary saddle dams and a three-year reservoir draw down. RCWD's surface storage system is comprised of Vail Lake (51,000 acre-feet). RCWD meets Temecula Gorge flow requirements of 2,500 acre-feet per year, as set by the Cooperative Water Resource Management Agreement between Camp Pendleton and RCWD, by discharging untreated imported water into Murrieta Creek, a tributary of the Santa Margarita River. Metropolitan owns and operates Diamond Valley Lake (800,000 acre-feet) and Lake Skinner (44,000 acre-feet) within the planning area.

Groundwater

In the South Coast region, natural recharge is typically insufficient to maintain groundwater basin water levels and current pumping levels due to the extent of impervious surfaces and the presence of clay soils. In some groundwater basins, as the demand for groundwater exceeded supply, landowners and other parties have turned to the courts to determine how much groundwater can rightfully be extracted. Most basin adjudications have resulted in either a reduction or no increase in the amount of groundwater extracted. Watermasters are further recognizing that they must also manage groundwater extraction to protect water quality and/or to prevent the spread of contaminants in groundwater. Adjudicated groundwater basins include: Central, Chino, Cucamonga, Main San Gabriel, Puente, Raymond, San Bernardino, Santa Margarita River, Santa Paula, Six Basins, Upper Los Angeles River, and the West Coast. Additional management of groundwater has been afforded through legislation to: Fox Canyon Groundwater Management Agency (GMA), Ojai GMA, Water Replenishment District of Southern California (WRD), and OCWD.

Groundwater production within the greater Metropolitan service area is estimated at 1.6 million acre-feet annually, employing nearly 5,000 acres of spreading basins and 36 injection wells (Metropolitan 2007). The discussion below provides examples of the larger basins, as there are too many small groundwater basins to name.

Groundwater is the largest single source of water in the Santa Clara Planning Area. The 66,200-acre Upper Santa Clara River Valley basin is comprised of two aquifers (an alluvial aquifer and a Saugus Formation aquifer) totaling approximately 1.9 million acre-feet of storage capacity. Due to extensive pumping by private well owners and by a majority of the 166 public water purveyors within Ventura County, overdraft and seawater intrusion problems were occurring to local groundwater basins. Established in 1982 by State legislation, the Fox Canyon GMA now manages some of the basins and is implementing actions to mitigate these issues. The 125,300-acre Lower Santa Clara River Valley basin is subdivided into five smaller basins: Oxnard, Mound, Santa Paula, Fillmore, and Piru. The largest of the sub-basins is the 58,000-acre Oxnard basin, which contains approximately 7.1 million acre-feet of storage capacity and is managed by the Fox Canyon GMA. Conjunctive use projects underway in Ventura County include Calleguas Conjunctive Use Program (North Las Posas Basin).

Many agencies in the Metropolitan Los Angeles Planning Area rely on artificial recharge, by diverting local supplies from rivers or creeks when flow conditions are optimal, to spreading grounds (or basins) which typically contain sandy soils that promote infiltration. LADWP, in partnership with the Los Angeles County Flood Control District, is moving forward with several storm water capture projects with the goal of increasing long-term groundwater recharge by a minimum 20,000 acre-feet per year. In addition, recycled water is infiltrated in spreading grounds and injected (along with imported water) along the coast to form barriers to seawater intrusion at three locations (the Alamitos, Dominguez Gap, and West Coast barriers). The 310,900-acre Coastal Plain of Los Angeles County basin is subdivided into 4 sub-basins: Santa Monica, Hollywood, Central, and West Coast. The Central and West Coast sub-basins represent almost 90 percent of the storage of the Coastal Plain basin and are both adjudicated for allowed pumping of up to 281,000 acre-feet per year. These sub-basins have a combined total storage capacity estimated at 20.3 million acre-feet and up to 450,000 acre-feet set aside for the development of future conjunctive use projects. Conjunctive use projects underway in Los Angeles County include Long Beach Conjunctive Use Storage Project (Central Basin).

Groundwater continues to be the primary water supply source in the Santa Ana Planning Area. Groundwater production is supported by incidental and artificial recharge of recycled water, imported water, and storm water supplies. On average, about 80,000 acre-feet per year of imported supplies from Metropolitan are recharged each year to support groundwater production. The 466,900-acre Upper Santa Ana Valley basin has nine sub-basins: Chino, Cucamonga, Rialto-Colton, Riverside-Arlington, Cajon, Bunker Hill, Yucaipa, San Timoteo, and Temescal. Total combined storage of the sub-basins is estimated at 21 million acre-feet. Groundwater pumping operations in the Chino, Bunker Hill, and Rialto-Colton sub-basins are managed under adjudication judgments. The 224,000-acre Coastal Plain of Orange County basin has a storage capacity of 37.7 million acre-feet. The Orange County groundwater basin, managed by OCWD, provides a majority of the water used by north and central Orange County cities. Conjunctive use of surface water and groundwater is a long-standing practice in the region, with numerous spreading grounds developed to recharge the basins. Phase I construction has been completed for OCWD and Orange County Sanitation District's Groundwater Replenishment System, which purifies 72,000 acre-feet per year of wastewater for groundwater storage either by injection along the seawater barrier or by percolation near the Santa Ana River. Conjunctive use programs underway in San Bernardino County include IEUA Cyclic Storage Agreement (Chino Basin) and Three Valley Municipal Water District Cyclic Storage Agreement (Main San Gabriel Basin).

Groundwater production in the San Diego Planning Area is limited by lack of storage capacity in local aquifers, availability of groundwater recharge, and degraded water quality. RCWD stores local runoff in Vail Lake via a surface water storage permit (up to 40,000 acre-feet from November 1 to April 30) and then releases available water to spreading basins for groundwater recharge. SDCWA does not utilize groundwater extraction to meet member agency needs. The proposed El Monte Valley Groundwater Recharge project, a joint effort between Padre Dam MWD and Helix WD in San Diego

County, would recharge the El Monte Valley Basin using highly treated recycled water. The Santa Margarita Conjunctive Use Project, by the Fallbrook PUD, provides for recharge of the groundwater basin underlying Camp Pendleton through diversions from the Santa Margarita River.

Recycled Water

Within Metropolitan's service area, there are approximately 355,000 acre-feet of planned and permitted uses of recycled water supplies. Actual use is approximately 209,000 acre-feet, which includes golf course, landscape, and cropland irrigation; industrial uses; construction applications; and groundwater recharge, including maintenance of seawater barriers in coastal aquifers. Metropolitan projects the development of 500,000 acre-feet of recycled water supplies (including groundwater recovery) by 2025 (Metropolitan 2004). A necessary component of water recycling is providing a means of disposal or storage for excess recycled water supplies during wet weather periods (other than discharge via regional ocean outfalls). Discharge of treated wastewater flows into streams and rivers can help satisfy environmental water demands and provide for incidental groundwater recharge. IPR through release of recycled water to groundwater spreading basins or surface storage reservoirs can further augment local drinking water supplies. By utilizing reclaimed water, agencies can more efficiently allocate their potable water and increase the reliability of water supplies in the region.

Recycled water in the Santa Clara Planning Area holds great potential as an alternative water source and a means to improve water supply reliability, particularly for agricultural irrigation. Four WWTPs in Ventura County currently reclaim a portion of their effluent. The Camrosa Water District recycles water from its own facilities, the City of Thousand Oaks' Hill Canyon WWTP, and Camarillo Sanitary District for agricultural and landscape irrigation demands. In the upper watershed, Santa Clarita Valley Sanitation District owns and operates two water reclamation plants (Saugus and Valencia) within the CLWA service area. A third reclamation plant is proposed as part of the Newhall Ranch project. Accordingly, CLWA has constructed an initial phase (Phase 1A) of the recycled water system and proposes to construct an additional phase in the near future.

Current average annual recycled water production in the Metropolitan Los Angeles Planning Area is approximately 225 million gallons per day (MGD), which represents approximately 25 percent of the current average annual effluent flows. WRD is permitted to recharge up to 50,000 acre-feet per year (45 MGD) of Title 22 recycled water from CSDLAC for replenishment of the Central sub-basin through use of the Montebello Forebay spreading grounds. West Basin MWD's Edward Little Water Recycling Facility in El Segundo, which produced approximately 24,500 acre-feet in 2004-2005, recently completed its Phase IV Expansion Project. Approximately 12,500 acre-feet per year of the water produced at this facility is purchased by WRD and injected into the West Coast Barrier by LACDPW. The use of recycled water by LADWP is projected to be approximately 50,000 acre-feet per year by 2019.

Recycled water currently represents approximately 4 percent of the total water demands in the Santa Ana Planning Area. Eastern MWD recycles effluent from four WWTPs. EMWD is reusing the majority of the treated wastewater. EMWD is also investigating the feasibility of indirect potable reuse through groundwater recharge, The Irvine Ranch Water District (IRWD) has developed an extensive recycled water treatment and delivery system and will expand capacity through 2013 to meet expected recycled water demand at buildout. Inland Empire Utilities Agency (IEUA) is expanding its water recycling with a goal of meeting 20 percent of their demand or 50,000 acre-feet with recycled water. The Western Water Recycling Facility, owned and operated by Western Municipal Water District, is currently being upgraded and expanded. Eastern Municipal Water District has Perris Valley and Moreno Valley Water Reclamation Facilities and recycled water is available through the OCWD's Green Acres Project and the El Toro Water District. As infrastructure is further developed, recycled water is projected to surpass surface water as a water supply source for the planning area. OCWD and Orange County Sanitation District's Groundwater Replenishment System provides 72,000 acre-feet per year of recycled water for groundwater recharge and injection along the seawater barrier.

The San Diego Planning Area contains a number of recycled water facilities. In Riverside County, water reclamation facilities include Santa Rosa and Temecula Valley which provide non-potable supplies for local use. Seventeen recycled water tertiary treatment facilities are located within San Diego County. The use of tertiary treated recycled water within the San Diego area is projected to increase from 11,500 acre-feet per year in 2005 to 47,600 acre-feet per year in 2030 (SDCWA 2007). In September 2008, the City of San Diego approved funding for an IPR demonstration project that releases advanced treated wastewater to San Vicente Reservoir for blending and subsequent additional treatment prior to redistribution.

Desalination

In the Metropolitan Los Angeles Planning Area, the 3 MGD Goldsworthy Desalter, owned and operated by WRD, provides brackish groundwater desalination for the dual purposes of remediation of a saline plume located within the West Coast sub-basin and provision of a reliable local water source to Torrance.

The potential for groundwater banking in the Santa Ana Planning Area is substantial, but the volume of clean water that can be stored may be hindered by high salt concentrations in the existing groundwater. In the Santa Ana watershed, three groundwater desalination plants have been constructed by SAWPA (in the Arlington and Chino areas) and are producing a total of 24 MGD. The Arlington Desalter is now owned and operated by Western Municipal Water District. The Temescal plant, constructed and operated by the City of Corona, has a capacity of 15 MGD. The Menifee and Perris Desalters, owned and operated by Eastern MWD, are producing 7 MGD. A third desalter (Perris II with a 5 MGD capacity is in design. The Chino Basin Desalter Authority operates Chino 1 and Chino II Desalters, which are producing 24 MGD (26,000 acre-feet per year).

The Irvine Desalter Project, a joint groundwater quality restoration project by IRWD and OCWD, yields 7,700 acre-feet per year of potable drinking water and 3,900 acre-feet per year of non-potable water. The Tustin Seventeenth Street Desalter, owned and operated by the City of Tustin yields approximately 2,100 acre-feet per year. The Arlington Desalter, managed by Western MWD, delivers approximately 6,400 acre-feet of treated groundwater annually to the City of Norco. Brine from local desalters is effectively transported from the watershed by SAWPA's 30 MGD capacity Santa Ana Regional Interceptor (SARI) brine pipeline to OCSD for treatment and then discharge to the ocean. As described above, groundwater extraction is limited in the San Diego Planning Area. Brackish groundwater desalination facilities in the planning area include the City of Oceanside's Mission Basin Desalter (6.37 MGD) and Sweetwater Authority's Reynolds Groundwater Desalination Facility (4 MGD).

Urban Water Conservation

Water conservation programs are coordinated in the Santa Clara Planning Area by a variety of agencies. Calleguas MWD, the local wholesaler of SWP supplies, administers programs with its member agencies in the southeastern portion of Ventura County. A regional agricultural interest group, the Ventura County Farm Water Coalition, was recently formed to collaborate on implementation of agricultural efficient water management practices. CLWA acts as the information clearinghouse for water conservation efforts in the upper watershed by purchasing advertising time in all media types and funding conservation programs by its member water retailers.

In the Metropolitan Los Angeles Planning Area, Metropolitan assists member agencies with implementation of water conservation programs. Additionally, LADWP implements public outreach and school education programs to encourage conservation ethics; seasonal water rates that are approximately 20 percent greater during the summer high use period; and free water conservation kits. As a result of these conservation efforts by LADWP, the water demand for Los Angeles is about the same as it was 25 years ago, despite a population increase of more than 1 million people. LADWP projects an additional savings of at least 50,000 acre-feet per year by 2030 through additional water conservation programs. The Central and West Basin MWDs recently completed water conservation master plans to coordinate and prioritize conservation efforts and identify enforcement protocols.

OCWD implements several water use efficiency programs in the Santa Ana Planning Area, including a hotel/motel water conservation program, an annual Children's Water Festival and a Water Heroes program and water saving tips and tools. Eastern Municipal Water District has a strategic goal to reduce per capita water use and has several programs to replace existing inefficient water devices and encourage water efficiency in new development. IEUA provides multiple rebate programs, including turf removal and water efficient fixtures, and has established the Inland Empire Landscape Alliance to promote the use of water efficiency landscaping by its cities and retail agencies. Western Municipal Water District operates the preeminent water conservation demonstration

center in the southland, Landscapes Southern California Style, which has been educating the public about water efficient planting and irrigation for over 15 years.

In the San Diego Planning Area, significant SDCWA and member agency funding has been directed toward implementing water conservation programs. Major programs include water efficient purchase incentives, efficiency standards, residential surveys, residential retrofits, landscape/irrigation improvements, and commercial/industrial/institutional retrofits. These programs resulted in 53,400 acre-feet of water savings during 2005; water savings are projected to annually exceed 100,000 acre-feet by year 2025. Numerous partnerships have also been developed to implement retail agency projects supported by external funding. For example, the 2007 Blueprint for Water Conservation is a partnership of SDCWA, member agencies, Cuyamaca College's Water Conservation Garden, and private stakeholders dedicated to increasing regional water conservation to 80,000 acre-feet per year by 2010 and further to 108,000 acre-feet per year by 2030.

Table SCB-1 Water Suppliers in the South Coast Hydrologic Region

Entity	Local Supply				Imported	Imported Supplier
	Surface	Groundwater	Desalination	Recycle		
Metropolitan Water District of Southern California (MWDSC)					•	SWP
Calleguas Municipal Water District (MWD)		•	•	•	•	MWDSC
Academy MWC, Arroyo Las Posas MWC, Balcolm Bixby MWA, Berylwood Heights MWC, Brandeis-Bardin MWC, Butler Ranch MWC, California Water Service Company, California-American Water Company, City of Camarillo, Camrosa Water District, Crestview MWC, Golden State Water Company, Del Norte MWC, Epworth MWC, Fuller Falls MWC, La Loma Ranch MWC, Lake Sherwood CSD, Las Lomas Water System, Mesa Water Co., Oak Park Water Service, City of Oxnard, Pleasant Valley MWC, Rancho Canada Water Company, Thermic MWC, City of Simi Valley, Solano Verde MWC, City of Thousand Oaks, Ventura County Waterworks District No. 1, Ventura County Waterworks District No. 8, Ventura County Waterworks District No. 17, Ventura County Waterworks District No. 19, Zone MWC	•	•	•	•	•	Calleguas MWD, United Water Conservation District
Central Basin MWD		•		•	•	MWDSC
City of Bell Gardens, City of Downey, City of Montebello, City of Norwalk, City of Vernon, City of La Habra Heights, City of La Mirada, City of Pico Rivera, City of Santa Fe Springs, City of Whittier, City of Bell, City of Commerce, City of Huntington Park, City of Maywood, City of Walnut Park, City of Lynwood, City of South Gate, City of Florence-Graham, City of Willowbrook, City of Artesia, City of Bellflower, City of Cerritos, City of Hawaiian Gardens, City of Lakewood, City of Paramount, City of Signal Hill, Water Replenishment District of Southern California (WRD)						Central Basin MWD
Eastern MWD		•		•	•	MWDSC
City of Hemet, City of Perris, City of San Jacinto, City of Menifee, Nuevo MWC, Moreno Valley MWC, Lake Hemet MWD, Rancho California Water District	•	•		•	•	Eastern MWD, Western MWD
Foothill MWD	•	•			•	MWDSC
Crescenta Valley Water District, La Canada Irrigation District, Mesa Crest Water Company, Valley Water Company, Las Flores Water Company, Lincoln Avenue Water Company, Rubio Canon Land and Water Association, Kinneloa Irrigation District		•			•	Foothill MWD
Inland Empire Utilities Agency (IEUA)				•	•	MWDSC
City of Chino, City of Chino Hills, City of Upland, Cucamonga Valley Water District, City of Fontana, City of Montclair, City of Ontario, City of Upland, Monte Vista Water District, Fontana Water Co., San Antonio Water Co.,	•	•		•	•	IEUA
Las Virgenes MWD					•	MWDSC
Municipal Water District of Orange County (MWDOC)		•			•	MWDSC
City of Brea, City Buena Park, East Orange County Water District (EOCWD), City of Fountain Valley, City Garden Grove, Golden State Water Co-Orange County District, City of Huntington Beach, City of La Habra, City of La Palma, Mesa Consolidated Water District, City of Orange, Orange County Water District (OCWD), City of Newport Beach, Santa Margarita Water District, City of Seal Beach, Serrano Water District, City of Tustin, City of Westminster, Yorba Linda Water District, El Toro Water District, Emerald Bay Service District, Irvine Ranch Water District (IRWD), Laguna Beach County Water District, Moulton Niguel Water District, City of San Clemente, South Coast Water District, City of San Juan Capistrano, Trabuco Canyon Water District, City of Laguna Beach	•	•	•	•	•	MWDOC, OCWA, EOCWD, IRWD, Cal Domestic
San Diego County Water Authority (SDCWA)	•	•	•	•	•	MWDSC, IID Transfer, Canal Lining
Carlsbad MWD, City of Del Mar, City of Escondido, Fallbrook PUD, Helix Water District, Lakeside Water District, City of Oceanside, Olivenhain MWD, Otay Water District, Padre Dam MWD, Camp Pendleton, City of Poway, Rainbow MWD, Ramona MWD, Rincon Del Diablo MWD, City of San Diego, San Dieguito Water District, Santa Fe Irrigation District, Sweetwater Authority (incl City of National City, South Bay Irrigation District), Vallecitos Water District, Valley Center MWD, Vista Irrigation District, Yuima MWD	•	•	•	•	•	SDCWA

Table SCB-1 Water Suppliers in the South Coast Hydrologic Region (continued)

Entity	Local Supply				Imported	Imported Supplier
	Surface	Groundwater	Desalination	Recycle		
Three Valleys MWD		•		•	•	MWDSC
City of La Verne, City of Covina, City of Glendora, City of Pamona, Southern California Water Co, Rowland Water District, Walnut Valley Water District, California State Polytechnic University-Pamona, Mount San Antonio College, Boy Scouts of America-Firestone Reservation	•	•		•	•	Three Valleys MWD, Covina Irrigating Co
Upper San Gabriel Valley MWD		•			•	MWDSC
Golden State Water Company, City of South Pasadena, Main San Gabriel Basin Watermaster, Suburban Water Systems, City of Alhambra, City of Arcadia, City of Monrovia, City of Azusa, Valley County Water District	•	•			•	Upper San Gabriel Valley MWD, Covina Irrigating Co, Cal Domestic
West Basin MWD	•	•	•	•	•	MWDSC
City of El Segundo, City of Inglewood, City of Lomita, City of Los Angeles, City of Manhattan Beach, City of Torrance, Water Replenishment District of Southern California, Los Angeles County Waterworks District #29, California American Water Company, California Water Service Company, Golden State Water Company		•	•	•	•	MET, West Basin MWD, LADWP
Western MWD		•			•	MWDSC
Box Springs MWC, City of Corona, City of Norco, City of Riverside, City of Wildomar, Eagle Valley MWC, Elsinore Valley MWD, Lee Lake Water District, Rancho California Water District	•	•		•	•	Eastern MWD, Western MWD
City of Anaheim		•			•	MWDSC
City of Beverly Hills		•			•	MWDSC
City of Burbank		•		•	•	MWDSC
City of Compton		•			•	MWDSC
City of Fullerton		•			•	MWDSC
City of Glendale		•		•	•	MWDSC
City of Long Beach		•		•	•	MWDSC
City of Pasadena		•			•	MWDSC
City of San Fernando		•			•	MWDSC
City of San Marino		•			•	Cal-American, City of Pasadena
City of Santa Monica		•		•	•	MWDSC
City of Torrance		•		•	•	MWDSC, WBMWD
Castaic Lake Water Agency (CLWA)	•	•		•	•	SWP, Buena Vista WSD, Rosedale-Rio Bravo WSD
Los Angeles County Water District #36, Newhall County Water District, Santa Clarita Water Division, Valencia Water Company	•	•		•	•	CLWA
San Bernardino Valley MWD		•			•	SWP
City of Redlands, City of Rialto, City of Colton, City of Loma Linda, City of San Bernardino, Terrace Water Co.,Western Heights Co, Marygold Mutual Water Co. Riverside Highland Water Co. Muscoy Mutual Water Co. East Valley Water District, Fontana Water Co., Yucaipa Valley Water District, West Valley Water District	•	•			•	
San Gorgonio Pass Water Agency (SGPWA)		•			•	SWP
City of Banning, Beaumont-Cherry Valley Water District, Yucaipa Valley Water District, South Mesa Water Company		•			•	SGPWA

Table SCB-1 Water Suppliers in the South Coast Hydrologic Region (continued)

Entity	Local Supply				Imported	Imported Supplier
	Surface	Groundwater	Desalination	Recycle		
San Gabriel Valley MWD						SWP
Casitas MWD	•	•			•	SWP (Ventura County allocation)
Casitas MWC, City of Buenaventura, Dennison Park Water System, Gridley Road Water Group, Hermitage MWC, Meiners Oaks CWD, North Fork Springs MWC, Ojala, Old Creek Road MWC, Oviatt Water Association, Rancho del Cielo MWC, Rancho Matilija MWC, Rincon Water and Roadworks, Ojai Water Conservation District, Senior Canyon MWC, Siete Robles MWC, Sisar MWC, Golden State Water Company, Sulphur Mountain Road Water Association, Tico MWC, Tres Condados, Ventura River CWD, Villanova Road Water Well Association	•	•			•	Casitas MWD
City of Ventura	•	•		•	•	SWP (Ventura County allocation)
United Water Conservation District	•	•			•	SWP (Ventura County allocation)
Aliso MWC, Alta MWC, Beedy Street Well, Brownstone MWC, Camarillo Airport Utility, Channel Islands Beach CSD, City of Fillmore, City of Port Hueneme, Cloverdale MWC, Community MWC, Cypress MWC, Dempsey Road MWC, Seacoast Cooling, Elkins Ranch Co., Farmer's Irrigation Co., Fillmore Irrigation Co., Goodenough MWC, Hailwood Inc., CB South, Poinsettia Stock Farm, Lake Piru Recreation Area, Limoneira Assoc., Middle Road MWC, Montalvo MWC, Nyeland Acres NWC, Oxnard Lemon MWC, Pleasant Valley CWD, Rio Manor MWC, Rio Plaza Water Company, San Cayetand MWC, City of Santa Paula, Saviers Road MWC, South Mountain MWC, Storkel MWC, Strickland MWC, Thermal Belt MWC, Timber Canyon MWC, Tobock Rock MWC, USNAS Point Mugu, USNCBC Port Hueneme, United MWC, Ventura County Waterworks District #16, Vineyard Avenue Acres MWC, Vineyard MWC, Warring Water Service, Piro MWC, Hardscrabble MWC, Sespe Agricultural Water, Guadalasca MWC, Citrus MWC, Lloyd-Butler MWC, Onard MWC, Toland Road Water System, Thornhill MWC	•	•			•	United Water Conservation District

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The California Water Plan provides a framework for resource managers, legislators, Tribes, other decision-makers, and the public to consider options and make decisions regarding California's water future. Our goal is that this document meet Water Code requirements, receive broad support among those participating in California's water planning, and be a useful document. With its partners, DWR completed the final Update 2009 volumes and Highlights in December 2009.

The first four volumes of the update and the Highlights booklet are contained on the CD attached below. All five volumes of the update and related materials are also available online at *www.waterplan.water.ca.gov.*

Volume 1: The Strategic Plan
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Volume 4: Reference Guide
Volume 5: Technical Guide

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SUMMARY

S.1 Introduction

The California Department of Water Resources (DWR) has prepared this Draft Environmental Impact Report (Draft EIR) to provide the public and responsible and trustee agencies information about the potential adverse effects on the local and regional environment associated with construction and operation of the Perris Dam Remediation Program (proposed project). This Draft EIR has been prepared pursuant to the California Environmental Quality Act (CEQA). As Lead Agency, DWR may use this EIR to approve the proposed project, make Findings regarding identified impacts, and if necessary, adopt a Statement of Overriding Considerations regarding these impacts.

This document is being circulated to local, state and federal agencies, and to interested organizations and individuals who may wish to review and comment on the Draft EIR. Publication of this Draft EIR marks the beginning of a 45-day public review period, during which written comments may be directed to the address below. During the 45-day review period, DWR will hold a formal public hearing on the Draft EIR. Inquiries about the proposed project should be directed to:

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S.2 Background

DWR operates and maintains the State Water Project (SWP), supplying water to 29 contracting agencies across the state. Lake Perris is the terminal reservoir for the East Branch of the California Aqueduct, providing a key water supply to the Metropolitan Water District of Southern California (MWD or Metropolitan). Lake Perris is located within the Lake Perris State Recreation Area (SRA) within Riverside County, providing several recreational opportunities including fishing, boating, picnicking, camping, nature study, rock climbing, horse back riding, and hiking. The water storage and conveyance facilities are owned and operated by DWR, in cooperation with Metropolitan.

Perris Dam is an earthfill embankment completed in 1974 containing approximately 25 million cubic yards of compacted fill. The lake's normal operating water level is 1588 feet above mean sea level (amsl). In 2005, DWR completed a foundation study of the Perris Dam. Results of the detailed liquefaction analysis of the Perris Dam foundation indicated that seismically-induced ground shaking could result in embankment deformations due to the liquefaction potential of sediments under the dam at several locations along the 2,300-foot-long segment along the southern span (left reach) of the dam. With the lake filled to its design capacity, this could result in overtopping of the dam during a strong ground shaking event. Based on the results of this stability analysis, DWR lowered the reservoir water surface elevation by 25 feet to 1563 feet amsl, until a long-term remedial solution can be implemented.

In an effort to maintain recreational activities on the lake, DWR ensured that the marina remained in the lowered lake and constructed a causeway from the shore across the exposed lakebed, providing full access to the marina facility. DWR imported 14,171 tons of sand to the Perris Beach area to allow beach-going recreational uses near the location of the previous beaches. DWR also installed a 2-mile long irrigation system connected to State Park water pumps and drip-line system that conveys lake water to the riparian habitat that exists along the eastern edge of the original lakeshore.

The foundation study also concluded that the presence of loose sands beneath the dam embankment at the right abutment should be investigated. Subsequent investigation by DWR concluded that excavation and replacement of a small portion of the dam in this location is warranted. The proposed project provides greater stability for the dam and outlet tower, as well as adding a new emergency outlet extension channel, providing greater public safety.

S.3 Project Description

In addition to the drawdown itself, the proposed Perris Dam Remediation Program includes three separate projects as described below: (1) Perris Dam Remediation Project, (2) Outlet Tower Replacement, and (3) Emergency Outlet Extension. The three projects combined provide the upgraded seismic protection needed to protect public safety. The following sections describe each project.

Lake Perris Drawdown

On August 2005, DWR initiated the drawdown of Lake Perris from 1588 feet amsl to 1563 feet amsl. The drawdown was complete by November 2005. The water removed from the lake was delivered to MWD for delivery or storage in other facilities. Although the drawdown was conducted under a CEQA Categorical Exemption in 2005, this EIR assumes the baseline condition to be pre-drawdown.

Perris Dam Remediation

DWR proposes to seismically upgrade the dam by improving the foundation material with cement-deep-soil-mixing (CDSM) methods, excavating a small portion of the dam toe and the

upper 20 feet of the downstream liquefiable foundation material, replacing the foundation material with re-compacted engineered fill, and then constructing a stability berm on top of the replaced foundation. This remediation strategy would allow Lake Perris to return to its previous maximum operating pool elevation of 1588 feet amsl after construction.

CDSM methods involve injecting soil-cement columns in the deepest and most liquefiable alluvial materials beneath the berm foundation. Deep soil mixing increases the stability of the soil and reduces liquefaction hazards as well as temporary destabilization caused by excavations at the toe.

Approximately 700,000 cy of soil would be excavated from the shallow foundation at the toe of the dam. The excavated material would be stockpiled on site and recompacted as excavation backfill and as part of the stability berm. A stability berm would be constructed atop the re-compacted foundation along the downstream toe of the dam. The berm would consist of approximately 1.75 million cubic yards of soil and one million tons of rock. The soil for the stability berm would be excavated from within the lakebed at the east end of the lake, and the rock would be quarried from the original rock quarry east of the lake in Bernasconi Hills. To convey the soil and rock to the downstream face of the dam, a haul road would be constructed from the east side of the lake, along the lakebed on the south side of the lake, and over a low spot on the Bernasconi Hills near the dam's left abutment.

Outlet Tower Replacement

DWR is proposing to construct a new outlet facility located approximately 400 feet from the existing tower. An area on the southern shore between the hill and the lake would be excavated and the new outlet tower constructed using dry construction methods. The new facility would consist of a tower extending from the dead pool elevation of 1500 feet of the lake to an elevation of 1600 feet amsl, approximately 12 feet above the lake level when full. A 600-foot long, 12.5-foot diameter tunnel would be constructed to connect the new outlet facility to the existing underground tunnel that connects to MWD's delivery system.

Emergency Outlet Extension

DWR is proposing to construct a new emergency outlet extension that would convey the required release from the dam to the Perris Valley Storm Drain. The proposed outlet extension would be approximately two miles long and would redirect flow parallel to Ramona Expressway and under the Perris Fairgrounds by connecting the outlet structure to the Perris Valley Storm Drain. The alignment crosses three roads which run perpendicular to Ramona Expressway: Fair Way, Lake Perris Drive, and Evans Road. Each road crossing would have reinforced concrete box culverts to allow vehicle traffic across the channel. A reinforced concrete box culvert or pipeline would also be used to pass flow into the Perris Valley Channel. Riprap would be placed on the upstream and downstream slopes of the Perris Valley Channel to reduce localized scour.

S.4 Analysis of Alternatives

CEQA requires that an EIR evaluate a reasonable range of alternatives to the proposed project that could attain the basic objectives of the project, but would avoid or reduce significant environmental effects of the project. This EIR evaluates dam remediation alternatives, an outlet tower retrofit alternative, and emergency outlet extension lining alternatives. These alternatives are discussed further in Chapter 6, Analysis of Alternatives. The EIR concludes that the proposed project is the environmentally preferred alternative for the dam remediation and outlet tower components of the project. However, the alternative to install the emergency outlet extension underground for its entire length was identified as the environmentally superior alternative.

S.5 Summary of Impacts

Table S-1, at the end of this chapter, presents a summary of the impacts and mitigation measures identified for the proposed Perris Dam Remediation Program. The complete impact statements and mitigation measures are presented in Chapter 3, Environmental Setting, Impacts, and Mitigation Measures. The level of significance for each impact was determined using significance criteria (thresholds) developed for each category of impacts; these criteria are presented in the appropriate sections of Chapter 3. Significant impacts are those adverse environmental impacts that meet or exceed the significance thresholds; less-than-significant impacts would not exceed the thresholds. **Table S-1** indicates the measures that will be implemented to avoid, minimize, or otherwise reduce significant impacts to a less-than-significant level.

The EIR finds only two significant and unavoidable impacts of the proposed project: 1) construction activities will likely exceed daily thresholds of significance for criteria air pollutants, and 2) recreational activities at Lake Perris SRA will be significantly affected during construction. All other potentially significant impacts identified would be reduced to less than significant levels with proposed mitigation measures.

S.6 Organization of this EIR

This Draft EIR has been organized into the following chapters:

1. **Introduction.** This chapter discusses the CEQA process and the purpose of the EIR.
2. **Project Description.** This chapter provides an overview of the Perris Dam Remediation Program, describes the need for and objectives of the project, and describes in detail proposed design, construction, and operating characteristics.
3. **Environmental Setting, Impacts and Mitigation Measures.** This chapter presents a description of the physical and regulatory setting of the Perris Dam Remediation Program, describes impacts that could result from implementation of the project, and identifies measures to mitigate those impacts. This chapter is divided into environmental issue areas (e.g., aesthetics; biological resources; land use; recreation).
4. **Cumulative Impacts.** This chapter identifies and describes other projects that could contribute to significant cumulative impacts; it also indicates the potential for implementation of the Perris Dam Remediation Program, in combination with other projects, to contribute to significant cumulative impacts.

5. **Growth Inducement.** This chapter describes the potential for the proposed project to induce growth.
6. **Alternatives Analysis.** This chapter presents an overview of the alternatives development process and describes the alternatives to the proposed project that were considered.
7. **Report Preparers.** This chapter identifies those involved in preparing this Draft EIR.
8. **Acronyms.**
9. **References.**

TABLE S-1
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Aesthetics		
Impact 3.1-1: Construction activities would temporarily affect the visual quality of the Lake Perris SRA and northern frontage of Ramona Expressway.	None required.	--
Impact 3.1-2: Once constructed, the new elements would alter the appearance of the project site.	**Mitigation Measure 3.1-2a:** If an open channel is constructed for any portion of the emergency outlet extension, DWR shall prepare and implement a maintenance plan which shall include scheduled trash removal, graffiti removal, general facility upkeep, and placing a fence around the emergency outlet extension to reduce trash deposition. **Mitigation Measure 3.1-2b:** DWR shall ensure that a DWR maintenance contact is provided to the City of Perris for direct communication if immediate action regarding maintenance of the extension is needed. **Mitigation Measure 3.1-2c:** DWR shall coordinate with the City of Perris to develop site access control fencing and landscaping to be consistent with the City guidelines.	Less than Significant
Impact 3.1-3: Construction of the haul road within the Bernasconi Hills would permanently alter the granite rock formations just east of the dam.	**Mitigation Measure 3.1-3:** DWR shall ensure that the construction contractor retain some of the large naturally weathered boulders currently within the Bernasconi pass to adorn the finished road to retain some of the original character of the trail.	Less than Significant
Impact 3.1-4: Construction of the project components would result in additional light and glare impacts during nighttime construction.	**Mitigation Measure 3.1-4a:** DWR shall ensure that lighting used for nighttime construction is shielded and directed downward to minimize impacts to neighboring residential areas. **Mitigation Measure 3.1-4b:** DWR shall notify Riverside County Planning Director prior to use of nighttime lighting. The notice shall include the location of lighting, the schedule, and total lumens.	Less than Significant
Air Quality		
Impact 3.2-1: Construction activities would emit criteria pollutants in excess of SCAQMD thresholds of significance that would contribute to existing poor air quality.	**Mitigation Measure 3.2-1a:** DWR shall ensure that contractors implement a fugitive dust control program pursuant to the provisions of SCAQMD Rule 403. **Mitigation Measure 3.2-1b** DWR shall ensure that construction equipment is properly tuned and maintained in accordance with manufacturer's specifications. **Mitigation Measure 3.2-1c:** DWR shall ensure that contractors maintain and operate construction equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues would turn their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and	Significant and Unavoidable

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	scheduled to avoid emissions peaks and discontinued during second-stage smog alerts. **Mitigation Measure 3.2-1d:** Electricity from power poles rather than temporary diesel- or gasoline-powered generators shall be used where available. **Mitigation Measure 3.2-1e:** All construction vehicles shall be prohibited from idling in excess of five minutes, both on- and off-site. **Mitigation Measure 3.2-1f:** Coatings and solvents used in the proposed project shall be consistent with applicable SCAQMD rules and regulations. **Mitigation Measure 3.2-1g:** Wheel washers shall be installed where vehicles exit the construction site onto paved roads. **Mitigation Measure 3.2-1h**: Haul vehicles shall be covered or comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads. **Mitigation Measure 3.2-1i**: Prior to removing the existing drainage system down-stream of the dam, DWR shall inventory materials that may be asbestos-containing. Any asbestos-containing materials including cement pipe (transite) will be removed and disposed of by certified asbestos workers in compliance with applicable asbestos abatement regulations (40 CFR Part 763 and 29 CFR Part 1910).	
Impact 3.2-2: Project operation would not violate air quality standards or contribute substantially to an existing or projected air quality violation nor expose sensitive receptors to pollutant concentrations resulting in an adverse health effect during long-term operation.	None required.	--
Impact 3.2-3: The project would not create objectionable odors affecting a substantial amount of people.	None required.	--
Impact 3.2-4: The project could result in a cumulatively considerable net increase of emissions which exceed quantitative thresholds for ozone precursors and/or conflict with implementation of state goals for reducing greenhouse gas emissions**.**	None required.	--
Biological Resources		
Impact 3.3-1: The lowering of the lake level has resulted in a temporary impact to the pre-drawdown lake shore habitat dominated by riparian plant species. In addition, construction of the stability berm will permanently remove a portion of the similar habitat type found below the dam.	**Mitigation Measure 3.3-1a:** DWR shall coordinate with CDFG and USFWS to minimize clearing of vegetation on the exposed lakebed outside of the construction zone while ensuring that sensitive species utilizing the habitat would not be impacted by construction activities.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	Mitigation Measure 3.3-1b: DWR shall prepare and implement a southern willow woodland and scrub restoration plan for temporal impacts to the northeastern riparian habitat surrounding the lake that may include the following measures: • Removal of dead trees within areas of low survivorship, leaving some in place as needed for snags, and re-contouring of select areas into planting basins of various sizes, • Obtain cuttings from the emerging post-draw-down habitat to be installed within the established planting basins, • Development of a maintenance and monitoring plan to ensure successful implementation and establishment until one year after water levels are returned to pre-draw-down conditions. **Mitigation Measure 3.3-1c:** DWR shall provide compensation lands at a 1:1 ratio for permanently impacted habitat including southern willow woodland. DWR shall prepare an equivalency analysis for the compensation land.	
Impact 3.3-2: Implementation of the proposed project could result in the loss of endangered, threatened, candidate, or rare plant species listed under the federal or state Endangered Species Acts, or plants designated as rare by the CNPS.	None required.	--
Impact 3.3-3: Implementation of the proposed project would result in permanent and temporal loss of southern willow woodland and scrub habitat which provides nesting habitat for the least Bell's vireo**.**	**Mitigation Measure 3.3-3a:** DWR shall modify the watering regimen for the band of southern willow woodland and scrub located on the eastern lakeshore pre-drawdown edge to include a periodic flooding schedule or some other means to sustain the pre-drawdown quality and extent of riparian habitat. Maintaining the pre-drawdown quality and extent of the riparian band through the project construction period would reduce temporary impacts to least Bell's vireo habitat impacted by the temporary lake drawdown. The regimen would be discontinued upon the refilling of the lake to its normal operating elevation of 1588 feet. **Mitigation Measure 3.3-3b:** DWR shall conduct the following measures: • Vegetation clearing needed to accommodate construction activities shall occur during the non-nesting season where feasible. • For habitat removal conducted during the vireo nesting season, DWR shall have a qualified biologist conduct a pre-construction nesting season protocol survey for the least Bell's vireo within the project area to determine and map the location and extent of nesting least Bell's vireo occurrence(s).	Significant and Unavoidable

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	• DWR shall avoid direct impacts on nesting least Bell's vireos located within the construction right of way. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season. • If construction and vegetation removal is proposed for the vireo nesting period then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone shall be established as approved by the USFWS and CDFG. Nest sites shall be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist. Implement **Mitigation Measures 3.3-1a through 3.3-1c**.	
Impact 3.3-4: Implementation of the proposed project would result in the permanent and temporary loss of non-native annual grassland habitat presumed to support the federally listed endangered Stephens' kangaroo rat.	**Mitigation Measure 3.3-4:** DWR shall implement the following measures: • DWR shall have a qualified biologist with a Stephens' kangaroo rat handling permit, conduct pre-construction surveys for the Stephens' kangaroo rat within the grassland habitat to determine and map the location and extent of Stephens' kangaroo rat occurrence(s) within the project impact area. Confirmed Stephens' kangaroo rat precincts shall be avoided with the establishment of a non-disturbance buffer zone approved by the USFWS and CDFG. DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on the Stephens' kangaroo rat. • Where avoidance of confirmed Stephens' kangaroo rat precincts is infeasible and unavoidable, and if approved by the RCA, DWR shall have qualified biologists permitted or otherwise approved by the USFWS conduct a pre-construction Stephens' kangaroo rat trapping and relocation effort to minimize take of the Stephens' kangaroo rat during construction. • DWR shall install a silt fence or some other impermeable barrier to Stephens' kangaroo rat to exclude Stephens' kangaroo rat from entering the active work areas.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Impact 3.3-5: Implementation of the proposed project would result in temporary impacts to migratory avian species due to temporary loss of southern willow woodland habitat and due to disturbance of construction activities.	**Mitigation Measure 3.3-5a:** DWR shall have a qualified biologist conduct a pre-construction spring/summer active season reconnaissance survey for nesting/roosting migratory bird species, and other nesting birds within 150-feet of the construction limits of each project element to determine and map the location and extent of special-status species occurrence(s) that could be affected by the project. **Mitigation Measure 3.3-5b:** DWR shall avoid direct impacts on any nesting birds located within the limits of construction. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season (February 1 through August 31). **Mitigation Measure 3.3-5c**: If construction and vegetation removal is proposed for the bird nesting period February 1 through August 31, then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone established dependent on the species and in consultation with the USFWS and CDFG. Nest sites shall be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist. Implement **Mitigation Measures 3.3-1a through 3.3-1c, and 3.3-3a**.	Significant and Unavoidable
Impact 3.3-6: Implementation of the proposed project would result in the permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, non-native grassland and other habitats which may support non-avian ground dwelling special-status species such as the northern red diamond rattlesnake, coastal western whiptail, San Diego pocket mouse, the Los Angeles pocket mouse, San Diego black-tailed jackrabbit, American badger and other special-status ground dwelling non-avian wildlife species.	**Mitigation Measure 3.3-6a:** DWR shall have a qualified biologist conduct a pre-construction field reconnaissance survey for non-listed special-status ground-dwelling species within the construction right-of-way. **Mitigation Measure 3.3-6b**: DWR shall avoid and minimize impacts on documented locations of special-status ground dwelling species to the extent feasible and practicable by reducing the construction right-of-way through areas of occurrences to either avoid the occurrence or reduce impacts to the minimum necessary to complete the project. **Mitigation Measure 3.3-6c**: DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on special-status ground dwelling wildlife species.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	Mitigation Measure 3.3-6d: DWR shall install a silt fence or some other impermeable barrier to exclude small wildlife species from entering the active work areas. Exclusion fencing can be limited to areas of documented occurrences of special-status wildlife as determined during pre-construction surveys. **Mitigation Measure 3.3-6e:** DWR shall have a qualified biologist conduct pre-construction and construction capture, salvage, and relocation efforts to remove special-status ground dwelling wildlife species, and other common species to the extent feasible, out of harms way to avoid and minimize impacts on these species.	
Impact 3.3-7: Implementation of the proposed project would result in permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, and other habitats which may support the formally listed endangered coastal California gnatcatcher, as well as a number of special-status avian species including the burrowing owl, golden eagle, Cooper's hawk, white-faced ibis and other special-status avian and bat species.	**Mitigation Measure 3.3-7a**: DWR shall have a qualified biologist conduct a pre-construction spring/summer active season reconnaissance survey for nesting/roosting coastal California gnatcatcher, burrowing owl, special-status bird and bat species, and other nesting birds within 150-feet of the construction limits of each project element to determine and map the location and extent of special-status species occurrence(s) that could be affected by the project. If burrowing owls are found to be present, appropriate protocol surveys must be conducted. Avoidance of burrowing owls during the nesting season shall be required, and if burrowing owls are found outside of the nesting season they shall be relocated by a qualified biologist in consultation with the USFWS and CDFG. **Mitigation Measure 3.3-7b:** DWR shall avoid direct impacts on any nesting birds located within the limits of construction. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season (February 1 through August 31). **Mitigation Measure 3.3-7c:** If construction and vegetation removal is proposed for the bird nesting period February 1 through August 31, then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone established dependent on the species and in consultation with the USFWS and CDFG. Nest sites shall be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist. **Mitigation Measure 3.3-7d**: If a natal bat roost site is located within the limits of construction during pre-construction surveys, it shall be avoided with non-disturbance buffer zone established by a qualified biologist in consultation with the USFWS and CDFG until the site is abandoned.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	Mitigation Measure 3.3-7e: DWR shall minimize impacts on documented locations of special-status species and any nesting birds by reducing the construction right-of-way through areas of occurrences to either avoid the occurrence or reduce impacts to the minimum necessary to complete the project. **Mitigation Measure 3.3-7f**: DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on special-status wildlife species.	
Impact 3.3-8: Implementation of the proposed project would result in the alteration of the population structure and composition of the recreational warm-water non-native fishery of Lake Perris.	**Mitigation Measure 3.3-8**: DWR in consultation with the Lake Perris SRA and CDFG shall plan for restoration of the fishery resource at Lake Perris to a sustainable population that supports recreation uses. • DWR shall fund habitat placement and fish monitoring in Lake Perris for three years, once the lake level is restored to Elevation 1588, under an agreement with CDFG. • DWR shall continue to coordinate and work with CDFG on appropriate activities to restore fish levels after reservoir restoration for a three year period. These efforts may include additional habitat placement and/or fish stocking.	Less than Significant
Impact 3.3-9: Implementation of the proposed project would result in the loss of shallow water habitat (3 to 10 feet) on the northeastern end of the lake which could impact spawning and rearing habitat for the non-native warm-water game fish and food resources for resident and migratory winter waterfowl.	**Mitigation Measure 3.3-9a**: In order to minimize impacts to shallow water breeding and rearing habitat for the non-native warm water fish and waterfowl resources around the eastern reservoir edge, the borrow area shall be established with a 125-foot no disturbance buffer zone between the inside reservoir edge of the riparian habitat and the edge of the borrow area. The 125-foot buffer would create a shallow bench around the reservoir edge and promote aquatic plant growth that would provide habitat for invertebrates and cover for fishes. Variable size rocks and rip rap shall be placed along portions of the borrow area in areas that would not generate hazards to boats. Gravel shall be placed on the shelf areas created by new excavation and maintained shallow water habitat, to promote spawning areas. Rootwads or other habitat enhancement structures intended to provide cover for fishes and generate foraging and spawning habitat, shall be placed within the rip rap and rocks where they do not present a hazard to boating. **Mitigation Measure 3.3-9b**: DWR shall minimize the borrow area size to the extent feasible, leaving as much of the previous shallow water shoreline as possible. The final designs given to the contractor will include a detailed construction zone limitation that identifies a minimum shoreline buffer zone. Implement **Mitigation Measure 3.3-8**.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Impact 3.3-10: Implementation of the proposed project would result in the temporary and permanent impacts to southern willow woodland and scrub, freshwater marsh and other waters of the U.S. and waters of the State within Lake Perris under the jurisdiction of the Corps pursuant to the Clean Water Act and CDFG pursuant to Section 1602 of the Fish and Game Code (Streambed Alteration Agreements).	None required.	--
Impact 3.3-11: Implementation of the proposed project would conflict with the provisions of the Western Riverside MSHCP or the Long-Term Stephens' Kangaroo Rat HCP.	**Mitigation Measure 3.3-11**: In order to comply with the Stephens' Kangaroo Rat HCP, the project shall be reviewed by the RCHCA. If occupied habitat is permanently affected by the project, DWR shall acquire compensation lands adjacent to a potential habitat reserve site at a 1:1 ratio or pay the $500 per acre mitigation fee set out by Riverside County Ordinance 663.10 or as required by the RCHCA. Implement **Mitigation Measures 3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, and 3.3-9a**	Less than Significant
Cultural Resources		
Impact 3.4-1: Project construction could adversely affect known or unknown cultural resources, including unique archaeological resources and historic resources.	**Mitigation Measure 3.4-1:** In the event that prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, all work within 50 feet of the resources shall be halted and DWR shall consult with a qualified archaeologist to assess the significance of the find according to *CEQA Guidelines* Section 15064.5. If any find is determined to be significant, DWR and the archaeologist shall meet to determine the appropriate avoidance measures or other appropriate mitigation. DWR (as applicable) shall make the final determination. All significant cultural materials recovered shall be, as necessary and at the discretion of the consulting archaeologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards. In considering any suggested mitigation proposed by the consulting archaeologist in order to mitigate impacts to historical resources or unique archaeological resources, DWR shall determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) shall be instituted. Work may proceed on other parts of the project site while mitigation for historical resources or unique archaeological resources is being carried out.	Less than Significant
Impact 3.4-2: The proposed project could adversely affect unidentified paleontological resources.	**Mitigation Measure 3.4-2:** DWR shall develop and implement a Paleontological Resource Monitoring and Mitigation Plan (PRMMP) prior to the onset of construction-related earth moving activities in order to either avoid or mitigate to a less-than-significant effect on these resources. The PRMMP should be designed by a qualified	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	paleontologist. During earth-moving construction-related activities, additional fossil sites may be uncovered. The PRMMP must include: • Mitigation protocol for all activities; • Special consideration should be made to collect sediment samples for potential fossiliferous locations as per the society of Vertebrate Paleontology standards; • Stratigraphic cross sections must be recorded; • Mapping of the geologic units must be graphed; and • Fossil remains must be cleaned, analyzed, and catalogued to be accepted for curation at a legal repository. All work must be conducted by a qualified Paleontologist and a final Report of Findings must be submitted upon completion of laboratory analysis.	
Impact 3.4-3: Project construction could result in damage to previously unidentified human remains.	**Mitigation Measure 3.4-3:** If human skeletal remains are uncovered during project construction, DWR (depending upon the project component) shall immediately halt work, contact the Riverside County coroner to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the *CEQA Guidelines*. If the County coroner determines that the remains are Native American, DWR shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by AB 2641). Per Public Resources Code 5097.98, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section (PRC 5097.98), with the most likely descendents regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Geology, Soils, and Seismicity		
Impact 3.5-1: Earthwork activities could create areas with unstable slopes associated with the existing embankment and the former rock quarry area.	**Mitigation Measure 3.5-1a:** During the final design phase of the project, DWR shall perform a design-level geotechnical evaluation to ensure the function of the stability berm. The geotechnical evaluation shall prescribe measures to mitigate hazards associated with excavation of the existing embankment. Slope stabilization measures may be identified including slope inclination, CDSM depths and locations, fill compaction, soil reinforcement, surface and subsurface drainage facilities, temporary shoring, and erosion control measures. These measures shall consider the long-term stability of the disturbed areas following construction activities. **Mitigation Measure 3.5-1b:** Prior to re-activating the quarry, DWR shall conduct a geotechnical evaluation of the quarry and provide recommendations to stabilize the quarry walls. Recommendations will include at a minimum the following, in conformance with hard rock mining and worker safety regulations: • Side wall contouring requirements • Shoring requirements • Stabilization requirements • Rock-fall protection mechanisms	Less than Significant
Impact 3.5-2: Exposure of soils to erosion and loss of topsoil during construction activities related to excavation of existing embankment, soil stockpile management, outlet tower construction, and emergency outlet extension construction.	**Mitigation Measure 3.5-2:** DWR shall incorporate into contract specifications the requirement that the contractor(s) develop and implement an erosion control plan, in addition to implementing requirements for preventing storm water pollution from construction activities as required by the Storm Water Pollution Prevention Plan (SWPPP). These requirements include developing and implementing erosion control measures for all construction activities including the following: • Slope stabilization measures • Haul road surface maintenance • Wind erosion protection measures for stockpiled soil • Storm water runoff control for all construction areas • Post construction restoration plans The final reclamation plan for the borrow area and rock quarry shall include drainage improvements to minimize erosion potential. Regular maintenance of the disturbed areas and stockpiled materials shall also be included in contract specifications for the contractor(s).	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Impact 3.5-3: Stockpiled materials from excavation of the embankment could cause subsidence of native materials underneath.	**Mitigation Measure 3.5-3:** The geotechnical evaluation shall include a review of the surface and near-surface materials in the areas where materials will be stockpiled. The evaluation shall determine if the underlying materials have adequate short-term strength to support the proposed stockpiles and, if not, shall provide recommendations to avoid this hazard. The recommendations shall be incorporated into contract specifications for the contractor(s). Recommendations could include reducing the size of the stockpiles, increasing the number of stockpiles, and finding alternative locations for stockpiles.	Less than Significant
Hazards and Hazardous Materials		
Impact 3.6-1: The proposed project could expose workers and the public to hazards including explosives, fuels, and hazardous materials that could be present in excavated soil.	None required.	--
Impact 3.6-2: The proposed project could expose workers and the public to asbestos-containing building materials that could be present in structures to be demolished by the project.	**Mitigation Measure 3.6-2:** DWR shall prepare a site safety plan that outlines the procedures necessary to remove potentially asbestos-containing building materials encountered during the excavation activities. The site safety plan shall outline personal protection requirements and training requirements for workers and shall outline removal and disposal methods.	Less than Significant
Impact 3.6-3: Construction of the proposed project could increase risk of wildland fires.	**Mitigation Measure 3.6-3:** In accordance with the Public Resources Code, the construction contractor shall be required to comply with the following legal requirements during construction activities for the proposed project:: • Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (PRC Section 4442). • Appropriate fire suppression equipment shall be maintained during construction – from April 1 to December 1 (PRC Section 4428). • On days during the year when a burning permit is required, flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor shall maintain the appropriate fire suppression equipment (PRC Section 4427). • On days during the year when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines shall not be used within 25 feet of any flammable materials (PRC Section 4431). These measures shall be included in the contractor's contract specifications. The contractor shall be responsible for the	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	implementation and monitoring of these safety measures and regular reporting to DWR.	
Hydrology and Water Quality		
Impact 3.7-1: Construction activities could promote soil erosion or result in chemical spills that could pollute storm water runoff and adversely affect local receiving water quality.	**Mitigation Measure 3.7-1a:** DWR shall prepare a SWPPP for each construction activity associated with the proposed project. The SWPPP shall be maintained at the construction site for the entire duration of construction. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of storm water discharge and to implement BMPs to reduce pollutants in storm water discharges during construction and post construction. SWPPPs shall include the following: • Source identification; • Preparation of a site map; • Description of construction materials, practices, and equipment storage and maintenance; • List of pollutants likely to contact storm water; • Estimate of the construction site area and percent impervious area; • Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in storm water runoff, such as detention basins, fiber rolls, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes; • Proposed construction dewatering plans; • List of provisions to eliminate or reduce discharge of materials to storm water; • Description of waste management practices; • Spill prevention and control measures; • Maintenance and training practices; and • Sampling and analysis strategy and sampling schedule for discharges from construction activities. **Mitigation Measure 3.7-1b:** DWR shall incorporate into contract specifications the requirements that: • The construction staging areas shall be graded to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters. • If heavy-duty construction equipment is stored overnight at the construction staging areas, drip pans or plastic lines with edges	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	shall be placed beneath the machinery engine block and hydraulic systems to prevent any leakage from entering runoff or receiving waters. • No pesticides or herbacides will be used to maintain vegetation clearing during construction. • Vehicle fueling will be conducted a minimum of 500 feet from Lake Perris. • The haul road over the Bernasconi Hills shall be designed with a drainage system that prevents runoff scouring and rutting. Runoff from the sloping roadway shall be conveyed to drainages at lower elevations with minimal velocity to prevent scouring. • Any grout waste or spills will be cleaned up immediately and disposed of off-site. • Spill kits capable of containing hazardous spills will be stored on-site. Required materials will be specified in contractor specifications.	
Impact 3.7-2: The dam remediation could interfere with groundwater recharge.	None required.	--
Impact 3.7-3: The emergency outlet extension could exceed the capacity of the Perris Valley Storm Drain during a rain event.	None required.	--
Land Use		
Impact 3.8-1: Construction of the proposed project would impact existing land uses.	**Mitigation Measure 3.8-1a:** If the underground emergency outlet extension alternative is selected, DWR shall restore the motocross facility and parking area to their pre-construction condition. **Mitigation Measure 3.8-1b:** DWR shall reduce the construction zone of the emergency outlet extension to the minimum width necessary to accommodate the channel. **Mitigation Measure 3.8-1c:** DWR shall coordinate with the Perris Fairgrounds to minimize construction during major events.	Significant and Unavoidable for open channel alternative; Less than Significant for underground alternative
Impact 3.8-2: Construction and operation of the proposed project could conflict with an existing habitat conservation plan.	Implement **Mitigation Measures Biology 3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, 3.3-9a, and 3.3-11.**	Less than Significant
Impact 3.8-3: Project implementation would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	None required.	--

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Noise and Vibration		
Impact 3.9-1: Project construction could substantially increase ambient noise levels or generate noise levels in excess of standards established in the local general plans or noise ordinances, or applicable standards of other agencies.	**Mitigation Measure 3.9-1a:** Nighttime work shall not include blasting or sheet pile-driving. **Mitigation Measure 3.9-1b:** Construction contractors shall implement the following: • Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems. • An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise. **Mitigation Measure 3.9-1c:** To reduce noise impacts due to construction, DWR shall require construction contractors to implement the following measures: • During construction, the contractor shall outfit all equipment, fixed or mobile, with properly operating and maintained exhaust and intake mufflers, consistent with manufacturers' standards. • Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used where feasible. Quieter procedures, such as use of drills rather than impact tools, shall be used whenever feasible. • Stationary noise sources that could affect adjacent receptors shall be located as far from adjacent receptors as possible. • Daytime construction activities would be limited to the times of 7:00 a.m. and 7:00 p.m. • Residents and park visitors shall be notified in advance of the night work schedule. **Mitigation Measure 3.9-1d:** A Blasting Plan for construction shall be prepared and followed that includes the following: • Primary components of the Blasting Plan shall include: – Identification of blast officer; – Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited;	Significant and Unavoidable

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	– Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting; – Description of means for transportation and on-site storage and security of explosives in accordance with local, state and federal regulations; – Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation); – Traffic control standards and traffic safety measures (if applicable); – Required personal protective equipment; – Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger; – Procedures for handling, setting, wiring, and firing explosives. Also procedures for handling misfires per Federal code; – Type and quantity of explosives and description of detonation device. Sequence and schedule of blasting rounds, including general method of excavation, lift heights, etc.; – Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure; – Description of blast vibration and air blast monitoring programs; – Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan); – Emergency Action Plan to provide emergency telephone numbers and directions to medical facilities. Procedures for action in the event of injury; – Material Safety Data Sheets for each explosive or other hazardous materials to be used; – Evidence of licensing, experience, and qualifications of blasters; and – Description of insurance for the blasting work. • A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls. • If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of	

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting. • Explosive materials shall be delivered in specially built vehicles marked with United Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting U.S. Department of Transportation (DOT) rules within the same vehicle. Vehicles shall have at least two 10-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses (CDL) with Hazmat endorsements, and drivers shall carry bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators. • The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required federal explosives license must submit photographs and fingerprints with the application to ATF. • The contractor shall provide 24-hour security and/or the use of motion-detector and alarmed double wire fencing security measures around the stored explosives.	
Impact 3.9-2: Construction activities including blasting could damage structures from groundborne vibration.	Implement **Mitigation Measure 3.9-1d**	Less than Significant
Public Safety		
Impact 3.10-1: Construction of the proposed project could expose Lake Perris SRA visitors to hazards from construction activities.	**Mitigation Measure 3.10-1a:** DWR will incorporate into contract specifications the requirements that: • Fencing shall be maintained around the perimeter of the construction zone including at the lake shore at all times during construction. Fencing at the lake shore would be designed to prevent any vessel from reaching the shoreline within the construction zone.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	• Signs shall be posted in English and Spanish on the fence warning visitors to stay outside the construction zones. • Construction equipment and trailers shall be secured each day in order to prevent items from being stolen or damaged. • Construction contractors shall be provided training to be aware of park visitors. Any visitors seen within the construction zone shall be immediately escorted out. **Mitigation Measure 3.10-1b:** DWR shall coordinate with California State Parks personnel to develop a site safety plan for the construction activities. The plan would identify construction zone access including fencing and gate control, routine patrolling, and signage.	
Public Services and Utilities		
Impact 3.11-1: The proposed project may cause a short-term increase in the demand for police and fire services.	None required.	--
Impact 3.11-2: Construction would require a short-term increase in energy demand.	None required.	--
Impact 3.11-3: Construction of the emergency outlet extension could encounter buried utilities.	None required.	--
Recreation		
Impact 3.12-1: Drawdown of Lake Perris could cause or accelerate physical deterioration of the recreational facilities at the Lake Perris SRA.	**Mitigation Measure 3.12-1a:** DWR shall assist Lake Perris SRA in conducting promotional and public outreach efforts to improve public awareness that the park is open during the drawdown period. The public outreach effort shall include making brochures available and posting of informational signs throughout the park describing the work being conducted and to advertise the facilities and activities currently available in order to promote recreational use at Lake Perris. **Mitigation Measure 3.12-1b:** At the conclusion of the project, DWR shall work cooperatively with DPR to assess physical deterioration to the marina, if any, directly related to the project. DWR shall develop an action plan with DPR and mitigate for those impacts.	Less than Significant
Impact 3.12-2: Construction activities would result in temporary disruption of recreational activities at Lake Perris SRA.	**Mitigation Measure 3.12-2:** DWR shall include in construction contractor specifications that construction would avoid the Big Rock rock-climbing area and that construction of the haul road would not alter the appearance of the rock cliff. Closed climbing structures would be identified for public awareness.	Significant and Unavoidable during the temporary construction period

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
Impact 3.12-3: Drawdown of Lake Perris, the excavation of the borrow area, and the construction of the new outlet tower would adversely affect the Lake Perris SRA sport fishery and waterfowl hunting opportunities**.**	Implement **Mitigation Measure 3.3-8, 3.3-9a through 3.3-9c**.	Significant and Unavoidable
Impact 3.12-4: Construction activities would result in temporary disruption of recreational activities at the Perris Fairgrounds. The open channel emergency outlet extension alternative would permanently impact activities at the Perris Fairgrounds**.**	**Mitigation Measure 3.12-4:** DWR shall prepare a parking plan for the fairgrounds and implement improvements to regain the lost parking spaces caused by the construction of the emergency outlet extension. Implement **Mitigation Measure 3.8-1a and 3.8-1b**.	Less than Significant for the underground alternative; Significant and Unavoidable for the open channel alternative
Traffic and Circulation		
Impact 3.13-1: Construction activities would result in short-term increases in vehicle trips by construction workers and construction vehicles.	**Mitigation Measure 3.13-1:** The following requirements shall be incorporated into contract specifications for the project: • The contractor(s) shall prepare and implement a traffic safety / traffic management plan, which would establish, at a minimum, the process for notification of construction activity and the means for people to report problems during construction. The plan will be made available to the public. Elements of the contractor's plan will include, but are not necessarily limited to, the following: – Provide a schedule of deliveries over the construction period showing the estimated number of trucks traveling to and from the project site during the different phases of the work. Provide updates of estimated truck traffic volumes as construction proceeds. Encourage off-peak hour deliveries. – Comply with roadside safety protocols. Provide advance "Road Work Ahead" (and other appropriate) warning signs to achieve required speed reductions for safe traffic flow (including turning movements between the Ramona Expressway and the main access roads) into and out of the work site. – Promote carpooling and use of public transportation for workers traveling to the construction site.	Less than Significant
Impact 3.13-2: Construction activities could affect traffic on Ramona Expressway, Evans Road and Lake Perris Drive as well as on roads within the Lake Perris SRA. Some road closures would occur within the Lake Perris SRA for the duration of construction.	**Mitigation Measure 3.13-2a:** DWR shall post signs at closed roads indicating the closure schedule and alternate routing for recreational and regular access. In addition, closure notification shall be posted on the DWR and Lake Perris SRA websites.	Less than Significant

TABLE S-1 (Continued)
SUMMARY OF IMPACTS AND MITIGATION MEASURES

Environmental Impact	Mitigation Measures	Significance after Mitigation
	Mitigation Measure 3.13-2b: DWR shall prepare a traffic control plan that identifies specific traffic control measures to ensure safety on the local roadway network and within the Lake Perris SRA. Control measures shall include use of flaggers within Lake Perris SRA if construction vehicles utilize Lake Perris SRA roads and trails outside the construction exclusion zone. **Mitigation Measure 3.13-2c:** Peak travel periods shall be avoided when scheduling road closures.	
Impact 3.13-3: The construction activity is located within the March Air Reserve Base Safety Zone Area III that could pose air traffic safety conflicts.	None required.	--
Cumulative Effects		
Impact 4-1: Construction of the proposed project in conjunction with other projects in the area could result in cumulative short-term impacts associated with construction activities. The short-term impacts associated with cumulative construction projects include impacts related to aesthetics, air quality, biological resources, hazardous materials, geology and soils, hydrology and water quality, land use, noise, and public services and utilities, and traffic. Construction-related impacts would be short-term. With measures identified in Chapter 3 to mitigate project impacts, the contribution of the proposed project to most cumulative, construction-related impacts would not be cumulatively considerable. However, the project's contribution to air quality impacts would be cumulatively considerable**.**	None required.	Cumulative air emissions would be Significant and Unavoidable; other cumulative impacts would be Less than Significant

CHAPTER 1
Introduction

1.1 Purpose of the EIR

The California Department of Water Resources (DWR) has prepared this Draft Environmental Impact Report (Draft EIR) to provide the public and responsible and trustee agencies information about the potential adverse effects on the local and regional environment associated with construction and operation of the Perris Dam Remediation Program (proposed project). This Draft EIR has been prepared pursuant to the California Environmental Quality Act (CEQA) of 1970 (as amended), codified at California Public Resources Code Sections 21000 et. seq., and the *CEQA Guidelines* in the Code of Regulations, Title 14, Division 6, Chapter 3.

This Draft EIR describes the environmental impacts of the proposed project and suggests mitigation measures to reduce impacts to a less-than-significant level. The impact analyses are based on a variety of sources, including agency consultation, technical studies and field surveys. DWR will use this EIR to consider implementation of the proposed project. As Lead Agency, DWR may use this EIR to approve the proposed project, make Findings regarding identified impacts, and if necessary, adopt a Statement of Overriding Considerations regarding these impacts.

1.2 CEQA EIR Process

1.2.1 Notice of Preparation

In accordance with Sections 15063 and 15082 of *CEQA Guidelines,* DWR, as Lead Agency, prepared and circulated a Notice of Preparation (NOP) (see **Appendix A**) on June 1, 2007. The NOP was mailed to approximately 77 interested parties, including local, state, and federal agencies; news publications; and other groups or individuals who had previously expressed interest in the project. A Notice of Completion (NOC) was also prepared by DWR and sent to the State Clearinghouse. Copies of the NOP were made available for public review at the Riverside County Library, Perris Branch, and the DWR web site: www.water.ca.gov.

The NOP provided a general description of the facilities associated with the Perris Dam Remediation Program, a summary of the probable environmental effects of the project to be addressed in the EIR, and maps showing the project location and a cross section of the Dam. The NOP provided the public and interested public agencies with the opportunity to review the proposed project and to provide comments or concerns on the scope and content of the

environmental review document including: the range of actions; alternatives; mitigation measures, and significant effects to be analyzed in depth in the EIR.

The 30-day project scoping period, which began with the distribution of the NOP, remained open through July 2, 2007. On June 20, 2007, a letter was sent to DWR from the Metropolitan Water District of Southern California (Metropolitan) requesting a 90-day extension for the NOP commenting period. On July 2, 2007, the extension was granted by DWR to the date of September 28, 2007.

1.2.2 Public Scoping Meeting

DWR held a public scoping meeting on June 20, 2007 at the Perris Fairgrounds in Harrison Hall. DWR placed display ads prior to the scoping meeting in the Press Enterprise on June 6, 7, and 8, 2007. The purpose of the meeting was to present the proposed project to the public through use of display maps, route alignments and handouts describing project components and potential environmental impacts. DWR staff, local water agency staff, and members of the public attended the scoping meeting. Attendees were provided an opportunity to voice comments or concerns regarding potential effects of the proposed project.

The Scope of the Draft EIR was determined based on the responses to the NOP and the issues raised at the public scoping meeting. Issues not related to environmental effects, such as financing, are not addressed in the Draft EIR but may be considered by the DWR Director before making a final decision on the proposed project. Please refer to **Appendix A** for written comments received during the Scoping Meeting and information related to the circulation of the NOP. These issues were considered during preparation of the Draft EIR.

1.2.3 Draft EIR

This document constitutes the Draft EIR. The report contains a description of the proposed project, description of the environmental setting, identification of project impacts, and mitigation measures for impacts found to be significant, as well as an analysis of project alternatives. The Draft EIR addresses the potential environmental effects of implementing the proposed project.

Significance criteria have been developed for each environmental resource analyzed in this Draft EIR, and are defined at the beginning of each impact analysis section. Impacts are categorized as follows:

- Significant and unavoidable;
- Potentially significant, but can be mitigated to a less-than-significant level;
- Less than significant (mitigation is not required under CEQA, but may be recommended);
- No impact; or
- Beneficial.

CEQA requires that a lead agency shall neither approve nor carry out a project as proposed unless the significant environmental effects have been reduced to an acceptable level, where possible (*CEQA Guidelines* §15091 and §15092). An acceptable level is defined as eliminating, avoiding, or substantially lessening the significant effects. If such a reduction is not possible, a lead agency

must adopt Findings and a Statement of Overriding Considerations. As defined in *CEQA Guidelines* §15093, a Statement of Overriding Considerations balances the benefits of a project against its unavoidable environmental consequences.

1.2.4 Organization of the Draft EIR

This Draft EIR has been organized into the following sections:

S. Summary. This chapter summarizes the contents of the Draft EIR.

1. Introduction. This section discusses the CEQA process and the purpose of the EIR.

2. Project Description. This section provides an overview of the proposed project, describes the need for and objectives of the proposed project, and provides detail on the characteristics of the proposed project.

3. Environmental Setting, Impacts and Mitigation Measures. This chapter describes the environmental setting and identifies impacts of the proposed project for each of the following environmental resource areas: Aesthetics; Air Quality; Biological Resources; Cultural Resources; Geology, Soils, Faulting, and Seismicity; Hazards and Hazardous Materials; Hydrology, Water Quality, and Groundwater; Land Use and Planning; Noise; Public Safety/Flooding; Public Services and Utilities; Recreation; and Traffic and Circulation. Measures to mitigate the impacts of the proposed project are presented for each resource area.

4. Cumulative Impacts. This chapter describes the potential impacts of the proposed project when considered together with other related projects in the project area.

5. Growth Inducement. This chapter describes the potential for the proposed project to induce growth.

6. Analysis of Alternatives. This chapter presents an overview of the alternatives development process and describes the alternatives to the proposed project that were considered.

7. Report Preparers. This chapter identifies authors and consultants involved in preparing this Draft EIR, including persons and organizations consulted.

8. Acronyms.

9. References.

1.2.5 Public Review

This document is being circulated to local, state and federal agencies, and to interested organizations and individuals who may wish to review and comment on the Draft EIR. Publication of this Draft EIR marks the beginning of a 45-day public review period, during which written comments may be directed to the address below. During the 45-day review period, DWR will hold a formal public hearing on the Draft EIR. The public hearing will be

held February 3, 2010 at 6pm in Harrison Hall at the Lake Perris Fairgrounds, 18700 Lake Perris Drive, Perris, CA 92571.

Comments on the Draft EIR should be sent or e-mailed to:

Tom Barnes
on behalf of the California Department of Water Resources
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017
tbarnes@esassoc.com

1.2.6 Final Environmental Impact Report Publication

Written and oral comments received in response to the Draft EIR will be addressed in a Response to Comments document which, together with the Draft EIR, will constitute the Final EIR. DWR will then consider EIR certification (*CEQA Guidelines* §15090). Once the EIR has been certified, DWR may proceed to consider project approval. Prior to approving the project, DWR must make written findings with respect to each significant environmental effect identified in the EIR in accordance with Section 15091 of *CEQA Guidelines*.

CEQA requires that the lead agency neither approve nor implement a project unless the project's significant environmental effects have been reduced to a less-than-significant level, essentially "eliminating, avoiding, or substantially lessening" the expected impacts. If the lead agency approves the project despite residual significant impacts that cannot be mitigated to less-than-significant level, the agency must state the reasons for its action in writing. This Statement of Overriding Considerations must be included in the record of the project approval.

1.2.7 Mitigation Monitoring and Reporting Program

State law requires lead agencies to adopt a mitigation monitoring and reporting program for those changes to the project that have been adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The *CEQA Guidelines* do not require that the specific reporting or monitoring program be included in the EIR. Throughout this EIR, however, proposed mitigation measures have been clearly identified and presented in language that will facilitate establishment of a monitoring program. All adopted measures will be included in a mitigation monitoring and reporting program to verify compliance.

CHAPTER 2
Project Description

2.1 Overview

DWR proposes to implement the Lake Perris Dam Remediation Program to remediate the Lake Perris Dam, replace the outlet tower, and construct an outlet conveyance to connect with the Perris Valley Storm Drain. The project is being proposed to address seismic safety concerns and to bring the facilities up to current safety standards. This section provides some background on DWR and Lake Perris, identifies project objectives, and presents the proposed project description.

2.2 Project Background

2.2.1 State Water Project

DWR operates and maintains the State Water Project (SWP), supplying water to 29 contracting agencies across the state. DWR operates 33 storage facilities, 20 pumping plants, four pumping-generating plants, five hydroelectric power plants, and 660 miles of canals and pipelines within the SWP (DWR, 2007a). Lake Perris is the terminal reservoir for the East Branch of the California Aqueduct, providing a key water supply to Southern California State Water Contractors including the Metropolitan Water District of Southern California (MWD or Metropolitan), which provides potable water to 28 cities and water districts within Southern California.

The California Aqueduct conveys water to Southern California from the Sacramento-San Joaquin Delta. The Delta receives runoff from over forty percent of California's land including flows from the Sacramento and San Joaquin Valleys. Water travels south from the Delta to the 444 mile-long California Aqueduct. The Aqueduct then splits into the West and East Branches south of the Tehachapi Mountains. The East Branch extends through Lake Silverwood, continues on through the Santa Ana Pipeline, and then terminates at Lake Perris. **Figure 2-1** depicts the California Aqueduct extending southward from the Sacramento River Delta.

The amount of water available to the SWP fluctuates widely each year due to factors such as hydrologic conditions, flood management needs, the capacity of SWP storage and conveyance facilities, changing weather-temperature conditions, water quality, and environmental requirements. Water deliveries are based on the long-term contracts that DWR has with each of the 29 contractors. Though the proposed project would require Lake Perris to be refilled, the

SOURCE: DWR, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-1

State Water Project Overview

project would not cause additional water to be taken from the Delta. The lake would only be refilled when water is available, which is dependent on the factors described above.

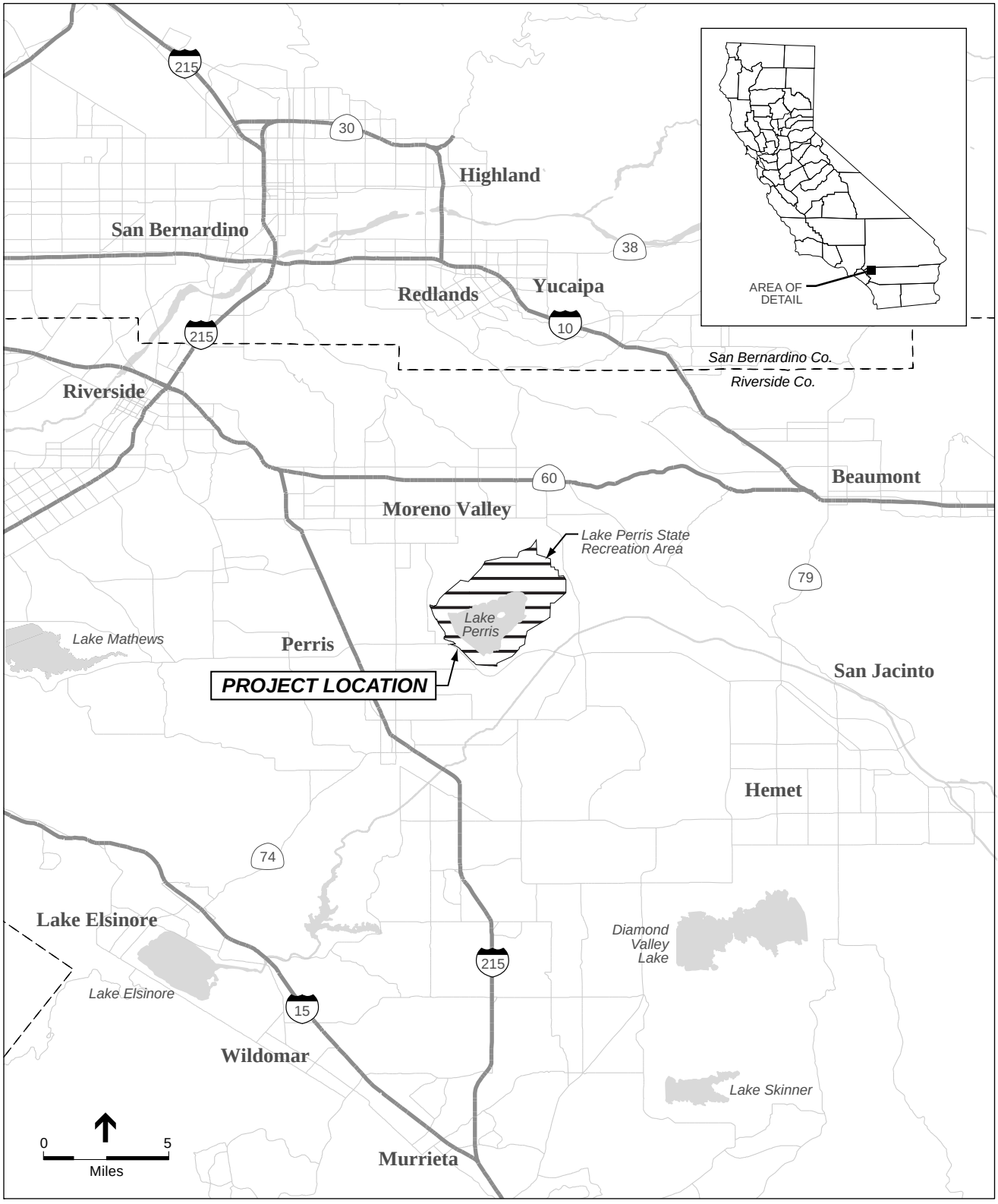
Recent developments regarding the Delta have introduced uncertainty into the SWP's ability to convey water to the contractors. In 2004, the Bureau of Reclamation and DWR developed a new Operating Criteria and Plan (OCAP) for the SWP and the Central Valley Project (CVP). The OCAP included the project descriptions required for a comprehensive biological assessment of the effects of SWP and CVP operations on listed species. In 2004, USFWS issued a non-jeopardy biological opinion (BO) with regards to impacts to the Delta smelt caused by revised operations of the CVP and SWP. The BO concluded that adverse effects to the Delta smelt would be avoided or minimized by the conservation and adaptive management measures included in the OCAP. In May 2007, the Wanger decision made by the U.S. District Court found the OCAP BO for Delta smelt to be inconsistent with the Federal Endangered Species Act and required that it be rewritten. On December 14, 2007 the court established interim operating rules while the BO is being rewritten that include in-Delta flow limits in Old and Middle Rivers which have the effect of restricting SWP and CVP pumping (DWR, 2007b).

Since the Wanger decision, a new BO has been issued by the USFWS for Delta Smelt. DWR preliminary modeling analysis conducted in December 2008 indicated that the measures within the new BO are significantly more restrictive than the Wanger Decision and would consequently further reduce exports from the Delta (i.e. further decrease reliability of the SWP). In addition, the California Department of Fish and Game Commission has since issued an Incidental Take Permit for longfin smelt that contains operational actions and the National Marine Fisheries Service has issued a new BO for Salmon that contains additional export limitations. Both of these permits could further reduce SWP reliability.

Preliminary modeling from DWR addressing the affects of the recently released Delta Smelt BO does indicate that additional significant reductions to SWP reliability are possible. Modeling results from DWR that take into account all recent actions that will further restrict the ability to export from the Delta and consequently reduce SWP reliability will not be available until the 2009 State Water Project Delivery Reliability Report is available, currently anticipated in the fall of 2009. This report may conclude that SWP reliability may decrease even further. The Perris Dam Remediation Program would not affect, or be affected by SWP reliability.

2.2.2 Perris Dam and Reservoir

Perris Dam and Reservoir, a multi-purpose facility known collectively as Lake Perris, is located within the Lake Perris State Recreation Area (SRA). **Figure 2-2** shows the regional location of the Lake Perris SRA. Perris Dam is an earthfill embankment completed in 1972, containing approximately 25 million cubic yards of compacted fill. The embankment is approximately 11,600 feet long, with a maximum structural height of 128 feet. The fill material was originally obtained from sediments in what was to become the lake bed, from clay borrow northeast of the lake, and from a quarry constructed within the Bernasconi Hills just east of the dam within the Lake Perris SRA.



SOURCE: Riverside County, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-2
Regional Location Map

While DWR may vary the water surface elevation to provide for operational requirements, the normal maximum operating water level on the lake is 1588 feet above mean sea level (amsl), 108 feet above reservoir bottom. The spillway crest is 1590 feet amsl and the dam crest elevation is at 1600 feet amsl. The designed reservoir capacity is 131,000 acre-feet (af) with a surface area of 2,320 acres.

Though primarily a water supply reservoir, recreational and fish and wildlife enhancement opportunities consistent with the water supply uses were considered during original construction and extended to the California Department of Parks and Recreation (DPR) and the California Department of Fish and Game (CDFG). The lake provides water supply, recreation, sport fishery, wildlife enhancement, emergency water storage uses, and incidental flood protection. Recreation opportunities include fishing, hunting, boating, picnicking, camping, nature study, rock climbing, horse back riding, and hiking.

Resources Agency Order No. 6, dated March 13, 1963, defines the responsibilities of each department at SWP multi-purpose facilities pursuant to Water Code Sections 11900-11925, also known as the Davis-Dolwig Act. The water storage and conveyance facilities and acquired land are owned and operated by DWR in cooperation with MWD of Southern California, Coachella Valley Water District, and Desert Water Agency. DPR and CDFG, whose use is subordinate to the water supply project purpose, are responsible for the management, operation, and maintenance of the public recreation areas.

2.2.3 Need for the Project

Perris Dam Remediation

The seismic stability of Perris Dam has been evaluated since its design in the 1960s and construction in the 1970s. Results of the earlier studies indicated that the strain potential on the dam during intense ground shaking caused by seismic events was relatively low. The initial foundation studies were considered adequate by the standards of practice during the design phase in the late-1960s and early-1970s. However significant advances in soil liquefaction engineering including soil sampling and testing methods have resulted in a different interpretation of the foundation conditions and predicted performance.

In 2005, DWR completed a foundation study of the Perris Dam. Results of the detailed liquefaction analysis of the Perris Dam foundation indicated that seismically-induced ground shaking could result in embankment deformations due to the liquefaction potential of sediments under the dam at several locations along the 2300-foot-long segment along the southern span (left reach) of the dam. With the lake filled to its design capacity, this could result in overtopping of the dam during a strong ground shaking event. Based on the results of this stability analysis, DWR lowered the reservoir water surface elevation by 25 feet to 1563 feet amsl, until a long-term remedial solution can be implemented. This reduction in surface elevation reduced the storage capacity of the lake by approximately 40 percent from 126,841 af to 72,000 af.

The foundation study also concluded that the presence of loose sands beneath the dam embankment at the right abutment should be further investigated. Subsequent investigation by DWR concluded that excavation and replacement of a small portion of the dam is warranted. This work extends as deep as Elevation 1574 (11 feet above the maximum lake level during the drawdown period). It is anticipated that approximately 15,000 cubic yards (cy) of dam material and underlying loose silty sand would be excavated and recompacted. The excavated clay core and silty sand shells of the dam would be reused, and a relatively small amount of imported clay (up to 4000 cy) would be needed to rebuild this portion of the dam.

A Perris Dam Reconnaissance Study was conducted in 2006 to evaluate alternatives to the dam remediation. Alternatives evaluated in the Reconnaissance Study included permanently lowering the lake level, maintaining the existing level, and raising the normal maximum operating level of the reservoir. The report recommended that restoring the lake to historical operating levels had the least impact.

Remediation of the dam foundation would encounter some below-grade drainage structures and monitoring wells that either would have to be destroyed or replaced. This includes some of the relief wells and other portions of the seepage collection system. The relief wells along the left reach would be destroyed by overdrilling and backfilling with cement-bentonite grout. They would be replaced by new relief wells. The perforated pipes in the toe drain of the dam and in the drain line connecting the relief wells are likely made of asbestos cement pipe. These drainage elements would be removed as part of the excavation at the toe of the dam. The new toe drain (12-inch perforated PVC or HDPE pipe) would be placed at the toe of the new berm to replace the toe drain (12-inch perforated asbestos-containing pipe) excavated from the toe of the dam. The length of the toe drain pipe would be up to 5200 feet. Similarly, up to 4000 feet of 12-inch perforated ACP would be removed from the line of relief wells and replaced with perforated PVC or HDPE as part of the new relief wells. The 1500 feet of existing 24-inch solid ACP that drains seepage water from the toe drain and relief wells to the flow meter near Ramona Expressway would also be replaced as it interferes with construction of both the dam foundation remediation and the emergency outlet conveyance construction. Finally, shallow irrigation lines may exist in the project area that were abandoned prior to construction of the dam. These abandoned water delivery pipes would be removed where encountered and capped if necessary.

Outlet Tower Replacement

The existing outlet tower, built in the early 1970s, is a 105-foot tall, freestanding structure constructed in the lake near the left abutment of the dam. The outlet tower contains 10 hydraulically operated 72-inch butterfly valves located at each of five equally spaced levels between Elevation 1503 and 1567 with two valves at each location. The tower was constructed of reinforced concrete and is circular in cross section with an inside diameter of 26 feet and an outside diameter of 31 feet. The outlet tower releases water from five selected levels to a 150-inch (12.5 foot) diameter horizontal tunnel at its base. The function of the outlet facility is to convey water to MWD's delivery facility just southwest of the eastern abutment of the dam and

to have the ability to release water from the lake when required during emergencies for the safety of the dam.

The structural integrity of the tower was evaluated in 2006 and was found to be deficient in shear capacity under pre-2008 seismic loading which could cause a failure of the structure. To remediate the stability of the outlet tower, DWR evaluated options to either retrofit the existing outlet tower or construct a new facility on the shore near the current tower. Several potential alternatives were considered to retrofit the tower, but none were found to be viable to reinforce the structure, given complexities of construction with water in the reservoir, thus construction of a new tower is required.

Emergency Outlet Extension

When Perris Dam was initially constructed, there was little development between the dam and the Perris Valley Storm Drain. The dam's emergency release facilities were designed and constructed to release 3800 cubic feet per second (cfs) of water downstream of the dam, allowing the water to form its own overland channel, resulting in an inundation area of 2700 acres. Over time, the areas downstream of the dam were developed with residential land uses that could be affected should the emergency release be needed. The existing emergency outlet structure consists of a rectangular pipe (12 feet by 6 feet), slide gate, and bulkhead, capable of releasing a maximum of 3800 cfs. The new facility would be sized to accommodate up to 1500 cfs which is the current emergency drawdown capacity requirement set by the California Department of Safety of Dams for Lake Perris. Currently, water released from the dam in an emergency could flood downstream residents because there is no conveyance structure to contain or direct the emergency flows.

2.2.4 Project Objectives

The objectives of the proposed project are to:

- Upgrade SWP infrastructure to meet current seismic standards
- Maintain SWP delivery commitments
- Maintain maximum access to beneficial uses at Lake Perris SRA during period of drawdown while ensuring public safety during construction
- Maintain maximum amount of pre-drawdown riparian habitat at Lake Perris SRA during period of drawdown
- Minimize risks associated with seismic hazards
- Provide infrastructure for the implementation of a safe emergency drawdown
- Enhance and restore public safety
- Maximize beneficial use of Lake Perris SRA by restoring reservoir to pre-drawdown water levels
- Minimize environmental impacts

2.3 Project Location

Lake Perris is located between the cities of Moreno Valley and Perris in an unincorporated area of Riverside County, approximately 15 miles south of the City of Riverside and 65 miles east of the City of Los Angeles (see Figure 2-2).

2.4 Baseline Condition

CEQA states that a project's potential impacts should be assessed against the existing baseline condition at the time the NOP is published (§15125). However, for purposes of this project, the baseline condition is assumed to be the pre-drawdown condition that was present in spring of 2005, before DWR implemented the 25 foot water level drawdown in the reservoir. The drawdown was conducted as an emergency public safety action and was identified as such in a CEQA Categorical Exemption filed by DWR in August 2005. For purposes of this EIR, the drawdown of the lake from an elevation of 1588 feet amsl to the current elevation of 1563 feet amsl, and subsequent improvements implemented by DWR to the facilities at the Lake Perris SRA are considered to be part of the project description.

2.5 Project Description

In addition to the drawdown itself, the proposed Perris Dam Remediation Program includes three separate components as described below: (1) Perris Dam Remediation, (2) Outlet Tower Replacement, and (3) Emergency Outlet Extension. The three components combined provide the upgraded seismic protection needed to protect public safety. **Figure 2-3** shows the location of each of the proposed components. The following sections describe each component.

2.5.1 Lake Perris Drawdown

On August 2005, DWR initiated the drawdown of Lake Perris from 1588 feet amsl to 1563 feet amsl. The drawdown was complete by November 2005. The water removed from the lake was delivered to MWD for delivery or storage in other facilities. **Figure 2-4** shows the area of the lakebed exposed during this process. DWR conducted several actions to mitigate initial impacts of the drawdown. In an effort to maintain recreational activities on the lake, DWR ensured that the marina remained in the lowered lake and constructed a causeway from the shore across the exposed lakebed, providing full access to the marina facility. In addition, the Department of Boating and Waterways physically moved docks 60 feet further off-shore to improve vessel access to slips. New ADA[1]-compliant access ramps were restored to these docks by DWR to replace those which had become too steep due to the drawdown. DWR also imported 14,171 tons of sand to the Perris Beach area to enhance beach-going recreational uses near the location of the previous beaches. DWR also installed a 2-mile long irrigation system connected to State Park water pumps and drip-line system that conveys lake water to the riparian habitat that exists along the eastern edge of the original lakeshore. Figure 2-4 shows the location of the new beach, marina causeway, boat launch extensions, and irrigation system.

[1] American's with Disabilities Act (ADA)

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-3
Location of Proposed Project Elements

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-4

Post-Drawdown Improvements

2.5.2 Perris Dam Remediation

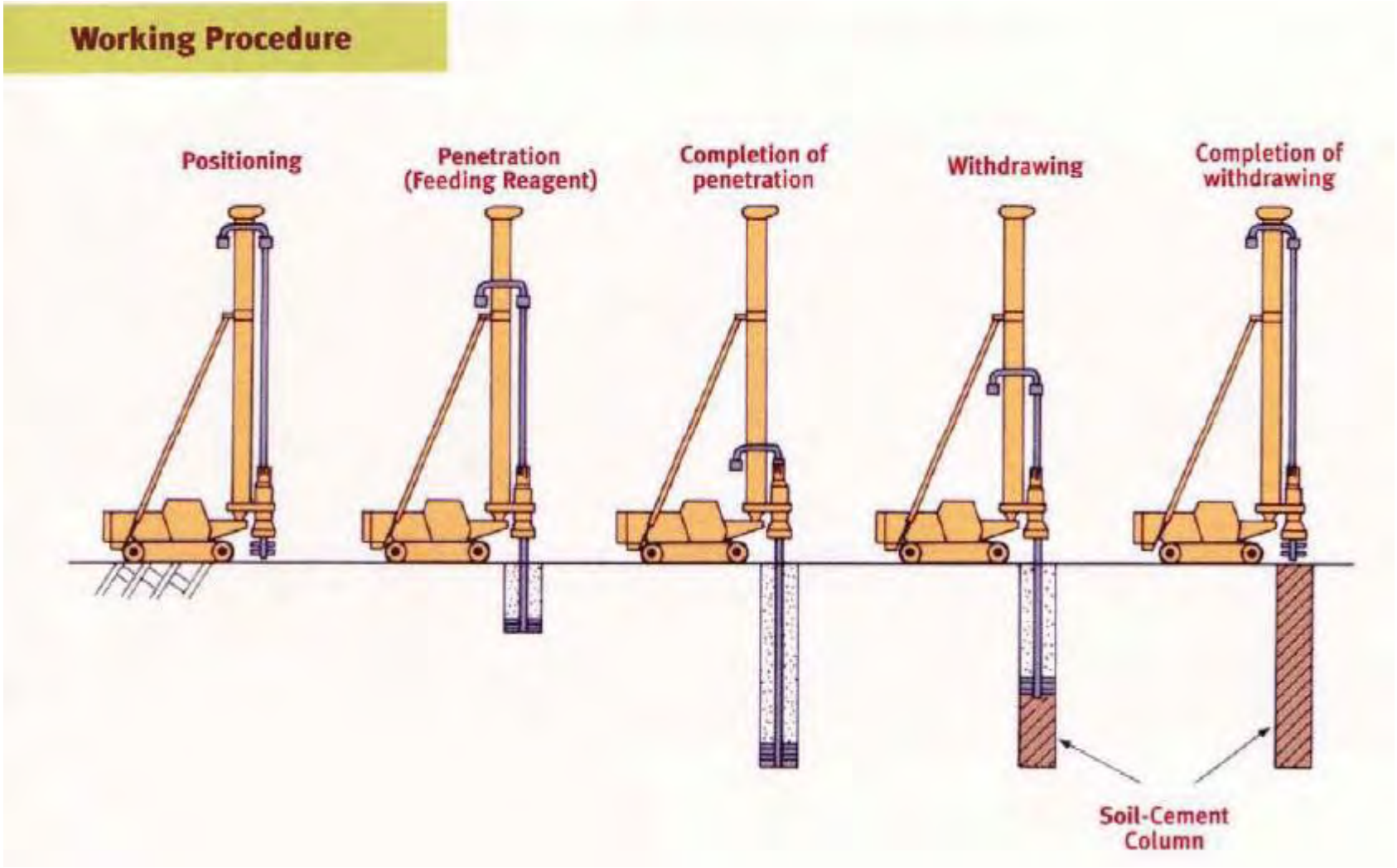
DWR proposes to seismically upgrade the dam by improving the foundation material with cement-deep-soil-mixing (CDSM) methods, excavating the toe of the dam to remove the liquefiable berm foundation material, replacing the berm foundation material with re-compacted engineered fill, and then constructing a stability berm on top of the replaced berm foundation. This remediation strategy would allow Lake Perris to return to its previous maximum operating pool elevation of 1588 feet amsl after construction.

CDSM methods involve thoroughly mixing cement paste with in-situ native soils within a zone from approximately 60 feet below original grade at the downstream toe of the dam. The blocks of soil-cement columns would be installed in the deepest and most liquefiable alluvial materials beneath the berm foundation. Deep soil mixing increases the stability of the soil and reduces liquefaction hazards as well as temporary destabilization caused by excavations at the toe. **Figure 2-5** presents a schematic view of CDSM techniques.

Following deep soil mixing, the groundwater would be lowered by an array of pumping wells and either temporary sheet piles or a permanent CDSM wall to facilitate the excavation and replacement of the uppermost liquefiable soils. The current seepage collection system is fed by gravity and is comprised of a drainage blanket, toe drain collector pipe, relief wells, relief well collector pipe, one large diameter well and a main drain line that leads to the flow meter. The new seepage collection system would serve essentially the same purpose. New relief wells and collector piping would be installed to prevent ponding of seepage water on the ground surface once the lake level is returned to its original elevation. The wells and the extended drainage blanket would maintain a stable groundwater elevation south of the dam. The water pumped from the wells during construction would discharge into a solid pipe leading out to the flow meter and on toward MWD's delivery system. After construction, gravity drainage from the extended drainage blanket and the new wells would also flow through the existing flow meter on toward MWD's system.

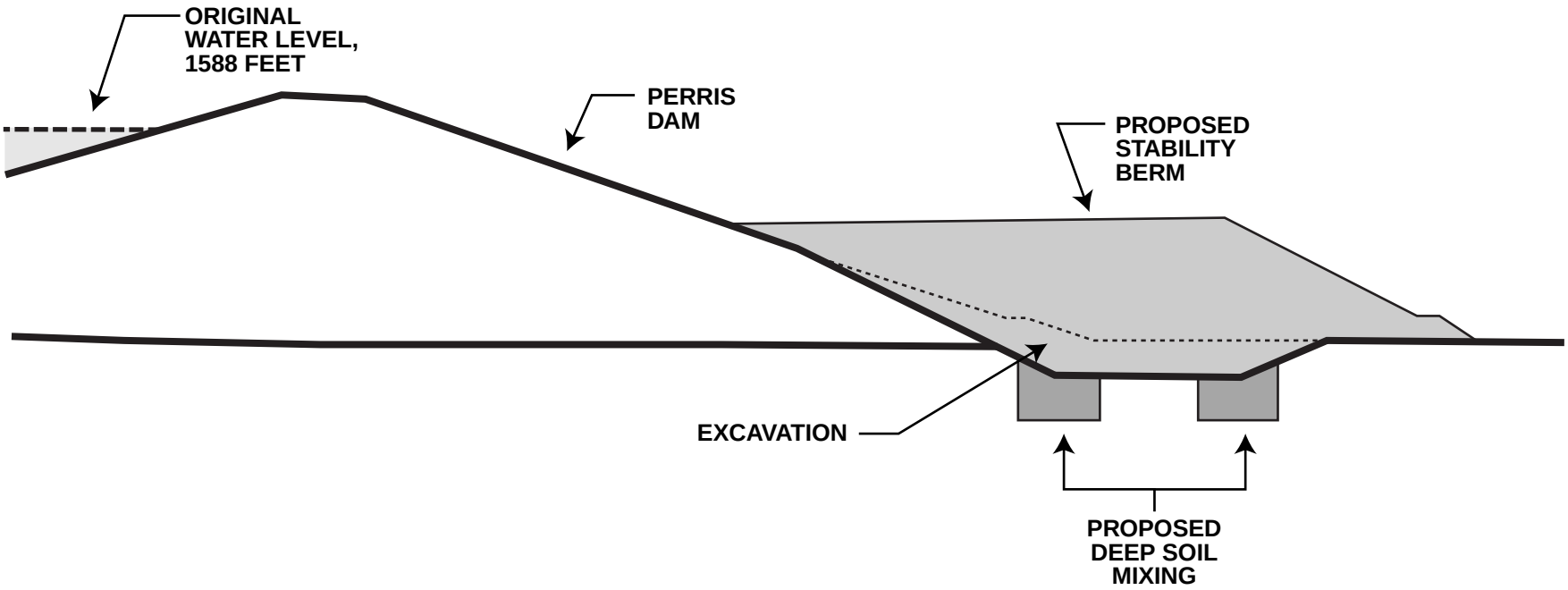
Approximately 700,000 cy of soil would be excavated from the shallow berm foundation at the toe of the dam. **Figure 2-6** provides a cross-section of the proposed excavation. Drain rock would be placed in the bottom lifts of the excavation to extend the existing drainage blanket to the new toe of the stability berm. The excavated material would be stockpiled on site and recompacted as excavation backfill and as part of the stability berm. Approximately 800,000 tons of drain rock and 300,000 cy of soil would be backfilled into the excavation area.

A stability berm would be constructed atop the re-compacted berm foundation along the downstream toe of the dam as shown schematically in **Figure 2-7**. The berm would consist of approximately 1.75 million cubic yards of soil and one million tons of rock. As shown in Figure 2-3, the soil for the stability berm would be excavated from within the lakebed at the east end of the lake, and the rock would be quarried from the original rock quarry east of the lake in Bernasconi Hills. To convey the soil and rock to the downstream face of the dam, a haul road would be constructed from the east side of the lake, along the lakebed on the south side of the



SOURCE: Courtesy of Raito, Inc.

Figure 2-5
Cement Deep Soil Mixing



0 100

Feet

SOURCE: Department of Water Resources, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-6
Perris Dam
Cross Section

Dam Remediation and Emergency Outlet Extension

0 900
Feet

SOURCE: GlobeXplorer, 2008; DWR, 2009; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-7
Emergency Outlet Extension

lake, and over a low spot on the Bernasconi Hills near the dam's left abutment. Figure 2-3 and **Figure 2-8** show the proposed route for the haul road.

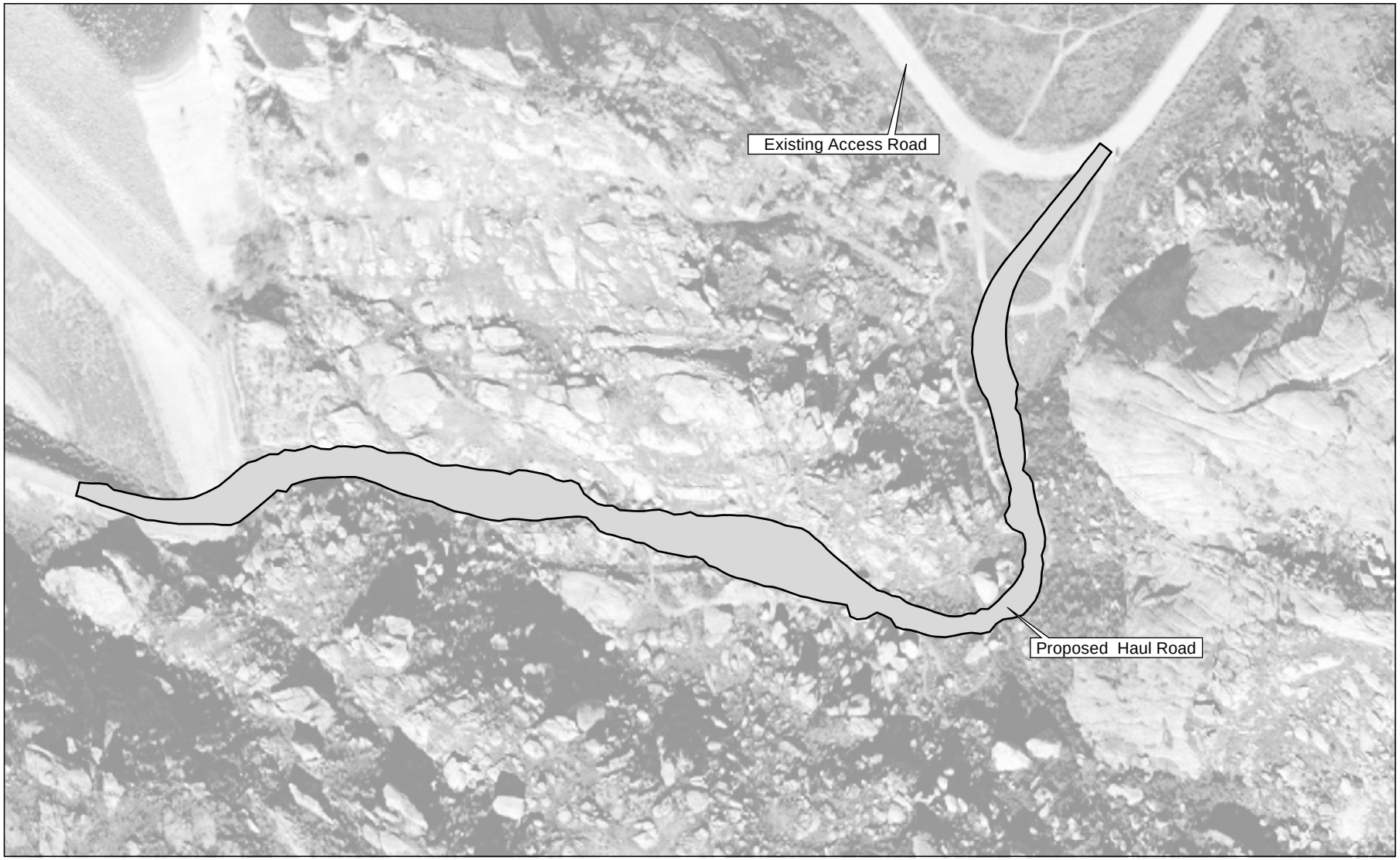
Soil and rock hauled to the toe of the dam may be stockpiled near the construction area or applied directly to the construction activity as they are quarried and delivered. **Figure 2-9** shows the construction zone including staging areas.

The borrow area would be located entirely within the lakebed exposed by the temporary drawdown. Similarly, the haul road would be constructed entirely within the exposed lakebed from the borrow area to just south of the dam. As shown in Figure 2-8, the haul road would continue over a portion of the Bernasconi Hills to the downstream side of the dam. The haul road in this location would require blasting and become a permanent, paved maintenance road at the end of construction. The borrow area and remaining portions of the haul road would be submerged when the lake is refilled.

2.5.3 Outlet Tower Replacement

DWR is proposing to construct a new outlet structure as a replacement facility, because the existing tower may fail during a major earthquake. The new outlet facility would be located approximately 400 feet from the existing tower. An area on the southern shore between the hill and the lake would be excavated and the new outlet tower constructed using dry construction methods (**Figure 2-10**). Excavated material would be hauled to the dam remediation construction area and used in the stability berm. Blasting into hard rock would be required.

The new facility would consist of a tower extending from the dead pool elevation of 1500 feet of the lake to an elevation of 1600 feet amsl, approximately 12 feet above the lake level when full. Appurtenant structures on top of the tower would extend an additional 20 feet above ground level. The facility would be constructed within the excavation. A 600-foot long, 12.5-foot diameter tunnel would be constructed to connect the new outlet facility to the existing underground tunnel that connects to MWD's delivery system. A staging area would be needed near the construction area, as shown on Figure 2-10, to stockpile construction material and equipment. Once the new outlet structure and the tunnel are constructed, a 300-foot long approach channel would be constructed to open the new outlet to the lake. A buoy line would be set in the lake approximately 300 feet from the shore limiting access to the vicinity of the facility. The old outlet tower would remain in place and would not be deconstructed.



SOURCE: DWR, 2009; ESA, 2009.

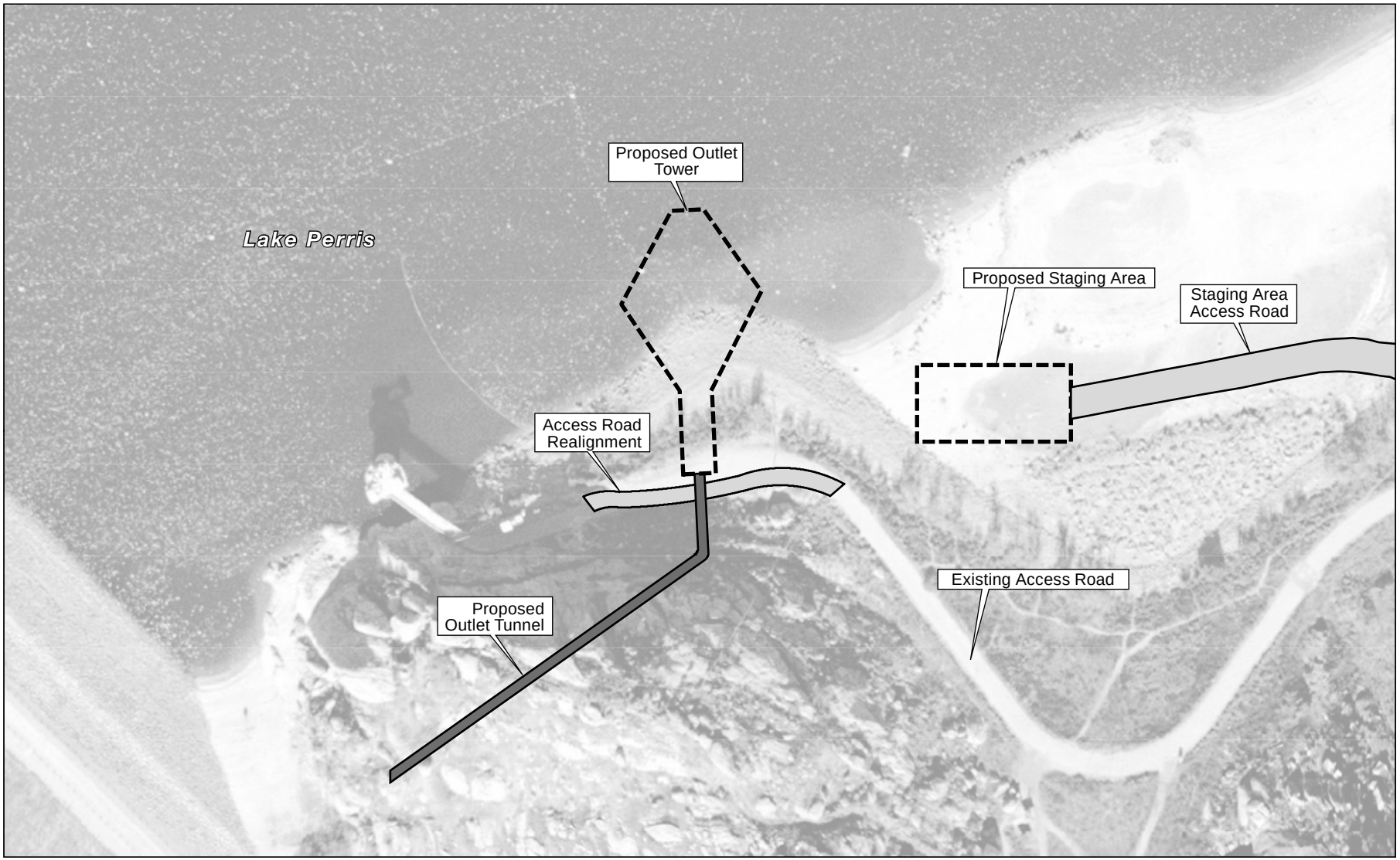
DWR - Perris Dam Remediation Program . 206008.02

Figure 2-8
Haul Road over Bernasconi Hills

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-9
Approximate Exclusion Zone
Off limits to Public
During Construction



SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 2-10
Proposed Outlet Tower
New Structure Location Plan

2.5.4 Emergency Outlet Extension

DWR is proposing to modify the existing valve and control systems to reduce emergency releases to a maximum 1500 cfs. DWR would also construct a new emergency outlet extension in the form of a conveyance that would completely contain and convey the maximum release from the dam to the Perris Valley Storm Drain. Figure 2-7 identifies the proposed route of the emergency outlet extension.

The proposed outlet extension would be approximately two miles long with a 1500 cfs capacity to the Perris Valley Storm Drain. There are two alternatives for the outlet extension being addressed. The first alternative would be underground as either a box culvert or pipeline from the existing outlet structure to Lake Perris Drive. The remaining portion of the conveyance channel from Lake Perris Drive to the Perris Valley Storm Drain, would either continue as an underground conveyance or transition to an unlined, open trapezoidal channel. This segment would be approximately 2700-feet long and would parallel Ramona Expressway and terminate at the Perris Valley Storm Drain. A 20-foot wide service road would run parallel to the conveyance channel. The maximum total affected width along the underground segment would be 110-feet. The maximum total affected width for the open channel option would be 160-feet including the service road. At the conjoining of the emergency outlet extension and the Perris Valley Storm Drain, a velocity dissipater structure would be constructed as a below-grade concrete vault.

The second alternative would be an unlined, open trapezoidal channel for the entire length of the outlet extension. A 20-foot wide service road would run parallel to the conveyance channel. The maximum total affected width for the open channel would be 160-feet including the service road. At the conjoining of the emergency outlet extension and the Perris Valley Storm Drain, a velocity dissipater structure would be constructed as a below-grade concrete vault.

The alignment crosses MWD's buried 10-foot diameter pipe just southwest of the existing outlet structure. The conveyance would cross over MWD's pipeline at this location. The underground conveyance alternative would be approximately six feet higher than the surrounding ground level, creating a small hill covered with soil. The open conveyance alternative would require approximately 300 feet of canal to be lined with concrete to prevent erosion near the pipeline. The length of the concrete is due to the skew orientation of the canal and pipeline alignments.

The alignment crosses three roads which run perpendicular to Ramona Expressway: Fair Way, Lake Perris Drive, and Evans Road. These roads would experience lane closures during the construction of the emergency outlet extension, but no full road closures would be necessary. Each road crossing would be restored after construction and would pass over the underground conveyance. If the segment between Lake Perris Drive to the Perris Valley Storm Drain is to be a trapezoidal open channel, then reinforced concrete box culverts would be placed at the Evans Road crossing. A reinforced concrete box culvert would also be used to pass flow into the Perris Valley Storm Drain. Riprap would be placed on the upstream and downstream slopes of the Perris Valley Storm Drain to reduce localized scour.

2.5.5 Perris Lake Refilling

Once construction of each project component is complete, the lake would be refilled to its original elevation of 1588 amsl. The lake would be filled by SWP water when available for delivery. The refilling would require approximately six months, assuming water availability over a consistent period.

2.6 Construction Characteristics

2.6.1 Construction Schedule

Table 2-1 summarizes proposed construction activities for each project component and estimated durations for those activities. As shown in the table, each of the three main facilities included in the project would require approximately two years each to construct. If the project components are constructed sequentially, the total construction period would be approximately four years to be completed in 2014. If the project components are constructed simultaneously the total construction period may be less than four years.

TABLE 2-1
CONSTRUCTION DURATION

Construction Activity	Duration (months)		
	Dam Remediation	Outlet Tower Replacement	Emergency Outlet Extension
Preliminary Activities and Site Preparation	2	2	2
Relocate Utilities	-	-	6
Excavation	4	3	2
Blasting	7	1	-
CDSM Treatment	15	-	-
Structure Improvements	6.5	3	5
Embankment Fill and Additional Improvements	8.5	-	-
Construct Outlet Release Extension	-	-	3
Construct Conveyance	-	-	6
Construct Delivery Tunnel	-	3	-
Construct Outlet Tower	-	8	-
Site Restoration and Demobilization	3	2	3
Total Construction Duration Per Component	**22**	**18**	**22**

SOURCE: DWR

Table 2-2 highlights a proposed construction sequence and the required equipment for each component. In general, construction activities, except for installation of CDSM elements, would occur between 7:00 a.m. and 7:00 p.m., five days per week (Monday through Friday)**.** Weekend and nighttime work may be required during some periods of construction activity. CDSM activities for the dam remediation component would be limited to two 10-hour shifts per day,

TABLE 2-2
CONSTRUCTION SEQUENCE AND EQUIPMENT

	Proposed Construction Sequence	Required Equipment
Dam Remediation	• Mobilize • Delineate and fence equipment and work areas • Grade buttress area below dam • Grade/blast new haul road • Clear embankment, borrow , and stockpile/staging areas • Blasting at quarry • Excavate borrow area • Excavate below dam • Cement deep soil mixing • Haul soil and rock to toe of dam • Construct and compact stability berm	Excavators and/or Scrapers, Graders, Loaders, Bulldozers, CDSM rigs, Vibrating rollers, Sheepfoot rollers, Hydraulic backhoes, End-dumps and belly-dumps, Dump trucks, Large trucks (importing material and cement to the site), Generators, Drill rigs, Water trucks, Tractor and disks, Asphalt concrete paver, Tandem roller, Pneumatic roller, Rock crusher, Shaker, and Conveyor belts, Air-track drill, Diesel generator unit (attached to mixing rig), Cement pump, Water tanks, Water pumps, Cement grout mixer, Cement silos, Control room, Multipurpose generator
Outlet Tower	• Mobilize and clear staging area • Excavate (blasting) • Construct new outlet tower • Tunnel to existing outlet tunnel • Remove granite plug (underwater blasting), joining new tower to lake	Bulldozers, Graders, Scrapers, Water trucks, Concrete trucks, Excavator, Dump trucks, Personal vehicles, Large trucks (importing material and cement to the site), Generators, Jumbo air drill, Rubber tire mucker
Emergency Outlet Extension	• Mobilize • Clear and grub project area • Identify and remove or relocate existing buried utilities • Excavate conveyance trench • Place/construct conveyance pipe/box culvert • Compact backfill around conveyance • Tie-in to Perris Valley Storm Drain	Bulldozers, Graders, Scrapers, Sheepfoot rollers, Water trucks, Concrete trucks, Excavators, Dump trucks, Lumber truck, Forklift, Asphalt paver, Tandem roller, Crane, Pneum roller, Personal vehicles

SOURCE: DWR

Monday through Saturday with no work conducted between midnight and 4:00 a.m. Large haul truck trips to and from the site would be generally limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, although some haul truck trips to and from the site could occur occasionally on weekends. Deliveries from off site would include cement, concrete, reinforcing steel, fencing, pipe, asphalt concrete, other construction materials, and construction equipment.

Continued use of trails and other recreation activities would be allowed during most of the proposed project construction period in areas sufficiently distant from the construction activities to ensure public safety. Construction zones would be clearly demarcated, controlled, and patrolled. Site access and control would be coordinated with Lake Perris SRA staff. Activities such as camping, picnicking, swimming, boating, rock-climbing, hiking and fishing would be temporarily closed at the Bernasconi Picnic area during construction.

2.6.2 Truck and Worker Commute Trips

On an average work day, construction traffic to the site would average 37 round-trips by trucks and 60 round-trips by personal vehicles. Peak construction traffic would depend on the number of activities performed concurrently and the length of time construction materials would be delivered to the site. The assumed daily maximum construction traffic for the proposed project would occur under a scenario in which CDSM treatment, outlet structure construction, and emergency outlet extension construction take place concurrently. Under such a scenario, peak daily vehicle trips would include about 1520 one-way trips, consisting of 1250 one-way trips by trucks and 270 one-way trips by personal vehicles (**Table 2-3**). An estimated 375 one-way daily truck trips, which represent 30 percent of all daily truck trips generated by project activities, would be external trips to and from the site. It is estimated that the remaining 70 percent (approximately 875 one-way daily truck trips) of all truck activity would remain on-site (borrow area, rock quarry, haul road, etc.) for the duration of the project.

TABLE 2-3
ESTIMATED PEAK PERSONAL VEHICLE TRIPS

Construction Activity	Number of Personal Vehicle Trips
Dam Remediation	65
Outlet Tower Replacement	25
Emergency Outlet Extension	45
Total Daily Personal Trips	**135**
Total Daily One-Way Personal Trips	**270**

SOURCE: DWR

2.6.3 Construction Activities

Dam Remediation

The fill material required for construction of the berm would total approximately 1,680,000 cy. The CDSM operation would mix approximately 80,000 cy of soil and cement for use as deep foundation material. The drainage blanket of the dam would require approximately 750,000 ton of rocks of varying sizes (six-inch maximum). This rock would be provided by drilling/blasting which would occur on a 13-acre area along the bottom of the existing quarry, located east of the lake within the Bernasconi Hills. **Table 2-4** summarizes daily truck trips required for the dam remediation. The borrow soil and crushed rock truck trips would occur entirely within the construction zone boundaries and would not affect local roadway network.

Outlet Tower Replacement

The new outlet tower would be constructed approximately 400 feet east of the existing outlet tower. The construction would be done in two phases. Phase I would involve an initial excavation up to a depth of 100 feet to make room for construction of the new facility, including the proposed new outlet structure and the 600-feet long tunnel. Excavation would require blasting,

TABLE 2-4
ESTIMATED PEAK TRUCK TRIPS – DAM REMEDIATION

	Soil from Borrow Area	Crushed Rock from Quarry	Cement for CDSM	Other Deliveries	Total
Total Quantity	1.68 million cy	750,000 tons	13,500 tons		
Quantity per Truckload	35 tons	35 tons	25 tons		
Total Truckloads	74,520	21,430	540		
Delivery Period	186 work days	143 work days	318 work days		
Truckloads per Day	**400**	**150**	**1-2**	**20**	**575**
One-Way Truck Trips per Day	**800**	**300**	**2-4**	**40**	**1,150**

SOURCE: DWR

shoveling, hauling, and a crew of 15 workers. During Phase I, a rock plug would be created by leaving the front portion without excavation in order to facilitate the construction of the new facility. The top of the plug would be set at elevation 1573, which would provide a freeboard of at least 10 feet above the current lake elevation of 1563.

Phase II would involve the construction of the approach channel by removing the rock plug. It is anticipated that it would be possible to remove the plug by underwater blasting and excavation without further lowering the lake.

It has been estimated that 4300 cy of concrete would be required for the construction of the proposed outlet tower and 30,000 cy of materials would be excavated and hauled. The excess material would be used for the dam remediation component of the project. **Table 2-5** summarizes truck trips required for the outlet tower replacement.

TABLE 2-5
ESTIMATED PEAK TRUCK TRIPS – OUTLET TOWER REPLACEMENT

	Concrete	Excavated Material	Rebar	Other Deliveries	Total
Total Quantity	8,000 tons	30,000 cy	800 tons	-	-
Quantity per Truckload	16 tons	20 tons	20 tons		-
Total Truckloads	403	1200	40		-
Delivery Period	132 work days	66 work days	88 work days		-
Truckloads per Day	**3**	**18**	**1**	**6**	**20**
One-Way Truck Trips per Day	**3**	**18**	**1**	**12**	**40**

SOURCE: DWR

Emergency Outlet Extension

Approximately 41,200 ft of precast concrete box culverts (or 8000 ft for the pipeline) would be imported for construction of the underground conveyance up to Lake Perris Drive. Culvert sections (or pipeline) would be hauled to the site on flatbed trucks. Approximately 360,000 cy of soil would have to be hauled between the excavation to a stockpile near the dam, 40,000 cy of which would be hauled from the stockpile back to the conveyance for backfill. Thirty-five acres would be cleared along the emergency outlet extension route, topsoil would be replaced after construction completion. **Table 2-6** summarizes truck trips required for the emergency outlet extension (quantities used are for the larger of the two alternative options).

TABLE 2-6
ESTIMATED PEAK TRUCK TRIPS – EMERGENCY OUTLET EXTENSION

	Precast Concrete Culvert	Soil from Excavation to Spoil	Other Deliveries	Total
Total Quantity	41,200 ft	360,000 cy		-
Quantity per Truckload	16 ft	34 cy		-
Total Truckloads	2,575	10,600		-
Delivery Period	150	30		-
Truckloads per Day	**17**	**350**	**5**	**370**
One-Way Truck Trips per Day	**34**	**700**	**10**	**750**

SOURCE: DWR

Description of Construction Activities

The following construction activities are required for each of the proposed project components.

Preliminary Activities

Installation of Fencing and Work Area Delineation

Prior to the start of construction activities, all project work areas would be defined to provide site security and public protection. Fencing would be installed to restrict the public from work areas. In addition, a construction office would be established near the construction area.

Site Preparation and Haul Road Construction

Construction zones would be cleared and grubbed of vegetation, debris, and large rocks using scrapers and other ground clearing equipment. The project would clear over 260 acres, 135 acres of which would be within the lakebed below the original water level.

A 13-acre, 40-foot wide haul road would be constructed from the borrow area to the dam toe. There would be an approximate three-acre area of assumed disturbance adjacent to the haul road (windrow, minor cut/fill, etc.). A rock quarry access road would be constructed in order to

connect the rock quarry to the main haul road (Figure 2-3). This road would disturb approximately two acres.

Staging and Stockpiling Activities

A shared 21-acre staging area located downstream of the dam, near the left abutment, would serve, in part, to stockpile materials during the construction of the emergency outlet extension and the dam remediation (see Figure 2-7). A staging area located east of the proposed outlet tower would encompass approximately four acres and a temporary stockpile area would encompass approximately six acres. Stockpiles, which would typically be approximately 10 feet high, would incorporate storm water erosion control features.

Uses and activities within the staging area could include, but are not limited to:

- Stockpiling
- Delivery of construction equipment, cement, drainage rock, and concrete. Equipment would likely be coming and going throughout the construction process. Cement import would end after CDSM activities are complete. Concrete delivery would occur during the extension of the portal walls.
- Delivery of fuel and fueling/maintenance of construction equipment (daily)
- Construction administration and meetings (project trailer) (daily)
- Worker restrooms
- Visitor parking and sign-in area
- Temporary storage for other equipment and materials (concrete forms, scaffolding, etc.) (daily)

Excavation Activities

Borrow Area Excavation

The proposed project includes excavation of fill material from a borrow area on the northeastern and possibly the southern portion of the lake, and transport of the material to the work area below the dam. This borrow area is currently exposed, but once the lake returns to its normal operating elevation, the area would be submerged.

As material is excavated from the borrow area, scrapers or haul trucks and other equipment would be used to move the material to the staging and stockpiling area via the haul road. Borrow area excavation activities could involve daily access by fuel and maintenance vehicles. Fuel trucks must maintain a 100-foot distance from the lake water's edge and maintenance involving hydrocarbons would not be allowed near the lake.

Dam Berm Foundation Excavation

Approximately 700,000 cubic yards of soil would be removed from the berm foundation excavation at the toe of the dam. The soil would be stockpiled on site and recompacted in the berm foundation excavation underlying the stability berm. Steel shoring may be needed to secure

the side-walls and assist with construction dewatering. These sheet piles would be installed with a pile driver.

Blasting

Quarry, Haul Road, and Outlet Tower Blasting

Hard rock excavation would be required within the existing quarry, along the haul route over the Bernasconi Hills, and at the shore of the lake for the new outlet tower. In preparation for blasting, drilling would be performed by air-track or jumbo air drills in order to make holes in the rock. For a quarry operation, holes are typically spaced in a grid pattern on 10-foot centers and the depth is approximately 10 to 20 feet. For tunnel work, holes are typically spaced in a grid pattern using two to four foot centers and depths are typically four to eight feet.

Charges would be placed in the drilled holes to fracture the rock. Typically, blasting would be limited to three or four times per day. Blasting would occur in each location periodically. Excavated rock material would be used within the stability berm.

Underwater Blasting/Excavation

Once the outlet tower excavation is complete and the facility is constructed, the rock plug would be removed. This would require conducting underwater excavation, including blasting.

Cement-Deep-Soil-Mixing Activities

CDSM would be conducted with mixing blades mounted on drill rigs to maintain continuous installation of vertical soil-cement mixed columns. As the mixing shafts are advanced into the soil, a grout mixture of Portland cement and water is pumped through the hollow stem of the shafts and injected into the soil at the shaft tips. Mixing blades on the shafts blend the soil with the grout. When the design depth is reached, the mixing shafts are withdrawn and the mixing process continues until the shafts are completely removed from the ground. After withdrawal, two to six overlapping soil-cement columns remain in the ground.

Cement grout would be batched at the site in a portable cement grout batch plant and then pumped to the mixing rig, which would be approximately 70 to 80 feet tall. Cement would be temporarily stored in silos, which would be about 20 to 30 feet high. Silos would be recharged with regular cement truck deliveries. The grout plant and silos would likely be moved two or three times over the duration of the project to minimize the distance between the cement grout batch plant and the mixing rig. A total of approximately 80,000 cy of soil-cement would be placed by the CDSM method, which would require up to 150,000 gallons of water.

CDSM may also be used to construct a permanent 50-ft deep partial cutoff wall at the downstream toe of the existing dam instead of using sheet piles. This wall would allow the extensive drainage blanket to continue to collect seepage water and relieve pore fluid pressures beneath the dam, while making the groundwater dewatering much more efficient in the excavation area. Reinforcing bars or small beams may be placed into the uncured soil-cement to strengthen the columns.

Tunneling

Tunneling would be required to connect the new outlet tower with the existing outlet tunnel. The tunnel would be approximately 12.5 feet in diameter and 600 feet in length. Tunneling work involving explosives, mucking, and hauling would take place more than 150 feet below the hill. The excavated material, mostly hard rock, would be used in the dam remediation component, or would be stockpiled.

Compaction Activities

Compaction of the berm and backfill materials would be accomplished with a tamping-type roller capable of obtaining required densities within allowable moisture contents. The material would be obtained directly from the borrow areas or double-handled from stock piles. Prior to placement, the material would be sufficiently mixed and moisture conditioned, either in the borrow areas or on the stock piles, using disking equipment, a motor grader, and water trucks, if necessary. The material would be placed in uniform, horizontal layers. The edges would likely be overbuilt and trimmed back to final grade.

Underground Conveyance

An open trench would be excavated approximately 70 feet wide and 15 feet deep. The trench would be sloped to avoid the need for shoring. The bottom of the trench would be prepared with appropriate bed material. Precast concrete pipe or box-culvert sections would be transported to the site and lowered into the trench using a crane. The sections would be connected, and the conveyance buried. The initial 2000 feet of the Emergency Outlet Extension would be installed through cut and cover construction methods. If the precast concrete pipe is the chosen alternative, the section described above would continue 6200 feet to Lake Perris Drive. If box-culverts are used, an open trench would be excavated approximately 110 feet wide and 10 feet deep along the 6200 foot segment. The box culverts would be placed in the trench and backfilled. Excess soil would be used within the stability berm.

Open Channel Construction

Either the entire channel or the final 2700 feet of the Emergency Outlet Extension would be installed as open trenching methods. An open trench 160 feet wide and approximately 15 feet deep would be excavated. A scraper operation would excavate the material from the channel to a stockpile area near the dam. Graders would fine grade the slopes and topsoil would be placed on the invert and side slopes. A natural mix of seed would be applied to the slopes and invert of the finished channel.

2.7 Discretionary Approvals Required for the Project

Table 2-7 on the following page presents a preliminary list of the agencies and entities in addition to DWR that would use this EIR in their consideration of specific permits and other discretionary approvals that may apply to the project. This EIR is intended to provide these agencies with information to support their decision-making processes. The table also lists the types of activities that would be subject to these requirements.

TABLE 2-7
DISCRETIONARY PERMITS POTENTIALLY REQUIRED

Agency	Permits and Authorizations Required	Activities Subject to Regulations
U.S. Army Corps of Engineers	Clean Water Act Section 404 Permit	Placement of dredge or fill materials into waters of the U.S.
California Department of Fish and Game	1602 Lake and Streambed Alteration Agreement	Fish and Game Code Section 1602 applies to projects impacting perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.
Regional Water Quality Control Board	Section 401 Water Quality Certification	Placement of dredge or fill materials into waters of the state.
	Storm Water Pollution Prevention Plan	Control of runoff from construction sites.
Riverside County	Multiple Species Habitat Conservation Plan (MSHCP) Approval	Activities within known habitat or designated critical habitat for a federal threatened or endangered species. Activities that could result in potential "take" of a listed species.
Riverside County Flood Control and Water Conservation District	Encroachment permit	Connection with Perris Valley Storm Drain
City of Perris	Local Encroachment Permits	Construction access within City of Perris roadways.

CHAPTER 3
Environmental Setting, Impacts, and Mitigation Measures

In compliance with Section 15126 of the *CEQA Guidelines*, **Chapter 3** provides an analysis of the environmental effects of the Perris Dam Remediation Program (proposed project). The project impacts are assessed against a pre-drawdown baseline condition. The following environmental issue areas are assessed in this chapter:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Geology, Soils Faulting, and Seismicity
- Hazards and Hazardous Materials
- Hydrology, Water Quality and Groundwater
- Land Use and Planning
- Noise
- Population and Housing
- Public Safety
- Public Services and Utilities
- Recreation
- Traffic and Circulation

Each environmental issue area includes the following subsections:

- Environmental Setting
- Regulatory Framework
- Impacts and Mitigation Measures

3.1 Aesthetics

This section addresses the aesthetic and visual quality impacts associated with construction and operation of the proposed Perris Dam Remediation Program. This section includes a description of existing visual conditions in the project area and an evaluation of potential effects on visual resources and public view corridors. Presumed views from public viewpoints are also discussed, based on existing visual conditions at the project site and surrounding area.

For purposes of this analysis, visual or aesthetic resources are generally defined as the natural and built landscape features that can be seen. The overall visual character of a given area results from the combination of natural landscape features, including landform, water and vegetation patterns, as well as the presence of built features such as buildings, roads, and other structures.

The EIR impact analysis considers view obstruction, negative aesthetic effects, and light and glare effects. This visual assessment is based on field observations of the project site and surroundings in addition to a review of topographic maps, project drawings, and technical data supplied by DWR, aerial and ground-level photographs of the project area, and computer-generated visual simulation from representative viewing locations.

3.1.1 Setting

Regional Setting

Riverside County encompasses 7,400 square miles of land from the Colorado River to within 14 miles of the Pacific Ocean. The western portion of the County is separated from the eastern portion by the San Jacinto and Santa Rosa Mountains. Several man-made lakes are located in the western portion of the County, including Lake Matthews, Lake Perris, Lake Skinner, Vail Lake, and Diamond Valley Lake. These lakes provide water storage and recreational uses. In recent years the County has experienced substantial urbanization that has altered the regional character from a rural, inland desert area to one of the major population centers of Southern California.

Topographic features in the project region include the Bernasconi Hills southeast of Lake Perris and Mt. Russell to the north. Major roadway corridors in the project vicinity include Ramona Expressway, a county eligible scenic route and State Route 215, located approximately three miles west of Lake Perris.

Project Area Setting

Much of the Lake Perris SRA consists of rocky desert mountains and alluvial fans with sparse vegetation. Lake Perris and its recreational improvements provide a contrast to the desert landscape. The original lake shoreline is bordered on the east by mature riparian vegetation. The developed areas west of the lake support non-native ornamental landscape vegetation. Tall shade trees exist within the Bernasconi picnic area east of the lake. **Figures 3.1-1** and **3.1-2** provide views of the park at the project construction locations. South of the dam, Ramona Expressway, a county eligible scenic route, is located adjacent to the proposed emergency outlet extension.

1. Existing outlet tower looking southwest

2. Location of proposed outlet tower

3. Location of proposed berm

4. View of rock quarry

SOURCE: ESA, 2007.

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Figure 3.1-1
Photos of Project Area

5. Location of proposed borrow area

6. View of exposed lakebed and location of proposed haul road looking north

7. View of proposed haul road location looking southwest

8. View of proposed haul road location looking northeast

SOURCE: ESA, 2007.

Figure 3.1-2
Photos of Project Area

Residential homes are located just south of Ramona Expressway and the proposed emergency outlet extension.

3.1.2 Regulatory Framework

State

State Scenic Highway Program

The State Scenic Highway Program, created by the California Legislature in 1963, was established to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. A highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a Scenic Highway. When a city or county nominates an eligible scenic highway for official designation, it defines the scenic corridor, which is land generally adjacent to and visible to a motorist on the highway. There are several eligible state scenic highways in Riverside County, but only Highway 243 and a portion of Highway 74 and Highway 62 are officially designated state scenic highways at this time. These designated scenic highways are well outside of the project area.

Local

Palomar Nighttime Lighting Policy Area

The entire project area falls within the Mount Palomar Nighttime Lighting Policy Area. The Mount Palomar Observatory is located approximately 38 miles from the project in San Diego County. The observatory requires unique nighttime lighting standards in order to allow the night sky to be viewed clearly. All areas within the 15 to 45 mile radius of the observatory must conform with the nighttime lighting regulations that apply to Zone B in the Riverside General Plan. The project must adhere to the lighting requirements of Riverside 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. The ordinance lists permitted lighting fixtures and uses. The ordinance requires that temporary uses of lights for construction obtain approval from the County.

3.1.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistency with Appendix G of the *CEQA Guidelines*, applicable local plans, and agency and professional standards, the project would have a significant impact on aesthetics if it would:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;

- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

The significance determination is based on several evaluation criteria, including the extent of project visibility from sensitive viewing areas such as designated scenic routes, public open space, or residential areas; the degree to which the various project elements would contrast with or be integrated into the existing landscape; the extent of change in the landscape's composition and character; and the number and sensitivity of viewers.

As part of this analysis, a set of computer-generated visual simulations have been produced to illustrate conceptual "before" and "after" visual conditions as seen from key public vantage points. The visual simulations provide a clear depiction of the location, scale, and general appearance of the proposed project changes. Digitized photographs and computer modeling and rendering techniques were used to prepare the simulation images. The simulations are based on the conceptual project drawings and technical data provided by DWR.

Designated Scenic Resources

Ramona Expressway is a county eligible scenic route. However, the project is not located within any designated scenic vista or scenic corridors, nor is it near designated scenic highways. Therefore, the project would not result in significant impacts to designated scenic resources and this issue is not discussed further.

Scenic Vistas and Visual Character

Impact 3.1-1: Construction activities would temporarily affect the visual quality of the Lake Perris SRA and northern frontage of Ramona Expressway.

Dam Remediation

Construction of the stability berm would be visible from the surrounding areas south of the Lake Perris SRA. South of the dam, excavation, stockpiled soils, and staging areas would be visible from Ramona Expressway. Cement mixing and injection facilities would be approximately 70 to 80 feet tall and would be visible from Ramona Expressway. The area is not within a designated scenic vista or scenic highway corridor. However, the construction activities would be visible from the south for a period of two years. Construction activities south of the dam would be temporary and would not cause a permanent significant degradation of the local character or visual quality south of the dam during the construction period.

The haul road, borrow area, staging areas, and stockpiled soils would directly impact the view from the western shore of the lake within the SRA. Large soil hauling vehicles would be seen moving on the haul roads continually. Chain-link fencing would be constructed around construction areas, degrading views from the western shore of the lake. Construction activities

would be visible for a period of two years. Long range views within the SRA are dominated by natural vistas and rocky desert mountains. Since the vistas would be restored following the temporary construction period, the impact would not be considered significant. (See Section 3.12 Recreation for a discussion of the impacts of temporary construction activities on recreational activities.)

Outlet Tower Replacement

Construction of the new outlet tower would require the use of heavy equipment on the eastern shore of the lake. Blasting would be required at the new outlet facility location. Haul trucks and construction activities would be visible from the western shore of the lake for the duration of the construction period. However, due to the temporary nature of the construction, the impact to vistas and local character would not be considered significant.

Emergency Outlet Extension

The proposed emergency outlet extension would run parallel to Ramona Expressway, a County eligible scenic route. Construction of the extension would create short-term visual impacts, as heavy equipment would be visible from the roadway. Construction of the emergency outlet extension would temporarily alter the visual landscape. Substantial construction activities are occurring in the area as the area is becoming urbanized. The outlet extension construction activities would be similar to other construction activities in the area. Due to the temporary nature of the construction, the impact to vistas and local character would not be considered significant.

Significance: Less than Significant.

Impact 3.1-2: Once constructed, the new elements would alter the appearance of the project site.

The aboveground changes proposed as part of the project would alter the long-term appearance of the project site as seen from views north and south of the dam. The new outlet tower and haul road would be visible from the lake surface, the Lake Perris camp grounds and Moreno beach area, and from recreational trails located within the Lake Perris SRA. The stability berm and emergency outlet extension would be visible from Ramona Expressway, which is a county eligible scenic route. The stability berm would also be visible from longer range views, from elevated ridges and from I-215. Figures 3.1-3 through 3.1-5 provide visual simulations of the stability berm, the outlet tower, and the haul road over Bernasconi Hills. The following discussions evaluate the potential visual impact for each new feature to be constructed.

Dam Remediation

The addition of the new stability berm would only slightly alter the overall appearance of the existing dam. The dam would be constructed of the same material and surfaced with similar erosion resistant grasses as the original dam, and therefore would be a similar color. As shown in

Figures 3.1-3 and **3.1-4**, the berm would be visible from neighboring long-range and short-range views, but would look similar to the existing dam.

The height of the dam would not change. The berm would not be visible by visitors within the Lake Perris SRA. Though the new stability berm would extend southward further than the original dam, it would be constructed to match and blend into the existing dam profile.

Ramona Expressway has been designated by the County as eligible to be a county scenic route. The existing roadway is bordered by encroaching residential and roadside commercial land uses. Longer-range views from Ramona Expressway include Perris Dam. As discussed above, the stability berm would not alter the appearance of the dam substantially. Therefore, the effect to the eligible scenic route would not be significant.

Construction of the berm would remove native riparian habitat south of the dam. Some riparian habitat would remain and would therefore continue to soften views of the dam along Ramona Expressway. The existing mature riparian habitat completely obscures the toe of the dam from neighboring views. Following construction, views of the dam and stability berm would be less obscured than under current conditions. However, it is anticipated that water seepage that has produced the riparian area would continue following the construction project. Over years, new riparian habitat would likely be established that would serve to further soften the short-range views of the dam. Although the stability berm would be visible following construction, the character of the view would be similar to existing conditions. Since the stability berm would be constructed of the same material as the original berm and would only slightly alter the appearance of the dam from long and short-range views, the impact to visual resources in the region would be less than significant.

Outlet Tower Replacement

The proposed outlet tower would be visible to visitors of the Lake Perris SRA near the existing tower. **Figure 3.1-5** shows the view of the new outlet tower from the western lake shore. Portions of the lakebed would be excavated in order to accommodate the new outlet tower. Once all of the proposed construction is complete and the lake returns to its original operating level, the tower would protrude only a few feet above the existing ground surface. Most of the tower would be underwater. The proposed tower would not be visible from Ramona Expressway or residential areas. Since the tower would be mostly underwater and would only slightly alter the views from the lake and western shoreline, the impact to visual resources would be less than significant.

Emergency Outlet Extension

The outlet extension would parallel Ramona Expressway. If the underground alternative is implemented, the segments of the emergency outlet extension that would be underground would have no visual impacts. The portion of the channel which crosses over MWD's pipeline would extend approximately six feet above ground but would not disrupt long-range views in the area.

If the open channel alternative is implemented, the portion of the outlet extension from the outlet tower to Perris Valley Drive would be constructed as an unlined trapezoidal channel. Under either

alternative, the open channel portion of the outlet extension to the Perris Valley Storm Drain would result in permanent visual impacts The new extension would appear similar to a large flood control channel. The extension would be visible from local land uses including residences and along the Ramona Expressway. Fencing would be constructed along the open channel. Local views and the local character of the Ramona Expressway frontage would be affected. Views across the flood control channel would be of the local land uses that would include residential communities now under development. Trash and debris could collect in the open portion of the emergency outlet extension and the structure could become an eyesore if not maintained. Vandalism and graffiti could impact the visual character of the Ramona Expressway frontage. To ensure that the channel was maintained to minimize visual impacts or degradation of the local character DWR would implement Mitigation Measures 3.1-2a through 3.1-2c. These measures would ensure that this potential impact would be less than significant.

Mitigation Measures

> **Mitigation Measure 3.1-2a:** If an open channel is constructed for any portion of the emergency outlet extension, DWR shall prepare and implement a maintenance plan which shall include scheduled trash removal, graffiti removal, general facility upkeep, and placing a fence around the emergency outlet extension to reduce trash deposition .
>
> **Mitigation Measure 3.1-2b:** DWR shall ensure that a DWR maintenance contact is provided to the City of Perris for direct communication if immediate action regarding maintenance of the extension is needed.
>
> **Mitigation Measure 3.1-2c:** DWR shall coordinate with the City of Perris to develop site access control fencing and landscaping to be consistent with the City guidelines.

Significance after Mitigation: Less than Significant.

Rock Outcroppings

Impact 3.1-3: Construction of the haul road within the Bernasconi Hills would permanently alter the granite rock formations just east of the dam.

A portion of the haul road, located along the Bernasconi Hills, would become a permanent addition to the landscape surrounding the lake (refer to Figure 3.1-4). The new haul road would be visible to visitors within the Lake Perris SRA and from Ramona Expressway. Effects on long range views are unsubstantial as shown in Figure 3.1-4. Although the road would be visible from across the lake, it would appear as a small scar, and would be consistent with surrounding recreational roads and trails within the area. The long-range view would be only slightly modified. The road would become part of the recreational facilities at the Lake Perris SRA providing hiking, biking, and equestrian use around the perimeter of the lake. Although a portion of the hillside would be permanently altered, the majority of the Bernasconi Hills would remain intact including the granite cliffs and boulders on either side of the road. The dominant stature of the hills within the region would not be diminished.

Existing Conditions

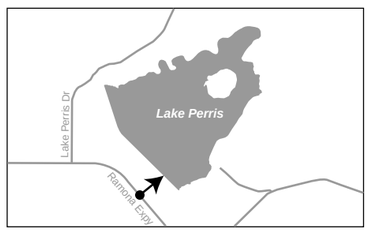
Proposed Haul Road

Proposed Stability Berm

Proposed Emergency Outlet Extension

Proposed Conditions

Disclaimer: Visual simulation is an approximate depiction of expected conditions based on preliminary engineering documents. Final design could slightly vary.



SOURCE: Psomas

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Figure 3.1-3
Simulated View with Project from Ramona Expressway at Bradley

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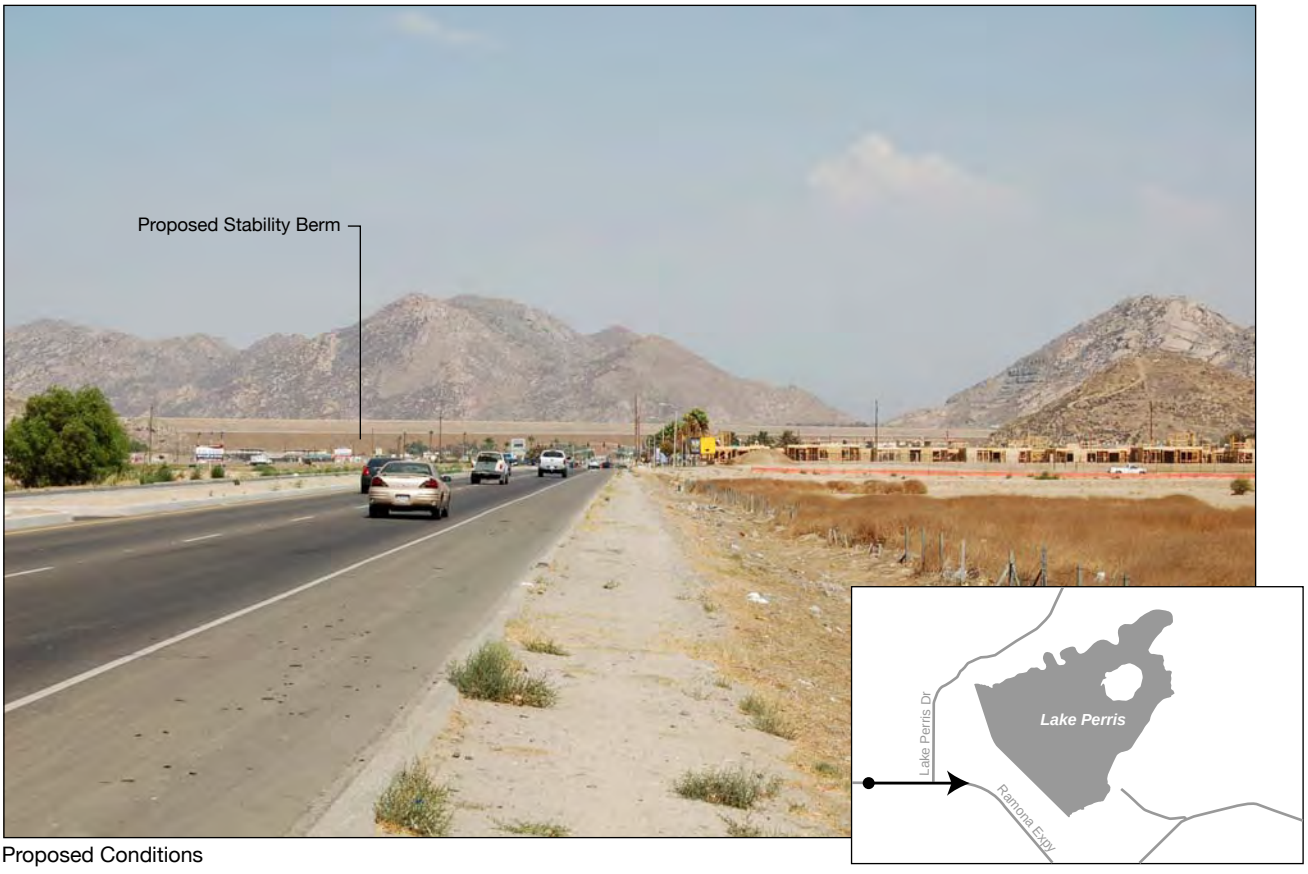
Existing Conditions



Proposed Conditions

SOURCE: Psomas

Disclaimer: Visual simulation is an approximate depiction of expected conditions based on preliminary engineering documents. Final design could slightly vary.

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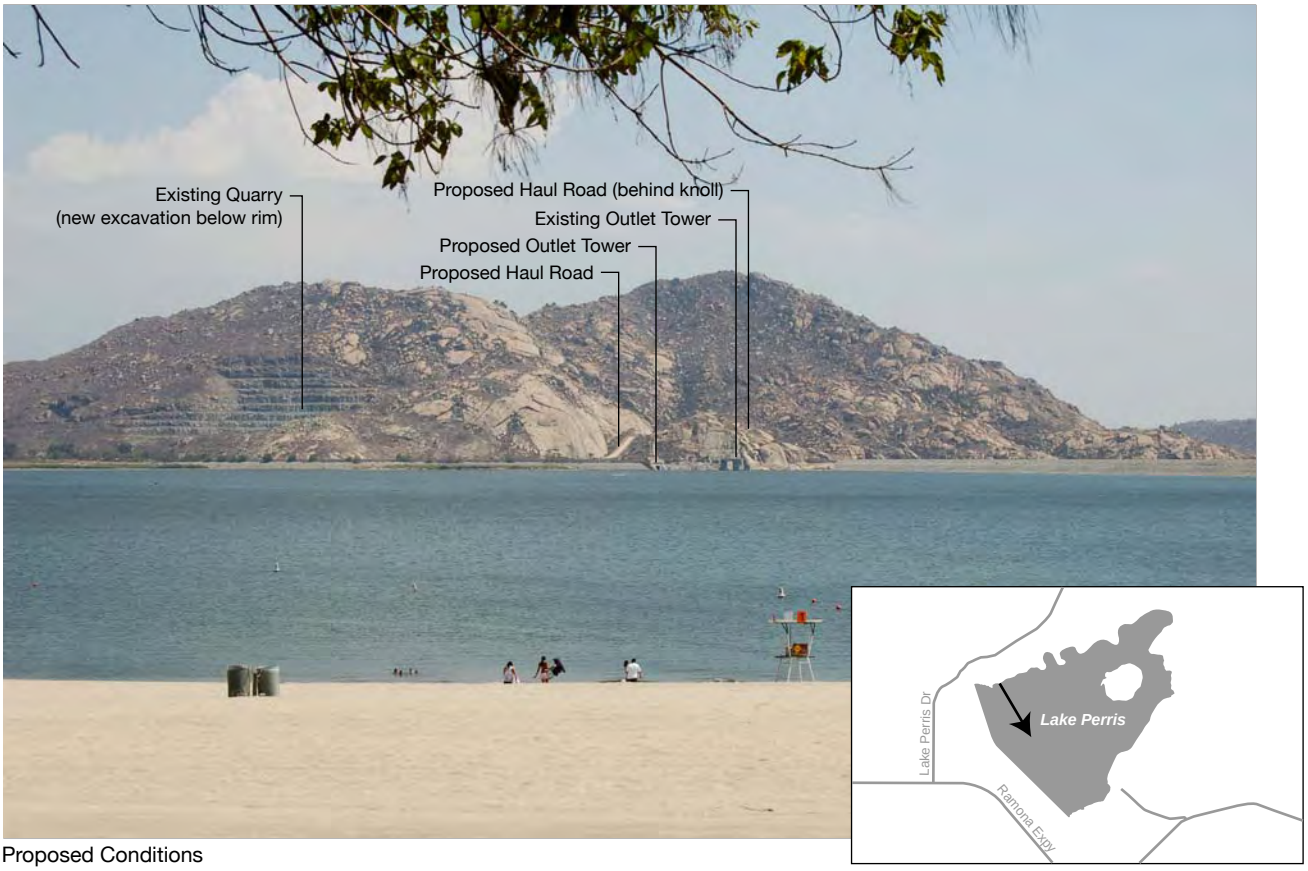
Figure 3.1-4
Simulated View with Project from Ramona Expressway

Existing Conditions



Proposed Conditions

SOURCE: Psomas

Disclaimer: Visual simulation is an approximate depiction of expected conditions based on preliminary engineering documents. Final design could slightly vary.

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Figure 3.1-5
Simulated View with Project
from Moreno Beach

Local views and access to natural areas would be altered. Several of the large, weathered granitic boulders currently on the pass would be destroyed. The foot trail that currently traverses these boulders would be replaced with a wide paved road. The impact would be limited to the haul road. The granitic formations, rock cliffs, and surrounding open space would otherwise remain essentially a natural, unaffected area. The haul road would be constructed to avoid affecting the sheer cliff face bordering the pass. The character of the trail over the pass would change, but the hills themselves would remain intact from long-range and short-range views. As a result, the installation of the road and removal of some of the granitic boulders along the pass would not significantly affect significant rock outcroppings or views of the Bernasconi hills.

Mitigation Measures

> **Mitigation Measure 3.1-3:** DWR shall ensure that the construction contractor retain some of the large naturally weathered boulders currently within the Bernasconi pass to adorn the finished road to retain some of the original character of the trail.

Significance after Mitigation: Less than Significant.

Light and Glare

Impact 3.1-4: Construction of the project components would result in additional light and glare impacts during nighttime construction.

Exterior lighting along the pipeline alignments during the construction period could be used occasionally if nighttime construction is necessary. The project would not result in any new permanent nighttime lighting fixtures. The Riverside County Ordinance No. 655 requires that the county is notified of temporary lighting for nighttime construction. Implementation of Mitigation Measure 3.1-4 would reduce the temporary impacts of construction lighting to less than significant.

Mitigation Measures

> **Mitigation Measure 3.1-4a:** DWR shall ensure that lighting used for nighttime construction is shielded and directed downward to minimize impacts to neighboring residential areas.
>
> **Mitigation Measure 3.1-4b:** DWR shall notify Riverside County Planning Director prior to use of nighttime lighting. The notice shall include the location of lighting, the schedule, and total lumens.

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.1-1 presents the impacts and mitigation summary for Aesthetics.

TABLE 3.1-1
AESTHETICS IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Visual Quality: Construction activities would temporarily affect the visual quality of the Lake Perris SRA and northern frontage of Ramona Expressway.	None required	--
Site Appearance: Once constructed, the new elements would alter the appearance of the project site.	3.1-2a through 3.1-2c	Less than Significant
Rock Outcropping: Construction of the haul road within the Bernasconi Hills would permanently alter the granite rock formations just east of the dam.	3.1-3	Less than Significant
Light and Glare: Construction of the project components would result in additional light and glare impacts during nighttime construction.	3.1-4a and 3.1-4b	Less than Significant

3.2 Air Quality

This section provides an overview of the existing air quality at the project site and surrounding region, the regulatory framework, an analysis of potential impacts to air quality that would result from implementation of the project, and identification of mitigation measures.

3.2.1 Setting

Regional Setting

The project is located in western Riverside County within the South Coast Air Basin (Basin). The Basin is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino counties.

Climate

In general, Southern California has a warm, dry Mediterranean climate, hot in the summer, mild in the winter. Temperatures are cooler near the coast and hotter away from the coast in the inland areas. Most of the precipitation comes as rain during the winter months, although rain showers are common during the summer in the higher desert areas. In the project area the average annual precipitation is about 10 inches per year and temperatures reach 90 degrees Fahrenheit an average of 100 days of the year. August daily highs average 95 degrees while daily lows average 64 degrees Fahrenheit. January offers average daily highs of 68 degrees and average daily lows of 43 degrees Fahrenheit. The predominant wind directions are either out of the northwest or southeast. Gusts greater than 15 miles per hour occur infrequently less than two percent of the time.[1]

Existing Air Quality in the Study Area Vicinity

The South Coast Air Quality Management District (SCAQMD) maintains monitoring stations within Riverside County that monitor air quality and compliance with applicable ambient standards. The closest stations to the project site are Perris (237 ½ N. D St.) and Riverside Magnolia (7002 Magnolia Ave.) monitoring stations. The following pollutants are monitored at this station: ozone (O_3), particulate matter less than 10 and less than 2.5 microns (PM10 and PM2.5). The most recent published data for the monitoring stations are presented in **Table 3.2-1**. In addition, air pollutants of interest to the regulatory agencies for their potential adverse impacts on sensitive receptors are described below.

Criteria Air Pollutants

Ozone

Short-term exposure to ozone can irritate the eyes and cause construction of the airways. Besides causing shortness of breath, ozone can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema.

[1] South Coast Air Quality Management District, Perris Monitoring Station, 1991-1999

TABLE 3.2-1
AIR QUALITY DATA SUMMARY (2006 - 2008)

Pollutant	Monitoring Data by Year			
	Standard[a]	2006	2007	2008
Ozone – Perris				
Highest 1 Hour Average (ppm)[b]	0.09	**0.169**	**0.138**	**0.142**
Days over State Standard		77	66	65
Highest 8 Hour Average (ppm)[b]	0.075	**0.122**	**0.1116**	**0.114**
Days over National Standard		83	73	77
Particulate Matter (PM10) – Perris				
Highest 24 Hour Average ($\mu g/m^3$)[b]	50	**119**	**1155**	**87**
Est. Days over State Standard[c]		NA	NA	NA
Highest 24 Hour Average ($\mu g/m^3$)[b] – National Measurement	150	125	1212	85
Est. Days over National Standard[c]		0	NA	NA
State Annual Average ($\mu g/m^3$)[b]	20	**NA**	**NA**	**NA**
Particulate Matter (PM2.5) – Riverside Magnolia				
Highest 24 Hour Average ($\mu g/m^3$)[b]	35	**55.3**	**68.5**	**42.9**
Days over National 2006 Standard		31.3	NA	NA
State Annual Average ($\mu g/m^3$)[b]	12	NA	NA	NA

NOTES: Values in **bold** are in excess of at least one applicable standard. NA = Not Available.

[a] Generally, state standards and national standards are not to be exceeded more than once per year.
[b] ppm = parts per million; µg/m3 = micrograms per cubic meter.
[c] PM10 is not measured every day of the year. Number of estimated days over the standard is based on 365 days per year.

SOURCE: California Air Resources Board, 2009. *Summaries of Air Quality Data*, 2006, 2007, 2008; http://www.arb.ca.gov/adam/cgi-bin/db2www/polltrendsb.d2w/start
California Air Resources Board, 2008a. *Ambient Air Quality Standard*s, last updated November 17, 2008.

Ozone, the main component of photochemical smog, is primarily a summer and fall pollution problem. Ozone is not emitted directly into the air but is formed through a complex series of chemical reactions involving other compounds that are directly emitted. These directly emitted pollutants (also known as ozone precursors) include reactive organic gases (ROG) and nitrogen oxides (NOx). The time period required for ozone formation allows the reacting compounds to spread over a large area, producing a regional pollution problem. Ozone problems are the cumulative result of regional development patterns rather than the result of a few significant emission sources.

Once formed, ozone remains in the atmosphere for one or two days. Ozone is then eliminated through reaction with chemicals on the leaves of plants, attachment to water droplets as they fall

to earth "rainout" and absorption by water molecules in clouds that later fall to earth with rain "washout".

Carbon Monoxide

Ambient carbon monoxide concentrations normally are considered a local effect and typically correspond closely to the spatial and temporal distributions of vehicular traffic. Wind speed and atmospheric mixing also influence carbon monoxide concentrations. Under inversion conditions, carbon monoxide concentrations may be distributed more uniformly over an area that may extend some distance from vehicular sources. Carbon monoxide levels can increase around busy intersections immediately with the onset of high traffic and disperse immediately to background levels, which are typically 1 to 2 ppm, when traffic levels decrease.

When inhaled at high concentrations, carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia, as well as for fetuses.

Carbon monoxide concentrations have declined dramatically in California due to existing controls and programs. Carbon monoxide concentrations are expected to continue declining due to the ongoing retirement of older, more polluting vehicles from the mix of vehicles on the road network.

Respirable Particulate Matter (PM10 and PM2.5)

PM10 and PM2.5 consist of particulate matter that is 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. (A micron is one-millionth of a meter). PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs and can cause adverse health effects. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis and respiratory illnesses in children. Recent mortality studies have shown an association between morbidity and mortality and daily concentrations of particulate matter in the air. Particulates can also damage materials and reduce visibility. One common source of PM2.5 is diesel particulate emissions.

Traffic generates particulate matter and PM10 emissions through entrainment of dust and dirt particles that settle onto roadways and parking lots. PM10 also is emitted by burning wood in residential wood stoves and fireplaces and open agricultural burning. PM10 can remain in the atmosphere for up to seven days before gravitational settling, rainout and washout remove it.

Nitrogen Dioxide

NO_2 is a reddish brown gas that is a by-product of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, nitrogen dioxide can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component of a brown cloud on high pollution days,

especially in conjunction with high ozone levels. The cloud can stay for extended periods of time until removed by area ventilation or precipitation.

Toxic Air Contaminants (TACs)

Non-criteria air pollutants or TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines and asbestos.

Asbestos is a type of fibrous mineral used in construction materials including cement pipe. Over time, exposure to friable asbestos can lead to health problems including asbestosis, lung cancer and mesothelioma, a form of lung cancer uniquely attributed to long-term exposure to airborne asbestos. Exposure to asbestos is hazardous via inhalation.

Diesel particulate matter (DPM) is the most complex of diesel emissions. Diesel particulates, as defined by most emission standards, are sampled from diluted and cooled exhaust gases. This definition includes both solids and liquid material that condenses during the dilution process. The basic fractions of DPM are elemental carbon, heavy hydrocarbons derived from the fuel and lubricating oil and hydrated sulfuric acid derived from the fuel sulfur. DPM contains a large portion of the polycyclic aromatic hydrocarbons (PAH) found in diesel exhaust. Diesel particulates include small nuclei mode particles of diameters below 0.04µm and their agglomerates of diameters up to 1µm. Ambient exposures to diesel particulates in California are significant fractions of total TAC levels in the State.

Odorous Emissions

Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source; wind speed and direction; and the sensitivity of receptors.

Greenhouse Gases and Global Climate Change

Gases that trap heat in the atmosphere are called greenhouse gases. The major concern is that increases in greenhouse gases are causing Global Climate Change. Global Climate Change is a change in the average weather on earth that can be measured by wind patterns, storms, precipitation and temperature.

Greenhouse gases allow sunlight to enter the atmosphere, but trap a portion of the outward-bound infrared radiation and warm up the air. The process is similar to the effect greenhouses have in raising the internal temperature, hence the name greenhouse gases. Both natural processes and human activities emit greenhouse gases. The accumulation of greenhouse gases in the atmosphere regulates the earth's temperature; however, emissions from human activities such as electricity

production and motor vehicles have elevated the concentration of greenhouse gases in the atmosphere. This accumulation of greenhouse gases has contributed to an increase in the temperature of the earth's atmosphere and contributed to Global Climate Change. The principal greenhouse gases are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF6), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), and water vapor (H_2O). Carbon dioxide is the reference gas for climate change because it gets the most attention and is considered the most important greenhouse gas. To account for the warming potential of greenhouse gases, greenhouse gas emissions are often quantified and reported as CO_2 equivalents (CO_2e).

3.2.2 Regulatory Framework

Federal

The Federal Clean Air Act (FCAA) requires the U.S. Environmental Protection Agency (USEPA) to identify National Ambient Air Quality Standards (NAAQS or national standards) to protect public health and welfare. National standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, PM10, PM2.5, and lead. **Table 3.2-2** shows current national and state ambient air quality standards and provides a brief discussion of the related health effects and principal sources for each pollutant.

Pursuant to the 1990 Federal Clean Air Act Amendments (FCAAA), the USEPA classifies air basins (or portions thereof) as "attainment" or "nonattainment" for each criteria air pollutants, based on whether or not the NAAQS had been achieved. **Table 3.2-3** shows the current attainment status of the project area.

The FCAA requires each state to prepare an air quality control plan referred to as the State Implementation Plan (SIP). The FCAAA added requirements for states containing areas that violate the NAAQS to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is a living document that is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of air basins as reported by the agencies with jurisdiction over them. The USEPA has responsibility to review all state SIPs to determine if they conform to the mandates of the FCAAA and will achieve air quality goals when implemented. If the USEPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the no attainment area and may impose additional control measures. Failure to submit an approvable SIP or to implement the plan within mandated timeframes can result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin. In reference to California in this issue, the SIP has been considered adequate.

TABLE 3.2-2
STATE AND NATIONAL CRITERIA AIR POLLUTANT STANDARDS, EFFECTS, AND SOURCES

Pollutant	Averaging Time	State Standard	National Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone	1 hour	0.09 ppm	---	High concentrations can directly affect lungs, causing irritation. Long-term exposure may cause damage to lung tissue.	Formed when ROG and NO_X react in the presence of sunlight. Major sources include on-road motor vehicles, solvent evaporation, and commercial / industrial mobile equipment.
	8 hours	0.07 ppm[1]	0.075 ppm		
Carbon Monoxide	1 hour	20 ppm	35 ppm	Classified as a chemical asphyxiant, carbon monoxide interferes with the transfer of fresh oxygen to the blood and deprives sensitive tissues of oxygen.	Internal combustion engines, primarily gasoline-powered motor vehicles.
	8 hours	9.0 ppm	9 ppm		
Nitrogen Dioxide	1 hour	0.18 ppm	---	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum refining operations, industrial sources, aircraft, ships, and railroads.
	Annual Avg.	---	0.030 ppm		
Sulfur Dioxide	1 hour	0.25 ppm	---	Irritates upper respiratory tract; injurious to lung tissue. Can yellow the leaves of plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	3 hours	---	0.5 ppm		
	24 hours	0.04 ppm	0.14 ppm		
	Annual Avg.	---	0.03 ppm		
Respirable Particulate Matter (PM-10)	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$	May irritate eyes and respiratory tract, decreases in lung capacity, cancer and increased mortality. Produces haze and limits visibility.	Dust and fume-producing industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g., wind-raised dust and ocean sprays).
	Annual Avg.	20 $\mu g/m^3$	---		
Fine Particulate Matter (PM-2.5)	24 hours	---	35 $\mu g/m^3$	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and results in surface soiling.	Fuel combustion in motor vehicles, equipment, and industrial sources; residential and agricultural burning; Also, formed from photochemical reactions of other pollutants, including NO_X, sulfur oxides, and organics.
	Annual Avg.	12 $\mu g/m^3$	15 $\mu g/m^3$		
Lead	Monthly Ave.	1.5 $\mu g/m^3$	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurological dysfunction.	Present source: lead smelters, battery manufacturing & recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 $\mu g/m^3$		
Hydrogen Sulfide	1 hour	0.03 ppm	No National Standard	Geothermal Power Plants, Petroleum Production and refining	Nuisance odor (rotten egg smell), headache and breathing difficulties (higher concentrations)
Sulfates	24 hour	25 $\mu g/m^3$	No National Standard	Produced by the reaction in the air of SO2.	Breathing difficulties, aggravates asthma, reduced visibility
Visibility Reducing Particles	8 hour	Extinction of 0.23/km; visibility of 10 miles or more	No National Standard	Reduces visibility, reduced airport safety, lower real estate value, discourages tourism.	See PM2.5.

NOTE: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter.

[1] This concentration was approved by the Air Resources Board on April 28, 2005 and became effective May 17, 2006.

SOURCE: California Air Resources Board, 2008a. *Ambient Air Quality Standards,* available at http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm Standards last updated November 17, 2008.

TABLE 3.2-3
WESTERN RIVERSIDE COUNTY ATTAINMENT STATUS

	Designation/Classification	
Pollutant	**Federal Standards**	**State Standards**
Ozone – one hour	No Federal Standard[a]	Nonattainment
Ozone – eight hour	Serious Nonattainment	Unclassified
PM10	Serious Nonattainment	Nonattainment
PM2.5	Nonattainment	Nonattainment
CO	Attainment	Attainment
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Lead	No Designation	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Visibility-Reducing Particles	No Federal Standard	Unclassified

[a] Federal One Hour Ozone National Ambient Air Quality Standard was revoked on June 15, 2005

SOURCE: California Air Resources Board, 2007a. *Area Designation Maps,* http://www.arb.ca.gov/desig/adm/adm.htm, page updated June 28, 2007.
8 Hour Ozone: http://www.epa.gov/air/oaqps/greenbk/gncs.html#CALIFORNIA
PM10: http://www.epa.gov/air/oaqps/greenbk/pncs.html#CALIFORNIA

State

The California Air Resources Board (CARB) manages air quality, regulates mobile emissions sources, and oversees the activities of county Air Pollution Control Districts and regional Air Quality Management Districts. CARB establishes state ambient air quality standards and vehicle emissions standards.

California has adopted ambient standards that are more stringent than the federal standards for the criteria air pollutants. These are shown in Table 3.2-2. Under the California Clean Air Act (CCAA) patterned after the FCAA, areas have been designated as attainment or no attainment with respect to the state standards. Table 3.2-3 summarizes the attainment status with California standards in the project area.

California State law defines TACs as air pollutants having carcinogenic effects. A total of 243 substances have been designated as TACs under California law; they include the 189 (federal) Hazardous Air Pollutants (HAPs) adopted in accordance with AB 2728. The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources but AB 2588 does not regulate air toxics emissions. Toxic air contaminant emissions from individual facilities are quantified and prioritized. Depending on the risk levels, emitting facilities are required to implement varying levels of risk reduction measures. The project does not include developing facilities that may be categorized as "High-priority," which are required to perform a health risk assessment.

In August of 1998, CARB identified particulate emissions from diesel-fueled engines (DPM) as TACs. CARB developed the *Risk Reduction Plan to Reduce Particulate Matter Emissions from*

Diesel-Fueled Engines and Vehicles (CARB, 2000). The document represents a proposal to reduce diesel particulate emissions, with the goal to reduce emissions and the associated health risk by 75 percent in 2010 and by 85 percent in 2020. The program aims to require the use of state-of-the-art catalyzed diesel particulate filters and ultra low sulfur diesel fuel on diesel-fueled engines.

CARB recently published the *Air Quality and Land Use Handbook: A Community Health Perspective* (CARB, 2005). The primary goal in developing the handbook was to provide information that would help keep California's children and other vulnerable populations out of harm's way with respect to nearby sources of air pollution. The handbook highlights recent studies that have shown that public exposure to air pollution can be substantially elevated near freeways and certain other facilities. However, the health risk is greatly reduced with distance. For that reason, CARB provided some general recommendations aimed at keeping appropriate distances between sources of air pollution and sensitive land uses, such as residences.

The USEPA regulates asbestos exposure, handling, and disposal through the National Emission Standards for Hazardous Air Pollutants (NESHAP, 40 CFR Parts 61 and 63) programs. Asbestos handling regulations promulgated from the Toxic Substances Control Act are included in 40 CFR Part 763. The US Occupational Safety and Health Administration (OSHA) regulates the use of asbestos in the work environment (CFR 29 part 1910). In both general industry and construction, OSHA regulates workplace exposure at 0.2 fibers per cubic centimeter of air (0.2 f/cc), averaged over an eight-hour work shift. The excursion or short-term limit is one fiber per cubic centimeter of air (1 f/cc) averaged over a sampling period of 30 minutes.

Greenhouse Gases

In 2005, in recognition of California's vulnerability to the effects of climate change, Governor Schwarzenegger established Executive Order S-3-05, which sets forth a series of target dates by which statewide emission of greenhouse gas would be progressively reduced, as follows:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020, reduce greenhouse gas emissions to 1990 levels; and
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

Assembly Bill 32 (AB 32)

In 2006, California passed the California Global Warming Solutions Act of 2006 (Assembly Bill No. 32; California Health and Safety Code Division 25.5, Sections 38500, et seq., or AB 32), which requires the CARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions will be reduced to 1990 levels by 2020.

In December 2007, CARB approved the 2020 emission limit of 427 million metric tons of CO_2 equivalents of greenhouse gases. The 2020 target of 427 million metric tons of CO_2e requires the reduction of 169 million metric tons of CO_2e, or approximately 30 percent, from the state's projected 2020 emissions of 596 million metric tons of CO_2e (business-as-usual).

Also in December 2007, CARB adopted mandatory reporting and verification regulations pursuant to AB 32. The regulations became effective January 1, 2009, with the first reports completed by June 1, 2009. The mandatory reporting regulations require reporting for certain

types of facilities that make up the bulk of the stationary source emissions in California. The regulation, in general, identifies major facilities as those that generate more than 25,000 metric tons/year of CO_2e. Cement plants, oil refineries, electric-generating facilities/providers, cogeneration facilities, and hydrogen plants and other stationary combustion sources that emit more than 25,000 metric tons/year CO_2e, make up 94 percent of the point source CO_2e emissions in California.

By adopting Assembly Bill (AB) 32 (2006) and Senate Bill (SB) 97 (2007); the State of California has established GHG reduction targets and has determined that GHG emissions, as they relate to global climate change, are a source of adverse environmental impacts in California that should be addressed under CEQA. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. In October 2008, ARB published its *Climate Change Scoping Plan*, which is the state's plan to achieve GHG reductions in California required by AB 32 (CARB 2008b). The scoping plan was approved by ARB on December 11, 2008.

The *Climate Change Scoping Plan* includes recommended measures that were developed to reduce greenhouse gas emissions from key sources and activities while improving public health, promoting a cleaner environment, preserving our natural resources, and ensuring that the impacts of the reductions are equitable and do not disproportionately impact low-income and minority communities. These measures, shown in **Table 3.2-4** by sector, also put the state on a path to meet the long-term 2050 goal of reducing California's greenhouse gas emissions to 80 percent below 1990 levels. The measures in the *Scoping Plan* approved by the Board will be developed over the next two years and will be in place by 2012.

TABLE 3.2-4
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Million Metric Tons per year of CO_2e)
Transportation		
T-1	Pavley I and II – Light Duty Vehicle Greenhouse Gas Standards	31.7
T-2	Low Carbon Fuel Standard (Discrete Early Action)	15
T-3[a]	Regional Transportation-Related Greenhouse Gas Targets	5
T-4	Vehicle Efficiency Measures	4.5
T-5	Ship Electrification at Ports (Discrete Early Action)	0.2
T-6	Goods Movement Efficiency Measures. • Ship Electrification at Ports • System-Wide Efficiency Improvements	3.5
T-7	Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)	0.93
T-8	Medium- and Heavy-Duty Vehicle Hybridization	0.5
T-9	High Speed Rail	1

TABLE 3.2-4 (continued)
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Million Metric Tons per year of CO_2e)
Electricity and Natural Gas		
E-1	Energy Efficiency (32,000 GWh of Reduced Demand) • Increased Utility Energy Efficiency Programs • More Stringent Building & Appliance Standards Additional Efficiency and Conservation Programs	15.2
E-2	Increase Combined Heat and Power Use by 30,000 GWh (Net reductions include avoided transmission line loss)	6.7
E-3	Renewables Portfolio Standard (33% by 2020)	21.3
E-4	Million Solar Roofs (including California Solar Initiative, New Solar Homes Partnership and solar programs of publicly owned utilities) • Target of 3000 MW Total Installation by 2020	2.1
CR-1	Energy Efficiency (800 Million Therms Reduced Consumptions) • Utility Energy Efficiency Programs • Building and Appliance Standards • Additional Efficiency and Conservation Programs	4.3
CR-2	Solar Water Heating (AB 1470 goal)	0.1
Green Buildings		
GB-1	Green Buildings	26
Water		
W-1	Water Use Efficiency	1.4[b]
W-2	Water Recycling	0.3[b]
W-3	Water System Energy Efficiency	2.0[b]
W-4	Reuse Urban Runoff	0.2[b]
W-5	Increase Renewable Energy Production	0.9[b]
W-6	Public Goods Charge (Water)	TBD[b]
Industry		
I-1	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	TBD
I-2	Oil and Gas Extraction GHG Emission Reduction	0.2
I-3	GHG Leak Reduction from Oil and Gas Transmission	0.9
I-4	Refinery Flare Recovery Process Improvements	0.3
I-5	Removal of Methane Exemption from Existing Refinery Regulations	0.01
Recycling and Water Management		
RW-1	Landfill Methane Control (Discrete Early Action)	1
RW-2	Additional Reductions in Landfill Methane • Increase the Efficiency of Landfill Methane Capture	TBD[b]
RW-3	High Recycling/Zero Water • Commercial Recycling • Increase Production and Markets for Compost • Anaerobic Digestion • Extended Producer Responsibility • Environmentally Preferable Purchasing	9[b]
Forests		
F-1	Sustainable Forest Target	5

TABLE 3.2-4 (continued)
LIST OF RECOMMENDED ACTIONS BY SECTOR

Measure No.	Measure Description	GHG Reductions (Million Metric Tons per year of CO_2e)
High Global Warming Potential (GWP) Gases		
H-1	Motor Vehicle Air Conditioning Systems: Reduction of Refrigerant Emissions from Non-Professional Servicing (Discrete Early Action)	0.26
H-2	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)	0.3
H-3	Reduction of Perfuorocarbons in Semiconductor Manufacturing (Discrete Early Action)	0.15
H-4	Limit High GWP Use in Consumer Products Discrete Early Action (Adopted June 2008)	0.25
H-5	High GWP Reductions from Mobile Sources • Low GWP Refrigerants for New Motor Vehicle Air Conditioning Systems • Air Conditioner Refrigerant Leak Test During Vehicle Smog Check • Refrigerant Recovery from Decommissioned Refrigerated Shipping Containers • Enforcement of Federal Ban on Refrigerant Release during Servicing or Dismantling of Motor Vehicle Air Conditioning Systems	3.3
H-6	High GWP Reductions from Stationary Sources • High GWP Stationary Equipment Refrigerant Management Program: o Refrigerant Tracking/Reporting/Repair Deposit Program o Specifications for Commercial and Industrial Refrigeration Systems • Foam Recovery and Destruction Program • SF_6 Leak Reduction and Recycling in Electrical Applications • Alternative Suppressants in Fire Protection Systems • Residential Refrigeration Early Retirement Program	10.9
H-7	Mitigation Fee on High GWP Gases	5
Agriculture		
A-1	Methane Capture at Large Dairies	1.0[b]

[a] This is not the SB 375 regional target. CARB will establish regional targets for each MPO region following the input of the regional targets advisory committee and a consultation process with MPOs and other stakeholders per SB 375
[b] GHG emission reduction estimates are not included in calculating the total reductions needed to meet the 2020 target

SOURCE: CARB, 2008c.

In addition to the scoping plan, ARB has also released the *Preliminary Draft Staff Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act.* The proposal recommends adhering to interim performance standards for project types and emissions sources including construction, energy, water use, waste, transportation, and total mass GHG emissions (CARB 2008d). Specific thresholds and performance criteria for these categories have yet to be developed.

The Natural Resources Agency (Resources) received recommended Amendments to the CEQA Guidelines for greenhouse gas emissions from the Governor's Office of Planning and Research on April 13, 2009. These proposed CEQA Guideline amendments would provide guidance to public agencies regarding the analysis and mitigation of the effects of greenhouse gas emissions in draft CEQA documents. On July 3, 2009, Resources commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments pursuant to Public Resources

Code section 21083.05. The recommended Amendments do not identify significance thresholds for greenhouse gas emissions.

California Air Pollution Control Officers Association (CAPCOA)

In January 2008, the California Air Pollution Control Officers Association (CAPCOA) issued a "white paper" on evaluating and addressing GHGs under CEQA (CAPCOA, 2008). This resource guide was prepared to support local governments as they develop their programs and policies around climate change issues. The paper is not a guidance document. It is not intended to dictate or direct how any agency chooses to address GHG emissions. Rather, it is intended to provide a common platform of information about key elements of CEQA as they pertain to GHG, including an analysis of different approaches to setting significance thresholds.

The paper notes that for a variety of reasons local agencies may decide not to have a CEQA threshold. Local agencies may also decide to assess projects on a case-by-case basis when the projects come forward. The paper also discusses a range of GHG emission thresholds that could be used. The range of thresholds discusses includes a GHG threshold of zero and several non-zero thresholds. Non-zero thresholds include percentage reductions for new projects that would allow the state to meet its goals for GHG emissions reductions by 2020 and perhaps 2050. These would be determined by a comparison of new emissions versus business as usual emissions and the reductions required would be approximately 30 percent to achieve 2020 goals and 90 percent (effectively immediately) to achieve the more aggressive 2050 goals. These goals could be varied to apply differently to new project, by economic sector, or by region in the state.

Other non-zero thresholds are discussed in the paper include:

- 900 metric tons/year CO_2E (a market capture approach);
- 10,000 metric tons/year CO_2E (potential ARB mandatory reporting level with Cap and Trade);
- 25,000 metric tons/year CO_2E (the ARB mandatory reporting level for the statewide emissions inventory);
- 40,000 to 50,000 metric tons/year CO_2E (regulated emissions inventory capture – using percentages equivalent to those used in air districts for criteria air pollutants),
- Projects of statewide importance (9,000 metric tons/year CO_2E for residential, 13,000 metric tons/year CO_2E for office project, and 41,000 metric tons/year CO_2E for retail projects), and
- Unit-based thresholds and efficiency-based thresholds that were not quantified in the report.

SCAQMD Draft GHG Significance Threshold

On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold for projects where the SCAQMD is lead agency. The interim threshold consists of five tiers of standards that could result in a finding of less than significant impact. The tiers include CEQA exemptions, consistency with regional GHG budgets, less than significant screening levels for industrial projects (10,000 metric tons/year CO2e) and

commercial/residential projects (3,000 metric tons/year CO2e), performance standards (i.e., 30 percent less than Business As Usual [BAU]), and carbon offsets (SCAQMD, 2008). The interim threshold amortizes construction emissions over the life of the project (i.e. 30 years).

Regional

Regional Comprehensive Plan and Guide

The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and addresses regional issues relating to transportation, the economy, community development, and the environment. SCAG is the federally designated metropolitan planning organization (MPO) for the majority of the southern California region and is the largest MPO in the nation. As the designated MPO, SCAG is mandated by the federal government to develop and implement regional plans that address transportation, growth management, hazardous waste management, and air quality issues. With respect to air quality planning, SCAG has prepared the Regional Comprehensive Plan and Guide (RCPG) for the Riverside County region, which includes Growth Management and Regional Mobility chapters that form the basis for the land use and transportation components of the Air Quality Management Plan (AQMP) and are utilized in the preparation of air quality forecasts and the consistency analysis that is included in the AQMP.

SCAQMD

The SCAQMD has jurisdiction over an area of approximately 10,743 square miles. This area includes all of Orange County, all of Los Angeles County except for the Antelope Valley, the nondesert portion of western San Bernardino County, and the western and Coachella Valley portions of Riverside County. The previously discussed Basin is a subregion of the SCAQMD jurisdiction. While air quality in this area has improved, the Basin requires continued diligence to meet air quality standards. The SCAQMD has adopted a series of AQMPs to meet the CAAQS and NAAQS. These plans require control technology for existing sources, control programs for area sources and indirect sources, a SCAQMD permitting system designed to allow no net increase in emissions from any new or modified permitted emission sources and transportation control measures.

The SCAQMD adopted a comprehensive AQMP update, the 2007 AQMP for the Basin, on June 1, 2007. The 2007 AQMP outlines the air pollution control measures needed to meet federal health-based standards for ozone (8-hour standard) by 2024, and PM2.5 by 2015. This revision to the AQMP also addresses several State and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. The 2007 AQMP is consistent with and builds upon the approaches taken in the 2003 AQMP for the attainment of the federal ozone air quality standard but highlights the significant amount of reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under FCAA (SCAQMD, 2007).

The SCAQMD adopts rules and regulations to implement portions of the AQMP. Several of these rules may apply to construction or operation of the project. For example, SCAQMD Rule 403 requires the implementation of best available fugitive dust control measures during active operations capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads. As another example, SCAQMD Regulation XIII ensures that the operation of new facilities do not interfere with progress in attainment of the NAAQS.

The SCAQMD has published a *CEQA Air Quality Handbook* (SCAQMD, 1993) that is intended to provide local governments such as the City of Perris and the County of Riverside, with guidance for analyzing and mitigating project-specific air quality impacts. This handbook provides standards, methodologies and procedures for conducting air quality analyses. The handbook is currently being revised. Supplemental information that was last updated in March of 2007 by the SCAQMD was used extensively in the preparation of this analysis.

Local Sensitive Receptors

Land uses such as schools, children's daycare centers, hospitals, and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality.

Residential areas are considered more sensitive to air quality conditions than commercial and industrial areas, because people generally spend longer periods of time at their residences, resulting in greater exposure to ambient air quality conditions. Recreational uses are also considered sensitive, due to the greater exposure to ambient air quality conditions and because the presence of pollution detracts from the recreational experience.

3.2.3 Impacts and Mitigation Measures

Significance Criteria

According to Appendix G of the *CEQA Guidelines*, the project would have a significant effect on air quality if it would:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any nonattainment pollutant (including releasing emissions that exceed quantitative thresholds for ozone precursors;
- Conflict with or obstruct implementation of California Global Warming Solutions Act of 2006 (AB 32);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Because of the SCAQMD's regulatory role in the Basin, the significance thresholds and analysis methodologies in the SCAQMD's *CEQA Air Quality Handbook* are used in evaluating project impacts.

Construction. The project would result in a significant construction air quality impact if regional emissions from the project exceed the significance thresholds set forth in **Table 3.2-5**.

- Regional emissions exceed the significance thresholds set forth in Table 3.2-5.

TABLE 3.2-5
AIR QUALITY SIGNIFICANCE THRESHOLDS

Pollutant	Construction	Operation
NOx	100 lbs/day	55 lbs/day
VOC (ROG)	75 lbs/day	55 lbs/day
PM10	150 lbs/day	150 lbs/day
PM2.5	55 lbs/day	55 lbs/day
CO	550 lbs/day	550 lbs/day

SOURCE: SCAQMD, 1993. *CEQA Air Quality Handbook*. April 1993.

Operations. The project would result in a significant operational air quality impact if any of the following occur:

- Either of the following conditions would occur at an intersection or roadway within one-quarter mile of a sensitive receptor:
  - The project causes an exceedance of the California one-hour or eight-hour CO standards of 20 or 9.0 ppm, respectively; or
  - For intersection or roadways where existing CO levels exceed California standards, the incremental increase due to the project is equal to or greater than 1.0 ppm for the one-hour CO standard, or 0.45 ppm for the eight-hour CO standard.
- The project would not be compatible with SCAQMD, SCAG, County of Riverside and/or City of Perris air quality goals and policies.

Toxic Air Contaminants. The project would result in a significant operational air quality impact if any of the following occur:

- On-site stationary sources emit carcinogenic or toxic air contaminants that individually or cumulatively exceed the maximum individual cancer risk of ten in one million or an acute or chronic hazard index of 1.0. (SCAQMD, 2005a).
- Hazardous materials associated with on-site stationary sources result in an accidental release of air toxic emissions or acutely hazardous materials posing a threat to public health and safety.

Construction Impacts

Daily regional emissions during construction were forecast by assuming a conservative estimate of construction (i.e., assuming all construction occurs at the earliest feasible date and that all

project components would be constructed concurrently) and applying the mobile-source and fugitive dust emissions factors derived from air quality emissions model URBEMIS 2007 version 9.2. The URBEMIS 2007 output sheets, which detail construction equipment assumptions by phase and construction phase durations, are provided in Appendix B of this document.

Operational Impacts

Toxic Air Contaminant Impacts

Potential TAC impacts are evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling). The screening-level analysis consists of reviewing the project's site plan and project description to identify any new or modified TAC emissions sources. If it is determined that the project would introduce a new source, or modify an existing TAC emissions source, then downwind sensitive receptor locations are identified and site-specific dispersion modeling is conducted to determine project impacts.

Operational Criteria Pollutants

Operational emissions of criteria pollutants are not expected to increase from pre-drawn levels. As with current operations, there would be minimal vehicle trips required daily for routine operations (i.e., inspection and maintenance) resulting in a less than significant increase in air quality emissions.

Consistency with Applicable Air Quality Plan

The SCAQMD has designated two key indicators of consistency with air quality policies. The first criterion requires that the project not result in an increase in the frequency or severity of existing air quality violations, cause or contribute to new violations, or delay the timely attainment of air quality standards or the interim emission reductions specified in the AQMP. The second criterion requires that the project not exceed the growth assumptions made in preparing the AQMP.

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis include forecasts of project emissions in a regional context during construction and operation. As described below in Impact 3.2-1, the project would result in ROG and NOx (which are ozone precursors) and PM2.5 emissions that would exceed the SCAQMD significance thresholds during the short-term duration of construction. Although the temporary emissions would contribute to air pollution in the basin, the construction activities would not result in measurably more frequent or more severe air quality violations. The AQMP identifies construction activities as contributing factors to the overall emissions sources and provides source control measures to reduce this contribution, but does not conclude that individual projects would delay the attainment of air quality standards for the basin. Compliance with the Rules established by the SCAQMD to reduce construction emissions including fugitive dust control measures and vehicle maintenance measures would ensure that the project would not conflict with the current AQMP.

The second consistency criterion requires that the project does not exceed the assumptions in the AQMP. A project is consistent with the AQMP if it is consistent with the population, housing and employment assumptions which were used in the development of the AQMP. The 2007 AQMP,

the most recent AQMP adopted by the SCAQMD, incorporates, in part, SCAG's 2004 Regional Transportation Plan (RTP) socioeconomic forecast projections of regional population and employment growth. The 2004 RTP is based on growth assumptions through 2030 developed by each of the cities and counties in the SCAG region. The project is consistent with growth assumptions included in the AQMP because it is only making a dam safer for the community that presently is in the vicinity, thus the project would not result in a regionally significant impact per SCAG Intergovernmental Review Criteria and *CEQA Guidelines* Section 15206. In addition, the project is consistent with the City General Plan, which is consistent with the RTP. As such, the project would be consistent with local air quality plans.

Conformance with Air Quality Standards

Impact 3.2-1: Construction activities would emit criteria pollutants in excess of SCAQMD thresholds of significance that would contribute to existing poor air quality.

Criteria Air Pollutants

Construction-related emissions would be short-term, but may still cause adverse effects on air quality. Construction activities include site preparation, earthmoving, and general construction. Site preparation includes activities such as general land clearing and grubbing. Earthmoving activities include cut-and-fill operations, trenching, blasting, soil compaction, and grading. General construction includes adding improvements such as roadway surfaces, structures, and facilities. The emissions generated from these construction activities include:

- Dust (including PM10 and PM2.5) primarily from "fugitive" sources (i.e., emissions released through means other than through a stack or tailpipe) such as soil disturbance;
- Combustion emissions of criteria air pollutants (ROG, NOx, carbon monoxide, carbon dioxide, PM10, and PM2.5) primarily from operation of heavy off-road construction equipment (primarily diesel-operated), portable auxiliary equipment, and construction worker automobile trips (primarily gasoline-operated); and
- Evaporative emissions (ROG) from asphalt paving and architectural coatings.

Construction-related fugitive dust emissions would vary from day to day, depending on the level and type of activity, silt content of the soil, and the weather. High winds (greater than 10 miles per hour [mph]) occur infrequently in the area, less than two percent of the time.[2] In the absence of mitigation, construction activities may result in significant quantities of dust, and as a result, local visibility and PM10 concentrations may be adversely affected on a temporary and intermittent basis during construction. In addition, the fugitive dust generated by construction would include not only PM10, but also larger particles, which would fall out of the atmosphere within several hundred feet of the site and could result in nuisance-type impacts. It is mandatory for all construction projects in the Basin to comply with SCAQMD Rule 403 for fugitive dust (SCAQMD, 2005b). Specific Rule 403 control requirements include, but are not limited to, applying water in sufficient quantities to prevent the generation of visible dust plumes, applying soil binders to uncovered areas, reestablishing ground cover as quickly as possible, utilizing a wheel washing system to remove bulk material from tires and vehicle undercarriages before

[2] South Coast Air Quality Management District, Perris Monitoring Station, 1991-1999

vehicles exit the project site, and maintaining effective cover over exposed areas. Compliance with Rule 403 would reduce PM10 and PM2.5 fugitive dust emissions associated with construction activities by 61 percent. Visual dust plumes from blasting are not anticipated and therefore blasting would not require any additional fugitive dust mitigation.

NOx, ROG, PM10, PM2.5, CO, and CO_2 construction emissions were estimated for a worst-case day based on maximum crew, truck trip, and equipment usage data from DWR. Emissions are based on criteria pollutant emission factors from URBEMIS 2007. As shown in **Table 3.2-6**, the estimated maximum daily NOx, PM10, and PM2.5 emissions without mitigation would be greater than the significance criteria. Thus, construction-related NOx, PM10, and PM2.5 emissions would be significant without mitigation.

TABLE 3.2-6
ESTIMATED WORST CASE DAY UNMITIGATED EMISSIONS FROM PROJECT CONSTRUCTION (POUNDS PER DAY)A

Project Data	ROG	NOx	CO	PM10[b]	PM2.5[b]	CO_2
Dam Remediation						
20011 Totals	10	99	46	205	46	12,985
20012 Totals	5	30	68	201	43	10,339
2013 Totals	5	23	63	2	1	10,339
Significant (Yes or No)?	No	No	No	Yes	No	NA
Emergency Outlet Extension						
2011 Totals	6	44	226	398	85	4,581
2012 Totals	8	41	127	398	85	19,513
2013 Totals	7	37	118	3	2	19,512
Significant (Yes or No)?	No	No	No	Yes	Yes	NA
Outlet Tower Retrofit						
2011 Totals	3	24	13	1	1	2,412
2012 Totals	2	15	9	1	1	1,839
Significant (Yes or No)?	No	No	No	No	No	NA
Combined Total for Project						
2011 Total	19	167	285	604	132	19,978
2012 Total	15	86	204	600	129	31,691
2013 Total	12	60	181	5	3	29,851
Significant (Yes or No)?	No	Yes	No	Yes	Yes	NA
SCAQMD Thresholds of Significance	75	100	550	150	55	NA

[a] Project construction emissions estimates for off-road equipment were made using URBEMIS2007, version 9.2. The emissions listed above are for a worse-case day, where it was assumed that all components of the project would overlap See Appendix B for more details.

[b] PM10 and PM2.5 emission estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression, which require that no visible dust be present beyond the site boundaries and achieves 61 percent or greater reduction in dust. A copy of SCAQMD Rule 403 is included in Appendix B.

NOTE: Values in **bold** are in excess of the applicable SCAQMD significance threshold. NA = Not Available

SOURCE**:** ESA, 2009

Toxic Air Contaminants

The greatest potential for TAC emissions would be related to diesel particulate emissions associated with heavy equipment operations during grading and excavation activities. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime will contract cancer, based on the use of standard risk-assessment methodology.

Projects, such as this project, that would have minimal TAC emissions do not require a Health Risk Assessment (HRA) to determine the individual cancer risk. Also, construction emissions generally do not require an HRA because construction is typically limited to a short period of time and the HRA considers individual cancer risk over the long-term. However, because the construction period for project components would last from three to four years and include diesel-powered construction equipment, an HRA was conducted to determine if the project construction would exceed the significance criteria for TACs related to an increase in individual cancer risk. A summary of the HRA is provided in this Air Quality Section, a longer description of the HRA is provided in **Appendix B** of this EIR.

The SCAQMD has established the CEQA significance threshold for individuals exposed to new TAC sources as the increased incremental cancer risk of 10 in one million or greater. The HRA analyzed the potential incremental cancer risks to residents in the project vicinity of the Perris Dam Remediation Program during construction activities. The primary TAC from construction is DPM. Four construction activities were identifies as potential sources of DPM. These activities include: (1) dam remediation, (2) construction of the replacement outlet tower, (3) construction of the emergency outlet extension, and (4) haul trips to export soil excavated during construction for all three components. Emission rates for the four activities were estimated using the URBEMIS 2007 model, which incorporates emission factors from CARB's OFFROAD and EMFAC2007 models. Emissions were input into the USEPA approved dispersion model AERMOD to calculate ambient air concentrations at receptors in the project vicinity.

The results of the HRA found that project construction would have a less-than-significant impact from DPM emissions at all sensitive receptors. The maximum exposed receptor would have an estimated increased incremental cancer risk of 3 in one million, which is less than one-third of the SCAQMD significance threshold of 10 in one million. The proposed project would not emit TACs which would exceed SCAQMD significance threshold. TAC impacts related to the violation of an air quality standard would be less than significant.

The project would include removing piping downstream of the dam that may be asbestos-containing. If handled improperly the asbestos-containing piping could become friable, exposing workers to asbestos fibers. The mitigation measure provided below would ensure that the materials would be handled and disposed of in compliance with applicable regulations. As such, project-related toxic emission impacts during construction would be less than significant.

Mitigation Measures

Mitigation Measure 3.2-1a: DWR shall ensure that contractors implement a fugitive dust control program pursuant to the provisions of SCAQMD Rule 403.[3]

Mitigation Measure 3.2-1b: DWR shall ensure that construction equipment is properly tuned and maintained in accordance with manufacturer's specifications.

Mitigation Measure 3.2-1c: DWR shall ensure that contractors maintain and operate construction equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues would turn their engines off when not in use to reduce vehicle emissions. Construction emissions shall be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.

Mitigation Measure 3.2-1d: Electricity from power poles rather than temporary diesel- or gasoline-powered generators shall be used where available.

Mitigation Measure 3.2-1e: All construction vehicles shall be prohibited from idling in excess of five minutes, both on- and off-site.

Mitigation Measure 3.2-1f: Coatings and solvents used in the proposed project shall be consistent with applicable SCAQMD rules and regulations**.**

Mitigation Measure 3.2-1g: Wheel washers shall be installed where vehicles exit the construction site onto paved roads.

Mitigation Measure 3.2-1h: Haul vehicles shall be covered or comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.

Mitigation Measure 3.2-1i: Prior to removing the existing drainage system down-stream of the dam, DWR shall inventory materials that may be asbestos-containing. Any asbestos-containing materials including cement pipe (transite) will be removed and disposed of by certified asbestos workers in compliance with applicable asbestos abatement regulations (40 CFR Part 763 and 29 CFR Part 1910).

Significance after Mitigation: Even with implementation of the mitigation measures listed above, and the fact that recreational uses would be reduced during construction, short-term construction-related emissions of NOx, PM10 and PM2.5 would be significant and unavoidable impacts on air quality.

Impact 3.2-2: Project operation would not violate air quality standards or contribute substantially to an existing or projected air quality violation nor expose sensitive receptors to pollutant concentrations resulting in an adverse health effect during long-term operation.

Operational emissions for the project would be generated primarily from on-road vehicular traffic. Minimal employee trips would be required daily for routine operations (i.e., inspection and maintenance) and these minimal trips would be approximately the same as the amount of

[3] SCAQMD Rule 403 requirements are detailed in Appendix B.

trips and emissions as pre-drawdown levels, resulting in a less than significant increase in air quality emissions.

Significance: Less than Significant.

Odors

Impact 3.2-3: The project would not create objectionable odors affecting a substantial amount of people.

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. SCAQMD Rule 402 prohibits such emissions. The project does not include any uses identified by the SCAQMD as being associated with odors. Odors associated with the construction project would be limited to vehicle exhaust from heavy machinery. Any mobile or stationary source generating an objectionable odor is subject to Rule 402 and may be reported to the SCAQMD. The SCAQMD resolves complaints through investigation and issuance of a notice to comply when necessary. Continued application of these existing regulations would avoid any impacts associated with objectionable odors and assure that any objectionable odors would not affect a substantial amount of people. Thus potential odor impacts would be less than significant.

Significance: Less than Significant.

Greenhouse Gases

Impact 3.2-4: The project would not result in a cumulatively considerable net increase of emissions which exceed quantitative thresholds for ozone precursors and/or conflict with implementation of state goals for reducing greenhouse gas emissions.

CEQA requires that lead agencies consider the reasonably foreseeable adverse environmental effects of projects they are considering for approval. GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. In turn, global climate change has the potential to result in rising sea levels, which can inundate low-lying areas; to reduce snowpack, leading to less overall water storage in the Sierra Nevada; to affect rainfall, leading to changes in water supply, increased frequency and severity of droughts, and increased wildfire risk; and to affect habitat and agricultural land, leading to adverse affects on biological and agricultural resources.

Cumulative impacts are the collective impacts of one or more past, present, and future projects that, when combined, result in adverse changes to the environment. When the adverse change is substantial and the project's contribution to the impact is considerable, the cumulative impact would be significant. The cumulative project list for this issue (global climate change) comprises anthropogenic (i.e., human-made) GHG emission sources across the entire planet. No project

alone, is likely to contribute to a noticeable incremental change to the global climate. However, legislation and executive orders on the subject of climate change in California have established a statewide context for GHG emissions, and an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that the cumulative impacts of GHGs, even additions that are relatively small on a global basis, need to be considered. Because of the cumulative nature of the climate change problem, even relatively small contributions may be potentially considerable and therefore, significant.

To establish additional context in which to consider the order of magnitude of project-generated construction GHG emissions, facilities (i.e., stationary, continuous sources of GHG emissions) that generate greater than 25,000 metric tons of CO_2e per year are mandated to report their GHG emissions to CARB pursuant to AB 32. In addition, CARB has released a preliminary draft staff proposal that recommends 7,000 metric tons of CO_2e per year be used as the baseline threshold for impacts. Estimated GHG emissions associated with construction of the entire project would be approximately 2,800 metric tons of CO_2 in the maximum year.[4] Absent any air quality regulatory agency-adopted threshold for GHG emissions, the proposed project would generate substantially fewer emissions than 25,000 or 7,000 metric tons of CO_2e per year.

Long term emission including electrical sources would not change from the pre-drawdown conditions. Therefore quantifications of GHG emissions related to electricity from project implementation were not evaluated. Short-term construction-related GHG emissions would cease after construction.

To further contextualize the construction emissions generated by the project, the following information and comparisons are provided:

A. The potential conflicts with the CARB's thirty-nine recommended actions in the Climate Change Scoping Plan (see Table 3.2-4);

B. The relative size of the project in comparison to the size of major facilities that are required to report greenhouse gas emissions (25,000 metric tons of CO_2e/yr), and the CARB's 7,000 metric tons of CO_2e/yr recommended baseline; and

C. The basic parameters of a project to determine whether its design is inherently energy efficient, will lead to wasteful energy use, or is neutral with regard to future energy use.

With regard to Item A, the project does not pose any apparent conflict with the most recent list of the CARB action strategies.

With regard to Item B, project construction greenhouse gas emissions would be approximately 2,800 metric tons of CO_2e/yr in the maximum year; as computed by URBEMIS2007. Project operations would be the same as operations under the pre-drawdown baseline level and there

[4] Construction emissions were modeled with the URBEMIS 2007 computer model. The URBEMIS 2007 model does not account for embedded CO2 emissions associated with the manufacture of construction equipment or production of concrete or other building materials used in project construction. URBEMIS does not estimate greenhouse gas emissions other than CO2, such as methane and nitrous oxide, as these levels are expected to be nominal in comparison to the estimated CO2 levels despite their higher global warming potential. See Appendix B for more details.

would be no increase in CO_2 emissions would be expected. The project would not be classified as a major source of greenhouse gas emissions (the lower reporting limit for major sources is 25,000 metric tons of CO_2e/yr).

Project construction greenhouse gas emissions for the whole project would total approximately 5,013 metric tons of CO_2e, to emphasize these low emissions, we can compare them as if they were emissions from one year which would be 22 percent of the 25,000 lower reporting limit, and 70 percent of the 7,000 recommended baseline. If the construction greenhouse gas emissions were amortized for a conservative 50 year dam lifetime, construction would account for 100 metric tons of CO_2e/yr.

With regard to Item C, the project is efficient with regard to energy use. The construction would use on-site materials to minimize transport of materials to the site and best management practices (BMP) including mitigation measures 3.2-1a and 3.2-1i. Furthermore the project is needed to reduce potential earthquake hazards to benefit the safety of nearby residents, recreational users, and people in the surrounding commercial areas.

Significance Less than Significant

Mitigation Measure Summary Table

Table 3.2-7 presents the impacts and mitigation summary for Air Quality.

TABLE 3.2-7
AIR QUALITY IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Construction Emissions: Construction activities would emit criteria pollutants in excess of SCAQMD thresholds of significance that would contribute to existing poor air quality.	3.2-1a through 3.2-1i	Significant and Unavoidable
Operational Emissions: Project operation would not violate air quality standards or contribute substantially to an existing or projected air quality violation nor expose sensitive receptors to pollutant concentrations resulting in an adverse health effect during long-term operation.	None required	--
Objectionable Odors: The project would not create objectionable odors affecting a substantial amount of people.	None required	--
Greenhouse Gas Emissions: The project would not conflict with implementation of state goals for reducing greenhouse gas emissions and thereby have a negative effect on Global Climate Change.	None required	--

3.3 Biological Resources

This section establishes the existing conditions and provides an evaluation of potential impacts to biological resources associated with the proposed project. A Biological Resources Technical Report that provides the primary source of the following section is included in **Appendix C**.

3.3.1 Methods

The setting and analysis of biological resources is based on a review of available literature, consultation with resource agencies, and extensive field surveys within the project study area. ESA and Psomas staff contacted the local field offices of Regional Conservation Authority (RCA), the CDFG, the U.S. Fish and Wildlife Service (USFWS), and U.S. Army Corps of Engineers (Corps) to identify agency concerns regarding the proposed project site. The gathering of available information and agency concerns was followed by extensive on-site field surveys within the biological survey area conducted by botanists and wildlife biologists. The area surveyed is shown in **Figure 3.3-1**. The purpose of the field surveys was to determine whether special-status plant and wildlife species occur or have the potential to occur within the habitat types on the proposed project site. During the field surveys, personnel searched for listed and sensitive plant and wildlife species, as well as habitat with the potential to support those species. Plant and wildlife species observed during field reconnaissance were recorded for inclusion in this analysis. The location and extent of potential jurisdictional waters of the United States and waters of the State were mapped as a part of the field studies.

A modified protocol survey for least Bell's vireo (*Vireo bellii pusillus*) was conducted during the months of June and July in riparian areas near the lake and dam. Trapping surveys for Los Angeles pocket mouse (*Perognathus longimembris brevinasus*) were conducted in September 2007. A protocol survey for coastal California gnatcatcher (*Polioptila californica californica*) was conducted during the months of July and August. A habitat assessment of the riparian vegetation along the northeastern portion of the lake and a waterfowl analysis was conducted in May 2009. The reports of findings for all abovementioned surveys are included in Appendix C.

As specified at the start of Section 3 (Environmental Setting, Impacts and Mitigation Measures), baseline conditions for establishing the existing setting for the analysis of project impacts on biological resources is a full Lake Perris at the 1588-foot water surface elevation (pre-drawdown conditions). The analysis of project impacts takes into account the effects of the emergency drawdown and takes into account the colonization and flooding of the recently exposed lake bottom that now supports habitat of pioneer plant species. In addition, the effects of the drawdown on the riparian habitat along the northeastern portion of the lake and the riparian habitats along the southeast perimeter of the lake are included in the analysis of biological resources.

Biological Survey Area Boundary
Project Footprint

0 3,500
Feet

SOURCE: GlobeXplorer, 2007; DWR, 2007; PSOMAS, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-1
Biological Survey Area

3.3.2 Regional Setting

Lake Perris is located within the southwestern California subregion of the California floristic province (Hickman, 1993). Perris Dam impounds Lake Perris, which is entirely within the Lake Perris SRA located between the cities of Moreno Valley and Perris in an unincorporated area of western Riverside County, approximately 15 miles south of the City of Riverside and 65 miles east of the City of Los Angeles. The proposed project site is located in the foothills of the Bernasconi Hills, the adjacent Lake Perris and the relatively level land below the dam, between approximately 1400 to 2000 feet amsl. Currently, the majority of the proposed project site would occur on public land. The land uses in the project vicinity include undeveloped/open space of the San Jacinto Mountain Range to the northeast and residential homes to the south and west. Lake Perris is a man-made lake and recreation area bounded by the Bernasconi Hills to the southeast and a number of other small hills to the north. The San Jacinto Mountain Range lies to the northeast. The proposed project site receives approximately 1.1 million visitors each year for activities that include water skiing, jet skiing, fishing, hunting, camping, hiking, rock climbing, horseback riding, bicycling, and wildlife watching. The Perris Fairgrounds immediately adjacent to the Lake Perris SRA to the west supports a motor sports complex. The San Jacinto Wildlife Area is immediately east of the Lake Perris SRA. The surrounding area is composed of a mosaic of suburban, developed land and open space/natural areas, with the majority of natural habitat being found in the San Jacinto Mountain range to the northeast.

Natural habitats around Lake Perris are composed primarily of Riversidean sage scrub, willow scrub, and non-native annual grassland. The surrounding lands are relatively dry with vegetation that varies from a dense association of sage scrub related species on the drier south facing slopes and chaparral related species on the north facing slopes due to greater soil moisture retention, to a sparse association of grasses, forbs and scattered sage scrub shrubs in the flatter areas near the toes of the surrounding foothill slopes. Soils range from a thin mantle over rocks on steep slopes, to deeper sandy friable soils in the flatlands and along the shores of Lake Perris.

The proposed project site lies within the Western Riverside County MSHCP area. The MSHCP is a comprehensive, multi-jurisdictional Habitat Conservation Plan (HCP) focusing on conservation of plant and wildlife species and their associated habitats in western Riverside County. The MSHCP establishes a framework and mechanism for projects to comply with State and federal endangered species regulations.

3.3.3 Project Setting – Habitat Types

The study area supports 10 plant communities, 13 associated sub-communities, and four non-vegetated features within and around the vicinity of the proposed project area identified during the field surveys. **Figure 3.3-2** maps plant communities identified in the project area. **Figures 3.3-3** through **Figure 3.3-5** provide photographs of vegetation types. Some of these plant communities and non-vegetated features existed prior to the lake drawdown, some of the plant communities and features are purely a result of the drawdown, and some fall into both categories as shown in **Table 3.3-1**, below. **Table 3.3-2** includes a list of plant species observed during field reconnaissance conducted for this study.

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-2
Habitat Types

1. View of damaged mature riparian habitat located on eastern portion of lake

2. View from east side of lake of former freshwater marsh and shallow water habitat, adjacent to band of emergent southern willow scrub

3. View northeast along lake edge of exposed shore and emergent willow scrub

4. View north of heliotrope scrub and sandbar with mule fat

SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-3
Biological Photos

5. View north, facing lake, of heliotrope scrub, mulefat scrub, and willow scrub in background.

6. View east showing habitat gradients.

7. View south of Riversidean sage scrub with lake and exposed lake shore in background.

8. View from south west corner of lake of Riversidean sage scrub.

SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-4
Biological Photos

9. View of Perris Dam and mature southern willow scrub

10. View of Perris Dam, non-native grassland and mature southern willow scrub

SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-5
Biological Photos

TABLE 3.3-1
HABITAT TYPES AT LAKE PERRIS PRE-DRAWDOWN AND EMERGING AFTER 2005 WATER LEVEL DRAWDOWN

Community Type	Existed in Pre-drawdown Conditions	Emerging Communities due to Drawdown
Riversidean Sage Scrub • Disturbed Riversidean Sage Scrub • Burned Riversidean Sage Scrub • Riversidean Sage Scrub-Buckwheat dominated • Riversidean Sage Scrub-Brittle bush dominated • Riversidean Sage Scrub/Urban • Disturbed Riversidean Sage Scrub/Urban	X	
Southern willow woodland and scrub • Southern Willow Scrub/Mule Fat Scrub	X	X
Mule Fat Scrub • Mule Fat Scrub/Rip-Rap • Mule Fat Scrub/Freshwater Marsh		X
Freshwater Marsh • Disturbed Freshwater Marsh	X	X
Coyote Brush Scrub	X	
Heliotrope Scrub/Sandbar • Heliotrope Scrub/Tamarisk Scrub/Sandbar		X
Non-native grassland • Burned non-native Grassland	X	
Eucalyptus Woodland • Eucalyptus Woodland/Disturbed Riversidean Sage Scrub	X	
Ruderal	X	X
Agriculture	X	
mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar	X	X
Non-vegetated Features		
Open water/Lake Perris	X	
Sand	X	X
Rip-Rap	X	X
Urban Areas	X	

SOURCE: PSOMAS, 2008

Characteristics of each plant community and non-vegetated feature are described below and are defined using classification systems developed by Holland (1986), Sawyer and Keeler-Wolff (1995), and described in the Western Riverside County MSHCP (2003). Sensitive habitats are those that are considered to support unique vegetation communities, sensitive plant and/or wildlife species, or function as corridors for wildlife movement. Four plant communities observed within the biological survey area—Riversidean sage scrub, southern willow woodland and scrub, mule fat scrub, and heliotrope scrub, and associated habitats—are sensitive plant communities and are described below.

TABLE 3.3-2
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
CONIFERAE	
Cupressaceae	Cypress Family
Cupresus sp.	cypress
Pinaceae	Pine Family
Pinus radiata	Monterey pine
ANGIOSPERMAE	**(DICOTYLEDONS)**
Amaranthus	Pigweed, Amaranth Family
*Amaranthus albus**	tumbleweed
Anacardiaceae	Sumac or Cashew Family
Rhus trilobata	skunkbrush (squawbush)
*Schinus molle**	Peruvian pepper tree
Toxicodendron diversilobum	poison oak
Apiaceae	Carrot Family
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	fennel
Asteraceae	Sunflower Family
Acourtia microcecphala	perezia (sacapellote)
Ambrosia acanthicarpa	annual bur ragweed (annual bur-sage)
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	wild tarragon (tarragon)
Artemisia tridentata	Great Basin sagebrush (big sagebrush)
Baccharis emoryi	Emory's baccharis
Baccharis pilularis	coyote bush
Baccharis salicifolia	mule fat
Bebbia juncea	sweetbush
Brickellia californica	California brickellbush
Brickellia desertorum	desert brickellbush
*Centaurea melitensis**	tocalote
*Chamomilla suaveolens**	pineapple weed (rayless chamomile)
Cirsium occidentale	cobweb thistle
Conyza canadensis	horseweed (mare's tail)
Conyza coulteri	Coulter's horseweed
*Cotula coronopifolia**	Brass-buttons
Encelia farinosa	brittlebush (incienso)
Ericameria palmeri	grassland goldenbush
Erigeron foliosus var. foliosus	fleabane aster
Eriophyllum confertiflorum	golden-yarrow

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Asteraceae (cont.)	
Filago californica	California filago (fluff weed)
*Filago gallica**	narrow-leaved filago
Gnaphaliem bicolor	two-toned everlasting (bicolored cudweed)
Gnaphalium californicum	California everlasting
Gnaphalium canescens ssp. microcephalum	felt-leaf everlasting (white everlasting)
*Gnaphalium luteo-album**	weedy cudweed
Gutierrezia californica	California matchweed (snakeweed)
Helianthus annus	common sunflower
Heterotheca grandiflora	telegraph weed
Isocoma menziesii	Menxie's goldenbush (white flowered goldenbush)
*Lactuca serriola**	prickly lettuce (wild lettuce)
Pluchea sericea	arrow weed
*Senecio vulgaris**	common groundsel
*Sonchus oleraceus**	common sow thistle
Stephanomeria virgata	virgate wreath plant (twiggy wreath plant)
Berberidaceae	Barberry Family
Berberis fremontii	Fremont's barberry
Boraginaceae	Borage Family
Amsinckia menziesii var. intermedia	common fiddleneck
Cryptantha microstachys	Tejon cryptantha
Heliotropium curassavicum	alkali heliotrope (wild heliotrope)
Brassicaceae	Mustard Family
*Brassica geniculata (=Herschfeldia incana)**	short-podded mustard (Mediterranean mustard)
*Brassica nigra**	black mustard
Capsella bursa-pastoris	shepherd's purse
*Sisymbrium orientale**	Oriental mustard (Oriental sisymbrium)
Thysanocarpus laciniatus	lacepod (fringepod)
Cactaceae	Cactus Family
Opuntia littoralis	coastal prickly pear
Opuntia prolifera	coast cholla
Capparaceae	Caper Family
Isomeris arborea (=Cleome isomeris)	bladderpod
Caprifoliaceae	Honeysuckle Family
*Lonicera japonica**	Japanese honeysuckle
Adoxaceae	Elderberry Family
Sambucus mexicana	blue elderberry (Mexican elderberry)

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Chenopodiaceae	Goosefoot Family
Atriplex canescens	fourwing saltbush
*Chenopodium album**	white goosefoot (lamb's quarters)
*Salsola tragus**	Russian thistle (tumbleweed)
Suaeda nigra (=S. moquinii, S. torreyana)	bush seepweed (iodine weed)
Convolvulaceae	Morning-Glory Family
*Convolvulus arvensis**	bindweek
Crassulaceae	Stonecrop Familly
Dudleya lanceolata	lance-leaved dudleya (lance-leaved live-forever)
Cucurbitaceae	Gourd Family
Cucurbita foetidissima	stinking gourd (wild gourd, coyote melon)
Marah macrocarpus	wild cucumber (manroot)
Cuscataceae	Dodder Family
Cuscuta californica	dodder (California witch's hair)
Euphorbiaceae	Spurge Family
Croton californicus	California croton
Croton setigerus (=Eremocarpus setigerus)	turkey mullein (doveweed)
Euphorbia albomarginata (=Chamaesyce albomarginata)	rattlesmake spurge (rattlesnake weed)
*Ricinus communis**	castor bean
Fabaceae	Legume Family
*Acacia longifolia**	Sydney golden wattle
Lotus agrophyllus	silverleaf lotus (silver lotus)
Lotus salsuginosus	coastal lotus (alkali lotus)
Lotus scoparius	deerweed (California broom)
Lupinus sp.	lupine
*Medicago polymorpha**	California bur clover (bur-clover)
*Melilotus alba**	white sweet clover
*Melilotus officinalis**	yellow sweet clover
*Parkinsonia aculeata**	Mexican palo verde
Fagaceae	Oak Family
Quercus agrifolia	coast live oak
Garryaceae	Silk Tassel Family
Garrya flavescens	pale silk tassel
Geraniaceae	Geranium Family
*Erodium cicutarium**	red-stemmed filaree

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Grossulariaceae	Gooseberry Family
Ribes aureum	golden currant
Ribes indecorum	white-flowered currant (white chaparral currant)
Hydrophyllaceae	Waterleaf Family
Eucrypta chrysanthemifolia	common eucrypta
Phacelia cicutaria	caterpillar phacelia
Phacelia distans	common phacelia
Juglandaceae	Walnut and Pecan Family
Juglans californica	California black walnut
Lamiaceae	Mint Family
*Marrubium vulgare**	horehound
Salvia columbariae	chia
Salvia leucophylla	purple sage
Salvia mellifera	black sage
Lauraceae	Laurel Family
*Cinnamomum camphorum**	camphor tree
Malvaceae	Mallow Family
Malacothamnus fasciculatus	bush mallow (chaparral bush mallow)
Myoporaceae	Myoporum Family
*Myoporum laetum**	myoporum
Myrtaceae	Myrtle Family
*Eucalyptus globulus**	blue gum eucalyptus
Eucalyptus sp.	eucalyptus
Nyctaginaceae	Four O'Clock Family
Mirabilis laevis (=Mirabilis californica)	wishbone bush
Oleaceae	Olive Family
Fraxinus velutina	Arizona ash (velvet ash)
*Olea europaea**	common olive
Onagraceae	Evening Primrose Family
Epilobium ciliantum ssp. ciliantum	willow herb
Papaveraceae	Poppy Family
Eschscholzia californica	California poppy
Platanaceae	Plane Tree, Sycamore Family
Platanus hybrida	London planetree
Platanus racemosa	California sycamore (western sycamore)

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Polygonaceae	Buckwheat Family
Eriogonum fasciculatum	California buckwheat
Eriogonum fasciculatum var. polifolium	California buckwheat
Eriogonum sp.	buckwheat
Polygonum lapathifolium	willow weed
*Rumex acetosella**	sheep sorrel
*Rumex crispus**	curly dock
Portulacaceae	Purslane Family
Caluptridium monandrum	common pussypaws
Ranunculaceae	Buttercup Family
Ceanothus crassifolius	pipestems (virgin's bower)
Rhamnaceae	Buckthorn Family
Ceanothus crassifolius	hoary-leaf ceanothus (thick-leaved ceanothus)
Rhamnus ilicifolia	holly-leaf redberry
Rosaceae	Rose Family
Heteromeles arbutifolia	toyon (Christmas-berry, California holly)
Prunus ilicifolia	hollyleaf cherry
Rubiaceae	Madder Family
Galium angustifolium	narrow-leaved bedstraw
Galium nuttallii	climbing bedstraw
Saliceae	Willow Family
Populus fremontii	Fremont cottonwood
Salix exigua	narrow-leaved willow (sandbar willow)
Salix gooddingii	black willow (Goodding's black willow)
Salix laevigata	red willow
Scrophulariaceae	Figwort Family
Antirrhinum coulterianum	white snapdragon
Keckiella antirrhinoides	yellow bush penstemon (yellow keckiella)
Keckiella cordifolia	heart-leaved penstemon
Mimulus aurantiacus	bush monkey flower
Penstemon centranthifolius	scarlet bugler
Penstemon sp.	penstemon
Scrophularia californica	California figwort (bee plant)
Veronica anagalis-aquatica	great water speedwell

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Solanaceae	Nightshade Family
Datura wrightii	sacred datura (false jimson weed)
*Nicotiana glauca**	tree tobacco
*Solanum nigrum**	black nightshade
Sterculiaceae	Cacao Family
Fremontodendron californicum	flannelbush
Tamaricaceae	Tamarisk Family
*Tamarix ramosissima**	Mediterranean tamarisk
Urticaceae	Nettle Family
Urtica dioica ssp. holosericea	hoary nettle
ANGIOSPERMAE	**(MONOCOTYLEDONS)**
Agavaceae	Agave Family
Yucca whipplei	our lord's candle (chaparral yucca, Spanish bayonet)
Arecaceae	Palm Family
*Phoenix canariensis**	Canary Island date palm
*Washingtonia robusta**	California fan palm
Cyperaceae	Sedge Family
Carex sp.	sedge
Cyperus involucratus	umbrella sedge
Scirpus sp.	bulrush
Juncaceae	Rush Family
Juncus acutus	spiny rush
Juncus sp.	rush
Liliaceae	Lily Family
Bloomeria crocea	golden stars
Poaceae	Grass Family
*Agrostis stolonifera**	creeping bentgrass
*Avena barbata**	slender oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess (soft brome)
*Bromus madritensis ssp. rubens**	red brome (foxtail chess)
*Bromus tectorum**	cheat grass (downy brome)
*Cynodon dactylon**	Bermuda grass
Distichlis spicata	salt grass
*Hordeum murinum**	foxtail barley
*Lamarkia aurea**	goldentop

TABLE 3.3-2 (continued)
PLANT SPECIES OBSERVED DURING FIELD SURVEYS

Scientific Name	Common Name
Poa secunda	perennial bluegrass (pine bluegrass)
*Polypogon monspeliensis**	rabbitfoot grass (annual beard grass)
*Schismus barbatus**	a'bu ma shi' (father of the earth)
Vulpia myuros (=Festuca myuros)*	rattail fescue
Typhaceae	Cattail Family
Typha angustifolia	narrow-leaved cattail

* Exotic plant species

SOURCE: Psomas, 2008

Pre-drawdown Plant Communities

The following plant communities occur within the study area and were present prior to the drawdown of the lake in 2005. The plant community acreages identified below are derived from field surveys recorded in Appendix C as shown in Figure 3.3-2.

Riversidean Sage Scrub

The Western Riverside County MSHCP (2003) describes Riversidean sage scrub as being dominated by a characteristic suite of low-statured, aromatic, drought deciduous shrub and subshrub plant species. Composition varies substantially depending on physical circumstances and the successional status of the habitat. Typical stands are fairly open and are generally dominated by California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), and red brome (*Bromus madritensis* ssp. *rubens*), each attaining at least 20 percent cover (Holland, 1986). Other common species typically found in Riversidean sage scrub include lemonadeberry (*Rhus integrifolia*), sugarbush (*Rhus ovata*), yellow bush penstemon (*Keckiella antirrhinoides*), Mexican elderberry (*Sambucus mexicana*), sweetbush (*Bebbia juncea*), boxthorn (*Lycium* spp.), tall prickly-pear (*Opuntia oricola*), and species of *Dudleya* (Riverside MSHCP, 2003). Riversidean sage scrub typically exists on steep slopes, severely drained soils, or clay soils that release stored soil moisture only slowly.

Within the biological survey area, Riversidean sage scrub was observed and mapped in numerous areas around Lake Perris. The characteristic plant species of the Riversidean sage scrub habitat found on the biological survey area include: California sagebrush, California buckwheat, annual bur ragweed (*Ambrosia acanthicarpa*), common California aster (*Corethrogyne filaginifolia* [*=Lessingia filaginifolia*]), ripgut brome (*Bromus diandrus*), red brome, and sticky monkeyflower (*Mimulus aurantiacus)*, among others. Approximately 594 acres of Riversidean sage scrub was mapped within the biological resources study area.

Several different sub-communities of Riversidean sage scrub are found at the study site with varying species compositions due to mechanical disturbance, fire regime, urban interface, and

climatic variation. Disturbed Riversidean sage scrub refers to areas that have been invaded by non-native species, or mechanically disturbed. Non-native shrubs, herbs and grasses such as bromes, prickly sow thistle (*Sonchus asper*), tree tobacco (*Nicotiana glauca*), and Russian thistle (*Salsola tragus*), among others were observed within this community, which was observed and mapped in small areas around Lake Perris. Burned Riversidean sage scrub, like disturbed Riversidean sage scrub, also contains large areas of bare ground, as well as California sagebrush, California buckwheat, and common California aster. However, non-native herbs and grasses such as bromes and tocalote (*Centaurea melitensis*) dominate this community. Approximately one acre of recently burned Riversidean sage scrub are found within the biological survey area. Riversidean sage scrub-California buckwheat dominated and Riversidean sage scrub-Brittlebush (*Encelia farinosa*) dominated habitats are similar in composition to Riversidean sage scrub, but exhibit a dominance of the species specified in their titles. Approximately 14 acres of Riversidean sage scrub-California buckwheat dominated habitat and seven acres of Riversidean sage scrub-Brittlebush dominated habitat were found within the biological survey area. The last two sub-communities feature the interface of Riversidean sage scrub with urban lands. Riversidean sage scrub/Urban is similar in composition to Riversidean sage scrub; however, it is within and/or surrounded by urban development, and lake and recreation facilities. This community is dominated by native plant species including California sagebrush, brittlebush, California buckwheat, and common California aster, with, non-native herbs and grasses such as bromes, tocalote, and other landscaped species. Approximately 19 acres of Riversidean sage scrub/Urban habitat are found within the biological survey area. Disturbed Riversidean sage scrub/Urban habitat observed and mapped within the proposed project area is similar in composition to Riversidean sage scrub/Urban habitat; however, it is more open with larger areas of bare ground, and has been invaded by non-native species and/or mechanically disturbed. Approximately 15 acres of disturbed Riversidean sage scrub/Urban habitat are found within the biological survey area.

Southern Willow Woodland and Scrub

Holland (1986) describes southern willow woodland and scrub as dense, broadleafed, winter-deciduous riparian thickets dominated by several willow species (*Salix* spp.) with scattered Fremont's cottonwood (*Populus fremontii*) and California sycamore (*Platanus racemosa*). According to the Western Riverside County MSHCP, southern willow woodland and scrub may also contain gooseberry (*Ribes* spp.) and elderberry. Most stands are too dense to allow much understory development.

Southern willow woodland and scrub is found in large areas around Lake Perris as a result of the lake edge and seepage below the dam. Approximately 78 acres of southern willow woodland and scrub were observed and mapped within the biological survey area. The characteristic plant species of the southern willow woodland and scrub habitat found within the study area include, Goodding's black willow (*Salix gooddingii*), red willow (*Salix laevigata*), narrow leaved willow (*Salix exigua*), mule fat (*Baccharis salicifolia*), tarragon (*Artemisia dracunculus*), curley dock (*Rumex crispus*), Fremont's cottonwood, and umbrella sedge (*Cyperus involucratus*). Where present in the southern willow woodland and scrub habitat, understory species included annual bur ragweed, southwestern spinyrush (*Juncus acutus*), and bromes (*Bromus diandrus, B.*

madritensis ssp. *rubens*). Areas of southern willow woodland and scrub grade into mule fat scrub and are designated as southern willow scrub/mule fat scrub.

Southern willow woodland and scrub is represented as a wetland plant community and likely falls under the jurisdiction of the Corps as an adjacent wetland to Lake Perris, pursuant to Section 404 of the Clean Water Act. The CDFG considers riparian habitats along rivers streams and lakes under their jurisdiction pursuant to Section 1602 of the California Fish and Game Code.

Freshwater Marsh

Holland describes freshwater marsh habitat as emergent wetlands dominated by perennial, emergent monocots four to five meters tall often forming a completely closed canopy. Freshwater marshes are found in quiet waters (lacking significant current), in permanently flooded areas with deep, peaty soils. The freshwater marsh community within the proposed project area occupies approximately 68 acres along the shore of Lake Perris. Narrow-leaved cattail (*Typha angustifolia*) is the dominant species found within this plant community along with bulrush (*Scirpus* sp.), southwestern spiny rush, willow (*Salix* sp.), willow herb (*Epilobium* sp.), and poison hemlock (*Conium maculatum*), among others. Approximately half of the freshwater marsh found on-site is considered disturbed freshwater marsh because it contains non-native shrubs, herbs and grasses including bromes, prickly sow thistle, tamarisk (*Tamarix ramosissima*), tree tobacco, and Russian thistle. Freshwater marsh and disturbed freshwater marsh composed of wetland plant associations likely fall within the jurisdiction of the Corps as adjacent wetlands to Lake Perris.

Coyote Brush Scrub

Coyote brush (*Baccharis pilularis*) is the sole or dominant shrub in the canopy of coyote brush scrub. The canopy tends to be continuous-to-intermittent with sparse ground cover. Although Holland (1986) does not recognize this coyote brush scrub habitat, this habitat type is persistent in California where coyote brush dominates the landscape. This plant association is a part of the coastal scrub series with plant species common to those observed and mapped within the Riversidean sage scrub habitat. Within the proposed project area, 13 acres of coyote brush scrub is found in the western and southwestern areas around Lake Perris. This habitat type is characterized in the proposed project area by coyote brush, mule fat, tarragon, sticky monkey flower, annual bur ragweed, and bromes.

Non-Native Grassland

Holland (1986) describes non-native grassland as a dense to sparse cover of annual grasses associated with numerous species of showy-flowered, native annual forbs (“wildflowers”), especially in years of abundant rainfall. Germination and growth of the annual grass and forbs species occurs with the onset of the late fall rains, with flowering and seed-set occurring from winter through spring. With a few exceptions, the plants are dead through the summer through the fall dry season, persisting as seeds. Soft chess (*Bromus hordeaceus*), wild oat (*Avena fatua*), and foxtail barley (*Hordeum murinum*) are the dominant grasses in this association with scattered mustard, sweet fennel (*Foeniculum vulgare*), California sagebrush, and California buckwheat among others that may be present.

There are approximately 347 acres of non-native grassland within the biological survey area. The characteristic plant species of the non-native grassland habitat found within the biological survey area include: bromes, tocalote, sweet fennel, wild oat, foxtail barley, and black mustard (*Brassica nigra*) among others. A small percentage (17 acres) of the non-native grassland has been burned to create habitat for the federally listed-endangered Stephens' kangaroo rat, known to occur within the area. This sub-community type is know as Burned non-native grassland and contains large areas of bare ground.

Eucalyptus Woodland

Eucalyptus trees (*Eucalyptus* spp.) are the sole or dominant trees in the canopy in this habitat type, with few other species present (Sawyer and Keeler-Wolf, 1995). Trees tend to have a continuous canopy and shrubs are infrequent with a sparse ground cover if any that is mostly covered in a thick layer of eucalyptus bark and leaf litter. Approximately one acre of eucalyptus woodland is found within the biological survey area. Eucalyptus trees dominate this habitat found within the proposed project area. In addition to eucalyptus trees, annual bur-sage, wild oats, and brome grasses were observed. An additional 27 acres of combined eucalyptus woodland/ disturbed Riversidean sage scrub occurs in the project area with a sparse eucalyptus cover with a higher density of California sagebrush, California buckwheat, common California aster, ripgut brome, and red brome.

Agriculture

Agriculture includes field areas laying either fallow or being actively used for agriculture practices. Approximately nine acres of agriculture were observed and mapped within the biological survey area north of Ramona Expressway west of Perris Lake Drive.

Open Water/Lake Perris

Open water/Lake Perris habitat includes the approximately 1862-acre man-made lake behind Perris Dam that has no defined surface water connection to downstream natural water courses. The lake is used primarily as a water supply reservoir, and also provides for recreational boating, hunting, fishing, and swimming purposes at varying usage levels throughout the year depending on the season. In accordance with the latest Rapanos Guidance memorandum, the Corps will continue to assert jurisdiction over traditional navigable waters (TNWs) and all wetlands adjacent to TNWs. While the Corps has not completed a formal traditional navigable waters (TNW) determination for Lake Perris, the Corps has confirmed it has been regulating dredge and fill activities at Lake Perris pursuant to Section 404 of the Clean Water Act and an applicant can concede jurisdiction under the preliminary jurisdictional determination option in the latest Rapanos Guidance memorandum. The Corps typically asserts regulatory jurisdiction over a water body that is not a TNW if that water body is "relatively permanent" (i.e., contains water year-round, or at least "seasonally," and also asserts jurisdiction over wetlands adjacent to such water bodies if the wetlands "directly abut" the water body (i.e., if the wetlands are not separated from the water body by an upland feature such as a berm, dike, or road).

The assumption of Corps regulatory for this project is based on the presence of a relatively permanent water, the recreational boating use of the lake (e.g. navigability), and the presumption of commercial purpose relating to navigation. The lake would also likely meet the interstate commerce nexus commonly applied to delineate isolated waters. The limits of Corps jurisdiction on Lake Perris are presumed to be the 1588 foot water surface level of the pre-drawdown lake level representing the Ordinary High Water Mark (OHWM). The lateral extent of Corps jurisdiction extends to the furthest limits of wetland habitat adjacent to the open water and that meets the three-parameter definition of a jurisdictional wetland. This again, is presumed to be the furthest extent of the willow riparian habitat along the northeastern portion of the lake, as well as willow riparian habitat occurring below the dam.

Unvegetated Sand and Rip Rap

Unvegetated sand describes the shoreline and beach areas around Lake Perris. Approximately 88 acres of mostly unvegetated sand were observed and mapped within the biological survey area. The sand areas tended to either be absent of any vegetation or very sparsely vegetated with both native and non-native plant species. Plant species identified within theses areas included small mule fat and willow saplings, heliotrope, scattered tamarisk, and brome grasses. Rip-rap describes the areas along the banks and shore of Lake Perris where un-grouted rip-rap has been placed for bank stabilization. Rip-rap is also found within one of the mule fat scrub plant communities mentioned above. Approximately 19 acres of rip-rap are found within the proposed project area. Sparse vegetation, between the rip-rap and boulders and along the lake edge includes mule fat and willow saplings, rushes, bromes, and heliotrope, among others.

Urban Areas

Urban areas describe land occupied by structures, paving and other impermeable surfaces, and/or areas where landscaping has been installed and is maintained. Within the proposed project area, urban areas are active recreation areas for camping facilities, boat docks and launch ramps, parking lots, and surrounding residences. Approximately 498 acres of urban areas were mapped within the study area.

Drawdown Plant Communities

The following is a description of plant communities that have colonized the exposed lakebed following the 2005 emergency drawdown. These terrestrial plant communities composed of pioneer species did not exist before the 2005 emergency drawdown as the land was submerged below the normal operational level of the 1588-foot elevation lake. They are described below in order to provide the reader with an understanding of current conditions and for the analysis of effects resulting from the drawdown and planned refilling.

Mule fat Scrub

Holland (1986) and Sawyer and Keeler-Wolf (2006) describe mule fat scrub as a, tall, herbaceous riparian scrub habitat dominated by mule fat with arroyo willow and/or narrowleaf willow, sedges (*Carex* spp.) and stinging nettle (*Urtica dioica*) occurring as associates in variable densities. Mule fat scrub is widely scattered along intermittent streams and in the upper floodplain areas of larger rivers in southern California.

There are approximately 47 acres of mule fat scrub within the proposed project area characterized by mule fat, Goodding's black willow, red willow, rushes (*Juncus* spp.), narrow-leaved cattail, tarragon, sticky monkey flower, and seep-spring monkey flower (*Mimulus guttatus*). Other species present in the community include annual bur ragweed, stinging nettle, and brome grasses. After the emergency drawdown, some areas of mule fat scrub now intermix with rip-rap around the shore areas of Lake Perris and are designated as mule fat scrub/rip rap. Seven acres of mule fat scrub have become interspersed with freshwater marsh (described above) and are designated mule fat scrub/freshwater marsh.

Heliotrope Scrub/Sandbar

Sawyer and Keeler-Wolf (1995) and Holland (1986) do not describe the Heliotrope Scrub/Sandbar habitat in their classification systems. However, this habitat type is generally persistent in California where alkali heliotrope (*Heliotropium curassavicum*) colonizes recently exposed/disturbed areas such as sandbar and lake shore areas. Approximately eight acres of heliotrope scrub/sandbar are mapped within the biological survey area characterized by alkali heliotrope, mule fat, mugwort (*Artemisia douglasiana*), and brome grasses. The recently colonized lake bottom also supports a heliotrope scrub/tamarisk scrub/sandbar subcommunity that has a higher dominance of tamarisk along with mule fat, mugwort, and brome grasses. Approximately 134 acres of heliotrope scrub/tamarisk scrub/sandbar are found within the study area.

Ruderal

Ruderal refers to those areas where vegetation has been affected by human activities resulting in a dominance of mostly weedy annual plant species such as brome grasses, mustards (*Brassica* and *Sisymbrium* spp.), filaree (*Erodium* spp.), and tocalote. Approximately 10 acres of ruderal vegetation were observed and mapped within the biological survey area.

3.3.4 Wildlife

The plant communities described above form the basis of the wildlife habitats within the study area that provide food and water sources upon which wildlife depend, along with nesting and denning sites, escape and movement cover, and protection from adverse weather. Some species are habitat specific for all their life history requirements, while many wildlife species that occur in the area move freely between plant communities to obtain all their life history needs. A list of avian wildlife species observed during 2007 biological resources surveys is provided as **Table 3.3-3**. **Table 3.3-4** lists all wildlife species observed at Lake Perris by Psomas biological resources surveys and observations obtained from the Department of Parks and Recreation.

The habitats within the project site support a diverse array of terrestrial and aquatic wildlife species. Waterfowl and waterbirds such as the western grebe (*Aechmorphorus clarkii*), great blue heron (*Ardea herodias*), and mallard (*Anas platyrhnchos*) roost and feed on Lake Perris and in the freshwater marsh and shoreline habitats found along the lake edge. Ospreys (*Pandion haliaetus)* and terns (*Sterna* spp.) can be observed over the lake foraging. Open water and shoreline habitats are also utilized by violet-green (*Tachycineta thalassina*), cliff (*Petrochelidon pyrrhonota*) and barn swallows (*Hirundo rustica*), as well as various species of bats which feed on insects found above the water surface.

TABLE 3.3-3
AVIAN SPECIES OBSERVED DURING 2007 FIELD SURVEYS AT LAKE PERRIS

Scientific name	Common name	Area				
		Irrigated Riparian	Riparian Below Dam	Bernasconi Hills	Open Water and Shoreline	RSS[a], NNG[b]
Ardea herodias	great blue heron	X			X	
Cathartes aura	turkey vulture	X		X		X
Pandion haliaetus	osprey	X			X	
Accipiter cooperii	cooper's hawk	X	X			
Buteo jamaicensis	red tailed hawk	X	X	X		X
Falco sparverius	American kestrel	X	X	X	X	X
Hydroprogne caspia	Caspian tern					
Callipepla californica	California quail	X		X		X
Zenaida macroura	mourning dove	X	X	X	X	X
Geococcyx californianus	greater roadrunner			X		X
Aeronautes saxatalis	white-throated swift			X	X	
Calypte anna	Anna's hummingbird	X	X	X		X
Picoides nuttallii	Nuttall's woodpecker	X	X			
Empidonax traillii extimus	southwestern willow flycatcher					
Sayornis nigricans	black phoebe	X				
Myiarchus cinerascens	ash-throated flycatcher	X	X			
Tyrannus verticalis	western kingbird	X				X
Vireo bellii pusillus	least Bell's vireo	X	X			
Corvus corax	raven	X	X	X	X	X
Tachycineta thalassina	violet-green swallow	X			X	X
Petrochelidon pyrrhonota	cliff swallow	X			X	X
Hirundo rustica	barn swallow	X	X		X	X
Psaltriparus minimus	bushtit	X	X			
Troglodytes aedon	house wren	X				
Salpinctes obsoletus	rock wren			X		
Pipilo crissalis	California towhee	X	X	X		X
Pipilo maculatus	spotted towhee	X	X			X
Melospiza melodia	song sparrow	X	X			X
Saltator atriceps	black-headed grosbeak	X	X			
Passerina caerulea	blue grosbeak	X	X			
Molothrus ater	brown-headed cowbird	X				X
Icterus bullockii	Bullock's oriole	X	X			
Carpodacus mexicanus	house finch	X	X			X
Carduelis psaltria	lesser goldfinch	X	X			X

[a] RSS – Riversidean sage scrub
[b] NNG – Non-native grassland

SOURCE: Psomas, 2008; ESA, 2007

TABLE 3.3-4
SPECIES OBSERVED AT LAKE PERRIS SRA

Scientific name	Common name
Amphibians	
Bufo boreas	western toad
Reptiles	
Aspidoscelis tigris stejnegeri	coastal whiptail (cocastal western whiptail)
Crotalus rubber rubber	red-diamond rattlesnake
Crotalus oreganus (=Crotalus viridis)	western rattlesnake
Lampropeltis getula	common kingsnake
Masticophis lateralis	California whipsnake (striped racer)
Pituophis catenifer	gopher snake
Sceloporus magister	desert spiny lizard
Sceloporus occidentalis	western fence lizard
Sceloporus orcutti	granite spiny lizard
Trachemys scripta	pond slider (exotic)
Uta stansburiana	common side-blotched lizard
Birds	
Accipiter cooperii	Cooper's hawk
Aechmophorus occidentalis	western grebe
Aeronautes saxatalis	white-throated swift
Agelaius phoeniceus	red-winged blackbird
Anas americana	American wigeon
Anas clypeata	northern shoveler
Anas platyrhunchos	mallard
Anas sp.	teal
Ardea herodias	great blue heron
Ardea alba	great egret
Athene cunicularia	burrowing owl
Aythya collaris	ring-necked duck
Bubo virginianus	great horned owl
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
Callipepla californica	California quail
Calypte anna	Anna's hummingbird
Carduelis psaltria	lesser goldfinch
Carpodacus mexicanus	house finch
Cathartes aura	turkey vulture
Catherpes mexicanus	canyon wren
Chamaea fasciata	wrentit
Charadrius vociferous	killdeer

TABLE 3.3-4 (continued)
SPECIES OBSERVED AT LAKE PERRIS SRA

Scientific name	Common name
Birds (cont.)	
Circus cyaneus	northern harrier
Colaptes auratus	northern flicker
Columba livia	rock pigeon
Corvus brachyrhynchos	American crow
Corvus corax	common raven
Dendroica coronata	yellow-rumped warbler
Egretta thula	snowy egret
Elanus leucurus	white-tailed kite
Empidonax traillii extimus	southwestern willow flycatcher
Falco peregrinus anatum	American peregrine falcon
Falco sparverius	American kestrel
Fulica americana	American coot
Geococcyx californianus	greater roadrunner
Geothlypis trichas	common yellowthroat
Himantopus mexicanus	black-necked stilt
Hirundo rusticca	barn swallow
Hydroprogne caspia	Caspian tern
Icterus bullockii	Bullock's oriole
Junco hyemalis	dark-eyed junco
Lanius ludovicianus	loggerhead shrike
Larus delawarensis	ring-billed gull
Larus occidentalis	western gull
Limnodromus sp.	Dowitcher
Megaceryle alcyon	belted kingfisher
Melospiza melodia	song sparrow
Mimus polyglottos	mockingbird
Molothrus ater	brown-headed cowbird
Myiarchus cinerascens	ash-throated flycatcher
Nycticorax nycticorax	black-crowned night heron
Oxyura jamaicensis	ruddy duck
Pandion haliaetus	osprey
Passer domesticus	house sparrow
Passerina caerulea	blue grosbeak
Pelecanus erythrorhynchos	American white pelican
Petrochelidon pyrrhonota	cliff swallow
Phainopepla nitens	phainopepla
Pheucticus melanocephalus	black-headed grosbeak
Picoides nuttallii	Nuttall's woodpecker

TABLE 3.3-4 (continued)
SPECIES OBSERVED AT LAKE PERRIS SRA

Scientific name	Common name
Birds (cont.)	
Pipilo crissalis	California towhee
Pipilo maculates	spotted towhee
Plegadis chihi	white-faced ibis
Podilymbus podiceps	pied-billed grebe
Polioptila caerulea	blue-gray gnatcatcher
Psaltriparus minimus	bushtit
Recurvirostra americana	American avocet
Salpinctes obsoletus	rock wren
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Stelgidopteryx serripennis	northern rough-winged swallow
Sterna forsteri	Forster's tern
Sturnella neglecta	westerm meadowlark
Sturnus vulgaris	starling
Tachycineta thalassina	violet-green swallow
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
Tyrannus Verticalis	western kingbird
Tyrannus vociferans	Cassin's kingbird
Tyto alba	barn owl
Vireo bellii pusillus	least Bell's vireo
Xanthocephalus xanthocephalus	yellow-headed blackbird
Zenaida macroura	mourning dove
Zonotrichia leucophrys	white-crowned sparrow
Mammals	
Canis latrans	coyote
Chaetodipus fallax fallax	northwestern San Diego pocket mouse
Dipodomys simulans	San Diego kangaroo rat (Dulzura kangaroo rat)
Lepus californicus	black-tailed jackrabbit
Lepus californicus bennettii	San Diego black-tailed jackrabbit
Lynx rufus	bobcat
Mephitis mephitis	stripped skunk
Mustela frenata	long-tailed weasel
Myotis spp.	bats
Odocoileus hemionus	mule deer (black-tailed deer)
*Perognathus longimembris brevinasus***	Los Angeles pocket mouse
Peromyscus boylii	brush mouse
Peromyscus maniculatus	deer mouse (North American deermouse)

TABLE 3.3-4 (continued)
SPECIES OBSERVED AT LAKE PERRIS SRA

Scientific name	Common name
Mammals (cont.)	
Pipistrellus hesperus	western pipistrelle
Procyon lotor	raccoon
*Dipodomys stephensi***	Stephens' kangaroo rat
Puma concolor	mountain lion
Spermophilus sp.	ground squirrel sp.
Spermophilus beecheyi	California ground squirrel
Sylvilagus audubonii	Audubon's cottontail (desert cottontail)
Thomomys bottae	Botta's pocket gopher

SOURCE: Species occurrence information obtained from Ken Kietzer, District Environmental Scientist, Department of Parks and Recreation and Psomas field surveys.
** Species occurrence information obtained from Riverside County RCA and Psomas

Shoreline habitats also support habitat generalists such as the mourning dove (*Zenaida macroura*), Anna's hummingbird (*Calypte anna*), common raven (*Corvus corax*), and California kingsnake (*Lampropeltis getula*). Mammals including raccoons (*Procyon lotor*), black-tailed deer (*Odocoileus hemionus*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), and bobcat (*Lynx rufus*) use the lake as a water and/or food source.

Riparian areas surrounding the lake edge and below the dam support a number of perching bird species including the ash-throated flycatcher (*Myiarchus cicerascens*), western kingbird (*Tyrannus verticalis*), least Bell's vireo, house wren (*Troglodytes aedon*), California towhee (*Pipilo crissalis*), spotted towhee (*Pipilo maculates*), black-headed grosbeak (*Saltator atriceps*), blue grosbeak (*Passerina caerulea*), song sparrow (*Melospiza melodia*), Bullock's oriole (*Icterus bullockii*), house finch (*Carpodacus mexicanus*) and lesser goldfinch (*Carduelis psaltria*). These species are adapted to cover provided by the willow trees, and forage in branches and along the floor for insects, seeds, and other food sources. Nuttal's woodpecker (*Pipicoides nuttallii*), red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and Cooper's hawk (*Accipiter cooperii*) are also found using the riparian habitat. Cottontail rabbits (*Sylvilagus audubonii*), black-tailed jackrabbits (*Lepus californicus*), raccoons, and long-tailed weasels (*Mustela frenata*) also inhabit wooded areas provided by southern willow woodland and scrub.

The sage scrub and chaparral habitats in the Bernasconi Hills support wildlife species adapted to drier and more open habitats including the California quail (*Callipepla californica*), greater roadrunner (*Geococcyx californianus*), white-throated swift (*Aeronautes saxatalis*), rock wren (*Salpinctes obsoletus*) and California towhee. Reptile species observed in this habitat include western fence lizards (*Sceloporus occidentalis*), gopher snakes (*Pituophis catenifer*), red diamond rattlesnake (*Crotalus rubber*), southern pacific rattlesnake (*Crotalus viridis helleri*), side blotched lizard (*Uta stansburiana*), granite spiny lizard (*Sceloporus orcutti*) and coastal western whiptail

(*Cnemidophorus tigris*). Mammals found on-site include the San Diego black-tailed jackrabbit, bobcat, coyote and a number of rodents.

Grassland species observed on-site include the California quail, mourning dove, white-throated swift (*Aeronautes saxatalis*), Anna's hummingbird, western kingbird, towhees, brown-headed cowbird (*Molothrus ater*) and finches. The Lake Perris SRA employs a cowbird trapping program to reduce the adverse effects from this nest parasite. Red-tailed hawks, American kestrels (*Falco sparverius*) and loggerhead shrikes (*Lanius ludovicianus*) also utilize grassland habitats as foraging grounds. Grasslands also support a number of reptiles such as the western whiptail and western fence lizard. Mammals found in grassland habitats include coyotes and a number of ground dwelling mammals such as ground squirrels (*Spermophilus spp.*), pocket gophers (*Thomomys bottae*), and kangaroo rats.

In addition to the plant communities of the biological survey area, the quarry offers a unique unvegetated habitat that potentially can be used by bats. The quarry was surveyed on two separate occasions for bat use (see Table 3.3-6), between four and 10 bats were observed flying in the vicinity of the quarry. No bat guano or rock staining from bats and no areas of whitewash or old bird nests were found, suggesting that predators can reach most areas of the quarry. Climbing predators such as raccoons, weasels and snakes could reach most locations on the rough sloping surfaces. There are very few natural cracks or fissures in the rock faces.

Fisheries

Lake Perris is currently stocked and managed as a recreational fishery supporting almost exclusively non-native warm-water fishes. Common fish species in the lake include largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), bluegill (*Lepomis macrochirus*), spotted bass (*Micropterus punctulatus*), flathead catfish (*Pylodictis olivaris*), green sunfish (*Lepomis cyanellus*), redear sunfish (*Lepomis microlophus*), and black crappie (*Pomoxis nigromaculatus*) (Podlech, 2007)). The CDFG plants rainbow trout (*Oncorhynchus mykiss*) in Lake Perris from October through May. Because rainbow trout require lower temperatures and flowing water for reproduction, it is stocked yearly as it does not reproduce in the lake. Warm-water fishes such as the largemouth bass and bluegill are found on the surface layers of the lake where emergent vegetation, algae and invertebrates provide food and shelter. Coldwater fishes, like the rainbow trout, are found in deeper sections of the lake where temperatures are lower. Brief life history summaries for the three most abundant shallow water fish species in Lake Perris are provided below.

Largemouth bass

Largemouth bass spawning occurs in the spring when water temperatures reach about 60°F. Males build the nests in two to eight feet of water and prefer to nest in quieter, more vegetated water, but will use any substrate besides soft mud, including submerged logs. Once the female has laid eggs in the nest (2,000 to 43,000) she is chased away by the male who then guards the eggs. The young, called fry, hatch in five to 10 days and remain in a group or "school" near the nest and under the male's watch for several days after hatching. Juvenile largemouth bass may continue to congregate in schools, but adults are usually solitary. Largemouth bass hide among

plants, roots or submerged limbs to strike their prey. Fry feed primarily on zooplankton and insect larvae. At about two inches in length they become active predators. Adults feed almost exclusively on other fish including bass and large invertebrates such as crayfish.

Bluegill

Bluegills begin spawning when water temperatures reach about 70°F. Spawning may peak in May or June, but continues until water temperatures cool in the fall. Because of their long spawning season, bluegills have very high reproductive potential, which often results in overpopulation in the face of low predation or low fishing pressure. Nests are created in shallow water, one to two feet in depth, primarily in gravel substrates. Fifty or more nests may be crowded into a small area, thus creating a spawning bed. Males guard the nest until the eggs hatch and fry leave. Young fish feed on plankton, but as they grow the adult diet shifts to aquatic insects and other aquatic larvae.

Redear sunfish

Redear sunfish spawn during the warm months of late spring and early summer, and in deeper water than most other sunfish, congregating in spawning beds. Nests are saucer-shaped depressions in gravel or silt, and are sometimes so close they almost touch. There are usually one or two peaks of activity during the spawning season. Redear sunfish feed primarily on snails as a major food item, although insect larvae may also be found in their diet. The species is usually found near the bottom in warm water with little current and abundant aquatic vegetation.

Waterfowl

The open water of Lake Perris and surrounding freshwater marsh provides roosting, resting and feeding habitat for waterfowl. Although used by waterfowl in the summer by species such as mallards and western grebes, Lake Perris is most heavily utilized in the winter by migratory ducks and geese, including wigeons (*Anas americana*), pintails (*Anas acuta*), gadwalls (*Anas strepera*), green-winged teals (*Anas crecca*), shovelers (*Anas clypeata*), and Canada geese (*Branta Canadensis*). Lake Perris is located within the Pacific Flyway, a large north-south migratory route extending between South America and parts of Canada and Alaska. No available estimates of number of waterfowl were available for Lake Perris itself, and surveys were not conducted over the winter when large numbers of waterfowl were present. **Table 3.3-5** shows the average number of waterfowl per species observed in the Audubon Society's San Jacinto Christmas Bird Count Circle over a 10-year period. The count circle is 15 miles in diameter and encompasses Lake Perris. The other large water source within the count circle radius is Mystic Lake, which though smaller than Lake Perris, similarly supports a large number of waterfowl in the winter. Lake Perris supports perhaps slightly more than half the number of waterfowl listed in Table 3.3-5.

3.3.5 Special-Status Species

Special-status plant and wildlife species include those listed as threatened, endangered, rare, or proposed/candidate species as threatened or endangered by the USFWS or CDFG. In addition, special-status species include California Special Concern Species as shown on the CDFG lists of special plants and animals, and California Native Plant Society (CNPS) listed plants. A special-

TABLE 3.3-5
AUDUBON CHRISTMAS COUNT WATERFOWL AND WATERBIRDS IN THE LAKE PERRIS/ SAN JACINTO AREA

	Count per Year[a,b]											
Species	**97**	**98**	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**Average**
Canada Goose	80	297	296	213	208	180	171	440	316	571	259	337
Gadwall	940	632	368	411	128	195	340	740	355	143	332	509
American Wigeon	16255	14385	13187	9138	7765	1873	5102	8631	1372	6485	3053	9694
Mallard	845	608	369	745	511	388	438	168	315	242	321	550
Cinnamon Teal	171	206	60	72	100	116	33	11	468	45	116	155
Northern Shoveler	3247	2342	6308	13030	3941	5059	1573	6768	3043	2507	8094	6212
Northern Pintail	2076	1003	1175	1211	7560	744	1110	681	4551	952	890	2439
American Green-winged Teal	2251	964	1167	3091	4010	1874	1392	1268	741	544	1845	2127
Canvasback	55	53	44	129	71	175	481	119	89	147	157	169
Ring-necked Duck	258	366	87	222	578	205	473	695	84	63	150	353
Lesser Scaup	509	453	275	106	128	189	176	134	24	93	33	236
Bufflehead	85	83	244	30	220	136	138	88	70	113	150	151
Ruddy Duck	2453	1692	1476	2560	1243	4375	1695	1298	4448	1567	2087	2766
Eared Grebe	1544	342	411	183	619	374	285	303	662	159	181	563
Western Grebe	346	216	1150	255	250	601	204	1600	869	520	147	684
American White Pelican	821		227	18	30	3	38	3	13	169	6	148
Double-crested Cormorant	198	46	234	103	152	35	127	54	114	18	35	124
Cattle Egret	644	251	67	432	164	267	71	162	52	168	2	253
White-faced Ibis		28	3	240	256	117	334	348	234	143	283	221
Red-tailed Hawk	145	126	93	107	101	117	90	117	140	92	175	145
American Coot	4738	5385	3590	3635	3329	7022	3445	4190	4855	2894	3888	5219
Killdeer	232	645	240	325	405	154	239	120	83	115	94	295
Black-necked Stilt	211	444	262	480	370	540	292	317	398	330	299	438
American Avocet	60	156	121	442	211	231	107	41	145	65	129	190
Least Sandpiper	917	211	350	1865	436	282	320	481	655	386	312	691
Long-billed Dowitcher	798	482	2625	2057	379	234	690	319	1984	390	611	1174
Bonaparte's Gull	379	410	131	650	100	1	566	51	163	70		280
Ring-billed Gull	2060	1803	1728	1167	1060	1670	1912	450	2491	1791	1884	2002
California Gull	633	1754	1632	1299	2147	2322	1860	2800	536	1490	3684	2240
gull sp.	150	68	1900							172	76	263

[a] Count for year 97 was conducted in Dec. 1996, count for year 98 was conducted in Dec. 1997, and so on. Only species with 100 individuals or more are shown.
[b] No data was taken for count year 99.

status species is considered to potentially occur in the project area if its known geographic range includes part of or is in the near vicinity of the project area and/or if the general habitat requirements or environmental conditions (e.g., soil type, etc.) required for the species are present within the project area. The potential for special-status species to occur was evaluated on a habitat basis for the project site, by incorporating the results of prior surveys, and using the reconnaissance-level surveys conducted by Psomas in 2007 (**Table 3.3-6**). As stated in the Methods Section of this report, protocol surveys conducted by Psomas included least Bell's vireo, California coastal gnatcatcher, and Los Angeles pocket mouse.

TABLE 3.3-6
SURVEYS CONDUCTED AT LAKE PERRIS

Survey Target Species	Date Conducted
Stephens' kangaroo rat	August 7 through August 17, 2006 and November 1 through November 8, 2006[a]
	June 15 through June 20, 2008
Common plants and wildlife, and habitat areas	May 9, May 30, June 5, June 12, June 14, June 26, August 1, August 26, September 2, and September 20, 2007
Southwestern willow flycatcher	May 31, June 7, June 21, June 28 and July 11, 2007
	May 31, June 9, June 23, July 2, and July 11, 2008
Least Bell's vireo	May 31, June 7, June 14, June 21, June 27, July 5, July 12, July 18, and July 26, 2007
	April 17, April 18, April 29, May 2, May 12, May 16, May 30, June2, June 9, June 13, June 23, June 24, July 3, July 8, July 14, and July 18, 2008
	April 10, 13, 20, 23, May 1, 4, 11, 14, 21, 26, June 1, 9, 11, 15, 22, and 25, 2009
California gnatcatcher	July 5, July 12, July 18, July 26, August 1, August 17, September 10, September 28, October 11, October 24, and November 8, 2007
	April 17, April 24, May 2, May 10, May 16, and May 23, 2008
Bat assessment	August 1 and September 2, 2007
Los Angeles pocket mouse	September 24 through September 29, 2007
Rare Plant Surveys	April 29 and June 2, 2008

[a] **Surveys conducted by Riverside County RCA**

SOURCE: Psomas, 2008

During the field surveys, the potential for species listed in **Table 3.3-7** to occur within the proposed project area was assessed. The potential for any of the assessed species to occur within the SRA outside of the surveyed area is outside the scope of this analysis. The potential for any species to occur was rated as low, moderate, or high based on the following criteria:

- *No Potential to Occur*: Species with no potential for occurrence are those for which the proposed project area is not within or near the boundary of the known range of the species and for which there is no suitable habitat to support the species.

- *Low Potential to Occur*: Species with a low potential for occurrence are those for which the proposed project area is on the boundary of the known range of the species, or those for which the proposed project area is within the boundary of the known range of the species and for which suitable habitat in the proposed project area is not known to be used by the species, or for which there are no known recorded occurrences of the species within or adjacent to the proposed project area.
- *Moderate Potential to Occur*: Species with a moderate potential for occurrence are those for which habitat is present, the proposed project is within the known range of the species, and one or more surveys did not detect the species. No nearby occurrences are known. Failure to detect the species is not definitive, and may be due to variable effects associated with fire, rainfall patterns and/or time of year.
- *High Potential to Occur*: Species with a high potential for occurrence are those for which habitat is present, the proposed project is within the known range of the species, and the species has been observed in similar habitat in the region by a qualified biologist.
- *Known to Occur*: Species with previously recorded occurrences within the project area and/or observed during field surveys.

Special-Status Plants

Table 3.3-7 summarizes results and conclusions from the field surveys and the literature review with regard to the potential for the occurrence of listed, candidate, state rare, or CNPS tracked plant species within the study area. A standard in the professional practice of botany is to conclude species absence only after sufficient review of the literature and appropriately timed field surveys including but not limited to:

- Where the species is detectable without flowers or fruits (e.g., perennial shrubs with distinctive vegetative features).
- Suitable habitat is clearly absent such as the lack of a specific soil type required by a species.
- Seasonally appropriate surveys conducted during years of adequate rainfall or surveys over several years have not detected the species.

In general and outside of these limited cases, even with field surveys, botanists assess probability of occurrence rather than make a definitive conclusion about species presence or absence. Failure to detect the presence of the species is not definitive, and may be due to variable effects associated with fire, rainfall patterns, and/or season.

The timing of the field surveys for the Lake Perris project was considered suitable for the identification of most, but not all potential special-status plant species. Conducting the field surveys in the late spring and summer decreased the detection of fall, winter and early spring blooming plant species. There were a number of plants in bloom, but there were also a number of plants not yet in bloom and a number of plants that had already bloomed and gone to seed. Therefore, an effort was made to determine presence or absence of potentially suitable habitat for those plants that could not be identified at that time. A complete list of plant species observed during biological resources surveys is provided in Table 3.3-2.

Listed Endangered, Threatened, Candidate and State Rare Plant Species

No plant species listed as endangered, threatened, candidate, or state rare pursuant to the federal or state Endangered Species Act were observed on the biological survey area during the field surveys. No plant species designated as a CDFG special plant, tracked by the CNPS, or locally important were observed within the proposed project area during the field surveys. However, because of the time of year in which the surveys took place, a habitat assessment was performed for potentially suitable habitat conditions to support special-status plant species, especially for annual species that appear above ground in a vegetative stage earlier or later in the year. As a result of the field surveys and the literature review, it was concluded that no listed plant species have more than a low potential to exist on or adjacent to the proposed project site (**Table 3.3-7**).

Special-Status Wildlife

Table 3.3-7 summarizes the results and conclusions from the literature review and field surveys regarding the potential for occurrence of special-status wildlife species within the study area. A standard in the professional practice of wildlife biology is to conclude species absence only after sufficient review of the literature, appropriately timed field surveys, or implementation of agency approved species-specific survey protocols that includes but is not limited to:

- Where the species known range and historic range is over 25 miles from the proposed project site.
- Suitable habitat is clearly absent.
- Seasonally appropriate and/or protocol surveys have been conducted, or surveys over several years have not detected the species.

In general and outside of these limited cases, even with field surveys, wildlife biologists assess probability of occurrence rather than make definitive conclusions about species presence or absence. Failure to detect the species is not definitive, and may be due to variable effects associated with fire, rainfall patterns and/or season.

During the field surveys, many species of wildlife that could potentially utilize the proposed project site may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. A single day survey cannot be used to conclusively determine absence except when potentially suitable habitat can be determined to be absent. However, the potential for the site to provide suitable habitat for special-status species was evaluated.

TABLE 3.3-7
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Listed Endangered, Threatened, Candidate and State Rare Plants						
Ambrosia pumila	dwarf burr ambrosia (San Diego ambrosia)	FE, CNPS:1B.1	San Diego ambrosia occurs in open habitats such as chaparral and coastal sage scrub in coarse substrates near drainages, and in upland areas on clay slopes or on the dry margins of vernal pools. This species occurs in a variety of associations that are dominated by sparse grasslands or marginal wetland habitats such as river terraces, pools, and alkali playas. In Riverside County, San Diego ambrosia is associated with open, gently-sloped grasslands and is generally associated with alkaline soils. Blooming period: Apr – Oct.	San Diego ambrosia is distributed from western Riverside County and western San Diego County, California south in widely scattered populations along the west coast of Baja California, Mexico. The majority of the California populations occur in San Diego County, where approximately 11 distinct populations have been reported along with two transplanted populations. San Diego ambrosia generally occurs at low elevations generally less than 1600 feet in the Riverside populations and less than 600 feet in San Diego County.	Covered (b)	**No potential to occur.** The Biological Survey Area lacks suitable soils and substrates to support this species. This species is also not known to occur within the LPSRA or the immediate region. Not observed during Psomas 2008 Rare Plant Surveys.
Berberis nevinii	Nevin's barberry	FE, SE, CNPS:1B.1	Grows in alluvial scrub community on sandy and gravelly substrates along the margins of dry washes. In the chaparral community, it grows on steep, north-facing slopes with coarse soils and rocky slopes. It has also been found in cismontane woodlands, riparian scrub, and coastal sage scrub. Occurs in wetlands in another region, but occurs almost always under natural conditions in non wetlands in California. Blooming period: Mar – Apr.	Nevin's barberry is endemic to southwestern cismontane southern California. It occurs in restricted localized populations from the interior foothills of the San Gabriel Mountains of Los Angeles County and San Bernardino County southeast to near the foothills of the Agua Tibia Mountains of southwestern Riverside County. Scattered naturalized populations have been established outside this range in San Diego County. Elevational range: 970 – 2700 feet MSL.	Covered (b, d)	**Low potential to occur.** Potentially suitable habitats and substrates are present within the Biological Survey Area. This species was not observed. Another species of barberry, Fremont's barberry (Berbis fremontii) was observed during the surveys. Nevin's barberry is not known to occur within the LPSRA or the immediate region. Not observed during Psomas 2008 Rare Plant Surveys.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Atriplex coronata var. notatior	San Jacinto Valley crownscale	FE, CNPS:1B.1	San Jacinto Valley crownscale occurs primarily in floodplains (seasonal wetlands) on moist, alkaline soils dominated by alkali chenopod scrub, alkali playas, vernal pools, and, to a lesser extent, alkali grasslands. Blooming period: Apr – Aug.	This species is restricted to the San Jacinto Valley, Perris Valley, Elsinore Valley and Menifee Valley of western Riverside County. The majority of known occurrences are in the vicinity of Hemet on white-clay soils along the San Jacinto River and Old Salt Creek tributary drainages. Elevational range: 455 – 1640 feet MSL.	Covered (a, d)	**Low potential to occur.** The Biological Survey Area lacks suitable floodplains habitat and suitable alkaline soils to support this species. Not observed during Psomas 2008 Rare Plant Surveys.
Navarretia fossalis	Moran's navarretia (spreading navarretia)	FT, CNPS:1B.1	The primary habitat for this species is vernal pools and depressions and ditches in areas that once supported vernal pools in saline-alkaline soils. It can also be found in artificial roadside ditches. It has been found in alkaline or saline scrubs (chenopod scrub) and playas, shallow freshwater marshes and swamps. Occurs almost always under natural conditions in wetlands. Blooming period: Apr – Jun.	Fewer than 30 occurrences exist throughout its range in Los Angeles, Riverside and San Diego counties to Baja California, Mexico. Most populations occur in three locations: on Otay Mesa, southwestern San Diego County; along the San Jacinto River in western Riverside County; and near Hemet also in Riverside County. Elevational range: 98 – 4265 feet MSL.	Covered (a, b)	**Low potential to occur.** The Biological Survey Area lacks appropriate vernal pools habitat and saline-alkaline soils to support this species. Not observed during Psomas 2008 Rare Plant Surveys.
Allium munzii	Munz' onion	FE, ST, CNPS:1B.1	Munz's onion is found on mesic exposures or seasonally moist microsites in grassy openings in coastal sage scrub, chaparral, juniper woodland, cismontane woodland, valley and foothill grasslands in clay soils. Blooming period: Mar – May.	Fewer than 15 occurrences of Munz's onion remain. All are located in western Riverside County. Found from Corona through Temescal Canyon and along the Elsinore Fault Zone to the southwestern foothills of the San Jacinto Mountains. Elevational range: 984 – 3510 feet MSL.	Covered (b)	**Low potential to occur.** The Biological Survey Area does not contain suitable habitat and it lacks appropriate clay soils to support this species. However, this species is known to occur within the immediate region of the LPSRA. Not observed during Psomas 2008 Rare Plant Surveys.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Brodiaea filifolia	thread-leaved brodiaea (threadleaf clusterlily)	FT, SE, CNPS:1B.1	This species typically occurs on gentle hillsides, valleys, and floodplains in semi-alkaline mudflats, vernal pools, mesic southern needlegrass grassland, mixed native-nonnative grassland and alkali grassland plant communities in association with clay, loamy sand, or alkaline silty-clay soils. This plant grows on various substrates ranging from clay to fine sand. It occurs in open valley and foothill grasslands, at the edge of vernal pools, flood plains, playas and openings in chaparral, cismontane woodlands or coastal scrub. It is equally likely to occur in wetlands or non wetlands. Blooming period: Mar – Jun.	Thread-leaved brodiaea occurs in a few scattered localities within Los Angeles, Orange, western Riverside, and northwestern San Diego counties. Small populations of the species occur on Fish and Game's lands at the San Jacinto Wildlife Area in Riverside County and Carlsbad Highlands in San Diego County. A significant population occurs on The Nature Conservancy's Santa Rosa Plateau in western Riverside County and a small population occurs in Aliso-Wood Canyons Regional Park in Orange County. Elevational range: 82 – 2821 feet MSL.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area contains suitable grassland and coastal sage scrub habitats with suitable soils and substrates to support this plant. This species is also known to occur within the immediate region of the LPSRA. Not observed during Psomas 2008 Rare Plant Surveys.
Special-Status Plants						
Symphyotrichum defoliatum (=*Aster bernardinus*)	San Bernardino aster	CNPS:1B.2	Found in cismontane woodlands, coastal scrub, lower montane coniferous forests, meadows and seeps, marshes and swamps, and vernally mesic valley and foothill grasslands. Can be found near ditches, streams, springs or disturbed areas. Grows in seasonally moist fine alluvial soils. Blooming period: Jul – Nov.	Found in Kern, Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Elevational range: 6 – 6691 feet MSL.	X	**Moderate potential to occur**. The Biological Survey Area contains suitable coastal sage scrub habitat to support this species. This species is also known to occur within the immediate region of the LPSRA. Not observed during Psomas 2008 Rare Plant Surveys.
Centromadia pungens ssp. laevis (=*Hemizonia pungens* ssp. *laevis*)	smooth tarplant	CNPS:1B.1	Smooth tarplants occur in a variety of habitats including alkali scrub, alkali playas, riparian woodland, watercourses, and grasslands with alkaline affinities. Also found on disturbed places. Blooming period: Apr – Sept.	Found in Riverside, Orange, San Diego and San Bernardino counties. Western Riverside County accounts for over 60 percent of the reported populations: the San Jacinto Wildlife Area, Salt Creek, the City of Hemet and San Jacinto, and in the Murrieta/Temecula area. Elevational range: 0 – 1574 feet MSL.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area lacks suitable alkaline habitat. However, this species is known to occur within the immediate region of the LPSRA.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	CNPS:1B.1	Coulter's goldfields are associated with low-lying alkali habitats along the coast and in inland valleys. The majority of the populations are associated with coastal salt marsh. Coulter's goldfields occur primarily in the alkali vernal plains community. These are floodplains dominated by alkali scrub, alkali playas, vernal pools, and, alkali grasslands. These habitats form mosaics that are largely dependent on salinity and micro-elevational differences. Blooming period: Feb – Jun.	Coulter's goldfields are distributed from coastal San Luis Obispo County south through coastal Santa Barbara County, Ventura County, Los Angeles to San Diego County and northwestern Baja California. Interior valley populations have been recorded from the Carrizo Plain of San Luis Obispo County south through Tehachapi (Kern County), Twenty Nine Palms (San Bernardino County), and cismontane western Riverside County, to the Ojos Negros Valley east of Ensenada, Mexico. Elevational range: 3 – 4002 feet MSL.	Covered (a, b, d)	**Low potential to occur.** The Biological Survey Area lacks appropriate alkali habitats and soils to support this species. However, this species is known to occur within the immediate region of the LPSRA.
Senecio aphanactis	chaparral ragwort (rayless ragwort)	CNPS: 2.2	Chaparral, cismontane woodland, coastal scrub (sometimes alkaline) and drying alkaline flats. Blooming period: Jan – Apr.	Found in Alameda, Contra Costa, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, Santa Barbara, Santa Clara, San Diego, San Luis Obispo, Solano, and Ventura counties. Elevational range: 50 – 2624 feet MSL.	X	**Moderate potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species. This species is also known to occur within the immediate region of the LPSRA.
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	CNPS: 2.1	Found in meadows and seeps, marshes and swamps, riparian forest and vernal pools/alkaline. Also found on mud flats of vernal lakes, drying river beds, and alkali meadows. In Riverside County, Wright's trichocoronis is found in the alkali vernal plains and associated with alkali playa, alkali annual grassland, and alkali vernal pool habitats. It is highly dependent on alkaline soils that are saturated for extended periods of time. Blooming period: May – Sept	Found in Riverside and Merced counties. Nearly extirpated in the Central Valley. This species is known only from four locations along the San Jacinto River from the vicinity of the Ramona Expressway and San Jacinto Wildlife Area and along the northern shore of Mystic Lake. Only two locations on either side of the Ramona Expressway have been seen in recent years. Elevational range: 16 – 1426 feet MSL.	Covered (a, b)	**Low potential to occur.** The Biological Survey Area lacks suitable alkali habitats and soils to support this species.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	CNPS:1B.2	Dry soils on chaparral and coastal sage scrub. Blooming period: Jan – Jul.	Found in Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Elevational range: 3 – 2903 feet MSL.	X	**Low potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species; however this species is not known to occur within the region of the LPSRA.
California macrophylla (=*Erodium macrophyllum*)	round-leaved filaree (large-leaf filaree)	CNPS:1B.1	This species is restricted to open cismontane woodland and valley and foothill grassland habitats on very friable clay soils. Blooming period: Mar – May.	In southern California, found in Kern, Los Angeles, Riverside, San Diego, and Ventura counties. Elevational range: 50 – 3937 feet MSL.	Covered (d)	**Low potential to occur.** The Biological Survey Area generally lacks suitable habitats with friable clay soils to support this species. This species is known to occur within the region of the LPSRA.
Nama stenocarpum	mud nama (mud fiddeleaf)	CNPS: 2.2	Found along marshes, swamps, lake shores, river banks, stream banks and intermittently wet areas. Blooming period: Jan – Jul.	Found in Los Angeles, Orange, Riverside, Imperial and San Diego counties. Elevational range: 16 – 1640 feet MSL.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area contains marshes along the lake shore; However, these soils are sandy and wekk drained. This species is not known to occur within the region of the LPSRA.
Sidalcea neomexicana	salt spring checkerbloom (mountain sidalcea)	CNPS: 2.2	Found in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, alkali playas, and brackish marshes.Blooming period: Mar – Jun.	Found in Kern, Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura counties. Elevational range: 50 – 5018 feet MSL.	X	**Low potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species; however this species is not known to occur within the region of the LPSRA.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Abronia villosa var. *aurita*	chaparral sand-verbena	CNPS:1B.1	Found in sandy soils of chaparral, coastal scrub, and desert dunes. Blooming period: Jan – Sept.	Found in Riverside, San Bernardino and San Diego counties. Elevational range: 262 – 5249 feet MSL.	X	**Moderate potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat. This species is known to occur within the region of the LPSRA.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower (knotweed spineflower)	CNPS:1B.2	Long-spined spineflower is associated primarily with heavy, often rocky, clay soils in valley and foothill grasslands, and openings in coastal sage scrub, and chaparral. Occasionally this species is associated with mountain meadows in sandy loam soil as at Cuyamaca State Park or in sandy or gravelly soils as on Kearney Mesa or Cutca Valley in San Diego County. Blooming period: Apr – Jul.	Populations found in Orange, western Riverside, San Diego and Santa Barbara counties. Elevational range: 100 – 4760 feet MSL.	Covered	**Moderate potential to occur.** The Biological Survey Area contains suitable soils, valley and foothill grasslands and coastal sage scrub habitats to support this species. This species is also known to occur within the region of the LPSRA.
Myosurus minimus ssp. *apus*	little mousetail	CNPS: 3.1	In southern California, little mousetail occurs in association with vernal pools and within the alkali vernal pools and alkali annual grassland components of alkali vernal plains. Little mousetail is found in areas that have semi-regular inundation. Blooming period: Mar – Jun.	Found in Riverside, San Bernardino, San Diego, Alameda, Contra Costa, Colusa, Lake, Merced, Solano, Tulare, Baja California, and Oregon. Most southern California populations are relatively small. The two largest concentrations of little mousetail are on the Otay Mesa of San Diego County and at Salt Creek west of Hemet in Riverside County. Elevational range: 65 – 2100 feet MSL.	Covered (a, b, d)	**No potential to occur.** The Biological Survey Area lacks suitable vernal pools and associated alkali habitats and soils to support this species. This species is not known to occur at LPSRA.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Lycium parishii	Parish's desert-thorn	CNPS: 2.3	Found in coastal sage scrub and Sonoran desert scrub. Blooming period: Mar – Apr.	Found in Riverside, San Diego and Imperial counties. Elevational range: 1000 – 3280 feet MSL.	X	**Low potential to occur.** The Biological Survey Area lacks suitable desert habitat to support this species. Coastal sage scrub habitat is present; this species is not known to occur within the region of the LPSRA.
Calochortus plummerae	Plummer's mariposa lily	CNPS:1B.2	This plant prefers openings in chaparral, foothill woodland, coastal sage scrub, valley and foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. They are found on dry, rocky slopes and soils and brushy areas. Can be very common after fire. Blooming period: May – Jul.	Found in Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. Elevational range: 330 – 5580 feet MSL.	Covered (e)	**Moderate potential to occur.** The Biological Survey Area supports suitable habitats and substrates to support this species. This species is known to occur within the region of the LPSRA.
Hordeum intercedens	vernal barley	CNPS: 3.2	Vernal barley is associated with mesic grasslands, vernal pools, and large saline flats or depressions. In Riverside County, vernal barley is associated with alkali flats and flood plains within the alkali vernal plains community. Within this community vernal barley is primarily associated with alkali annual grasslands and vernal pools and to a lesser extent alkali scrub and alkali playa. Can also be found on coastal dunes, coastal scrub, and alkaline valley/foothill grasslands. Blooming period: Mar – Jun.	Vernal barley occurs in scattered locations bordering the Central Valley of central California. In southern California it has been reported from Santa Barbara, Ventura, Los Angeles, Orange, Riverside, and San Diego Counties. Elevational range: 16 – 3280 feet MSL.	Covered (a)	**No potential to occur.** The Biological Survey Area lacks suitable alkaline habitats and soils to support this species. This species is known to occur within the region of the LPSRA.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Listed Endangered, Threatened, and Candidate Wildlife						
Amphibians						
Bufo californicus	arroyo toad	FE, SSC	A toad of sandy riverbanks, streams, washes, and arroyos. Breeds in and near streams. It frequents riparian areas grown to mule fat, willows, cottonwoods, and/or sycamores or coast live oaks in valley-foothill and desert riparian as well as a variety of more arid habitats including desert wash, palm oasis, and Joshua tree, mixed chaparral and sagebrush. It requires shallow (3 -10 inches deep), exposed streamside, quiet water stretches, or overflow pools with silt-free sandy or gravelly bottoms especially favored for breeding. Nearby sandy terraces, dampened in places by capillary action, and with some scattered vegetation providing surface sheltering and burrowing sites and foraging areas.	The arroyo toad is found in the coastal plain, coastal slopes and coastal mountain streams of southern California west of the desert in southern Monterey County (San Antonio River) southward through the Transverse and Peninsular ranges to the Rio Santo Domingo (Baja California, Mexico). They also occupy a few drainages on the desert slopes of the San Gabriel and San Bernardino ranges. Desert populations found along lower Whitewater River in Riverside County and Mojave River in San Bernardino County. Its known elevational range extended from near sea level to 4600 feet msl in California.	Covered (a, c)	**No potential to occur.** The Biological Survey Area does not contain suitable breeding water and substrate habitats to support this species. It is a toad of sandy riverbanks, streams, washes, and arroyos. Human disturbance and exotic species make presence unlikely. This species is not known to occur within the LPSRA, however it is known from the immediate region.
Birds						
Haliaeetus leucocephalus	bald eagle (nesting and wintering)	SE, Fully Protected	Range-wide, bald eagles occur primarily in or near seacoasts, rivers, wetlands swamps, and large lakes. Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches and nesting sites to support them. Perching sites need to be composed of large trees or snags with heavy limbs or broken tops. It roosts communally in winter in dense, sheltered, remote conifer stands. The State's breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers.	Bald eagles breeds mostly in low mountain areas up to 7000 feet msl in the northern third of the state. Most breeding territories are in northern California, but the eagles also nest in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations from the central coast range to inland southern California, and on Santa Catalina Island. They winter throughout California, except in the highest mountains and the driest southern deserts; however it is found along parts of the Colorado River.	Covered (a)	**Known to occur (seasonally).** The Biological Survey Area provides potential foraging and roosting habitat for this species during winter migration. Bald eagles are known to use the LPSRA during the winter. The bald eagle is primarily a winter migrant within western Riverside County. Bald eagles have attempted to breed at LPSRA, but were unsuccessful.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Falco peregrinus anatum	American peregrine falcon (nesting)	SE, Fully Protected	Peregrines are found in a large variety of open habitats, including tundra, marshes, seacoasts, savannahs and high mountains. The species breeds mostly in woodland, forest, wetlands, cities, agricultural areas and coastal habitats. Open ledges, caves, and potholes on high, vertical cliffs, generally 100 to 300 feet in height that overlook rivers, lakes, or the ocean provide peregrines with suitable nesting sites.	The range includes most of California, except in deserts, during migrations and in winter. During the breeding season, the birds are most often sighted along the coastline of the entire state, in the Sierra Nevada, and in other mountains of northern California. In winter, found inland throughout the Central Valley, and occasionally on the Channel Islands. Migrants occur along the coast and in the western Sierra Nevada in spring and fall.	Covered (a)	**Known to occur.** Observed during the field surveys by Psomas and known to occur seasonally at LPSRA. The peregrine falcon is primarily a rare spring and fall transient and a casual visitant during other seasons of the year. There are no breeding records documented for the species in the Biological Survey Area.
Empidonax traillii extimus	southwestern willow flycatcher (nesting)	FE, SE	Southwestern willow flycatchers arrive in southern California in April and adults depart from the breeding territory in mid-August to early September. They utilize riparian woodlands along streams and rivers with mature, dense stands of willows and cottonwoods. Riparian habitat provides both breeding and foraging habitat for the species. They nest from zero to 13 feet above ground in thickets of trees.	It occurs from near sea level to over 8500 feet msl, but is primarily found in lower elevation riparian habitat in southern California. Breeds in California from the Mexican border north to the Owens Valley, the South Fork Kern River, and Santa Ynez River in Santa Barbara County.	Covered (a)	**Known to occur.** This species was not observed during focused SWFL surveys. However, this species has been observed within the LPSRA. The Biological Survey Area contains suitable breeding and foraging riparian woodland habitat to support this species. Species not observed during Psomas 2008 protocol surveys.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Vireo bellii pusillus	least Bell's vireo (nesting)	FE, SE	Least Bell's vireos primarily occupy riverine riparian habitats that typically feature dense cover within 1-2 m of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses. 2,000 feet elevation in the interior.	A spring and summer resident of southern California. The subspecies is currently restricted to southern California south of the Tehachapi Mountains, along the coast and the western edge of the Mojave Desert to northwestern Baja California below 2000 feet in elevation. Breeding pairs have been observed in the counties of Monterey, San Benito, Inyo, Santa Barbara, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego.	Covered (a)	**Known to occur (seasonally).** Observed during the focused LBV field surveys by Psomas2008 and known to occur seasonally at LPSRA. During the focused LBV surveys, this species was observed below the dam and near the proposed project area in the riparian band on the east shore of the lake.
Polioptila californica californica	coastal California gnatcatcher	FT, SSC	A non-migratory, permanent resident of coastal sage scrub habitat, which is a broad category of vegetation. They also use adjacent chaparral, grassland and riparian habitats for foraging.	They are restricted to coastal slopes of southern California from Ventura and western San Bernardino counties south to northern Baja below 1500 feet msl. May still occur along lower, coastal slopes of San Gabriel and San Bernardino Mountains in Los Angeles and San Bernardino counties, but status is uncertain. Their breeding period is from February to August.	Covered	**Known to occur.** CAGN was not observed during the focused CAGN surveys conducted by Psomas (2007). However, this species has been observed within the LPSRA. Suitable foraging and breeding coastal sage scrub habitat is present within the Biological Survey Area.
Mammals						
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE, SSC	The San Bernardino kangaroo rat typically is found in early to intermediate stage alluvial fan sage scrub along river and stream terraces, and flood plains. Sandy loam substrates allow for the digging of simple, shallow burrows. They require open, sparse shrub vegetation and they actively avoid rocky substrates and areas with dense vegetation.	The San Bernardino kangaroo rat occurs in scattered, isolated patches of alluvial sage scrub habitat throughout San Bernardino and Riverside counties. The remaining three locations (Santa Ana River, Lytle Creek Wash and Cajon Creek Wash, and San Jacinto River) contain the largest extant concentrations of San Bernardino kangaroo rats.	Covered (c)	**Low potential to occur.** The Biological Survey Area does not contain suitable habitats to support this species.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Dipodomys stephensi	Stephens' kangaroo rat	FE, ST	The Stephens' kangaroo rat is found in open annual and perennial grasslands or sparse shrublands such as coastal sage scrub with cover of less than 50%. They avoid areas with dense grass cover. They require friable soils and avoid rocky soils and they use flatter slopes.	Stephens' kangaroo rat is restricted to the San Jacinto Valley and adjacent areas in western Riverside County and northern-central San Diego County. It is found at elevations ranging from approximately 180 feet msl on Camp Pendleton in San Diego County to 4100 feet in the Anza Valley.	Covered	**Known to occur.** The Biological Survey Area below the dam contains suitable grassland and coastal sage scrub habitat with suitable soils to support this species. This species is known to occur within the LPSRA.
Special-Status Wildlife						
Amphibians						
Spea hammondii	western spadefoot	SSC	A vernal pool associated species that uses upland areas such as coastal sage scrub, and grasslands habitats for aestivation. They require rain pools/vernal pools in which to reproduce and that persist with more than three weeks for metamorphosis. Pools must lack fish, bullfrogs, and crayfish.	It is a California near endemic ranging from Shasta County southward into Baja California restricted to west of the Sierran-desert range axis. The western spadefoot ranges throughout the Central Valley and adjacent foothills. In the Coast Ranges it is found from Point Conception, Santa Barbara County, south to the Mexican border. Elevations of occurrence extend from near sea level to 4471 feet in the southern Sierra foothills.	Covered (a)	**Low potential to occur.** The Biological Survey Area does not support vernal pools or other ponding areas that the spadefoot needs in order to reproduce. This species is not known to occur within the LPSRA, but found within the immediate region.
Reptiles						
Actinemys marmorata pallida *(=Emys marmorata pallida)*	southwestern pond turtle	SSC	Inhabits slow moving permanent or intermittent streams, small ponds, small lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and sewage treatment lagoons. Pools are the preferred habitat within streams. Abundant logs, rocks, submerged vegetation, mud, undercut banks, and ledges are necessary habitat components for cover as well as a water depth greater than 2 m.	Currently, it ranges south of San Francisco Bay to northern Baja California, Mexico.	Covered (a)	**No potential to occur.** Human disturbance and exotic species make presence unlikely. This species is not known to occur within the LPSRA or the immediate region.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Coleonyx variegatus abbotti	San Diego banded gecko	ND	This species is found in granite or rocky outcrops in coastal scrub and chaparral habitats within coastal and cismontane southern California.	In California, this gecko is found in the interior southern coastal region, generally west of the Peninsular Ranges and South of the Transverse Ranges, and north up the coast to Ventura County. It ranges beyond California south into Baja California.	Covered	**Known to occur.** The Biological Survey Area supports suitable coastal sage scrub with rock outcrops to support this species. Observed in 2008 by DWR staff.
Phrynosoma coronatum (blainvillii population)	coast (San Diego) horned lizard	SSC	Found in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. In inland areas, this species is restricted to areas with pockets of open microhabitat with loose, fine soils with a high sand fraction; and abundance of native ants.	It ranges from the Transverse Ranges southward to the Mexican border west of the deserts. The known elevation range of this species is from 32 – 6990 feet msl.	Covered	**Known to occur.** The Biological Survey Area supports habitat to support this species. This species is known to occur within the LPSRA and all over western Riverside County.
Aspidoscelis hyperythra *(=Cnemido-phorus hyperythrus)*	orange-throated whiptail	SSC	This subspecies is found within semi-arid brushy areas typically with loose soil and rocks, including washes, stream sides, rocky hillsides, and coastal chaparral. Habitat types include low elevational chaparral, non-native grassland, coastal sage scrub, juniper woodland and oak woodland. Associations include alluvial fan scrub and riparian areas.	Belding's orange-throated whiptail is uncommon to fairly common over much of its range in Orange, Riverside, and San Diego counties. Also occurs in southwestern San Bernardino County near Colton. They extend from near sea level to 3412 feet msl (northeast of Aguanga, Riverside County).	Covered	**Known to occur.** The Biological Survey Area contains suitable habitats. This species is known to occur within the LPSRA and throughout western Riverside County.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Aspidoscelis tigris stejnegeri *(=Cnemido-phorus tigris stejnegeri)*	coastal whiptail (coastal western whiptail)	ND	The coastal western whiptail is found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage such as deserts, chaparral and semiarid. Also found in woodland and riparian areas. The western whiptail can be found in open, often rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations. The ground may be firm soil, sandy, or rocky.	This subspecies is found in coastal Southern California, mostly west of the Peninsular Ranges and south of the Transverse Ranges, and north into Ventura County. Ranges south into Baja California.	Covered	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable soils and open, rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations to support this species. This species is known to occur within the LPSRA and all over western Riverside County.
Anniella pulchra pulchra	silvery legless lizard	SSC	This species is common in several habitats. It is found primarily in areas with sandy or loose organic soil or where there is plenty of leaf litter. Usually associated with friable soils with some moisture content and some vegetative cover. They are often found under surface objects.	This California endemic ranges throughout California. It generally occurs west of the desert.	X	**Moderate potential to occur.** The Biological Survey Area contains habitat with leaf litter However this species is not known to occur within the LPSRA, but it is known to occur within the immediate region.
Charina trivirgata roseofusca	coastal rosy boa	ND	The coastal rosy boa inhabits arid and semi-arid shrublands, canyons, and other rocky areas. Appears to be common in riparian areas, but does not require permanent water. It is absent from grasslands. It appears to prefer moderate to dense vegetative cover with rocks. They have been found under rocks, in boulder piles, and along rock outcrops and vertical canyon walls.	The coastal rosy boa occurs in southwestern California to the coastal slopes of the San Gabriel and San Bernardino mountains, and across the Peninsular Ranges into the desert in San Diego County. They only occur west of the desert below approximately 3937 feet msl in elevation.	X	**Known to occur.** The Biological Survey Area contains suitable rocky scrub and riparian habitats to support this species. This species is known to occur within the LPSRA and throughout western Riverside County.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Crotalus ruber ruber	northern red-diamond rattlesnake	SSC	It is most commonly associated with heavy brush with large rocks or boulders. They need rodent burrows, cracks in rocks or surface cover objects.	The known range of northern red-diamond rattlesnake extends from Morongo Valley in San Bernardino County southward on both coastal and desert sides of the Peninsular Ranges to Baja California, Mexico. Its known elevational range extends from near sea level to about 5000 feet msl.	Covered	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable coastal sage scrub and rock habitats to support this species. This species is known to occur within the LPSRA and throughout western Riverside County.
Birds						
Pelacanus erythrorhynchos	American white pelican (nesting colony)	SSC	This species nest sat large freshwater and salt water lakes, usually on small islands or remote dikes. The nest-site must be flat or gently sloping, lacking shrubs or other obstructions that would impede taking flight, free of human disturbance, and usually with loose earth suitable for nest-mounds.	In California, they nest only at large lakes in the Klamath Basin. They are common spring and fall migrants at the Salton Sea, the Colorado River, Morro Bay, and San Diego Bay. Migrant flocks pass overhead almost any month, but mainly in spring and fall throughout the state, especially in southern California.	X	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lake habitat to support this species during the migration season. This species is known to occur within the LPSRA, but do not nest.
Phalacrocorax auritus	double-crested cormorant (rookery site)	WL	They require lakes, rivers, reservoirs, estuaries, or ocean for foraging. They require undisturbed nest-sites beside the water, on islands or the mainland. Double-crested cormorants nest in tall trees (live or dead), wide rock ledges on cliffs, or rugged slopes near (or in) the aquatic environments. The suitable nest-site must be within 5 - 10 miles of a dependable food supply.	A yearlong resident along the entire coast of California and on inland lakes. During August to May, it is fairly common to locally very common along the coast and in estuaries and salt ponds. Rookeries are extremely scarce away from the Salton Sea, the Colorado River, and the Channel Islands.	Covered (a)	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lake habitat to support this species. This species is known to occur within the LPSRA. They are not known to breed at the LPSRA.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Plegadis chihi	white-faced ibis (rookery site)	WL	Migrant and wintering white-faced ibis may be found foraging in shallow lacustrine waters, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields, and estuaries.	The white-faced ibis is an uncommon summer resident in sections of southern California. This species no longer breeds regularly anywhere in California except at a few local spots in Riverside County, the Salton Sea, the Central Valley and northeastern California.	Covered (a)	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lakeshore mudflat habitat to support this species. This species is known to occur within the LPSRA.
Pandion haliaetus	osprey (nesting)	WL	Strictly restricted to ocean shores, bays, freshwater lakes, rivers, large streams, reservoirs, and large waters supporting fish with surrounding or nearby forest habitats.	A common winter species in southern California. Within California, breeding populations reside in the Cascade and Sierra Mountain ranges and along the coast south to Marin County. An uncommon breeder along southern Colorado River. Wintering habitat is found along the California coast south of San Francisco.	Covered (a)	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable lake habitat. As a transient species and potential nesting bird, the osprey has been recorded at LPSRA.
Elanus leucurus	white-tailed kite (nesting)	Fully Protected	The white-tailed kite inhabits low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, oak woodlands and riparian areas adjacent to open areas. Open grasslands, meadows, or marshes are used for foraging close to isolated, dense-topped trees for nesting and perching. Substantial groves of dense, broad-leafed deciduous trees are used for cover, nesting and roosting.	In California, the white-tailed kite is a common to uncommon, year-long resident in coastal and valley lowlands. It is found in virtually all lowlands of California west of the Sierra Nevada range and the southeast deserts. It is common in the Central Valley and along the entire California coast.	Covered (a)	**Known to occur.** The Biological Survey Area contains suitable foraging grassland habitat and suitable nesting riparian habitat to support this species. This species is known to occur within the LPSRA as a year long resident.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Circus cyaneus	northern harrier (nesting)	SSC	Frequents open fresh and saltwater wetlands, grasslands, pastures, upland prairies, dry uplands, croplands, shrub-steppe, meadows, desert sinks. It uses tall grasses and forbs in wetlands, for cover and it roosts on ground. It is mostly found in flat, open areas of tall, dense grasses, moist or dry shrubs, in the vicinity of marshes, rivers, ponds, or grassy valleys for nesting, cover, and feeding.	In California, it occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as 10,000 feet msl. It breeds from sea level to 5700 feet msl in the Central Valley and Sierra Nevada.	Covered (breeding)	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging and nesting grassland habitat to support this species. This species is known to occur within the LPSRA
Accipiter striatus	sharp-shinned hawk (nesting)	WL	Habitats include riparian deciduous, ponderosa pine, black oak, mixed conifer, and Jeffrey pine. The species uses dense near open areas. It roosts in intermediate to high-canopy forest. For nesting they occur in dense tree stands which are cool, moist, well shaded and usually near water. For hunting habitat, they often use openings at the edges of woodlands.	It is a fairly common migrant and winter resident throughout California, except in areas with deep snow.	Covered	**Known to occur.** The Biological Survey Area contains suitable breeding and foraging riparian habitat. This species is known to occur within the LPSRA. It is a common migrant and wintering species within western Riverside County.
Accipiter cooperii	Cooper's hawk (nesting)	WL	The Cooper's hawk breeds primarily in riparian areas and oak woodlands. It frequents landscapes where wooded areas occur in patches and groves. Dense stands with moderate crown-depths are usually used for nesting. They hunt in broken woodland and habitat edges. Within the range in California, it most frequently uses dense stands of live oak, riparian deciduous or other forest habitats near water. They are also found and can breed in suburban and urban settings.	A breeding resident throughout most of the wooded portion of the state. In southern California, the species is present year-round.	Covered (a)	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable breeding and foraging riparian habitat to support this species. This species is known to occur within the LPSRA.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Buteo regalis	ferruginous hawk (wintering)	WL	Within southern California, ferruginous hawks typically winter in open fields, grasslands, and agricultural areas. It roosts in open areas, usually in a lone tree or utility pole.	In the winter, ferruginous hawks can be found throughout California, with the exception of the extreme northeastern and northwestern regions. However, they are most common in the southern region of the state. It is migratory; it generally arrives in California in September and departs by mid-April. There are no breeding records from California.	Covered	**Known to occur (seasonally).** The Biological Survey Area contains suitable foraging and roosting habitat to support this species. It does not breed in southern California.
Aquila chrysaetos	golden eagle (nesting and wintering)	Fully Protected	Golden eagles occur locally in open country, especially in rolling foothills and mountainous regions. Within southern California, the species favors grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nesting is primarily restricted to rugged, mountainous country.	Within California the distribution, abundance, and seasonality of the golden eagle is described as: uncommon permanent resident and migrant throughout California, except center of Central Valley. It ranges from sea level up to 11,500 feet msl.	Covered	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging open country grassland habitat to support this species. This species is known to occur within the LPSRA, but it is not known to breed there.
Charadrius montanus	mountain plover (wintering)	SSC	Within southern California, the largest numbers of birds occur in short grasslands and agricultural areas in the interior, such as freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. The birds spend about 75 percent of their time on plowed fields, but prefer heavily grazed annual grasslands or burned fields. They prefer short vegetation, bare ground, flat topography, and areas with burrowing rodents.	It does not nest in California. It occurs within the state only during the wintering season. Currently, mountain plovers winter in flocks in the Sacramento and San Joaquin Valleys, in central and south-coastal California, east locally to the southwestern deserts and south to central Mexico.	Covered	**Known to occur (seasonally).** The Biological Survey Area contains suitable foraging short grass habitats and flat topography to support this species.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Athene cunicularia	burrowing owl (burrow sites and some wintering sites)	SSC	They require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an abundance of active small mammal burrows, most notably the California ground squirrel. As a critical habitat feature need, they require the use of rodent or other burrows for roosting and nesting cover. They may also use pipes, culverts, and nest boxes where burrows are scarce.	It is a year-long resident formerly common throughout the state. In California, burrowing owls are restricted to the central valley to San Diego.	Covered (c)	**Known to occur.** The Biological Survey Area contains suitable habitat and level terrain. No signs of species were observed during all surveys conducted by Psomas at Lake Perris SRA.
Asio otus	long-eared owl (nesting)	SSC	Breeding habitat generally consists of groves of oaks or riparian woodlands with a closed canopy. Hunting habitat consists of oak and sycamore woodlands. Appears to be more associated with forest edge habitat than open or forest habitat. During breeding, the species uses the hardwood deciduous forests and during the winter season.	Uncommon yearlong resident throughout the state except the Central Valley and southern California deserts where it is an uncommon winter visitor. It apparently makes only local movements in California, although some migration may occur. These may be seasonal movement westward from the Sierra Nevada foothills in fall.	X	**Known to occur (seasonally).** The Biological Survey Area contains suitable habitats to support this species. The species has not been reported recently to occur in western Riverside County.
Lanius ludovicianus	loggerhead shrike (nesting)	SSC	The loggerhead shrike prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting. It is known to forage over open ground within areas of short vegetation. Individuals like to perch on posts, utility lines and often use the edges of denser habitats.	A common resident and winter visitor in lowlands and foothills throughout California.	Covered	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains habitat to support this species. It occurs as a yearlong resident, in western Riverside County.
Eremophila alpestris actia	California horned lark	WL	A year-long resident within the state and within a variety of open habitats. Within southern California, California horned larks breed primarily in open fields, (short) grasslands, and rangelands. Grasses, shrubs, forbs, rocks, litter, clods of soil, and other surface irregularities provide cover.	The species breeds and resides in the coastal region of California from Sonoma County southeast to the Mexican border.	Covered	**Known to occur.** The Biological Survey Area supports suitable habitat with sparse vegetation. This species is known to occur within the LPSRA. It occurs as a yearlong resident in western Riverside County.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Progne subis	purple martin (nesting)	SSC	Purple martins inhabit open forests, woodlands, and riparian areas with snags in the breeding season. The birds typically breed in tall sycamores, and other large trees. They are secondary cavity nesters and typically nest in old woodpecker holes usually near a body of water. It forages and nests in riparian areas, forest, and woodlands. Purple martins may be found virtually anywhere in aerial habitat during migration	It is an uncommon to rare, local summer resident in a variety of wooded, low-elevation habitats throughout the state. In the south, it is now only a rare and local breeder on the coast and in interior mountain ranges.	Covered (a)	**Low potential to occur.** The Biological Survey Area contains suitable nesting riparian habitat and foraging grassland habitat to support this species. This species is not known to occur within the LPSRA, but is known to occur in the immediate region.
Campylo-rhynchus brunneicapillus sandiegensis	San Diego cactus wren (coastal cactus wren)	SSC (San Diego and Orange counties)	An obligate, non-migratory resident of the coastal sage scrub plant community. It frequents desert succulent shrub, Joshua tree, and desert wash habitats and other arid terrain with thickets, patches, or tracts of larger, branching cacti, stiff-twigged, thorny shrubs, and small trees. It is closely associated with three species of cacti and occurs almost exclusively in thickets of cholla and prickly pear dominated stands of coastal sage scrub.	The current range of the San Diego cactus wren occurs in cismontane southern California from southern Ventura County, east through coastal Los Angeles County to southwestern San Bernardino County, and south through Orange County, western Riverside County to coastal San Diego County, California and extreme northwestern Baja California, Mexico. Found below 1500 feet msl in elevation.	Covered	**Known to occur.** The Biological Survey Area does not contain suitable cactus and desert habitat. However this bird is known to exist in the Bernasconi Hills.
Dendroica petechia brewsteri	yellow warbler (nesting)	SSC	Yellow warblers in southern California breed and forage in lowland and foothill riparian woodlands dominated by cottonwoods, sycamores, aspens, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland.	It usually arrives in California in April, and mostly is gone by October. Small numbers regularly overwinter in southern California lowlands. Breeding distribution includes several southern California mountain ranges and throughout most of San Diego County. Winters in Imperial and Colorado River valleys.	Covered (a)	**Known to occur (seasonally).** The Biological Survey Area contains suitable nesting and foraging riparian habitat to support this species. This species is known to occur within the LPSRA.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Icteria virens	yellow-breasted chat (nesting)	SSC	In southern California they are found in tall, dense, relatively wide riparian woodlands and thickets of willows with well-developed understories. Nesting areas are associated with streams, swampy ground, and the borders of small ponds. Breeding habitat must be dense to provide shade and concealment.	In southern California, breeds locally on the coast and very locally inland. In migration, may be found in lower elevations of mountains in riparian habitat. It usually arrives in April and departs by late September for the wintering grounds in Mexico and Guatemala.	Covered (a)	**Moderate potential to occur.** The Biological Survey Area contains suitable nesting and foraging riparian habitat. This species is not known to breed within the LPSRA.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	WL	This species uses grass-covered hillsides, coastal sage scrub, and chaparral and often occur near the edges of the denser scrub and chaparral associations. Optimal habitat consists of sparse, low brush or grass, hilly slopes preferably interspersed with boulders and outcrops. The species may occur on steep grassy slopes without shrubs if rock outcrops are present.	The current range and distribution of this subspecies is extremely restricted to a narrow belt of semiarid coastal sage scrub and sparse chaparral from Santa Barbara south to the northwestern corner of Baja California.	Covered	**Known to occur.** The Biological Survey Area contains suitable coastal sage scrub and rocky habitat. This species is known to occur within the LPSRA and throughout western Riverside County.
Amphispiza belli belli	Bell's sage sparrow (nesting)	WL	Bell's sage sparrow is a breeder in dry chaparral and coastal sage scrub along the coastal lowlands, inland valleys, and in the lower foothills of local mountains. In transmontane California, it occupies sagebrush, alkali desert scrub, desert scrub, and similar habitats. In cismontane California, it frequents chaparral dominated by chamise, and coastal scrub dominated by sage.	In summer, it is uncommon to common east of the Cascade Range and Sierra Nevada, in foothills bounding the Central Valley, and in the Transverse, Peninsular, and coastal ranges from Trinity County south to the Mexican border. It occurs only locally at montane elevations, mostly in southern California.	Covered	**Known to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat. This species is known to occur throughout western Riverside County.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Agelaius tricolor	tricolored blackbird (nesting colony)	SSC	The tricolored blackbird breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, tall herbs and forages in grassland and cropland habitats. Colonies require nearby water, a suitable nesting substrate, and open-range foraging habitat of natural grassland, woodland, or agricultural cropland.	Mostly a resident in California. It is common locally throughout the Central Valley and in coastal districts from Sonoma County south. It breeds locally west of the Cascade Range, Sierra Nevada, south to extreme southwest San Bernardino County, western Riverside County and western and southern San Diego County.	Covered (colony)(a)	**Known to occur.** The Biological Survey Area contains suitable nesting marsh habitat and suitable foraging grassland habitat. This species is known to breed within the LPSRA. This species is a year long resident in western Riverside County.
Mammals						
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	SSC	It inhabits coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities. It generally exhibits a strong microhabitat affinity for moderately gravelly and rocky substrates. In western Riverside County, the San Diego pocket mouse also commonly is found in disturbed grassland and open sage scrub vegetation with sandy-loam to loam soils.	The northwestern San Diego pocket mouse occurs mainly in arid coastal and desert border areas in western San Diego County, in Riverside County southwest of Palm Springs, in San Bernardino County. Elevational range from sea level to 6000 feet.	Covered	**Known to occur.** Observed during the Los Angeles pocket mouse and SKR trapping surveys conducted by Psomas. The Biological Survey Area contains suitable grassland and coastal sage scrub habitat. This species is known to occur within the LPSRA.
Perognathus longimembris brevinasus	Los Angeles pocket mouse	SSC	This species probably inhabits open ground of fine, sandy soils and may utilize these soil types for burrowing. It may be restricted to lower elevation grassland and coastal sage scrub. It probably prefers sparsely vegetated habitats.	The geographic range of Los Angeles Pocket mice is restricted to lower elevation grasslands and coastal sage associations in the Los Angeles Basin, from approximately Burbank and San Fernando (Los Angles County) on the northwest to San Bernardino (San Bernardino County) on the northeast, and Cabazon, Hemet, and Aguanga (Riverside County) on the east and southeast.	Covered (c)	**Known to occur.** This species was not found during the focused LAPM surveys, however was observed during the SKR trapping surveys conducted by Psomas. The Biological Survey Area contains suitable grassland and coastal sage scrub habitat outside of the proposed project area.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Neotoma bryanti intermedia	Bryant's woodrat	SSC	Bryant's woodrat is found in a variety of shrub habitats primarily associated with rock outcroppings, boulders, sage scrub, cactus, or other areas of dense undergrowth. Bryant's woodrat commonly inhabit Joshua tree woodlands, pinyon-juniper woodlands, mixed chaparral, coastal sage scrub, and coastal desert habitats seaward of the coastal mountain ranges. Bryant's woodrat is often associated with coastal sage scrub communities, rocky outcroppings and boulder-covered hillsides in chaparral or oak woodlands, and if present large cactus patches, like the prickly pear cactus.	The subspecies of Bryant's woodrat occurs from Alameda County east of the San Francisco Bay in Central California south along both inner and outer Coast Ranges, the western foothill of southern Sierra Nevada, Traverse, and Peninsular Ranges, as well as coastal southern California into northwestern Baja California, at least as far as El Rosario.	Covered	**Known to occur.** Captured during SKR trapping surveys. The Biological Survey Area contains suitable coastal sage scrub habitat and rock outcrops. This species is known to occur within the Lake Perris SRA and throughout western Riverside County.
Neotoma lepida intermedia	San Diego desert woodrat	SSC	The San Diego desert woodrat is found in a variety of shrub and desert habitats primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth. The desert woodrat often is associated with large cactus patches, rocky outcroppings and boulder-covered hillsides. In rocky outcrops, they are known to construct dens in the cracks between boulders. Cactus patches are also a favorite den site.	The San Diego desert woodrat occurs in coastal southern California from San Luis Obispo County south into Baja California.	Covered	**Known to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat and rock outcrops.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	SSC	The black-tailed jackrabbit is a habitat generalist occurring in open areas or semi-open country, typically in grasslands, agricultural fields or sparse coastal scrub. Jackrabbits typically are not found in high grass or dense brush.	San Diego black-tailed jackrabbit occurs only on the coastal side of the southern California mountains. This subspecies has been recorded from northern Baja California through San Diego, Orange, Los Angeles, Riverside, San Bernardino and Ventura Counties.	Covered	**Known to occur.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable sparse habitat. This species is known to occur within the LPSRA and throughout western Riverside County.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Macrotus californicus	California leaf-nosed bat	SSC	In California, they occupy the low-lying desert areas of southern California. Habitats occupied include desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis. Needs rocky, rugged terrain with mines or caves for roosting. Day roosts usually are in deep mine tunnels or caves, occasionally in buildings or bridges. The roost must provide shelter from heat and aridity. Night roosts may be in buildings, mines, bridges, rock shelters, or other sites with overhead protection. These bats often are found in large groups.	The California leaf-nosed bat is found from Riverside, Imperial, San Diego, and San Bernardino counties south to the Mexican border. Former populations have disappeared from coastal basins, from Los Angeles to San Diego. Desert populations have declined, but this species is only common along the Colorado River. California records are below 2000 feet.	X	**No potential to occur.** The Biological Survey Area does not contain suitable desert habitats to support this species. This species is not known to occur within the LPSRA or within the immediate region.
Eumops perotis californicus	western mastiff bat	SSC	Western mastiff bats are found in a variety of habitats, such as semi-arid to arid habitats but is geomorphically restricted, occurring primarily where there are significant rock features offering suitable roosting habitat. A cliff dwelling species, found under exfoliating rock slabs and rock crevices along cliffs. Western mastiff bats can also be found in similar crevices in large boulders and buildings. When roosting in rock crevices they require a sizable drop from their roost in order to achieve flight. Western mastiff bats prefer deep crevices that are at least 15 or 20 feet above the ground.	In California, they have been recorded from Butte County southward through the southern California coastal basins and the western portions of the southeastern desert region.	X	**Low potential to occur.** The Biological Survey Area contains suitable foraging habitats, but it does not contain suitable roosting rock habitats. This species is not known to occur within the LPSRA, but it is known from the immediate region.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Nyctinomops femorosaccus	pocketed free-tailed bat	SSC	Habitats used include pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. Pocketed Free-tailed bats are characteristically associated with rocky, desert areas with relatively high cliffs. They generally use crevices in rocks and caves as day-roosts, although they sometimes are found in man-made structures.	The pocketed free-tailed bat is found in Riverside, San Diego, and Imperial counties. This species is rare in California, but is more common in Mexico. May occur in Orange County.	X	**Low potential to occur.** The Biological Survey Area does not contain suitable foraging or roosting desert habitats to support this species. This species is not known to occur within the LPSRA, but it has been observed within the immediate region.
Lasiurus blossevillii	western red bat	SSC	Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging. Any mix of grassland, shrubs, forests, riparian areas and cropland are suitable. This bat is primarily solitary. It roosts in the foliage of trees. The space beneath the roost must be free of obstacles to allow the bats to drop into flight.	The red bat is locally common in some areas of California, from Shasta County to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts. The winter range includes western lowlands and coastal regions south of San Francisco Bay. There is migration between summer and winter ranges.	X	**Low potential to occur.** The Biological Survey Area does contain suitable foraging and roosting riparian habitat. However, this species is not known to occur within the LPSRA.
Lasiurus xanthinus	western yellow bat	ND	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. This species occurs year-round in California. Roosts in trees. Has been captured roosting under palm trees. Roosts and feeds in, and near, palm oases and riparian habitats. Forages over water and among trees.	The southwestern yellow bat is uncommon in California, known only in Los Angeles and San Bernardino counties south to the Mexican border. This species has been recorded below 2000 feet msl.	X	**Low potential to occur.** The Biological Survey Area does contain suitable habitat. However, this species is not known to occur within the LPSRA, but it is known from the immediate region.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Townsend's big-eared bats live in a variety of communities, including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Edge is preferred for foraging. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night and day. Maternity roosts are warm. Habitat for Townsend's big-eared bats must include appropriate roosting, maternity, and hibernacula sites free from disturbances by humans.	Townsend's big-eared bat is found throughout California, but the details of its distribution are not well known. This species may be found at any season throughout its range.	X	**Low potential to occur.** The Biological Survey Area does contain suitable foraging habitat, but not suitable roosting habitat. This species is not known to occur within the LPSRA.
Euderma maculatum	spotted bat	SSC	Little is known about the habitat requirements of this solitary species. It appears to occupy a variety of habitats from dry deserts and grasslands through mixed conifer forests. They forage in a wide variety of habitats and feed over water and along washes, fields, marshes, and openings in coniferous forests. They roost mostly in rock crevices, and occasionally in caves and buildings. Cliffs provide optimal roosting habitat.	The spotted bat is mostly found in foothills, mountains and desert regions of southern California. Elevational range extends from below sea level in California to above 10,000 feet msl in New Mexico.	X	**Low potential to occur.** The Biological Survey Area contains suitable foraging and roosting habitats. However this species is not known to occur within the LPSRA or within the immediate region of the LPSRA.
Antrozous pallidus	pallid bat	SSC	Uses a wide variety of habitats including deserts, grasslands, shrublands, woodlands, and forests form sea level up through mixed conifer forests. They are most common in deserts, preferring areas of open, dry habitats, with rocky areas for roosting and water nearby. Night roosts may be in more open sites, such as porches and open buildings	The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada. Local data suggest that this species may be most common at elevations below 6000 feet msl on both coastal and desert sides.	X	**Low potential to occur.** The Biological Survey Area contains suitable foraging and roosting habitats to support this species; however this species is not known to occur within the LPSRA or within the immediate region of the LPSRA.

TABLE 3.3-7 (continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential for Occurrence
Puma concolor	mountain lion	Fully Protected	Mountain lions use many habitats, including desert scrub, chaparral, swamps, and forests. They avoid agricultural areas, flat shrubless desert, and other habitats that lack topographic or vegetative cover. It feeds primarily on mule deer and tends to be found where deer can be obtained. Mountain lions use rocky areas, cliffs, and ledges that provide cover within open woodlands and chaparral, as well as riparian areas that provide protective habitat connections for movement between fragmented core habitat.	Mountain lions are a widespread, uncommon permanent resident, ranging from sea level to alpine meadows. They are found in nearly all habitats in California that support mule deer populations, except xeric regions of the Mojave and Colorado deserts that do not support mule deer populations and they are excluded from croplands in the Central Valley.	Covered	**Known to occur.** The Biological Survey Area contains suitable habitats to support this species. The LPSRA supports mule deer populations to support the mountain lion. Though known to occur in the area impacts to this species are not expected due to being highly mobile and having a large home range.
Taxidea taxus	American badger	SSC	Badgers occur from alpine meadows to elevations as low as Death Valley. In California, badgers occupy a diversity of habitats. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated ground. Badgers are generally associated with dry, open, treeless regions, prairies, parklands, and cold desert areas. They seem to occur primarily in areas of low to moderate slope.	In California, badgers ranged throughout the state except for the humid coastal forests of northwestern California. No current data exist on the status of badger populations in California. The badger's altitudinal range extends from below sea level in Death Valley to over 12,000 feet msl.	X	**Known to occur.** The Biological Survey Area contains suitable open grassland habitats and ground squirrel populations to support this species.

TABLE 3.3-7 (Continued)
LISTED ENDANGERED, THREATENED, AND CANDIDATE SPECIES WITHIN THE VICINITY OF LAKE PERRIS.

ND = no designation

Federal Status
FE = federally endangered: any species, subspecies, or variety of plant or animal that is in danger of extinction throughout all or a significant portion of their range. Species become officially listed as endangered and receive explicit protection under the federal Endangered Species Act (ESA) upon publication of final rule for listing in the Federal Register.
FT = federally threatened: any species, subspecies, or variety of plant or animal that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future. Once listed in the Federal Register, threatened species receive discretionary protection under the Endangered Species Act.
FC = federal candidate for listing: any species, subspecies, or variety of plant or animal that is being considered for listing as endangered or threatened, but for which a proposed regulation has not yet been published in the Federal Register. Federal candidate species may receive discretionary protection.

California State Status
SE = California state endangered: any species, subspecies, or variety of plant or animal that 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, overexploitation, predation, competition, or disease.
ST = California state threatened: any species, subspecies, or variety of plant or animal that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.
SSC = species of special concern status applies to animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist. The CDFG 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 decline 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.
Fully protected: animal species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Fish and Game Code.
WL = CDFG watch list. This list includes taxa that are not on the current special concern list that (1) formerly were on the prioritized 1978 or unprioritized 1992 special concern lists and are not currently listed as state threatened and endangered, (2) have been removed (delisted) from either the state or federal threatened and endangered lists (and remain on neither), or (3) are currently designated as "fully protected" in California.

California Native Plant Society Status
CNPS 1B = California Native Plant Society List 1B plants are native California species, subspecies or varieties that are rare, threatened, or endangered in California and throughout its range.
CNPS 2 = California Native Plant Society List 2 plants are native California species, subspecies or varieties that are rare, threatened or endangered in California, but more common outside of the state.
CNPS 3 = California Native Plant Society List 3 plants are native California species, subspecies or varieties that more information is needed to assign them to one list or another or to reject them.

California Native Plant Society Threat Codes
0.1 means it is seriously endangered in California.
0.2 means it is fairly endangered in California.
0.3 means it is not very endangered in California.

Western Riverside County MSHCP
Covered: No further surveys are required.
Covered (a): Surveys may be required for these species as part of wetlands mapping (Section 6.1.2 of MSHCP).
Covered (b): Surveys may be required for these species within Narrow Endemic Plant Species survey area (Section 6.1.3 of MSHCP)
Covered (c): Surveys may be required for this species within locations shown on survey maps (Section 6.3.2 of MSHCP)
Covered (d): Surveys may be required for these species within Criteria Area as (Section 6.3.2 of MSHCP)
Covered (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 objectives for these species are presented in Section 9.0 of the MSHCP. Please refer to Table 9-3 of the MSHCP for specific conservation objectives that must be met for the 16 species prior to including them on the list of Covered Species Adequately Conserved.
Covered (f): These Covered Species will be considered to be Covered Species Adequately Conserved when a memorandum of Understanding is executive with the Forest Service that addresses management for these species on Forest Service Land. Please refer to Table 9-3 of the MSHCP.
X = Not covered by the MSHCP, but identified by the CNDDB and other literature.

SOURCES: Psomas, 2008

Listed Endangered, Threatened and Candidate Wildlife Species

One wildlife species, the least Bell's vireo, listed as endangered, pursuant to the federal and state Endangered Species Acts was observed within or adjacent to the proposed project site during the field surveys. No other wildlife species listed as threatened or candidate pursuant to the federal or state Endangered Species Acts were observed within or adjacent to the proposed project site during the field surveys. The Los Angeles pocket mouse was observed during field surveys conducted at the proposed project site below the dam.

As a result of the field surveys and the literature review, it was concluded that the following five listed wildlife species either have been recorded to occur, or have a moderate or high potential to occur within the study area.

- Bald Eagle
- Southwestern Willow Flycatcher
- Least Bell's Vireo
- Coastal California Gnatcatcher
- Stephens' Kangaroo Rat

Bald eagle

The bald eagle has been observed on Lake Perris mostly as a winter migrant. They have also been observed at Santa Ana River/Prado Basin, Lake Elsinore, Vail Lake, Lake Hemet, Lake Mathews, and Lake Skinner (RCIP, 2003). Bald eagles typically require large bodies of water or free flowing rivers containing fish, with adjacent snags or other perches. They generally nest in large trees with open branching. Bald eagles nest from February to August, with nests usually located near a permanent water source.

Southwestern willow flycatcher

This breeding season migrant is restricted to riparian woodlands along streams, rivers, wetlands and marshes with mature, dense stands of willows, cottonwoods, or smaller spring fed or boggy areas with willows or alders. Southwestern willow flycatchers typically arrive in southern California at the end of April and adults depart from the breeding territory in mid-August to early September. Riparian habitat provides both breeding and foraging habitat for the species. This subspecies is known to breed in only eight locations in Southern California, including the Santa Margarita and San Luis Rey rivers in San Diego County and the Santa Ynez River in Santa Barbara County (San Diego Natural History Museum, 1995). Southwestern willow flycatchers have been recorded in western Riverside County from the Prado Basin area eastward to the vicinity of Vail Lake (RCIP, 2003). A small number of occurrences have been recorded historically near Lake Perris but there have been no known territories on-site since 1990 (RCIP, 2003). Southwestern willow flycatchers were not observed during protocol surveys in 2007.

Least Bell's vireo

This migratory songbird requires riparian woodlands with a dense understory and stratified canopy. The least Bell's vireo is a spring and summer breeding migrant of southern California, arriving by end of March and migrating back to Mexico by end of August (RCIP, 2003). The second largest population in the U.S. occurs at the Prado Dam flood control basin and along Chino Creek in western Riverside County (RCIP, 2003). A minimum of two least Bell's vireo

breeding territories were located during 2005 and 2007 surveys in the riparian band on the northeast shore of Lake Perris near pictograph rock. Least Bell's vireos have also been observed in the riparian area below Lake Perris Dam in 2007 and within the emerging lakebed vegetation in 2009.

Coastal California gnatcatcher

The coastal California gnatcatcher is a resident species restricted to coastal sage scrub habitats generally below 750 feet elevation in coastal regions and below 1500 feet inland (Atwood and Boisinger, 1992). It ranges from Ventura County south to San Diego County and northern Baja California. It is less common in coastal sage scrub with a high percentage of tall shrubs such as laurel sumac, preferring habitat with more low growing vegetation. California gnatcatchers are found in sage scrub habitats throughout western Riverside County with high densities in the area between Lake Elsinore, Lake Skinner, and Temecula (RCIP, 2003). Protocol surveys conducted during 2007 and 2008 field surveys of the study area resulted in no observations of the coastal California gnatcatcher.

Stephens' kangaroo rat

The Stephens' kangaroo rat is a small burrowing rodent adapted for arid environments with long, strong hind legs, and short, relatively small front legs. The Stephens' kangaroo rat is found almost exclusively in open grasslands or sparse shrublands such as coastal sage scrub with cover of less than 50 percent. They prefer areas with buckwheat, chamise, brome grasses and filaree. They avoid areas with dense grass cover. As a fossorial (burrowing) animal, it typically is found in well drained, gravelly or sandy and sandy loam soils with a low clay content, and avoid rocky soils. However, there are exceptions where they can utilize the burrows of pocket gophers and California ground squirrels.

The Stephens' kangaroo rat is found in western Riverside County in patches from the Corona Hills to Anza Valley, in the Temecula area to Potrero Valley, and in the Badlands (RCIP, 2003). The San Jacinto Wildlife Area-Lake Perris SRA is a core reserve area for Stephens' kangaroo rat (RCIP, 2003). Stephens' kangaroo rat has been found in the grassland habitat east of Lake Perris and in portions of the grassland areas below the dam. Stephens' kangaroo rat trapping was conducted at Lake Perris by the Riverside County RCA as part of the Western Riverside County MSHCP monitoring program in 2006. There was one trapping grid below the dam, located at the northwest end of the dam. One Stephens' kangaroo rat was captured during the summer (August 15-17) 2006 trapping session and a second Stephens' kangaroo rat was captured during the fall (November 1-3) 2006 session. Stephens' kangaroo rats were PIT tagged to mark individual captures. Several other Stephens' kangaroo rats were captured in other locations around Lake Perris during the 2006 RCA trapping effort.

Protocol surveys were conducted in 2008 for SKR within the construction impact areas and no SKR were found. Some SKR were located below the dam in the grassland areas west of the northern portion of the dam similar to where they had been located in 2006. This area is not within the construction area for the proposed project. The 2008 survey results are included in the Biological Resource Evaluation included in Appendix C.

Non-Listed Special-Status Wildlife Species

Four non-listed special-status species wildlife species were observed within or adjacent to the proposed project site during the field surveys, these include:

- Coastal Western Whiptail
- Cooper's Hawk
- White-faced Ibis
- San Diego Black-tailed Jackrabbit

As a result of the field surveys and the literature review, it was concluded that the following twenty-one non-listed special-status wildlife species either have been recorded to occur, or have a moderate or high potential to occur on the proposed project site. Habitat requirement summaries and observations or probability for occurrence within the study area are shown in Table 3.3-7 and further detailed in the background biological resources report included in **Appendix C**, *Biological Resource Evaluation of the Lake Perris Dam Remediation Project*.

- Coast Horned Lizard
- Belding's Orange throated Whiptail
- Northern Red Diamond Rattlesnake
- White-faced Ibis
- White-tailed Kite
- Golden Eagle
- Mountain Plover
- Burrowing Owl
- Loggerhead Shrike
- California Horned Lark
- San Diego Cactus Wren
- Yellow-breasted Chat
- Southern California Rufous-crowned Sparrow
- Bell's Sage Sparrow
- Tricolored Blackbird
- Western Mastiff Bat
- Los Angeles Pocket Mouse
- Northwestern San Diego Pocket Mouse
- San Diego Desert Woodrat
- San Diego Banded Gecko
- Rosy Boa

3.3.6 Regulatory Framework

Federal Endangered Species Act

The USFWS administers the federal Endangered Species Act (FESA) that provides a process for listing species as either threatened or endangered, and methods of protecting listed species. Species are listed as either endangered or threatened under Section 4 of the FESA that defines as "endangered" any plant or animal species that is in danger of extinction throughout all or a significant portion of its range and "threatened" if a species is likely to become endangered in the foreseeable future. Section 9 of the FESA prohibits "take" of listed threatened or endangered species. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in such conduct. Harm under the definition of "take" includes disturbance or loss of habitats used by a threatened or endangered species during any portion of its life history. Under the regulations of the FESA, the USFWS may authorize "take" when it is incidental to, but not the purpose of, an otherwise lawful act.

The Western Riverside County MSHCP serves as the vehicle through which parties may comply with FESA, CESA and the Natural Communities Conservation Plan (NCCP) Act in western Riverside County for the incidental take of federal and state-listed endangered and threatened

species. Under the Riverside County MSHCP, DWR is considered a "Participating Special Entity" and can apply for Take Authorization to the RCA by completing a detailed application containing a description of the proposed project, and an analysis of its potential impacts to Covered Species and their habitats and to the MSHCP Conservation Area. Take authorization for a "Participating Special Entity" can then be granted by the MSHCP RCA.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-711) makes it unlawful to possess, buy, sell, purchase, barter or “take” any migratory bird listed in Title 50 of the Code of Federal Regulations Part 10. “Take” is defined as possession or destruction of migratory birds, their nests or eggs. Disturbances that causes nest abandonment and/or loss of reproductive effort or the loss of habitats upon which these birds depend would be in violation of the MBTA.

Federal Clean Water Act

The Corps regulates the discharge of dredged or fill material into waters of the U.S. including wetlands pursuant to Section 404 of the Clean Water Act. The Corps has permitting authority permits for the discharge of dredged and/or fill material into waters of the United States. As discussed above, the Corps will continue to assert jurisdiction over traditional navigable waters (TNWs) and all wetlands adjacent to TNWs. While the Corps has not completed a formal traditional navigable waters (TNW) determination for Lake Perris, the Corps has confirmed it has been regulating dredge and fill activities at Lake Perris pursuant to Section 404 of the Clean Water Act and an applicant can concede jurisdiction under the preliminary jurisdictional determination option in the latest Rapanos Guidance memorandum. The Corps typically asserts regulatory jurisdiction over a water body that is not a TNW if that water body is “relatively permanent” (i.e., contains water year-round, or at least “seasonally,” and also asserts jurisdiction over wetlands adjacent to such water bodies if the wetlands “directly abut” the water body (i.e., if the wetlands are not separated from the water body by an upland feature such as a berm, dike, or road).

The assumption of Corps regulatory for this project is based on the relatively permanent presence of water, the recreational boating use of the lake (e.g. navigability), and the presumption of commercial purpose relating to navigation. The lake would also likely meet the interstate commerce nexus commonly applied to delineate isolated waters. The limits of Corps jurisdiction on Lake Perris are presumed to be the 1588 foot water surface level of the pre-drawdown lake level representing the Ordinary High Water Mark (OHWM). The lateral extent of Corps jurisdiction extends to the furthest limits of wetland habitat adjacent to the open water and that meets the three-parameter definition of a jurisdictional wetland. This again, is presumed to be the furthest extent of the willow riparian habitat along the northeastern portion of the lake, as well as willow riparian habitat occurring below the dam.

California Endangered Species Act

The CDFG administers the California Endangered Species Act (CESA). The State of California considers an endangered species one whose prospects of survival and reproduction are in immediate jeopardy. A threatened species is 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 plant species is one present in such small numbers throughout its range that it may become endangered if its present environment worsens. State threatened and endangered species are protected against take, which under the CESA is restricted to direct killing or harm of individual animals and does not apply to the loss of habitat as it does under FESA.

Fish and Game Code of California

All birds, and raptors specifically, and their nests, eggs and parts thereof are protected under Sections 3503 3503.5 of the Fish and Game Code of California. Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) is considered a violation of this code. Additionally Section 3513 prohibits the take or possession of any migratory non-game bird listed by the MBTA.

CDFG regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake which supports fish or wildlife resources under Sections 1600-1603 of the Fish and Game Code of California. The CDFG issues Streambed Alteration Agreements for the alteration of any of these areas. It is not legal to alter the bed or bank of a stream or lake or their natural water flow without a CDFG Streambed Alteration Agreement.

Non-Listed Species Management and Conservation Concerns

Species of Special Concern is an informal designation used by CDFG for some declining wildlife species that are not proposed for listing as threatened or endangered. This designation does not provide legal protection, but signifies that these species are recognized as declining by CDFG.

The CNPS has developed an inventory of California's sensitive plant species. This inventory summarizes information on the distribution, rarity, and endangerment of California's vascular plants. The inventory is divided into four lists based on the rarity of the species. In addition the CNPS provides an inventory of plant communities that are considered natural communities of special concern by the state and federal resource agencies, academic institutions, and various conservation groups. The determination of the level of significance of impacts on plant species and natural communities is based on the number and size of remaining occurrences as well as recognized threats.

Natural communities of special concern are those that support concentrations of special-status plant or wildlife species, are of relatively limited distribution, or are of particular value to wildlife. Natural communities of special concern are not afforded legal protection unless they are

designated critical habitat for federally listed threatened or endangered species, support formally listed species, or are jurisdictional wetland habitats.

Western Riverside County Multi-Species Habitat Conservation Plan

The proposed project site lies within the boundary of the Western Riverside County MSHCP. The MSHCP involves the assembly and management of a 500,000-acre Conservation Area for the conservation of natural habitats and their constituent wildlife populations. The approval of the MSHCP and the Implementing Agreement (IA) by the USFWS and CDFG allows signatories of the IA to issue "take" authorizations for the 146 species covered by the MSHCP (termed "covered species"), including state and federally listed species as well as other identified sensitive species. The "take" authorization includes impacts to the habitats of the covered species. The signatories considered "permittees" include Riverside County, 14 cities in western Riverside County, Caltrans, and California Department of Parks and Recreation (State Parks).

The MSHCP allows the permittees to "take" (permit the loss of) the plant and animal species covered by the MSHCP through their local land use planning and development review processes. DWR is not a permittee under the MSHCP, however, any regional public facility provider such as a utility or a public district or agency, including a school, water or irrigation district, that operates and/or owns land within the MSHCP Plan Area and that applies for Take Authorization is defined as a Participating Special Entity. DWR as a Participating Special Entity may request Take Authorization for its activities pursuant to the permits. The MSHCP is designed to provide compliance with federal and state endangered species requirements.

The proposed project site lies within the Lake Perris SRA, which is designated a Public/Quasi-Public Land by the MSHCP. The Recreation Area is under the jurisdiction of State Parks. Although State Parks does not own all of the land, it does maintain, manage, and control access and the uses within the boundaries of the project area. Maintenance of existing public facilities in Public/Quasi-Public Lands is permitted by the MSHCP. The maintenance must occur within existing disturbance areas and without any changes in facility operation that would affect covered species.

If Public/Quasi-Public Lands would be used in a way that alters the land use so that the land would not contribute to covered species conservation, then replacement land must be acquired or otherwise permanently protected. The replacement must be at a minimum ratio of 1:1 replacement taking into account direct and indirect effects of Public/Quasi-Public Lands in one location with Public/Quasi-Public Lands in another location. The replacement land must be biologically equivalent or superior to the land that would be affected. An analysis describing the equivalent conservation must be approved by the USFWS and CDFG. The analysis must compare the effects and benefits of the proposed project, including specific mitigation and compensation for lost conservation values, with the conditions prior to development. The analysis must consider specific project design features, including project sighting and design guidelines, in the MSHCP and BMPs in the IA.

Stephens' Kangaroo Rat Habitat Conservation Plan

The proposed Project is located within the boundary of the adopted HCP for the endangered Stephens' kangaroo rat (SKR) implemented by the Riverside County Habitat Conservation Agency (RCHCA). The SKR HCP mitigates impacts from development on the SKR by establishing a network of preserves and a system for managing and monitoring them. Through implementation of the SKR HCP, more than $45 million has been dedicated to the establishment and management of a system of regional preserves designed to ensure the persistence of SKR in the plan area. This effort has resulted in the permanent conservation of approximately 50 percent of the SKR occupied habitat remaining in the HCP area. Through direct funding and in-kind contributions, SKR habitat in the regional reserve system is managed to ensure its continuing ability to support the species.

3.3.7 Impacts and Mitigation Measures

Significance Criteria

To determine the level of significance of an identified impact, the criteria outlined in the *CEQA Guidelines* were used. The following is a discussion of the approaches to, and definitions of, significance of impacts to biological resources drawn from several distinct guidelines sections.

CEQA Guidelines Section 15065 directs lead agencies to find that a project may have a significant effect on the environment if it 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 animal community, reduce the number or restrict the range of an endangered, rare, or threatened species, or eliminate important examples of the major periods of California history or prehistory. *CEQA Guidelines* Section 15206 further specifies that a project shall be deemed to be of statewide, regional, or area-wide significance if it would substantially affect sensitive wildlife habitats including, but not limited to, riparian lands, wetlands, bays, estuaries, marshes, and habitats for rare and endangered species as defined by the Fish and Game Code Section 903. *CEQA Guidelines* (Section 15380) provide that a plant or animal species, even if not on one of the official lists, may be treated as "rare or endangered" if, for example, it is likely to become endangered in the foreseeable future. Additional criteria to assess significant impacts to biological resources due to the proposed project are specified in *CEQA Guidelines* Section 15382 (Significant Effect on the Environment) "*…a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance*."

Appendix G of the *CEQA Guidelines* (as revised) indicates that a project would have a significant effect on the environment if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the CDFG or USFWS;
- Have 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, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- Fundamentally conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Fundamentally conflict 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 specify that there must be a significant connection between the mitigation measure and a "legitimate governmental interest (*CEQA Guidelines 15126.4*)." The mitigation measure must also be "roughly proportional" to the impact for which it is mitigating. Specifically, *CEQA Guidelines* 15126.4(a)(4):

- There must be an essential nexus (i.e. connection) between the mitigation measure and a legitimate governmental interest. *Nollan v. California Coastal Commission*, 483 U.S. 825 (1987); and
- The mitigation measure must be "roughly proportional" to the impacts of the project. *Dolan v. City of Tigard*, 512 U.S. 374 (1994). Where the mitigation measure is an *ad hoc* exaction, it must be "roughly proportional" to the impacts of the project. *Ehrlich v. City of Culver City* (1996) 12 Cal.4th 854.

Riparian Vegetation

Impact 3.3-1: The lowering of the lake level has resulted in a temporary impact to the pre-drawdown lake shore habitat dominated by riparian plant species. In addition, construction of the stability berm will permanently remove a portion of the similar habitat type found below the dam.

Temporary Effects

Prior to the drawdown, a band of mature southern willow woodland and scrub (approximately 48 acres) was well established along the eastern edge of the lake (see **Figure 3.3-6**). When the lake was drawn down, this vegetation was isolated from its water source. To avoid the destruction of this habitat, DWR installed an irrigation system that conveys lake water through a pipeline and sprinkler system along the entire northeast shore of the lake. This irrigation system is designed to maintain the vegetation until the lake level is restored. However, some areas have shown signs of water stress or mortality resulting in reduced cover. DWR has modified irrigation methods in order to maintain and increase survivability within the riparian area and continues to work on improving the irrigation system. It is expected that the riparian area will recover once the water is returned to its original level.

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2009.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-6
Riparian Areas

An assessment of the approximately 68 acres of existing riparian habitat composed of southern willow woodland and scrub along the northeastern portion of the lake was conducted by ESA in March 2009 (see Appendix C). The assessment divided the existing northeastern riparian habitat into patches categorized from 1-6 based on the survivorship value of the patch (1 being a patch with low survivorship, and 6 being the highest survivorship). Using this method, described in detail in Appendix C, the assessment concludes that approximately 23.8 acres (48.3 percent) of the original 48 acres of habitat value had been lost as of March 2009. It is assumed that this is a temporary loss that will be restored once the lake level is brought back to its original elevation.

The drawdown of Lake Perris in 2005 has also resulted in emerging vegetation of various types within the exposed lakebed and along the new lake shoreline. These include heliotrope scrub/sandbar, freshwater marsh, mule fat scrub, southern willow woodland and scrub, and ruderal areas (see Figure 3.3-2). These habitats became established on the exposed lakebed following the lowering of the lake level, and were not part of the original baseline for evaluating project impacts. DWR and State Parks in coordination with CDFG and USFWS staff have allowed this emerging vegetation to thrive rather than removing it through regular maintenance in order to provide interim habitat value.

A visual assessment of the emerging southern willow scrub habitat along the new shoreline was conducted in March 2009. Two separate areas of high quality southern willow scrub habitat were identified along the new shoreline, totaling approximately 11 acres. During the March 2009 survey, least Bell's vireo were observed utilizing this emerging willow shoreline vegetation (Appendix C).

The emerging willow scrub shoreline vegetation is providing some level of value to offset the loss of the mature, pre-existing riparian habitat along the northeastern side of the lake. Due to its proximity to the affected riparian vegetation, and quality of habitat, the new lake shore's emerging vegetation has provided and will continue to provide a temporary location for wildlife species to inhabit during the drawdown period. However, during construction, the emerging vegetation within the construction zone will be removed. Furthermore, once the lake is returned to its original water level, the emerging vegetation will be submerged. In coordination with CDFG and USFWS, DWR will maintain as much high-quality willow scrub habitat as possible around the new lakeshore outside of the construction zone throughout the construction period. This will provide a band of willow habitat along the lakeshore parallel to the haul road through the construction period. Mitigation Measure 3.3-1a will ensure that DWR coordinate with CDFG and USFWS to manage these areas. The existing riparian habitat surrounding the lake is expected to return to its original quality within a few years of the raised lake elevation, resulting in no permanent loss of habitat. Mitigation Measure 3.3-1b commits DWR to implementing a habitat restoration plan to ensure that the habitat values return to the original condition or are enhanced.

Permanent Effects

Construction of the stability berm would encroach onto a portion of the mature riparian habitat that exists below the dam (see Figure 3.3-6). This southern willow woodland and scrub habitat has grown up as a result of seepage from the dam. The proposed project would permanently

remove 11 acres of this habitat. Mitigation Measure 3.3-1c would provide compensation for the lost riparian habitat. Compensation requirements would be consistent with the MSHCP and would require concurrence from CDFG and USFWS.

Mitigation Measures

Mitigation Measure 3.3-1a: DWR shall coordinate with CDFG and USFWS to minimize clearing of vegetation on the exposed lakebed outside of the construction zone while ensuring that sensitive species utilizing the habitat would not be impacted by construction activities.

Mitigation Measure 3.3-1b: DWR shall prepare and implement a southern willow woodland and scrub restoration plan for temporal impacts to the northeastern riparian habitat surrounding the lake that may include the following measures:

- Removal of dead trees within areas of low survivorship, leaving some in place as needed for snags, and re-contouring of select areas into planting basins of various sizes,
- Obtain cuttings from the emerging post-draw-down habitat to be installed within the established planting basins,
- Development of a maintenance and monitoring plan to ensure successful implementation and establishment until one year after water levels are returned to pre-draw-down conditions.

Mitigation Measure 3.3-1c: DWR shall provide compensation lands at a 1:1 ratio for permanently impacted habitat including southern willow woodland. DWR shall prepare an equivalency analysis for the compensation land.

Significance after Mitigation: Less than Significant.

Special-Status Plant Species

Impact 3.3-2: Implementation of the proposed project could result in the loss of endangered, threatened, candidate, or rare plant species listed under the federal or state Endangered Species Acts, or plants designated as rare by the CNPS.

No plants listed as endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts, and no plants listed as rare by the CNPS, were observed during the field surveys and none are known to occur within the proposed project site. As a result of the field surveys and the literature review, it was concluded that no listed plant species have more than a low potential to exist on or adjacent to the proposed project site due to lack of suitable habitats, soils and other factors such as known distribution and elevation ranges (see Table 3.3-7). Therefore no direct or indirect project impacts to listed, endangered, threatened, candidate or state rare plant species are anticipated as a result of implementation of the proposed project.

Significance: Less than Significant.

Special-Status Wildlife Species and Habitat

Impact 3.3-3: Implementation of the proposed project would result in permanent and temporal loss of southern willow woodland and scrub habitat which provides nesting habitat for the least Bell's vireo.

Least Bell's vireo is a federal and state-listed endangered species. This migratory songbird is generally found in riparian woodlands with a dense understory. It is a spring and summer migratory breeder in southern California. Two breeding territories of the least Bell's vireo have been found in the riparian band of southern willow woodland and scrub bordering the northeastern shore of Lake Perris. One least Bell's vireo territory has also been observed in the southern willow woodland and scrub habitat below Perris Dam during field surveys. In addition, least Bell's vireo were also observed utilizing the emerging vegetation at the new shoreline. Impacts (both temporary and permanent) to southern willow woodland and scrub present on-site would result in the loss of habitat for the least Bell's vireo.

As discussed in Impact 3.3-1, the drawdown has reduced the acreage of high quality habitat used by the least Bell's vireo on the northeastern shore of Lake Perris. To some extent these impacts have been lessened by emergent riparian vegetation that has provided interim vireo habitat within the lakebed during the drawdown period. Mitigation Measure 3.3-1a, 3.3-1b and 3.3-3a would reduce impacts to the least Bell's vireo resulting from the temporary loss of riparian vegetation along the northeastern portion of the lake. Mitigation Measure 3.3-3b will encourage removal of habitat during non-nesting season. Mitigation Measure 3.3-1c would compensate off-site for permanent impacts to vireo habitat below the dam.

The permanent reduction of habitat used by the least Bell's vireo below Perris Dam where 11 acres of southern willow woodland and scrub would be removed for the construction of the stability berm is considered a potentially significant impact that could be considered "take" under FESA.

The Western Riverside County MSHCP serves as the vehicle through which parties may comply with FESA, CESA and the NCCP Act in western Riverside County for the incidental take of federal and state-listed endangered and threatened species. Under the Riverside County MSHCP, DWR is considered a "Participating Special Entity" and can apply for Take Authorization to the RCA by completing a detailed application containing a description of the proposed project, and an analysis of its potential impacts to Covered Species and their habitats and to the MSHCP Conservation Area. Take authorization for a "Participating Special Entity" can then be granted by the RCA.

Fundamentally, the MSHCP has been established to avoid jeopardizing the continued existence of listed or proposed for listing endangered or threatened species. In issuing take authorization within the MSHCP the USFWS and CDFG have required that impacts are avoided and minimized

to the maximum extent feasible. For unavoidable impacts, compensation would be required to offset the temporary and permanent loss of habitat functions and values.

In order to minimize significant impacts on the least Bell's vireo, and to ensure compliance with FESA, CESA and the MSHCP, the following mitigation measures shall be implemented. However, due to the duration of the drawdown and the constant disruption to the least Bell's vireo habitat during the two year construction period, impacts to the least Bell's vireo would be considered significant and unavoidable.

Mitigation Measures

Mitigation Measure 3.3-3a: DWR shall modify the watering regimen for the band of southern willow woodland and scrub located on the eastern lakeshore pre-drawdown edge to include a periodic flooding schedule or some other means to sustain the pre-drawdown quality and extent of riparian habitat. Maintaining the pre-drawdown quality and extent of the riparian band through the project construction period would reduce temporary impacts to least Bell's vireo habitat impacted by the temporary lake drawdown. The regimen would be discontinued upon the refilling of the lake to its normal operating elevation of 1588 feet.

Mitigation Measure 3.3-3b: DWR shall conduct the following measures:

- Vegetation clearing needed to accommodate construction activities shall occur during the non-nesting season where feasible.
- For habitat removal conducted during the vireo nesting season, DWR shall have a qualified biologist conduct a pre-construction nesting season protocol survey for the least Bell's vireo within the project area to determine and map the location and extent of nesting least Bell's vireo occurrence(s).
- DWR shall avoid direct impacts on nesting least Bell's vireos located within the construction right of way. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season.
- If construction and vegetation removal is proposed for the vireo nesting period then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone shall be established as approved by the USFWS and CDFG. Nest sites shall be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist.

Implement **Mitigation Measures 3.3-1a through 3.3-1c**

Significance after Mitigation: Significant and Unavoidable.

Impact 3.3-4: Implementation of the proposed project would result in the permanent and temporary loss of non-native annual grassland habitat presumed to support the federally listed endangered Stephens' kangaroo rat.

The Stephens' kangaroo rat is a ground-dwelling rodent found almost exclusively in open grasslands or sparse shrub habitats such as coastal sage scrub. This species has been previously documented present in the Lake Perris SRA east of the lake and on the north end below the dam outside the construction footprint. Trapping for SKR conducted in 2008 found no SKR in the project impact area (Appendix C). While non-native grassland (47 acres) would be impacted by implementation of the project staging area, stability berm and emergency outlet extension, these areas do not support SKR populations based on the 2008 trapping results. The construction of an open channel emergency outlet extension would result in permanently impacted grassland within the SKR HCP fee area. The remaining non-native grassland area would be used for staging purposes and would be restored following construction. Additional non-native grassland habitat would be restored following construction of the underground emergency outlet extension alternative.

Refer to Impact 3.3-11 for a discussion on project impacts related to the SKR HCP.

Mitigation Measures

Mitigation Measure 3.3-4: DWR shall implement the following measures:

- DWR shall have a qualified biologist with a Stephens' kangaroo rat handling permit, conduct pre-construction surveys for the Stephens' kangaroo rat within the grassland habitat to determine and map the location and extent of Stephens' kangaroo rat occurrence(s) within the project impact area. Confirmed Stephens' kangaroo rat precincts shall be avoided with the establishment of a non-disturbance buffer zone approved by the USFWS and CDFG. DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on the Stephens' kangaroo rat.
- Where avoidance of confirmed Stephens' kangaroo rat precincts is infeasible and unavoidable, and if approved by the RCA, DWR shall have qualified biologists permitted or otherwise approved by the USFWS conduct a pre-construction Stephens' kangaroo rat trapping and relocation effort to minimize take of the Stephens' kangaroo rat during construction.
- DWR shall install a silt fence or some other impermeable barrier to Stephens' kangaroo rat to exclude Stephens' kangaroo rat from entering the active work areas.

Significance after Mitigation: Less than Significant.

Impact 3.3-5: Implementation of the proposed project would result in <u>temporary</u> impacts to migratory avian species due to temporary loss of southern willow woodland habitat and due to disturbance of construction activities.

Seasonal and sporadic migrant avian species stopping at Lake Perris SRA could be affected by the reduced quality of the existing riparian habitat along the northeast shore of the lake (as described in Impact 3.3-1), implementation of Mitigation Measure 3.3-1a through 3.3-1c, and 3.3-a would reduce this impact to a less than significant level. The disturbance caused by construction activities could also impact these migrant avian species. During the construction period, some migratory species may avoid the SRA.

Construction activities would increase the level of disturbance and presence of humans and large machines in open space areas of the park over a period of two years. This disturbance would significantly alter the ambience of the park, resulting in the potential for wildlife to move from the vicinity of the construction to more remote areas of the park. Human activity is common in the proposed construction zones, but the level of activity would increase substantially. Following construction, wildlife would likely return to the vicinity of the eastern lake shore.

Blasting occurring within the quarry, at the proposed new outlet tower, and along the haul road over the Bernasconi Hills could disrupt nesting birds and local wildlife. Sudden irregularly timed percussive noise events of 110 dBA could startle wildlife and could result in flight response. Nesting birds could leave the nests which could affect survival of the brood. The startling could stress wildlife in general, resulting in lower productivity or flight from the area. Blasting could occur irregularly for a period of two years. Limiting blasting to non-nesting periods would not be feasible. Impacts of noise to the environment are discussed in Section 3.9. Mitigation measures identified in the noise impact section (Section 3.9) require that noise barriers be installed for blasting activities. This would reduce the noise levels, but not eliminate the startle factor entirely. The potential impact to birds and wildlife from blasting noise would be considered a significant and unavoidable impact of the project.

Mitigation Measures

> **Mitigation Measure 3.3-5a:** DWR shall have a qualified biologist conduct a pre-construction spring/summer active season reconnaissance survey for nesting/roosting migratory bird species, and other nesting birds within 150-feet of the construction limits of each project element to determine and map the location and extent of special-status species occurrence(s) that could be affected by the project.
>
> **Mitigation Measure 3.3-5b:** DWR shall avoid direct impacts on any nesting birds located within the limits of construction. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season (February 1 through August 31).
>
> **Mitigation Measure 3.3-5c:** If construction and vegetation removal is proposed for the bird nesting period February 1 through August 31, then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone established dependent on the species and in consultation with the USFWS and CDFG. Nest sites shall

be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist.

Implement **Mitigation Measure 3.3-1a through 3.3-1c, and 3.3-3a**

Significance: Blasting could disrupt nesting migratory birds in the area resulting in a significant and unavoidable temporal impact of the project.

Impact 3.3-6: Implementation of the proposed project would result in the permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, non-native grassland and other habitats which may support non-avian ground dwelling special-status species such as the northern red diamond rattlesnake, coastal western whiptail, San Diego pocket mouse, the Los Angeles pocket mouse, San Diego black-tailed jackrabbit, American badger and other special-status ground dwelling non-avian wildlife species.

The proposed project would result in both temporary and permanent impacts to a number of habitats around the edge of Lake Perris and below Perris Dam. Permanent impacts to Riversidean sage scrub, non-native grasslands, southern willow woodland and scrub, and coyote brush scrub would result from the construction of the stability berm below the dam, the emergency outlet extension and portions of the haul road through the Bernasconi Hills (**Table 3.3-8** and Figure 3.3-6).

The northern red diamond rattlesnake, coastal western whiptail and San Diego black-tailed jackrabbit were observed on or adjacent to the project site during field surveys. Seven other sensitive ground dwelling wildlife species were found to have moderate to high potential to occur on the project site including the coast horned lizard, Belding's orange throated whiptail, Los Angeles pocket mouse, northwestern San Diego pocket mouse, San Diego desert woodrat, San Diego banded gecko and the rosy boa. Both temporary and permanent impacts on Riversidean sage scrub, non-native grasslands, southern willow woodland and scrub and other plant communities present on-site would result in the loss of habitat for these species to the extent they occur within the project site. Furthermore, project implementation could result in mortality to individuals should they occur within the active project areas.

Trapping surveys conducted along the southeastern portion of the lake in 2007 found no Los Angeles pocket mice. However several Los Angeles pocket mice were captured during the 2008 Stephens' kangaroo rat protocol surveys conducted below the dam. Other special-status species captured during the surveys included one Bryant's woodrat and several San Diego pocket mice (see Appendix C for detailed information regarding each survey). Mitigation Measures 3.3-6a through 3.3-6e would reduce any impacts to these special-status species to a less than significant level.

TABLE 3.3-8
PROJECT IMPACTS TO LOCAL HABITATS

	Approximate Permanent Impacted Acres		Approximate Temporary Impacted Acres	
Habitat Type	**Underground Channel Alternative**	**Open Channel Alternative**	**Underground Channel Alternative**	**Open Channel Alternative**
southern willow scrub	11	11	24	24
non-native grasslands	7	28	40	19
Riversidian sage scrub	9	17	8	1
Coyote brush scrub	1	1	0	0

Special-status species that are not otherwise listed within the Endangered Species Act may not be provided legal protection. Significant impacts to non-listed special-status species would occur if a substantial modification to habitat supporting the species occurred. In order to reduce potentially significant impacts to non-avian ground dwelling special-status species to a less than significant level, the following mitigation measures should be implemented.

Mitigation Measures

Mitigation Measure 3.3-6a: DWR shall have a qualified biologist conduct a pre-construction field reconnaissance survey for non-listed special-status ground-dwelling species within the construction right-of-way.

Mitigation Measure 3.3-6b: DWR shall avoid and minimize impacts on documented locations of special-status ground dwelling species to the extent feasible and practicable by reducing the construction right-of-way through areas of occurrences to either avoid the occurrence or reduce impacts to the minimum necessary to complete the project.

Mitigation Measure 3.3-6c: DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on special-status ground dwelling wildlife species.

Mitigation Measure 3.3-6d: DWR shall install a silt fence or some other impermeable barrier to exclude small wildlife species from entering the active work areas. Exclusion fencing can be limited to areas of documented occurrences of special-status wildlife as determined during pre-construction surveys.

Mitigation Measure 3.3-6e: DWR shall have a qualified biologist conduct pre-construction and construction capture, salvage, and relocation efforts to remove special-status ground dwelling wildlife species, and other common species to the extent feasible, out of harms way to avoid and minimize impacts on these species.

Significance after Mitigation: Less than Significant.

Impact 3.3-7: Implementation of the proposed project would result in permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, and other habitats which may support the formally listed endangered coastal California gnatcatcher, as well as a number of special-status avian species including the burrowing owl, golden eagle, Cooper's hawk, white-faced ibis and other special-status avian and bat species.

The proposed project would result in both temporary and permanent impacts to a number of habitats around the edge of Lake Perris and below Perris Dam. A combined total of 47 acres of temporary and permanent impacts to non-native grassland would result from the stability berm stockpile area and new emergency outlet extension below the dam. As summarized in Table 3.3-8, permanent impacts to 17 acres of Riversidean sage scrub, 11 acres of southern willow woodland and scrub, and one acre of coyote brush scrub would result from the construction of the stability berm below the dam, portions of the haul road, and the emergency outlet extension's open channel alternative (Figure 3.3.6). The underground emergency outlet extension alternative would permanently impact the same amount of southern willow woodland and scrub and coyote brush scrub, but would have 9 acres of permanent impacts to Riversidean sage scrub. Temporary project impacts include approximately 24 acres of southern willow woodland along the east shore of the reservoir.

Cooper's hawk, white-faced ibis, loggerhead shrike, and golden eagle were observed on the project site during field surveys. Nine other special-status bird and bat species were found to have moderate to high potential to occur on the project site including the burrowing owl, white-tailed kite, mountain plover, California horned lark, San Diego cactus wren, yellow-breasted chat, southern California rufous-crowned sparrow, Bell's sage sparrow, tricolored blackbird and western mastiff bat.

Temporary and permanent impacts on Riversidean sage scrub, non-native grasslands, southern willow woodland and scrub and other plant communities present on-site would result in the loss of habitat for these species within the project site. The CDFG Code Sections 3503 and 3503.5 and the Federal MBTA of 1918 also prohibit the possession and destruction of birds, nests, and/or their eggs. In order to reduce potentially significant impacts to a less than significant level, the following mitigation measures shall be implemented.

Mitigation Measures

> **Mitigation Measure 3.3-7a:** DWR shall have a qualified biologist conduct a pre-construction spring/summer active season reconnaissance survey for nesting/roosting coastal California gnatcatcher, burrowing owl, special-status bird and bat species, and other nesting birds within 150-feet of the construction limits of each project element to determine and map the location and extent of special-status species occurrence(s) that could be affected by the project.
>
> If burrowing owls are found to be present, appropriate protocol surveys must be conducted. Avoidance of burrowing owls during the nesting season shall be required, and if burrowing owls are found outside of the nesting season they shall be relocated by a qualified biologist in consultation with the USFWS and CDFG.

Mitigation Measure 3.3-7b: DWR shall avoid direct impacts on any nesting birds located within the limits of construction. This could be accomplished by establishing the construction right of way and removal of plant material outside of the typical breeding season (February 1 through August 31).

Mitigation Measure 3.3-7c: If construction and vegetation removal is proposed for the bird nesting period February 1 through August 31, then active nest sites located during the pre-construction surveys shall be avoided and a non-disturbance buffer zone established dependent on the species and in consultation with the USFWS and CDFG. Nest sites shall be avoided with approved non-disturbance buffer zones until the adults and young are no longer reliant on the nest site for survival as determined by a qualified biologist.

Mitigation Measure 3.3-7d: If a natal bat roost site is located within the limits of construction during pre-construction surveys, it shall be avoided with non-disturbance buffer zone established by a qualified biologist in consultation with the USFWS and CDFG until the site is abandoned.

Mitigation Measure 3.3-7e: DWR shall minimize impacts on documented locations of special-status species and any nesting birds by reducing the construction right-of-way through areas of occurrences to either avoid the occurrence or reduce impacts to the minimum necessary to complete the project.

Mitigation Measure 3.3-7f: DWR shall stake, flag, fence, or otherwise clearly delineate the construction right-of-way that restricts the limits of construction to the minimum necessary to implement the project that also would avoid and minimize impacts on special-status wildlife species.

Significance after Mitigation: Less than Significant.

Fisheries

Impact 3.3-8: Implementation of the proposed project would result in the alteration of the population structure and composition of the recreational warm-water non-native fishery of Lake Perris.

The emergency drawdown in 2005 has caused a decrease in water depth around the lake and has resulted in the loss of shallow water habitat (3 to 10 feet in depth), which normally provides important spawning and rearing areas for warm-water game fish in Lake Perris. The lower water level forces small fish into deeper water where there are higher chances of predation due to the loss of cover and habitat. In addition, construction activities including blasting for the new outlet tower could impact fish in the near proximity. The excavation of the borrow area could also result in the reduction of shallow-water habitat and an increase in deep water habitat once the reservoir is refilled. As a result, aquatic vegetation may be unable to establish in the deep water areas. Aquatic vegetation normally acts as spawning and rearing habitat for fish. Impacts to the fishery could result from the loss of shallow-water habitat.

According to data from the CDFG, the population structure of Lake Perris is shifting due to the effects of the drawdown. Recent (2006) surveys show that the number of largemouth bass, 12 inches in length or larger has decreased by approximately 40 percent compared to pre-drawdown levels. Lake temperatures have historically not been suitable for reproduction of rainbow trout, though some 'holdovers' survive from season to season. Increases in lake temperatures appear to have reduced the number of holdover rainbow trout, thus reducing the larger sized fish. The number of young largemouth bass, bluegill, and redear sunfish are also below average. These species are not reproducing at levels high enough to sustain current populations, likely due to an increase in predation and a decrease in suitable spawning habitat. However, on the whole, fish concentrations appear to be higher due to the 40 percent decrease in water volume. Appendix C: Biological Resources Appendix includes an assessment of the 2007 status of the fishery at Lake Perris

Lake Perris is a man-made lake not within any historic watercourse that ever supported native fishes. The lake currently supports regularly stocked, as well as self-sustaining populations of non-native warm-water game fishes. The lake is managed for its fishery by CDFG and State Parks as a public trust asset. Impacts to individual fish affected during construction would not be a significant impact since these species are not considered sensitive species. However, DWR will implement Mitigation Measure 3.3-8 in an effort to help restore fish populations at Lake Perris once the water level has been returned to its normal operating elevation. The potential impact to the fishery at Lake Perris as a public trust asset is discussed in the Recreation section of this EIR.

Mitigation Measures

Mitigation Measure 3.3-8: DWR in consultation with the Lake Perris SRA and CDFG shall plan for restoration of the fishery resource at Lake Perris to a sustainable population that supports recreation uses.

- DWR shall fund habitat placement and fish monitoring in Lake Perris for three years, once the lake level is restored to Elevation 1588, under an agreement with CDFG.
- DWR shall continue to coordinate and work with CDFG on appropriate activities to restore fish levels after reservoir restoration for a three year period. These efforts may include additional habitat placement and/or fish stocking.

Significance after Mitigation: Less than Significant.

Impact 3.3-9: Implementation of the proposed project would result in the loss of shallow water habitat (3 to 10 feet) on the northeastern end of the lake which could impact spawning and rearing habitat for the non-native warm-water game fish and food resources for resident and migratory winter waterfowl.

The excavation of approximately two million cubic yards of soil from the borrow area at the east end of the lake would result in the reduction of shallow water habitat and an increase in deep water habitat once the lake is filled back to normal operating levels. As a result, aquatic vegetation would be unable to re-establish in these areas due to the lack of light at the deeper

levels. Aquatic vegetation supports aquatic invertebrates and both can be used as a food source by waterfowl and fish. Aquatic vegetation is also used as spawning and rearing habitat by fish. Many of the warm-water fish stocked in the lake, including redear sunfish and largemouth bass nest in waters with depths of less than 10 feet. Some fish, such as the bluegill, require depths of two feet or less. As the fish populations in Lake Perris are non-native recreational fish, from a special-status species standpoint, impacts resulting from the borrow area excavation on the non-native fish populations are considered to be less than significant.

Thousands of migratory and wintering waterfowl use the habitat resources on and around Lake Perris for foraging, roosting, and resting. The use of the lakebed as a borrow area would result in the loss of some of the available freshwater marsh and shallow water habitat along the northeastern edge of the lake where waterfowl tend to congregate to feed. **Figure 3.3-7** shows the extent of shallow water areas (10 foot depth or less) within the proposed borrow area. The project would reduce the shallow-water habitat from approximately 93 acres under pre-drawdown conditions, to approximately 69 acres—a loss of 24 acres (see Waterfowl Analysis Memo included in Appendix C). As shown in the Waterfowl Analysis Memo, the borrow area would reduce the amount of shallow water habitat available by approximately 26 percent, but the large majority of the lake and lake edge would still be available to waterfowl for shallow water resources. Mitigation Measures 3.3-8, 3.3-9a and 3.3-9b require that DWR implement a restoration plan to encourage the return of shallow water habitat along the lake's edge. Once construction is finished and efforts have been made to improve the shoreline habitat and recover fish population, waterfowl are expected to return to the lake in numbers similar to pre-drawdown conditions.

DWR has also been funding 15 acres of waterfowl pond rehabilitation at the San Jacinto Wildlife Area to mitigate for the temporary loss of waterfowl hunting opportunities, waterfowl food production and riparian vegetation. Following implementation of mitigation, the effects to migratory water fowl would be less than significant.

Mitigation Measures

> **Mitigation Measure 3.3-9a:** In order to minimize impacts to shallow water breeding and rearing habitat for the non-native warm water fish and waterfowl resources around the eastern reservoir edge, the borrow area shall be established with a 125-foot no disturbance buffer zone between the inside reservoir edge of the riparian habitat and the edge of the borrow area. The 125-foot buffer would create a shallow bench around the reservoir edge and promote aquatic plant growth that would provide habitat for invertebrates and cover for fishes. Variable size rocks and rip rap shall be placed along portions of the borrow area in areas that would not generate hazards to boats. Gravel shall be placed on the shelf areas created by new excavation and maintained shallow water habitat, to promote spawning areas. Rootwads or other habitat enhancement structures intended to provide cover for fishes and generate foraging and spawning habitat, shall be placed within the rip rap and rocks where they do not present a hazard to boating.

Lakebed above 1578 Elevation (92.84 Acres)
Proposed Borrow Area

0 3,500
Feet

SOURCE: GlobeXplorer, 2007; DWR, 2008; ESA, 2008.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.3-7
Shallow Water Area
within Proposed Borrow Area

Mitigation Measure 3.3-9b: DWR shall minimize the borrow area size to the extent feasible, leaving as much of the previous shallow water shoreline as possible. The final designs given to the contractor will include a detailed construction zone limitation that identifies a minimum shoreline buffer zone.

Implement **Mitigation Measure 3.3-8**

Significance after Mitigation: Less than Significant.

Waters of the U.S. and State

Impact 3.3-10: Implementation of the proposed project would result in the temporary and permanent impacts to southern willow woodland and scrub, freshwater marsh and other waters of the U.S. and waters of the State within Lake Perris under the jurisdiction of the Corps pursuant to the Clean Water Act and CDFG pursuant to Section 1602 of the Fish and Game Code (Streambed Alteration Agreements).

Some areas within the project could be categorized as wetland habitats and may fall under the jurisdiction of the Corps and/or CDFG. Potentially significant impacts from the alteration of Lake Perris within Corps and/or CDFG jurisdiction would be mitigated to a less-than-significant level with restoration of temporarily affected habitats and compensation for permanently affected habitats. The area within the exposed lakebed and along the original shoreline is considered to be Corps jurisdictional. The riparian area below the dam is not considered to be Corps jurisdictional.

DWR would obtain Clean Water Act regulatory compliance in the form of a permit from the Corps or written documentation from the Corps that a permit is not required. In permitting projects, the Corps seeks to meet the goal of no net loss of functions and values of wetlands and other waters of the U.S. and would require at a minimum the restoration of disturbed areas to original contours and a revegetation program to restore areas of jurisdictional habitat disturbed by the proposed project.

DWR shall obtain California Fish and Game Code Section 1602 compliance in the form of a completed Streambed Alteration Agreement or written documentation from the CDFG that an agreement is not required. DWR shall implement all the terms and conditions of the CDFG Streambed Alteration Agreement.

Significance: Less than Significant.

Habitat Conservation Plan

Impact 3.3-11: Implementation of the proposed project would conflict with the provisions of the Western Riverside MSHCP or the Long-Term Stephens' Kangaroo Rat HCP.

Western Riverside County MSHCP

As discussed throughout this section, the project falls within the Western Riverside County MSCHP. The Western Riverside County MSHCP involves the assembly and management of a 500,000-acre Conservation Area for the conservation of natural habitats and their constituent wildlife populations. The approval of the MSHCP and the Implementing Agreement (IA) by the USFWS and the CDFG allows signatories of the IA to issue "Take" authorizations for the 146 species covered by the MSHCP (termed "covered species"), including state and federally listed species as well as other identified special-status species. The "take" authorization includes impacts to the habitats of the covered species. The Western Riverside County MSHCP includes the entire western riverside county, and any new development in this area is required to pay an acreage fee established by the County in Ordinance No. 810 and 810.2, to support the financing for the MSHCP. The fee provides for compliance with FESA and CESA. The MSHCP is further broken down into core areas and linkages which are the focus of reserve and preservation actions. The proposed project lies within Core H, which is comprised of Lake Perris SRA, San Jacinto Wildlife Area, private lands and lands with pre-exiting conservation agreements. Core H provides habitat for wildlife species (discussed under impacts listed above) and contains soils suitable for some Narrow Endemic Plant Species (covered below under MSHCP Section 6.1.3/6.1.4). The project does not lie within any of the proposed or existing criteria areas or any wildlife movement corridors. Furthermore, the proposed project is in compliance with the MSHCP's *Activities Outside of Criteria Area Requirements*, which states:

> Public and private Development, including construction of buildings, structures, infrastructure and all alterations of the land, that are carried out by Permittees, Participating Special Entities, Third Parties Granted Take Authorization and others within the Plan Area, that are outside of the Criteria Area are permitted under the Plan, subject to consistency with MSHCP policies that apply outside the Criteria Area (such as policies related to riparian and riverine areas and vernal pools, narrow endemic plant species, additional survey needs and procedures, and funding/fee issues).

Additional Plan Wide Requirements that may apply to areas outside the MSHCP Criteria Areas are outlined in Sections 6.1.2 (Riverine/Riparian, Vernal Pool, and Fairy Shrimp Habitat), Section 6.1.3 (Narrow Endemic Plant Species Surveys), Section 6.3.2 (Criteria Area Species Surveys, which covers additional survey needs and procedures), and Section 6.1.4 (Urban/Wildlands Interface Requirements) of the Western Riverside County MSHCP. The site is expected to have the potential for narrow endemics and criteria area species as listed in Sections 6.1.3, and 6.3.2, refer to Table 3.3-7, Western Riverside County MSHCP column, for information regarding which species are covered under each section. Implementation of Mitigation Measure 3.3-1c would mitigate for any impacts associated with development within the Western Riverside County MSHCP Fee area.

MSHCP Section 6.1.2

According to field surveys, the site does not contain any vernal pool or fairy shrimp habitat, however, there are areas of riparian habitat located below the dam and along the eastern portion of the lake. Mitigation Measures 3.3-9a would maintain a 125 foot buffer between the riparian area along the eastern portion of the lake and any construction disturbance within the borrow area and haul road. Mitigation Measures 3.3-3a would help maintain the health of the riparian area, due to the new watering regimen and Mitigation Measures 3.3-1a and 3.3-1b would help improve the transition of the riparian area between the drawdown and re-filling of the lake. Implementation of the abovementioned mitigation measures would ensure consistency with the MSHCP for the riparian area along the eastern portion of the lake. A portion of the riparian area below the lake would be removed due to the construction of the new stability berm. With implementation of Mitigation Measures 3.3-1 through 3.3-1c, 3.3-3a, and 3.3-9a the project would be consistent with this portion of the MSHCP.

MSHCP Section 6.1.3/6.1.4

The MSHCP identifies requirements for the protection of narrow endemic plants and for urban-wildland interface areas. Narrow Endemic Plant Species identified by the Riverside County Integrated Project (RCIP) Conservation Summary Report Generator for the emergency outlet extension project component area west of Lake Perris Drive includes, San Diego ambrosia, many-stemmed dudleya, spreading navarretia, California orcutt grass, and Wright's trichocoronis. Rare plant surveys were conducted for the entire project area and none of the above listed plant species were observed, therefore the project is consistent with this portion of the MSHCP. The Lake Perris SRA is surrounded to the north and east by undeveloped land. Development is expanding west and south of the SRA. With the implementation of Mitigation Measure 3.3-1b and 3.3-3a the project would be consistent with this portion of the MSHCP.

MSHCP Section 6.3.2

The MSHCP requires habitat assessments to be conducted for the burrowing owl and the Los Angeles pocket mouse throughout much of the project impact area. Implementation of Mitigation Measures 3.3-6a through 3.3-6e and 3.3-7a would reduce the impact on the Los Angeles pocket mouse to a less than significant level and would ensure consistency with the MSHCP.

Identified Criteria Area plant species which require habitat assessments were identified for the emergency outlet extension project component area west of Lake Perris Drive. These species include: Coulter's goldfields, Davidson's saltscale, little mousetail, mud nama, Parish's brittlescale, round-leaved filaree, San Jacinto Valley crownscale, smooth tarplant, and thread-leaved brodiaea. Rare plant surveys were conducted in 2008 for the entire project area and none of the above listed plant species were observed, therefore the project is consistent with this portion of the MSHCP.

Stephen's Kangaroo Rat HCP

The proposed project falls within the SKR HCP fee area. The SKR HCP mitigates impacts from development on the SKR by establishing a network of preserves and a system for managing and

monitoring them. Through implementation of the SKR HCP, more than $45 million has been dedicated to the establishment and management of a system of regional preserves designed to ensure the persistence of SKR in the plan area. This effort has resulted in the permanent conservation of approximately 50 percent of the SKR occupied habitat remaining in the HCP area. The HCP requires that direct and indirect impacts to the Stephens' kangaroo rat, including habitat destruction of occupied land be mitigated either via on-site preservation of land, or the payment of the mitigation fee set out by the County ordinance. Mitigation fees are used to finance the implementation of the Stephens' Kangaroo Rat HCP. Currently, the areas of project disturbance are not occupied by SKR (according to protocol SKR surveys conducted at Lake Perris in 2008) and have not been historically occupied by SKR. However, should the area become occupied implementation of Mitigation Measure 3.3-11 would ensure compliance with Riverside County Ordinance 663.10.

Mitigation Measures

Mitigation Measure 3.3-11: In order to comply with the Stephens' Kangaroo Rat HCP, the project shall be reviewed by the RCHCA. If occupied habitat is permanently affected by the project, DWR shall acquire compensation lands adjacent to a potential habitat reserve site at a 1:1 ratio or pay the $500 per acre mitigation fee set out by Riverside County Ordinance 663.10 or as required by the RCHCA.

Implement **Mitigation Measures 3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, and 3.3-9a**

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.3-9 presents the impacts and mitigation summary for Biological Resources.

TABLE 3.3-9
BIOLOGICAL RESOURCES IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Riparian Vegetation: The lowering of the lake level has resulted in a temporary impact to the pre-drawdown lake shore habitat dominated by riparian plant species. In addition, construction of the stability berm will permanently remove a portion of the similar habitat type found below the dam.	3.3-1a through 3.3-1c	Less than Significant
Special-Status Plant Species: Implementation of the proposed project could result in the loss of endangered, threatened, candidate, or rare plant species listed under the federal or state Endangered Species Acts, or plants designated as rare by the CNPS.	None required	--

TABLE 3.3-9
BIOLOGICAL RESOURCES IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Least Bell's vireo: Implementation of the proposed project would result in permanent and temporal loss of southern willow woodland and scrub habitat which provides nesting habitat for the least Bell's vireo.	3.3-1a through 3.3-1c, 3.3-3a, and 3.3-3b	Significant and Unavoidable
Stephens' Kangaroo Rat: Implementation of the proposed project would result in the permanent and temporary loss of non-native annual grassland habitat presumed to support the federally listed endangered Stephens' kangaroo rat.	3.3-4	Less than Significant
Avian species: Implementation of the proposed project would result in temporary impacts to migratory avian species due to temporary loss of southern willow woodland habitat and due to disturbance of construction activities.	3.3-1a through 3.3-1c, 3.3-3a, and 3.3-5a through 3.3-5c	Significant and Unavoidable
Special-status ground dwelling species habitat: Implementation of the proposed project would result in the permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, non-native grassland and other habitats which may support non-avian ground dwelling special-status species such as the northern red diamond rattlesnake, coastal western whiptail, San Diego pocket mouse, the Los Angeles pocket mouse, San Diego black-tailed jackrabbit, American badger and other special-status ground dwelling non-avian wildlife species.	3.3-6a through 3.3-6e	Less than Significant
Special-status avian species habitat: Implementation of the proposed project would result in permanent and temporary loss of Riversidean sage scrub, southern willow woodland and scrub, and other habitats which may support the formally listed endangered coastal California gnatcatcher, as well as a number of special-status avian species including the burrowing owl, golden eagle, Cooper's hawk, white-faced ibis and other special-status avian and bat species.	3.3-7a through 3.3-7f	Less than Significant
Fisheries: Implementation of the proposed project would result in the alteration of the population structure and composition of the recreational warm-water non-native fishery of Lake Perris.	3.3-8	Less than Significant
Shallow Water Habitat: Implementation of the proposed project would result in the loss of shallow water habitat (3 to 10 feet) on the northeastern end of the lake which could impact spawning and rearing habitat for the non-native warm-water game fish and food resources for resident and migratory winter waterfowl.	3.3-8, 3.3-9a and 3.3-9b	Less than Significant

TABLE 3.3-9
BIOLOGICAL RESOURCES IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Waters of the US: Implementation of the proposed project would result in the temporary and permanent impacts to southern willow woodland and scrub, freshwater marsh and other waters of the U.S. and waters of the State within Lake Perris under the jurisdiction of the Corps pursuant to the Clean Water Act and CDFG pursuant to Section 1602 of the Fish and Game Code (Streambed Alteration Agreements).	None required	--
Habitat Conservation Plan: Implementation of the proposed project would conflict with the provisions of the Western Riverside MSHCP or the Long-Term Stephens' Kangaroo Rat HCP.	3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, and 3.3-9a	Less than Significant

3.4 Cultural and Paleontological Resources

The majority of this section's contextual summarizations are based upon the Lake Perris Dam Remediation Project Archaeological Survey report, a comprehensive archaeological assessment of the project area performed by DWR employees, Janis K. Offermann and Tiffany A. Schmid. This section will discuss the overall setting for the proposed project, which includes a summarization of the prehistoric, ethnographic, historic, and paleontological contexts. This section will also define and explain all applicable regulatory frameworks. The methodology used as part of the assessment of cultural resources within the Area of Potential Effect (APE) will be defined. Cultural resources found to be within the Perris Dam Remediation Program APE will be assessed, and potential impacts will be identified. Recommended mitigation measures for the preservation or protection of any potentially impacted cultural resources are also included.

A cultural resource is defined as any prehistoric archaeological, historic archaeological, or historic architectural resource. Paleontological resources are the petrified remains of past life commonly called fossils. Federal, State, and local guidelines have been established by which an item, object, structure, building, or any other such entity, can be considered or defined as a cultural resource (See Section 3.4.2, below). All projects that can potentially impact identified cultural resources must be assessed in order to ascertain the extent of the impact and mitigation measures, preferably avoidance, that must be proposed so as to preserve those resources. The assessment of project impacts on cultural resources under CEQA (*CEQA Guidelines*, Section 15064.5) is a two-step process: (1) determine whether the project site contains significant cultural resources then, (2) if the site is found to contain a cultural resource, determine whether the project would cause a substantial adverse change to the resource.

3.4.1 Setting

General Setting

The Lake Perris Remediation Program is located within the Lake Perris SRA in the Perris Valley region of the San Jacinto Plain. The Lake Perris SRA is situated to the south of Moreno Valley and to the east of the City of Perris, with the lake and associated recreational area bounded on the southeast by the Bernasconi Hills and on the north-northeast by the Russell Mountains. Vegetation in this area is a mixture of California Coastal Sage Scrub, Chaparral, and non-native grasslands, situated within the Southern California Mountains and Valleys ecological section (M262B, U.S. Forestry Service), Perris Valley and Hills Sub-section (M262Bk). Primary plant communities include, but are not limited to, California sagebrush, buckwheat, chamise and scrub oak.

Prehistoric Context

The chronological breakdown of the prehistory of the project area and its surrounding region is continually being debated and revised. Several different chronological systems have been proposed, each with their own unique terminology and chronological division. Warren (2004)

provides a concise discussion of current scholarship pertaining to the chronology of the history of the deserts of Southern California and proposes a single chronological system for the California Desert Region, which includes four primary prehistoric periods: the Pinto, the Gypsum, the Saratoga Springs, and the Protohistoric.

The Pinto Period (circa [c.] 5,000 to 2,000 B.C.)

Small, un-developed surface deposits dating from the Pinto Period suggest that Pinto settlement patterns consisted of temporary or seasonal occupation by small, migratory groups that were dependent upon a combination of big and small-game hunting and collection strategies which could include the exploitation of stream or water resources. Typically, sites of this period are found along lake shores and streams or springs, some of which are now dry. Material culture representative of this period in California prehistory include roughly formed projectile points, "heavy-keeled" scrapers, choppers, and the occasional use of flat millingstones and manos (Warren 2004:411).

Gypsum Period (c. 2,000 B.C. to A.D. 500)

It is during this time that we see archaeological evidence suggestive of inter-tribal trade, particularly between the desert and the coast. The artifact assemblage associated with this period includes an increase in the prevalence of millingstones and manos, and it is believed that it was during this period that the pestle and mortar were introduced. These technological developments may point to the increased consumption of seeds and mesquite. Other artifacts associated with the Gypsum Period include Humboldt Concave Base, Gypsum Cave, Elko Eared, and Elko Corner-notched projectile points. Towards the end of the Gypsum period, there is evidence for the use of the bow and arrow (Warren 2004:415).

Saratoga Springs Period (c. A.D. 500 to 1,200)

The general cultural pattern for this period is a continuation of that of the preceding Gypsum Period. The increase in cultural complexity continued into this period and the archaeological record attests to established trade routes between desert and coastal populations by way of shell beads and steatite, as well as an introduction of Anasazi influence from the eastern Great Plains as evidenced by the appearance of turquoise and pottery. Material culture related to this period includes Rose Spring and Eastgate projectile points, millingstones, manos, mortars and pestles, slate pendants, and incised stones (Warren 2004:422).

The Protohistoric Period (A.D. 1,200 to European Contact)

By the Protohistoric period, an extensive network of established trade routes wound their way through the desert, shuffling quality goods to populations throughout the Mojave Region. It is also believed that these trade routes encouraged or were the motivating factors for the development of an "increasingly complex socioeconomic and sociopolitical organization" within Protohistoric peoples in the Southern California area. Housepit village sites are prevalent during this period, as are the presence of Desert Side-notched and Cottonwood projectile points, pottery, steatite shaft straighteners, painted millingstones, and to a lesser degree, coastal shell beads. By

the end of this period, however, a decline in trade occurred and well-established village sites were abandoned (Warren 2004:425).

Ethnographic Background

Two primary ethnographic populations, the Luiseño and the Cahuilla, were present within the project area and the immediate surrounding area. The Luiseño were regionally centered along the coastal areas of Southern California, particularly along those sections of Northern San Diego County, Orange County and Los Angeles County proper, stretching inland into the present western end of Riverside and San Bernardino Counties. Cahuilla traditional areas extended east of the easternmost flank of the Luiseño, dominating the Peninsular and Transverse Mountain Ranges and the San Jacinto Plain, east into the Colorado Desert regions and south into areas beyond the now present Salton Sea (Bean & Shipek 1978:550; 575).

Although these two populations lived simultaneously and shared traditional lands, both were governed by distinct sociopolitical and socioeconomic systems. Little is known of the Luiseño political structure, but it appears that villages were centered on clans, and that each village was headed by a chief (Bean and Shipek 1978:555). It is estimated that there may have been around 50 Luiseno villages with a population of about 200 each at the time of the first Spanish contact (Bean & Shipek 1978:557).

Villages were strategically placed in locations that were defensible and that offered a reliable supply of water, such as sheltered coves or canyons or on the side slopes near warm thermal zones. Most houses in Luiseño villages were thatched, partially subterranean conical structures (Bean & Shipek 1978:553).

Luiseño material culture was characterized by the bow and arrow, curved throwing sticks and a variety of other hunting-specific tools, war clubs, slings, canoes, basketry, nets, hooks, metates and manos, pestles and mortars, and pottery. Also present are a variety of beads and other ornaments made of a variety of source materials such as bone, stone, and shell.

Situated to the east of the traditional areas of the Luiseño, the Cahuilla dominated the territory of Southern California's vast deserts, the Peninsular, and Transverse mountainous areas. This village society occupied high-altitude locations as well as low desert lands, with villages positioned in close proximity to canyons with high precipitation levels or plentiful water sources (mountainous locations), near fresh water sources or at the termini of alluvial fans where the high water table provided abundant mesquite and shallow wells could be dug. House structures of the Cahuilla ranged from "brush shelters to dome-shaped or rectangular structures 15-20 feet long" (Altschul et al. 1984; Bean 1978; Warren 2004). The Cahuilla social structure revolved around clans and exogamous moieties (components connected through inter-marriage). Hunting, in conjunction with the exploitation of a variety of available resources governed the Cahuilla subsistence strategy in much the same way as the Luiseño. The primary difference between the subsistence strategies of these two groups rested in the fact that the Cahuilla did not have access to marine resources, as those resources fell within the territory of the Luiseño. Another difference between

these two groups is the rise of agricultural techniques within the Cahuilla, particularly among those tribes around the Colorado River.

The material culture of the Cahuilla was extensive and varied, and included pottery, ornamental items, charmstones, and a number of knapped stone tools. Unlike other Native American populations in Southern California, the Cahuilla were able to retain their autonomy even after the arrival and increasing control of European explorers and the settling governments that followed. It was not until 1891 that the Cahuilla culture and its population began to succumb to the pressure of European and, later, United States governing bodies (Altschul et al. 1984; Bean 1978; Bean & Smith 1978; Warren 2004).

Historical Background

The historical setting for the project area under discussion is summarized into three primary periods: The Mission Period (A.D. 1769 – A.D. 1822), the Mexican or Rancho Period (A.D. 1822 – A.D. 1848), and from A.D. 1848 to the present.

The Mission Period (A.D. 1769 – A.D. 1822)

Upon the arrival of Spanish explorers to the area, a network of missions was constructed along the Pacific Coast of Baja California and, later, Alta California, which encompasses modern-day California. It was the aim of these missions to repeat a strategy employed by the Spanish in the area now known as Mexico (Brower 1996: 12). This strategy was to encourage, by any means necessary, the assimilation of Native populations to adopt the Spanish custom, language, and religion. The mission strategy relied upon an agricultural economy and as such, locations selected for the construction of a mission depended upon three factors: “arable soil for crops, an adequate supply of fresh water, and a large local Indian population” for labor (Rolle 2003: 41). Because of this, no missions were constructed in the immediate vicinity of the current project area, but it has been documented that the San Gabriel Mission utilized the fertile grasslands of the inland valleys as pasture for their cattle.

Juan Bautista de Anza was the first recorded European visitor to the area. He is credited with the discovery of an inland route from Sonora to the northern coast of California in 1774, bringing him through much of what is now known as Riverside County (Rolle 2003: 45) via the San Jacinto Mountains. With de Anza, the colonization of Alta California began in earnest. With the opening of the overland route, Spanish pueblos were established, evolving into the Spanish system of governance. In 1810, the population of New Spain revolted against high taxes and unfair laws. In 1821, the war was over and New Spain won its independence, becoming the Republic of Mexico; the lands of Alta California were included as part of the newly formed Republic (Brower 1996: 53).

The Mexican Period (A.D. 1822 – A.D. 1848)

With the late entry of Alta California into the fold of the Mexican-controlled territories, the years that followed involved the establishment and expansion of Mexican governorships throughout

California. In the 1830s, the missions began to be desecularized. Large expanses of mission land became ranchos or land grants that were given to prominent individuals (Brower 1996: 54). The following years were dominated by strategic attempts of wealthy and politically significant persons to gain control of more lands for cattle. Despite these struggles, as well as sporadic Native American uprisings by local bands, trade and agriculture continued to flourish. It was towards the later term of this period that the slow infiltration of Americans into California began. Unrest amongst the population of California increased and with it, a growing disdain for Mexican governorship and an ever-growing foreign population (principally American, French, and Russian) that would eventually compete for ultimate control over the region.

As the number of foreign elements within the boundaries of present-day California increased, so too did foreign interest in the acquisition of the region. The United States made a bold move towards the acquisition of western territories by positioning military forces to actively engage the Mexican military, thus beginning the Mexican-American War (A.D. 1846 – A.D. 1848). With the success of U.S. forces against the Mexicans, the Treaty of Guadalupe Hidalgo was drafted and signed, bringing an end to the conflict and giving control over Alta California, along with other regions in the present-day American Southwest, to the American government.

A.D. 1848 – Present

In 1850, two years after the discovery of gold in the mountains of eastern California, California entered into the Union as the 31st state of the United State of America. As a result of the discovery of gold and the mass migration of fortune-hunters to both southern and northern California, the population of the region exploded and development of urban areas grew. The transcontinental railroad came to the region in 1869, bringing industry and settlers to the area; the city of Riverside became the first of these colonized areas in what is now Riverside County. Cattle ranches were slowly replaced by citrus farming and agriculture, industries of major importance to the populace of the area.

The city of Perris, California, came into its own with the construction of the Santa Fe Railway, which required the routing of the line through Perris en route to San Diego in 1881. With this new access channel, settlers amassed in the area and by 1885, the city of Perris was under construction. When the rail system left the area, the region's development of an agriculturally-based economy kept Perris afloat. Due to the construction of the Colorado River Aqueduct during the 1930s and other efforts to bring water to the region by the Eastern Municipal Water District in the 1950s, agriculture in the area shifted from dry farming crops to a more diverse collection of crops including alfalfa, the King potato, and sugar beets (City of Perris History, 2007).

The State Water Project was approved by the California Legislature in 1951, with construction beginning in 1957 and continuing into the present day. The terminus of this approximately 600-mile-long water delivery and storage system is Lake Perris, which was constructed in the later part of the 1960s and the early 1970s.

At present, the region surrounding the project area includes a combination of agricultural land that is slowly being encroached upon by urban residential development, particularly in the plain to the west of the Lake Perris earthen dam.

Paleontological Resources

Paleontological resources are fossilized evidence of past life found in the geologic record. Despite the huge volume of sedimentary rock deposits preserved worldwide and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of the infrequency of fossil preservation, fossils (particularly vertebrate fossils) are considered to be nonrenewable resources. Because of their rarity and the scientific information they can provide, fossils are highly significant records of ancient life. Paleontological resource localities are sites where the fossilized remains of extinct animals and/or plants are found. According to a regional paleontological assessment performed for the County of Riverside, the project is situated within a high sensitivity (high b) area. The category high b "indicates that fossils are likely to be encountered at or below four feet of depth, and may be impacted during excavation by construction activities" (Riverside County Land Information System Report: 2008).

Methods

Archival

On May 31, 2007, an archival record search request was submitted to the Eastern Information center of the California Historical Resources Information System at the Department of Anthropology at the University of California, Riverside. The purpose of this search was to identify previous archaeological/historical investigative activity and previously recorded cultural resources within 0.5 miles of the proposed project area. This records search included an examination of previous survey coverage and reports, historic maps, and known cultural resources within a 0.5-mile radius of the project site. Other sources that were reviewed included the California Register of Historic Places (California Register), the National Register of Historic Places (National Register), the California State Historic Resources Inventory (HRI), *California Place Names* (Bright & Gudde, 1998), and *Historic Spots in California* (Kyle et al. 1990).

Field Methods

An archaeological field survey of the project area was performed by DWR Archaeologist Tiffany A. Schmid and Senior Environmental Planner Janis K. Offermann on May 09-10, 2007 and on September 20, 2007. Areas surveyed included the repair site for the present dam, the location upon which the emergency outlet extension would be constructed, all staging areas, and a borrow area plus associated haul road. The area was surveyed in 15-meter transects. The goal of the pedestrian survey conducted by the DWR team was to relocate the two sites known to exist in the project area (CA-RIV-287 and CA-RIV-490), and identify any previously unknown prehistoric or historic cultural resources present within the project APE.

Native American Correspondence

The Native American Heritage Commission (NAHC) was contacted on April 12, 2007 to request a database search for sacred lands or other cultural properties of significance to local Indian people. The Commission also provided a list of people or organizations that might have specific information regarding cultural resources in the project area, or who may have an interest in the current project.

Results

Archival

The archival search resulted in the identification of twenty-two previously recorded archaeological resources within 0.5 miles of the project area, two of which are within the proposed project area (CA-RIV-487 and CA-RIV-490), as well as two sites (CA-RIV-463 and CA-RIV-1849) located immediately adjacent to the APE. These sites are discussed below. Sixteen previous cultural resources studies were conducted within 0.5 miles of the APE, and the combined area investigated within these studies covers the majority of the current APE. Exceptions to this are the left-abutment of the dam, the borrow area, and a few isolated locations.

CA-RIV-487

CA-RIV-487 consists of a single mano that was found next to a boulder outcrop. This isolated find is adjacent to, and immediately west of, the proposed borrow area for this project.

CA-RIV-490

CA-RIV-490 is located near the southeast corner of the reservoir, adjacent and west of the proposed borrow area haul road. It consists of a single saucer-shaped bedrock mortar and an elongated, narrow, milling slick on a single, isolated granitic slab. Site dimensions are 40 m (N-S) by 25 m (E-W). Other artifacts were noted to be associated with this milling outcrop, including “three fragments of bivalve shell.

CA-RIV-463

CA-RIV-463 represents a multi-component site situated along the western slope of the Bernasconi Hills, to the north of Bernasconi Pass. The site is located within a small east-west trending canyon and is said to measure 160 m (N-S) by 100 m (E-W). This resource is described in its record as a major prehistoric habitation site, with the remnants of historic elements by way of a tailings pile, historic well located near a permanent spring, and stone walls. Prehistoric artifacts present include several milling slicks and mortars, as well as a single andesite secondary flake.

CA-RIV-1849

CA-RIV-1849 is a prehistoric archeological site consisting of four bedrock outcroppings with seven total grinding slicks and three mortars; no associated artifacts are noted. Site dimensions

are described as 60 m by 50 m and this site is located approximately 2,000 feet away from the southeast corner of the dam at the base of the adjacent Bernasconi Hills.

Native American Correspondence

The Sacred Lands Files database search performed by the NAHC did not indicate the presence of Native American sacred lands in the project area. Follow-up consultation was conducted on April 18, 2007 with those tribes and individuals indicated by the NAHC. This consisted of a letter describing the proposed project and a map indicating the project area. Recipients were requested to reply with any information they are able to share about Native American resources that might be affected by the proposed project. As of the drafting of this report, a response has been received from Erica Helms of the Soboba Band of Luiseño Indians (May 4, 2007). In her response, Ms. Helms did not indicate the presence of any sensitive areas within the project vicinity.

Field Survey

The field investigation conducted by DWR was unable to relocate previously recorded cultural resource CA-RIV-487 (the mano). The location of CA-RIV-490 was confirmed and no additional artifacts were observed at the site. No new cultural resources were encountered during the pedestrian survey of the project area.

3.4.2 Regulatory Framework

Cultural Resources

Numerous laws and regulations require federal, state, and local agencies to consider the effects a project may have on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Office and the Advisory Council on Historic Preservation). The National Historic Preservation Act (NHPA) of 1966, as amended; the California Register of Historical Resources, Public Resources Code (PRC) 5024; and CEQA are the primary federal and State laws governing and affecting preservation of cultural resources of national, State, regional, and local significance. The applicable regulations are discussed below.

Federal

National Register of Historic Places

First authorized by the Historic Sites Act of 1935, the National Register was established by the NHPA of 1966, as "an authoritative guide to be used by federal, State, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment."[1] The National Register recognizes both historical-period and prehistoric archaeological properties that are significant at the national, State, and local levels. In the context of this project, which does not

[1] Code of Federal Regulations (CFR), 36 Section 60.2.

involve any historical-period structures, the following National Register criteria are given as the basis for evaluating archaeological resources.

To be eligible for listing in the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must meet one or more of the following four established criteria:[2]

1. Are associated with events that have made a significant contribution to the broad patterns of our history;
2. Are associated with the lives of persons significant in our past;
3. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
4. Have yielded, or may be likely to yield, information important in prehistory or history.

Unless the property possesses exceptional significance, it must be at least fifty years old to be eligible for National Register listing.[3]

In addition to meeting the criteria of significance, a property must have integrity. Integrity is defined as "the ability of a property to convey its significance."[4] The National Register recognizes seven qualities that, in various combinations, define integrity. To retain historic integrity a property must possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.[5] The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association.

State

The State implements the NHPA through its statewide comprehensive cultural resources surveys and preservation programs. The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation, implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historic Resources Inventory. The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the State's jurisdictions.

2 U.S. Department of the Interior, National Park Service, *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (Washington, DC: National Park Service, 1995).
3 Exceptional Significance as defined by National Register Criteria Consideration G: Properties That Have Achieved Significance Within the Past Fifty Years. *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (Washington, DC: National Park Service, 1995).
4 National Register Bulletin 15, p. 44.
5 *Ibid.*

California Register of Historical Resources

The California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change."[6] The criteria for eligibility for the California Register are based upon National Register criteria.[7] Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.[8]

To be eligible for the California Register, a prehistoric or historical-period property must be significant at the local, state, and/or federal level under one or more of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register.
- California Registered Historical Landmarks from No. 770 onward.
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5.9
- Individual historical resources.

6 California Public Resources Code § 5024.1(a).
7 *Ibid*, § 5024.1(b).
8 *Ibid*, § 5024.1(d).
9 Those properties identified as eligible for listing in the National Register of Historic Places, the California Register of Historical Resources, and/or a local jurisdiction register.

- Historical resources contributing to historic districts.
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as a historic preservation overlay zone.

California Environmental Quality Act

The CEQA is the principal statute governing environmental review of projects occurring in the State. CEQA requires lead agencies to determine if a proposed project would have a significant effect on archaeological resources. CEQA is codified at Public Resources Code sec. 21000 et seq. As defined in Section 21083.2 of CEQA a "unique" archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition, the *CEQA Guidelines* recognize that certain historical resources may also have significance. The Guidelines recognize that a historical resource includes: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of Section 21084.1 of CEQA and Section 15064.5 of the *CEQA Guidelines* apply. If an archaeological site does not meet the criteria for a historical resource contained in the *CEQA Guidelines*, then the site is to be treated in accordance with the provisions of CEQA Section 21083, which is a unique archaeological resource. The *CEQA Guidelines* note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (*CEQA Guidelines* Section 15064.5(c)(4)).

Paleontological Resources

Federal

A variety of federal statutes specifically address paleontological resources. They are generally applicable to a project if that project includes federally owned or managed lands or involves a

federal agency license, permit, approval, or funding. Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 *et. seq.*; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal lands.

State

Paleontological resources are also afforded protection by environmental legislation set forth under CEQA. Appendix G of the *CEQA Guidelines* provides guidance relative to significant impacts on paleontological resources, stating that a project would normally result in a significant impact on the environment if it would "…disrupt or adversely affect a paleontologic resource or site or unique geologic feature, except as part of a scientific study." Section 5097.5 of the Public Resources Code specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, the California Penal Code Section 622.5 sets the penalties for the damage or removal of paleontological resources.

Professional Standards

The Society of Vertebrate Paleontology (SVP) has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation. Most qualified professional paleontologists in the nation adhere closely to the SVP's assessment, mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most California state regulatory agencies accept the SVP standard guidelines as a measure of professional practice.

3.4.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the *CEQA Guidelines*, the proposed project is considered to have a significant impact if it would result in any of the following:

- A substantial adverse change in the significance of a historical resource that is either listed or eligible for listing in the National Register, the California Register, or a local register of historic resources;
- A substantial adverse change in the significance of a unique archaeological resource;
- Disturbance or destruction of a unique paleontological resource or site or unique geologic feature; or
- Disturbance of any human remains, including those interred outside of formal cemeteries.

CEQA provides that a project may cause a significant environmental effect where the project could result in a substantial adverse change in the significance of a historical resource (Public Resources Code, Section 21084.1). *CEQA Guidelines* Section 15064.5 defines a "substantial

adverse change" in the significance of a historical resource to mean physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be "materially impaired" (*CEQA Guidelines*, Section 15064.5[b][1]).

CEQA Guidelines, Section 15064.5(b)(2), defines "materially impaired" for purposes of the definition of "substantial adverse change" as follows:

The significance of a historical resource is materially impaired when a project:

- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

In accordance with *CEQA Guidelines* Section 15064.5(b)(3), a project that follows the Secretary of the Interior's *Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* or *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* is considered to have mitigated impacts to historic resources to a less-than-significant level.

Historic resources are usually 50 years old or older and must meet at least one of the criteria for listing in the California Register (such as association with historical events, important people, or architectural significance), in addition to maintaining a sufficient level of physical integrity (*CEQA Guidelines* Section 15064.5[a][3]).

Historical and Archaeological Resources

Impact 3.4-1: Project construction could adversely affect known or unknown cultural resources, including unique archaeological resources and historic resources.

A cultural resources records search indicated that two cultural resources, CA-RIV-287 and CA-RIV-490, had been previously recorded in the APE. One resource (CA-RIV-487) could not be relocated during the 2007 archaeological field survey. It was the determination of the DWR archaeologists that CA-RIV-487 was more than likely covered with silt and, therefore, was not observable during the survey. In addition, it was determined from CA-RIV-487's site record that although the site is within the project APE, it would not be within the area of direct impact of the project. The last known location of this resource would be avoided.

CA-RIV-490, the isolated granitic slab, was relocated by the 2007 field survey. CA-RIV-490 would be avoided during construction activities and no further studies are recommended at this time.

It is possible that previously unknown archaeological or historical sites, such as shell middens, stone artifacts, and historic trash scatters, may occur within the project area. Inadvertent damage to significant buried archaeological deposits during construction would be a significant impact. Implementation of Mitigation Measure 3.4-1, however, would reduce the impact to a less-than-significant level.

Mitigation Measures

> **Mitigation Measure 3.4-1:** In the event that prehistoric or historic subsurface cultural resources are discovered during ground-disturbing activities, all work within 50 feet of the resources shall be halted and DWR shall consult with a qualified archaeologist to assess the significance of the find according to *CEQA Guidelines* Section 15064.5. If any find is determined to be significant, DWR and the archaeologist shall meet to determine the appropriate avoidance measures or other appropriate mitigation. DWR (as applicable) shall make the final determination. All significant cultural materials recovered shall be, as necessary and at the discretion of the consulting archaeologist, subject to scientific analysis, professional museum curation, and documentation according to current professional standards.
>
> In considering any suggested mitigation proposed by the consulting archaeologist in order to mitigate impacts to historical resources or unique archaeological resources, DWR shall determine whether avoidance is necessary and feasible in light of factors such as the nature of the find, project design, costs, and other considerations. If avoidance is infeasible, other appropriate measures (e.g., data recovery) shall be instituted. Work may proceed on other parts of the project site while mitigation for historical resources or unique archaeological resources is being carried out.

Significance after Mitigation: Less than Significant.

Paleontological Resources

Impact 3.4-2: The proposed project could adversely affect unidentified paleontological resources.

Paleontological resources are known to occur in this area of Riverside County. Identified as an area of high sensitivity by Riverside County, the project has the potential to impact fossil resources.

If a paleontological resource is discovered, the impact to the resource could be substantial. However, implementation of Mitigation Measure 3.4-2 would minimize this impact to a less-than-significant level.

Mitigation Measures

Mitigation Measure 3.4-2: DWR shall develop and implement a Paleontological Resource Monitoring and Mitigation Plan (PRMMP) prior to the onset of construction-related earth moving activities in order to either avoid or mitigate to a less-than-significant effect on these resources. The PRMMP should be designed by a qualified paleontologist. During earth-moving construction-related activities, additional fossil sites may be uncovered. The PRMMP must include:

- Mitigation protocol for all activities;
- Special consideration should be made to collect sediment samples for potential fossiliferous locations as per the society of Vertebrate Paleontology standards;
- Stratigraphic cross sections must be recorded;
- Mapping of the geologic units must be graphed; and
- Fossil remains must be cleaned, analyzed, and catalogued to be accepted for curation at a legal repository.

All work must be conducted by a qualified Paleontologist and a final Report of Findings must be submitted upon completion of laboratory analysis.

Significance after Mitigation: Less than Significant.

Human Remains

Impact 3.4-3: Project construction could result in damage to previously unidentified human remains.

There is no indication that any particular site in the project area has been used for human burial purposes in the recent or distant past. Therefore, it is unlikely that human remains would be encountered during construction of the proposed project. However, in the unlikely event that human remains were discovered during subsurface activities, including those interred outside of formal cemeteries, the human remains could be inadvertently damaged, which could be a significant impact. However, this impact would be minimized by implementation of Mitigation Measure 3.4-3.

Mitigation Measures

Mitigation Measure 3.4-3: If human skeletal remains are uncovered during project construction, DWR (depending upon the project component) shall immediately halt work, contact the Riverside County coroner to evaluate the remains, and follow the procedures and protocols set forth in Section 15064.5 (e)(1) of the *CEQA Guidelines*. If the County coroner determines that the remains are Native American, DWR shall contact the NAHC, in accordance with Health and Safety Code Section 7050.5, subdivision (c), and Public Resources Code 5097.98 (as amended by AB 2641). Per Public Resources Code 5097.98,

the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section (PRC 5097.98), with the most likely descendents regarding their recommendations, if applicable, taking into account the possibility of multiple human remains.

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.4-1 presents the impacts and mitigation summary for Cultural Resources.

TABLE 3.4-1
CULTURAL RESOURCES IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Historical and Archaeological Resources: Project construction could adversely affect known or unknown cultural resources, including unique archaeological resources and historic resources.	3.4-1	Less than Significant
Paleontological Resources: The proposed project could adversely affect unidentified paleontological resources.	3.4-2	Less than Significant
Human Remains: Project construction could result in damage to previously unidentified human remains.	3.4-3	Less than Significant

3.5 Geology, Soils, Faulting and Seismicity

This section evaluates whether construction and operation of the proposed project would result in potential adverse impacts related to local geology, existing soil conditions, or seismicity. The evaluation and analysis of geology, soils, faulting and seismicity are based, in part, on review of various geologic maps and reports. The primary sources include the *Perris Dam Foundation Study* and the *Perris Dam Reconnaissance Study*. The geologic and geotechnical evaluation of the proposed project also included review of available geologic maps, resources, geotechnical studies, and subsurface boring data.

3.5.1 Setting

Regional Geology

The project area lies within the geologically complex region of Southern California referred to as the Peninsular Ranges geomorphic province.[1] The Peninsular Ranges province lies in the southwestern-most tip of California with the Transverse Range province to the north, the Colorado Desert province to the east, and the Pacific Ocean to the west. The topography of the province is similar to the Coast Ranges with alternating northwest trending ridges and valleys but the geology more closely resembles the Sierra Nevada with granitic intrusions into older metamorphic rocks (CGS, 2002a).

The project site is located between the northwest trending Perris and San Jacinto Valleys surrounded by the Bernasconi Hills to the south and the Russell Mountains to the north. Lake Perris covers a large portion of the valley floor within the surrounding ridges characterized by weathered granitic bedrock (Kgr) of variable thickness that is overlain by alluvial deposits at lower elevations (DWR, 2005). The weathered bedrock becomes fresh and more competent with depth.

The current dam embankment is founded mostly on native alluvial soils (Qal) deposited in the valley floor. These deposits consist of stream and slope wash deposits that originated from the weathering of nearby granitic rocks. The alluvium typically ranges in thickness from 0 to 150 feet throughout the reservoir and dam site area except for an area beneath the left reach of the dam where a deep paleo-channel occupies a topographic low in the granitic bedrock. The alluvium in this paleo-channel attains a thickness of as much as 290 feet. The alluvium (Qal) consists primarily of Silty Sands (SM) and Clayey Sands (SC) with lenses of Poorly Graded Sands (SP-SM) and minor amounts of gravel. In general, the coarser grained materials are found upstream from the dam axis and toward the abutments where the slope gradients increase. The full dam alignment is divided into two segments by a granitic outcrop referred to as the mid-abutment area.

The alluvium (Qal) also contained lenses of isolated, near surface cemented fine-grained Silty Sands (SM) across the valley floor colloquially referred to as “hardpan.” The hardpan was less

[1] A geomorphic province is an area that possesses similar bedrock, structure, history, and age. California has 11 geomorphic provinces (CGS, 2002a).

frequently encountered in more recent subsurface explorations and likely may have gone into solution by 30 years of saturation from the reservoir.

The stability berm would be constructed mostly from materials excavated from the borrow area located at the east end of the lake and from the existing rock quarry located east of the left abutment in the Bernasconi Hills. The soils from the borrow area at the east end of the lake consist of recent lake deposits up to about a foot thick overlying the alluvial sediments that would be inundated when the reservoir level is returned to a normal reservoir operating elevation of 1588 feet. The hard rock from the present level of the quarry consists of mostly slightly weathered to fresh granitic bedrock.

Topography

The topography within the region is dominated by the semi-circular ridge of bedrock surrounding the reservoir which includes Mt. Russell and the Bernasconi Hills. The lowest elevations occur downstream of the dam at approximately 1480 feet below mean sea level (msl). The Bernasconi Hills reach an elevation of 2589 at their highest and Mt. Russell peaks at 2704 feet amsl. The normal operating level of the dam is 1588 feet amsl which is 108 feet above the reservoir floor (WGI, 2006). Southwest of the dam embankment several granitic rock outcrops rise above the valley floor, the highest of which has an elevation of 1704 feet amsl. The dam crest is at an elevation of 1,600 feet (not including camber) amsl and approximately 40 feet wide. The downstream face is at a slope of approximately three horizontal to one vertical (3H:1V) whereas the upstream face is at 4H:1V. A 10-foot wide service road bench is cut into the downstream face near the toe of the dam.

Soils

The U.S. Department of Agriculture (USDA) Soil Conservation Service has never mapped the area surrounding the project site. However, information obtained from DWR prior to construction of the dam indicates that the reservoir was predominantly underlain by buried stream channel deposits (DWR, 1975 as referenced in DWR, 2005). The stream deposits consisted of sands, silts, and gravels.

Seismicity

Southern California is a region of high seismic activity with numerous active and potentially active faults.[2] Major earthquakes have affected the region in the past and can be expected to occur again in the near future on one of the principal active faults in the San Andreas Fault System. The principal active faults in the region include the San Andreas, San Jacinto and Elsinore faults.

[2] An *active* fault is defined by the California Geological Survey is a fault that has had surface displacement within Holocene time (approximately the last 11,000 years). A *potentially active* fault is a fault that has shown evidence of surface displacement during the last 1.6 million years, unless direct geologic evidence demonstrates inactivity for the last 11,000 years or longer. This definition does not mean that faults lacking evidence of surface displacement are necessarily inactive. *Sufficiently active* is also used to describe a fault if there is some evidence that Holocene surface displacement occurred on one or more of its segments or branches (Hart, 1997).

Richter magnitude (M) is a measure of the size of an earthquake as recorded by a seismograph, the standard instrument that records ground shaking. The reported Richter magnitude for an earthquake represents the highest amplitude measured by the seismograph at a distance of 100 kilometers from the epicenter. Richter magnitudes vary logarithmically, with each whole number step representing a tenfold increase in the amplitude of the recorded seismic waves. Earthquake magnitudes are also measured by their moment magnitude (Mw), which is related to the physical characteristics of a fault, including the rigidity of the rock, the size of fault rupture, and the movement or displacement across a fault (CGS, 2002b).

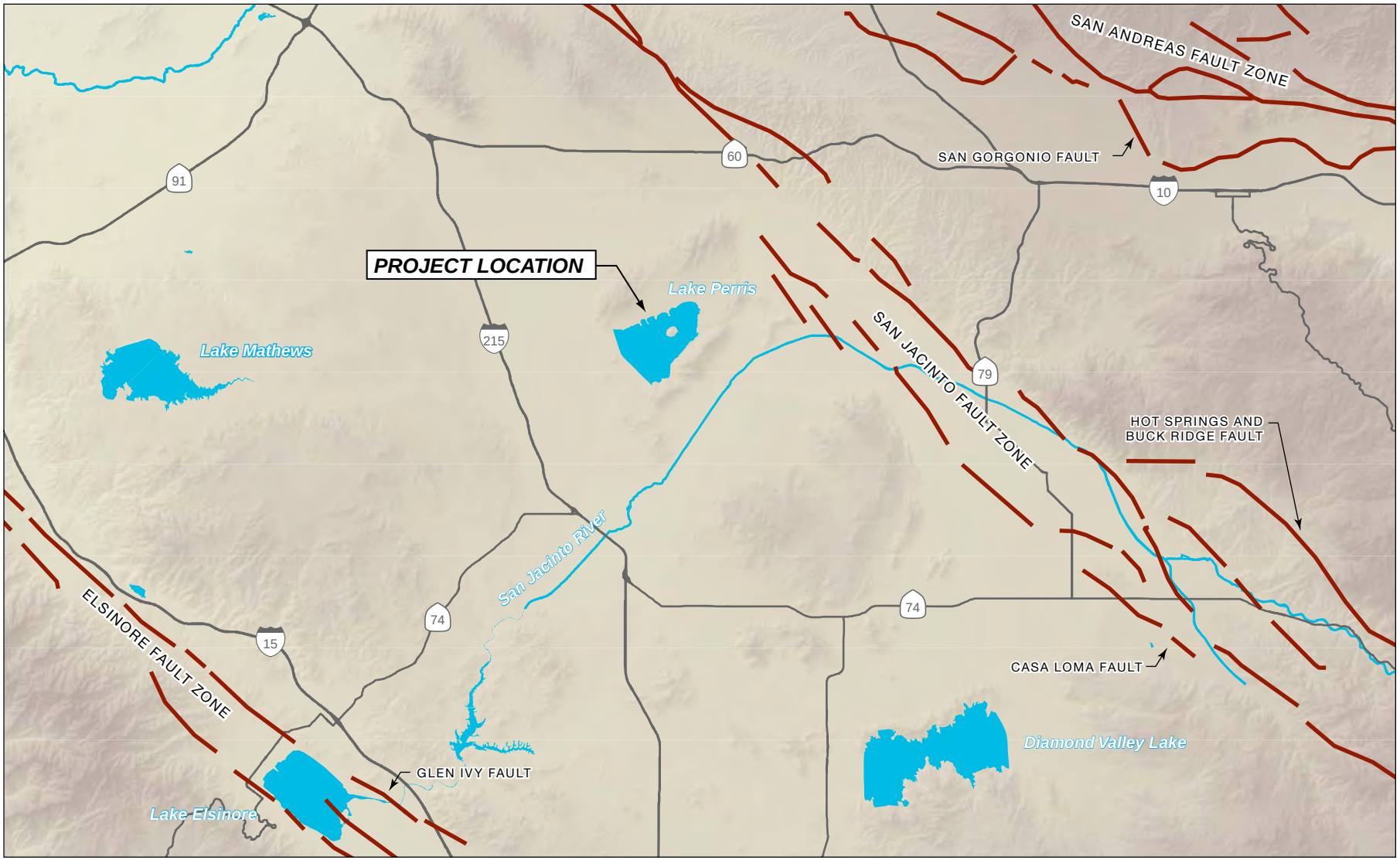
The project site is located seismically within what is known as the Perris structural block. The Perris block is bound by the San Jacinto fault to the east, the Elsinore fault to the west, trends of the Red Hill and San Jose faults to the north, and a trend of the Murrieta Hot Springs fault to the south (DWR, 2005) (**Figure 3.5-1**). A number of these faults, such as the San Andreas, San Jacinto, and Elsinore, have experienced significant seismic activity during historic time (within the last 200 years).

Table 3.5-1 lists the location of regionally active faults and potentially active faults significant to the project area due to proximity, activity status, date of most recent motion, and maximum moment magnitude (Mmax). The Mmax is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type, which are all related to the physical size of fault rupture and displacement across a fault.

The San Jacinto fault is the most seismically active fault in Southern California (Treiman, 2007a). The San Jacinto fault is also the closest active fault to the dam at approximately 5 miles to the northeast. Significant earthquakes have occurred on various segments of the fault, which is over 100 miles long, in 1987 (M 6.6) and 1967 (M 6.6) in addition to earthquakes that occurred prior to the advent of measuring devices in 1899 and 1918 (Treiman, 2007a).

The largest historic earthquake to affect the area occurred on the San Andreas fault, located approximately 17 miles northeast from the project site. The 1857 Fort Tejon earthquake was estimated at M 7.9 and caused surface rupture along the fault for 225 miles. The 1857 earthquake along with the 1906 San Francisco earthquake represent the two largest fault ruptures in historic time. The southernmost fault rupture associated with the 1857 event occurred within 35 to 40 miles of the project site near Cajon Pass (DWR, 2005).

The Elsinore fault is located approximately 14 miles southwest of the project site. Multiple earthquake events have been identified only on the northern segments of the fault so the interactions of the various strands are not well known (Treiman, 2007b). Historical record indicates that a large earthquake occurred on the Elsinore fault in 1910 at an estimated magnitude of 6.0 (DWR, 2005). However, compared to the San Jacinto, the historic activity on the Elsinore fault has been relatively low.



Faults

0 5

Miles

SOURCE: Riverside County, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.5-1
Regional Faults

TABLE 3.5-1
ACTIVE FAULTS IN THE PROJECT VICINITY

Fault	Location and Direction from Project Site	Recency of Movement	Fault Classification[a]	Historical Seismicity[b]	Maximum Moment Magnitude Earthquake (Mmax)[c]
San Jacinto (including the Casa Loma Segment)	5 miles northeast	Historic (historic rupture)	Active	M 6.6 1987, M6.6 1968 Many >M6.0	7.2
San Andreas	17 miles northeast	Historic (1906N, 1989N, 1857S ruptures)	Active	M 7.9 1857 M 7.1, 1989 M 7.9, 1906 M 7.0, 1838 Many >M 6.0	8.0
Elsinore	20 miles southeast	Historic (1861 rupture) Holocene	Active	M 6.0, 1910	7.1

[a] Jennings, 1994, and Hart, 1997. An active fault is defined by the California Geological Survey as one that has had surface displacement within approximately the last 11,000 years. A potentially active fault is defined as a fault that has showed evidence of surface displacement during approximately the last 1.6 million years.
[b] Richter magnitude (M) and year for recent and/or large events. Richter magnitude scale reflects the maximum amplitude of a seismic wave measured at a distance of 100 kilometers from the epicenter.
[c] Moment magnitude is related to the physical size of a fault rupture and movement across a fault. The maximum moment magnitude (Mmax) is the strongest earthquake that is likely to be generated along a fault and is based on empirical relationships of surface rupture length, rupture area, and fault type.
N=Northern
S=Southern

SOURCES: Jennings, 1994; Hart, 1997; DWR, 2005, Treiman, 2007a and 2007b.

No other active faults are present in the vicinity of the project site. Old bedrock shear zones have been observed within the project area; however these are thought to be the result of granitic intrusion rather than seismic activity (DWR, 2005). Otherwise the Perris block is virtually devoid of significant seismicity when compared to other surrounding areas (DWR, 2005).

Seismic Hazards

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered most likely along active faults.

The project site is not located within an Alquist-Priolo Earthquake Fault Zone, as designated by the Alquist-Priolo Earthquake Fault Zoning Act, and no mapped active faults are known to pass through the immediate project region. Therefore, the risk of ground rupture at the project site is extremely low.

Ground Shaking

Earthquakes in the Southern California region could produce strong ground shaking in the project vicinity and represent the most severe loading most dams could experience (Fraser, 2001). Ground shaking intensity is partly related to the size of an earthquake, the distance to the site, and the response of the geologic materials that underlie a site. As a rule, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. Violent ground shaking is generally expected at and near the epicenter of a large earthquake; however, different types of geologic materials respond differently to earthquake waves. For instance, deep unconsolidated materials can amplify earthquake waves and cause longer periods of ground shaking.

Ground motion during an earthquake can be described using the motion parameters of acceleration, velocity, and duration of shaking. A common measure of ground motion is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. For comparison purposes, the maximum peak acceleration value recorded during the Loma Prieta earthquake (San Andreas fault) was in the vicinity of the epicenter, near Santa Cruz, at 0.64 g. The lowest recorded value was 0.06 g in the bedrock on Yerba Buena Island. However, an earthquake on the San Jacinto fault could produce more severe ground shaking at the project site. According to estimates made by the CGS, the peak ground acceleration at the site could reach up to 0.70 g (CGS, 2007b).[3] This calculation is based on what was determined to be the maximum credible earthquake (MCE)[4] on the San Jacinto fault, with a Mw of 7.5 at a distance of approximately 5 miles from the site (DWR, 2005). A deterministic analysis of potential groundshaking at the project site concluded that the PGA at the proposed site, more specifically at the crest of the dam, could reach 0.78g (DWR, 2005).[5]

Secondary Earthquake Hazards

Secondary earthquake hazards at the project site include earthquake-induced land sliding, settlement, and liquefaction. Strong ground motions that occur during earthquakes are capable of inducing landslides and related forms of ground failure. Settlement is the gradual downward

[3] A probabilistic seismic hazard map shows the predicted level of hazard from earthquakes that seismologists and geologist believe could occur. The map's analysis takes into consideration uncertainties in the size and location of earthquakes and the resulting ground motions that can affect a particular site. The maps are typically expressed in terms of probability of exceeding a certain ground motion. These maps depict a 10% probability of being exceeded in 50 years. There is a 90% chance that these ground motions will NOT be exceeded. This probability level allows engineers to design buildings for larger ground motions than seismologists think will occur during a 50-year interval, making buildings safer than if they were only designed for the ground motions that are expected to occur in the 50 years. Seismic shaking maps are prepared using consensus information on historical earthquakes and faults. These levels of ground shaking are used primarily for formulating building codes and for designing buildings. (CGS, 2007a)

[4] The MCE is the largest earthquake reasonably capable of occurring based on current geological knowledge. The MCE is used for design purposes in a deterministic seismic hazard assessment.

[5] This PGA value was determined using what is known as a deterministic seismic hazard assessment approach. First, the faults nearest a site are identified and assessed for activity, then for each seismic source, an earthquake scenario consisting of the maximum magnitude a fault is capable of generating at the closest distance to the site is used to determine the ground motion estimate. A deterministic seismic hazard analysis is time-independent and does not represent the likelihood of such an event occurring within a given time frame (Fraser, 2001).

movement of an engineered structure (such as a building) due to the compaction of unconsolidated material below the foundation. Settlement accelerated by earthquakes can result in vertical or horizontal separations of structures or portions of one structure; cracked foundations, roads, sidewalks, and walls; and (in severe situations) building collapse and bending or breaking of underground utility lines. Soil liquefaction, a phenomenon in which soils lose significant strength due to cyclic shaking, can result in ground failure. The soils most susceptible to liquefaction are clean, loose, uniformly graded, saturated, sands, and silts. In general, upland areas have a low liquefaction potential, except where significant alluvium is present in creek bottoms or swales.

The potential for excessive embankment deformations as a result of seismically induced liquefaction of the foundation soils were found to be present at the project site. The area found to be the most susceptible was a 2,300-foot long portion of the left reach of the dam. The static analyses considered stability of the embankment during and immediately following a ground-shaking event. The dynamic analyses predicted permanent horizontal displacements to exceed 30 feet and the estimated vertical displacements 15 feet. Even in the event the predicted displacements were smaller, the potential for significant cracking was also recognized which could lead to failure due to the brittle nature of the embankment materials.

Other Geologic Hazards

Landslides and Slope Failure

Ground failure is dependent on the slope and geology as well as the amount of rainfall, human activities such as excavation, or seismic activity. A slope failure is a mass of rock, soil, and debris displaced downslope by sliding, flowing, or falling. Landslide-susceptible areas are characterized by steep slopes and downslope creep of surface materials. Debris flows consist of a loose mass of rocks and other granular material that, if saturated and present on a slope, can move downslope.

The rate of rock and soil movements can vary from a slow creep over many years to a sudden mass movement. Landslides occur throughout California, but the density of incidents increases in zones of active faulting. At the project site, there is a potential for slope failures occurring mainly as rockfalls within the existing rock quarry as well as the surrounding upland areas.

3.5.2 Regulatory Framework

State

Division of Safety of Dams

Since 1929, California has supervised the construction and operation of dams to prevent failure, safeguard life and protect property. The California Department of Water Resources, Division of Safety of Dams (DSOD) oversees the construction, enlargement, alteration, repair, maintenance, operation, and removal of dams and reservoirs. The DSOD has jurisdiction over all non-Federal dams in the State that are 25 feet or higher (regardless of storage capacity) and dams with a storage capacity of 50 af of water or greater (regardless of height). Dams six feet or less in height

(regardless of storage capacity) or dams with a storage capacity of 15 af or less (regardless of height) are not under DSOD jurisdiction.

The DSOD reviews permit applications to evaluate the safety of dams and reservoirs. DSOD staff provides independent review of facilities design and safety calculations. The DSOD requires the collection of data concerning subsoils, foundation conditions, availability of construction materials, and geologic hazards to assess the potential for seepage, earth movement, and other conditions that may occur in the vicinity of a dam or reservoir. Investigations usually include exploratory pits, trenches, drilling including hydraulic conductivity testing, geophysical surveys, and physical tests to measure properties of foundation materials. During construction or repair of a dam or reservoir, the DSOD makes continuous or periodic inspections to verify that construction is proceeding in accordance with approved plans.

California Building Code

The California Building Code (CBC) has been codified in the California Code of Regulations (CCR) as Title 24, Part 2, which is a portion of the California Building Standards Code. The California Building Standards Commission is responsible for coordinating building standards under Title 24. Under state law, all building standards must be centralized in Title 24 or they are not enforceable. The purpose of the CBC is to provide minimum standards to safeguard property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures within its jurisdiction. The Uniform Building Code (UBC), published by the International Conference of Building Officials, is a widely adopted building code in the United States. The CBC is based on the 1997 UBC, with necessary California amendments. These amendments include significant building design criteria that have been tailored for California earthquake conditions. The CBC applies to all structures that require a foundation.

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act) signed into law in December of 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Act is to regulate development on or near active fault traces to reduce the hazard of fault rupture and to prohibit the location of most structures for human occupancy across these traces. Cities and counties must regulate certain development projects within the zones, which includes withholding permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement (Hart and Bryant, 1997). Surface fault rupture is not necessarily restricted within an Alquist-Priolo Zone. However, the proposed and existing project sites are not located within an Alquist-Priolo fault zone and therefore, this Act is not applicable to this project.

3.5.3 Impacts and Mitigation Measures

Significance Criteria

In accordance with Appendix G of the *CEQA Guidelines*, a geologic or seismic impact is considered significant if it would:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault
  - Strong seismic ground shaking
  - Seismic-related ground failure, including liquefaction
  - Landslides
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on-site or offsite landslide, lateral spreading, subsidence (i.e., settlement), liquefaction, or collapse;
- Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property;
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;
- Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local General Plan, Specific Plan, or other land use plan.

Seismic-Related Hazards

Based on the geologic environment in the project area, the proposed project would not result in impacts associated with fault rupture, ground shaking, liquefaction, expansive soil, wastewater disposal, or mineral resources. No impact discussion is provided for these topics for the following reasons:

Fault Rupture. The faults most susceptible to earthquake rupture are active faults, which are faults that have experienced surface displacement within the last 11,000 years (35,000 years per DSOD criteria). No active faults traverse through the project site, and the nearest active fault (Casa Loma strand of the San Jacinto) is approximately 5 miles away. Therefore, the potential for fault rupture to affect the proposed project is negligible.

Ground Shaking. The purpose of the project is to improve the stability and performance of the dam in order to meet seismic safety requirements of the DSOD. Therefore, the project itself would significantly reduce the potential for injury and damage from ground shaking and is considered a beneficial impact.

Liquefaction. Soils underlying the dam embankment are susceptible to liquefaction. The project would significantly reduce this potential hazard by improving the engineering properties of the alluvial soils downstream of the dam toe and buttressing the dam with a stability berm. Therefore, the project would result in a beneficial impact. The project would not change the existing liquefaction potential resulting from elevated groundwater caused by seepage from the reservoir.

Other Geologic Constraints

Based on the geologic environment in the project area, the proposed project would not result in impacts due to expansive soil, wastewater disposal, or mineral resources. No impact discussion is provided for these topics for the following reasons:

Expansive Soil. The project would not cause a potential risk to life or property due to the absence of expansive soils. The embankment fill would be reconstructed using the existing embankment materials and materials excavated from the lakebed and borrow area. The fill used for the new embankment would be compacted and engineered under the supervision and approval of the DSOD. By adhering to the engineering specifications required by the DSOD, the effects of expansive soils, if present, would be minimized. Therefore, there is no impact associated with this hazard.

Wastewater Disposal. None of the project elements require the use of septic or other alternative disposal wastewater systems, and therefore no impact associated with this hazard would result.

Mineral Resources. No designated Mineral Resource Zones would be affected by the proposed project. The borrow area would be located within the inundation area of the lake. The stability berm would be located at the toe of the dam. Neither of the emergency outlet extension alternatives would affect access to designated mineral resources. There would be no conflict with mineral extraction interests.

Unstable Soils and Geology

Impact 3.5-1: Earthwork activities could create areas with unstable slopes associated with the existing embankment and the former rock quarry area.

The proposed project includes significant earthwork and grading activities during construction. The toe of the existing dam would be removed in order to access the liquefiable alluvium in the treatable portion of both the foundation soils and the soils comprising the berm foundation downstream of the dam. Excavation activities are also proposed for the construction of the new outlet tower and for both emergency outlet extension alternatives (though the aboveground alternative would require less excavation as compared to the underground alternative). In addition, further excavation in the amount of approximately 800,000 tons of rock from the existing rock quarry in the Bernasconi Hills for the stability berm would be required. Earthwork associated with the borrow area in the eastern end of the lake would also be required. No slope instability associated with work in the borrow area in the lake would occur. Some minor slope failures associated with the excavated embankment are possible.

The findings of the slope stability analysis of the dam following the effects of liquefaction indicated the potential for instability of the embankment causing deformations and potential overtopping (DWR, 2005). The project would significantly reduce this potential hazard by improving the liquefiable soils, recompacting the toe of the foundation, and constructing a stability berm at the downstream toe of the dam, all subject to DSOD oversight and approval. This engineered improvement of both the foundation and the downstream berm soils would ultimately reduce the potential for slope instability to less than significant levels. However, implementation of Mitigation Measure 3.5-1a would ensure that slope stability impacts are reduced to less than significant levels throughout construction.

The quarry area has remained essentially off-limits to visitors since the opening of the park. Reopening the quarry for hard-rock mining would require ensuring stability of the existing rock faces. Reactivating the quarry would require that DWR comply with mining regulations that establish slope and rock stability requirements. Occasional minor wedge failures may occur within the rock quarry. The new mining activity would provide for re-contouring parts of the existing quarry to ensure compliance with mine safety regulations.

Mitigation Measures

> **Mitigation Measure 3.5-1a:** During the final design phase of the project, DWR shall perform a design-level geotechnical evaluation to ensure the function of the stability berm. The geotechnical evaluation shall prescribe measures to mitigate hazards associated with excavation of the existing embankment. Slope stabilization measures may be identified including slope inclination, CDSM depths and locations, fill compaction, soil reinforcement, surface and subsurface drainage facilities, temporary shoring, and erosion control measures. These measures shall consider the long-term stability of the disturbed areas following construction activities.
>
> **Mitigation Measure 3.5-1b:** Prior to re-activating the quarry, DWR shall conduct a geotechnical evaluation of the quarry and provide recommendations to stabilize the quarry walls. Recommendations will include at a minimum the following, in conformance with hard rock mining and worker safety regulations:
>
> - Side wall contouring requirements
> - Shoring requirements
> - Stabilization requirements
> - Rock-fall protection mechanisms

Significance after Mitigation: Less than Significant.

Soil Erosion

Impact 3.5-2: Exposure of soils to erosion and loss of topsoil during construction activities related to excavation of existing embankment, soil stockpile management, outlet tower construction, and emergency outlet extension construction.

Significant quantities of soils would be excavated, stockpiled, and transported as part of the proposed project. The stability berm would require approximately two million cy of material to construct which would be taken from several sources in the area. The outlet tower replacement would require excavation of 19,000 cy of soil and rock. The underground emergency outlet extension alternative would require excavation of over 327,000 cy of mostly soil. The open channel emergency outlet extension alternative would require excavation of approximately 600,000 cy of soil. If unmanaged, erosion could cause the loss of topsoil or undermine access roads. The impact would be less than significant with implementation of the following mitigation measure.

Mitigation Measures

> **Mitigation Measure 3.5-2:** DWR shall incorporate into contract specifications the requirement that the contractor(s) develop and implement an erosion control plan, in addition to implementing requirements for preventing storm water pollution from construction activities as required by the Storm Water Pollution Prevention Plan (SWPPP). These requirements include developing and implementing erosion control measures for all construction activities including the following:
>
> - Slope stabilization measures
> - Haul road surface maintenance
> - Wind erosion protection measures for stockpiled soil
> - Storm water runoff control for all construction areas
> - Post construction restoration plans
>
> The final reclamation plan for the borrow area and rock quarry shall include drainage improvements to minimize erosion potential. Regular maintenance of the disturbed areas and stockpiled materials shall also be included in contract specifications for the contractor(s).

Significance after Mitigation: Less than Significant.

Subsidence

Impact 3.5-3: Stockpiled materials from excavation of the embankment could cause subsidence of native materials underneath.

Some of the soil excavated from the dam toe area and/or the borrow area would be stockpiled nearby for reuse in reconstruction of the foundation and berm. Depending on the size of the stockpiles and the nature of the underlying materials, though highly unlikely, there is a potential for near surface settlement of the ground surface underneath the stockpiles. The impact would be less than significant with implementation of Mitigation Measure 3.5-1a, and the following mitigation measure.

Mitigation Measures

Mitigation Measure 3.5-3: The geotechnical evaluation shall include a review of the surface and near-surface materials in the areas where materials will be stockpiled. The evaluation shall determine if the underlying materials have adequate short-term strength to support the proposed stockpiles and, if not, shall provide recommendations to avoid this hazard. The recommendations shall be incorporated into contract specifications for the contractor(s). Recommendations could include reducing the size of the stockpiles, increasing the number of stockpiles, and finding alternative locations for stockpiles.

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.5-2 presents the impacts and mitigation summary for Geology, Soils, Faulting and Seismicity.

TABLE 3.5-2
GEOLOGY, SOILS, FAULTING AND SEISMICITY IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Unstable Sloping: Earthwork activities could create areas with unstable slopes associated with the existing embankment and the former rock quarry area.	3.5-1a and 3.5-1b	Less than Significant
Erosion: Exposure of soils to erosion and loss of topsoil during construction activities related to excavation of existing embankment, soil stockpile management, outlet tower construction, and emergency outlet extension construction.	3.5-2	Less than Significant
Foundation Subsidence: Stockpiled materials from excavation of the embankment could cause subsidence of native materials underneath.	3.5-3	Less than Significant

3.6 Hazards and Hazardous Materials

This section evaluates the potential for the project to encounter hazards and hazardous materials.

3.6.1 Setting

Wildland Fire

The California Public Resources Code includes fire safety regulations, described in **Appendix D**, that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors[1] on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas. The Public Resources Code requirements would apply to construction activities at Lake Perris because this site is located in an area designated as a "Wildland Area That May Contain Substantial Fire Risks and Hazards" (California Department of Forestry and Fire Protection, 2007).

Emergency Operations Planning

Riverside County has developed an Emergency Operations Plan (EOP) containing detailed emergency response checklists outlining procedures to be followed in the event of natural disasters, severe storms, major system failures, or terrorist attacks (Riverside County, 2006). The District prepares this site-specific emergency response plan under the guidance of the Riverside County Emergency Operations Plan. The plan identifies staff people to perform emergency duties and lists the resources needed to accomplish emergency tasks.

Potential Presence of Hazardous Materials in Soil and Groundwater

To evaluate the potential presence of hazardous materials in the vicinity of planned construction activities, an environmental database review (EDR, 2007) was conducted to identify permitted uses of hazardous materials,[2] environmental cases,[3] and spill sites[4] where soil and/or groundwater contamination may be present. Search distances are consistent with those specified in the current American Society for Testing and Materials (ASTM) International Standard E 1527, Phase I Environmental Site Assessment Standard. A description of each database reviewed and the date of the database is provided in **Appendix D**; those databases with identified sites are listed in **Table 3.6-1**.

1 A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

2 Permitted hazardous materials uses are facilities that use hazardous materials or handle hazardous wastes, but are assumed to comply with current hazardous materials and hazardous waste regulations.

3 Environmental cases are those sites suspected of releasing hazardous substances or have had cause for hazardous substances investigations and are identified on regulatory agency lists.

4 Spill sites include locations where a spill of hazardous materials has been reported to state or federal regulatory agencies.

TABLE 3.6-1
DESCRIPTION OF ENVIRONMENTAL DATABASES

Database Name	Description of Database
CA FID UST	California Environmental Protection Agency (Cal-EPA) Facility Inventory Database—Underground Storage Tanks (USTs). Facilities in a historical listing of active and inactive USTs.[a]
Cortese	Hazardous Waste & Substances Sites. List of sites designated by the State Water Resource Control Board (leaking underground storage tank), the Integrated Waste Board (solid waste facilities/landfill sites), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.
ENVIROSTOR	The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.
LUST	Geotracker's Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents.
SCH	This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.
SWEEPS UST	Statewide Environmental Evaluation and Planning System. A listing of UST sites that was prepared for the State Water Resources Control Board in the early 1980s, but is no longer maintained or updated.[a]

[a] Search area: within 1/4 mile of property.

SOURCES: ESA, 2007

Using ASTM International-specified search distances, one environmental regulatory case was identified within the Lake Perris SRA. The database search identified the fuel storage and dispensing facility located at the marina docking facility at 17801 Lake Perris Drive at the western edge of the dam. Based on the database review, this facility has been historically impacted by a leaking underground gasoline storage tank (CA FID UST, LUST, Cortese, and SWEEPS UST databases). Santa Ana Regional Water Quality Control Board (Santa Ana RWQCB) records indicate that three single-wall fiberglass storage tanks were removed in 1994 and replaced by one double-walled storage tank. Although the contamination source was removed, soil sampling conducted in 2006 revealed residual contamination in soils within the area of the previous tanks. Further remedial action currently proposed includes vapor extraction (Burnhardt, 2007).

Hazardous Building Materials

Old structures have the potential to contain hazardous building materials, including asbestos, polychlorinated biphenyls (PCBs), and lead-based paints. State and federal laws control the removal and disposal of hazardous materials and require the generator to follow strict notification and abatement procedures prior to disturbance of these materials.

Asbestos is a common name for a group of naturally occurring fibrous silicate minerals that are made up of thin but strong, durable fibers used in building materials, including insulation, shingles, and floor and ceiling tiles. Asbestos could be present in adhesives or other surface treatments used in construction and the regular maintenance of the outlet works.

PCBs are mixtures of synthetic organic chemicals with physical properties ranging from oily liquids to waxy solids that are useful to reduce oil temperature. Until the use of PCBs was made illegal, they were used widely in hundreds of industrial and commercial applications, including use in hydraulic, electrical, and heat transfer equipment; and as plasticizers in caulking, paints, plastic, and rubber compounds. Some PCBs still remain in older equipment.

Lead-based paint is toxic to humans, particularly young children, and can cause a range of human health effects depending on the level of exposure. Lead-based paints were used on the surfaces of many older structures; if such paint is separated from a structure due to peeling, lead may also be found in nearby soil. Tetra-ethyl lead, which was used as a gasoline additive until it was phased out in 1986, is also found in high concentrations in the soils adjacent to major roadways that were constructed prior to its phase-out.

3.6.2 Regulatory Framework

Hazardous materials, defined in Section 25501(h) of the California Health and Safety Code, are materials that, because of their quantity, concentration, or physical or chemical characteristics, pose a potential hazard to human health and safety or to the environment if released. Title 22 of the California Code of Regulations, Division 4.5, Chapter 11 contains regulations for the classification of hazardous wastes. A waste is considered hazardous if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases) in accordance with the criteria established in Article 3. Article 4 lists specific hazardous wastes, and Article 5 identifies specific waste categories, including Resource Conservation and Recovery Act (RCRA) hazardous wastes, non-RCRA hazardous wastes, extremely hazardous wastes, and special wastes.

Hazardous materials and hazardous wastes are extensively regulated by federal, state, and local regulations. In general, these regulations provide definitions of hazardous materials; establish reporting requirements; set guidelines for handling, storage, transport, remediation, and disposal of hazardous wastes; and require health and safety provisions for both workers and the public. Regulatory agencies also maintain lists, or databases, of sites that are permitted to handle hazardous wastes or store hazardous materials in underground storage tanks, as well as sites where soil or groundwater quality may have been affected by hazardous materials.

The major federal, state, and regional agencies enforcing hazardous material regulations include: the U.S. Environmental Protection Agency (federal); the California Department of Toxic Substances Control (DTSC) of the California Environmental Protection Agency (state); the Santa Ana RWQCB and the SCAQMD (regional). In addition, a number of local agencies at the county and city level are responsible for regulating hazardous materials in the project area. Under

the Certified Unified Program Agency regulations, the Hazardous Materials Management Division (HMMD) of the Riverside County Department of Environmental Health is responsible for implementing most hazardous materials regulations in Riverside County.

The federal Occupational Safety and Health Administration (OSHA) enforces regulations covering the handling of hazardous materials including explosives. The regulations are designed to protect workers from hazards associated with encountering hazardous materials at the work site. The regulations require certain training, operating procedures, and protective equipment to be used at work sites that could encounter hazardous materials. Asbestos handling regulations are included in 29 CFR Part 1910.1001; explosives handling is included in 29 CFR Part 1910.109. The Department of Transportation (DOT) regulates transport of hazardous materials including explosives in 49 CFR Parts 171-179.

The RWQCB requires registration of an above-ground fuel storage tank at a construction site if the tank is 20,000 gallons or larger, or if the aggregate volume of above-ground petroleum storage is greater than 100,000 gallons. The above-ground storage tank used to temporarily store diesel during construction would be on the order of 1,000 gallons in size and would not be subject to this act.

3.6.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this analysis and consistent with Appendix G of the *CEQA Guidelines*, the proposed project would result in potentially significant impacts if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Result in hazardous emissions or the handling of hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school;
- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- Be located within an area covered by an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, and would result in a safety hazard for people residing or working in the project area;
- Be located within the vicinity of a private airstrip and would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

Title 40 of the Code of Federal Regulations (40 CFR) and Title 22 of the California Code of Regulations define and identify hazardous materials and wastes and provide threshold levels for these substances. Regulatory agencies determine what constitutes a substantial hazard or an insignificant level of hazardous materials on a case-by-case basis, depending on the proposed uses, potential exposure, and degree and type of hazard.

Airport Compatibility

Lake Perris is located in the vicinity of nearby March Air Reserve Base. The March Air Reserve Base airstrip lies approximately 2.5 miles west of the dam. The portion of Lake Perris SRA covered by the March Air Reserve Base zone of influence in the countywide airport land use compatibility plan is a low risk area characterized by low noise impacts from over-flights (Riverside County, 2004). Therefore, impacts from airport-related activities would be less than significant. Lake Perris is not covered by any other airport zone of influence. The closest civilian airport is Perris Valley Airport, which is located more than five miles to the south near Highway 74.

Emergency Response Plans

Emergency notification and response are the responsibilities of the local jurisdictions including the County of Riverside and the Cities of Perris and Moreno Valley. Local law enforcement agencies would be responsible for evacuation plans and implementation in the event of a failure in the dam. The proposed project would enhance the safety of the dam. During construction, the lake level would remain at the reduced level to protect public safety. The project would not adversely affect local safety or emergency response plans. Measures to avoid interference with emergency access routes during construction are addressed in Section 3.8, Traffic and Circulation.

Hazardous Materials

Except for the temporary use of diesel and other operational-related hazardous materials during the construction period, operation of Lake Perris would not involve the long-term use of hazardous materials. Thus, there are no long-term impacts related to the routine transport, use, or disposal of hazardous materials; upset and accident conditions involving the release of hazardous materials; or handling of hazardous materials, substances, or wastes within ¼ mile of an existing or proposed school.

Impact 3.6-1: The proposed project could expose workers and the public to hazards including explosives, fuels, and hazardous materials that could be present in excavated soil.

Blasting would require transport, storage, and use of blasting agents controlled by DOT and OSHA regulations. DWR would require contractors to prepare a Blasting Plan (see Mitigation Measure 3.9-1d) that would outline regulatory requirements for safe transport, storage and use of blasting agents. Compliance with these regulations would provide for the safety of workers and the general public.

Construction activities would require storage of fuels, lubricants, solvents, and oils for maintenance of on site equipment. If these materials were improperly stored or spilled, workers could be exposed. None of the materials would pose a threat to neighboring land uses since the quantities would be low and none of the materials could travel quickly off site such as in vapor clouds. Management of hazardous materials used during the construction process would be regulated under USEPA regulations (40 CFR). Compliance with regulations would ensure that workers, visitors to the park, and the general public would not be exposed to hazardous materials.

The proposed project would require substantial excavation, grading, and earthmoving within watershed lands that have remained relatively undisturbed since the construction of Perris Dam. It is possible during project activities requiring excavation that soil contamination could be discovered in the shallow subsurface soils, such as that surrounding the previously excavated leaking underground storage tank (LUST). In many cases, especially in urbanized areas, residual petroleum from leaking underground tanks and other localized surface spills are discovered in shallow excavations. When uncovered and exposed to air, hazardous materials in the soil can be released, causing vapors to come in contact with construction workers and sometimes the public. Depending on the nature and extent of any contamination encountered, adverse health effects and nuisance vapors could result if proper precautions are not taken. Contaminated soil could also require disposal as a restricted or hazardous waste.

Regulatory database review conducted for the proposed project identified one hazardous materials case within the vicinity of the project area. The source of contamination, a leaking fuel tank, has since been removed, the extent of impact has been delineated, and remediation is currently underway. The depth of the impacted soil has been recorded and concentrations of the fuel in surrounding soil have been determined. Proposed excavation operations are not expected to encounter soil contamination in quantities that would cause a human health risk if uncovered and exposed to open air.

Areas adjacent to the project are not involved in and would not likely become involved in hazardous materials use or storage before or during the proposed project construction activities. Further, although the operation of motorized watercraft is currently a permitted use on Lake Perris, residual oils and fuels present in water and soils from motor craft are not expected to be present at concentrations high enough to pose a significant risk to construction personnel exposed to these contaminants during the project.

Significance: Less than Significant.

Impact 3.6-2: The proposed project could expose workers and the public to asbestos-containing building materials that could be present in structures to be demolished by the project.

Asbestos containing pipes may be encountered during excavation at the toe of the dam. The pipes are part of the drainage system installed when the dam was first constructed in the 1970s. Demolition, storage, transportation, and disposal of these materials would be subject to hazardous

materials regulations including OSHA and USEPA regulations. The transite pipe that may be encountered is generally not friable and if handled properly would pose minimal risk to workers or neighboring land uses. Nonetheless, improper handling of pulverized transite can emit friable asbestos into the air. DWR would require contractors to comply with OSHA and USEPA regulations covering asbestos management. Implementation of a site safety plan would ensure that the materials would be handled to minimize exposure of workers and neighboring land uses to asbestos.

Mitigation Measures

> **Mitigation Measure 3.6-2:** DWR shall prepare a site safety plan that outlines the procedures necessary to remove potentially asbestos-containing building materials encountered during the excavation activities. The site safety plan shall outline personal protection requirements and training requirements for workers and shall outline removal and disposal methods.

Significance after Mitigation: Less than Significant.

Wildland Fires

Impact 3.6-3: Construction of the proposed project could increase risk of wildland fires.

The use of construction equipment and temporary on-site storage of diesel fuel could pose a wildland fire risk because Lake Perris is located in a "Wildland Area That May Contain Substantial Fire Risks and Hazards" designated by the California Department of Forestry and Fire Protection. The time of the greatest fire danger is during the clearing phase, when people and machines are working among vegetative fuels that could be highly flammable; if piled on-site, the cleared vegetative materials could also become sources of fuel for fires. Potential sources of ignition include equipment with internal combustion engines, gasoline-powered tools, and equipment or tools that produce a spark, fire, or flame. Such sources include welding equipment, sparks from blades or other metal parts scraping against rock, overheated brakes on wheeled equipment, friction from worn or unaligned belts and drive chains, and burned-out bearings or bushings. Sparking as a result of scraping against rock is difficult to prevent. The other hazards result primarily from poor maintenance of construction equipment. Smoking by on-site construction personnel is also a source of ignition during construction. Compliance with the requirements of the Public Resources Code as outlined below in Mitigation Measure 3.6-3 would ensure that potential impacts due to construction-related wildland fires are less than significant.

Mitigation Measures

> **Mitigation Measure 3.6-3:** In accordance with the Public Resources Code, the construction contractor shall be required to comply with the following legal requirements during construction activities for the proposed project:
>
> - Earthmoving and portable equipment with internal combustion engines shall be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (PRC Section 4442).

- Appropriate fire suppression equipment shall be maintained during construction – from April 1 to December 1 (PRC Section 4428).
- On days during the year when a burning permit is required, flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor shall maintain the appropriate fire suppression equipment (PRC Section 4427).
- On days during the year when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines shall not be used within 25 feet of any flammable materials (PRC Section 4431).

These measures shall be included in the contractor's contract specifications. The contractor shall be responsible for the implementation and monitoring of these safety measures and regular reporting to DWR.

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.6-2 presents the impacts and mitigation summary for Hazards and Hazardous Materials.

TABLE 3.6-2
HAZARDS AND HAZARDOUS MATERIALS IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Contaminated Soil Exposure: The proposed project could expose workers and the public to hazards including explosives, fuels, and hazardous materials that could be present in excavated soil.	None required	--
Asbestos Exposure: The proposed project could expose workers and the public to asbestos-containing building materials that could be present in structures to be demolished by the project.	3.6-2	Less than Significant
Wildland Fires: Construction of the proposed project could increase risk of wildland fires.	3.6-3	Less than Significant

3.7 Hydrology, Water Quality, and Groundwater

This section provides a description of local surface water and groundwater resources and evaluates the impacts of the proposed project on hydrology, water quality, and groundwater.

3.7.1 Setting

Surface Water

Lake Perris is a man-made lake completed by DWR in 1972 and situated behind a two-mile long, 128-foot tall earthfill dam. The lake has a surface area of approximately 2,000 acres and is located within the San Jacinto sub-watershed portion of the Santa Ana River watershed. The San Jacinto watershed drains the northwestern corner of Riverside County ultimately to Prado Basin. **Figure 3.7-1** shows the major surface water features in the area.

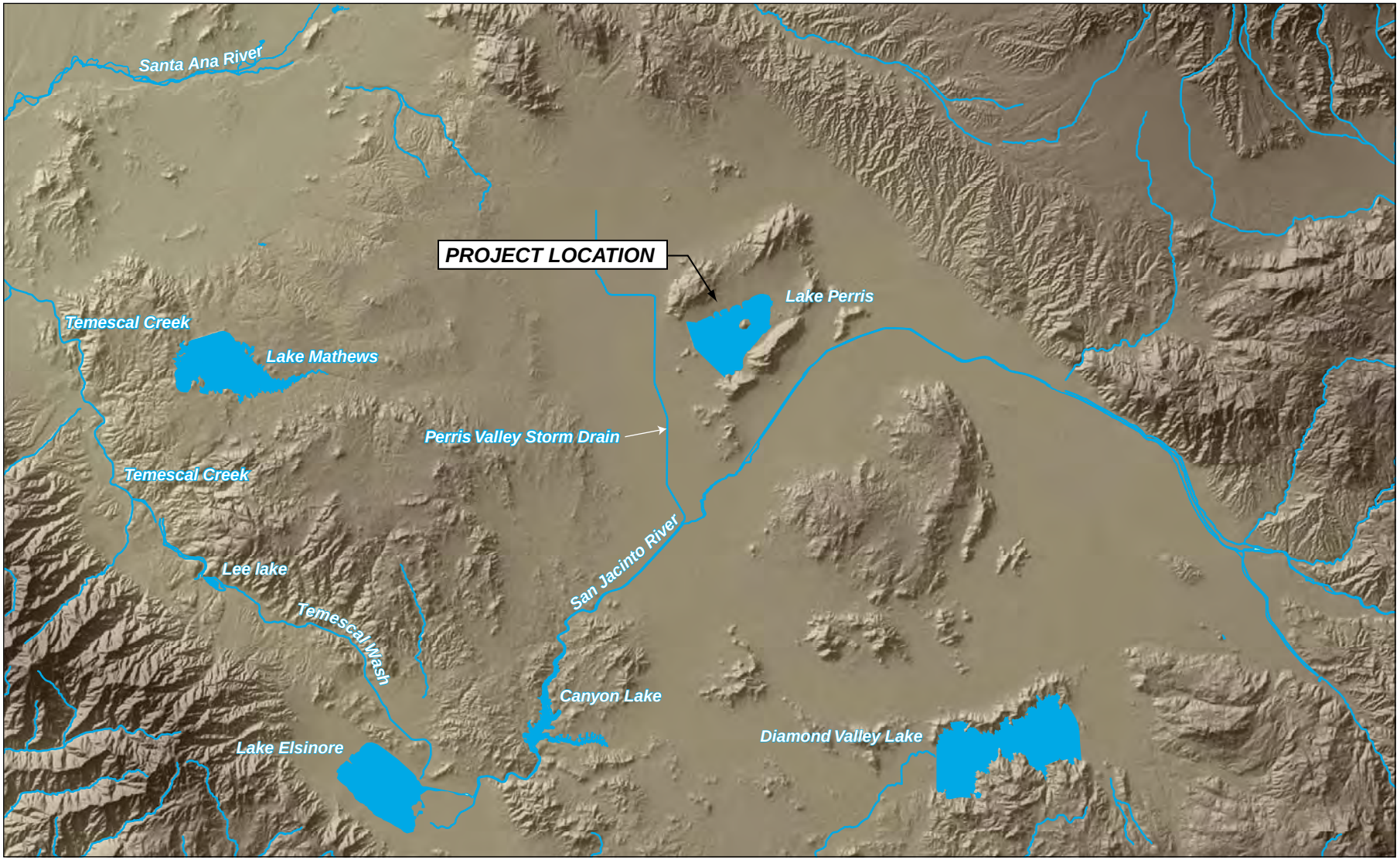
The San Jacinto River originates in the San Jacinto Mountains and flows through Canyon Lake to Lake Elsinore. Flow in the river is ephemeral, responding primarily to rain events in the watershed that occur in the winter. Lake Elsinore overflows every few years, but otherwise serves to capture most of the water that flows to it from the upper watershed. It discharges to the Temescal Wash, which terminates in the Santa Ana River at Prado Basin.

There are various man-made reservoirs in the vicinity of Lake Perris, including Lake Mathews, Skinner Reservoir, Canyon Lake, Diamond Valley Lake, and Eden Lake, though Lake Elsinore is the primary natural lake within the watershed. The Perris Valley Storm Drain, a man-made drainage channel, conveys storm water from the greater Perris area to the San Jacinto River. Lake Perris is located within Hydrologic Unit 802.11 that drains toward the San Jacinto River.

Groundwater

Lake Perris is situated over the West San Jacinto Groundwater Basin (WSJGB). The basin is fed by local precipitation as well as from Lake Perris. DWR completed the *Perris Dam Remediation Groundwater Study* in August of 2006. The study evaluated the quantity of seepage from Perris Reservoir and its affects on the adjacent groundwater basins. The groundwater report evaluated previous groundwater, engineering, and engineering geologic studies conducted in the vicinity of the Perris Dam and Reservoir site since 1963. Additionally, the study summarized the general hydrogeologic conditions of portions of the WSJGB that are directly affected by seepage from Perris Reservoir.

The Groundwater Study concludes that seepage through the alluvium underlying Perris Dam has resulted in average rises to the groundwater table of about 100 feet downstream of the dam. Consequently, the groundwater storage volume of the WSJGB has significantly increased since the lake was filled in the 1970s.



SOURCE: Riverside County, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.7-1
Regional Hydrology

Climate

The climate of the San Jacinto watershed is Mediterranean with hot, dry summers and cooler, wetter winters. Average annual precipitation ranges from nine to 11 inches per year. Most of the precipitation occurs between November and March in the form of rain with variable amounts of snow in the higher elevations. The climatological cycle of the region results in high surface water flows in the spring and early summer, followed by low flows during the dry season.

Flooding

The Federal Emergency Management Agency (FEMA), through its Flood Insurance Rate Mapping program, designates areas where urban flooding could occur during 100-year and 500-year flood events.[1] Areas below the project site, along existing drainage extensions, are located within the 100-year hazard areas. **Figure 3.7-2** shows the local 100-year flood plain. **Figure 3.7-3** shows the estimated inundation area for the Lake Perris dam.

Storm Water Drainage

A 250-foot wide, earthen Perris Valley Storm Drain is the backbone of the City of Perris's storm drainage system. The channel serves as the primary collector of storm water in the northern part of Perris and Moreno Valley. The storm drain was built by Riverside County Flood Control and Water Conservation District (RCFCWCD) in the mid 1950's to alleviate drainage problems associated with the expansion of March Air Reserve Base and frequency of overland flow in Perris Valley during periods of high runoff. RCFCWCD currently owns and maintains the channel. Figure 3.7-1 shows the location of the channel.

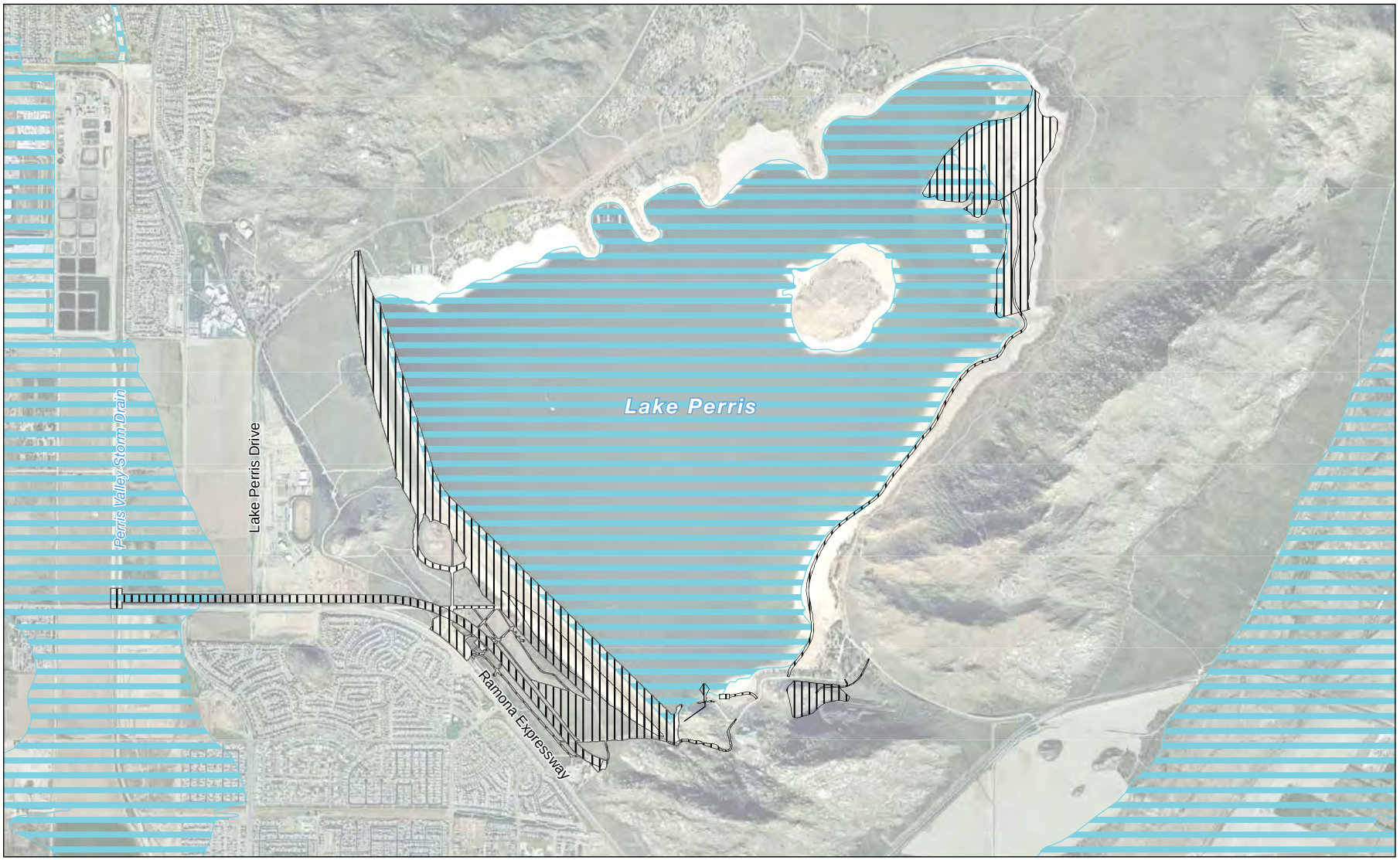
The channel alignment extends from Heacock Street in the City of Moreno Valley through the City of Perris to the San Jacinto River. All existing City storm drains flow laterally into the Perris Valley Storm Drain from the east and west. The City of Perris notes that deepening the Perris Valley Storm Drain and the San Jacinto River would be required to accommodate future storm water volumes.

3.7.2 Regulatory Framework

Federal

The Clean Water Act (CWA) authorizes the USEPA to restore and maintain the chemical, physical, and biological integrity on the nation's waters by implementing water quality regulations. The National Pollutant Discharge Elimination System (NPDES) permit program under Section 402 of the CWA regulates discharges to waters of the United States. The USEPA has delegated authority for issuing NPDES permits in California to the State Water Resources Control Board (SWRCB), which has nine regional boards.

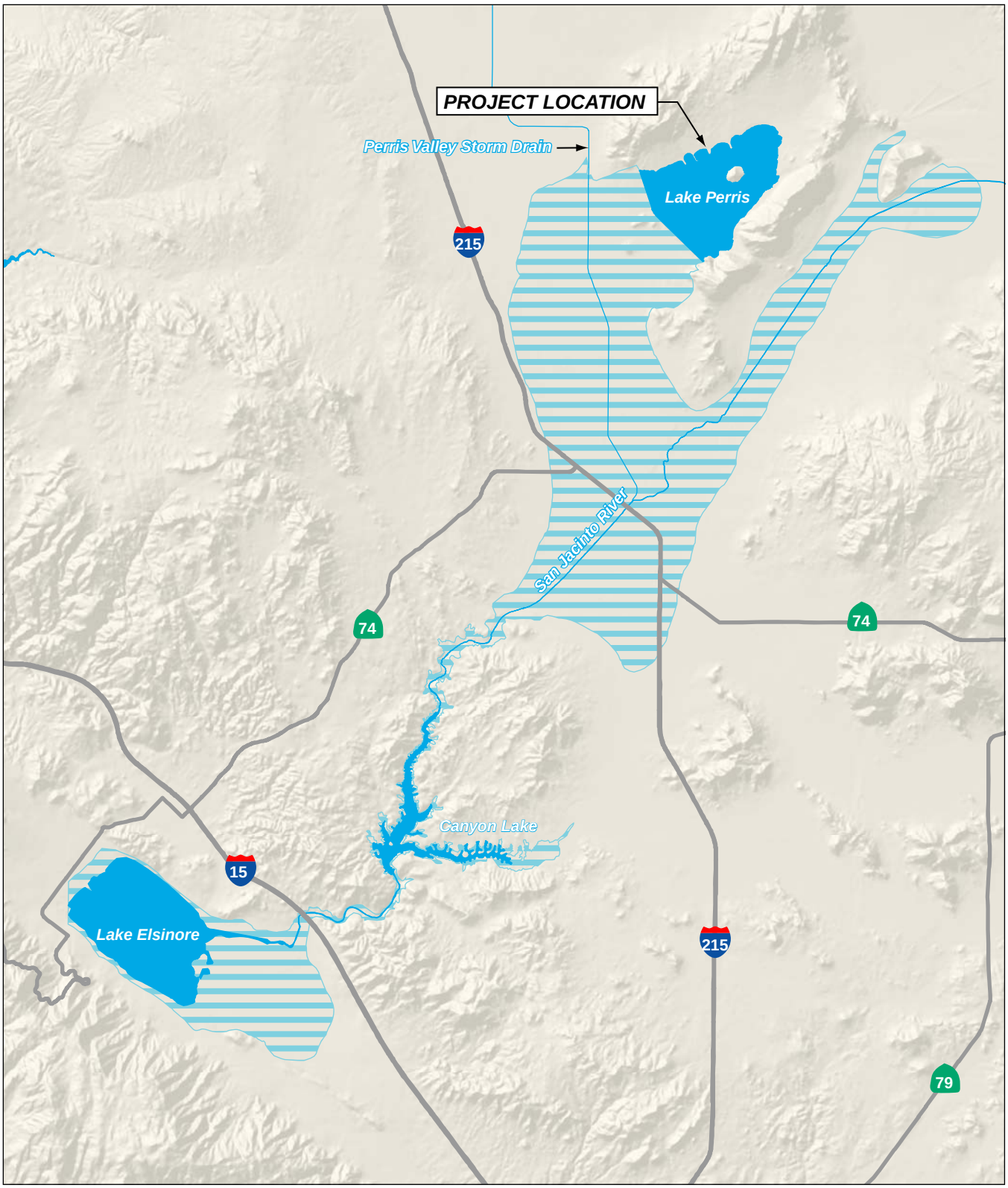
[1] A 100-year flood event has a one percent probability of occurring in a single year. Although infrequent, 100-year floods can occur in consecutive years or periodically throughout a decade. A 500-year flood event has a 0.2 percent probability of occurring in a single year.



SOURCE: GlobeXplorer, 2007; DWR, 2007; PSOMAS, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.7-2
100 Year Flood Zone



Perris Dam Inundation

0 2

Miles

SOURCE: Riverside County, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.7-3

Perris Dam Inundation

The Santa Ana RWQCB regulates water quality in the project area. The CWA requires states to establish water quality standards to protect designated uses for all waters of the United States.

The Federal Clean Water Act Section 303(d) requires that states identify waters that do not meet water quality standards (beneficial uses, water quality objectives and the antidegradation policy) with the implementation of technology-based controls. Once a water body has been placed on the 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load (TMDL) to address each pollutant causing impairment. As a surface water reservoir for drinking water, Lake Perris is not an impaired water body on the 303(d) list.

Executive Order 11988, Flood Plain Management

Executive Order 11988 requires the Corps to provide leadership and to take action to:

- Avoid development in the existing 100-year floodplain, unless such development is the only practicable alternative;
- Reduce the hazards and risk associated with floods;
- Minimize the impact of floods on human health, safety, and welfare; and
- Restore and preserve the natural and beneficial values of the current floodplain.

To comply with Executive Order 11988, the policy of the Corps is to formulate projects that, to the extent possible, avoid or minimize adverse effects associated with use of the floodplain, and avoid inducing development in an existing floodplain unless there is no practicable alternative.

State

The Porter-Cologne Water Quality Control Act mandates that the SWRCB adopt statewide water quality control plans, which serve as the legal, technical, and programmatic basis of water quality regulation for a region. The project area lies within the jurisdiction of the RWQCB, Santa Ana Region. The Santa Ana Region Basin Plan contains descriptions of beneficial uses of all surface and groundwater resources, water quality objectives, and strategies for achieving the water quality objectives, such as the adoption of TMDLs (RWQCB, 1995).

The Basin Plan identifies the following beneficial uses for Lake Perris:

- Municipal And Domestic Supply (MUN),
- Agricultural Water Supply (AGR),
- Industrial Service Supply (IND),
- Industrial Process Supply (PROC),
- Groundwater Recharge (GWR),
- Body Contact Recreation (REC1),
- Non-Body Contact Recreation (REC2),
- Warm Freshwater Aquatic Habitat (WARM),
- Cold Freshwater Habitat (COLD), And
- Wildlife Habitat (WILD).

Local

The NPDES permit system includes coverage of storm water runoff from construction sites greater than one acre in area. In the project area, the storm water program is administered by the Riverside County Department of Building and Safety, Grading Division. The Riverside County

Department of Building and Safety Grading Division administers storm water quality management program for the Lake Perris area.

The federal CWA effectively prohibits discharges of storm water from construction projects unless the discharge is in compliance with an NPDES permit. The SWRCB has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity that encompasses one or more acres of soil disturbance.

The NPDES storm water program requires operators of both large and small construction sites to obtain authorization to discharge storm water under an NPDES construction permit. Construction activity resulting in a land disturbance of one acre or more must obtain coverage under the General Permit. In general, the NPDES storm water permitting requirements for construction activities require that the landowner and/or contractor develop and implement a SWPPP and submit required notices. The SWPPP must specify BMPs that would prevent construction pollutants from running offsite into receiving waters. The SWPPP must include measures for erosion and sediment controls, methods for construction waste handling and disposal, and post-construction erosion and sediment control requirements. The SWPPP also addresses the elimination or reduction of non-storm water discharges to receiving waters and inspection procedures for BMPs.

Riverside County Flood Control and Water Conservation District

The RCFCWCD has established Master Drainage Plans and Area Drainage Plans that guide the sizing of drainage infrastructure needed to provide the conveyance requirements of the County. These documents provide design conditions for development in the County.

3.7.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the *CEQA Guidelines*, a project would have a significant impact to hydrology, water quality, or groundwater if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge;
- Substantially alter the existing drainage patterns in a manner that would result in substantial erosion or siltation on or off the site;
- Create or contribute runoff water that would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff;
- Substantially degrade water quality;
- Be subject to inundation by seiche, tsunami, or mudflow;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

- Place structures within a 100-year flood hazard area that would impede or redirect flood flows; or
- Contaminate a public water supply.

Surface Drainage

The proposed project would not significantly alter the drainage patterns of the project areas that would result in substantial erosion potential. The new dam face would have a similar slope and would be constructed of similar material as the existing dam. The borrow area would be submerged into the lake following completion of the stability berm. The quarry would become deeper, but would not alter drainage patterns. The new outlet facility would not alter drainage patterns in the area. Neither emergency outlet extension alternative would disrupt local storm water runoff systems. The outlet extension would convey water to the Perris Valley Storm Drain which has adequate capacity to accommodate the emergency flow during otherwise dry conditions.

Flood Risk

Seiche waves could occur in the lake resulting from a seismic event. The dam is designed to contain seiche waves that could be generated by local seismic activity. The strengthening of the dam would further reduce the risk of damage from a seiche wave caused by an earthquake. The project would not subject people to increased hazards from seiche waves. The site is too far from the coast to be affected by tsunami waves. The strengthening of the dam would not increase mudflow hazards.

No structures would be constructed within the 100-year flood plain. The project would reinforce the structural strength of the dam reducing the potential flood risk downstream of the dam. During construction activities, the water level behind the dam would be maintained at the lower level to reduce the potential hazard of seismic-related dam failure.

Water Quality

Impact 3.7-1: Construction activities could promote soil erosion or result in chemical spills that could pollute storm water runoff and adversely affect local receiving water quality.

Construction would include site clearing, grading, excavation, blasting, soil stockpiling, backfilling, tunneling, and compacting. Project construction would occur within areas that drain to Lake Perris or to tributaries of the Perris Valley Storm Drain. Construction activities could promote soil erosion discharging sediment to adjacent drainages. Sedimentation would degrade the water quality of the receiving waters. Hazardous materials associated with construction equipment such as fuels, oils, antifreeze, coolants, and other substances would adversely affect water quality if inadvertently released to surface waters. Construction would involve substantial grading exposing large areas of soil to erosion during rain events. DWR would be required to prepare a SWPPP for coverage under the state-wide storm water discharge NPDES permit. Incorporation of BMPs would minimize the impact to a less than significant level.

Specific BMPs that may be applicable would include establishment of sediment basins and erosion control perimeter around active construction and contractor layout areas, silt fencing, jute netting, fiber rolls, or other appropriate measures to control sediment from leaving the construction area. BMPs such as installing containment measures at fuel storage sites and avoiding overfilling of tanks would prevent chemicals from being transported off site. Construction contractors would be made aware of the required BMPs and good housekeeping measures for the project site and associated construction staging areas. Construction debris and waste materials would be collected at the end of each day and properly disposed in trash or recycle bins.

The haul road over the Bernasconi Hills would be subject to erosion once completed due to the slope over the hill. The existing runoff in the hills meanders through boulder fields or sheet flows down cliff faces to the lower elevations. Mitigation Measure 3.7-1b requires that the road be designed with adequate drainage features to reduce erosion potential.

Mitigation Measures

Mitigation Measure 3.7-1a: DWR shall prepare a SWPPP for each construction activity associated with the proposed project. The SWPPP shall be maintained at the construction site for the entire duration of construction. The objectives of the SWPPP are to identify pollutant sources that may affect the quality of storm water discharge and to implement BMPs to reduce pollutants in storm water discharges during construction and post construction. SWPPPs shall include the following:

- Source identification;
- Preparation of a site map;
- Description of construction materials, practices, and equipment storage and maintenance;
- List of pollutants likely to contact storm water;
- Estimate of the construction site area and percent impervious area;
- Erosion and sedimentation control practices, including soils stabilization, revegetation, and runoff control to limit increases in sediment in storm water runoff, such as detention basins, fiber rolls, silt fences, check dams, geofabrics, drainage swales, and sandbag dikes;
- Proposed construction dewatering plans;
- List of provisions to eliminate or reduce discharge of materials to storm water;
- Description of waste management practices;
- Spill prevention and control measures;
- Maintenance and training practices; and
- Sampling and analysis strategy and sampling schedule for discharges from construction activities.

Mitigation Measure 3.7-1b: DWR shall incorporate into contract specifications the requirements that:

- The construction staging areas shall be graded to contain surface runoff so that contaminants such as oil, grease, and fuel products do not drain towards receiving waters.
- If heavy-duty construction equipment is stored overnight at the construction staging areas, drip pans or plastic lines with edges shall be placed beneath the machinery engine block and hydraulic systems to prevent any leakage from entering runoff or receiving waters.
- No pesticides or herbacides shall be used to maintain vegetation clearing during construction.
- Vehicle fueling shall be conducted a minimum of 500 feet from Lake Perris.
- The haul road over the Bernasconi Hills shall be designed with a drainage system that prevents runoff scouring and rutting. Runoff from the sloping roadway shall be conveyed to drainages at lower elevations with minimal velocity to prevent scouring.
- Any grout waste or spills will be cleaned up immediately and disposed of off site.
- Spill kits capable of containing hazardous spills will be stored on-site. Required materials will be specified in contractor specifications.

Significance after Mitigation: Less than Significant.

Groundwater Recharge

Impact 3.7-2: The dam remediation could interfere with groundwater recharge.

Lake Perris is known to significantly augment local groundwater quantity from seepage through the alluvial foundation material under the dam. The *Perris Dam Remediation Groundwater Study* showed that lowering the surface water elevation to 1563 feet amsl has resulted in a five to seven foot lowering of the groundwater elevation at monitoring wells located adjacent to the left and right abutments of the dam. The data show the direct connection between the lake and the local groundwater basin at these two well monitoring locations. The Groundwater Study also showed that other groundwater monitoring wells, some as far as ten miles away, remained fairly constant despite the lowering of the reservoir elevation. As noted in the Geology Section, the dam is underlain by alluvium typically ranging in thickness from zero to 150 feet throughout the reservoir and dam site area except for an area beneath the left reach of the dam where a deep paleo-channel occupies a topographic low in the granitic bedrock. The alluvium in this paleo-channel attains a thickness of as much as 290 feet below ground surface. The SWRCB has acknowledged the presence of an underground stream in this location that conveys native groundwater apparently not associated with Lake Perris through the valley. The proposed project would essentially introduce cement columns up to 40 feet deep beneath the base of the dam that would strengthen the foundation of the dam but would not prevent seepage that occurs under

existing conditions. The intermittent columns would not impinge on the amount of water seepage from the dam or in any underground stream channel that may be present.

During construction, either temporary steel sheet piles or a permanent CDSM cut-off wall would be installed at the toe of the dam to a depth of up to 60 feet below ground surface. The barrier would be needed to dewater the excavation area during the CDSM process. If sheet piles are used, they would be removed once the CDSM columns were in place and the excavation re-filled. If a permanent CDSM cut-off wall is used to enable construction dewatering, it would be left in place. Although the permanent dewatering cut-off wall would create a shallow barrier to water seepage, it would not be deep enough to significantly disrupt the current seepage. The seepage would not be affected by the remediation project since the alluvial soils reach typical depths of 150 feet below ground surface. The proposed dewatering system would function similar to the existing system, lowering groundwater levels near the toe of the dam, but not affecting groundwater levels farther south in the valley. Therefore, downstream groundwater producers would not be affected by the project.

Significance: Less than Significant.

Runoff Capacity

Impact 3.7-3: The emergency outlet extension could exceed the capacity of the Perris Valley Storm Drain during a rain event.

The emergency outlet extension would channel water to the Perris Valley Storm Drain that flows to the San Jacinto River and Lake Elsinore. The Perris Valley Storm Drain is a storm water runoff facility that drains an upper portion of the San Jacinto watershed. The emergency outlet extension provides emergency drawdown capabilities, and is not intended for use as a storm drain system. Both the aboveground and underground alternatives for the emergency outlet extension would be approximately two miles long with a 1500 cfs capacity. During heavy rain events, the Perris Valley Storm Drain may not have the additional capacity needed to accommodate the full volume from the emergency outlet extension in addition to the storm run off. The duration of high flow in the Perris Valley Storm Drain is generally limited to periods of rain, with the flow reducing sharply as storms pass. The emergency outlet extension is not intended for routine use. Management of the drawdown to avoid exceeding the storm drain system in coordination with the RCFCWCD would ensure that the system capacity is not exceeded.

Significance: Less than Significant.

Mitigation Measure Summary Table

Table 3.7-1 on the following page presents the impacts and mitigation summary for Hydrology, Water Quality, and Groundwater.

TABLE 3.7-1
HYDROLOGY, WATER QUALITY, AND GROUNDWATER IMPACTS AND MITIGATION SUMMARY

Proposed project Impact	Mitigation Measure	Impact Significance
Storm Water Contamination: Construction activities could promote soil erosion or result in chemical spills that could pollute storm water runoff and adversely effect local receiving water quality.	3.7-1a and 3.7-1b	Less than Significant
Groundwater Recharge: The dam remediation could interfere with groundwater recharge.	None required	--
Perris Valley Storm Drain Capacity: The emergency outlet extension could exceed the capacity of the Perris Valley Storm Drain during a rain event.	None required	--

3.8 Land Use and Planning

This section evaluates land use issues related to construction and operation of the proposed project including project consistency with local and regional plans and policies and compatibility of the proposed improvements with agricultural uses. This evaluation is based on review of adopted local land use plans and policies, reconnaissance visits, and aerial photographs.

3.8.1 Setting

Regional Setting

Riverside County encompasses 7,400 square miles of Southern California. Over 200 miles across, it is bounded on the east by the Colorado River and to the west by Orange County. The county is bisected by the San Jacinto and Santa Rosa Mountains. The western portion of the county is experiencing rapid urbanization. Key areas of development include the City of Riverside, the March Air Reserve Base, Moreno Valley, Perris, Lake Elsinore, Hemet, and Temecula.

Local Setting

Existing Land Use Environment

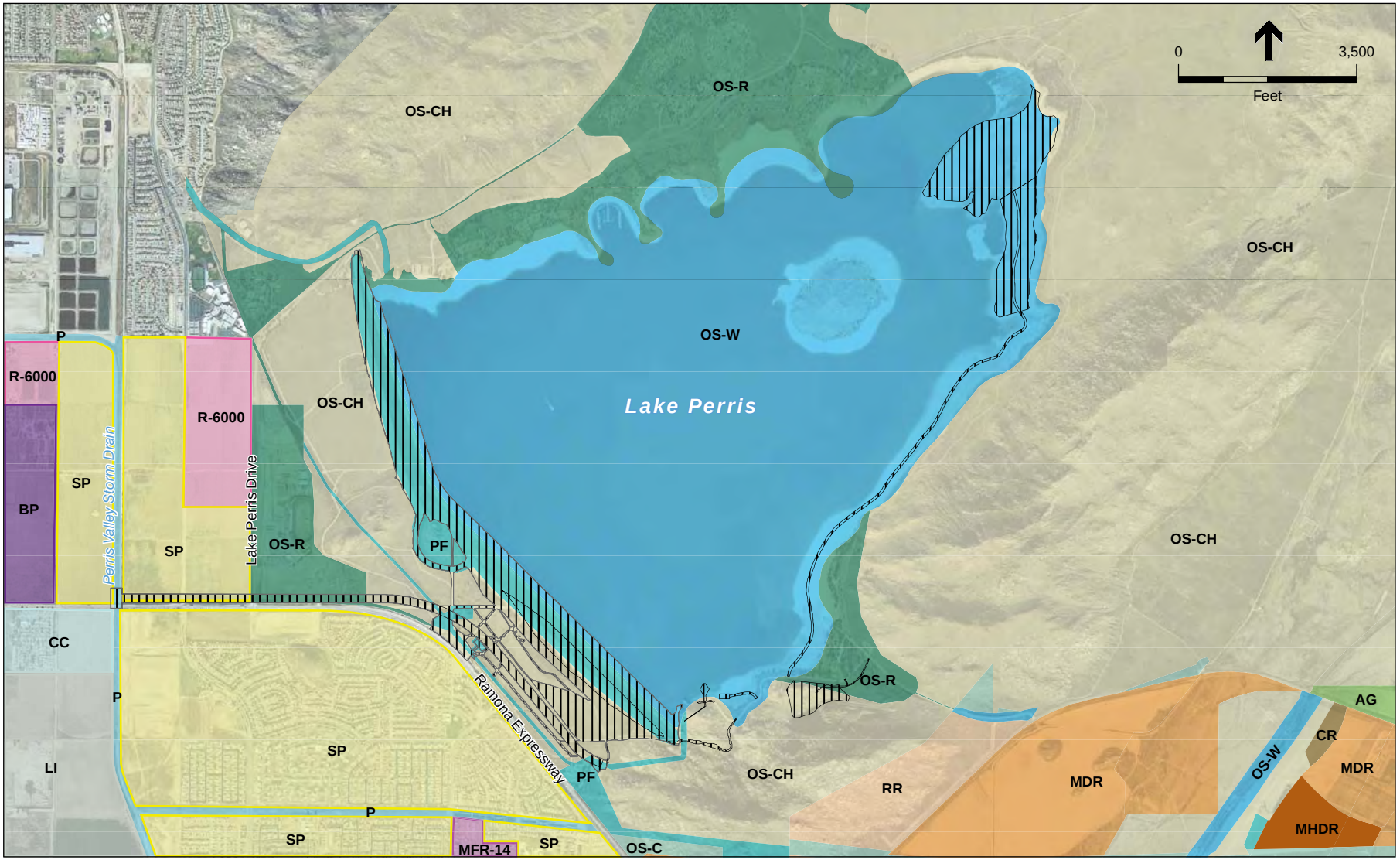
The proposed project is located in and around Lake Perris, in an unincorporated area of Riverside County, and in the City of Perris. Lake Perris and the area immediately around the lake are owned by DWR and comprise the Lake Perris SRA. The Lake Perris SRA is managed by the California Department of Parks and Recreation. DWR owns and operates the SWP facilities on site including the dam and outlet facilities. The CDFG owns the areas below the dam and manages them for habitat conservation value. The Perris Fairgrounds operate on a parcel of land at the corner of Ramona Expressway and Lake Perris Road.

Riverside County

General Plan Land Use Designations

General Plan land use designations in the project vicinity are illustrated in **Figure 3.8-1**. The figure references the Riverside County General Plan and the City of Perris General Plan land use designations. Land use in and around Lake Perris is largely governed by the Riverside County General Plan and is part of the County of Riverside Reche Canyon/Badlands Area Plan (County of Riverside, 2003). Lake Perris is surrounded by lands designated as Public Facilities (PF), Open Space-Conservation Habitat (OS-CH), and Open Space-Recreation (OS-R). The Land Use Element of the General Plan for the County of Riverside defines these land use categories as follows:

> **Open Space – Conservation Habitat (OS-CH)** – The Open Space-Conservation Habitat land use designation applies to public and private lands conserved and managed in accordance with adopted MSHCPs. Ancillary structures or uses may be permitted for the purpose of preserving or enjoying open space. Actual building or structure size, siting, and design would be determined on a case by case basis.



AG - Agriculture
CR - Commercial Retail
PF - Public Facilities
RR - Rural Residential
MDR - Meduim Density Residential
MHDR - Meduim High Density Residential
OS-CH Open Space Conservation Habitat
OS-C Open Space Conservation
OS-R Open Space Recreation
OS-W Open Space Water
R-6000 Residential
MFR-14 Residential
CC Community Commercial
LI Light Industrial
BP Business Park
SP Specific Plan
P Public/Semi-Public Facilities/Utilities
Project Footprint

SOURCE: GlobeXplorer, 2007; DWR, 2007; Riverside County, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.8-1
Land Use

Open Space – Water (OS-W) – Open Space-Water designated areas include bodies of water and major floodplains and natural drainage corridors. Ancillary structures or uses may be permitted for flood control or recreational purposes. The extraction of mineral resources subject to an approved surface mining permit may be permissible, provided that the proposed project can be undertaken in a manner that does not result in increased flooding hazards and that is consistent with maintenance of long-term habitat and riparian values.

Open Space – Recreation (OS-R) – The Open Space-Recreation land use designation allows for active and passive recreational uses such as parks, trails, camp grounds, athletic fields, golf courses, and off-road vehicle parks. Ancillary structures may be permitted for recreational opportunities. Actual building or structure size, siting, and design would be determined on a case by case basis.

Public Facilities (PF) – The Public Facilities area plan land use designation provides for the development of various public, quasi-public, and private uses with similar characteristics, such as governmental facilities, utility facilities including public and private electric generating stations and corridors, landfills, airports, educational facilities, and maintenance yards. Privately held uses with public facility characteristics are not required to be designated as Public Facilities, but are eligible to be so designated based on site-specific reviews of the characteristics of the use in question. Due to the varied nature of this category, building intensity and design criteria for uses shall generally comply with those standards and policies most similar to the intended use. Airports, utility facilities, other than electric generating stations, and landfills generally have low Floor Area Ratios (FAR). Building intensities for civic uses such as County administrative buildings and schools, however, are comparable to other employment generating land use designations. The maximum intensity allowed for civic uses within the Public Facilities designation is 0.60 FAR. Actual FAR would vary for other uses and the appropriate FAR would, therefore, be determined in the zoning ordinance.

Open Space – Conservation (OS-C) – The Open Space-Conservation land use designation is applied to land designated for preservation of non-MSHCP habitat lands, protection from natural hazards, and preservation of science and other natural resources. Ancillary structures or uses may be permitted provided that they further the intent of this designation and do not substantially alter the character of the area. Actual building or structure size, siting, and design would be determined on a case by case basis.

Rural Residential (RR) – The Rural Residential land use designation allows one single family residence per five acres, as well as limited animal-keeping and agricultural activities. For multi-lot developments, the minimum lot size per residential unit is 2.5 acres, though the overall density of the development must not exceed 0.2 dwelling units per acre. Limited recreational uses, compatible resource development (not including the commercial extraction of mineral resources) and associated uses, and governmental uses are also allowed within this designation.

Low Density Residential (LDR) – The Low Density Residential land use designation provides for the development of detached single family residential dwelling units and ancillary structures on large parcels. In the Rural Community Foundation Component, equestrian and other animal-keeping uses are expected and encouraged. Agriculture is

permitted in this designation. The density range is from two dwelling units per acre to one dwelling unit per acre.

The areas surrounding the Lake Perris SRA are dominated by open space uses. The area designated as OS-R along the north shore of the lake includes park facilities such as campgrounds, offices, the Regional Indian Museum, parking lots, a marina, group picnic areas, a horse camp, and a bike trail. The area designated as OS-R along the south shore of the lake consists of Bernasconi Beach and picnic areas as well as areas designated for camping and rock-climbing. Perris Dam is designated as a PF and Lake Perris itself is designated as OS-W (County of Riverside – Land Use Map 2005).

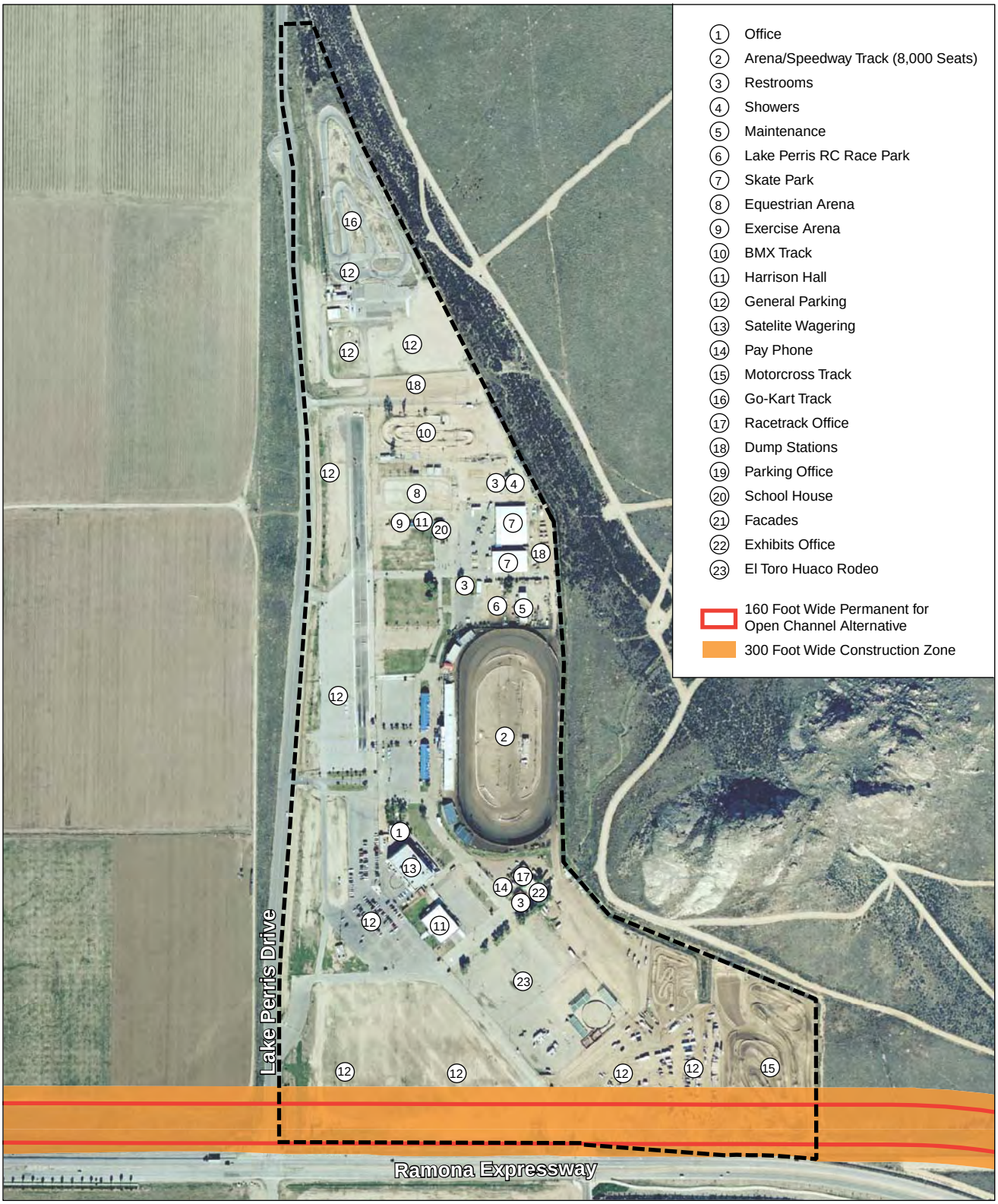
The area between the dam and the expressway is currently OS-CH. The land adjacent to the project site and north of the Expressway consists of several parcels designated as PF, OS-C, RR, and LDR.

The Perris Fairgrounds are located west of the Lake Perris SRA and north of Ramona Expressway in unincorporated Riverside County and encompass 108 acres of land designated as OS-R. According to the Fairgrounds, nearly one million people visit the Fairgrounds annually. The site is home to the Southern California Fair. The Fairgrounds are operated and managed by the 46th District Agricultural Association (DAA), a state agency that receives fiscal and policy oversight from both the California Department of Food and Agriculture and the California Division of Fairs and Expositions. Within the Fairgrounds, the Starwest Motocross Park, the El Toro Huaco Rodeo, and a general parking are closest to Ramona Expressway and the proposed project area. Starwest Motocross has been on the Fairgrounds since 1991 and supports 250,000 visitors annually. Additionally, the Perris Fairgrounds house an 8,000 seat speedway track; a hall that can be reserved for meetings, conferences, and weddings; Apex Go-Kart track; Lake Perris BMX track; a skate park; an equestrian arena; satellite wagering facilities; and office facilities. **Figure 3.8-2** provides a map of the Perris Fairgrounds. Facilities are regularly rented for a variety of events, including both long term contracts and interim contracts for circuses, tent sales, consumer shows, concerts, rodeos, RV rallies, receptions and car shows.

Zoning

The zoning classification for Lake Perris, the surrounding areas in unincorporated Riverside County, and the Perris Fairgrounds is W-2: Controlled Development Areas. According to Riverside County's Zoning Ordinance, Article XV, Section d, commercial fairgrounds and exhibitions are permitted provided a conditional permit has been granted. Article IV, Section e allows for "structures and installations necessary to the conservation and development of water such as dams, pipelines, water conduits, tanks, reservoirs, wells and the necessary pumping and water production facilities."

The Riverside County General Plan was adopted on October 7, 2003. At that time, the Consistency Zoning Program was outlined, the goal of which is to bring zoning designations into consistency with the General Plan (County of Riverside Concepts) in a reasonable period of time as required by California law.



SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.8-2
Perris Fairgrounds

Consistency is determined on a scale of one to four where one is consistent, two is generally consistent, three is generally inconsistent, and four is inconsistent. Within the project area, the OS-W land use designation and the W-2 zoning designation are rated four or inconsistent, the OS-CH land use designation and the W-2 zoning designation are rated three or generally inconsistent, and the OS-R land use designation and the W-2 zoning designation are rated two or generally consistent.

City of Perris

The area west of Lake Perris Drive is within the City of Perris and is characterized by vacant land and some residential development. The Land Use Element of the City of Perris General Plan outlines ten area plans within the city. The area through which the proposed emergency outlet extension would go is part of the City of Perris Planning Area 1: North Industrial/ Commercial. The land use designation in this area is primarily Specific Plan with the exception of the northeast area that is designated as R-6000 (see Figure 3.8-2). The R-6000 designation provides for low-density, single family dwellings at densities up to seven units per acre (minimum 6,000 square foot lots).

The specific plan for this area has not been completed and therefore the zoning designation takes precedence over land use. The parcel designated as R-6000 is zoned R7-Residential, which is consistent with the land use designation. The remaining parcels north of Ramona Expressway and east of Perris Valley Storm Drain are zoned as either R-4, which provides for low-density single family dwellings at densities of up to four dwelling units per acre; OS - Open Space; or CN - Commercial Neighborhood (Perris Zoning Map, 2005). The area zoned as open space is a narrow parcel of land approximately 280 feet wide immediately north of Ramona Expressway. The City of Perris Zoning Ordinance, Chapter 19.47.020, lists “Sewer Treatment plants, reservoirs, and flood control channels” among permissible uses in open space zones. As such, neither of the emergency outlet extension alternatives would conflict with the applicable zoning designations for the project area.

The area south of Ramona Expressway also is part of the City of Perris. This area is characterized primarily by residential development. When the dam was built, there was little development in this area east of the storm drain. However, both the land use designation and zoning ordinance from the Specific Plan have enabled this residential development to take place.

March Air Reserve Base

The former March Air Reserve Base, located immediately southeast of the Reche Canyon/ Badlands Area, was established in 1918 for military purposes and was functional as such until 1993. In 1996, the 6,500 acre airport was converted to an Active Duty Reserve Base and is now governed by the Joint Powers Authority (JPA), a group comprised of four members including the County of Riverside and the Cities of Perris, Moreno Valley, and Riverside. The airport serves as an important source of potential commerce for the area and the JPA has plans to turn part of the airport into an active inland port (Riverside Reche Canyon, 2003). The influence policy area, specifically the Airport Influence Policy Area/Safety Zone Area III, includes the western portions

of Lake Perris as well as the proposed outlet extension running from the dam to the Perris Valley Storm Drain. The City of Perris' General Plan specifically suggests that Perris' Planning Area 1 focus infrastructure and development around potential cargo operations from the airport as a means to bring jobs, disposable income, retail uses, and therefore sales tax revenue to the City of Perris (Perris Land Use, 2005).

Existing Agricultural Environment

Agricultural resources in the project area and adjacent lands, as determined by the California Department of Conservation, are shown in **Figure 3.8-3**. Specifically, there are two sites within the vicinity of the project area that have been designated as agricultural land by the state, though not by the Riverside County General Plan. On the southeastern edge of Lake Perris, this land is OS-R and has been designated Farmland of Local Importance (Department of Conservation, 2004). Though this area would not necessarily be directly affected by the proposed project, it could be located within the boundaries of the construction area, which would be delineated by fencing, and thus could be affected by construction activity.

The second site is located east of the dam in the City of Perris and the southeastern portion of the Perris Fairgrounds. The southeastern portion of the Perris Fairgrounds, which is currently a parking lot, has been designated as Farmland of Local Importance (Department of Conservation, 2004). The adjacent land in the City of Perris, situated between the Fairgrounds and the Perris Valley Storm Drain, is designated as Prime Farmland and Farmland of Statewide Importance. These lands are largely vacant at present, except in the northeast corner where residential development has begun. The proposed emergency outlet extension would run through the vacant land adjacent to the northern side of Ramona Expressway. There are no Williamson Act contracts in the project area or in adjacent lands (See Section 3.8.2, Regulatory Framework below for a description of the Williamson Act).

3.8.2 Regulatory Framework

Federal

Federal Aviation Administration

The Federal Aviation Administration (FAA) is the branch of the U.S. Department of Transportation with regulatory responsibility for civil aviation. The FAA is responsible for establishing policies and regulations to ensure the safety of the traveling public. The FAA oversees publicly-owned airports that are open to the public or airports that receive federal funding (Rodriguez, 2006). FAA Advisory Circular 150/5200-33B addresses hazardous wildlife attractants on or near airports (FAA, 2007). This Advisory Circular is intended to provide guidance on siting certain land uses that have the potential to attract potentially hazardous wildlife to a public-use airport or its vicinity. The FAA Advisory Circular recommends against "land use practices that attract or sustain populations of hazardous wildlife within the vicinity of airports or cause movement of hazardous wildlife onto, into, or across the approach or departure airspace, aircraft movement area, loading ramps, or aircraft parking area of airports." The

L - Farmland of Local Importance
P - Prime Farmland
S - Farmland of Statewide Importance
U - Unique Farmland
Project Footprint

0 3,500
Feet

SOURCE: GlobeXplorer, 2007; DWR, 2007; Department of Conservation, Farmland Mapping and Monitoring Program, 1984-2006.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.8-3
Farmland

Advisory Circular recommends a separation distance of 5,000 feet between airports using piston-powered aircraft and any project or change in land use that could attract hazardous wildlife, such as open-air water storage facilities. For airports using turbine-powered aircraft, the FAA recommends a separation distance of 10,000 feet between an airport and a potential hazardous wildlife attractant. For projects that are located outside the 5,000/10,000-foot criteria but within five statute miles of the airport's air operations area,[1] the FAA may review development plans, proposed land-use changes, operational changes, or wetland mitigation plans to determine whether such changes in land use would create potential wildlife hazards to aircraft operations.

March Air Reserve Base is located within 4.8 miles of the proposed project. ESA spoke to Douglas Adams, Community Planner for March Air Reserve Base, to discuss the proposed project and to determine whether the proposed project would have the potential to increase wildlife hazards for flights operating out of March Air Reserve Base. Mr. Adams stated that flight tracks associated with operations at March Air Reserve Base do not pass near the Perris Lake Reservoir due to the presence of high terrain. (Adams, 2007).

State

Caltrans Division of Aeronautics

The State Aeronautics Act, Public Utilities Code (PUC) section 21001 et. seq., is the foundation for the Caltrans aviation policies. The Division of Aeronautics issues permits for and annually inspects public-use airports. Aviation system planning provides for the integration of aviation into transportation system planning on a regional, statewide, and national basis. The Division of Aeronautics administers noise regulation and land use planning laws that foster compatible land use around airports and encourages environmental mitigation measures to lessen noise, air pollution, and other impacts caused by aviation. The Division of Aeronautics also provides grants and loans for safety, maintenance and capital improvement projects at airports (Caltrans, 2006).

California Farmland Mapping and Monitoring Program

The California Department of Conservation, under the Division of Land Resource Protection, has established the Farmland Mapping and Monitoring Program (FMMP). The FMMP monitors the conversion of the state's farmland to and from agricultural use. The map series identifies eight classifications and uses a minimum mapping unit size of ten acres. The FMMP also produces a biannual report on the amount of land converted from agricultural to non-agricultural use. The FMMP maintains an inventory of state agricultural land and updates its "Important Farmland Series Maps" every two years (Department of Conservation, 2007a). Important farmlands are divided into the following five categories based on their suitability for agriculture.

1. **Prime Farmland.** Prime Farmland is land with the best combination of physical and chemical characteristics able to sustain long-term production of agricultural crops. This

[1] Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.

land has produced irrigated crops at some time within the four years prior to the mapping date.

2. **Farmland of Statewide Importance.** Farmland of Statewide Importance is land that meets the criteria for Prime Farmland but with minor shortcomings such as greater slopes or lesser soil moisture capacity.
3. **Unique Farmland.** Unique Farmland has even lesser quality soils and produces the state's leading agricultural crops. This land is usually irrigated but also includes non-irrigated orchards and vineyards.
4. **Farmland of Local Importance.** Farmland of Local Importance is land that is important to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
5. **Grazing Land.** Grazing Land is land on which the existing vegetation is suited to the grazing of livestock.

Williamson Act

The California Land Conservation Act of 1965, also known as the Williamson Act, is designed to preserve agricultural and open space lands by discouraging their premature and unnecessary conversion to urban uses (Department of Conservation, 2007b). The Act creates an arrangement whereby private landowner's contract with counties and cities to voluntarily restrict their land to agricultural and compatible open-space uses. In return, Williamson Act contracts offer tax incentives by ensuring that land would be assessed for its agricultural productivity rather than its highest and best use. Contracts run for a period of ten years; however, some jurisdictions exercise the option of making them long term, up to twenty years. Contracts are automatically renewed unless the landowner files for non-renewal or petitions for cancellation. Williamson Act contracts can be divided into the following categories: Prime Agricultural Land, Non-Prime Agricultural Land, Open Space Easement, Built Up Land, and Agricultural Land in Non-Renewal.

County

Riverside County General Plan

The County of Riverside General Plan recognizes 19 geographic planning areas within the county. The proposed project is located within the Reche Canyon/ Badlands Area Plan as well as the incorporated City of Perris.

The Land Use Element, the Multipurpose Open Space Element, and the Reche Canyon/ Badlands Area Plan govern the land use and agricultural resources of the county and the proposed project area. The Land Use Element presents goals and policies that guide future geographic patterns of development in the county. The Multipurpose Open Space Element outlines the county's intentions for protecting and preserving natural resources, agriculture, open space, and recreational opportunities (Riverside Multipurpose, 2003). The Reche Canyon/Badlands Area Plan contains specific policies that guide the physical development of this particular part of Riverside County to be used in conjunction with the County of Riverside General Plan and Vision Statement. Some goals and policies for land use and open space in the County of Riverside General Plan that are relevant to the proposed project are as follows:

General Plan Land Use Element

Infrastructure, Public Facilities & Service Provisions

Policy LU 5.4. Ensure that development and conservation land uses do not infringe upon existing public utility corridors, including fee owned rights-of-way and permanent easements, whose true land use is that of "public facilities." This policy will ensure that the "public facilities" designation governs over what otherwise may be inferred by the large scale general plan maps.

Open Space, Habitat & Natural Resource Preservation

Policy LU 8.1. Provide for permanent preservation of open space lands that contain important natural resources, hazards, water features, watercourses, and scenic and recreational values.

Airports

Policy LU 14.9. All development proposals within an Airport Influence Area will be submitted to the affected airport.

Open Space Area Plan Land Use Designations

Policy LU 18.2. Cooperate with the CDFG, USFWS, and any other appropriate agencies in establishing programs for the voluntary protection, and where feasible, voluntary restoration of significant environmental habitats.

Open Space – Recreation

Policy LU 19.1. The County shall develop and maintain a regional park system that provides recreational opportunities for residents and visitors of Riverside County.

Policy LU 19.2. Provide for a balanced distribution of recreational amenities in Open Space, Rural, and Community Development General Plan land uses.

Public Facilities

Policy LU 25.1. Accommodate the development of public facilities in areas appropriately designated by the General Plan and area plan land use maps.

Policy LU 25.6. Ensure that development and conservation land uses do not infringe upon existing public utility corridors, including fee owned rights-of-way and permanent easements, whose true land use is that of Public Facilities. This policy will ensure that the "public facilities" designation governs over what otherwise may be inferred by the large-scale general plan maps.

General Plan Open Space Element

Open Space, Parks and Recreation

Policy OS 20.1. Preserve and maintain open space that protects County environmental resources and maximizes public health and safety in areas where significant environmental hazards and resources exist.

Policy OS 20.2. Prevent unnecessary extension of public facilities, services, and utilities, for urban uses, into Open Space-Conservation designated areas.

Reche Canyon Badlands Area Plan

Policy RCBAP 13.1. Protect visual and biological resources in the Reche Canyon/ Badlands area through adherence to General Plan policies found in the Multipurpose Open Space Element.

Policy RCBAP 16.1. Conserve habitat that captures the diversity of the Riverside Lowlands bioregion within the Reche Canyon/ Badlands area. The Reche Canyon/ Badlands region includes substantial areas of remaining natural habitat within the Riverside Lowlands, including a portion of the San Jacinto River, the Badlands, Reche Canyon area, and the Mystic Lake/ San Jacinto Wildlife Area.

Local

City of Perris General Plan

The Land Use Element and Conservation Element of the City of Perris General Plan govern the land use and agricultural resources of the city. The Land Use Element presents goals and policies that guide future geographic patterns of development in the city. The Conservation Element describes the management and conservation practices for natural resources and open space in the city.

3.8.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses potential impacts of the proposed project to land use and agricultural uses in the project area. The impact significance criteria are based on guidance provided by Appendix G of the *CEQA Guidelines* regarding significant environmental effects. For this Draft EIR, the proposed project would have a significant impact if it would:

- Physically divide an established community;
- Conflict with existing or designated land uses in the area or land use policies;
- Conflict with any habitat conservation plan or natural community conservation plan;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;
- Conflict with existing zoning for agricultural use, or a Williamson Act contract; and
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use.

Division of Community

The dam remediation and outlet tower would not physically divide a community. The underground emergency outlet extension alternative would run parallel to the Ramona

Expressway and would be installed under roadways that would avoid physically dividing the community. The open channel emergency outlet extension alternative would also parallel the Ramona Expressway, and is consistent with all applicable the zoning designations from the Specific Plan for the project area (refer to Impact 3.8-1 below for more information). Though the open channel emergency outlet extension would be aboveground, it would be developed on land that was anticipated by the Specific Plan for such uses and would not divide an established community.

Existing Land Use and Land Use Plans

Impact 3.8-1: Construction of the proposed project would impact existing land uses.

Construction activities would require closing the eastern portion of the lake shoreline, including the Bernasconi picnic area and rock climbing area, to the public. During this period, recreation activities would be limited. Since the access restrictions are temporary in nature, the impact to land use is considered less than significant.

The vacant land affected in the City of Perris by the emergency outlet extension is zoned within a Specific Plan area. The city has acknowledged that the area would be developed in the near future for residential uses. The Specific Plan area acknowledges that the corridor north of Ramona Expressway is reserved as a water conveyance channel. Therefore the proposed emergency outlet extension is compatible with the Specific Plan.

A segment of the Perris Fairgrounds would be graded and excavated to accommodate the outlet channel. Construction of the underground emergency outlet channel alternative would temporarily demolish a 300-foot wide corridor along the southern border of the Fairgrounds affecting approximately 15 square acres. The channel would result in an approximately 160-foot wide corridor that temporarily affects land uses. Similarly, construction of the open channel emergency outlet channel alternative would temporarily demolish a 300-foot wide corridor along the southern border of the Fairgrounds, resulting in a permanent 160-foot wide easement. The open channel would permanently reduce the acreage at the Fairgrounds now used for the Starwest Motocross Park. The temporary and permanent impact area is currently comprised of the Fairgrounds' largest general parking lot, a portion of the Starwest Motocross Park, and the entranceway to the Fairgrounds from Ramona Expressway. No permanent buildings exist within this construction corridor. The general parking lot is unpaved and is used for events at any of the facilities within the Fairgrounds. The El Toro Huaco Rodeo facility is adjacent to the location of the proposed outlet channel but would not be affected. Figure 3.8-2 identifies the Fairgrounds and construction impact zone.

Construction of the underground emergency outlet extension alternative on the Perris Fairgrounds would temporarily affect land use. Construction of the open channel emergency outlet extension alternative would permanently affect land use. Approximately eight acres of the parking lot (room

for approximately 750 parking spaces[2]) would be temporarily displaced for the underground outlet channel alternative, and permanently displaced for the open channel alternative. Three acres of the 6.5-acre motocross facility (approximately 45 percent) would be temporarily removed from service by the underground outlet channel alternative, and permanently removed by the open channel alternative. An additional four acres consisting of the Fairgrounds entranceway, some additional unpaved general parking, and an area for ancillary motocross uses also would be temporarily displaced by the underground outlet channel alternative and permanently displaced by the open channel alternative. The Fairgrounds are fully developed as shown in Figure 3.8-2. With installation of the underground emergency outlet extension alternative, the Fairgrounds could be restored to its original land uses. With installation of the open channel outlet extension alternative, the Fairgrounds would not be restored to its original condition, and certain facilities would be lost permanently (see Figure 3.8-2).

The Fairgrounds encompasses approximately 108 acres and attracts nearly one million annual visitors. The facility provides an important function to the local community. The underground emergency outlet alternative would disrupt and require the temporary closure of the Starwest Motocross facility. Although this disruption would modify the facility, most of the Fairgrounds would remain unaffected, as shown on Figure 3.8-2. Under this alternative, the function of the Perris Fairgrounds to provide recreational facilities to the public would remain viable. Mitigation Measure 3.8-1b commits DWR to minimizing the impact zone of the channel through the Fairgrounds. With implementation of Mitigation Measures 3.8-1a through 3.8-1c, impacts to the Fairgrounds resulting from construction and operation of the underground emergency outlet extension alternative would be considered less than significant.

The open channel emergency outlet extension alternative would result in the permanent loss of portions of the Starwest Motocross facility and of the existing parking lot. As such, this alternative would represent a permanent conversion of existing land uses, and the permanent loss of recreational activities and parking spaces. Therefore, even with implementation of Mitigation Measures 3.8-1b and 3.8-1c (Mitigation Measure 3.8-1a would not apply), construction of the open channel emergency outlet extension alternative through the Fairgrounds would result in a significant and unavoidable impact.

Mitigation Measures

> **Mitigation Measure 3.8-1a:** If the underground emergency outlet extension alternative is selected, DWR shall restore the motocross facility and parking area to their pre-construction condition.
>
> **Mitigation Measure 3.8-1b:** DWR shall reduce the construction zone of the emergency outlet extension to the minimum width necessary to accommodate the channel.
>
> **Mitigation Measure 3.8-1c:** DWR shall coordinate with the Perris Fairgrounds to minimize construction during major events.

[2] Riverside County zoning code Section 18.12 requires that parking space be a minimum of 9 feet by 18 feet with a 28 foot aisle between rows.

Significance after Mitigation: Significant and unavoidable for the open channel alternative; Less than significant for the underground alternative.

Habitat Conservation Plans

Impact 3.8-2: Construction and operation of the proposed project could conflict with an existing habitat conservation plan.

The new stability berm, the haul road over Bernsconi Hills, and the emergency outlet extension would eliminate land managed for habitat conservation values by CDFG. The open space areas within the Lake Perris SRA are managed for their recreational and habitat values. The new facilities required to stabilize the integrity of the dam and provide for emergency drawdown capabilities would ultimately support the continued operations of the Lake Perris SRA as well as enhance public safety. The property is managed for habitat conservation by Riverside County's MSHCP. Modifying the use of the land would require compensation pursuant to the guidelines provided in the MSHCP. Section 3.3, Biological Resources, of this EIR establishes values for these project impact areas and establishes a mitigation strategy to comply with the MSHCP policies. These impacts are discussed in Section 3.3, Biological Resources, along with other impacts to wildlife, habitat, and riparian areas. Compliance with compensation guidelines outlined in the MSHCP and approval of those measures by the County of Riverside would result in the project being in compliance with the MSHCP.

Mitigation Measures

> Implement **Mitigation Measures Biology** 3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, 3.3-9a, and 3.3-11.

Significance after Mitigation: Less than Significant.

Important Farmland

Impact 3.8-3: Project implementation would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.

Construction of the emergency outlet extension would cross land within the City of Perris designated as Prime Farmland and Farmland of Statewide Importance by the California Department of Conservation (see Figure 3.8-3). The City of Perris does not consider this land to be agricultural land. In 1991, the City of Perris General Plan Land Use Element eliminated the agricultural land use designation and re-designated all agricultural lands for other uses. The EIR for the 1991 General Plan identified conversion of agricultural land as a significant cumulative impact and a Statement of Overriding Considerations was adopted. The City of Perris' General Plan 2030 (adopted in April, 2005) therefore had no impact on conversion of agricultural land

since the conversion had already been acknowledged in the previous plan. Accordingly, both the open channel and underground emergency outlet extension alternatives would have no impact on agricultural resources.

Land identified as Farmland of Local Importance by the California Department of Conservation within the footprint of the Perris Fairgrounds is designated as OS-R in the Riverside County General Plan. The area of the Fairgrounds that would be affected by the project and that is designated as agricultural land on FMMP maps is currently a parking lot and a motocross facility. Implementation of the proposed project would not convert agricultural land to non-agricultural uses.

Significance: Less than Significant.

Mitigation Measures Summary Table

Table 3.8-1 presents the impacts and mitigation summary for Land Use and Planning.

TABLE 3.8-1
LAND USE AND PLANNING IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance After Mitigation
Existing Land Usage: Construction of the proposed project could impact existing land uses	3.8-1a through 3.8-1c	Significant and Unavoidable for the open channel emergency outlet extension alternative; Less than Significant for the underground emergency outlet extension alternative.
Habitat Conservation Plan: Construction and operation of the proposed project could conflict with an existing habitat conservation plan.	Biology 3.3-1a through 3.3-1c, 3.3-3a, 3.3-6a through 3.3-6e, 3.3-7a, 3.3-9a, and 3.3-11.	Less than Significant
Agricultural Lands: Project implementation would convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	None required	--

3.9 Noise

This section provides an overview of the existing noise environment at the project site and surrounding area, as well as an analysis of potential impacts and mitigation measures that would result from implementation of the project.

3.9.1 Setting

Noise Principles and Descriptors

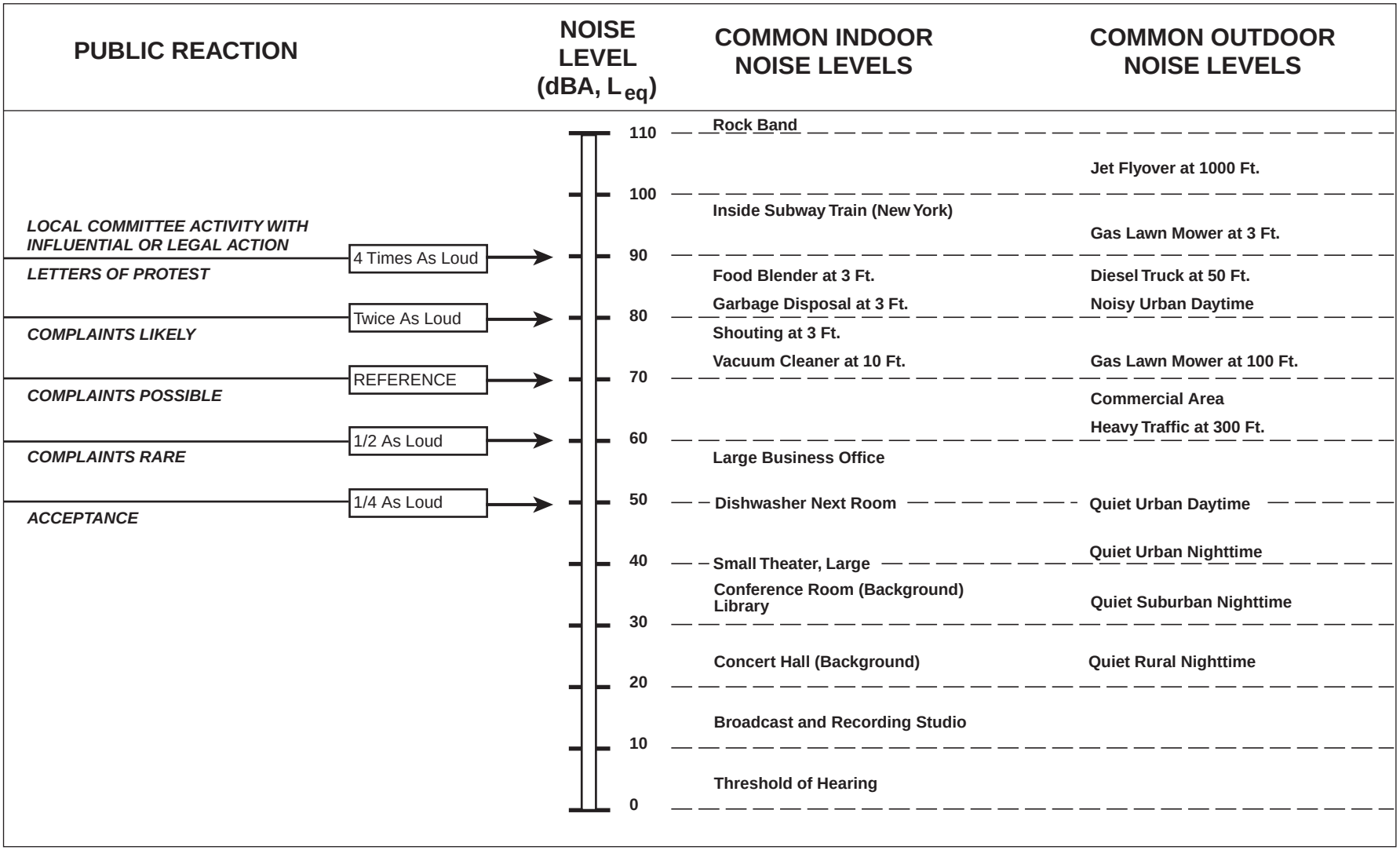
Noise is defined as unwanted sound. Sound, traveling in the form of waves from a source, exerts a sound pressure level (referred to as sound level) which is measured in decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1000 Hz and above 5000 Hz in a manner corresponding to the human ears decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 3.9-1**.

Noise Exposure and Community Noise

The noise levels presented in Figure 3.9-1 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.



SOURCE: ESA, 2007

Figure 3.9-1
Effect of Noise on People

These successive additions of sound to the community noise environment vary the community noise level from instant to instant requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: the instantaneous maximum noise level for a specified period of time.

L50: the noise level that is equaled or exceeded 50 percent of the specified time period. The L50 represents the median sound level.

L90: the noise level that is equaled or exceeded 90 percent of the specified time period. The L90 is sometimes used to represent the background sound level.

DNL: 24-hour day and night A-weighted noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: similar to the DNL the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10-dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

As a general rule, in areas where the noise environment is dominated by traffic, the L_{eq} during the peak-hour is generally equivalent to the DNL at that location (Caltrans, 1998).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no complete satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- outside of the laboratory, a 3-dBA change is considered a just-perceivable difference;
- a change in level of at least 5-dBA is required before any noticeable change in human response would be expected; and
- a 10-dBA change is subjectively heard as approximately a doubling in loudness, and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement. Hard sites are those with a reflective surface between the source and the receiver such as parking lots or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such at traffic noise from vehicles) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans, 1998).

Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment (FTA, 2006), ground-borne vibration can be a serious concern for nearby neighbors, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, sheet pile-driving and operating heavy earth-moving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the affect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (Vdb) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-

made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, students, the elderly and sick), and vibration sensitive equipment.

The effects of ground-borne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most projects, with the occasional exception of blasting and sheet pile-driving during construction. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV and the FTA threshold of human annoyance to ground-borne vibration is 80 RMS (FTA, 2006).

3.9.2 Regulatory Framework

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dBA at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

State

For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dBA. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dBA at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local

Local noise issues are addressed through implementation of general plan policies, including noise and land use compatibility guidelines, and through enforcement of noise ordinance standards. Noise ordinances regulate such sources as mechanical equipment and amplified sounds as well as prescribe noise limits in residential and commercial zones. Although ordinances may not apply to DWR construction projects, it would be a prudent construction practice to work with host

jurisdictions and neighboring communities during project planning and to apply the local environmental protection standards. For this project, noise regulations and standards of the County of Riverside and the City of Perris were considered with respect to the proposed facilities and nearby sensitive receptors.

City of Perris Municipal Code

The following portions of the municipal code are relevant to the project.

7.34.050 General prohibition.

A. It is unlawful for any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof. The standards for dBA noise level in Section 7.34.040 shall apply to this section (see **Table 3.9-1**). To the extent that the noise created causes the noise level at the property line to exceed the ambient noise level by more than 1.0 decibels, it shall be presumed that the noise being created also is in violation of this section.

TABLE 3.9-1
CITY OF PERRIS NOISE LEVEL STANDARDS

Time Period	Maximum Noise Level (dBA)
10:01 p.m. – 7:00 a.m.	60
7:01 a.m. – 10:00 p.m.	80

SOURCE: City of Perris Ordinance 1082 § 2(part), 2000

B. The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists should include, but not be limited to, the following:

- The level of the noise;
- Whether the nature of the noise is usual or unusual;
- Whether the origin of the noise is natural or unnatural;
- The level of the ambient noise;
- The proximity of the noise to sleeping facilities;
- The nature and zoning of the area from which the noise emanates and the area where it is received;
- The time of day or night the noise occurs;
- The duration of the noise; and
- Whether the noise is recurrent, intermittent or constant.
(Ord. 1082 § 2(part), 2000).

It is unlawful for any person between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, or on a legal holiday, with the exception of Columbus Day and Washington's

birthday, or on Sundays to erect, construct, demolish, excavate, alter or repair any building or structure in such a manner as to create disturbing, excessive or offensive noise. Construction activity shall not exceed 80 dBA in residential zones in the city (Ord. 1082 § 2(part), 2000).

County of Riverside General Plan

Noise Element

The County of Riverside is in the process of updating their General Plan. Some draft temporary construction policies are as follows;

> **Policy N 12.1:** Minimize the impacts of construction noise on adjacent uses within acceptable practices. (AI 105, 108)
>
> **Policy N 12.2:** Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas. (AI 105, 108)

County of Riverside Municipal Code

The County of Riverside municipal code identifies the following acceptable noise threshold standards as shown in **Table 3.9-2**. The County of Riverside does not differentiate between anything that causes noise levels that exceed the threshold. Construction noise higher than the threshold would be considered a significant noise contribution.

TABLE 3.9-2
COUNTY OF RIVERSIDE SOUND LEVEL STANDARDS

Land Use	Maximum Decibel Level (dB Lmax)
Residential	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	55
Recreation	
10:00 p.m. to 7:00 a.m.	45
7:00 a.m. to 10:00 p.m.	45

SOURCE: County of Riverside Ordinance 847 § 4, 2006

3.9.3 Existing Noise Environment

The noise environment surrounding the project site is influenced primarily by boating activities, the fairgrounds and traffic on local roadways. Noise levels away from these noise sources can be quite low depending on the amount of nearby human activity.

Metrosonics Model db3080 sound level meters were used to obtain the ambient noise level measurements. The meters were calibrated to ensure the accuracy of the measurements. Twelve short-term noise level measurements were taken near the project site. The noise measurement results are presented below in **Table 3.9-3**.

TABLE 3.9-3
EXISITING NOISE ENVIRONMENTS AT PROJECT LOCATION

Location	Time Period	Leq (dB)	Noise Sources
Short Term 1 North west corner of furthest west parking lot on the lake	August 19 4:29 – 4:34 p.m.	44	55 dB car 45 dB jet ski 53 dB wind
Short Term 2 East of marina, 50 ft from parking lot	August 19 4:46 – 4:51 p.m.	46	Wind People on dock
Short Term 3 10 ft from water south of furthest east parking lot	August 19 5:06 – 5:11 p.m.	53	Wind Car Waves Wind sail
Short Term 4 Corner of Ramona and Fair Way, 50 feet from Ramona, near motocross track	August 19 5:24 – 5:29 p.m.	66	Traffic Water fountain
Short Term 5 Corner of Ramona and Bradley 50 feet from 9' sound wall, 50 feet from Ramona	August 19 5:52 – 5:57 p.m.	62	Dirt bikes Traffic
Short Term 6 Parking lot of recreation area south of lake	August 19 6:14 – 6:19 p.m.	47	Wind Airplane
Short Term 7 North west corner of furthest west parking lot on the lake	August 20 8:15 – 8:20 a.m.	45	Birds 60 dB Cleanup Crew 61 dB Car Noise level lowers to 41 dB
Short Term 8 East of marina, 50 ft from parking lot	August 20 8:25 – 8:30 a.m.	42	People on dock 47 dB van
Short Term 9 10 ft from water south of furthest east parking lot	August 20 8:38 – 8:43 a.m.	43	48 – 55 dB boat Noise level lowers to 40
Short Term 10 Corner of Ramona and Bradley 50 feet from 9' sound wall, 50 feet from Ramona	August 20 8:54 - 8:59 a.m.	62	Traffic 72 dB Truck
Short Term 11 Parking lot of recreation area south of lake	August 20 9:10 - 9:15 a.m.	44	45 dB Plane Noise level lowers to 40 dB
Short Term 12 Corner of Ramona and Fair Way, 50 feet from Ramona, near Perris Auto Speedway/ Starwest Motocross Park	August 20 9:22 – 9:27 a.m.	64	2 dirt bikes 66 dB revved dirt bike engine

SOURCE: ESA 2007

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, hotels, schools, rest homes, and hospitals are generally more sensitive to noise than commercial and industrial land uses. Neighborhood parks are not considered to be noise-sensitive, but passive recreational uses such as bird watching or picnicking are considered to be noise-sensitive. The closest sensitive receptors to the project components are described below.

Sensitive receptors in the project vicinity are residential neighborhoods within the City of Perris, Rancho Verde High School, Lake Perris SRA headquarter offices and recreational facilities within the Lake Perris SRA. **Figure 3.9-2** shows the location of nearby land uses that support sensitive receptors including schools and residences. The closest residences are about 1400 feet southeast of the proposed stability berm, and approximately 200 feet from the proposed emergency outlet extension along the Ramona Expressway. Rancho Verde High School is located approximately 3500 feet from the stability berm construction zone.

The entire Lake Perris SRA supports recreational visitors that could be considered sensitive receptors. The construction zone would be fenced, providing an approximately 200-foot buffer between active construction activities and unrestricted use. On the outside of the fence, recreation activities could occur at any time. Fishing and boating on Lake Perris could occur within approximately 200 feet of the shoreline where construction activities are occurring. Bernasconi picnic area is approximately 800 feet from the rock quarry, but would be off-limits to the public during construction of the project.

3.9.4 Impacts and Mitigation Measures

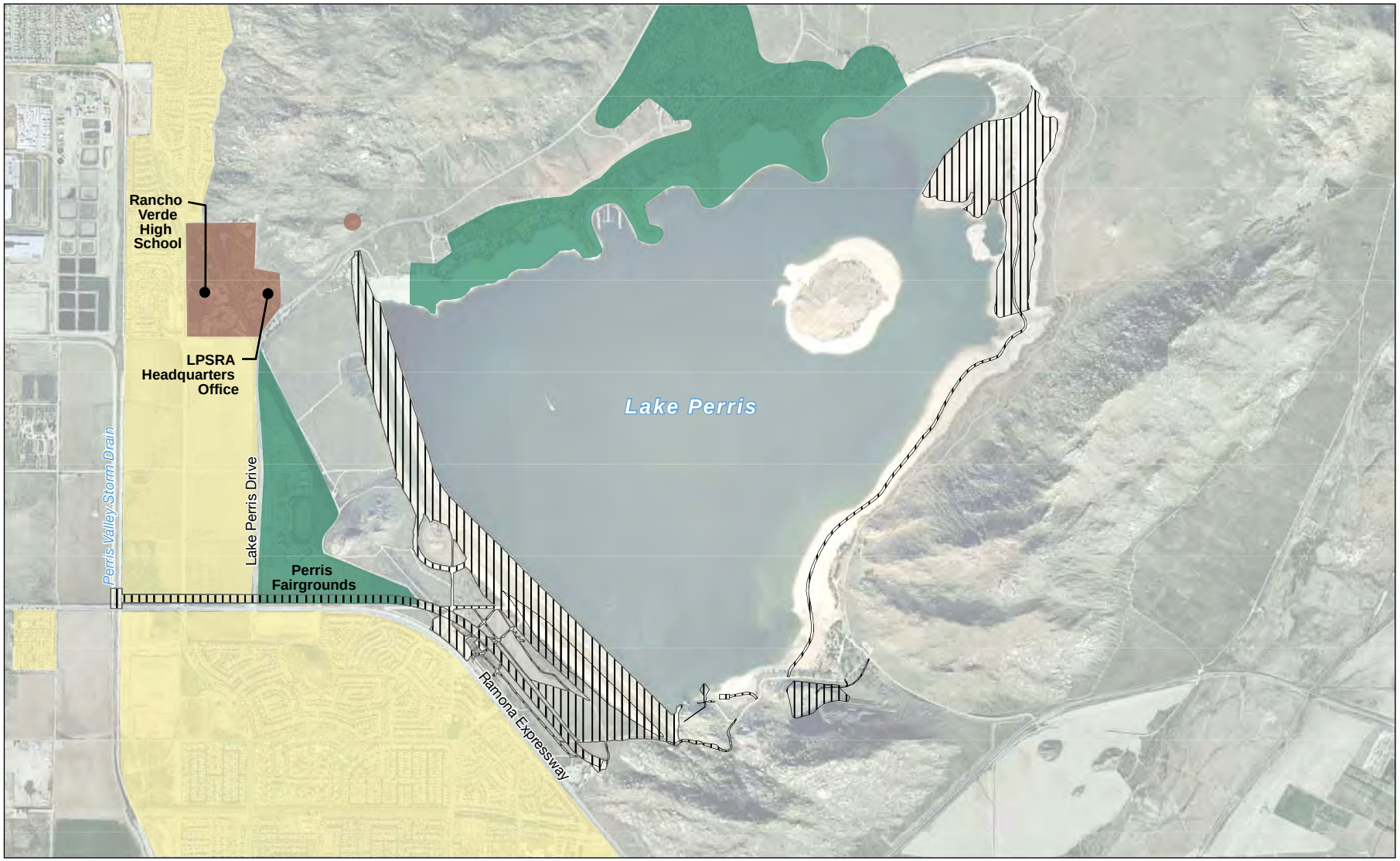
Significance Criteria

Based on Appendix G of the *CEQA Guidelines,* a project may be deemed to have a significant effect on the environment with respect to noise and/or ground-borne vibration if it would result in:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- Exposure of people residing or working in the project area to excessive noise levels (for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport); or
- Exposure of people residing or working in the project area to excessive noise levels (for a project within the vicinity of a private airstrip).

The project would result in significant noise impacts if it would generate noise or vibration levels in excess of the following thresholds shown in **Table 3.9-4**.

> **Construction Noise.** The project would result in a significant construction impact if construction activity would occur outside of the daytime hours permitted by the City of Perris Municipal code or cause over 55 dBA in a residential area, or 45 in a recreational area in Riverside County.



Residential Areas (Including future land use)
Recreational Facilities
Office/Schools
Project Footprint

0 3,500
Feet

SOURCE: GlobeXplorer, 2007; DWR, 2007; ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.9-2
Nearby Sensitive Receptors

TABLE 3.9-4
THRESHOLDS OF SIGNIFICANCE FOR NOISE EXPOSURE

Ambient Noise Level Without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5.0 dB or more
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

SOURCE: Federal Interagency Committee on Noise (FICON), 1992.

Vibration. The project would result in a significant vibration impact if buildings would be exposed to the FTA building damage ground-borne vibration threshold level of 0.2 PPV or if sensitive individuals would be exposed to the FTA human annoyance response ground-borne vibration threshold level of 80 RMS.

Stationary Noise. A resulting off-site noise level from stationary non-transportation sources that exceeds 45 dBA Lmax anytime at the property line of recreational land uses in Riverside County jurisdiction (cannot exceed 45 dBA at the recreational sites). A resulting off-site noise level from stationary non-transportation sources that exceeds 80 dBA Lmax in the daytime (7:00 a.m. to 10:00 p.m.) or 60 dBA Leq in the nighttime (10:00 p.m. to 7:00 a.m.) at the property line of residential or other noise sensitive land uses in City of Perris jurisdiction (cannot exceed 80 dBA at the nearest residences in Perris).

Traffic Noise. As described in Table 3.9-4 above, the project would result in a significant traffic noise impact if mobile noise would result in increased noise levels of 1.5 dBA Ldn or more in an ambient noise environment greater than 65 dBA Ldn; or increased noise of 3 dBA Ldn or more in an ambient noise environment between 60 and 65 dBA Ldn; or increased noise of 5 dBA Ldn or more in an ambient environment of less than 60 dBA Ldn.

Airport Compatibility

The project is approximately two miles from March Air Reserve Base. The project would not introduce land uses that would be sensitive to aircraft noise. Therefore, there would be no impact from noise from airport operations. This potential impact will not be discussed further.

Exposure of People to Noise

Operational Noise

The project would not add any new stationary noise sources (e.g., pumps, transformers, emergency generators, etc.). Therefore, operation of the Perris Dam would not increase ambient noise levels from stationary noise sources in the dam vicinity. Project operations would have no impact from new stationary noise sources. Traffic generated by the project operations would be infrequent. Only a few daily vehicle trips would be expected for routine inspection and maintenance, similar to existing conditions. The project would not increase operational noise, and the issue is not discussed further.

Construction Noise

Impact 3.9-1: Project construction could substantially increase ambient noise levels or generate noise levels in excess of standards established in the local general plans or noise ordinances, or applicable standards of other agencies.

Construction activity noise levels at and near the construction areas would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes. In addition, certain types of construction equipment generate impulsive noises such as sheet pile-driving and blasting.

Table 3.9-5 shows typical noise levels during different construction stages. **Table 3.9-6** shows typical noise levels produced by various types of construction equipment.

TABLE 3.9-5
TYPICAL CONSTRUCTION NOISE LEVELS

Construction Phase	Noise Level (dBA, Leq) [a]
Ground Clearing	84
Excavation	89
Foundations	78
Erection	85
Finishing	89
Rock Blasting	111 to 115

NOTE: Average noise levels correspond to a distance of 50 feet from the noisiest piece of equipment associated with a given phase of construction and 200 feet from the rest of the equipment associated with that phase.

SOURCE: U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971. Except for blasting; rock blasting data provided by the National Park Service.

TABLE 3.9-6
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Sheet Pile Driver	101
Backhoe	85
Rock Blasting	111 to 115

SOURCE: Cunniff, Environmental Noise Pollution, 1977. Except for blasting; rock blasting data provided by the National Park Service.

Construction of the project would generate a significant amount of noise corresponding to the appropriate phase of construction and the noise generating equipment used during those phases. The closest sensitive receptors would be those described in the setting section and other sensitive receptors in the study area vicinity would be exposed to construction noise at incrementally lower

levels. Noise from construction activities generally attenuates at a rate of 4.5 to 7.5 dBA per doubling of distance. Construction noise at the nearest receptor is analyzed below for each project component with an assumed attenuation rate of 6 dBA, because most of the loudest construction activities would attenuate at a rate similar to a point source. Figure 3.9-2 locates nearby sensitive receptors.

Proposed Borrow Area

The borrow area would be located approximately 2000 feet from the picnic areas on the west shoreline. Noise would be generated by excavators, loaders, and heavy-duty trucks hauling soil to the dam. Blasting would not occur in the borrow area. However, blasting would be required for the portion of the haul road over the Bernsconi Hills. Other than during blasting, the loudest noise emissions from construction would be about 88 dBA at 50 feet. Noise levels at the nearest picnic area from the borrow area (on the west shore) are expected to be about 56 dBA. Construction noise at these levels would exceed county noise ordinance levels at the nearest sensitive receptor location and would be significant without mitigation. Blasting would occur infrequently perhaps three or four times a day for a few weeks until the haul road is completed. The loudest noise emissions would be about 115 dBA at 50 feet. The noise levels at the nearest residences are expected to reach about 75 dBA, based on distance attenuation only, noise levels would be reduced further due to the shielding affects of local mountains. Noise levels at the nearest recreation are expected to reach about 69 dBA. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Rock Quarry

The nearest recreational area to the rock quarry is about 9500 feet to the northeast, and the nearest residence is about 5000 feet to the southeast. Blasting would occur in the rock quarry, therefore the loudest noise emissions would be about 115 dBA at 50 feet. Periodic noise from blasting could be heard throughout the area up to three to four times a day potentially for a period of over a year. The duration of each blast event is expected to last for less than five seconds. The noise levels at the nearest residences are expected to reach about 75 dBA, based on distance attenuation only, noise levels would be reduced further due to the shielding affects of local mountains. Noise levels at the nearest recreation are expected to reach about 69 dBA. Blasting is a short term noise event; other construction noise would be more continuous at about 88 dBA at 50 feet, which would be about 48 dBA at the nearest residences and 42 dBA at the nearest recreation area. Mountains between the residences and the rock quarry would provide further attenuation to residences. Construction noise at these levels would be under City noise ordinance levels at the nearest residence but exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards, however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Outlet Tower

The nearest residents to the outlet tower construction zone are about 3000 feet southeast, and the nearest recreation area is about 9000 feet to the northeast. Underwater blasting would occur at the outlet tower, therefore the loudest noise emissions would be about 115 dBA at 50 feet. Periodic noise from blasting could be heard throughout the area up to three to four times a day potentially for a period of over a year. The duration of each blast event is expected to last for less than five seconds. Noise levels would be about 79 dBA at the nearest residences and 70 dBA at the nearest recreation area. However, the dam would act as a noise barrier and further diminish the noise levels to the residential area. Blasting is a short term noise event; other construction noise would be more continuous at about 88 dBA at 50 feet, which would be about 52 dBA at the nearest residence and 43 at the nearest recreation area. Construction noise at these levels would not exceed the City noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Stability Berm

The stability berm is located about 1400 feet from the nearest residence and 5000 feet from the nearest recreational area. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels are expected to be about 59 dBA at the nearest residence and 48 dBA at the nearest recreational area. Construction noise at these levels would not exceed noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. DWR would use CDSM methods to block water seepage during the construction of the stability berm, if necessary, sheet pile-driving may be used. Implementation of Mitigation Measures 3.9-1a through 3.9-1d would reduce these impacts to a less than significant level when work is conducted during day-time hours. However, DWR may need to extend CDSM operations into the night in order to avoid excessive mobilization requirements. Nighttime noise of 59 dBA at the nearest residences would be considered a significant and unavoidable impact of the project since it would cause a temporary nuisance condition.

Proposed Right Abutment Work

The right abutment work is located approximately 3400 feet from the nearest residence and about 1000 feet from the nearest recreational area. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels are expected to be about 51 dBA at the nearest residence and 62 dBA at the nearest recreational area. Construction noise at these levels would not exceed noise ordinance levels at the nearest residence but would exceed County noise ordinance levels and would be significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Proposed Emergency Outlet Extension

The emergency outlet extension would be located about 200 feet from the nearest residences. The loudest noise emissions would be about 88 dBA at 50 feet. Noise levels at the nearest sensitive receptors are expected to be about 76 dBA. Construction noise at these levels would exceed city noise ordinance levels at the nearby sensitive receptor location and would be potentially significant without mitigation. Mitigation Measure 3.9-1a through 3.9-1d would ensure that noise levels would not exceed established standards; however, existing noise levels are generally low and the temporary increase could be considered substantial, and therefore significant and unavoidable.

Mitigation Measures

Mitigation Measure 3.9-1a: Nighttime work shall not include blasting or sheet pile-driving.

Mitigation Measure 3.9-1b: Construction contractors shall implement the following:

- Signs shall be posted at the construction sites that include permitted construction days and hours, a day and evening contact number for the job site, and a contact number in the event of problems.
- An on-site complaint and enforcement manager shall respond to and track complaints and questions related to noise.

Mitigation Measure 3.9-1c: To reduce noise impacts due to construction, DWR shall require construction contractors to implement the following measures:

- During construction, the contractor shall outfit all equipment, fixed or mobile, with properly operating and maintained exhaust and intake mufflers, consistent with manufacturers' standards.
- Impact tools (e.g., jack hammers, pavement breakers, and rock drills) used for construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used. External jackets on the tools themselves shall be used where feasible. Quieter procedures, such as use of drills rather than impact tools, shall be used whenever feasible.
- Stationary noise sources that could affect adjacent receptors shall be located as far from adjacent receptors as possible.
- Daytime construction activities would be limited to the times of 7:00 a.m. and 7:00 p.m.
- Residents and park visitors shall be notified in advance of the night work schedule.

Mitigation Measure 3.9-1d: A Blasting Plan for construction shall be prepared and followed that includes the following:

- Primary components of the Blasting Plan shall include:
  - Identification of blast officer;

  - Scaled drawings of blast locations, and neighboring buildings, streets, or other locations which could be inhabited;
  - Blasting notification procedures, lead times, and list of those notified. Public notification to potentially affected vibration and nuisance noise receptors describing the expected extent and duration of the blasting;
  - Description of means for transportation and on-site storage and security of explosives in accordance with local, state and federal regulations;
  - Minimum acceptable weather conditions for blasting and safety provisions for potential stray current (if electric detonation);
  - Traffic control standards and traffic safety measures (if applicable);
  - Required personal protective equipment;
  - Minimum standoff distances and description of blast impact zones and procedures for clearing and controlling access to blast danger;
  - Procedures for handling, setting, wiring, and firing explosives. Also procedures for handling misfires per Federal code;
  - Type and quantity of explosives and description of detonation device. Sequence and schedule of blasting rounds, including general method of excavation, lift heights, etc.;
  - Methods of matting or covering of blast area to prevent flyrock and excessive air blast pressure;
  - Description of blast vibration and air blast monitoring programs;
  - Dust control measures in compliance with applicable air pollution control regulations (to interface with general construction dust control plan);
  - Emergency Action Plan to provide emergency telephone numbers and directions to medical facilities. Procedures for action in the event of injury;
  - Material Safety Data Sheets for each explosive or other hazardous materials to be used;
  - Evidence of licensing, experience, and qualifications of blasters;
  - Description of insurance for the blasting work.

- A sound attenuation plan shall be prepared outlining sound control measures that would include the use of blasting mats or sound walls.
- If vibration results in damage to any nearby structures or utilities, or scenic rock faces, blasting shall immediately cease. The stability of segmental retaining walls, existing slopes, creek canals, etc. shall be monitored and any evidence of instability due to blasting operations shall result in immediate termination of blasting.
- Explosive materials shall be delivered in specially built vehicles marked with United Nations (UN) hazardous materials placards. Explosives and detonators shall be delivered in separate vehicles or be separated in compartments meeting DOT rules within the same vehicle. Vehicles shall have at least two ten-pound Class-A fire extinguishers and all sides of the vehicles display placards displaying the UN Standard hazard code for the onboard explosive materials. Drivers shall have commercial driver licenses (CDL) with Hazmat endorsements, and drivers shall carry

bill-of-lading papers detailing the exact quantities and code dates of transported explosives or detonators.

- The contractor must comply with U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) table-of-distance requirements (CFR 27, U.S. Department of Justice, Alcohol, Tobacco, Firearms and Explosives Division Part 555) that restrict explosive quantities based on distance from occupied buildings and public roadways. Employees must also comply with the security requirements of the Safe Explosives Act (Title XI, Subtitle C of Public Law 107-296, Interim Final Rule), implemented in March 2003. These requirements require background checks for all persons that use, handle or have access to explosive materials; and responsible persons on a now required federal explosives license must submit photographs and fingerprints with the application to ATF.
- The contractor shall provide 24-hour security and/or the use of motion-detector and alarmed double wire fencing security measures around the stored explosives.

Significance after Mitigation: Daytime construction would comply with local noise ordinances and result in a Less than Significant impact. However, existing noise levels are generally low within the Lake Perris SRA and the temporary increase due to construction could be considered substantial and therefore significant and unavoidable temporary impact. In addition, nighttime construction could exceed 59 dBA at the nearest residences which would also be considered a significant and unavoidable impact of the project.

Vibration

Impact 3.9-2: Construction activities including blasting could damage structures from groundborne vibration.

As shown in **Table 3.9-7**, use of a large bulldozer for project construction generates vibration levels of up to 0.089 PPV or 87 RMS (large bulldozer) at a distance of 25 feet. Blasting activities can result in even higher vibration levels depending on the magnitude of the blast.

TABLE 3.9-7
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment Activity	PPV at 25 Feet (inches/second)[a]	RMS at 25 Feet (VDB)[b]
Large Bulldozer	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79

[a] Buildings can be exposed to ground-borne vibration levels of 0.2 PPV without experiencing structural damage.
[b] The human annoyance response level is 80 RMS.

SOURCE: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.

The nearest residential structure to the stability berm construction zone would be approximately 1400 feet from heavy equipment activity. At this distance vibration would not be expected to damage structures. Blasting would occur within the quarry, the outlet structure, and within Bernasconi Hills. These areas are more than 2000 feet from the nearest residential or commercial structures. Groundborne vibration would not likely affect structures at this distance. However, rock faces close to the quarry may be affected. Mitigation Measure 3.9-1d requires that the blasting plan include a vibration monitoring program. The mitigation includes provisions for ceasing blasting activities that may affect stability of the surrounding cliffs, including the rock climbing areas. With implementation of mitigation, the impact would be less than significant.

Mitigation Measures

Implement **Mitigation Measure 3.9-1d**

Significance after Mitigation: Less than Significant.

Mitigation Measure Summary Table

Table 3.9-8 presents the impacts and mitigation summary for Noise.

TABLE 3.9-8
NOISE IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Excessive Noise: Project construction could substantially increase ambient noise levels or generate noise levels in excess of standards established in the local general plans or noise ordinances, or applicable standards of other agencies.	3.9-1a through 3.9-1d	Significant and Unavoidable
Vibration: Construction activities including blasting could damage structures from groundborne vibration.	3.9-1d	Less than Significant

3.10 Public Safety

This section evaluates the risks to human health and safety that could result from implementation of the proposed project.

3.10.1 Setting

Dam Inundation Area

Lake Perris is located in unincorporated Riverside County near the Cities of Perris and Moreno Valley, and in close proximity to the March Air Reserve Base. The dam was built in 1974 during a time when little other development existed in the Perris Valley. In the event of a dam failure, the dam was designed to discharge up to 3,800 cfs into the valley with no particular conveyance facility to guide the water toward downstream river beds. Figure 3.7-3 shows the modeled inundation zone of the dam. This area currently encompasses large developed areas of Perris and Moreno Valley.

DWR completed the *Perris Dam Foundation Study* in 2005 that concluded that the alluvium underlying a portion of the embankment was susceptible to liquefaction and that large liquefaction-induced embankment deformations could occur along some segments of the dam during a large earthquake. This embankment deformation would allow water to flow over the dam crest. As a result of this study, the elevation of Lake Perris was reduced from 1588 to 1563 feet amsl. The reduction in water level substantially reduced the risk of dam failure.

State Recreation Area

The Lake Perris SRA provides varied recreational opportunities that attract hikers, campers, and boaters. Visitors to the facility are allowed to access most of the park with little restriction. Most of the facility's developed areas occur on the northern shore of the lake. Parking lots and boat launches attract the greatest number of park visitors to this area. The remaining park is open to the public. Hikers may access remote areas of the Lake Perris SRA either on or off of existing trails during the day or night. Camping areas are located on either shore of the lake. Rock climbing opportunities exist in the Bernasconi Hills area. The park is patrolled by full-time California State Park rangers.

3.10.2 Regulatory Framework

Federal

Occupational Safety and Health Administration

OSHA is a federal agency responsible for establishing worker health and safety standards. OSHA regulations cover worker education, site control, personal safety equipment, hazards exposure, and safe work practices. OSHA has regulatory authority to impose fines on employers that are found to violate OHSA health and safety standards. All construction sites are subject to OSHA regulations and inspections.

State

California Division of Safety of Dams

The California Water Code entrusts the regulatory Dam Safety Program to DWR. The principal goal of this program is to avoid dam failure and thus prevent loss of life and destruction of property. The DSOD reviews plans and specifications for the construction of new dams or for the enlargement, alteration, repair, or removal of existing dams under application and must grant written approval before the owner can proceed with construction. Professional engineers and geologists from the DSOD evaluate each project, investigate proposed sites, and check available construction materials. Dams under DSOD jurisdiction include artificial barriers, together with appurtenant works, which are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more. Any artificial barrier not in excess of six feet in height, regardless of storage capacity, or that has a storage capacity not in excess of 15 acre-feet, regardless of height, is not considered jurisdictional (DSOD, 2006).

California Government Code Section 8589.5

This section of the California Code of Regulations requires that cities have emergency procedures in place for the evacuation and control of populated areas within the limits of inundation below dams. The responsibility for disaster planning and emergency response belongs to the local jurisdictions.

3.10.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistency with Appendix G of the *CEQA Guidelines*, applicable local plans, and agency and professional standards, the project would have a significant impact to water quality or surface waters if it would:

- Substantially alter existing drainage patterns or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off the site;
- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or
- Expose people to hazards from construction activities.

Dam Failure

The proposed project would reduce the potential for dam failure due to seismic hazards. As a result, the risk of inundation to land uses below the dam would be reduced. Dam safety is regulated by DSOD, which instigated the liquefaction analysis of the dam. The local cities and the county have primary responsibilities for disaster planning and emergency response including dam failure. The Cities of Perris and Moreno Valley have prepared emergency evacuation plans. City and county law enforcement are involved in public notification and emergency evacuation. Furthermore, the emergency outlet extension would provide the mechanism for a controlled

emergency release of the lake of 1500 cfs. Therefore, the project would not increase the public safety risk associated with the Perris Dam.

The project would not alter existing draining patterns or expose people to structures that could result in significant injury or death through flooding. Therefore, the above significance criteria are not discussed further within the report.

Construction Hazards

Impact 3.10-1: Construction of the proposed project could expose Lake Perris SRA visitors to hazards from construction activities.

Access is generally uncontrolled within the Lake Perris SRA. Park visitors may be encountered in any area within the park at any time of day or night. The eastern shore is accessible from the land and from the lake. The proposed project would involve the use of large machinery that could pose hazards to park visitors. The southern and eastern shores of the lake are frequented by boaters, hikers, swimmers, rock climbers, and campers. Construction in this area would include excavation of over 1.5 million cy of lake bed sediments and transportation of the material on a haul road to the opposite side of the dam. Figure 2-8 identifies a construction zone that encompasses the haul road routes, excavation areas, blasting areas, stockpiling locations, and backfilled areas. In order to protect public safety, these construction zones would be fenced off and access would be restricted during construction periods. The Bernasconi campground would be closed for the duration of the construction period. Figure 2-8 identifies the portion of the Lake Perris SRA that would be closed and off-limits to the general public for the duration of construction activities. Mitigation Measures 3.10-1a and 3.10-1b would assist in reducing risk of accidents involving park visitors during the construction activities.

Construction equipment, including blasting agents, would be stored on site. Use of blasting agents would be strictly controlled consistent with OSHA, USEPA, and DOT regulations. Control measures for blasting would provide for the protection of park visitors including the control of flyrock from blasts (see Mitigation Measure 3.9-1d).

Mitigation Measures

Mitigation Measure 3.10-1a: DWR shall incorporate into contract specifications the requirements that:

- Fencing shall be maintained around the perimeter of the construction zone including at the lake shore at all times during construction. Fencing at the lake shore would be designed to prevent any vessel from reaching the shoreline within the construction zone.
- Signs shall be posted in English and Spanish on the fence warning visitors to stay outside the construction zones.
- Construction equipment and trailers shall be secured each day in order to prevent items from being stolen or damaged.

- Construction contractors shall be provided training to be aware of park visitors. Any visitors seen within the construction zone shall be immediately escorted out.

Mitigation Measure 3.10-1b: DWR shall coordinate with California State Parks personnel to develop a site safety plan for the construction activities. The plan would identify construction zone access including fencing and gate control, routine patrolling, and signage.

Significance after Mitigation: Less than Significant.

Summary of Impacts and Mitigation Measures

Table 3.10-1 presents the impacts and mitigation summary for Public Safety/Flooding.

TABLE 3.10-1
PUBLIC SAFETY IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance After Mitigation
Hazard Exposure for Lake Perris SRA Visitors: Construction of the proposed project could expose Lake Perris SRA visitors to hazards from construction activities.	3.10-1a and 3.10-1b	Less than Significant

3.11 Public Services and Utilities

This section discusses existing utilities and public services in the vicinity of the Lake Perris SRA, presents the associated regulatory framework, and provides an analysis of potential impacts to public services and utilities that would result from the proposed project. Public utilities in the project area include: water, wastewater, electrical, and natural gas conveyance facilities. Public services include: solid waste disposal, schools, hospitals, police, and fire protection services.

3.11.1 Setting

The following discussion describes existing public services, utilities and energy systems.

Public Services

Fire Protection

Riverside County Fire Department provides fire protection services to two million residents in sixteen cities, various unincorporated areas in the County, and one Community Service District. There is a large amount of open space within the County that has the potential for wildland and urban interface fires.

Police Protection

The Riverside County Sheriff's Department (RCSD) serves 14 cities and various unincorporated areas in the county. The Perris Police Station of the RCSD is located at 403 East 4th Street in Perris and serves Perris and portions of unincorporated Riverside County. The Moreno Valley Police Station is located at 22850 Calle San Juan De Los Lagos in Moreno Valley and serves the City of Moreno Valley (RCSD, 2007). The California Highway Patrol is responsible for the enforcement of traffic-related offenses in the County's unincorporated areas. State Park Rangers are responsible for safety within the Lake Perris SRA.

Schools and Hospitals

Schools in the vicinity of the project area include two schools in the Perris area, one school in the Nuevo area, and seven schools in the Moreno Valley area. The closest full-service hospital to the project area is about 2.8 miles away, at Moreno Valley Community Hospital in Moreno Valley, and about 3.9 miles away, at Riverside County Regional Medical Center in Moreno Valley. The locations of these facilities are listed in **Table 3.11-1**.

Public Utilities and Services

Water Facilities

The Eastern Municipal Water District (EMWD) provides drinking water, sewage collection, treatment, and disposal services for portions of Riverside County including the cities of Hemet, Moreno Valley, Murrieta, Perris, San Jacinto, and Temecula. WMWD is a member agency of Metropolitan. EMWD's supply is a combination of imported, ground, and recycled water.

TABLE 3.11-1
SCHOOLS AND HOSPITALS IN PROJECT VICINITY

Schools in the Vicinity of the Project Area	Street Address and City	Proximity to Project Site
Sierra Vista Elementary School	20300 Sherman Road, Perris	1.8 miles
Rancho Verde High School	17750 Lasselle Street, Moreno Valley	1.9 miles
Val Verde High School	972 West Morgan Street, Moreno Valley	2.2 miles
Vista Verde Middle School	25777 Krameria Street, Moreno Valley	2.8 miles
El Potrero Elementary School	16820 Via Pamplona, Moreno Valley	2.7 miles
Mary Mc Leod Bethune School	25390 Krameria Street, Moreno Valley	3.0 miles
Landmark Middle School	15261 Legendary Drive, Moreno Valley	3.0 miles
Mountain Shadows Middle School	30401 Reservoir Avenue, Nuevo	3.2 miles
Victoriano School	25650 Los Cabos Drive, Moreno Valley	3.3 miles
Vista Del Lago High School	15150 Lasselle Street, Moreno Valley	3.6 miles
Moreno Valley Community Hospital	27300 Iris Avenue, Moreno Valley	2.8 miles
Riverside County Regional Medical Center	26520 Cactus Avenue, Moreno Valley	3.9 miles

SOURCE: ESA

Approximately 75 percent of EMWD's potable water is imported from the California State Water Project through DWR and Metropolitan (EMWD, 2007).

The City of Perris purchases approximately 640 million gallons of water each year from EMWD which is then distributed to approximately 2,300 customers through a 37-mile distribution system (City of Perris, 2004). Approximately 85 percent of the City of Moreno Valley is served by EMWD (City of Moreno Valley, 2006).

The Box Springs Mutual Water Company (BSMWC) provides water to the area of Moreno Valley that lies between Old Highway 215 and Elsworth Street and between Alessandro Boulevard and the north side of Eucalyptus Avenue. Most of BSMWC's distribution facilities are deteriorated, which limits its ability to serve new developments. Seventy-five percent of BSMWC's water is groundwater and the remainder is purchased from DWR (City of Moreno Valley, 2006).

Storm Water

Regional flood control planning is under the jurisdiction of the RCFCWCD. The RCFCWCD is responsible for implementation and enforcement of the Drainage Area Management Plan. The Cities of Perris and Moreno Valley utilize both sanitary sewers and storm drains. In the past, Moreno Valley has experienced severe flooding and a drainage system is required to convey storm runoff safely through the area (City of Moreno Valley, 2006).

Electricity and Natural Gas

Southern California Edison is the principal provider of electricity in the vicinity of the project area. The City of Moreno Valley is also served by Moreno Valley Utilities. The Southern California Gas Company is the principal provider of natural gas to Riverside County and the cities of Perris and Moreno Valley.

Solid Waste Management

Waste Management of the Inland Empire is the local division of Waste Management Inc. that provides waste and recycling services to Riverside County. It operates the El Sobrante Landfill in Corona, which processes about 43 percent of the County's annual waste (Waste Management, 2007). It can currently receive up to 10,000 tons of refuse per day and is expected to remain open for approximately 29 more years. The Badlands landfill is located in Moreno Valley and operated by the Riverside County Waste Management Department. It can currently receive up to 4,000 tons of refuse per day and is expected to reach capacity between 2018 and 2020 (City of Moreno Valley, 2006).

3.11.2 Regulatory Framework

State

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (PRC, Division 30), enacted through AB 939 and modified by subsequent legislation, required all California cities and counties to implement programs to reduce, recycle, and compost at least 50 percent of wastes by the year 2000 (PRC Section 41780). The state determines compliance with this mandate to "divert" 50 percent of generated waste (which includes both disposed and diverted waste) through a complex formula. This formula requires cities and counties to conduct empirical studies to establish a "base year" waste generation rate against which future diversion is measured. The actual determination of the diversion rate in subsequent years is arrived through deduction, not direct measurement; instead of counting the amount of material recycled and composted the city or county tracks the amount of material disposed at landfills and then subtracts the disposed amount from the base year amount. The difference is assumed to be diverted (PRC Section 41780.2).

3.11.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistency with Appendix G of the *CEQA Guidelines*, applicable local plans, and agency and professional standards, the project would have a significant effect if it would:

- Exceed the disposal capacity of local landfills or cause wasteful, inefficient, or unnecessary consumption of energy;
- Impair or prevent a city or county from complying with the waste diversion mandates of the California Integrated Waste Management Act of 1989;

- Interfere with or substantially change the demand for governmental services, such as parks or police and fire protection, or require alteration of these services;
- Substantially interfere with or change the demand for utilities.

Solid Waste

Although construction of the proposed project would require excavation of materials, no export of waste is anticipated. Instead, waste materials would be recycled within the confines of the project area. Topsoil would be stockpiled and re-spread after the project is completed. The excavated materials from the outlet tower and emergency outlet extension would be reused for remediation of the dam. Some incidental construction waste would be generated that would need to go to a landfill, but this waste would be minimal and would have no impact on landfill capacity.

The waste diversion mandates within the California Integrated Waste Management Act of 1989 are not discussed further within this report because it was not considered significant or as having an impact toward the project. The following sections identify and evaluate potentially significant impacts of the proposed project.

Public Services

Impact 3.11-1: The proposed project may cause a short-term increase in the demand for police and fire services.

Construction of proposed facilities would generate truck and employee traffic along haul routes and at the proposed sites, temporarily increasing the accident potential in these areas. This increase in potential accidents, however, would be limited in duration and only create a short-term demand of additional police or fire services on an as-needed and emergency basis. This short-term increase in demand would be minimal and could be accommodated by existing resources within the project areas.

Significance: Less than Significant.

Energy Demand

Impact 3.11-2: Construction would require a short-term increase in energy demand.

Proposed construction activities would require connections to existing power sources, which would slightly increase short-term electricity demand during construction. Most of the construction activities deal with excavation and drilling, which would be serviced by diesel fuel, not electricity, and the CDSM plant would operate on diesel generator. Some energy would be needed for trailer and small equipment. Long-term electricity demand would remain unchanged. The proposed project would result in a less-than-significant increase in electricity demand.

Significance: Less than Significant.

Utilities

Impact 3.11-3: Construction of the emergency outlet extension could encounter buried utilities.

The emergency outlet extension extends from the southeastern corner of the dam parallel to Ramona Expressway to the Perris Valley Storm Drain. The outlet extension would traverse several streets and the Perris Fairgrounds. According to the Fairgrounds, within 200 feet of Ramona Expressway, numerous underground utilities exist including water mains and backflow devices, high voltage electricity lines, sanitation sewer lines, irrigation system pipelines, lighting, electronic message center, and control fencing. Prior to construction of either emergency outlet extension alternative, DWR would conduct an underground utilities search that would contact local utilities including the Fairgrounds to determine the location of known utilities. As part of the project, the utilities would be avoided or rerouted during construction to maintain services. If temporary service interruptions are necessary, DWR would coordinate with the local land uses affected to minimize the temporary nuisance. Services would be restored as soon as possible.

Significance: Less than Significant.

Summary of Impacts and Mitigation Measures

Table 3.11-2 presents the impacts and mitigation summary for Public Services and Utilities.

TABLE 3.11-2
PUBLIC SERVICES AND UTILITIES IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after Mitigation
Police and Fire Service Demand: The proposed project may cause a short-term increase in the demand for police and fire services.	None required	--
Energy Demand: Construction would require a short-term increase in energy demand.	None required	--
Buried Utilities: Construction of the emergency outlet extension could encounter buried utilities.	None required	--

3.12 Recreation

This section addresses potential impacts of the proposed project on recreational activities at the Lake Perris SRA. This analysis reviews recreation impacts resulting from the drawdown of Lake Perris based on visitation information gathered from DPR.

3.12.1 Setting

In 1974, after the completion of Perris Dam, DWR and DPR entered into an agreement to transfer possession and control of certain real property at Lake Perris from DWR to DPR. The agreement allowed DPR to develop recreational opportunities pursuant to Chapter 10, Part 3, Division 6 of the California Water Code, commonly referred to as the Davis-Dolwig Act. The agreement also states that the use of the property by DPR is subordinate to the use by DWR for the construction, operation and maintenance of the State Water Resources Development System (TPC, 1974).

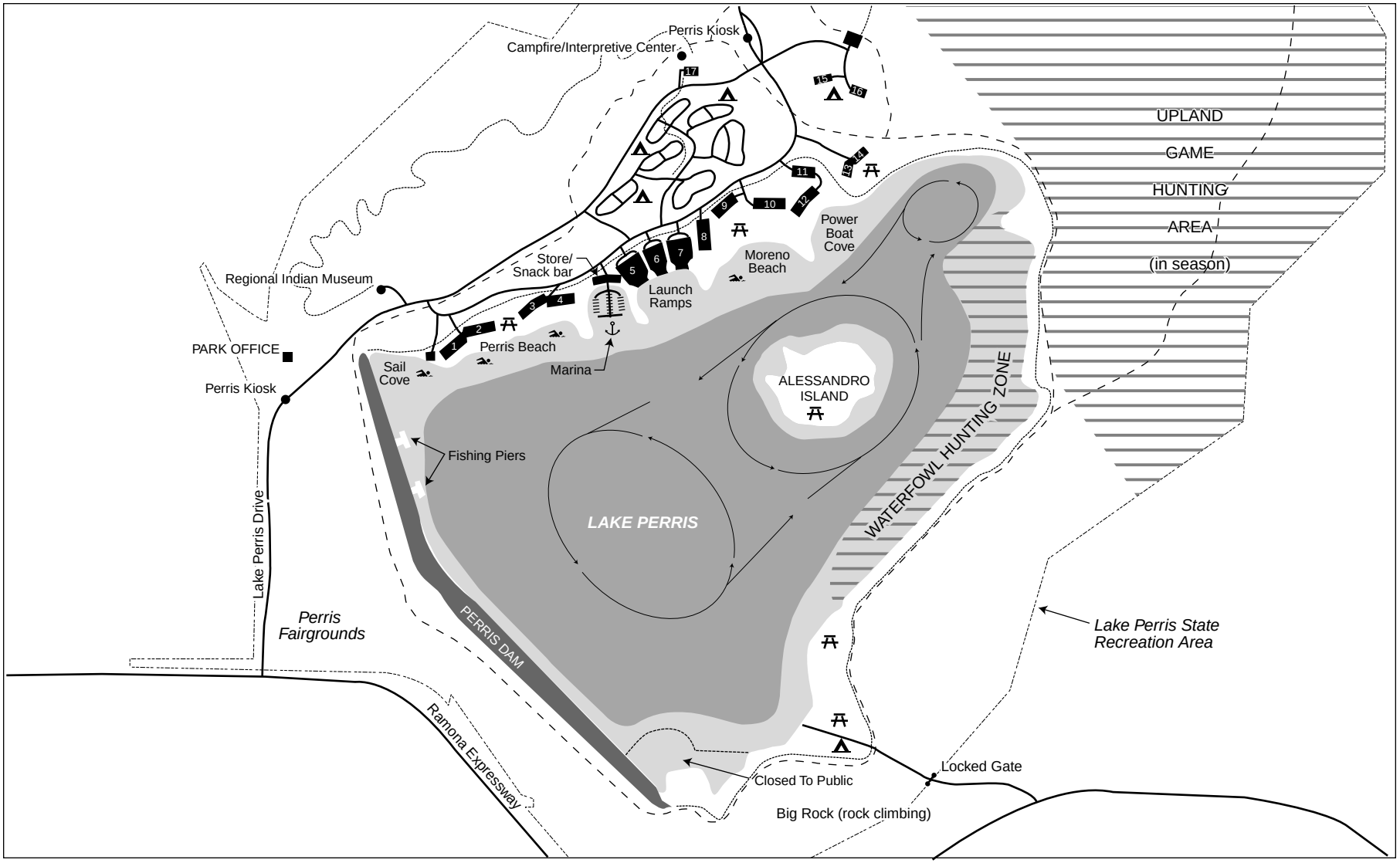
DPR has developed the land around Lake Perris into a large and widely popular State Park. The average attendance prior to 2005 was 1.1 million visitors per year (DPR, 2005). Water-oriented recreation activities at Lake Perris SRA include fishing, boating, swimming, water skiing, wind surfing, scuba diving, and jet skiing. Onshore-oriented recreation in the park includes: picnic sites with shade structures, hiking, camping, rock climbing, bicycling, and sunbathing. The Ya'i Heki' Regional Indian Museum is located within the park and is open on weekends and Wednesdays. These primary activities are supported by basic facilities such as entry control, parking, restrooms, and orientation information (display panels/water stations). **Figure 3.12-1** shows the recreation facilities available today at Lake Perris SRA. **Figures 3.12-2** through **3.12-4** provide pictures of some of the recreational improvements at the Lake Perris SRA.

Recreational Activities

Camping

Campgrounds at Lake Perris SRA are located on the north and south sides of the reservoir. The south side contains family campsites within the Bernasconi camping area. On the north side there are family campsites as well as separate areas for group camping and horse camps. Within the family camping area, there are 167 sites for tent camping and 264 paved sites for recreational vehicles. Tent camping sites are 31 feet long and do not have electrical hookups. The paved sites are also 31 feet long and have electrical hookups. All camp sites have a table, fire ring with a grill, and access to water. Restrooms with hot showers can be found at various locations within the campgrounds.

The separate horse camping area is equipped with corrals, water troughs, picnic tables, campfire rings, drinking water, and chemical toilets. There are seven units that can each accommodate up to eight people and three vehicles with horse trailers.



SOURCE: California Department of Recreation.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.12-1
Pre-Drawdown
Recreational Facilities

1. Bernasconi group camping area

2. Bernasconi picnic area

3. Park area near Bernasconi

4. Big Rock (rock climbing)

SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.12-2
Recreation Photos

5. Paved bike trail

6. Horse trail near petroglyph rock

7. Launch ramps

8. Fishing boat

SOURCE: ESA, 2007.

Figure 3.12-3
Recreation Photos

9. View of marina looking south

10. Launch ramp near lifeguard station

11. View of picnic benches on the western shore of the lake

12. View of Moreno Beach looking east

SOURCE: ESA, 2007.

DWR - Perris Dam Remediation Program . 206008.02

Figure 3.12-4
Recreation Photos

Boating

Facilities

The existing marina is located on the north shore to the right of parking lot four. The marina is concession-operated consisting of 200 wet slips and 70 dry storage spaces for monthly rental. There are also 35 slips available for overnight rental. A gas dock for fuel sales has recently closed. As a result, the current concessionaire trucks in fuel for its fuel sales. The marina concessionaire rents fishing boat and pontoon boats as well as other water recreation equipment including water skis, kneeboards, wake boards, and ski vests. The marina store carries bait and tackle, boating accessories, camping supplies, and snacks serving both marina users and other park visitors. Until recently the marina also operated a snack bar but it has recently closed. There are also two paved boat ramps with parking for boat trailers located on the north side of the reservoir from lots five through seven which provide six lanes of boat launch access.

Permitted Reservoir Use

Lake Perris SRA allows Two Stroke engines and the maximum boat speed on the reservoir is 35 mph. Personal watercraft use is permitted at Lake Perris. Fishing and pontoon boat rentals are available from the Lake Perris Marina. Sailboats and windsurfers can park and launch in the sail cove area west of lot one. Alessandro Island is a day use boat-in area only with picnic tables and grills.

Marina Concession Operations

Construction of the marina was completed in 1976. In June 1976, the large national recreation facility operator Volume Services Inc. (subsequently know as Volume Services America and more recently as Centerplate) signed a 25 year concession contract agreement with DPR. At the end of the 25 year contract period (in 2001), Volume Services America continued to operate the marina under a month to month agreement with DPR until February 2004, when it transferred the contract to Pyramid Enterprises (aka Rocky Mountain Recreation) who are the current marina operator (concessionaire) at Lake Perris. DPR will issue a solicitation for a new long-term operating agreement for the Lake Perris marina operations, once the dam is repaired and Lake Perris returns to its normal operating level. Due to the marina facilities' age and current physical conditions, DPR expects that significant new construction/renovation would be necessary to provide future marina services at the Lake (Singleton, 2007).

Under the terms of the current concession contract, the operator minimum "rental fee" to the State of California is $7,200 per year. However, generally the concessionaire's actual rental fee to DPR is determined by its annual revenues. The contract sets a rental rate of six percent of its annual gross sales (with a reduction to two percent for its fuel sales). During its first full year of operating the Lake Perris marina (i.e. June 2004 to June 2005 contract year), Pyramid Enterprises made nearly $559,000 in gross sales and paid DPR a $26,785 rental fee. However, the concessionaire's gross sales dropped to approximately $465,000 the following year – a more than $93,000 decrease equivalent to nearly a 17 percent sales decline from the previous year (DPR, 2006). Although specific information on the marina's gross sales for the June 2006 to June 2007 fiscal year could not be obtained, according to the concessionaire, sales levels for the marina

operations were more than half its pre-drawdown levels (prior to August 2005) (Carter, 2007). The primary source of lost marina revenues is the reduced slip occupancy at the marina. In addition, the concession has experienced reduced retail sales and equipment rental revenues.

Swimming

Lake Perris SRA has two designated swim areas, Moreno and Perris Beach. Scuba diving is only allowed at Perris Beach. During the summer months and on weekends when beach visitorship is high, lifeguards are on duty daily.

Fishing

Shoreline fishing and float tube fishing are allowed, but not along designated swim beaches, nor where "no fishing" signs are posted. Fishing is also allowed off the Lake Perris Marina dock for an additional fee. All anglers 16 years and older must purchase a fishing license from the CDFG. Fishing is allowed during regular park hours only.

No creel survey data was available from Lake Perris SRA or CDFG more recent than 1984. Available general information indicate that fish found at Lake Perris include largemouth bass, spotted bass, bluegill, red ear sunfish, black crappie, carp, channel catfish and bull catfish. The reservoir is regularly stocked during the winter months with rainbow trout; catfish are also stocked. The best areas to look for catfish are along the southwest corner of the dam or at the east end of the reservoir. Trout can be found near the marina or along marshy areas. Bass tournaments are held regularly during winter months.

Fishing limits include: five bass (legal size, over 12 inches), five trout, ten catfish. Bluegill, sunfish, crappie and carp have no established limits.

Picnicking

The day use areas of Lake Perris SRA offer 300 picnic sites with tables and grilling features. The most popular areas are located next to Moreno Beach and Perris Beach. Both beaches have large grassy areas adjacent to the sand for playing games, sunbathing, and picnicking. There are three group picnic areas on the north side of the reservoir that are equipped with tables, grills, running water, and large sinks. Each of these units would accommodate up to 200 people. The Bernasconi Beach group picnic area is located on the southern side of the reservoir and can accommodate 25-100 people. This area has tables, grills, water and chemical toilets. Figure 3.12-2 shows pictures of picnicking areas.

Hiking/Biking/Horseback Riding

There is a nine-mile hiking and bicycling trail around the reservoir perimeter. Two other main hiking trails lead to the scenic overlook at Terri Peak and a spot near the camping area that offers a view of Moreno Pass. The Lake Perris Stables offer daytime horse rentals. Horse can be ridden on the horse trail that circles the reservoir and on various smaller trails in the recreation area.

Rock Climbing

Big Rock is a climbing spot located within Lake Perris SRA near the outlet tower. The climbing spot is approximately 180 feet high. It hosts 34 recognized routes that are popular among beginning and intermediate climbers, but also provides some aggressive opportunities for more advanced climbers. The climbing area is open year round and is approximately half a mile from the Bernasconi Road parking area. Chemical toilets and picnic tables are provided near the climbing area. Figure 3.12-2 shows the rock climbing area.

Hunting

Hunting is allowed in the designated hunting area located on the northeast portion of the recreation area. The following upland game may be hunted during their allowable seasons: brush and cottontail rabbits, black tailed jackrabbits, valley quail, morning dove, ducks, and geese. The most common species hunted are the mallard, gadwall, and green winged teal. The hunter's lot kiosk is located on the Group Camp road.

Figure 3.12-1 identifies the hunting areas. The duck hunting area is located within the shallow northern shore of the reservoir. From 2007 to the present waterfowl hunting seasons have been canceled due to waterfowl habitat disruption from the reservoir drawdown.

Ya'i Keki' Regional Indian Museum

The Ya'i Heki' Regional Indian Museum is located at 17801 Lake Perris Drive, near the northern end of the dam. The museum provides a comprehensive interpretation of Native American history, including the cultures of various native tribes and indigenous peoples throughout the southern California desert region.

Perris Fairgrounds

The Perris Fairgrounds consists of approximately 105 acres offering a variety of recreational opportunities, including: a speedway track, skate park, equestrian arena, BMX track, motocross track, go-kart track, and rodeo arena. The Perris Fairgrounds is also home to the Southern California Fair.

3.12.2 Regulatory Framework

The following agencies have regulatory authority over recreation areas in or near the proposed project site.

California State Parks

Lake Perris State Recreation Area is part of the system of California State Parks. Established in the early 1970s, the area surrounds Lake Perris, the southernmost reservoir in the SWP. It is managed by California's DPR, which was created within the California Resources Agency and is charged to "provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued

natural and cultural resources, and creating opportunities for high-quality outdoor recreation" (California State Parks, 2007). The California Code of Regulations and the Public Resources code charge California State Parks with accomplishing its mission through a legal mandate to "administer, protect, provide for recreational opportunity, and develop the State Park System; to interpret the values of the State Park System to the public; to operate the Off-Highway Motor Vehicle Recreation Program; to administer the California Historical Resources Protection Program; and to administer federal and state grants and bond funds to local agencies" (California State Parks, 2004). DPR manages more than 270 park units that include terrestrial and marine reserves, state beaches, wilderness areas, historic structures, and off-highway vehicle parks and that cover 1.4 million acres, 280 miles of coast, 625 miles of lake and river frontage, 15,000 campsites and 3,000 miles of multi-use trails.

46th District Agricultural Association

The Lake Perris Fairgrounds is operated and managed by the 46th DAA, a state agency that receives fiscal and policy oversight from both the California Department of Food and Agriculture and the California Division of Fairs and Expositions. The 46th DAA is a sub-agency of the California Department of Food and Agriculture and is responsible for the management of the Southern California Fair.

3.12.3 Impacts and Mitigation Measures

Significance Criteria

This section addresses potential impacts of the proposed project to recreational facilities in the project area. The impact significance criteria are based on guidance provided by Appendix G of the *CEQA Guidelines* regarding significant environmental effects. For this Draft EIR, the proposed project would have a significant impact if it would:

- Conflict with established recreational uses;
- Cause or accelerate substantial physical deterioration of an existing neighborhood, regional park, or other recreational facility;
- Result in the need for construction or expansion of recreational facilities that could adversely affect the environment.

Expansion of Recreational Facilities

The project would not result in additional population that would require the construction or expansion of recreational facilities.

Deterioration of Recreational Facilities

Impact 3.12-1: Drawdown of Lake Perris could cause or accelerate physical deterioration of the recreational facilities at the Lake Perris SRA.

Attendance at Lake Perris declined 47 percent between 2004 and 2008 apparently at least in part as a result of the drawdown of the reservoir level. **Table 3.12-1** summarizes attendance numbers for seven years since 2002 provided by the Lake Perris SRA. Both paid boat launches and camping sites have declined since the drawdown. Although non-water-related facilities have not been affected by the drawdown, use of paid camping sites has declined approximately 41 percent since 2004. The reduction in visitors appears to be directly related to the drawdown compounded by the perception in the community that the facility is closed or is less attractive. The reduction in attendance at the Lake Perris SRA is not considered an environmental impact by itself. Loss of revenue to the Lake Perris SRA and its concessionaire is not an environmental impact except insomuch as the economic effect results in a physical change to the environment. The following sections evaluate impacts resulting from the drawdown and loss of visitorship to swimming, boating, camping and terrestrial activities including hiking, biking, horseback riding and rock climbing. The analysis assesses physical changes to the environment caused by the reduction in visitors.

TABLE 3.12-1
SEVEN-YEAR ATTENDANCE RECORDS AT LAKE PERRIS STATE RECREATION AREA

Year	Paid Day Use	Paid Overnight Camping	Paid Boat Launches	Total Attendance
2002	791,506	252,477	74,532	1,296,118
2003	896,704	223,793	66,792	1,206,149
2004	825,177	219,120	71,923	1,175,599
2005	780,226	176,016	65,970	1,020,739
2006	474,403	117,102	32,253	649,122
2007	470,465	124,833	30,136	677,534
2008	424,519	129,731	23,423	623,393
Percent change from 2004-2008	-51.8%	-40.8%	-67.4%	-47.0%

SOURCE: California Department of Parks and Recreation, Lake Perris State Recreation Area, 2009.

Swimming Facilities

Swimming facilities in place at Lake Perris include Moreno and Perris Beach. The distance between the lawn area and the waters edge was significantly increased at both of these beaches by the drawdown. The exposed lakebed substrate within this distance was not suitable or sufficient for beach related activities. In 2006, DWR imported 14,171 tons of sand to the Perris Beach area to enhance the beach and maintain access to the water for swimming activities. The sand was spread between elevations 1558 and 1564 covering a 3,000 feet long by 80 feet wide area. Lifeguard stations were also relocated closer to the new shoreline. As a result of the new beach sand, the area dedicated to swimming and beach activities was actually increased by 5.5 acres. The impacts of the drawdown on swimming facilities have been effectively lessened by DWR's actions. No significant deterioration of facilities would occur.

Camping and Other Terrestrial Activity Facilities

Lake Perris contains 426 camping sites, numerous picnicking areas, a rock climbing area and several hiking, biking, and horseback riding trails throughout the SRA. Although general attendance and camping has decreased since 2004, the facilities have remained open. Campgrounds, hiking trails, and rock climbing areas remain open to the public. The drawdown has not substantially limited these opportunities. Similar to the discussion provided regarding boating, the general perception that the park is either closed or less attractive may be depressing visitorship. Implementation of mitigation measures to increase public outreach would assist in restoring visitorship.

Initially, closing the entire Perris SRA during the construction of the dam and tower remediation projects was considered, primarily to ensure that the public's safety would not be jeopardized by construction activities. However, since the construction work area will be essentially limited to the southeastern side of the reservoir, it was decided to keep the main portions, the more heavily recreated areas, of the park open and to only restrict public access to the southeastern side of the reservoir. This will remove from service three group camping sites in the Bernsconi Campground. The remaining camping sites north and west of the reservoir will be available for public use for the duration of construction. Once construction is completed, the group campgrounds will be re-opened.

The temporary closure of the Bernasconi group camping and group picnicking areas could result in deterioration of these facilities from neglect. Construction activities could modify, damage or degrade the facilities within the construction zone. Following construction, DWR would assist DPR in returning the Bernasconi campsites to their pre-construction condition. The project would not result in significant deterioration of the group camp sites.

Boating Facilities

The drawdown reduced the size of the reservoir, shortening the reservoir's water edge perimeter. The distance from the existing facilities to the new water's edge increased. The reservoir's surface area was reduced by about 40 percent. At maximum water surface, up to 450 watercrafts are allowed on the reservoir at any one time. With the drawdown, the maximum number of watercraft has been reduced to 250 (refer to Impact 3.12-2 for a discussion of impacts to boating activities). Following the initial drawdown, the marina was stranded on the shore and the ends of the boat ramps were exposed, effectively eliminating all boating activity. DWR along with the Department of Boating and Waterways assisted the Lake Perris SRA in 2005 by funding modifications to the marina that included extending the marina roughly 60 feet further out into the reservoir. During this process, several slips were damaged reducing the marina's capacity. DWR also funded the extension of two of the three boat ramps so that they were functional at the lower water level. With these modifications, the reservoir was reopened for boating recreation, albeit to a significantly lesser degree since launch ramps 7, 14 and the Power Cove Launch ramp were permanently closed. Figure 2-4 identifies improvements funded by DWR to ameliorate effects of the drawdown on recreational facilities at the Lake Perris SRA. Despite DWR's actions to reestablish boating opportunities, the number of boat launches decreased by 51 and 53 percent

during the summer and winter, respectively, based upon attendance data from 2001 to 2006 (Monterey Plus DEIR, 2007d).

The marina concession operator has reported major decreases in its occupancy levels and sales revenues in its financial reports to DPR. According to the concession operator several factors are responsible for the marina operations lost slip rents and other revenue decreases as follows:

- Extensive negative press attention on the Lake's current conditions has contributed heavily in reduced public use of the marina facilities. The concession operator has reported that they continue to receive inquiries from the public as to whether their boating use of the reservoir was possible. Public outreach and other promotion efforts could possibly reduce the effect (Carter, 2007).
- Many former boaters are unfamiliar with the visual attributes of the exposed and unvegetated shoreline that may be discouraging park attendance. Although this condition occurs at most water storage reservoirs that respond to precipitation and demand, Lake Perris is maintained at a relatively consistent elevation (Carter, 2007).
- The marina facility was constructed in the 1970s and has not received major upgrades since then. The facility may be nearing its useful life. The reduction in the number of slips caused by its relocation to deeper waters and the perception of general disrepair may be contributing to the reduced usership. In addition, causeway access to the slips has a very steep angle for customers. According to the concessionaire, the severity of the incline makes the use of the slips difficult for many customers and may be a contributing factor to the reduction in usership (Carter, 2007).
- During the course of the slips relocation, the marina has had difficulty with its provision of water and electrical power to the slips. Some slips are currently without water and electrical utility services. This reduced marina service may reduce Lake Perris's competitiveness with other marinas in the region (Carter, 2007).
- The lowering of the reservoir coupled with on-going degradation of the existing marina physical condition has reduced both perceived and actual ability of the slips' to provide safe mooring facilities, particularly during storm conditions. As a result, some customers are reluctant to use the wet slip facilities especially during the non-summer season when potential storm events are more likely. The resulting reduced occupancy contributes to the increased non-summer slip rental revenue losses. It also discourages the extent of occasional and "casual" reservoir usage during those periods when reservoir use is already limited (e.g. mid-week and non summer seasons) (Carter, 2007).
- Since the boat ramp use fees are not collected by the concessionaire, the reduced launch ramp access has a more indirect effect on the concession operations. However, the marina's 35 overnight slips do rely on visitors putting in using the boat ramp (Carter, 2007).

Future efforts to bid out a new concession agreement by DPR would likely be hampered by a weakened customer base and reduced market potential. Potential future operators and financial partners (e.g. loan institutions) would be less interested in the future marina development opportunity at Lake Perris based on a greater risk and uncertainty associated with low occupancy rates and revenues at the current marina operations. If the concessionaire defaults or new contracts are not viable, the physical condition of the facilities would deteriorate further.

Given the facilities' age and condition, major redevelopment of the Lake Perris marina is overdue and is necessary to maintain the Lake's boating recreational use. The pre-drawdown condition of

the marina was poor, requiring major upgrades irrespective of the drawdown and proposed project. The proposed project has not substantially affected the marina's condition. DWR already extended the access ramp and moved the marina facilities back into the water to ensure that wet slips were still available after the drawdown. DWR also replaced some crossbeams in the marina structural frame to assist in rehabilitation of the facilities and to ensure public safety. The facilities remain functional, although visitorship has declined. The sooner that sufficient funding is secured and the new concession solicitation and selection process successfully completed the less potential for the facilities to be neglected by the concession operators.

The longer term and underlying demand for boating recreation at Lake Perris is strong given the rapid local population growth and lack of comparable recreation sites nearby. It is expected that with the return of the original reservoir level and a refurbished marina and ancillary facilities, future boating use will rebound to pre-drawdown numbers.

The reduction in boat recreation at Lake Perris has an economic effect on the concessionaire and on the park's ability to maintain the concessionaire's contract. CEQA (§15064(e)) is concerned with economic impacts only with respect to physical changes to the environment they bring about. If the drawdown or reduced visitorship resulting from the drawdown, caused the marina and boating facilities to dilapidate beyond the normal weathering due to age, then appropriate mitigation would be to repair or replace the facilities with equal value. However, the marina facilities at Lake Perris SRA in 2004 were already reaching the end of their useful life. The drawdown has not directly contributed to physical deterioration of the marina or other concessionaire facilities. In 2006, DWR performed significant maintenance to the marina. The facilities remain functional, although visitorship has declined. Mitigation Measure 3.12-1a would assist with restoring visitorship. Once the reservoir level is restored, the marina would return to its original location and permitted boat launches would return to pre-drawdown numbers. Mitigation Measure 3.12-1b would ensure that DWR repaired physical damage to the marina caused by the drawdown. Physical impacts to the boating facilities caused by the drawdown would be less than significant.

Mitigation Measures

> **Mitigation Measure 3.12-1a:** DWR shall assist Lake Perris SRA in conducting promotional and public outreach efforts to improve public awareness that the park is open during the drawdown period. The public outreach effort shall include making brochures available and posting of informational signs throughout the park describing the work being conducted and to advertise the facilities and activities currently available in order to promote recreational use at Lake Perris.
>
> **Mitigation Measure 3.12-1b:** At the conclusion of the project, DWR shall work cooperatively with DPR to assess physical deterioration to the marina, if any, directly related to the project. DWR shall develop an action plan with DPR and mitigate for those impacts.

Significance after Mitigation: Less than significant.

Disruption of Recreational Activities

Impact 3.12-2: Construction activities would result in temporary disruption of recreational activities at Lake Perris SRA.

Consideration was originally given to the possibility of closing the entire Lake Perris SRA during the construction period to ensure the public would not interfere with borrow hauling activities. However, since all construction activities were planned for only the southern shore of the reservoir and beneath the dam, only the recreation areas in close proximity to the construction activities would be restricted from public access. The construction zone would be fenced including the lakeshore to prevent boaters from interfering with the excavation and hauling activities. An exclusion buoy would be placed approximately 200 feet from the south shoreline to keep boaters a safe distance from construction during the entire two-year construction period. Lake Elsinore and Diamond Valley Lake are located approximately 20-22 miles away and offer alternative recreational opportunities similar to Lake Perris. Lake Elsinore has multiple boat launches, campgrounds, day use and beach areas, watercraft rentals, and motocross tracks. Diamond Valley Lake offers fishing (coldwater and warm water fish), fishing tournaments and boating.

Noise from construction equipment, haul trucks, and blasting would affect the recreational experience for the duration of the two-year construction period. Impacts from noise are described in Section 3.9. See Table 3.9-8 which summarizes noise impacts and mitigation. The visual impact of construction equipment and trucks and the general increased activity on the south shore of the reservoir would disrupt the otherwise quiet and relaxing recreational experience. See Table 3.1-1 summarizing visual impacts and mitigation. The construction would disrupt the peaceful character of the natural setting and would be unavoidable for the duration of the construction period. It is fully anticipated that this would likely result in further reduced attendance.

Camping

Camping north of the reservoir would not be significantly impacted by construction activities. Closures relating to material transportation during the dam remediation and outlet tower construction would affect the Bernasconi campground's, three group campsites out of a total of 426 camp sites for the entire park. The group camp sites accommodate between 25 and 80 campers each. Although the remaining campgrounds north and west of the reservoir would remain open, the camping experience could be adversely affected during the day by noise and visual impacts from the on-going construction activities. Therefore, the temporary effect of construction on the camping experience at the SRA would be significant and unavoidable.

Boating

The drawdown has resulted in revised boating rules that prohibit access to some areas and require slower speeds. The boating activities allowed by the new rules would be mostly unaffected by construction-related closures since transportation access to the marina and remaining functional boat ramp would remain in service. Visitors would have full access to the boat launch and marina facilities during the construction period.

Boat speed limits have been reduced from 35 mph to five mph around Allesandro Island and a new navigation pattern has been established. Lake Perris SRA has posted signs at the reservoir shore, at the marina, and on their website describing the rule changes. Posting of signs would continue throughout the duration of the lower reservoir level, in order to keep all visitors informed.

Boating activities on the water would remain open to the public under modified rules, enforced by DPR. However, the boating experience would be affected by noise and visual impacts from construction activities. Most of these impacts would occur during the weekday periods when visitorship is lowest. However, the disruption could substantially reduce the quality of the recreation experience. This would conflict with the recreational use and result in a significant and unavoidable temporary impact.

Swimming

The swimming areas at the north end of the reservoir would not significantly be affected by construction activities. DWR has provided sand to restore access to the reservoir for swimmers. Although swimming activities would be affected by noise and visual disruptions from across the reservoir, the distance is great enough that swimming activities would largely remain unaffected by the construction.

Picnicking

Picnicking opportunities north of the reservoir would not be significantly impacted by construction activities. However, the Bernasconi day-use area, which can accommodate between 25-100 people, would be closed entirely to the public for the two-year construction period. There would still be three group picnic areas that accommodate 200 people each and 300 additional picnic sites at Perris and Moreno Beaches that would remain open. Approximately 15 percent of the picnic areas would be closed during the two year construction time period. It is anticipated that the balance of the picnicking areas would accommodate the demand throughout this time period.

Hiking/Bicycling/Horseback Riding

Hiking, bicycling, and horseback riding trails would remain open during construction, except near the Bernasconi Campgrounds, near the quarry, and near the existing outlet tower. The remaining paths would remain open. However, construction activities within the construction zones would generate noise and visual impacts that would affect the hiking and horseback riding experience at Lake Perris SRA. The normally peaceful natural environment would be adjacent to large earthmoving equipment working all day for two years. The disruption could substantially reduce the quality of the recreation experience. The noise may also bother the horses which could prevent some visitors from being able to ride in the area. This would conflict with the recreational use of the facility and result in a significant and unavoidable temporary impact. It is expected that the use of these facilities would return to pre-drawdown levels once the construction is complete. In addition, once construction is complete, the construction haul road over the Bernasconi Hills could be used for recreation, complimenting the trail system around the Lake Perris SRA

Hunting

The reservoir drawdown impacted waterfowl habitat and as a result, hunting seasons have been canceled since 2007. Hunting would be unavailable for the duration of construction given the intensive construction activities, the loss of the hunting grounds, and the proximity of construction workers. Duck and small game hunters may access other hunting areas during the drawdown period. However, the borrow area may permanently remove water fowl hunting opportunities at Lake Perris SRA due to the loss of shallow-water habitat. DWR has been funding a 15-acre portion of a waterfowl pond rehabilitation project at the San Jacinto Wildlife Area to mitigate for the loss of waterfowl hunting opportunities. The permanent loss of hunting opportunities at the Lake Perris SRA is considered a significant and unavoidable impact of the project (see Impact 3.12-3).

Rock Climbing

Blasting would occur near Big Rock, the reservoir's primary rock climbing location. The entire area would be closed for the duration of the construction period. The haul road would traverse next to the rock face but would not affect the rock. Impacts to rock climbing are considered a significant and unavoidable temporary impact. Mitigation Measure 3.12-2b would ensure that Big Rock would not be affected by construction.

Mitigation Measures

> **Mitigation Measure 3.12-2:** DWR shall include in construction contractor specifications that construction would avoid the Big Rock rock-climbing area and that construction of the haul road would not alter the appearance of the rock cliff. Closed climbing structures would be identified for public awareness.

Significance after Mitigation: Construction activities would result in the temporary loss of recreation opportunities at Lake Perris SRA. DWR has implemented measures to maintain recreational uses at the facility including establishing a new beach area and extending the marina into the lowered lake. However, some camping, picnicking, rock climbing, biking and hiking facilities would be closed for the duration of the two-year construction period. In addition, construction activities could substantially disrupt the recreation experience within a natural open space environment in the open portion of the SRA. This would conflict with recreational uses at the Lake Perris SRA, which would be considered a significant and unavoidable impact of the project during the temporary construction period.

Impact 3.12-3: Drawdown of Lake Perris, the excavation of the borrow area, and the construction of the new outlet tower would adversely affect the Lake Perris SRA sport fishery and waterfowl hunting opportunities.

Lake Perris SRA has historically been host to bass fishing tournaments. These tournaments declined in number by 75 percent in 2007 and may be affected for the duration of the construction due to the reduced fishery, compromised access and general disruption caused by the construction activities. With a reduction in shallow-water habitat to support the spawning areas, impacts to

sport fishing would be significant. DWR installed 137 brush shelters for fish habitat mitigation in Lake Perris in 2006. DWR and DFG are working to establish further fish habitat improvement at Lake Perris. However, the reduction of the sport-fish spawning habitat would be a significant and unavoidable impact of the project.

The reduction in waterfowl habitat caused by construction activities would also impact waterfowl hunting. The excavation of the borrow area would result in the loss of much of the available freshwater marsh and shallow-water habitat (i.e., water less than 10 feet deep) along the northeastern edge of the reservoir where waterfowl tend to congregate to feed. The marsh and shallow water habitats are used by water fowl for foraging. If only the 125-foot buffer is left in place following excavation, the shallow-water habitat would be reduced from approximately 93 acres under pre-drawdown conditions, to approximately 69 acres, a loss of 24 acres. The remaining shallow-water habitat may not be adequate to support suitable cover for waterfowl. DWR has funded 15 acres of a CDFG waterfowl pond rehabilitation project at the San Jacinto Wildlife Area to offset the loss of waterfowl hunting opportunities at Lake Perris. Hunting opportunities would be available at these and other locations in the region for hunters no longer able to use the Lake Perris SRA. However, the project may result in the permanent reduction of hunting and fishing opportunities at Lake Perris SRA due to the reduction in marsh and shallow-water acreage. This reduction in the self-sustaining fishery and waterfowl hunting opportunities is considered a significant and unavoidable impact of the project.

Mitigation Measures

Implement **Mitigation Measures Biology 3.3-8, 3.3-9a through 3.3-9b**.

Significance after Mitigation: Even with proposed mitigation, excavation in the borrow area may result in a significant and unavoidable impact to sport fishery opportunities and waterfowl hunting opportunities.

Perris Fairgrounds

Impact 3.12-4: Construction activities would result in temporary disruption of recreational activities at the Perris Fairgrounds. The open channel emergency outlet extension alternative would permanently impact activities at the Perris Fairgrounds.

The two alternatives for construction of the emergency outlet extension, underground versus open channel, would result in two different impacts to the Perris Fairgrounds. Construction of the underground emergency outlet extension alternative would temporarily remove approximately 45 percent of an existing motocross facility within the fairgrounds. The construction would also temporarily remove approximately 750 parking spaces[1] (eight acres) used for large events at the fairgrounds. The parking area and motocross facility would be replaced following construction.

[1] Riverside County zoning code Section 18.12 requires that parking space be a minimum of 9 feet by 18 feet with a 28 foot aisle between rows.

Although the proposed project would conflict with the motocross facility, the remaining area within the fairgrounds would be open to the public for recreational uses. Once completed, the underground emergency outlet extension alternative would not conflict with the facilities or diminish their availability to the public. The project would not result in the deterioration of the recreational facilities.

Construction of the open channel emergency outlet extension alternative would permanently remove approximately 45 percent of an existing motocross facility within the fairgrounds. Given the development on the fairgrounds, reconfiguring the site to accommodate a similarly sized motocross facility would be difficult. The construction would also remove approximately 750 parking spaces[1] (eight acres) used for large events at the fairgrounds. The loss of the parking spaces would be a significant impact. Additional parking areas would need to be identified. Mitigation Measure 3.12-4 commits DWR to providing compensatory parking spaces to replace those removed by construction.

During construction, motocross enthusiasts would be able to go to nearby tracks. Perris Raceway is located approximately eight miles south and Lake Elsinore Motocross Park is located approximately 20 miles south of Perris Fairgrounds. Both locations offer alternatives to motocross recreational opportunities in the area. Perris Raceway has two separate tracks, while Lake Elsinore Motocross Park has seven tracks. The impact to recreational facilities at the fairgrounds would be temporary and less than significant for the underground alternative. Once construction of the emergency underground outlet extension is complete, the Perris Fairgrounds would return to fully normal operations. If the open channel emergency outlet channel is selected, the motocross facility would either be reconfigured on the remaining site, or would be removed from the Fairgrounds altogether. Other opportunities for motocross in the area would be available for public use. The open channel alternative would result in a permanent loss of 8 acres of the Fairgrounds, or approximately 8 percent of the total property. The Fairgrounds would remain functional, but would lose some parking capacity and possibly the entire motocross facility. This would be considered a significant and unavoidable impact of the open channel alternative necessary to provide the emergency outlet extension for Perris Reservoir.

Mitigation Measures

> **Mitigation Measure 3.12-4:** DWR shall prepare a parking plan for the fairgrounds and implement improvements to regain the lost parking spaces caused by the construction of the emergency outlet extension.
>
> Implement **Mitigation Measures 3.8-1a and 3.8-1b**

Significance after Mitigation: Less than Significant for the underground emergency outlet extension alternative: significant and unavoidable for the open channel emergency outlet extension alternative.

Mitigation Measures Summary Table

Table 3.12-2 presents the impacts and mitigation summary for Recreation.

TABLE 3.12-2
RECREATION IMPACTS AND MITIGATION SUMMARY

Proposed Project Impact	Mitigation Measure	Significance after mitigation
Deterioration of Recreation Facilities: Drawdown of Lake Perris could cause or accelerate physical deterioration of the recreational facilities at the Lake Perris SRA.	3.12-1a and 3.12-1b	Less than Significant
Disruption of Activities: Construction activities would result in temporary disruption of recreational activities at Lake Perris SRA.	3.12-2	Significant and Unavoidable
Fishing and Hunting: Drawdown of Lake Perris, the excavation of the borrow area, and the construction of the new outlet tower would adversely affect the Lake Perris SRA sport fishery and waterfowl hunting opportunities.	Biology 3.3-8, 3.3-9a and 3.3-9b	Significant and Unavoidable
Perris Fairgrounds: Construction activities would result in temporary disruption of recreational activities at the Perris Fairgrounds. The open channel emergency outlet alternative would permanently impact activities at the Perris Fairgrounds.	3.12-4, Land Use 3.8-1a and 3.8-1b	Less than Significant for the underground alternative; Significant and Unavoidable for the open channel alternative

3.13 Traffic and Circulation

This section assesses potential traffic and circulation impacts on the basis of information supplied by DWR, the Riverside County Transportation Commission (RCTC), Caltrans, and the City of Perris, Department of Engineering.

The following were considered in the assessment of potential impacts:

- Review and evaluation of documents, plans and aerial photographs to determine the characteristics of roads that are proposed to accommodate construction-generated vehicle trips. Characteristics included the number of travel lanes, traffic control, on-street parking (permitted or prohibited), bicycle routes, transit service (including bus stops), and land uses served by the affected roads (e.g., sensitive uses like fire stations, schools, etc.)
- Automatic (24-hour) traffic volume counts on the Ramona Expressway. Counts taken on a weekday and used to estimate typical daily and peak hour traffic volumes.
- Estimated highest number of vehicle trips that project-related activities would generate, on both a daily and peak hourly basis.

3.13.1 Setting

The project area lies within unincorporated Western Riverside County. The roadway network on which construction workers and construction vehicles (including trucks that would transport equipment and fill material to and from the worksite) would travel to access the site consists of regional highways and local roadways (see Figure 2-2).

Existing Traffic Circulation Network

Regional Roadways

Interstate 215 (I-215) is a north-south freeway bypass that connects the cities of Murrieta and Sun City to the south of the project site and Moreno Valley, Riverside and San Bernardino to the north. I-215 provides full access ramps with the Ramona Expressway approximately five miles east of the project site. State Route 60 (SR-60) is an east-west freeway north of Lake Perris that runs from Interstate 10 (I-10) near the Los Angeles River in Los Angeles east to I-10 in Riverside County, with an overlap at I-215. State Route 74 (SR-74) is an east-west freeway that connects Interstate 5 (I-5) in San Juan Capistrano (Orange County) east to Palm Desert (Riverside County). SR 74 is to the south of the project site and passes through the City of Perris.

Local Roadways

The Ramona Expressway is a four-lane east-west arterial which runs from I-215 in Perris to SR-74 in Hemet. The Expressway follows the contours of Lake Perris on its south shore and provides access to the project site at Bernasconi Road. Bernasconi Road provides access to the lake's south shore recreational facilities which include group campgrounds, picnic areas, a multi-use path and rock climbing areas.

Local roadways would encounter a lowered level of use due to the decreased visitorship at Lake Perris SRA, caused by the drawdown of the lake.

Traffic Volumes

Automatic machine traffic counts were conducted by the City of Perris, Department of Engineering over a 24-hour period on the Ramona Expressway.[1] The results indicate that there are about 17,465 vehicles per day (vpd) on weekdays. Weekday peak-hour traffic volumes are about 1500 and 1280 vehicles per hour (vph) during the a.m. and p.m. peak hours, respectively.[2]

The most recent data published by Caltrans indicate the average daily traffic volume on SR 60 near Perris Boulevard is about 86,000 vehicles, with about 10.5 percent trucks. The average daily traffic volume on SR-74 in the vicinity of I-215 is about 20,000 vehicles with 10 percent trucks. I-215 just south of the Ramona Expressway is estimated at 104,000 vehicles, with 12 percent trucks (Caltrans, 2007b).

Transit Service

The project area is served by Riverside Transit Agency (RTA). RTA buses number 19 and 41 run on the Ramona Expressway (with stops at Evans Street), but have no stops near the project site.

3.13.2 Regulatory Framework

The development and regulation of the transportation network in the vicinity of the proposed project primarily involves state and county jurisdictions. Applicable state and local laws and regulations related to traffic and transportation issues are discussed below.

County of Riverside

The proposed project is located within unincorporated Riverside County and is governed by the Riverside County General Plan. The Circulation Element of the County General Plan includes policies for transportation planning and development of facilities to support development in a manner that addresses a move from sprawl to more concentrated urban development (Riverside County, 2003).

Congestion Management Program

Riverside County also supports the Riverside Congestion Management Program (CMP), created in compliance with Proposition 111 that aims to more directly link land use, transportation and air quality to promote reasonable growth management programs. The purpose of the state-mandated CMP is to monitor roadway congestion and assess the overall performance of the region's transportation system. Based upon this assessment, the CMP contains specific strategies and improvements to reduce traffic congestion and improve the performance of a multi-modal

[1] Estimated daily traffic volume is based on automatic machine counts conducted on Wednesday, March 15, 2006.
[2] Weekday traffic typically has two peak hours, which correspond to the morning and evening commute hours (during the two-hour periods of 7:00 to 9:00 a.m., and 4:00 to 6:00 p.m.).

transportation system. Examples of strategies include increased emphasis on public transportation and rideshare programs, mitigating the impacts of new development, and better coordinating land use and transportation planning decisions.

Destination 2030: 2004 Regional Transportation Plan

Destination 2030 is SCAG's 2004 RTP for its member counties. The RTP focuses on improving the balance between land use and current, as well as future transportation systems. SCAG develops, maintains and updates the RTP on a three-year cycle.

California Department of Transportation

Caltrans manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulation of the use of state roadways. The project area includes roadways that fall under Caltrans' jurisdiction (e.g., I-215, SR-60, and SR-74).

Caltrans' construction practices require temporary traffic control planning "during any time the normal function of a roadway is suspended" (FHWA, 2003). In addition, Caltrans requires that permits be obtained for transportation of oversized loads and transportation of certain materials, and for construction-related traffic disturbance.

3.13.3 Impacts and Mitigation Measures

Significance Criteria

For the purposes of this EIR and consistent with Appendix G of the *CEQA Guidelines*, a project that would cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system is considered to have a significant impact on the environment. The project is also considered to have a potentially significant impact if:

- Traffic generated by construction workers and construction vehicular activities substantially affects roadway traffic flow, especially during peak traffic hours;
- Construction activities pose a traffic safety hazard to motor vehicles, bicyclists, or pedestrians;
- Construction substantially affects parking availability, causing traffic safety/operational problems;
- Construction activities significantly affect local transit service;
- Movement of heavy vehicles causes substantial damage or wear of public roadways; or
- Construction activities affect air traffic patterns and result in substantial safety risks.

Wear of Public Roadways

The use of big trucks to transport equipment and material to and from the project worksite could affect pavement conditions on the designated haul routes by increasing the rate of road wear. The

project's impacts are expected to be negligible on I-215 and the Ramona Expressway since no substantial soil hauling activities off-site would be required.

Transit Services

The project would not disrupt local roadways or affect transit services.

Air Traffic

The project is located over four miles from the nearest airport. The project would not disrupt air traffic.

Parking

The project would not reduce parking at the Lake Perris SRA. No additional parking demand would be created by the project. Construction parking would be provided within designated construction zones.

Local Traffic Hazards and Congestion

The proposed project would not cause long-term effects to local traffic because, once completed, the dam would only require maintenance activities similar to those that occur under existing conditions.

Impact 3.13-1: Construction activities would result in short-term increases in vehicle trips by construction workers and construction vehicles.

Trip Generation and Distribution

During the project construction period, project traffic external to the site would be generated from two sources: truck trips to and from the worksites, and personnel (construction work crews and supervisory staff) working at the sites. Most project-generated traffic would access the sites off the Ramona Expressway from I-215. Almost all of the truck trips would be inbound trips to deliver materials and equipment, and outbound empty trucks. Other truck trips would include the initial delivery of construction vehicles and equipment used to haul material from the borrow area and rock quarry to the construction sites (which would generate project traffic internal to the site).

The workforce for the project would generate auto commute trips. The number of personnel and associated trips would vary over the construction period, but is estimated to average about 60 people over the course of the project, with a maximum of up to about 120 people.

The following assumptions were made as part of the trip generation estimate, based on construction traffic estimates presented in Chapter 2, Project Description:

- Basic construction materials (soil and rock) would be excavated and quarried from within the site.

- All trucks used to haul material from the borrow area and rock quarry would be left on-site; truck drivers would come to the site by personal vehicles.
- Cement used in the CDSM operations and construction of the outlet tower and the emergency outlet extension would be imported in bulk by tanker trucks of 25-ton capacity.
- Public access to the south shore area would be generally controlled and limited when necessary during project construction.

The intensity and nature of the construction activity would vary over the duration of the project construction period, and the number of vehicle trips generated by that activity would similarly vary. Based on information provided in Chapter 2, Project Description, the peak number of daily vehicle trips would be about 1520 one-way trips (270 one-way worker trips, and 1250 one-way truck trips). It is noted that of the peak period 1250 daily truck trips 30 percent (375 one-way trips) are estimated to be external trips to and from the site. The remaining 875 peak daily one-way trips would operate on-site hauling soil and rock from the borrow area and rock quarry to the project sites. On-site trucks would also haul excavated materials between the three project sites. Because the truck trips would be spread over the course of a 12-hour work day, the project would generate about 105 one-way truck trips per hour overall and about 32 one-way truck trips to and from the site per hour. There would be a maximum of about 135 one-way worker trips in the morning and 135 one-way worker trips in the evening.

Project Effects on Traffic Flow

Construction-generated traffic would be temporary and therefore would not result in long-term degradation in operating conditions on area roadways or at area intersections. As stated above, the number of vehicle trips generated by construction activity would vary over the construction period in step with the intensity and nature of that activity. The estimated increase in traffic volumes caused by project-generated traffic would not be substantial relative to background traffic conditions, nor would project traffic significantly disrupt daily traffic flow on area roadways.[3] Project-generated truck trips would be spread over the course of the work day, and construction workers would commute to and from the worksite primarily before or after peak traffic hours.

The highest level of truck traffic would generate an average of about one truck every two minutes, and project-generated traffic (trucks and worker vehicles) would increase the daily traffic volume on the Ramona Expressway by less than four percent, and by less than one percent on I-215. These percent increases in traffic volumes would not be substantial, and project traffic would not significantly disrupt daily traffic flow on these roadways.

Construction-related truck traffic occurring on roadways in the peak direction during the weekday peak traffic hours would coincide with peak hourly traffic and would have the greatest potential to impede traffic flow. The primary impact from construction truck traffic would be a temporary and intermittent reduction of roadway capacities due to the slower movements of trucks

[3] Day-to-day traffic volumes typically vary by as much as 10 percent (i.e., plus-or-minus five percent), and an increase of less than that is unlikely to be perceptible to the average motorist.

compared to passenger vehicles. Drivers could experience delays if they were traveling behind a construction truck.

Level of service standards for roadways that are part of the CMP network (e.g., the area freeways) are intended to regulate long-term traffic increases from operation of new development, and do not apply to temporary construction or demolition projects such as the proposed project. Therefore, the proposed project would not exceed level of service standards established by the Riverside County Transportation Commission for designated CMP roadways.

The relatively low level of construction-generated traffic and reduced visitorship during the drawdown, combined with implementation of Mitigation Measure 3.13-1 would result in a less-than-significant traffic impact.

Mitigation Measures

Mitigation Measure 3.13-1: The following requirements shall be incorporated into contract specifications for the project:

- The contractor(s) shall prepare and implement a traffic safety/traffic management plan, which would establish, at a minimum, the process for notification of construction activity and the means for people to report problems during construction. The plan would be made available to the public. Elements of the contractor's plan shall include, but are not necessarily limited to, the following:
  - Provide a schedule of deliveries over the construction period showing the estimated number of trucks traveling to and from the project site during the different phases of the work. Provide updates of estimated truck traffic volumes as construction proceeds. Encourage off-peak hour deliveries.
  - Comply with roadside safety protocols. Provide advance "Road Work Ahead" (and other appropriate) warning signs to achieve required speed reductions for safe traffic flow (including turning movements between the Ramona Expressway and the main access roads) into and out of the work site.
  - Promote carpooling and use of public transportation for workers traveling to the construction site.

Significance after Mitigation: Less than Significant.

Impact 3.13-2: Construction activities could affect traffic on Ramona Expressway, Evans Road and Lake Perris Drive as well as on roads within the Lake Perris SRA. Some road closures would occur within the Lake Perris SRA for the duration of construction.

The project would not alter the physical configuration of the existing roadway network serving the area and would not introduce unsafe design features. In addition, there would be minimal conflicts between project trucks and private vehicles on the Lake Perris SRA access road (Bernasconi Road). Continued use of trails and other recreation activities would be allowed during most of the proposed project construction period within the Lake Perris SRA, but activities near the construction zone such as rock-climbing, hiking and fishing would be temporarily closed

during construction. Figure 2-8 shows the approximate limit of the construction zone closure area that would be in place for the duration of the construction period.

Traffic control measures, such as use of flaggers, would be implemented under the proposed project to ensure safe traffic flow within the Lake Perris SRA. In addition, during periods when construction equipment utilized the neighboring roadway network including Ramona Expressway, traffic control measures would be employed. No full road closures would occur outside of the Lake Perris SRA.

Mitigation Measures

> **Mitigation Measure 3.13-2a:** DWR shall post signs at closed roads indicating the closure schedule and alternate routing for recreational and regular access. In addition, closure notification shall be posted on the DWR and Lake Perris SRA websites.
>
> **Mitigation Measure 3.13-2b:** DWR shall prepare a traffic control plan that identifies specific traffic control measures to ensure safety on the local roadway network and within the Lake Perris SRA. Control measures shall include use of flaggers within Lake Perris SRA if construction vehicles utilize Lake Perris SRA roads and trails outside the construction exclusion zone.
>
> **Mitigation Measure 3.13-2c:** Peak travel periods shall be avoided when scheduling road closures.

Significance after Mitigation: Less than Significant.

Airport Safety Zone

Impact 3.13-3: The construction activity is located within the March Air Reserve Base Safety Zone Area III that could pose air traffic safety conflicts.

The March Air Reserve Base is located to the northwest of the project site. The boundary of the Airport's Influence Area includes the Lake Perris Dam and project site. There are a number of safety zones associated with the Airport Influence Area, and properties within these zones are subject to regulations governing such issues as development intensity, density, height of structures, and noise.

The project site falls within Safety Zone Area III. This zone has no restrictions on population density, however it limits coverage by structures to a maximum 50 percent of gross or 65 percent net of parcel square footage and discourages schools, auditoriums, amphitheaters, stadiums and discourages land uses involving, as the primary activity, manufacture, storage, or distribution of explosives or flammable materials.

Project construction activities would not exceed the existing maximum elevation (1600 feet) in the project area. The replacement outlet tower would be only slightly higher than existing grade and the height of the dam would not be altered by the proposed repairs. The project would include

the use of explosives at the rock quarry and outlet tower sites and the use and limited storage of fuels (flammable materials) in the area. The use of these materials would be controlled, limited and temporary and would not violate the requirements of the Airport Influence Area Policies.

Significance: Less than Significant.

Summary of Impacts and Mitigation Measures

Table 3.13-1 presents the impacts and mitigation summary for Traffic and Circulation.

TABLE 3.13-1
TRAFFIC AND CIRCULATION IMPACTS AND MITIGATION SUMMARY

Proposed project Impact	Mitigation measure	Significance after Mitigation
Construction Vehicle Trips: Construction activities would result in short-term increases in vehicle trips by construction workers and construction vehicles.	3.13-1	Less than Significant
Public Roadway Traffic: Construction activities could affect traffic on Ramona Expressway, Evans Road and Lake Perris Drive as well as on roads within the Lake Perris SRA. Some road closures would occur within the Lake Perris SRA for the duration of construction.	3.13-2a through 3.13-2c	Less than Significant
Airport Safety Zone: The construction activity is located within the March Air Reserve Base Safety Zone Area III that could pose air traffic safety conflicts.	None required	--

CHAPTER 4
Cumulative Impacts

4.1 CEQA Analysis Requirements

A cumulative impact is created as a result of the combination of the project evaluated in an EIR together with other projects causing related impacts. The *CEQA Guidelines* require that EIRs discuss the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects.[1] According to *CEQA Guidelines* §15130(a) and (b), the purpose of this section is to provide a discussion of significant cumulative impacts which reflects "the severity of the impacts and their likelihood of occurrence." The *CEQA Guidelines* indicate that the discussion of cumulative impacts should include:

- Either: (A), a list of past, present, and probable future projects producing related or cumulative impacts; or (B), a summary of projections contained in an adopted general plan or similar document, or in an adopted or certified environmental document, which described or evaluated conditions contributing to a cumulative impact;
- A discussion of the geographic scope of the area affected by the cumulative effect;
- A summary of expected environmental effects to be produced by these projects; and,
- Reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

The analysis of cumulative effects in this chapter focuses on the effects of concurrent construction of the proposed project with other spatially and temporally proximate projects. As such this analysis relies on a list of projects that have the potential to contribute to cumulative impacts in the project area.

4.2 Related Projects

This analysis considers the impacts of Perris Dam Remediation Program in combination with potential environmental effects of other projects in the project area. "Other projects," also referred to as "cumulative projects" include recently completed projects, projects currently under construction, and future projects currently in development. The potential for projects to have a cumulative impact depends on both geographic location as well as project schedule.

[1] *CEQA Guidelines* Section 15130, 15065, as amended January 1, 2000.

4.2.1 Geographic Scope

The geographic area affected by cumulative projects varies depending on the environmental topic. For example, construction noise impacts would be limited to areas directly affected by construction noise, whereas the area affected by a project's air emissions generally includes the entire air basin, and impacts associated with aesthetics would include the affected viewshed.

The proposed project is located in Western Riverside County. The majority of the project would occur within the unincorporated area of the County near the City of Perris and the City of Moreno Valley. A portion of the proposed emergency outlet extension would be located in the City of Perris. This chapter considers the potential cumulative effects of the project in combination with development projects occurring in these areas and in the wider scope of coverage, including the Cities of Perris and Moreno Valley.

4.2.2 Project Timing

As noted above, projects considered in this analysis include those that have recently been completed, are currently under construction, or are in planning. Schedule is particularly relevant to the consideration of cumulative construction-related impacts, since construction impacts tend to be relatively short-term. However, for future projects, construction schedules are often broadly estimated and can be subject to change. Although the timing of the future projects described in Section 4.2.4 are likely to fluctuate due to schedule changes or other unknown factors, this analysis assumes these projects would be implemented concurrently with construction of the Perris Dam Remediation Program, between 2010 and 2013.

4.2.3 Type of Projects Considered

As described in Chapter 3 of this EIR, the majority of impacts associated with implementation of the proposed project are short-term and related to construction, rather than long-term project operation. Therefore, the project could contribute to cumulative effects when considered in combination with impacts of other construction projects in the project area**.** For this analysis, other past, present, and reasonably-foreseeable future construction projects, particularly other infrastructure and commercial projects, in the area have been identified. Long-term cumulative impacts of the project in conjunction with the other projects in the area are assessed as well.

4.2.4 Description of Cumulative Projects

Table 4-1 lists current and proposed projects that could potentially contribute to cumulative impacts within the project area. In addition to the projects listed in Table 4-1, additional development that has not been identified as of this time, could occur within the project area, as planned by the County of Riverside, and nearby Cities.

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Perris	WF Construction, Inc. 80,890 sq. ft. concrete tilt up.	Submitted July 2008; not yet approved.	Webster Avenue, south of Morgan Street
City of Perris	Revision of the Downtown Specific Plan	Submitted August 2008; not yet approved.	City of Perris
City of Perris	North Perris Commerce Specific Plan	Submitted October 2008; not yet approved.	City of Perris
City of Perris	TM Calandra, President. 484,000 sq. ft. industrial building.	Submitted November 2008; not yet approved.	Webster Avenue & Ramona Expressway
City of Perris	Roy P.Sweeney. 12,200 sq. ft. multi-tenant building.	Approved April 2009	2560 N Perris Boulevard, Lot E.
City of Perris	Roy P.Sweeney. 10,000 sq. ft, multi-tenant building.	Submitted December 2008; not yet approved.	2560 N Perris Boulevard, Lot L
City of Perris	Initial Study for Perris Valley Storm Channel	Completed in March 2009; currently under review.	Perris Valley Storm Channel
City of Perris	Recyclewise. Construction of a recycling collection facility in GI zone.	Submitted March 2009; currently under review.	2282 Goetz Road
City of Perris	Perris Valley Airport Land Use Plan	Submitted April 2009; currently under review.	Perris Valley Airport
City of Perris	Cesar Madrid of C & D Homes, Inc. 35 lots for multi-family development.	Submitted for review July 2007; status unknown.	Northwest corner of Alpine Drive and A Street
City of Perris	Oakmont Ramona Expressway, LLC. Construction of 5 industrial buildings totaling 3,008,000 sq. ft. Oakmont II	Submitted for review July 2007; status unknown.	Ramona Expressway at Indian Avenue.
City of Perris	Dave Wakevield of Nuevo Road Partners, II, LLC. Construction of 55,987 sq. ft. retail center with drive thru for fast food and retail.	Submitted for review July 2007; status unknown.	Old Nuevo Road east of I-215.
City of Perris	Dave Wakevield of Nuevo Road Partners, II, LLC. Construction of 4 buildings totaling 18,515 sq. ft. retail center with drive thru for fast food and retail.	Submitted for review July 2007; status unknown.	Old Nuevo Road east of I-215.
City of Perris	EMWD. 33,000 sq. ft. addition.	Approved September 2007.	2270 Trumble Road
City of Perris	RMC, LLC. Construction of 6 light industrial buildings for a total of 46,790 sq. ft.	Submitted for review September 2007; status unknown.	Southeast corner of 7th Street and G Street.
City of Perris	Stratford Ranch Investors, LLC. Development of 442,000 sq. ft. of commercial space for a Target Store.	Submitted September 2007; status unknown.	Northeast corner of Ramona Expressway and Evans Road.
City of Perris	WLPX Perris Venue, LLC. 63.74 acre commercial site to be developed to 621,000 sq. ft. retail space including Target Store.	Submitted for review September 2007; status unknown.	Redlands Avenue and I-215.
City of Perris	Dr & Mrs. Hong Ling Lee. 16,517 sq. ft. retail building with drive thru.	Submitted for review November 2007; status unknown.	Southeast corner of Perris Boulevard and Rider Street

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Perris	Weekend Warrior Mfg. Redevelop a 14.34 ± acre site to add 16,400 sq. ft. of building space and 66,900 sq. ft. of canopy.	Submitted for review December 2007; status unknown.	804 S. Redlands Avenue
City of Perris	FR Goetz Rd., LLC. Preliminary review for four buildings totaling 3,306,917 sq. ft. on 205 acres.	Approved January 2008.	Southwest corner of Mapes Street and Goetz Street.
City of Perris	Matt Englhard, FR/Cal Ellis, LLC. Construction of four industrial buildings totaling 9,452,520 sq. ft. in the New Perris Specific Plan.	Submitted January 2008; status unknown.	Northeast corner of Ellis Street and Redlands Avenue.
City of Perris	Ivano Stamegna. Preliminary review for 6 unit apartment complex on .45 acres.	Approved March 2008.	Northeast corner of Flame Avenue and Medical Center Drive.
City of Perris	John Pulliam. Operation of a soil and ground water remediation system for up to 3 years.	Approved March 2008.	1535 Nandina Avenue
City of Perris	12,200 square-foot multi-tenant building.	Approved April 2009.	2560 N Perris Blvd
City of Perris	10,000 square-foot multi-tenant building.	Pending, 2008+	2560 N Perris Blvd
City of Moreno Valley	Moreno Valley Mall at TowneGate. Updating and repositioning of the 1.2 million sq. ft. regional mall.	300,000 sq. ft. currently under development.	South of Highway 60 and east of Day Street.
City of Moreno Valley	TownGate Center and Plaza. Existing and expanding community shopping center.	Partially open and under construction	Southwest corner of Frederick Street and Highway 60.
City of Moreno Valley	TownGate Crossing. 250,000 sq. ft. shopping center.	Partially under construction	South of Highway 60 and east of Day Street. West side of Moreno Valley Mall.
City of Moreno Valley	TownGate Promenade. Expanding 353,000 sq. ft. shopping center.	Partially under construction	Southeast corner of Day Street and Campus Parkway.
City of Moreno Valley	TownGate Square. A mixed-use commercial, retail/restaurant/office development project with 136,000 sq. ft. of retail/restaurant, plus 170,000 sq. ft. of office.	Under construction.	Southeast corner of Gateway Drive and Day Street.
City of Moreno Valley	Moreno Valley Plaza. Existing community center. Major multi-phase renovation of shopping center.	Under construction	Southwest corner of Sunnymead Boulevard and Heacock Street.
City of Moreno Valley	Stoneridge Towne Centre. 579,295 sq. ft. commercial center.	Partially open and under construction	Southeast corner of Highway 60 and Nason Street.
City of Moreno Valley	Moreno Beach Plaza. Anchor includes Wal-Mart and 86,000 sq. ft. expansion.	Partially open and under construction	South of Highway 60 and west of Moreno Beach Dr.
City of Moreno Valley	Moreno Marketplace. 93,788 sq. ft. retail center/neighborhood shopping center.	Under construction	Northwest corner of Cactus and Moreno Beach.
City of Moreno Valley	Rancho Belago Plaza. 14,000 sq. ft. retail/commercial center.	Approved and in plan check	Southwest corner of JFK and Moreno Beach Drive

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Moreno Valley	Iris Plaza. 109,289 sq. ft. retail commercial center.	Under construction	Southeast corner of Perris and Iris.
City of Moreno Valley	N&R Square. 13,000 sq. ft. retail center.	Under construction	Perris Boulevard south of Alessandro Boulevard
City of Moreno Valley	Sunnymead and Indian. Two building commercial development totaling 19,360 sq. ft.	Approved	Sunnymead Boulevard west of Indian Avenue
City of Moreno Valley	Elsworth Plaza, Three new buildings with a total of 30,000 sq. ft.	Under construction	Southwest corner of Alessandro and Elsworth.
City of Moreno Valley	Alessandro and Lasselle. 140,000 sq. ft. retail center	In planning phase	Northeast corner of Alessandro Boulevard and Lasselle Boulevard
City of Moreno Valley	Alessandro and Lasselle. Mixed-use residential/commercial project with 96 residential units and 11,000 sq. ft. of commercial	In planning phase	Northwest corner of Alessandro Boulevard and Lasselle Boulevard.
City of Moreno Valley	Alessandro and Moreno Beach. 36,000 sq. ft. retail center.	In planning phase	Southwest corner of Alessandro and Moreno Beach.
City of Moreno Valley	Alessandro and Moreno Beach. 15,150 sq. ft. retail/office space	Approved	Southeast corner of Alessandro and Moreno Beach.
City of Moreno Valley	Komar Cactus Plaza. 81,000 sq. ft. mixed-use retail/restaurant project with 110-hotel guest rooms, two drive-thru restaurants 12,220 sq. ft. of restaurant	In planning phase	Northeast corner of Cactus Avenue and Commerce Center Drive
City of Moreno Valley	Pigeon Pass and Hemlock. 13,140 sq. ft. retail center on 1.02 acres.	In planning phase	Pigeon Pass and Hemlock.
City of Moreno Valley	Tesco – "Fresh and Easy Neighborhood Market (several locations).	Frederick and Cottonwood – Opening soon Iris and Oliver – Approved Perris and Iris – Opening soon	Several locations: Frederick and Cottonwod; Iris and Oliver; Perris and Iris.
City of Moreno Valley	Hawthorn Inn & Suites. Four-story hotel with 79 guest rooms	Approved	Cactus Avenue and Elsworth Boulevard
City of Moreno Valley	Frederick and Sunnymead. 29,699 sq. ft. hotel with 58 guest rooms	Under construction	Frederick and Sunnymead.
City of Moreno Valley	Marriott TownePlace Suites. Four-story hotel with 110 guest rooms	In planning phase	Komar Cactus Plaza
City of Moreno Valley	Sleep Inn Suites. Three-story hotel with 74 guest rooms	In planning phase	Olivewood Plaza Drive
City of Moreno Valley	Value Place. Four-story extended stay hotel with 113 guest rooms and 41,189 sq. ft.	In planning phase	Northwest corner of Sunnymead Boulevard and Heacock Avenue

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Moreno Valley	Towngate Promenade. Hampton Inn and Suites with 115 guest rooms. Ayres Suites, hotel with 127 guest rooms.	Hampton Inn and Suites – open Ayres Suites – under construction	Hampton Inn and Suites – Southwest corner of Town Circle and Memorial Way Ayres Suites – Northwest corner of Gateway Drive and Memorial Way
City of Moreno Valley	Cresta Bella. Mixed-use project with 30,000 sq. ft. of medical office condominium space	In planning phase	On Iris east of Moreno Valley Community Hospital.
City of Moreno Valley	Jacobs Mixed Use. 10-acre mixed-use project with 48,000 sq. ft. office/retail plus 80,000 sq. ft. self-storage.	Under construction	Southwest corner of Graham Street and Alessandro Bouelvard
City of Moreno Valley	Moreno Valley Medical Campus. 80,000 sq. ft. medical/ office /condominium complex.	Approved and in plan check	On Iris west of Moreno Valley Community Hospital.
City of Moreno Valley	Olivewood Plaza. 22,58 sq. ft. three-story office building	Approved and in plan check	North of Sunnymead Boulevard and west of Graham Street
City of Moreno Valley	Imperial Village Senior Retirement Community Center. 217,000 sq. ft. mixed-use medical complex on 18 acres	In planning phase	East of Nason Street and south of Brodiaea Avenue
City of Moreno Valley	TownGate Square. 170,000 sq. ft. of office space.	Approved	Southeast corner of Gateway Drive and Day Street
City of Moreno Valley	Alere Property Group. 407,948 sq. ft. distribution center.	In plan check	Northeast corner of Indian Street and San Michele Road.
City of Moreno Valley	Alere Property Group. 423,015 sq. ft. distribution center.	Approved and in plan check	Indian Street and San Michele Road
City of Moreno Valley	Apache Colonel Rogers Trust. 569,200 sq. ft. industrial complex with warehouse facilities.	Approved and in plan check	Unknown
City of Moreno Valley	BAS Recycling. 66,934 sq. ft. recycling plant	In plan check	Day Street south of Alessandro Boulevard.
City of Moreno Valley	Cemex Materials. Proposed concrete plant.	Approved and in plan check	Corner of Nandina Avenue and Indian Street
City of Moreno Valley	Centerpoint Business Park. 2,461,738 sq. ft. in 9 buildings.	Three building in plan check; two available for lease	Between Alessandro, Frederick, Cactus and Heacock.
City of Moreno Valley	84 Lumber Co., 56,400 sq. ft. retail/lumber storage complex on 11.04 acres	Approved and in plan check	Southeast corner of Heacock and Nandina.
City of Moreno Valley	First Industrial Realty Trust. 874,000 sq. ft. industrial/distribution facility in two buildings	Approved	North side of Nandina Avenue, west of Perris Boulevard
City of Moreno Valley	First Industrial Realty Trust. 1.1 million sq. ft. in two buildings	Approved and in plan check	North side of Nandina Avenue, between Heacock Street and Indian Street

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Moreno Valley	First Industrial Reality Trust, 1,491,469 sq. ft. in two buildings	Approved	Southwest corner of Indian Street and Iris Avenue
City of Moreno Valley	Gateway Business Park. 34 industrial condominiums totaling 184,036 sq. ft.	Approved and in plan check	South of Alessandro Boulevard west of Day Street
City of Moreno Valley	Highland Fairview. 1,812,107 sq. ft. commercial building	Approved and in plan check	South of Alessandro Boulevard and Theodore Street
City of Moreno Valley	Komar Investments. Proposed 1.75 million sq. ft. industrial/distribution center on 80 acres.	Approved and in plan check	North side of San Michele Road between Heacock Street and Indian Street
City of Moreno Valley	Masonry Technology, Inc. Three building industrial complex on five acres	In planning phase	Nandina Avenue east of Indian Street
City of Moreno Valley	Overton Moore: 519,716 sq. ft. industrial warehouse buildings on 25.9 acres	Approved	Northwest corner of Cactus Avenue and Frederick Street
City of Moreno Valley	Prologis. 2,224,419 sq. ft. of industrial in six buildings	In planning phase	South of SR-60 between Pettit Street and Quincy Street
City of Moreno Valley	Rados Tennants in Common. Seven industrial buildings totaling 617,127 sq. ft.	In planning phase	Northeast corner of Heacock Street and Iris Avenue
City of Moreno Valley	Ridge property Trust. 943,800 sq. ft. industrial buildings	In planning phase	South of SR-60 between Quincy Street and Redlands Boulevard
City of Moreno Valley	Robertsons Ready-Mix. Concrete plant	Approved	Old 216 Frontage Road, south of Alessandro Boulevard
City of Moreno Valley	Ross Dress for Less Distribution Center. 1.3 million sq. ft. building. 2nd phase adding 897,000 sq. ft.	Under construction	Perris Blvd. south of Globe Street
City of Moreno Valley	Vogel Engineers Inc. 1,616,133 sq. ft. warehouse distribution center	In planning phase	North side of Oleander Storm Drain between Indian Street and Perris Boulevard
City of Moreno Valley	Western Realco. 1,582,898 sq. ft. in four buildings.	In planning phase	Southeast corner of Iris Avenue and Heacock Street
	MAJOR TRANSPORTATION PROJECTS		
Caltrans	Interchange at I-15 and Magnolia Avenue	Construction as of June 2009. 2-yr project.	City of Corona, Riverside County
Caltrans	60/91/215 Improvements	Construction began in February 2004. Completed in December 2008	Riverside County, Moreno Valley
Caltrans	I-10 Pavement Rehabilitation	Begin Construction: April 1, 2009 End Construction: Early 2011	1-10 from County Line Road, Calimesa to Pennsylvania Road, Beaumont.

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
RCTC	I-15 Corridor Improvement Project (In conjunction with Caltrans).	Project began April 2008. Construction scheduled to begin 2015 and finish 2019.	I-15 north of the I-15/I-215 separation northward to the San Bernardino County line. Affects the Cities of Murrieta, Wildomar, Lake Elsinore, Corona, Norco and portions of unincorporated Riverside County.
RCTC	SR-79 Realignment Project	In the environmental review phase; Construction scheduled to begin 2013.	SR-79 between Domenigoni Parkway and Gilman Springs Road in the San Jacinto-Hemet area
RCTC	I-215 Widening Projects (North Project, Central Project and South Project)	In the environmental review phase for the northern and central projects. Southern project environmental review complete. Construction scheduled to begin 2010 (southern project).	South Project: I-215 north of Temecula to Scott Road north of Murrieta. Central Project: I-215 from Scott Road north of Murrieta to Nuevo Road in Perris. North Project: I-215 from Nuevo Road in Perris to SR-60 in Riverside.
RCTC	Mid County Parkway Project.	Completed Draft EIR/EIS in 2008; waiting to complete additional environmental review. Construction scheduled to begin 2012.	32-mile east-west limited access route within western Riverside County connecting the San Jacinto area with the Corona area.
RCTC	San Jacinto Branch Line Commuter Rail (Perris Valley Line) Project.	Environmental review phase complete. Construction scheduled to begin 2010.	24 mile extension of the Metrolink 91 Line beginning at the existing Riverside-Downtown Station in the City of Riverside and heading north on the BNSF Line; southeast along the San Jacinto Branch Line; terminus in the City of Perris at SR-74 and Ethanac Road in Perris.
RCTC	SR-60 Improvements (lane additions, HOV lane, connectors, truck-climbing lane, and interchange improvements).	2005-2012+	Downtown Riverside with the Ontario International Airport and Los Angeles to the west and Moreno Valley and the communities of the Pass and the Coachella Valley to the east.
RCTC	SR-74 Widening Project	Partially complete partially under construction	7th Street to "G" Street in Perris; I-15 at Dexter Avenue in Lake Elsinore to Wasson Canyon Road; Wasson Canyon Road to 7th Street in Perris.

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
SANBAG	I-10 Improvements to Tippecanoe Interchange. Reconstruct Interchange and construct auxiliary lanes.	Construction scheduled to begin in 2010.	San Bernardino, near Redlands
SANBAG	1-10 High Occupancy Vehicle (HOV) Extension	In preliminary engineering, design and environmental review phases. Construction anticipated to begin in 2020.	I-10 from Haven Avenue in Ontario to Ford Street in Redlands
SANBAG	I-215 Bi-County Widening	On hold.	Widening of I-215 between 60/91/215 interchange in Riverside County and Orange Show Road interchange in San Bernardino County.
SANBAG	!-215 Bi-County HOV Gap closure	In project development stages.	Construct HOV lanes along I-215 corridor between 60/91/215 interchange in Riverside County and Orange Show Road interchange in San Bernardino County.
SANBAG	I-10 Widening (Redlands)	Construction scheduled for completion in late 2009.	Between Orange Street and Ford Street in Redlands
SANBAG	I-10 Westbound Widening	In final design phase; Construction schedules for completion in 2011.	Add one general purpose lane to westbound I-10 from Live Oaks Canyon Road in Yucaipa to Ford Street in Redlands
SANBAG	I-215 Widening (Central San Bernardino)	Final design approved in May 2009; Construction scheduled for completion in 2014.	I-215 between Rialto Avenue and Massachusetts Avenue
SANBAG	I-215 Widening (5th Street Bridge)	Construction scheduled for completion in late 2009.	Replaces 5th Street Bridge over I-215 and Burlington Northern Santa Fe railroad tracks.
SANBAG	I-15 and I-215 interchange improvements (Devore)	Construction scheduled for completion in 2015	1-15/I-215 interchange
SANBAG	I-215 and Barton Road – replace interchange	Construction scheduled for completion in 2015	I-215 and Barton Road
SANBAG	I-215 and Mt. Vernon Avenue/Washington Street – replace interchange	Construction scheduled for completion in 2016	I-215 and Mt. Vernon Avenue/Washington Street
SANBAG	I-215 and SR-210 High Speed Connectors	Construction scheduled for completion in 2014	Northbound I-215 to westbound SR-210; eastbound SR-210 to southbound I-215
SANBAG	State Street/University Parkway and BNSF Railroad – bridge State Street/University Parkway over BNSF Railroad	Construction scheduled for completion in June 2009	City of San Bernardino

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
City of Perris	Ramona Expressway Widening	In design phase; construction scheduled to begin late Summer 2009.	East of Perris Boulevard and West of Bradley Street
City of Perris	Perris Boulevard Widening	In design phase	North of Ramona Expressway to the Moreno Valley city limits.
City of Perris	Rider Street Widening	In design phase	Between Sherman road and Avalon Street
San Bernardino County	Intersection improvement on 5th Avenue	ROW: August 2009 Construction scheduled to begin January 2010.	Mentone
San Bernardino County	San Bernardino Avenue signal installation	Construction scheduled to begin December 2009.	Fontana
San Bernardino County	Rehab and overlay on Alabama Street	In planning phases; Construction dates unknown.	Redlands
San Bernardino County	Garnet Street Bridge Replacement	Construction scheduled to begin April 2011.	Redlands
	WATER AGENCY INFRASTRUCTURE PROJECTS		
DWR	Phase I East Branch Extension Project EIR	Completed 2003	San Bernardino, Redlands, Mentone, Highland, Santa Ana River Wash area
DWR	Phase II East Branch Extension Project EIR	Construction scheduled to begin in 2010 and be completed in 2013	San Bernardino County, Redlands, Highland, Yucaipa, and Mentone
MWD	Inland Feeder Project	Completed 2007	Santa Ana River Wash area
San Bernardino Valley Water Conservation District (SBVWCD)	Santa Ana River Wash Land Management and HCP, aka "Wash Plan"	Competed environmental documentation in 2009. Unknown construction dates.	Santa Ana River Wash area
SBVWCD	High Groundwater Mitigation Project to increase pump and pipeline capacity, and plan for future construction of new pumps and pipelines	2007-2012+	San Bernardino, Bunker Hill Groundwater Basin
SBVMWD	North Lake Area	Unknown	82.4 acres in City of San Bernardino, immediately north of downtown
SBVMWD	South Lake Area	Unknown	53.7 acres in San Bernardino, near I-215 and Mill Street junction
San Gorgonio Pass Water Agency (SGPWA)	Noble Creek in-stream recharge project of unknown capacity. Creation of recharge facilities (berms) to assist in groundwater recharge.	Finalizing permitting. Construction schedules to begin April 2010.	Beaumont, Cherry Valley

TABLE 4-1
PLANNED AND APPROVED PROJECTS IN THE PROJECT AREA

Planning Jurisdiction	Project	Project Status / Construction Dates	Location
SGPWA	Proposed EBX Extension to Cabazon	In planning phase; considering several alternatives in consideration. Construction dates unknown.	Yucaipa/Redlands to Cabazon
SGPWA	Supplemental Water Master Plan	Finalization of Draft Water Master Plan in August 2009.	Throughout SGPWA service area
City of Perris	Initial Study for Perris Valley Storm Drain Channel	Submitted March 2009.	City of Perris
City of Redlands	Sewer Capital Improvements Project (CIP) pipeline replacement.	Construction began in April 2009. Anticipated for completion in August 2009.	Redlands
City of Redlands	Water CIP pipeline replacement.	Construction scheduled to begin August 2009; 1 year project.	Redlands
City of Redlands	Highline pipeline replacement project	Construction scheduled to begin October 2009; 5 month project.	Redlands
City of Redlands	Country Club #1 Reservoir replacement project	Construction scheduled to begin October 2009; 5 month project.	Redlands
San Bernardino County	Intersection improvement on 5th Avenue	ROW: August 2009 Construction scheduled to begin January 2010.	Mentone
San Bernardino County	San Bernardino Avenue signal installation	Construction scheduled to begin December 2009.	Fontana
San Bernardino County	Rehabilitation and overlay on Alabama Street	Currently in planning phases. Construction dates unknown.	Redlands
San Bernardino County	Garnet Street Bridge Replacement	Construction scheduled to begin April 2011.	Redlands

SOURCES:

San Bernardino National Forest Service, Schedule of Proposed Actions, March 2009.
City of Perris, Capital Improvement Projects List, June 2009.
City of Redlands, Capital Improvement Program List, June 2009.
City of Redlands, Status of Major Projects List, December 2008. .
Caltrans, District 8, Riverside County Projects.
City of Moreno Valley, Economic Development Activity Summary, May 2009.
SANBAG, Major Projects: Quarterly Project Status Briefing, January 2009 Through March 2009.
Riverside County Transportation Commission, 2009.

4.3 Cumulative Effects

Construction Related Impacts

Impact 4-1: Construction of the proposed project in conjunction with other projects in the area could result in cumulative short-term impacts associated with construction activities. The short-term impacts associated with cumulative construction projects include impacts related to aesthetics, air quality, biological resources, hazardous materials, geology and soils, hydrology and water quality, land use, noise, and public services and utilities, and traffic. Construction-related impacts would be short-term. With measures identified in Chapter 3 to mitigate project impacts, the contribution of the proposed project to most cumulative, construction-related impacts would not be cumulatively considerable. However, the project's contribution to air quality impacts would be cumulatively considerable.

Construction of Perris Dam Remediation Program is scheduled to begin in 2010 and be completed in 2013. The potential cumulative contribution of the proposed project in conjunction with the other identified projects is discussed below by environmental topic area.

Aesthetics

The geographic scope of cumulative aesthetic impacts is the viewsheds affected by construction of Perris Dam Remediation Program. The proposed project in conjunction with other projects in the vicinity would result in short-term visual impacts during construction. Construction activities would require the use of heavy equipment and storage of materials at the construction zone. During construction, excavated trenches, stockpiled soils, and other materials within the construction easement would constitute negative aesthetic elements in the visual landscape that would affect views of the area. As noted in Chapter 3, the construction-related effects would be temporary and are not considered significant on a project basis.

The dam remediation portion of the proposed project would involve construction of a stability berm that would temporarily impact visual resources at Lake Perris and the surrounding areas. During construction, the haul road, the borrow area, staging areas, and stockpiled soils would directly impact the view from the western shore of the lake. South of the dam, excavation, stockpiled soils, and staging areas could be visible from Ramona Expressway. Large vehicles would be seen moving within the haul roads continually. Cement mixing and injection facilities could be visible from Ramona Expressway. Chain-link fencing, however, would be constructed around construction areas within the Lake Perris SRA to diminish views from the western shore of the lake. Construction activities would be visible for a period of two years. Once construction is complete, these temporary impacts would cease.

As previously stated, due to the temporary nature of the impact and the fact that the area is not within a designated scenic vista or scenic highway corridor, aesthetic impacts would not be considered significant. Considering the short term nature of project construction and the limited scope of views affected, the project's contribution to adverse impacts on visual resources during project construction would not be cumulatively considerable.

Air Quality

The geographic scope of cumulative air quality impacts is the South Coast Air Basin. Concurrent construction of the project with other projects in the air basin would generate short-term emissions of criteria pollutants and toxic air contaminants, including suspended and inhalable particulate matter and equipment exhaust emissions. Other projects that would contribute to cumulative impacts on air quality are shown in Table 4-1. Implementation of Mitigation Measure 3.2-1 would ensure implementation of the SCAQMD requirements to control fugitive dust at construction sites and other measures to limit construction dust and vehicle and equipment emissions. However, as discussed in Section 3.2, the project nevertheless would exceed SCAQMD significance thresholds for criteria air pollutants, resulting in significant and unavoidable air quality impacts during the short-term duration of construction activities. Because the project construction would exceed significance thresholds established by the SCAQMD for activities and operations within the air basin, its contribution to cumulative air quality impacts would be cumulatively considerable. DWR would be required to prepare a statement of overriding considerations prior to adopting the project for both the direct impact as well as an indirect cumulative impact.

The accumulation of GHGs has been implicated as the driving force in global climate change. Climate change is commonly used interchangeably with “global warming” and the “greenhouse effect.” Definitions vary among regulatory authorities and members of the scientific community, but in general climate change can be described as the changes in the earth’s climate caused by natural fluctuations and anthropogenic activities that alter the composition of the global atmosphere. No project alone would contribute to a noticeable incremental change to the global climate. However, legislation and executive orders on the subject of climate change in California have established a statewide context for GHG emissions, and an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that the cumulative impacts of GHGs, even additions that are relatively small on a global basis, need to be considered. Because of the cumulative nature of the climate change problem, even relatively small contributions may be potentially considerable and therefore, significant.

As described in Section 3.2, the proposed project would not result in a direct significant and unavoidable contribution of GHG. This project would not conflict with the state goal of GHG emission reduction to 1990 levels by 2020. Nonetheless, the project would be considered cumulatively considerable since the project’s emissions combined with regional, state, and global emissions would contribute to conditions that affect the global climate.

Biological Resources

The geographic scope of this resource area is the open space and undeveloped watershed lands surrounding Lake Perris bounded by the San Jacinto Nuevo and Potrero mountain ranges. Potentially significant biological resource impacts identified in Chapter 3 include impacts on: specified plant communities, open water/Lake Perris, habitats for sensitive species, and impacts to potential nesting birds. Proposed mitigation measures described in Chapter 3 would reduce most of these impacts to a less-than-significant level. The majority of the project impacts would

be temporary, and disturbed areas would be revegetated and habitat restored. As described above, most of the projects listed in Table 4-1 are commercial or utility and transportation infrastructure projects, predominantly located in the urban and developed areas where there are generally fewer sensitive biological resources than in the Lake Perris SRA. Furthermore, the project's impacts to biological resources would be mitigated through the application of the Western Riverside County MSHCP that enables a cumulative approach to habitat conservation. Therefore, the proposed project would not contribute considerably to cumulative biological impacts.

Cultural Resources

The geographic scope of this resource area encompasses the northwest trending Perris and San Jacinto Valleys surrounded by the Bernasconi Hills and the Russell Mountains and immediate vicinity. As described in Chapter 3, the potential exists for cultural resources to be encountered during project construction. Proposed mitigation would provide contingency procedures in the event that cultural resources are encountered; therefore, the project impact would be less than significant. Due to the low likelihood of encountering cultural resources during project construction, the project would not contribute to cumulative cultural resource effects in the Perris and San Jacinto Valleys and immediate vicinity.

Geology, Soils, Faulting, and Seismicity

The geographic scope of potential cumulative impacts related to geology, soils, faulting, and seismicity, encompasses the northwest trending Perris and San Jacinto Valleys surrounded by the Bernasconi Hills and the Russell Mountains and immediate vicinity. As described in Chapter 3, construction of the proposed project would include earthwork activities that could create areas with unstable slopes; exposure of soils to erosion and loss of topsoil during construction activities; and subsidence of native materials. As described in Chapter 3, the construction of the proposed project could create areas with unstable slopes, expose soils to erosion and loss of topsoil during construction activities, and cause subsidence of native soils underneath stockpiled materials; however, these impacts would be mitigated to a less-than-significant level with the implementation of identified measures. Since none of the projects shown in Table 4-1 are located within the area of potential impact, there would be no cumulative geologic or seismic impacts.

Hazards and Hazardous Materials

As described in Chapter 3, the proposed project could expose workers and the public to hazardous materials used during construction or that could be present in excavated soils. However, the project would not increase permanent use of hazardous materials or result in on-site contamination that could contribute to cumulative hazardous waste in the region. The project would not generate hazardous waste requiring disposal at an off-site landfill.

Compliance with PRC regulations governing the use of construction equipment in fire prone areas would mitigate potential wildland fire risks. The project would not add considerably to the potential for wildland fires in the region. Furthermore, remediation of the dam would reduce the potential safety hazard from seismic failure. Therefore, the project would not add considerably to cumulative hazards.

Hydrology and Water Quality

The geographic scope of potential cumulative water quality impacts encompasses the Santa Ana River, San Jacinto River, and their tributaries and associated drainage areas within the Perris Dam Remediation Program area. As discussed in Chapter 3, construction activities associated with the project could degrade water quality from sedimentation as a result of increased erosion or from the release of fuel or hazardous materials. The other projects listed in Table 4-1 could have similar construction-related impacts on water quality in the project area. Construction activities at other project sites also could increase erosion and subsequent sedimentation, with impacts on water quality as well as storm drain capacity. Cumulative projects also could adversely impact surface water quality through the release of fuels or other hazardous materials, or discharges from excavation dewatering activities, to stream extensions or storm drains. Implementation of Mitigation Measure 3.7-1a requires DWR to prepare and implement a SWPPP that identifies potential pollutant sources and BMPs to reduce pollutants in storm water discharges. Therefore, the contribution of the proposed project to regional water quality would not be cumulatively considerable.

The increase in impervious surface area resulting from the project would be minor; increased runoff as a result of increased impervious surface would not be significant. The other projects listed in Table 4-1 also could contribute to increased runoff due to increases in impervious surfaces to varying degrees. Because the project would result in only a minor increase in impervious surface area, and because drainage facilities at the above-ground facilities would be appropriately designed to accommodate storm water runoff, the project's contribution to cumulative runoff would not be cumulatively considerable.

Land Use and Planning

The geographic scope of this impact covers the areas Lake Perris, in an unincorporated area of Riverside County, and in the City of Perris. Lake Perris and the area immediately around the lake are owned by DWR and comprise the Lake Perris SRA.

As discussed in Chapter 3, project implementation of the emergency outlet extension alternatives would eliminate a segment of land managed for habitat conservation values by CDFG. In addition, a 300-foot corridor of the Perris Fairgrounds would be decommissioned by the construction of either alternative. This area is comprised of a large general parking area, facilities for El Toro Huaco Rodeo, and Starwest Motocross Park. Although consistent with local zoning, construction of the proposed outlet extension would encroach into Fairgrounds and alter the land use. Implementation of the underground emergency outlet extension would alter this land use temporarily, while implementation of the aboveground emergency outlet extension would alter this land use permanently. The facilities affected by the outlet extension corridor could not be re-located on the Fairgrounds. Most of the projects listed in Table 4-1 are commercial or utility and transportation infrastructure projects, predominantly located in the urban and developed areas to the north and south of the project area; therefore, the project's contribution to cumulative land use impacts would not be considered significant.

Noise

The geographic scope of potential cumulative noise vibration impacts encompasses the proposed construction sites and immediate vicinity (within the range of audible noise from the facilities during construction and operation) as well as along the access and haul routes to the construction site.

The project would result in intermittent and temporary noise above existing ambient noise levels due to construction activities in the project vicinity. With implementation of mitigation measures, the project's daytime and nighttime noise would be considered a significant and unavoidable direct impact of the project. While there is the potential for the proposed project to contribute to construction noise levels generated by the cumulative projects listed in Table 4-1, the actual schedule and timing of construction activities is uncertain. DWR would coordinate with the appropriate departments of the neighboring jurisdictions and with other utility districts and agencies regarding the schedule and timing of construction projects that would occur near the Perris dam site. With early and ongoing coordination, DWR would avoid conflicts with other projects to the extent possible, and the project's contribution to cumulative construction noise impacts, as mitigated, would not be considered significant.

Public Services and Utilities

As described in Chapter 3, construction of the proposed Perris Dam upgrades could result in significant project impacts associated with the planned or accidental disruption of utility services, potential temporary increased demand for police and fire department services, and increased demand on waste disposal facilities. Construction activities associated with many of the projects listed in Table 4-1 also could result in the disruption of utilities service or temporarily increase the demand for public services. Prior to construction, DWR would conduct an underground utilities search that would contact local utilities, including the Fairgrounds, to determine the location of known utilities. As part of the project, the utilities would be avoided or rerouted during construction to maintain services. If temporary service interruptions are necessary, DWR would coordinate with the local land uses affected to minimize the temporary nuisance. Services would be restored as soon as possible. Implementation of these measures would ensure that the project's contribution to cumulative impacts on public services and utilities would not be cumulatively considerable.

Recreation

Recreational activities would be impacted due to ongoing construction noise, air quality and aesthetic issues. In addition, construction would result in temporary closure of some recreational facilities. However, implementation of the mitigation measures described in Chapter 3 would reduce these temporary impacts to a less than significant level. The cumulative impact of the projects in Table 4-1 on recreational facilities in the project region is unknown. The increased residential development in the area would increase local demand for recreational facilities. Restoring the Lake Perris SRA to pre-drawdown conditions would assist in accommodating the recreational demand. None of the projects listed would directly affect recreation resources in this area; therefore, the proposed project would not result in cumulative impacts to recreation resources.

Traffic

The geographic scope of this impact area lies within unincorporated Western Riverside County. The roadway network on which construction workers and construction vehicles (including trucks that would transport equipment and fill material to and from the worksite) would travel to access the site consists of regional highways and local roadways.

As described in Chapter 3, the proposed project would result in short-term increases in vehicle trips, reduced access to and parking at adjacent land uses, increased potential for traffic safety conflicts, and increased wear-and-tear on designated haul routes. While the project impacts would be reduced to a less-than-significant level with implementation of proposed mitigation measures, the project could contribute to cumulative traffic and circulation impacts when considered in combination with projects listed in Table 4-1.

Potential cumulative traffic impacts could occur as a result of: (1) projects that would generate increased traffic at the same time on the same roads as the proposed project, causing increased congestion and delays, and (2) infrastructure projects in roads that would be used by the proposed project construction workers and trucks, which could delay project-generated vehicles traveling past the work zones of the other projects. In addition to cumulative (additive) effects on traffic flow conditions, the proposed project and other cumulative projects would extend the period of time when there would be disruptions (albeit not all disruptions would be significant) to traffic flow on area roadways.

The proposed project would not add a significant number of truck trips to local roadways. Most of the truck trips would occur within the Lake Perris SRA. DWR would coordinate with the surrounding jurisdictions and with other utility districts and agencies regarding the timing of construction projects that would occur near the Perris Dam upgrade. Such coordination would help to minimize multiple disruptions in the same areas. DWR would also submit plans related to, and comply with the requirements of, encroachment permits with local jurisdictions, which would provide further opportunities to coordinate multiple projects. Specific measures to mitigate significant impacts would be determined as part of the interagency coordination.

CHAPTER 5
Growth Inducement

The *CEQA Guidelines* (§15126.2(d)) require that an EIR evaluate the growth inducing impacts of a proposed action. A growth-inducing impact is defined as follows:

> [T]he way in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are [public works] projects which would remove obstacles to population growth…. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have direct and/or indirect growth inducement potential. Direct growth would result if a project, for example, involved construction of new housing. A project would have indirect growth inducement potential if it established substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. Similarly, a project would indirectly induce growth if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service.

The environmental effects of a proposed project's induced growth are secondary or indirect impacts. Secondary effects of growth can result in significant increased demand on community and public service infrastructure; increased traffic and noise; degradation of air and water quality; and conversion of agricultural land to urban uses.

The objectives of the proposed project are essentially to upgrade the existing infrastructure to meet current seismic standards and restore public safety while maintaining the beneficial uses of the Lake Perris SRA. Implementation of the proposed project would allow DWR to continue the safe operation of Perris Dam and Lake Perris at the pre-drawdown reservoir level. This project purpose and implementation of the proposed project would have no potential to directly foster population growth or to result in the construction of additional housing.

Project construction is not expected to involve employment opportunities substantially beyond the level normally available to construction workers in the area, and, in general, workers are expected to be drawn from the local labor pool**.** The project may require a limited amount of accommodations for construction workers during construction. However, this impact would be less than significant due to the available rental housing that exists in the area relative to the potential temporary increase in demand.

The proposed project would restore Lake Perris to its pre-drawdown level, which would not expand the local water supply. Lake Perris was designed to have an operating volume of 127,000 acre-feet and the proposed project would not result in an expansion of the lake beyond the pre-drawdown capacity. Without expanding the water supply, the proposed project has no potential to directly foster population growth.

CHAPTER 6
Analysis of Alternatives

6.1 Introduction and Approach

6.1.1 Introduction

The *CEQA Guidelines* Section 15126.6 requires that an EIR describe and assess a reasonable range of alternatives to a project that would feasibly meet most of the basic project objectives and avoid or substantially lessen significant project impacts. Thus, the range of alternatives is limited to those that would both avoid or substantially lessen the project impacts and also meet most of the basic project objectives. If an alternative does not reduce or avoid the impacts of the project, then it does not meet the CEQA purpose for the alternatives analysis. If an alternative does not meet most of the project objectives to some degree, then it is not a viable alternative to the project. In addition, an alternative must be feasible – capable of being implemented from a technical, economic, schedule and institutional perspective. CEQA also requires that an EIR evaluate the "No Project" alternative along with its impacts.

The proposed project includes three components to seismically upgrade the dam and its facilities and improve public safety: 1) dam remediation to meet current seismic safety standards, 2) replacement of the outlet tower, and 3) construction of an emergency outlet extension for the emergency outlet facility.

6.1.2 Approach to Alternatives Analysis

In 2005, DWR completed a foundation study of the Perris Dam that indicated the potential for seismically induced slope failure due to liquefaction in the soils beneath the dam, as a result of the characteristic earthquake event (an earthquake with Moment Magnitude of 7.5) on the San Jacinto Fault. The report identified specific actions needed to ensure the continued safe operation of the dam, including the lowered lake elevation. Based on this finding, a Perris Dam Reconnaissance Study was conducted (Washington Group, 2006). The purpose of the Reconnaissance Study was to evaluate alternatives to remediating the foundation of the dam and making the other improvements that would be needed for Perris Dam to safely impound the reservoir at its designed water surface elevation. Alternatives evaluated in the Reconnaissance Study included permanently lowering the lake level, maintaining the existing level, and raising the normal maximum operating level of the reservoir.

As noted above, the proposed project involves three distinct components of dam operation -- the dam itself, the outlet tower, and the proposed emergency outlet extension. Because each project

component provides independent utility and could conceivably be implemented independently of the other two, this chapter considers the project alternative(s) of each component separately. The no-project alternative components are considered together.

6.1.3 Project Objectives

The objectives of the proposed project are to:

- Upgrade SWP infrastructure to meet current seismic standards;
- Maintain SWP delivery commitments;
- Maintain maximum access to beneficial uses at Lake Perris SRA during period of drawdown while ensuring public safety during construction;
- Maintain maximum amount of pre-drawdown riparian habitat at Lake Perris SRA during period of drawdown;
- Minimize risks associated with seismic hazards;
- Provide infrastructure for the implementation of a safe emergency drawdown;
- Enhance and restore public safety;
- Maximize beneficial use of Lake Perris SRA by restoring reservoir to pre-drawdown water levels; and
- Minimize environmental impacts.

6.2 Project Alternatives

6.2.1 Dam Remediation Alternatives

Increased Dam Capacity Alternative

The Reconnaissance Study includes four scenarios for increasing the reservoir operating level above the existing design elevation of 1,588 feet. The Increased Dam Capacity Alternative evaluated here encompasses these four scenarios. Under this alternative, the existing dam would be raised, creating a larger reservoir. Dam remediation would be required, involving the same proposed components as the proposed project, such as deep soil cement mixing, soil re-compaction, and the stability berm. Enlarging the reservoir would inundate existing habitat for Stephens' kangaroo rat, least Bell's vireo, and California coastal gnatcatcher in the northeast end of the reservoir. Therefore, under this alternative a saddle dam would be constructed at the northeast end of the reservoir to protect such habitat. A second saddle dam would also be required at the Bernasconi Pass on the south side of the lake. Additionally, it is assumed that the outlet tower and emergency outlet extension would be constructed at a scale that is appropriate to the dam capacity.

Ability to Meet Project Objectives

The Increased Dam Capacity Alternative would meet each of the project objectives except the objective to maintain the maximum amount of pre-drawdown riparian habitat at Lake Perris SRA. The existing riparian habitat would be inundated. **Table 6-1** summarizes the ability of the Increased Dam Capacity Alternative to meet the project objectives.

Impact Assessment

Aesthetics

Under this alternative two new saddle dams would be constructed in addition to the stability berm. Potential impacts to long-range views from these structures would be substantially greater than the proposed project.

Air Quality

Under this alternative the significant and unavoidable construction emissions identified for the proposed project would increase due to longer duration and the need for more equipment.

Biology

Impacts to biological resources from construction of the proposed project would be increased over a greater distance. Avoidance of sensitive species would be more difficult. The existing riparian habitat supporting least Bells vireo would be inundated. In addition, substantial areas of California coastal gnatcatcher and Stephen's kangaroo rat habitat would be affected.

Cultural Resources

Potential impacts to unknown cultural resources would be increased with the larger construction area.

Geology

Impacts to the unique geologic features within the Bernasconi Hills would be increased due to the higher water levels and the need for saddle dams.

Hazardous Materials

Potential impacts from hazardous materials would be similar to the proposed project.

Hydrology

Increasing the water level elevation could increase groundwater levels downstream which could result in areas of shallow groundwater. This could adversely affect subsurface structures and could result in downstream ponding.

Land Use

Increasing the size of the lake would inundate lands currently used by the State Parks for recreation. However, a larger lake would accommodate a greater number of water-sport visitors.

TABLE 6-1
ABILTY OF PROJECT ALTERNATIVES TO MEET PROJECT OBJECTIVES

Objectives	No Project	Increased Dam Capacity	Reduced Dam Capacity	Recreation Alternative	Decommission Perris Dam	Retrofit Current Outlet Tower
Upgrades SWP infrastructure to meet current seismic standards?	No	Yes	Yes	Yes	Yes	Yes
Maintain SWP delivery commitments?	Yes	Yes	Yes	No	Yes	Yes
Maintain maximum access to beneficial uses at Lake Perris SRA during period of drawdown while ensuring public safety during construction?	No	Yes	No	No	No	Yes
Maintain maximum amount of pre-drawdown riparian habitat at Lake Perris SRA during period of drawdown?	No	No	No	No	No	Yes
Minimize risks associated with seismic hazards?	No	Yes	Yes	Yes	Yes	Yes
Provide infrastructure for the implementation of a safe emergency drawdown?	Yes	Yes	Yes	Yes	Yes	Yes
Enhance and restore public safety?	No	Yes	Yes	Yes	Yes	Yes
Maximize beneficial use of Lake Perris SRA by restoring reservoir to pre-drawdown water levels?	Yes	Yes	No	No	No	Yes
Minimize environmental impacts	Yes	No	No	No	No	Yes

SOURCE: ESA, 2007

Noise

Under this alternative construction noise would be increased due to the wider construction zone and longer construction period due to additional project components.

Public Safety

Construction activities within the park would pose hazards to park visitors for a longer period of time over a wider area.

Public Services and Utilities

Impacts to public services and utilities would be greater than the proposed project since the size of the construction area is wider and the duration of construction longer.

Recreation

Water recreation would be enhanced under this alternative since the surface area of the lake would be increased. Recreational facilities would require modification to accommodate the new shoreline of the larger lake.

Traffic

Impacts to traffic from construction would be greater under this alternative since the construction area is wider and the duration longer.

Summary

The Increased Dam Capacity Alternative would result in increased impacts for many resources since the project would include additional saddle dams requiring more construction over a longer period. This alternative would benefit water-sport activities due to the increased surface area of the lake. **Table 6-2** summarizes the impacts associated with this alternative.

Reduced Dam Capacity Alternative

The Reconnaissance Study includes two scenarios for reducing the reservoir operating level below the existing design elevation of 1,588 feet. The Reduced Dam Capacity Alternative evaluated here permanently reduces the reservoir operating level to Elevation 1,563. Under this alternative, the reservoir would be permanently smaller. This alternative assumes that dam remediation would still be implemented, albeit at a reduced scale compared to the proposed project. This alternative would involve the same dam remediation components as the proposed project, such as deep soil cement mixing and soil re-compaction, albeit at a reduced scale. Additionally, it is assumed the outlet tower and emergency outlet extension alternative would be constructed at a scale that is comparable to the reduced dam capacity assumed for this alternative.

TABLE 6-2
COMPARISON OF ALTERNATIVES TO THE PROPOSED PROJECT

Potential Impacts	No Project Alternative	Increased Dam Capacity	Reduced Dam Capacity	Recreation Alternative	Dam Decommissioning	Retrofit Current Outlet Tower
Aesthetics	Lesser	Greater	Greater	Lesser	Greater	Lesser
Air Quality	Lesser	Greater	Similar	Lesser	Lesser	Similar
Biology	Lesser	Greater	Greater	Similar	Greater	Similar
Cultural Resources	Lesser	Greater	Similar	Lesser	Lesser	Similar
Geology, Soils, Faulting, and Seismicity	Lesser	Greater	Similar	Similar	Lesser	Similar
Hazardous Materials	Lesser	Similar	Similar	Similar	Lesser	Similar
Hydrology and Water Quality	Greater	Greater	Greater	Greater	Greater	Greater
Land Use	Lesser	Greater	Similar	Similar	Greater	Similar
Noise	Lesser	Greater	Similar	Lesser	Lesser	Lesser
Public Safety	Greater	Greater	Similar	Lesser	Lesser	Similar
Public Services and Utilities	Lesser	Greater	Similar	Greater	Greater	Similar
Recreation	Greater	Lesser	Greater	Greater	Greater	Greater
Traffic and Circulation	Lesser	Greater	Similar	Similar	Lesser	Similar

SOURCE: ESA, 2007

Ability to Meet Project Objectives

The Reduced Dam Capacity Alternative would meet each of the project objectives except the objective to maintain the maximum amount of pre-drawdown riparian habitat at Lake Perris SRA and the objective to restoring the lake to its pre-drawdown condition. Table 6-1 summarizes the ability of the Reduced Dam Capacity Alternative to meet the project objectives.

Impact Assessment

Aesthetics

Under this alternative the potential impacts to long-range views from the stability berm would be similar to the proposed project. This alternative would result in adverse visual impacts due to the exposure of the unvegetated shoreline that previously had been underwater.

Air Quality

Under this alternative the significant and unavoidable construction emissions identified for the proposed project would be similar to the proposed project but would be of shorter duration.

Biology

Impacts to biological resources from construction of the proposed project would be similar to the proposed project. The existing riparian area north of the lake would be eliminated due to the lower lake level. This would adversely affect least Bell's vireo habitat.

Cultural Resources

Potential impacts to unknown cultural resources would be similar to the proposed project.

Geology

Potential impacts to geology would be similar to the proposed project.

Hazardous Materials

Potential impacts from hazardous materials would be similar to the proposed project.

Hydrology

Reducing the water level elevation would decrease groundwater levels downstream, which would result in a reduction of water supplies. This could adversely affect water suppliers in the area.

Land Use

Impacts to land use would be similar to the proposed project.

Noise

Under this alternative construction noise would be similar to the proposed project.

Public Safety

Construction hazards within the park would be similar to the proposed project.

Public Services and Utilities

Impacts to public services and utilities would be similar to the proposed project.

Recreation

Water-sport activities would be constrained under this alternative since the surface area of the lake would be decreased. Recreational facilities would require modifications to accommodate the new shoreline of the smaller lake.

Traffic

Impacts to traffic from construction would be similar to the proposed project.

Summary

The Reduced Dam Capacity Alternative would result in similar impacts for many resources since the project would construct similar facilities. The impacts to air quality would not be avoided. Impacts to biological resources would be greater than the proposed project since the riparian areas would be adversely affected. Table 6-2 summarizes the impacts associated with this alternative.

Recreation Alternative

This alternative permanently reduces the reservoir operating level to Elevation 1,542. Under this alternative, the reservoir would be permanently smaller and used for recreation purposes only, not for water storage. This alternative assumes that dam remediation would not be required. The outlet tower would be reduced in height to accommodate the lowered lake elevation and the emergency outlet extension alternative would be constructed at a scale that is comparable to the reduced dam capacity assumed for this alternative.

Ability to Meet Project Objectives

The Recreation Alternative would meet only four out of eight project objectives. Table 6-1 summarizes the ability of the Recreation Alternative to meet the project objectives.

Impact Assessment

Aesthetics

Under this alternative there would be no potential impacts to long-range views from the stability berm because one would not be constructed. This alternative would result in adverse visual impacts due to the exposure of the unvegetated shoreline that previously had been underwater. The new shoreline would affect the views in the park until new vegetation emerged.

Air Quality

Under this alternative the significant and unavoidable construction emissions identified for the proposed project would be less than that of the proposed project because no dam remediation would be required.

Biology

Impacts to biological resources from construction would be less than under the proposed project. However, the riparian corridor on the original lake shore would be entirely eliminated. A new riparian corridor would emerge at the new lake shore to support sensitive species. The lake would support water fowl and fisheries similar to pre-drawdown conditions, but with the changing water elevation the remaining shallow water habitat would likely diminish. The habitat below the dam would likely remain unaffected.

Cultural Resources

Potential impacts to unknown cultural resources would be lesser than under the proposed project because no haul road over Bernasconi Hills would be required to transport materials since there would be no berm construction.

Geology

Potential impacts to geology would be similar to the proposed project.

Hazardous Materials

Potential impacts from hazardous materials would be lesser than under the proposed project due to the fact that no new berm would be constructed and no asbestos abatement would be required.

Hydrology

Reducing the water level elevation would decrease groundwater levels downstream, which would result in a reduction of water supplies. This could adversely affect water suppliers in the area.

Land Use

Impacts to land use would be similar to the proposed project.

Noise

No dam remediation would be necessary therefore decreasing the amount of construction required and the noise generated.

Public Safety

Construction hazards within the park would be less than the proposed project since no dam construction would occur.

Public Services and Utilities

Impacts to public services and utilities would be greater than to the proposed project. MWD has the ability to use the Perris reservoir for its storage capacity. Although, MWD could operate its system without Lake Perris, the additional emergency storage remains available to them. Reducing this storage would pose a greater impact to water service reliability.

Recreation

Water-sport activities would be constrained under this alternative since the surface area of the lake would be decreased. Recreational facilities would require modifications to accommodate the new shoreline of the smaller lake. Impacts to the hunting and fishing opportunities would be similar to the proposed project.

Traffic

Impacts to traffic from construction would be similar to the proposed project.

Summary

The Recreation Alternative would not require the construction of the new dam and would therefore have different impacts than the proposed project. The impacts to air quality would be decreased due to less construction. Impacts to biological resources would be similar to the proposed project since the riparian areas would be re-emerge following completion of the project. Table 6-2 summarizes the impacts associated with this alternative.

Dam Decommissioning Alternative

The Reconnaissance Study includes one scenario for draining the reservoir and decommissioning the dam. The decommissioning of Perris Dam would require draining the reservoir, removing the outlet tower, and retrofitting the dam to prevent impounding storm water runoff. It is assumed that much of the earthen dam would remain in place. MWD would continue to serve customers via the Santa Ana Pipeline, but would not be able to use the reservoir for emergency storage.

Ability to Meet Project Objectives

The Dam Decommissioning Alternative would only meet the project objectives that pertain to minimizing seismic hazards, restoring public safety, meeting seismic standards, and maintaining SWP delivery commitments. The removal of impounded water would eliminate the potential dam failure hazard. Table 6-1 summarizes the ability of the Dam Commissioning Alternative to meet the project objectives.

Impact Assessment

Aesthetics

Under this alternative, potential impacts to long-range views from the stability berm would be eliminated. However, draining the lake would significantly change the character of the area.

Air Quality

Under this alternative the significant and unavoidable construction emissions identified for the proposed project would be largely avoided. However, the dry lake bed could generate fugitive dust emissions until vegetation is reestablished, which could take several years in the arid region.

Biology

Impacts to biological resources from construction of the proposed project would be avoided, including the removal of riparian habitat at the toe of the dam. However, draining the lake would remove the water source for the entire riparian habitat in the area, which would result in the elimination of the surrounding riparian habitat. This could significantly affect the federally listed least Bell's vireo. The desert habitat would eventually re-vegetate the lake bed, but the riparian habitat would be eliminated permanently, resulting in significant impacts to biological resources. The value of the lake to fisheries and water fowl would be entirely eliminated, resulting in a significant impact of the project.

Cultural Resources

Potential impacts to unknown cultural resources would be avoided with the elimination of earth moving activities.

Geology

Decommissioning the dam and draining the lake would eliminate the potential hazard of dam failure from seismic events. Impacts to the unique geologic features within the Bernasconi Hills would be avoided.

Hazardous Materials

Potential impacts from hazardous materials would be less than the proposed project since excavation would be substantially avoided.

Hydrology

Draining the lake would substantially reduce groundwater recharge and would lower the water table downstream. This would significantly affect water supply in the communities downstream from the dam. Storm water draining into the former lakebed would need to be channeled downstream of the dam. This would require constructing storm drain facilities to connect with the Perris Valley Storm Drain.

Land Use

Decommissioning the dam would remove recreational uses at Lake Perris SRA. This would significantly affect the State Parks facility. Impacts to the Fairgrounds would be avoided.

Noise

Under this alternative construction noise would be avoided.

Public Safety

This alternative would eliminate hazards of potential dam failure.

Public Services and Utilities

Decommissioning the Perris Dam would remove the reservoir's water supply functions, which include providing emergency standby storage and domestic drinking water supply. MWD has the ability to use the Perris reservoir for its storage capacity. Although, MWD could operate its system without Lake Perris, the additional emergency storage remains available to them. Reducing this storage would pose a greater impact to water service reliability.

Recreation

Under this alternative, water-based recreation would no longer be available. Land-based recreation opportunities would remain following restoration of the area. This would be a significant impact to recreational opportunities in the region.

Traffic

Construction traffic would be eliminated under this alternative.

Summary

The decommissioning of Perris Dam would avoid significant impacts to air quality resulting from the proposed project, but it would result in additional significant impacts to aesthetics, biological resources, land use, drainage, public utilities, and recreation. As a result, this alternative was not considered further. Table 6-2 summarizes the impacts associated with this alternative.

6.2.2 Outlet Tower Alternative

Tower Retrofit

This alternative would include the seismic retrofit of the existing outlet tower. The retrofit would include updating the tower structure to meet current seismic criteria.

Ability to Meet Project Objectives

The Tower Retrofit Alternative would meet the project objectives associated with tower improvements, including upgrading the tower to meet current seismic standards; minimizing the risks associated with seismic hazards affecting the tower; and thereby generally improving public safety. **Table 6-1** summarizes the ability of the Outlet Tower Alternative to meet the project objectives.

Impact Assessment

Aesthetics

Retrofitting the tower would involve underwater and underground construction activities. Therefore, this alternative would not have any aesthetic impacts because the construction would not obstruct views of the area.

Air Quality

This alternative would result in similar air emissions from construction equipment and delivery trucks.

Biology

The underwater construction necessary for this alternative could temporarily affect aquatic resources at the base of the tower. However, these effects would not be considered significant.

Cultural Resources

Retrofitting the tower would not affect cultural resources.

Geology

Retrofitting the tower would not affect geology.

Hazardous Materials

Potential impacts from hazardous materials would be similar to the proposed project.

Hydrology

Under water construction could affect water quality due to increased turbidity. This effect would be temporary.

Land Use

Retrofitting the tower would not have an impact on land use.

Noise

This alternative would avoid the need for blasting which would reduce noise impacts of the proposed project.

Public Safety

This alternative would meet the objective of eliminating potential seismic hazards.

Public Services and Utilities

The alternative would not affect public services or utilities.

Recreation

During construction activities for this alternative, water-based recreational activities would not be allowed near the tower. This would be a temporary impact.

Traffic

Retrofitting the tower would have similar traffic impacts as the proposed project.

Summary

Retrofitting the outlet tower would reduce temporary construction impacts associated with the proposed project including noise. However, the contribution to potentially significant construction air emissions would be similar to the proposed project.

6.2.3 Emergency Outlet Extension Alternatives

Fully Covered Outlet Extension Alternative

Under this alternative, the proposed emergency outlet extension would be constructed similar to the proposed project's underground emergency outlet extension alternative, except that the extension would be fully covered its entire length.

Ability to Meet Project Objectives

This alternative would meet project objectives associated with the proposed emergency outlet extension including reducing risks associated with seismic hazards and improving public safety, by channeling emergency releases from the dam away from development below the dam site. Table 6-1 summarizes the ability of the Fully Covered Outlet Extension Alternative to meet the project objectives.

Impact Assessment

Aesthetics

This alternative would reduce aesthetic impacts of the proposed project by placing the emergency outlet tower underground and out of site of local views for its entire length.

Air Quality

This alternative would result in similar air quality impacts.

Biology

Impacts to biological resources would be similar to the proposed project.

Cultural Resources

This alternative would have similar impacts to cultural resources as the proposed project.

Geology

This alternative would have similar impacts to geology as the proposed project.

Hazardous Materials

Potential impacts from hazardous materials would be similar to the proposed project.

Hydrology

This alternative would have similar impacts to hydrology as the proposed project.

Land Use

Under this alternative, land use impacts along Ramona Expressway would be reduced.

Noise

The alternative would have similar impacts to noise as the proposed project.

Public Safety

After the construction of the project, the increased durability of the outlet extension would meet the project objectives for increased public safety.

Public Services and Utilities

Under this alternative impacts to public services and utilities would be the same as the proposed project.

Recreation

Under this alternative, impacts to recreation would be similar to the proposed project.

Traffic

Under this alternative impacts to traffic would be the same as the proposed project.

Summary

Under the Fully Covered Outlet Extension Alternative impacts would be similar to the proposed project except that the final segment of the extension would also be underground, reducing impacts to aesthetics and land use.

6.3 No Project Alternative

The No Project Alternative assumes the proposed Perris Dam Remediation Program would not occur. This alternative would assume that the existing lowered level of Lake Perris would remain at an elevation of 1,563 feet. No additional project elements, such as the emergency outlet extension and outlet tower would be constructed.

Ability to Meet Project Objectives

The No Project Alternative would not meet any of the project objectives. The seismic upgrade to meet current standards would not occur; a reduced safety risk associated with seismic hazards would not be achieved; enhanced and restored public safety would not be achieved, and recreational uses at Lake Perris SRA would not be maximized. Table 6-1 summarizes the ability of the No Project Alternative to meet the project objectives.

Impact Assessment

This Alternative would result in the permanent lowering of the water surface elevation to the existing condition of 1563 feet, which would reduce the potential dam inundation area in the

event of a maximum probable earthquake. No short term construction related impacts would result under this alternative because no construction activities would occur. Permanently maintaining the water surface elevation at 1563 feet would result in long-term and potentially significant impacts to biological and recreational resources. Furthermore, a release of emergency overflow water would not be contained in a channel as compared to the proposed project. Thus, this alternative could result in flood hazards.

6.4 Alternative Borrow Area Location

DWR has proposed the use of the lake bed for the source of material for the stability berm since the area is readily accessible, the site is owned by DWR, the material is suitable, and its use would minimize impacts of hauling the material from an off-site location. The original dam was constructed from a borrow area in the lake bed that is currently below the water level.

The preferred borrow site for the material needed for the stability berm (the site currently proposed) is located on the northeast end of the lake. The borrow material would be excavated from the lake bed that was exposed as a result of the 25-foot drawdown imposed as an interim safety measure at the end of 2005. The material would be transported to the construction site via a haul road constructed mostly on the lake bed and around the south side of the lake, near the left abutment. Approximately two miles of temporary haul road would be constructed on the exposed lake bed, and less than a mile of haul road would be constructed outside the rim of the lake to traverse up and over the rock slope near the left abutment. The equipment used for the excavation and transport would likely include excavators at the borrow site and off-highway trucks for the transportation of the material to the construction site. DWR staff provided a rough estimate of $6/cy for excavating and transporting material to the berm site, producing a total material cost of $10.5 million for the preferred borrow site (DWR, 2009).

The Alternative Borrow Area Location would be located within a 20-mile radius of Lake Perris, at an aggregate mine capable of producing the required volume of fill materials. Although several quarries exist within a 20-mile radius of Lake Perris, transporting the estimated two million cubic yards of material over local roadways would result in significant damage to the roads. The Alternative Borrow Area Location would require the use of state highways to transport the material to the site, and would therefore significantly impact local traffic (i.e., level of service and safety on roadways) and air quality, but would not impact local habitat as the preferred borrow site would. An estimate of the cost of the Alternative Borrow Area Location assumed a 20 mile haul distance, 12 cy capacity truck, $100/hr trucking rate, and $4/cy material cost. Utilizing these parameters, DWR estimated the cost of material acquisition and transport to be approximately $16.50/cy, for a total cost of approximately $29 million for the Alternative Borrow Area Location (DWR, 2009).

The preferred borrow site would impact shallow water habitat requiring mitigation measures for any permanently lost habitat. The final amount of restoration habitat would be determined after construction. DWR has proposed mitigation to assist in restoring the fishery, including restoration of disturbed areas and the purchase of off-site habitat at a 1:1 ratio, but the success of the restoration is speculative, and may not be effective. Therefore, the EIR acknowledges that loss of

the shallow water habitat is a potentially significant and unavoidable impact to recreational opportunities at the SRA including duck hunting and fishing (Impact 3.12-3).

Utilization of the Alternative Borrow Area Location would eliminate the significant and unavoidable impact related to recreational resources caused by the loss of shallow water habitat, as the Alternative Borrow Area Location would be an existing aggregate mine and thus would not impact any habitat. However, due to the Alternative Borrow Area Location's longer haul distance, more air pollution and increased traffic on local roads would result.

URBEMIS2007 software was used to estimate project related construction emissions for each borrow site alternative (i.e., the preferred borrow site and the Alternative Borrow Area Location). The results of the modeling were compared to the applicable SCAQMD thresholds (Refer to **Table 6-3** and **Table 6-4**). As shown, the Alternative Borrow Area Location would result in greater quantities of all analyzed pollutants. Particularly, the Alternative Borrow Area Location would result in significant increases in ROG such that the selection of the Alternative Borrow Area Location, as opposed to the preferred borrow site, would result in a significant impact in ROG emissions. In addition, while emissions of NOx would be significant in either borrow site, NOx emissions resulting from the Alternative Borrow Area Location would be considerably increased. Furthermore, it is important to note the differences in CO_2 emissions. The Alternative Borrow Area Location would generate 115,201 lbs/day more CO_2 than the proposed borrow site, which equates to seven times more CO_2 than the proposed borrow site. Thus, with respect to air quality, the Alternative Borrow Area Location would result in significant increases in air quality impacts, as compared to the proposed borrow site.

TABLE 6-3
PROPOSED BORROW SITE CONSTRUCTION EMISSION ESTIMATES (LBS/DAY)

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
2009 TOTALS (lbs/day unmitigated)	13.96	169.50	68.97	0.17	1,120.63	239.31	20,095.05
2010 TOTALS (lbs/day unmitigated)	13.03	155.29	63.51	0.17	1,119.90	238.63	20,095.01
SCAQMD Regional Significance Threshold	75	100	550	--	150	75	--
Potential Impact	No	Yes	No	NA	Yes	Yes	NA

TABLE 6-4
ALTERNATIVE BORROW AREA LOCATION CONSTRUCTION EMISSION ESTIMATES (LBS/DAY)

	ROG	NOx	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
2009 TOTALS (lbs/day unmitigated)	83.76	1,098.84	425.61	1.24	1,163.31	276.31	135,296.51
2010 TOTALS (lbs/day unmitigated)	77.99	1,001.83	388.54	1.24	1,158.39	271.78	135,296.47
SCAQMD Regional Significance Threshold	75	100	550	--	150	75	--
Potential Impact	Yes	Yes	No	NA	Yes	Yes	NA

The environmental impacts associated with on and off-site borrow sources include lost habitat, increased traffic, and increased air pollution. The net cost of environmental mitigation for each alternative have not been estimated however, based on cost estimates provided by DWR, the material and labor cost alone for the currently proposed borrow site is $18.5 million less than the Alternative Borrow Area Location. If the net costs of environmental impacts were included, the currently proposed borrow site may be even more economically attractive.

6.5 Environmentally Superior Alternative

CEQA requires that an EIR identify an environmentally preferred alternative (*CEQA Guidelines* Section 15126.6[e][2]). The Increased Dam Capacity Alternative would provide the potential for greater water storage in the region. However, raising the dam and constructing new saddle dams would significantly increase the construction impacts associated with the proposed project. Impacts to air quality, noise, traffic, and biological resources would each increase significantly. Land uses would be altered due to the larger lake that would accommodate increased water-related recreation activities. The No Project Alternative, the Dam Decommissioning Alternative, and the Recreation Alternative would eliminate the significant impact to air quality resulting from the proposed project. However, the Recreation Alternative and the Dam Decommissioning Alternative, along with the Reduced Dam Capacity Alternative would each result in significant impacts to biological resources since the riparian areas would be eliminated or significantly reduced in size. These three alternatives also would significantly impact recreational uses of the lake due to reductions in lake surface area. For these reasons, the proposed project is the environmentally superior dam remediation alternative.

The Outlet Tower Retrofit Alternative would avoid impacts associated with blasting. Otherwise, it could increase water quality impacts during construction. Other construction impacts would be similar. Due to potential water quality impacts during construction for the retrofit alternative, the proposed project is considered the environmentally superior outlet tower alternative.

The Open Channel Outlet Extension Alternative would not avoid any of the significant impacts of the proposed project and would increase impacts to aesthetics, biology, land use, and recreation. The Fully Covered Outlet Extension would lessen impacts to aesthetics, land use, and recreation relative to the proposed project, and would therefore be considered the environmentally superior outlet extension alternative.

CHAPTER 7
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CHAPTER 8
Acronyms

AB 32	Assembly Bill 32
af	Acre-Feet
AGR	Agricultural Water Supply
amsl	Above Mean Sea Level
APE	Area of Potential Effect
AQMP	Air Quality Management Plan
ASTM	American Society for Testing and Materials
ATF	U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives
Basin	South Coast Air Basin
BMP	Best Management Practice
BO	Biological Opinion
BSMWC	Box Springs Mutual Water Company
c.	Circa
Cal-EPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CDL	Commercial Driver License
CDSM	Cement-Deep-Soil-Mixing
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFC	Chlorofluorocarbon
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second

CH_4	Methane
CIP	Capital Improvements Project
CMP	Congestion Management Program
CN	Commercial Neighborhood
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO_2	Carbon Dioxide
CO_2E	Carbon Dioxide Equivalents
COLD	Cold Freshwater Habitat
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
cy	Cubic Yards
DAA	District Agricultural Association
dB	Decibel
dBA	A-weighted decibels
DOT	U.S. Department of Transportation
DPM	Diesel Particulate Matter
DPR	California Department of Parks and Recreation
Draft EIR	Draft Environmental Impact Report
DSOD	Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EIR	Environmental Impact Report
EMWD	Eastern Municipal Water District
EOP	Emergency Operations Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Floor Area Ratio
FCAA	Federal Clean Air Act
FCAAA	Federal Clean Air Act Amendments
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FMMP	Farmland Mapping and Monitoring Program

FTA	Federal Transit Administration
g	Gravity
GHG	Greenhouse Gas
GWP	Global Warming Potential
GWR	Groundwater Recharge
H:V	Horizontal to Vertical
H_2O	Water Vapor
HAP	Hazardous Air Pollutants
HCP	Habitat Conservation Plan
HDPE	High-density Polyethylene
HFCs	Hydrofluorocarbons
HMMD	Hazardous Materials Management Division
HOV	High Occupancy Vehicle
HRA	Health Risk Assessment
HRI	Historic Resources Inventory
Hz	Hertz
I-5	Interstate 5
I-10	Interstate 10
I-215	Interstate 215
IA	Implementation Agreement
IND	Industrial Service Supply
JPA	Joint Powers Authority
Kgr	Weathered Granite Bedrock
LCFS	Low Carbon Fuel Standard
Ldn	Ambient Noise Level
LDR	Low Density Residential
LUST	Leaking Underground Storage Tank
M	Richter Magnitude
MBTA	Federal Migratory Bird Treaty Act
MCE	Maximum Credible Earthquake
Metropolitan	Metropolitan Water District of Southern California
Mmax	Maximum Moment Magnitude
MMT	Million Metric Tons
$MMTCO_2E$	Million Metric Tons of Carbon Dioxide Equivalent
mph	Miles per Hour

MPO	Metropolitan Planning Organization
MSHCP	Multiple Species Habitat Conservation Plan
msl	Mean Sea Level
MUN	Municipal and Domestic Water Supply
Mw	Moment Magnitude
MWD	Metropolitan Water District of Southern California
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCCP	Natural Communities Conservation Plan Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Preservation Act
NOC	Notice of Completion
NOP	Notice of Preparation
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O_3	Ozone
OCAP	Operating Criteria Plan
OHP	Office of Historic Preservation
OHWM	Ordinary High Water Mark
OPR	Office of Planning and Research
OS	Open Space
OS-C	Open Space Conservation
OS-CH	Open Space Conservation Habitat
OSHA	Occupational Safety and Health Administration
OS-R	Open Space Recreation
OS-W	Open Space Water
PAH	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PCV	Polyvinyl Chloride
PF	Public Facilities
PFCs	Perfluorocarbons
PGA	Peak Ground Acceleration
PM 10	Particulate Matter Less than 10

PM 2.5	Particulate Matter Less than 2.5
ppm	Parts per Million
PPV	Peak Particle Velocity
PQP	Public and Quasi-Public Lands
PRC	Public Resources Code
PRMMP	Paleontological Resource Monitoring and Mitigation Plan
PROC	Industrial Process Supply
PUC	Public Utilities Code
Qal	Alluvial Soil
RCA	Regional Conservation Authority
RCFCWCD	Riverside County Flood Control and Water Conservation District
RCHCA	Riverside County Habitat Conservation Agency
RCIP	Riverside County Integrated Project
RCPG	Regional Comprehensive Plan and Guide
RCRA	Resource Conservation and Recovery Act
RCSD	Riverside County Sheriff's Department
RCTC	Riverside County Transportation Commission
REC1	Body Contact Recreation
REC2	Non-Body Contact Recreation
RMS	Root Mean Square
ROG	Reactive Organic Gases
RR	Rural Residential
RTA	Riverside Transit Authority
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
State Parks	California Department of Parks and Recreation
SBVMWD	San Bernardino Valley Municipal Water District
SBVWCD	San Bernardino Water Conservation District
SC	Clayey Sands
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SF6	Sulfur Hexafluoride
SGPWA	San Gorgonio Pass Water Agency
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan

SKR	Stephens' Kangaroo Rat
SM	Silty Sands
SMBRP	State Mitigation and Brownfields Reuse Program
SP-SM	Poorly Graded Sand
SR 60	State Route 60
SR 70	State Route 70
SRA	State Recreation Area
SVP	Society of Vertebrate Paleontology
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	Toxic Air Contaminants
TMDL	Total Maximum Daily Load
UBC	Uniform Building Code
UN	United Nations
U.S.	United States
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Services
UST	Underground Storage Tank
Vdb	Decibel Notation
VMT	Vehicle Miles Traveled
vpd	Vehicles per Day
vph	Vehicles per Hour
W-2	Controlled Development Areas
WARM	Warm Freshwater Aquatic Habitat
WILD	Wildlife Habitat
WSJGB	West San Jacinto Groundwater Basin

CHAPTER 9
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Appendix A

Notice of Preparation and Response to NOP

ESA

NOTICE OF PREPARATION
DWR Perris Dam Remediation Project EIR

To: Calif. Office of Planning and Research
Responsible and Trustee Agencies
Other Interested Parties

Subject: Notice of Preparation of Environmental Impact Report

Project: Perris Dam Remediation Project

Lead Agency: Department of Water Resources

Date: June 1, 2007

This Notice of Preparation (NOP) has been prepared to notify agencies and interested parties that the Department of Water Resources (DWR) as the Lead Agency is beginning preparation of an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the proposed Perris Dam Remediation Project. Perris Dam, which impounds Lake Perris, is located 15 miles south of the City of Riverside in Riverside County approximately 65 miles east of Los Angeles. DWR has identified potential seismic safety risks in a section of the foundation of Perris Dam. There is no imminent threat to life or property. DWR is proposing to upgrade the dam by removing and replacing foundation material along a portion of the dam toe and adding a stability berm. The proposal includes installing soil-cement columns beneath some of the replaced foundation by means of deep soil mixing. In addition, DWR is proposing to replace the outlet tower and construct a new release channel to provide safe carriage of emergency drawdown flows.

DWR is soliciting the views of interested persons and agencies as to the scope and content of the environmental information to be studied in the EIR. In accordance with CEQA, agencies are requested to review the project description provided in this NOP and provide comments on environmental issues related to the statutory responsibilities of the agency. The EIR will be used by DWR when considering approval of the Perris Dam Remediation Project.

In accordance with the time limits mandated by CEQA, comments to the NOP must be received by DWR no later than 30 days after publication of this notice. We request that comments to this NOP be received no later than July 2, 2007. Please send your comments to the address shown below.

Please include a return address and contact name with your comments. Please send comments via mail or email to the address show below:

c/o Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

Email: tbarnes@esassoc.com
Telephone: 213-599-4300

A public meeting will be held to receive public comments and suggestions on the project. The scoping meeting will open to the public and held at the following location:

Harrison Hall
Lake Perris Fairgrounds
18700 Lake Perris Dr.
Perris, CA 92571

Wednesday, June 20, 2007 at 5:00 pm

PROJECT LOCATION

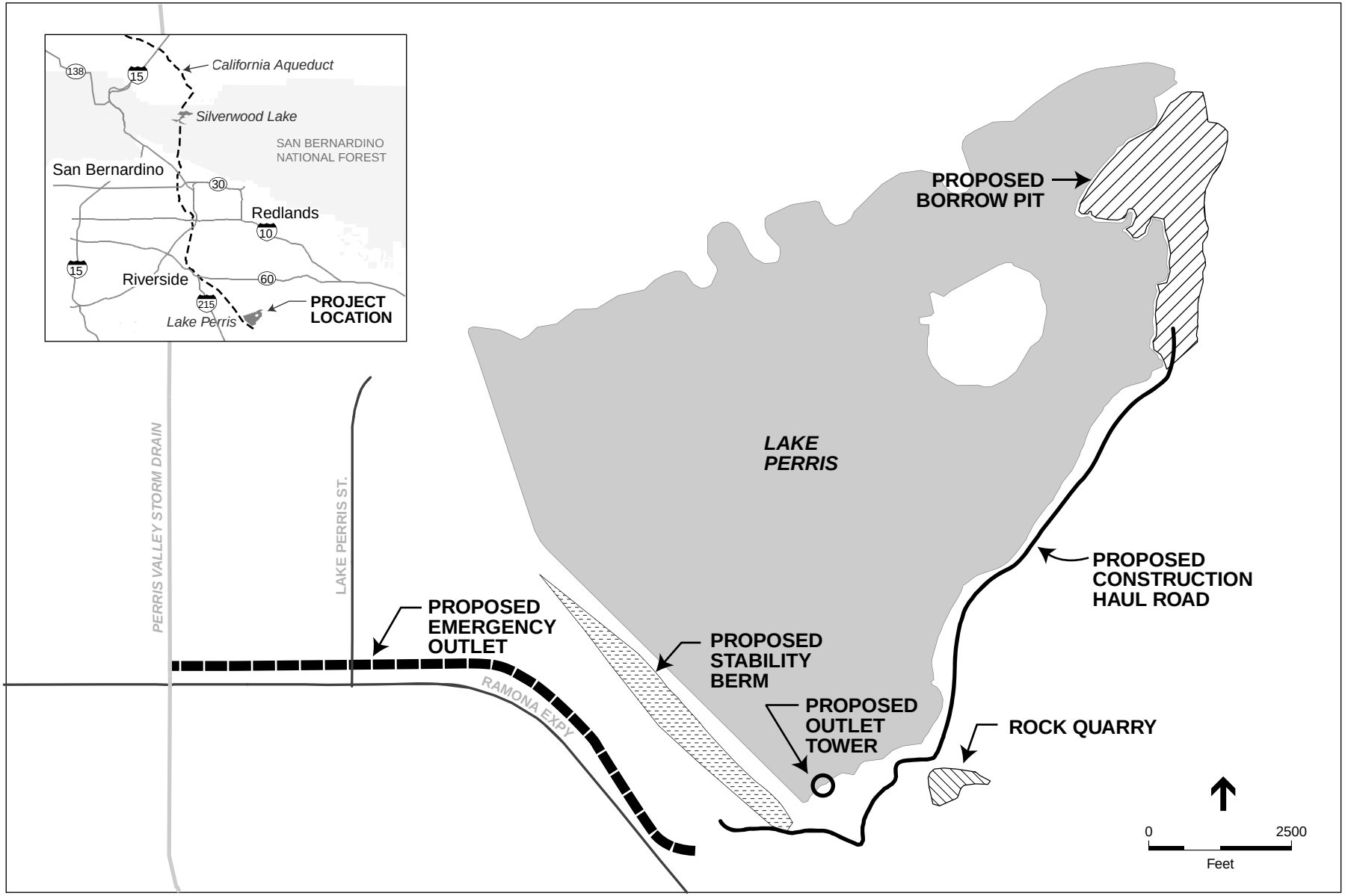
The Department of Water Resources (DWR) operates the State Water Project (SWP), which supplies water to numerous communities and millions of people throughout California. The SWP includes an extensive system of aqueducts and pipelines that convey water from the Feather River and Sacramento River watersheds through the Central Valley, terminating at Lake Perris in Riverside County (**Figure 1**). Lake Perris is entirely within the Lake Perris State Recreation Area (LPSRA) located between the cities of Moreno Valley and Perris in an unincorporated area of Riverside County, approximately 15 miles south of the City of Riverside and 65 miles east of the City of Los Angeles.

PROJECT BACKGROUND

Perris Dam is an earthfill dam completed in 1974 that impounds the Lake Perris reservoir. The dam and lake are owned and operated by DWR, in cooperation with the Metropolitan Water District of Southern California (MWDSC), which supplies water for municipal and industrial uses throughout southern California. Water is conveyed from the East Branch Aqueduct of the SWP to Lake Perris via the Santa Ana Valley Pipeline. Lake Perris has a capacity of approximately 127,000 acre-feet (af) and a surface area of 2,292 acres when filled to normal design capacity, with a pool elevation of 1,588 feet above mean sea level (AMSL).[1] The dam crest elevation is 1,600 feet AMSL. Lake Perris is a multi-purpose reservoir used for water supply, recreation, fish and wildlife habitat, and emergency water storage. The recreational opportunities at Lake Perris include swimming, boating, camping, hunting, fishing, horseback riding, hiking, rock climbing, and bird and animal watching. The LPSRA has approximately 1.1 million visitors each year.

In 2005, DWR completed a geotechnical investigation and seismic assessment of Perris Dam and concluded that the southeastern reach of the dam, (the “left reach”), is underlain by soil lenses prone to liquefaction. During strong seismic-related shaking, these soils could cause earthquake-induced deformation of the dam. The deformations could lower the dam crest enough to allow overtopping. As a safety precaution, the lake has been drawn down to a maximum elevation of 1,563 feet AMSL, resulting in a current surface area of 1,882 acres. This water level restriction results in a capacity loss of approximately 52,000 af, leaving the reservoir operating at approximately 60 percent of its normal capacity.

[1] The elevations stated in this document are based on the National Geodedic Vertical Datum of 1929 which was used for the original construction of the dam. This remediation project will use NAVD 88. The difference is about 2.5 feet.



SOURCE: Street Map USA; ESA, 2007.

DWR - Perris Reservoir NOP . 206008

Figure 1
Perris Dam
Remediation Construction Area

PROJECT OBJECTIVES

The objectives of the proposed project are as follows:

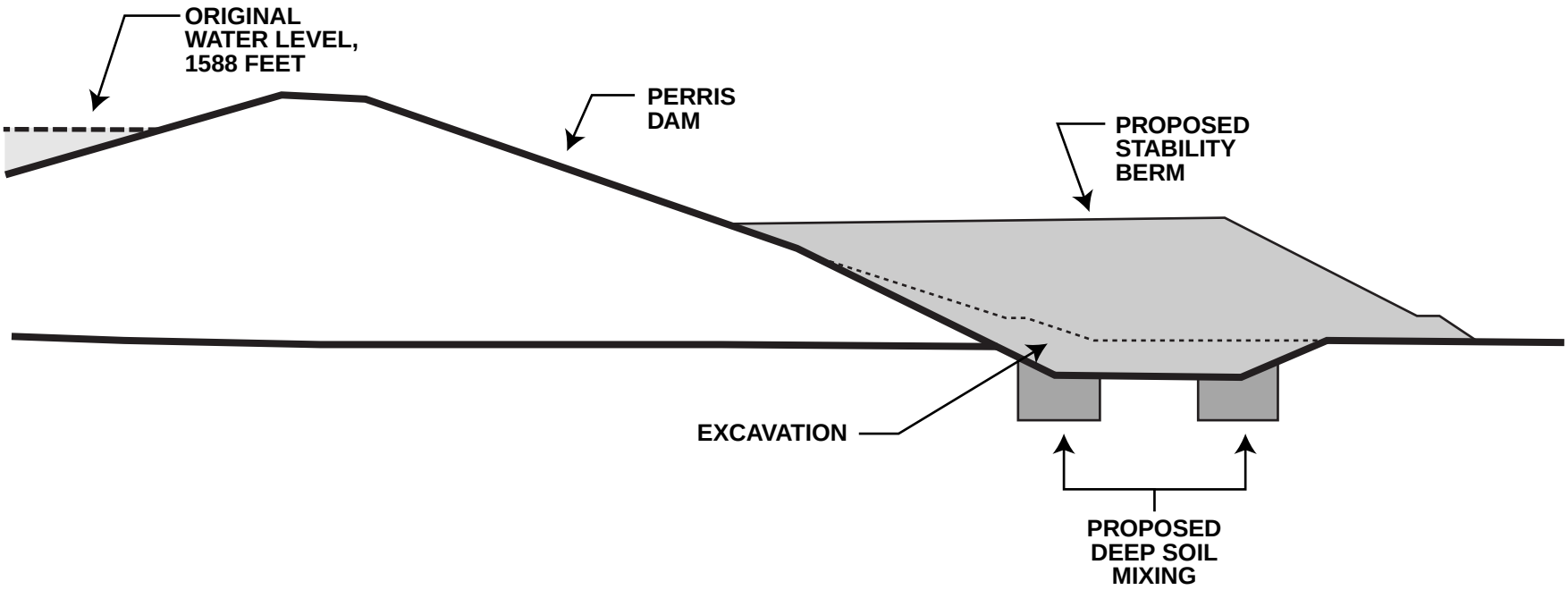
- Upgrade SWP infrastructure to meet current seismic standards in an economical and environmentally sound manner;
- Minimize the risks associated with seismic hazards;
- Enhance and restore public safety within the lake area and downstream of the dam;
- Protect, upgrade and restore the water delivery system;
- Maximize the beneficial uses of the LPSRA by restoring the reservoir to its pre-drawdown water levels.

PROJECT DESCRIPTION

The Perris Dam Remediation Project includes three separate projects as described below: (1) Perris Dam Remediation Project, (2) Outlet Tower Retrofit, and (3) Emergency Outlet Release Facility. All three projects will be constructed without draining the lake in an effort to maintain the beneficial uses of the State Recreation Area.

Perris Dam Remediation Project

Perris Dam is an earthfill embankment that is 11,600 feet long and has a maximum height of 128 feet above original ground level. The embankment contains approximately 20 million cubic yards of compacted fill. DWR proposes to seismically upgrade the dam by improving the foundation material with deep soil mixing methods, excavating the toe of the dam to remove the liquefiable foundation material, replacing it with re-compacted engineered fill, and then constructing a stability berm on top of the replaced foundation. This remediation strategy will allow Perris Lake to return to its previous maximum operating pool elevation of 1,588 feet AMSL after construction. The blocks of soil-cement columns will be installed in the deepest and most liquefiable alluvial materials beneath the replaced foundation soil, as shown in **Figure 2**. Deep soil mixing increases the stability of the soil and reduces the hazards associated with deep excavations. Following deep soil mixing, the groundwater will be lowered by an array of pumping wells to facilitate the excavation and replacement of the uppermost liquefiable soils. Re-compaction is the most reliable method for improving liquefiable soils. A stability berm will be constructed atop the re-compacted foundation along the downstream toe of the dam as shown schematically in **Figure 2**. The berm would consist of approximately 2 million cubic yards of soil and 1 million tons of rock. As shown in **Figure 1**, the soil will be excavated from within the lakebed at the east end of the lake, and the rock will be quarried from the original rock quarry south of the lake in Bernasconi Hills.



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Feet

SOURCE: Department of Water Resources, 2007.

DWR - Perris Reservoir NOP . 206008

Figure 2
Perris Dam
Cross Section

To convey the soil and rock to the downstream face of the dam, a haul road will be constructed from the east side of the lake, along the lakebed on the south side of the lake, and over a low spot on the Bernasconi Hills near the dam's left abutment.

Outlet Tower Retrofit

The outlet tower, built in the early 1970s, is a 105-foot tall, freestanding structure constructed in the lake near the left abutment of the dam. The tower contains 10 hydraulically operated 72-inch valves located at each of five equally spaced levels between elevation 1,503 and 1,567 AMSL with two valves at each location. The tower was constructed of reinforced concrete and is circular in cross section with an inside diameter of 26 feet and an outside diameter of 31 feet. The tower releases water from five selected levels to a 150-inch diameter horizontal tunnel at its base. The function of the outlet facility is to convey water to MWD's delivery facility just southwest of the eastern abutment of the dam and to have the ability to release water from the lake when required during emergencies for the safety of the dam. The structural integrity of the tower was evaluated in 2006 and was found to be deficient in shear capacity under current seismic loading which can cause a failure of the structure.

To remediate the stability of the tower, DWR evaluated options to either retrofit the existing tower or construct a new facility on land near the current tower. DWR is proposing to construct a new tower and abandon the old tower because retrofitting the original structure was found to be not feasible. The new outlet facility would be located approximately 400 feet from the existing tower. An area on the eastern shore between the hill and the lake would be excavated and the new tower constructed using dry construction methods (**Figure 1**). Once constructed, the excavation area would be extended by removing the soil plug at the edge of the lake to form an approach channel that would connect the new outlet structure to the lake.

Emergency Outlet Release Facility

When Perris Dam was initially constructed, there was little development between the dam and the Perris Valley Storm Drain. The dam's emergency release facilities were designed and constructed to release 3,800 cubic feet per second (cfs) of water downstream of the dam, allowing the water to form its own overland channel and resulting in an inundation area of 2,700 acres. Over time, the areas downstream of the dam were developed with residential land uses that could be affected should the emergency release facilities be needed. Currently, water released from the dam in an emergency could flood downstream residents because there is no conveyance to contain or direct the emergency flows.

The existing emergency outlet facility consists of a rectangular pipe (12 feet by 6 feet), slide gate, and bulkhead, capable of releasing a maximum of 3,800 cfs. The existing emergency outlet facility does not include a conveyance structure to

contain the water once released. As currently designed, any water released from the emergency outlet would form its own overland channel. DWR is proposing to either retrofit the existing valve or add a new valve to reduce emergency releases to a maximum 1,500 cfs. DWR would also construct a new emergency outlet conveyance channel that would completely contain and convey the maximum release from the dam to the Perris Valley Storm Drain. The new channel would cover a distance of approximately two miles and would skirt the north edge of the existing Ramona Expressway. **Figure 1** identifies the proposed route of the discharge channel.

PROJECT ALTERNATIVES

Following the drawdown of Lake Perris in 2005, DWR and its water contractors evaluated options for the long-term operation of the dam and reservoir. Each evaluation took into account the three principal project areas: dam structural remediation, outlet tower retrofit, and emergency release facilities. Four major options were studied: (1) enlarging the existing dam to Elevation 1,640 feet AMSL, (2) retrofitting the existing dam to return the water level to Elevation 1,588 feet AMSL, (3) retrofitting the existing dam and modifying the storage capacity to stay at Elevation 1,563 feet AMSL, and (4) retrofitting the existing dam and modifying the storage capacity to Elevation 1,540 feet AMSL. DWR is currently proceeding with option number two above. The EIR will describe the alternatives considered and explain the screening criteria that were used to select the preferred alternative.

DISCUSSION OF IMPACTS

The EIR will assess the physical changes to the environment that would likely result from construction and operation of the Perris Dam Remediation Project, including direct, indirect and cumulative impacts. Potential impacts of the proposed project are summarized below. The EIR will identify mitigation measures if necessary to minimize potentially significant impacts of the proposed project.

Aesthetics

The aesthetic qualities of the project areas, which lie entirely within the Lake Perris State Recreation Area (LPSRA), include both natural and human-dominated features. The recreation area includes the 2,300 acre reservoir and 6,000 acres of the neighboring Russell Mountains and Bernasconi Hills. The park attracts over a million visitors annually for its water recreation and surrounding natural beauty. The proposed project would permanently alter the dam and outlet tower area. However, the character and visual conditions of the LPSRA would not change significantly. Local aesthetics may be temporarily impacted during construction. The EIR will evaluate the proposed project for impacts related to aesthetic resources, including consistency of the project with the Riverside County General Plan, local ordinances and state and federal regulations.

Air Quality and Global Warming / Climate Change

The proposed project is located within the South Coast Air Basin. Construction of the proposed project would generate emissions from construction equipment exhaust, earth movement, construction workers' commute, and material hauling. The EIR will evaluate the effects of construction activities on air quality as well as potential impacts on global warming and climate change. The EIR will develop mitigation measures if necessary to reduce the level of impact.

Biological Resources

The LPSRA encompasses a variety of wildlife habitats and is home to a wide diversity of plant and animal species. The project area includes important desert and riparian habitat for several threatened or endangered species including, but not necessarily limited to, the Stephens kangaroo rat (*Dipodomys stephensii*), the Least Bell's vireo (*Vireo bellii pusillus*) and the Southwestern willow flycatcher (*Empidonax traillii extimus*). Construction of the berm may remove portions of the 30 acres of woodland/riparian vegetation located in three segments at the foot of the dam. These riparian areas currently exist due to subsurface seepage from the reservoir. Construction will avoid direct impacts to the riparian habitat located on the northeast shore of the lake. This habitat is currently being maintained with a temporary irrigation system installed to minimize adverse effects while the lake elevation is lowered. The EIR will evaluate the potential impact of the proposed project on sensitive species and critical habitats including the existing riparian vegetation. The LPSRA is identified in the Riverside County Multi-Species Habitat Conservation Plan (MSHCP) as public/quasi-public lands. The EIR will evaluate the consistency of the proposed project with the MSHCP and the Riverside County General Plan, local ordinances, and state and federal regulations. Mitigation measures will be developed if necessary to adhere to MSHCP requirements and reduce the level of impact where possible.

Cultural Resources

Six archeological sites are known to exist in the vicinity of the project area. Two additional sites are known to be currently inundated by the lake. Excavation from the borrow pit and road construction could uncover previously unknown archaeological or paleontological resources. Other historic resources may exist in the area. The EIR will assess the potential effects of the proposed project on cultural resources at Perris Dam and Lake. Mitigation measures will be developed if necessary to reduce the level of impact where possible.

Geology and Soils

The proposed project is located in a seismically active region. The objective of the project is to reduce seismic hazards posed by the dam. The remediation of Perris Dam will be subject to potential seismic hazards including soil liquefaction associated with ground shaking and potential transverse cracking of the dam. In

addition, construction activities could expose soils to increased erosion. The material used in the new berm will be mined from the lakebed and the adjacent original quarry. The EIR will summarize previous geologic and engineering studies conducted for Perris Dam to evaluate seismic and geologic hazards, and will also evaluate construction impacts to soils and unique geologic features in the region. Mitigation measures will be developed if necessary to reduce potential effects from the proposed project.

Hazards and Hazardous Materials

Excavation activities could uncover contaminated soils or hazardous substances that pose a hazard to human health or the environment. The EIR will assess the potential for encountering such hazards at Perris Dam and will develop mitigation measures if necessary to ensure that any hazards encountered during construction would be handled in accordance with applicable regulations.

Hydrology, Groundwater and Water Quality

Perris Lake affects the underlying West San Jacinto Groundwater Basin. Seepage from Perris Lake has been recognized since the dam was constructed. Seepage underneath Perris Dam has been monitored since 1973. Seepage from Perris Lake has significantly raised the local groundwater table and improved groundwater quality downstream of Perris Dam.[2] The EIR will evaluate the impact of the proposed project on surface hydrology, groundwater hydrology, and water quality and will develop mitigation measures if necessary to reduce potential effects to less than significant levels.

Land Use

The proposed project would not permanently affect or change any of the current land uses in the Lake Perris State Recreation Area (LPSRA). Temporary closures could occur along the Southeast shoreline and Bernasconi picnic areas during construction. Rock climbing and the multi-use trail leading from the climbing area could also be temporarily affected by construction. In addition, the emergency release channel would traverse a section of private land, including an existing fairgrounds and motor-cross facility, prior to reaching the Perris Valley Storm Drain. The EIR will evaluate the compatibility of the proposed project with existing and planned land uses in the region and will address strategies for mitigating disturbance to current land uses.

Noise and Light

Construction of the proposed project would generate noise that could affect residences, businesses, recreation areas, and other sensitive receptors near the project site. The EIR will evaluate the proximity of sensitive receptors to the

[2] Department of Water Resources, *Perris Dam Remediation Groundwater Study*, Project Geology Report 58-11-20, August 2006.

project site and recommend mitigation measures if necessary to ensure that the proposed project complies with local policies and ordinances to minimize noise impacts. In addition, Lake Perris and the surrounding region falls within the jurisdiction of the Mount Palomar Nighttime Lighting Policy Area. The lighting requirements protect various wildlife, birds and bats and are covered in the Riverside County General Plan. These requirements may affect night-time work and will be addressed in the EIR.

Population and Housing

Perris Dam is located in an increasingly urbanized section of Riverside County and directly above a growing population center, which includes residential housing and a school. Future population and housing growth in the area may depend upon the careful remediation of the dam. The EIR will describe population growth trends in the Perris Dam area and will assess project compatibility with local growth trends.

Recreation

LPSRA is a California State Park. The lake and neighboring Russell Mountains and Bernasconi Hills lie within park boundaries. Recreational activities at LPSRA would be affected temporarily during construction of the proposed project. However, once construction is complete, recreational activities would return to historic levels, or would even increase due to the enlarged capacity for boating, water skiing and jet skiing which result from the deepened eastern lakebed. The EIR will evaluate the effects of the proposed project on recreation at Lake Perris and surrounding areas and will develop mitigation measures if necessary to reduce impacts to less than significant levels.

Traffic and Transportation

Construction of the proposed project may temporarily affect local transportation corridors. In addition, the March Air Reserve Base has an “Airport Influence Policy Area/Safety Zone Area III” referred to in the Riverside County General Plan with a perimeter and restrictions that may affect work near the toe of the dam. The EIR will evaluate the impact of the proposed project on traffic and circulation at the project site, including restrictions imposed by the Riverside County General Plan. The EIR will develop mitigation measures if necessary to minimize any potential effects.

Matrix of Comments

Commenter, Affiliation	Comment
Kirk Brus, US Army Corps of Engineers	Noted that if a federal interest is part of the subject matter project, then NEPA, the Endangered Species Act, and Section 106 of NHPA must be applied. Also, requested that, if needed, a Clean Water Act 401 Water Quality Certification application/permit be addressed.
Karen Goebel and Dee Sudduth, US Fish and Wildlife Services & CDFG	Requested that the DEIR address not only the impacts to all fish and wildlife resources associated with the dam remediation project, but also include an analysis of impacts to biological resources from lowering of the lake water level. Recommended that the DEIR analyze the potential direct and indirect impacts to species and their habitats. Concerned that the length of time it will take to complete the project will further degraded the least Bell's vireo habitat. Also concerned about the drawdown's impact on the fishery and angular use of the lake. Noted that DWR will need to either obtain take coverage or obtain individual State and Federal permits.
Gregor Blackburn, FEMA	Summarized NFIP floodplain management building requirements: 1) All buildings constructed in floodplain must be elevated above Base Flood Elevation Level; 2) A hydrologic and hydraulic analysis must be performed prior to start of development and must demonstrate that the development would not cause any rise in base flood levels; 3) Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision.
Gary Watts, Department of Parks and Recreation	Concerned that the reduction in recreational opportunities coupled with the long-term construction period is expected to negatively impact the visitor's experience. Requested that the EIR study the change in the character of the park's complex, impact on visitors and species, and effect on the park's recreation activities.
Delaine Shane, Metropolitan Water District of Southern California	Requested a 90 day extension of the review period.
	Requested that additional analysis and discussion be included in the requested areas to allow DWR decisions makers to determine whether this project would result in significant impacts to Metropolitan and its member agencies in providing a reliable supply of water. Requested that potential impacts to MWD's water supply resulting from the proposed project be included in the impact analysis of the Draft EIR. Recommended that the Draft EIR consider, as a feasible alternative, the decommissioning of the reservoir as a public safety measure.
Sheryll Del Rosario, Southern California Association of Governments	Determined that the proposed Project is not regionally significant per SCAG Intergovernmental Review Criteria and CEQA Guidelines.
Steve Smith, South Coast Air Quality Management District	Requested all appendices and technical documents related to air quality analysis be sent with the Draft EIR. Requested that all potential adverse air quality impacts that could occur from all phases of the project be identified. Recommended calculating localized air quality impacts and comparing results to localized significance thresholds. If the project does generated significant adverse air quality impacts, all feasible mitigation measures should be used.
Brad Eckardt, City of Perris	Concerned about the impacts to air quality from mobile sources, such as trucking. Request for an analysis of how construction vehicles will impact roads in the city and an analysis of potential traffic impacts of an increase in recreation at the

Commenter, Affiliation	Comment
	reservoir. Requested that the DEIR address all potential impacts to vibration, noise, glare, and aesthetic on all sensitive receptors in the city. Requested information regarding the capacity of the emergency flow-out channel and its impact on the Fairgrounds. Requested that the DEIR address whether any efforts undertaken to mitigate impact, including irrigation, have proved adequate.
Habib Motlagh, City of Perris	Would like the following items to be considered: 1) The proposed discharge channel along Ramona Expressway shall be coordinated with the adopted Drainage Master Plan. This channel should be utilized for the purpose of emergency discharge as well as the daily drainage purpose; 2) Most of the traffic (construction and otherwise) generated because of your project will be utilizing Ramona Expressway, which is under City of Perris jurisdiction. The traffic report shall address this issue and discuss additional improvements on the proposed route.
Kathleen Dale and John Terell, City of Moreno Valley	Requested that the following issues be addressed: 1) Effects of proposed dewatering on groundwater levels in the project area, including any influence on movement of known areas of groundwater contamination; 2) Changes in inundation limits and depths in the event of a dam failure as a result of proposed improvements.
Teresa Tung, Riverside County Flood Control and Water Conversation	Requested that the EIR evaluate potential direct and indirect impacts to proposed MDP facilities in the project area. Requested that the capacity of the interim Perris Valley Channel to convey the 1500 CFS released from the dam be evaluated. Recommended that a hydrology/hydraulic analysis should fully evaluate any potential impacts to the mapped floodplain. Noted that the project proponent will need to demonstrate that all project related activities within the District right-of-way is consistent with the Multiple Species Habitat Conservation Plan. Also requested that the EIR address potential impacts to jurisdictional features.
George Hague, Sierra Club, San Gorgonio Chapter	Requested that if the lake increases in size over its original size then the DEIR must analyze the impact on plants, animals, and park usage. Would like to know how impacts to the San Jacinto Wildlife will be avoided when Fish and Game owns the land at the west side of the dam's base. Requested the inclusion of accurate maps of both the San Jacinto Wildlife and Lake Perris properties.
Malcolm McCassy, Starwest Motorcross Park	Concerned that the proposed emergency runoff channel would affect the fairgrounds aesthetic value and the marquee sign. Also the channel would eliminate more parking than the businesses could afford to lose.
Don A. Kazarian, Perris Auto Speedway	Requested to minimize adverse impacts from emergency runoff channel.
Ann L. Turner-McKibben, Friends of the N. San Jacinto Valley	Requested that the DEIR examine the extent to which this project will impinge upon the maintenance of wildlife populations on the designated mitigation lands in front of the Lake Perris dam and the proposed rock quarry site in the Bernasconi Hills. Concerned that the cumulative impacts of the project may place the Stephens' Kangaroo Rat in jeopardy of extinction. Concerned that the repair of the seepage problem will eliminate the riparian habitat in front of the dam.
Lou Ochoa, McCanna Ranch Water Company	Concerned about the depth of the repairs and the soil mixing that is proposed. Would like to be assured that the flow of the ancient stream underneath the pre-existing sub-grade to the Dam foundation is not affected.
Vince Agnifili, 46th District Agricultural Association	Concerned about impacts from the emergency runoff channel on business at the fairgrounds. Would like more information regarding the channel and its importance.
Mary Ellen Krut, Cybernet Consulting Inc	Would like the opportunity to discuss how they can contribute to the project's success.

Commenter, Affiliation	Comment
Michael McKibben, geologist	Would like the following concerns to be addressed: 1) The quarry area has overly steep quarry walls that exceed regulation; 2) The Big Rock climbing area has historical and cultural significance and should not be disturbed; 3) The proposed location of the stability berm lies partly within current wetlands and other types of wildlife habitat; 4) By causing rises in the groundwater table, seepage has also significantly increased liquefaction potential in and around the Lake Perris area, particularly in areas where new housing developments are being proposed.
Bob Whitaker, race fan	Requested that the impacts on the racing community in the Perris area be taken into account.
Greg Holmes, Department of Toxic Substances Control	Provided the following recommendations: 1) The EIR should identify the current or historic uses at the project site that may have resulted in a release of hazardous waste/substances; 2) The EIR should identify the known or potentially contaminated sites within the proposed project area. For all identified sites, the EIR should evaluate whether conditions at the site may pose a threat to human health or the environment.
Gerald Zimmerman, Colorado River Board of California	No comment.
Comments from Scoping Meeting: June 20, 2007, 5:00pm, Harrison Hall.	• The concrete channel will be aesthetically unpleasing. • During the construction period, in case of disaster, what are the plans for people living down stream? • Is there a possibility of dam construction failure? • How are citizens notified in case there is an earthquake? • What magnitude seismic event was the dam built to withstand? What will the post-construction dam be able to withstand? • When will the water level be raised? Before 2012? • The new lake rules are causing problems. • How will watercraft manage the drawdown? • In what order will the repairs take place? • Has anyone done studies to find out the consequences of an emergency release? • Will the homes at the base of the dam be safe after construction? • Where will the berm be? • Who bears responsibility of an emergency alarm system? • Will there be any impact on Ramona Expressway traffic? • From a camper's point of view, noise and dust from construction will be disruptive. Has a conveyor system alternative been considered? • Consider combining storm drain in neighboring community with the emergency outlet extension. • Request inclusion of surrounding cities and the fairgrounds in the process. • What is the capacity of the emergency outlet extension? • Could a conveyor system be built to move quarried materials? • The owner of the fairgrounds would like to be kept informed regarding the project. Suggested that the storm drain be used as an alternative so as to not disrupt motocross.
Mark B, Perris City Council Member (comments provided at the Scoping Meeting)	• Feels that the city has been kept out of the loop of the process. Has a level of distrust of the project. • Has a master plan for a community with a drain adjacent to the emergency outlet. • Envisioned this lake to be like Castaic Lake.

Commenter, Affiliation	Comment
	• Would like to participate and requests that the City of Perris be kept in the loop. This will have a tremendous impact on the City.

Hello Tom Barnes:

The US Army Corps of Engineers (Corps) thanks you for mailing the Notice of Preparation (NOP) on the proposed Perris Dam Remediation project.

Comments on the subject matter NOP:

If a federal interest is part of the subject matter project, the National Environmental Quality Act (NEPA) of 1969, as amended (Public Law 91-190) must be applied, as well as compliance with the Endangered Species Act (ESA) of 1973 as amended, and Section 106 of National Historic Preservation Act (NHPA).

If a requirement exists for a Clean Water Act (CWA) 401 Water Quality Certification (WQC) application/permit on the proposed action, please ensure that this is also addressed.

Thank you for considering these NOP comments.

Kirk Brus
Phone 213.452.3876
E-mail: kirk.c.brus@usace.army.mil

Mailing address:

US Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Attn: Kirk Brus (CESPL-PD-RL), Room 1430
Los Angeles, CA. 90053-2325

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
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California Department of Fish & Game
Inland Deserts Region
3602 Inland Empire Blvd., Ste C-220
Ontario, California 91764
(909) 484-0459
FAX (909) 481-2945

In Reply Refer To:
FWS/CDFG-4837.2

JUL 2 2007

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard
Suite 1450
Los Angeles, California 90017

Subj: Notice of Preparation of a Draft Environmental Impact Report for the Department of Water Resources' Perris Dam Remediation Project (SCH # 2007061004), Riverside County, California

Dear Mr. Barnes:

The California Department of Fish and Game (Department) and the U.S. Fish and Wildlife Service (Service), hereafter collectively referred to as the Wildlife Agencies, have reviewed the subject Notice of Preparation (NOP). The proposed project is located at the Lake Perris State Recreation Area between the cities of Moreno Valley and Perris in an unincorporated area of Riverside County, California. The proposed project would seismic retrofit the existing Lake Perris dam by improving the foundation materials though excavation and soil remixing. The project also includes other ancillary project features such as a new or retrofitted outlet tower, new emergency outlet release facility, construction haul road, and borrow site. Upon completion of the dam rehabilitation project, lake levels will be allowed to return to pre-emergency draw down levels.

The Department is responding as a Trustee Agency for fish and wildlife resources [Fish and Game Code sections 711.7 and 1802 and the California Environmental Quality Act Guidelines (CEQA) section 15386] and as a Responsible Agency regarding any discretionary actions (CEQA Guidelines section 15381). The Department is responsible for ensuring appropriate conservation of fish and wildlife resources including rare, threatened, and endangered plant and animal species, pursuant to the California Endangered Species Act, and administers the Natural Community Conservation Planning Program (NCCP). The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service is also responsible for administering the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et seq.).

On June 22, 2004, the Department issued Natural Community Conservation Plan Approval and Take Authorization for the Western Riverside County Multiple Species Habitat Conservation

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Plan (MSHCP), as per Section 2800, et seq., of the California Fish and Game Code. The Service also issued Take Authorization for the MSHCP through a section 10(a)(1)(B) permit. The MSHCP establishes a multiple species conservation program to minimize and mitigate habitat loss and the incidental take of covered species in association with activities covered under the permit. The proposed project occurs within the MSHCP Plan Area and is identified as Public/Quasi-public land.

Based on the Wildlife Agencies review of the NOP and several meetings with the State Department of Water Resources (DWR), we are providing the following comments to assist with your preparation of a draft environmental impact report (DEIR).

Emergency Lake Draw Down

In October 2005, Lake Perris was lowered 25 feet as an emergency measure to protect the public until a means of addressing the seismic vulnerability of the dam could be identified and implemented. In order to implement the proposed project, water levels will need to remain at the lowered condition. Upon completion of the dam rehabilitation project, the water level of the lake will be returned to its original level. It is estimated that it will take six to ten years before Lake Perris water levels are restored. Because the emergency draw down of the lake is interdependent and inter-related to the dam rehabilitation project, the DEIR needs to address not only the impacts to all fish and wildlife resources associated with the dam remediation project, but must also include an analysis of impacts to biological resources from lowering of the lake water level. The baseline for assessing project related impacts needs to be the conditions prior to the lowering of the lake. This is of particular importance as negative affects to the riparian habitats surrounding the lake from the draw down are already evident. Because of the extended period for the lowered lake levels, the DEIR should identify the means to quantify and monitor the riparian habitats overtime, and what measures have, or will be implemented, to offset the impacts associated with the emergency draw down and dam rehabilitation.

State and Federally Listed/Sensitive Species

The proposed project (including the emergency drawdown of the lake and the remediation of the dam) will have the potential to directly and indirectly impact State and Federal Threatened and Endangered species including the least Bell's vireo (vireo), southwestern willow flycatcher, California gnatcatcher, Stephens' kangaroo rat (SKR), and other sensitive species and wildlife resources (neo-tropical migratory birds, shorebirds, waterfowl, raptors). We recommend that the DEIR analyze the potential direct and indirect impacts to these species and their habitats. The DEIR should include the results of appropriate species surveys and any measures to avoid or minimize the "take" of listed species. The Department has provided DWR with the information on where listed and sensitive species were known to be present within the project area and locations of potential habitats which must be surveyed. Also, the Wildlife Agencies advised DWR to conduct protocol surveys for vireo and flycatcher this spring. While we want this

project to proceed as quickly as possible, we cannot complete our review and issue the required endangered species take coverage without the results of the protocols surveys.

Due to the emergency drawdown of the lake, the riparian habitat on the east end of Lake Perris where nesting pairs of least Bell's vireo are known to occur is exhibiting signs of stress. As previously discussed, the DEIR should include an assessment of the riparian habitat based on the total number of acres that were present before lowering of the lake occurred and the extent of the degradation as a result of the lowered water levels. We recognize that a temporary irrigation system has been installed in an effort to maintain the habitat during the draw down. However, because of the length of time it will take to complete the dam remediation and return the lake to pre-draw down levels, the Wildlife Agencies anticipate that further degradation of vireo habitat will occur. The Wildlife Agencies also have concerns how activities related to the dam remediation will affect listed species that occupy the riparian habitat, including indirect impacts due to noise, as well as utilizing the adjacent area as a borrow site (see comments related to the borrow site below). In addition, impacts to the California gnatcatcher and coastal sage scrub habitat should be assessed in conjunction with the proposed construction haul road. We recommend that these impacts be thoroughly assessed in the DEIR

On the west end of the project site below the dam, riparian habitat is also present and suitable for Threatened and Endangered species. Surveys for Threatened, Endangered, and other sensitive species that utilize this riparian habitat need to be conducted. Water seeping from the dam currently supports this habitat. The Wildlife Agencies are concerned that during project construction and following project completion, water will no longer be available to support this riparian habitat. Please address all potential direct and indirect impacts to this riparian habitat in the DEIR. The DEIR needs to quantify the riparian habitat by vegetation community and potential direct impacts to the habitat. In addition, all indirect impacts to species or the habitat should be identified in the DEIR (e.g. noise impacts, reduction or loss of water reaching the habitat).

The project site is located within the San Jacinto/Lake Perris SKR Core Reserve (Core Reserve) identified in the Riverside County Habitat Conservation Agency's (RCHCA) Habitat Conservation Plan for the Stephens' Kangaroo Rat in Western Riverside County (SKR HCP). The SKR HCP identifies impact minimization measures required for all public facility improvement projects within a Core Reserve. In addition, the SKR HCP requires that for each acre of SKR habitat disturbed in a Core Reserve, the sponsoring agency must acquire and permanently dedicate to SKR conservation a replacement acre of SKR occupied habitat. The location of the replacement habitat is subject to approval by the Wildlife Agencies. The project proponent proposes to construct an outlet channel below the dam for future emergency releases. The location of the proposed outlet channel is within the Core Reserve and would not only impact SKR and SKR habitat, but also cause fragmentation of the Core Reserve. The DEIR needs to address potential impacts to SKR and the Core Reserve, any proposed impact minimization measures, and the size and location of any mitigation areas intended to fulfill the 1:1 habitat replacement requirement.

The Wildlife Agencies are also concerned with potential indirect impacts (i.e. noise impacts) to sensitive species including burrowing owl and other raptors. Burrowing owls are known to occur in the vicinity of the proposed project and may be impacted due to noise and/or use of the haul roads. Other potential raptor nesting and foraging areas that may be directly or indirectly impacted by the project and that should be addressed in the DEIR include riparian areas and along the Bernasconi Hills.

Fishery Impacts

A detailed analysis of how the fishery within Lake Perris has been, and will be impacted and the proposed mitigation measures to offset these impacts needs to be thoroughly addressed in the DEIR. This analysis should include what the status of the fishery was before the lowering of the lake, how the lowering of the lake affected the fishery, how long after the project will the fishery take to recover, and what mitigation measures will be implemented to recover the fishery to pre-project conditions. Also, the DEIR should identify mitigation measures which will be implemented during dam remediation to maintain and improve the fishery during the extended drawdown period.

The Department recommends that the DEIR should include an analysis of how angler use has been affected by the drawdown and what mitigation measures will be implemented to increase the number of anglers using the lake during remediation and upon refill of the lake.

Outlet tower construction could have significant impacts on the ability of the DWR to recover the fishery within Lake Perris. The outlet tower is located in one of the best fishing location on the lake and the area will now be removed and closed to the anglers. Also, the DEIR must provide a detailed description on the timing of the tower construction and particularly the approach channel. The Department is very concerned with the potential fishery impacts associated with the construction of the new approach channel to the outlet tower. The DEIR must include the mitigation measures to protect the lake's water quality during construction of the tower and approach channel. In addition, the DEIR needs to address appropriate mitigation for the loss of public fishing access to the area around the new outlet tower and removal of large submerged rock structure in the area around the tower and approach channel.

Borrow Area

The Department is concerned that the borrow areas are likely to have significant adverse impacts to the fishery and waterfowl hunting opportunities. By removal of material from the east end of Lake Perris the project will impact a major spawning area. The proposed borrow area will reduce shallow water habitats and will be too deep for warm water species in the lake to spawn. Also, the borrow site and haul road will remove a significant portion of the pre-project fish habitat from the lake. By lowering the borrow site by 25 feet, the area will no longer support aquatic plant growth resulting in impacts to both fish and waterfowl species that have historically

used the area. The fish will no longer have escape cover during the spring, summer, and fall; therefore, their recruitment will be impacted. The proposed borrow area has been used by the Department for waterfowl hunting and this use will be permanently eliminated by the project. By lowering the area it will be unsafe for hunters to use the site and without shallow aquatic vegetation for waterfowl to forage on they will no longer use the area. Impacts to fish and wildlife resources as a result of the proposed borrow site needs to be adequately addressed in the DEIR. We recommend that the DEIR also identify appropriate measures to offset the impact of the borrow site. The Department recommends that an area 1.5 times the size of the borrow pit area be identified and improved to make it useable for waterfowl hunting. The DEIR will need to identify and mitigate any impacts associated with the conversion of the area into a waterfowl hunting area. The mitigation must include land acquisition and all the necessary funding to staff, maintain, and provide water for the newly create waterfowl hunting area in perpetuity. Also, the DEIR must identify how the loss of waterfowl hunting during dam remediation will be mitigated.

The NOP identifies increased boating recreation use of the east end of Lake Perris by deepening of the area. The east side of Lake Perris is one of the major fishing areas on the lake and under pre-project conditions was protected as a no wake area. If increased recreational boating occurs in this area it will have significant adverse impact on the fishery and angler use of the lake. With increased high speed boating in the area there will be increased erosion and sedimentation resulting in a loss of fish nests and recruitment. Also, the increased wave action will make the area less desirable to anglers and; therefore, result in a loss of angler use. The Department recommends that the DEIR identify the increase level of recreational boating in this previously protected area and mitigate the losses to the fishery and anglers. These potential impacts are significant and it may be necessary to identify other nearby lakes which could be enhanced and made available to anglers to offset the loss of angling at Lake Perris.

The Wildlife Agencies also recommend that the DEIR address how the deepening of the lake in the borrow area will affect the existing shoreline and associated biological resources such as the loss of shallow water habitats utilized by shorebirds, and potential shoreline erosion and loss of riparian habitats at the lake fringes.

Permits

As discussed during our project coordination meeting on May 23, 2006, the proposed project (drawdown and remediation activities) has the potential to result in the take of listed species; therefore, DWR will need to either obtain take coverage as a Participating Special Entity under the MSHCP or obtain individual State (2081 Incidental Take Permit) and Federal section 10(a)(1)(B) permits. If you choose to seek take coverage for listed species through the provisions of the MSHCP, the project must demonstrate consistency with the MSHCP and its associated policies and procedures including addressing the Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools policy (MSHCP pp 6-20), Protection of Narrow Endemic Plant Species policy (MSHCP pp 6-28), and Additional Survey Needs and Procedures (MSHCP pp 6-63).

Take coverage for SKR can be obtained from the RCHCA pursuant to their authority under the SKR HCP. To get coverage for SKR, all minimization and mitigation requirements identified for public facility improvement projects within a Core Reserve, including obtaining concurrence from the Wildlife Agencies on the location of any proposed replacement habitat, will need to be fulfilled.

Because the project will impact habitat associated with a lake, notification to the Department for a Lake or Streambed Alteration Agreement is required, pursuant to Section 1600 et. seq. of the Fish and Game Code.

The Department has been participating in meetings for approximately two years and wants the project to proceed as quickly as possible. However, the DEIR must fully address our concerns and identify all mitigation measures when it is submitted for our review.

The Wildlife Agencies appreciate the opportunity to provide comments on the proposed action. If you have any questions pertaining to these comments or would like to discuss our concerns, please contact Mr. Mike Giusti at (951) 926-7561 of the Department or Ms. Doreen Stadtlander of the Service at (760) 431-9440 ext. 223.

Sincerely,

Karen A. Goebel
Assistant Field Supervisor
U. S. Fish and Wildlife Service

Dee Sudduth
Deputy Regional Manager
California Department of Fish and Game

cc:
Gary Watts, California State Parks and Recreation, Perris, CA

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

June 14, 2007

Tom Barnes, ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, California 90017

Dear Mr. Barnes:

This is in response to your request regarding comments on the Notice of Preparation of Environmental Impact Report for the Perris Dam Remediation Project.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the County of Riverside (Community Number 060245), Map revised August 18, 2003. Please note that the County of Riverside, California is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The Riverside County floodplain manager can be reached by calling Mekbib Degaga, Senior Civil Engineer, Flood Control & Water Conservation Department, at (951) 955-1265.

If you have any questions or concerns, please do not hesitate to call Marshall Marik of the Mitigation staff at (510) 627-7057.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
Mekbib Degaga, Senior Civil Engineer, Riverside County
Garret Tam Sing/Salomon Miranda, State of California, Department of Water Resources, Southern District
Marshall Marik, Floodplanner, DHS/FEMA Region IX
Sandro Amaglio, Environmental Officer, DHS/FEMA Region IX

State of California • The Resources Agency
Arnold Schwarzenegger, *Governor*
DEPARTMENT OF PARKS AND RECREATION
Ruth Coleman, *Director*
Inland Empire District
17801 Lake Perris Drive
Perris, CA 92571
(951) 443-2423
http://www.parks.ca.gov

July 2, 2007

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

Re: Notice of Preparation (NOP) for the Perris Dam Remediation Project

Dear Mr. Barnes:

The Inland Empire District of the Department of Parks and Recreation (State Parks) appreciates the opportunity to comment on the aforementioned project. State Parks is a trustee agency as defined by the California Environmental Quality Act (CEQA).

State Parks' mission in part is to provide for the health, inspiration, and education of the people of California by preserving the state's extraordinary biodiversity and creating opportunities for high quality outdoor recreation. As the office responsible for the stewardship of Lake Perris State Recreation Area (Lake Perris SRA), we have an interest and concern about potential changes to the park's resources, including facilities, natural, cultural, recreational, and economic.

In general, as noted below, we request the Draft Environmental Impact Report (EIR) include an evaluation of recreation, cultural and natural resource, and economic values. The conclusion of the evaluation should provide measures to minimize all potential and definite temporary and permanent impacts to the evaluation's purpose. We are committed to working with you to develop mutually acceptable solutions.

Project Description

We recognize the efforts to minimize disruption in beneficial uses of Lake Perris SRA. However, the drawdown has altered the visitor's experience. The reduction in recreational opportunities coupled with the long-term construction period is expected to exponentially affect the already impacted visitor experience, recreational opportunities, cultural and natural resources, economic factors and facilities. Nonetheless, maintaining the drawdown lake elevation below 1,588 has caused and will continue to cause a negative effect in the recreational and other values at Lake Perris SRA until the project is complete.

Discussion of Impacts: Dam Remediation

The Draft EIR should study the significant change in the character of the park's complex. As potential mitigation, an updated General Plan should be prepared or funded.

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 4
To Tom Barnes	From Enrique Arroyo
Co.	Co.
Dept.	Phone # 951-940-5664
Fax # 213 599-4301	Fax #

drawdown lake elevation below 1,588 has caused and will continue to cause a negative effect in the recreational and other values at Lake Perris SRA until the project is complete.

Discussion of Impacts: Dam Remediation

The Draft EIR should study the significant change in the character of the park's complex. As potential mitigation, an updated General Plan should be prepared or funded. The majority of our comments relate to the Dam Remediation component, as noted in the following sections.

Aesthetics

The Draft EIR should include detailed figures, maps, and other graphic images related to the following:

- East end aerial before and after;
- East end elevation before and after;
- Truck haul road aerial before and after;
- Truck haul road elevation before and after;
- Perris Dam aerial before and after;
- Perris Dam cross section before and after; and,
- Rock Quarry front view before and after from campground, marina, on the lake (on watercraft), and Power Cove.

Air Quality

The Draft EIR should consider the effect of airborne particles on park visitors (including those with allergies), facilities and natural resources, such as native and exotic plants and animals. Regular and seasonal wind patterns should factor into the analysis.

Biological Resources

The Draft EIR should identify natural resources within Lake Perris SRA including but not limited to bald eagles, least Bell's vireo, Southwestern willow flycatcher, California Gnatcatcher, Stephen's Kangaroo Rat, raptors, reptiles, and plants. In addition, the Draft EIR should provide measures to reduce potentially significant impacts to natural resources following consultation, if necessary, with regulatory agencies.

The Draft EIR should provide written material describing human interaction with resources to its contractors and others involved in entering Lake Perris SRA related to the three projects. The material may include information such as precautionary measures for protecting resources and safety awareness of resources (i.e., snakes, mountain lion, etc.). We request to be invited for the preparation of the written material and procedures for distribution.

Cultural Resources

The Draft EIR should identify procedures to follow upon discovery of previously unknown resources. We request to be consulted prior to the Draft EIR to share known cultural resources and to synchronize the policies of our departments.

Hazards and Hazardous Materials

The Draft EIR should consider the effect of hazardous materials and hazards on park visitors. Precautionary measures should be developed to ensure the public's health is not impacted.

Land Use

The Draft EIR should describe potential changes in the character of the park's complex. Furthermore, the Draft EIR should identify measures to mitigate significant impacts.

Noise and Light

If the project requires construction from any period form dusk to dawn, the Draft EIR should identify measures to avoid or minimize noise and light impacts to park visitors and natural resources.

Recreation

The Draft EIR should describe the effect of the projects on the park's recreation activities, including but not limited to, camping, boating, equestrian, and hiking. Furthermore, the Draft EIR should identify adequate mitigation to compensate the public's loss of recreational opportunities.

The Draft EIR should describe the effect of the projects on the lake's surface area. Any reduction in the lake's surface area will increase mitigation requirements from those preliminarily noted in the NOP.

The project appears to require the closure of the park's Bernasconi area, popular for its group camping, fishing, rock climbing, and equestrian uses. The Draft EIR should describe and illustrate the amount of Bernasconi area required for the project and measures to mitigate the potential temporary and permanent loss of recreation, cultural and resource values.

Bike/pedestrian path and equestrian trail are expected to be closed during construction. We request that the Draft EIR describe the effect of the temporary closure and identify mitigation measures.

The Draft EIR should identify the project's effect on the facilities in the Bernasconi area and throughout the park, including ramadas, structures, restrooms, paths and recreation amenities.

Traffic and Transportation

The Draft EIR should analyze the on-site circulation system for construction-related vehicles and the effect on park visitors and employees while driving, walking or on other modes of travel. Safety measures required to protect the public and employees should be identified.

The Draft EIR should describe the effect of the project on local and regional circulation, including traffic entering and exiting the park. The Draft EIR should also consider the project's effects on park visitors entering on modes other than vehicles, including pedestrian, bicycle, and equestrian.

The Draft EIR should identify temporary and permanent closures of access points to Lake Perris SRA. In an effort to minimize negative impacts to law enforcement, public safety, state employees, park visitors and others, any temporary and/or permanent access impediments should be identified and measures should be identified to reduce impacts.

Outlet Tower Replacement

The Draft EIR should provide details on construction activities, potential effects on park's resources and opportunities, and measures to minimize impacts. In addition, the Draft EIR should evaluate the location of the new outlet tower and its potential impact on the park's resources.

New Release Channel

Provide details on construction activities, potential effects on park's resources and opportunities, and measures to minimize impacts.

We suggest that a public relations campaign be developed to inform stakeholders of the construction project, any detours, and other stages.

Again, we appreciate the opportunity to comment. If you have any questions, please contact Enrique Arroyo, at (951) 940-5664.

Sincerely,

Gary Watts
District Superintendent

cc: Ted Jackson, State Parks
Tony Perez, State Parks
Rick Rayburn, State Parks
Kathy Weatherman, State Parks
State Clearinghouse
DPLA Environmental Review Unit
Steve Watanabe, Department of Boating and Waterways
Mike Guisti, Department of Fish & Game
Doreen Stadtlander, U.S. Fish and Wildlife Service
Kevin Donhoff, Metropolitan Water District

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Executive Office

June 20, 2007

Via E-Mail and Federal Express

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, California 90017

Dear Mr. Barnes:

Request for 90-Day Extension of Review Period for the Notice of Preparation of an Environmental Impact Report for Perris Dam Remediation Project (SCH No. 2007061004)

The Metropolitan Water District of Southern California (Metropolitan) has received a copy of the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Perris Dam Remediation Project. We agree that public safety is the highest priority and that the ultimate fate of Lake Perris Dam should be decided upon as soon as possible, however, Metropolitan is requesting additional time to respond to the NOP, pursuant to the State California Environmental Quality Act Guidelines, §15103.

Given the current challenge associated with the State Water Project supplies over the next few years due to recent potential water management actions to protect the Delta Smelt, we feel that more time is required in order to determine the best course of action. The impact to water supply is a new issue that needs to be further evaluated in the dam remediation option before we can adequately comment on your NOP.

Due to the complexity and nature of this project and related issues, Metropolitan respectfully requests a 90-day extension of the review period for the Perris Dam Remediation Project NOP. We believe that this request is well justified as stated above. If I can be of further assistance, please contact me at (213) 217-6217.

Very truly yours,

Delaine W. Shane
Interim Manager, Environmental Planning Team

LIM/lim
(Public Folders/EPU/Letters/11-JUN-07A.doc – Tom Barnes)

Copy: Mr. Lester Snow and Ms. Teresa Sutliff
Department of Water Resources
1416 9th Street
Sacramento, California 95814

Ms. Terry Roberts
Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 222
Sacramento, California 95814

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Executive Office

July 2, 2007

Via E-Mail and Federal Express

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, California 90017

Dear Mr. Barnes:

Notice of Preparation of an Environmental Impact Report for Perris Dam Remediation Project

The Metropolitan Water District of Southern California (Metropolitan) has received a copy of the Notice of Preparation (NOP) notifying interested parties that the Department of Water Resources (DWR) is beginning preparation of an Environmental Impact Report (EIR) for Perris Dam Remediation Project (Project). The Draft EIR will assess the physical changes to the environment that would likely result from construction and operation of the Perris Dam Remediation Project, including direct, indirect and cumulative impacts.

The proposed Project includes upgrading the dam by removing and replacing foundation material along a portion of the dam toe and adding a stability berm and installing soil-cement columns beneath some of the replaced foundation by means of deep soil mixing. In addition, DWR is proposing to replace the outlet tower and construct a new release channel to provide safe carriage of emergency drawdown flows. All three projects will be constructed without draining the lake in an effort to maintain the beneficial uses of the State Recreation Area.

Metropolitan is a cooperative of 26 cities and water agencies charged with providing a reliable supply of high quality drinking water to 18 million people in six counties. Metropolitan imports water from the Colorado River and Northern California to supplement local supplies, and helps its members to develop increased water conservation, recycling, storage and other water-management programs.

As a result of receiving the NOP, Metropolitan requested, in a letter dated June 20, 2007, a 90-day extension under the State California Environmental Quality Act (CEQA) Guidelines, §15103 (attached). DWR has not responded to our request. Therefore, Metropolitan, as an affected public agency, requests that additional analysis and discussion be included in the following areas listed below to allow DWR decision-makers to determine whether this Project would result in significant impacts to Metropolitan and its member agencies in providing a reliable supply of water.

Environmental Baseline/Settings
The environmental setting/baseline conditions must be based on and take into account the existing problems associated with Bay/Delta water deliveries and the uncertainties these problems create to Southern California. These deliveries are and will be unreliable due to environmental and regulatory constraints, and therefore must be considered in the context of the proposed repairs at Lake Perris. In that way, the Draft EIR can then adequately forecast potential environmental impacts and provide for appropriate, feasible mitigation measures.

Significant Environmental Impacts Analysis
CEQA Guidelines, §15126.2 states that "Direct and indirect significant effects of the project on the environment shall be clearly identified and described, giving due consideration to both the short-term and long-term effects. The discussion should include relevant specifics of the area, the resources involved,...and other aspects of the resource base such as water..." Pursuant to this CEQA section, Metropolitan requests that potential impacts to our water supply resulting from the proposed Project be included in the impact analysis section of the Draft EIR and appropriate mitigation measures to avoid, reduce, or minimize significant effects.

Alternatives to the Proposed Project
Metropolitan recommends that the Draft EIR consider, as a feasible alternative to the proposed project, the decommissioning of the reservoir as a public safety measure, pursuant to CEQA Guidelines, §15126.6. As stated in this section, a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation, must be considered in the Draft EIR.

Cumulative Impacts
While recognizing public health and safety as a primary objective, we feel that more time is required to determine the best course of action for all of the Lake Perris stakeholders. The current efforts to protect Delta Smelt in the Bay/Delta have created a large amount of uncertainty over the next several years with respect to the delivery of State Water Project (SWP) water. The preferred alternative is based on the assumption that SWP pumping operations will return to and remain at sustained levels in the near future. Yet, today such an assumption is not reasonable. The Draft EIR should address these changed conditions and potential cumulative impacts to Metropolitan's water supply. The proposed Project has possible environmental effects that may be cumulatively considerable when viewed in connection with the effects of the SWP long-term Delta Smelt issues (CEQA Guidelines, §15065 and §15130).

Additional points that should be addressed in the Draft EIR include:

- An alternative of a non-water supply facility;
- Address refill period and potential impacts to other facilities and SWP contractors during refill;
- Identify actions, mitigations, and costs associated with the draining of the lake for public safety;

- Evaluate the biological impacts to the California Department of Fish and Game's (CDFG) San Jacinto Wilderness Area adjacent to Perris Dam;
- Evaluate the potential impacts to the fishing opportunities within the reservoir as currently managed by the CDFG; and
- Address cumulative impacts with this project in conjunction with other projects related to Metropolitan's Lake Perris Pollution Prevention and Source Protection Program and the ongoing activities of Metropolitan.

Lastly, Metropolitan may provide future comments as the CEQA process progresses. We look forward to receiving a copy of the Draft EIR. If I can be of further assistance, please contact me at (213) 217-6217 or Kevin Donhoff at (213) 217-6359.

Very truly yours,

Delaine W. Shane
Interim Manager, Environmental Planning Team

LIM/lim
(Public Folders/EPU/Letters/28-JUN-07A.doc – Tom Barnes)

Enclosure: Metropolitan Letter Dated June 20, 2007

Copy: Mr. Lester Snow
Department of Water Resources
1416 9th Street
Sacramento, California 95814

Ms. Terry Roberts
Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 222
Sacramento, California 95814

Mr. Steve Robbins
General Manager-Chief Engineer
Coachella Valley Water District
P.O. Box 1058
Coachella, CA 92236

Mr. Dave Luker
General Manager-Chief Engineer
Desert Water Agency
P.O. Box 1710
Palm Springs, CA 92263

Mr. Ralph Torres, Deputy Director
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Mr. Rich Sanchez, Chief
Division of Engineering
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Mr. Carl Torgerson, Chief
Division of Operations and Maintenance
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Ms. Teresa Sutliff
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

Mr. Rob Cooke, Acting Chief
State Water Project Analysis Office
Department of Water Resources
P. O. Box 942836
Sacramento, CA 94236-0001

Ms. Jeanne Kuttel
Department of Water Resources
P.O. Box 942836
Sacramento, CA 94236-0001

MWD
METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

Executive Office

June 20, 2007

Via E-Mail and Federal Express

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, California 90017

Dear Mr. Barnes:

Request for 90-Day Extension of Review Period for the Notice of Preparation of an Environmental Impact Report for Perris Dam Remediation Project (SCH No. 2007061004)

The Metropolitan Water District of Southern California (Metropolitan) has received a copy of the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Perris Dam Remediation Project. We agree that public safety is the highest priority and that the ultimate fate of Lake Perris Dam should be decided upon as soon as possible, however, Metropolitan is requesting additional time to respond to the NOP, pursuant to the State California Environmental Quality Act Guidelines, §15103.

Given the current challenge associated with the State Water Project supplies over the next few years due to recent potential water management actions to protect the Delta Smelt, we feel that more time is required in order to determine the best course of action. The impact to water supply is a new issue that needs to be further evaluated in the dam remediation option before we can adequately comment on your NOP.

Due to the complexity and nature of this project and related issues, Metropolitan respectfully requests a 90-day extension of the review period for the Perris Dam Remediation Project NOP. We believe that this request is well justified as stated above. If I can be of further assistance, please contact me at (213) 217-6217.

Very truly yours,

Delaine W. Shane
Interim Manager, Environmental Planning Team

LIM/lim
(Public Folders/EPU/Letters/11-JUN-07A.doc – Tom Barnes)

Copy: Mr. Lester Snow and Ms. Teresa Sutliff
Department of Water Resources
1416 9th Street
Sacramento, California 95814

Ms. Terry Roberts
Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 222
Sacramento, California 95814

SOUTHERN CALIFORNIA

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Orange County: Chris Norby, Orange County • Christine Barnes, La Palma • John Beauman, Brea • Lou Bone, Tustin • Debbie Cook, Huntington Beach • Leslie Daigle, Newport Beach • Richard Dixon, Lake Forest • Troy Edgar, Los Alamitos • Paul Glaab, Laguna Niguel • Robert Hernandez, Anaheim • Sharon Quirk, Fullerton

Riverside County: Jeff Stone, Riverside County • Thomas Buckley, Lake Elsinore • Bonnie Flickinger, Moreno Valley • Ron Loveridge, Riverside • Greg Pettis, Cathedral City • Ron Roberts, Temecula

San Bernardino County: Gary Ovitt, San Bernardino County • Lawrence Dale, Barstow • Paul Eaton, Montclair • Lee Ann Garcia, Grand Terrace • Tim Jasper, Town of Apple Valley • Larry McCallon, Highland • Deborah Robertson, Rialto • Alan Wapner, Ontario

Tribal Government Representative: Andrew Masiel Sr., Pechanga Band of Luiseño Indians

Ventura County: Linda Parks, Ventura County • Glen Becerra, Simi Valley • Carl Morehouse, San Buenaventura • Toni Young, Port Hueneme

Orange County Transportation Authority: Art Brown, Buena Park

Riverside County Transportation Commission: Robin Lowe, Hemet

Ventura County Transportation Commission: Keith Millhouse, Moorpark

6.21.07

June 25, 2007

c/o Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

RE: SCAG Clearinghouse No. I 20070335 Perris Dam Remediation Project

Dear Mr. Barnes:

Thank you for submitting the **Perris Dam Remediation Project** for review and comment. As areawide clearinghouse for regionally significant projects, SCAG reviews the consistency of local plans, projects and programs with regional plans. This activity is based on SCAG's responsibilities as a regional planning organization pursuant to state and federal laws and regulations. Guidance provided by these reviews is intended to assist local agencies and project sponsors to take actions that contribute to the attainment of regional goals and policies.

We have reviewed the **Perris Dam Remediation Project**, and have determined that the proposed Project is not regionally significant per SCAG Intergovernmental Review (IGR) Criteria and California Environmental Quality Act (CEQA) Guidelines (Section 15206). Therefore, the proposed Project does not warrant comments at this time. Should there be a change in the scope of the proposed Project, we would appreciate the opportunity to review and comment at that time.

A description of the proposed Project was published in SCAG's **June 1-15, 2007** Intergovernmental Review Clearinghouse Report for public review and comment.

The project title and SCAG Clearinghouse number should be used in all correspondence with SCAG concerning this Project. Correspondence should be sent to the attention of the Clearinghouse Coordinator. If you have any questions, please contact me at (213) 236-1856. Thank you.

Sincerely,

SHERYLL DEL ROSARIO
Associate Planner
Intergovernmental Review

JUN 26 2007

Doc 137186

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4182
(909) 396-2000 • www.aqmd.gov

June 9, 2007

Mr. Tom Barnes, ESA
Department of Water Resources
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

Dear Mr. Barnes:

Notice of Preparation of a Draft Environmental Impact Report for the Perris Dam Remediation Project.

The South Coast Air Quality Management District (SCAQMD) appreciates the opportunity to comment on the above-mentioned document. The SCAQMD's comments are recommendations regarding the analysis of potential air quality impacts from the proposed project that should be included in the draft environmental impact report (EIR). Please send the SCAQMD a copy of the Draft EIR upon its completion. **In addition, please send with the draft EIR all appendices or technical documents related to the air quality analysis and electronic versions of all air quality modeling and health risk assessment files. Without all files and supporting air quality documentation, the SCAQMD will be unable to complete its review of the air quality analysis in a timely manner. Any delays in providing all supporting air quality documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

The SCAQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. The SCAQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from the SCAQMD's Subscription Services Department by calling (909) 396-3720. Alternatively, the lead agency may wish to consider using the California Air Resources Board (CARB) approved URBEMIS 2002 Model. This model is available on the SCAQMD Website at: www.aqmd.gov/ceqa/models.html.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the project and all air pollutant sources related to the project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, that is, sources that generate or attract vehicular trips should be included in the analysis.

The SCAQMD has developed a methodology for calculating PM2.5 emissions from construction and operational activities and processes. In connection with developing PM2.5 calculation methodologies, the SCAQMD has also developed both regional and localized significance thresholds. The SCAQMD requests that the lead agency quantify PM2.5 emissions and compare the results to the recommended PM2.5 significance thresholds. Guidance for calculating PM2.5 emissions and PM2.5 significance thresholds can be found at the following internet address: http://www.aqmd.gov/ceqa/handbook/PM2_5/PM2_5.html.

In addition to analyzing regional air quality impacts the SCAQMD recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LST's can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the proposed project, it is recommended that the lead agency perform a localized significance analysis by either using the LSTs developed by the SCAQMD or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at http://www.aqmd.gov/ceqa/handbook/LST/LST.html.

It is recommended that lead agencies for projects generating or attracting vehicular trips, especially heavy-duty diesel-fueled vehicles, perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis") can be found on the SCAQMD's CEQA webpages at the following internet address: http://www.aqmd.gov/ceqa/handbook/mobile_toxic/mobile_toxic.html. An analysis of all toxic air contaminant impacts due to the decommissioning or use of equipment potentially generating such air pollutants should also be included.

Mitigation Measures

In the event that the project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize or eliminate significant adverse air quality impacts. To assist the Lead Agency with identifying possible mitigation measures for the project, please refer to Chapter 11 of the SCAQMD CEQA Air Quality Handbook for sample air quality mitigation measures. Additional mitigation measures can be found on the SCAQMD's CEQA webpages at the following internet address: www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html Additionally, SCAQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook contain numerous measures for controlling construction-related emissions that should be considered for use as CEQA mitigation if not otherwise required. Other measures to reduce air quality impacts from land use projects can be found in the SCAQMD's Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning. This document can be found at the following internet address: http://www.aqmd.gov/prdas/aqguide/aqguide.html. In addition, guidance on siting incompatible land uses can be found in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Perspective, which can be found at the following internet address: http://www.arb.ca.gov/ch/handbook.pdf. Pursuant to state CEQA Guidelines §15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed.

Data Sources

SCAQMD rules and relevant air quality reports and data are available by calling the SCAQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available via the SCAQMD's World Wide Web Homepage (http://www.aqmd.gov).

The SCAQMD is willing to work with the Lead Agency to ensure that project-related emissions are accurately identified, categorized, and evaluated. Please call Charles Blankson, Ph.D., Air Quality Specialist, CEQA Section, at (909) 396-3304 if you have any questions regarding this letter.

Sincerely,

Steve Smith

Steve Smith, Ph.D.
Program Supervisor, CEQA Section
Planning, Rule Development and Area Sources

SS:CB:li
RVC070605-05LI
Control Number

CITY OF PERRIS

DEVELOPMENT SERVICES DEPARTMENT
PLANNING DIVISION
135 NORTH D STREET, PERRIS, CA 92570-2200
TEL.: (951) 943-5003 FAX: (951) 943-8379

July 2, 2007

Tom Barnes
ESA
707 Wilshire Blvd., Suite 1450
Los Angeles, CA 90017

Re: Notice of Preparation DWR Perris Dam Remediation Project EIR

Dear Tom Barnes:

The City of Perris ("City") appreciates the opportunity to comment on the Draft Environmental Impact Report ("DEIR") for the proposed Perris Dam Remediation Project ("Project"). The City's comments are recommendations regarding the analysis of potential impacts from the proposed Project that should be included in the DEIR. Please send the City a copy of the DEIR upon its completion to the undersigned. After reviewing the Notice of Preparation ("NOP"), the City believes that the Department of Water Resources ("DWR"), as the lead agency for the Project, should consider the following potential impacts in addition to those outlined in the NOP.

A. AIR QUALITY IMPACT.

The NOP describes the following work to be performed as part of the Project:

1. Deep Soil Mixing to improve the foundation material of the Dam;

2. Removal of liquefiable material;

3. Construction of a new berm along the existing wall of the Dam, which will use two million cubic yards of soil from the lake bed and one million tons of rock from the quarry in the Bernasconi Hills;

4. Construction of an internal haul road for the transportation of solid and rock materials;

5. Excavation for new outlet tower; and

6. Construction of new outlet channel of approximately 2 miles.

The City anticipates that each of the above activities will create significant dust and airborne particles from the construction equipment, earth work, etc., and acknowledges that the NOP raises these potential impact. However, we wish to also stress that the potential impacts to air quality from mobile sources, such as trucks hauling the materials, are not specifically raised in the NOP. These activities would appear to have a potential impact to air quality, especially to the City and surrounding communities.

B. TRAFFIC.

Each of the work elements of the Project identified in Section A above will presumably require trucks and other construction related vehicles and equipment to use the roads in and around the City. The DEIR should adequately address the routes such construction traffic would likely impact and the level of such impacts. Additionally, the DEIR should analyze any potential alternative routes to avoid impacts to the City, including residential neighborhoods adjacent to the Project.

The NOP also explains that the Project may ultimately result in an increase in recreational activities when the capacity of the Dam is enlarged. Recreational users already use the Ramona Expressway to access the Dam. The Ramona Expressway currently operates at poor Levels of Service at peak hours. Accordingly, the City would like to have the DEIR address any reasonably foreseeable impacts to City streets, including but not limited to the Ramona Expressway, from the anticipated increase in recreational activities at the Dam.

The NOP does not seem to address potential traffic impacts to the surrounding areas, including the City. Instead, the NOP seems to address circulation impact of the Project "at the Project Site." The City would like to assure that the DEIR adequately analyzes traffic impacts to the surrounding areas, including the City.

C. VIBRATION, NOISE, GLARE AND AESTHETIC IMPACTS.

Each of the work elements of the Project identified in Section A above will presumably impact the City through the creation of vibration and noise during construction activities. Additionally, insofar as some activities may occur in the evening hours, the impacts could include glare from lighting used during construction. The NOP does not seem to address these potential impacts, including from mobile sources such as trucks, equipment and other vehicles used for the Project. The Project will further impact the aesthetic quality of the area surrounding the southern boundary of the Project site. Given that residential neighborhoods in the City are located immediately southwest of the Project location, the City would like to have the DEIR address all potential impacts related to vibration, noise, glare and aesthetic on all sensitive receptors in the City, including the aforementioned residential neighborhood and users of the Ramona Expressway.

D. NEW OUTLET TOWER AND CONSTRUCTION OF CHANNEL.

The City understands that the proposed Project seeks to provide an emergency flow-out channel leading to the Perris Valley Storm Drain. The City would like to assure that the DEIR

adequately addresses any potential to over tax such storm drain during high rain periods. Additionally, the proposed channel leading to the storm drain should be analyzed to ascertain any flooding potential to areas within the City, including nearby homes and the Ramona Expressway.

The NOP also explains that the proposed channel is anticipated to interfere or disrupt certain property, including the Fairgrounds and a motocross track in the City. The City would appreciate having an opportunity to comment on such potential impacts and proposed alternatives to the proposed route of such channel.

E. FEASIBILITY OF MITIGATION MEASURES.

The City understands that the financial resources required from the Project are estimated at $460,000,000, which will be shared by three water agencies, the Coachella Valley Water District, Desert Water Agency and Metropolitan Water District. In light of this significant cost, the City would like to assure that there remain sufficient funds available for such agencies to perform other mitigation projects or measures related to the Project or surrounding areas, including the City.

F. ACTIONS TAKEN TO DATE.

We understand that the water levels at the Dam have already been reduced by approximately 25 fee before any impacts have been studied. Although the City acknowledges that the reduction of the water level was implemented to avoid any flooding hazards due to findings that the Dam is inadequate, there seem to have been impacts to some outlining areas of the lake within the Dam, including some plant and animal habitat. The City requests that the DEIR address whether any efforts undertaken by DWR to mitigate such impact, including irrigation, have proved adequate.

The City is willing to work with DWR as the lead agency to ensure that project-related impacts to the City and surrounding areas are accurately identified, and evaluated. Please feel free to contact the undersigned at (951) 943-5003 if you have any questions or comments regarding this letter.

Very truly yours,

CITY OF PERRIS

Brad Eckhardt
Planning Manager

Cc: Eric Dunn, City Attorney
Richard Belmudez, City Manager

CITY OF PERRIS

HABIB MOTLAGH, CITY ENGINEER

July 24, 2007

Mr. Tom Barnes, ESA
707 Wilshire Blvd., Suite 1450
Los Angeles, CA 90017

Re: Lake Perris Dam NOP (P8-000)

Dear Mr. Barnes,

The City of Perris has previously submitted some of their comments in regards to the NOP. I also understand that there will be future opportunities for comments once the EIR is out for public review and comment. At this time, you may want to consider the following items:

- The proposed discharge channel along Ramona Expressway shall be coordinated with the adopted Drainage Master Plan. This channel should be utilized for the purpose of emergency discharge as well as the daily drainage purpose.
- Most of the traffic (construction and otherwise) generated because of your project will be utilizing Ramona Expressway, which is under City of Perris jurisdiction. The traffic report shall address this issue and discuss additional improvements on the proposed route.

Again, thank you for allowing us to comment on NOP. Please call if you have any questions or require additional information.

Sincerely,

Habib Motlagh
City Engineer

RECEIVED
JUL 27 2007

Cc: Brad Eckhardt, Planning Manager

DEPARTMENT OF ENGINEERING
170 WILKERSON AVE., SUITE D, PERRIS, CA 92570-2200
TEL.: (951) 943-6504 - FAX: (951) 943-8416

MORENO VALLEY

Community Development Department
Planning Division

14177 Frederick Street
P.O. Box 88005
Moreno Valley, CA 92552-0805
Telephone: 951.413.3206
FAX: 951.413.3210

JUN 2 6

June 20, 2007

Tom Barnes
ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, CA 90017

Re: Perris Dam Remediation Project
Response to Notice of Preparation

Dear Mr. Barnes:

The City of Moreno Valley has reviewed the June 1, 2007 Notice of Preparation for the referenced project. Based upon the project information provided in the NOP, the City of Moreno Valley requests that the following issues be addressed in the forthcoming EIR:

1. Hydrology, Groundwater and Water Quality – effects of proposed dewatering upon groundwater levels in the project area, including any influence on movement of known areas of groundwater contamination.
2. Hydrology, Groundwater and Water Quality – changes in inundation limits and depths in the event of dam failure as a result of the proposed improvements.

We look forward to the opportunity to review the draft Environmental Impact Report. We understand the document will be released in electronic format and will be available for review online. The City is amenable to reviewing the document in electronic format, and will request paper copies of relevant sections if necessary.

Should you have any questions or concerns, please contact Kathleen Dale at (951) 413-3228.

Sincerely,

Kathleen Dale
Associate Planner

John C. Terell, AICP
Planning Official

WARREN D. WILLIAMS
General Manager-Chief Engineer

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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

June 28, 2007

Department of Water Resources
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Suite 1450
Los Angeles, CA 90017

Ladies and Gentlemen:

Re: Notice of Preparation of Environmental Impact Report for the Perris Dam Remediation Project

This letter is written in response to the CEQA Notice of Preparation of an Environmental Impact Report (EIR) for the Department of Water Resources' proposed Perris Dam Remediation Project. The proposed project would consist of the Perris Dam Remediation, the Outlet Tower Retrofit, and the Emergency Outlet Release Facility extending from the Perris Valley Channel to the Perris Dam. The proposed project is located within the city of Perris and the Lake Perris State Recreation Area.

The Riverside County Flood Control and Water Conservation District (District) has the following comments and concerns that should be addressed:

1. The proposed project is located within the District's Perris Valley and Perris Valley Channel Master Drainage Plans (MDP). When fully implemented, these MDP facilities will provide flood protection to relieve those areas within the plan of the most serious flooding problems and will provide adequate drainage outlets. The EIR should include an exhibit that shows the MDP facilities within and adjacent to the proposed project area. The proposed Emergency Outlet Release Facility may conflict with the alignments of master planned facilities. The EIR should evaluate potential direct and indirect impacts to proposed MDP facilities in the project area. The District's MDP facility maps can be viewed online at www.floodcontrol.co.riverside.ca.us. To obtain further information on the MDP and the proposed District facilities, contact Mark Wills of the District's Planning Section at 951.955.1282.

2. Please be advised that the District owns and operates the interim Perris Valley Channel. The existing earthen channel does not have the capacity to convey the FEMA estimated 100-year peak flow of 11,300 CFS. The capacity of the interim Perris Valley Channel to convey the 1,500 CFS released from the dam should be evaluated. A probability analysis of peak flows and the simultaneous release from Perris Dam should be completed. In all cases, the potential of inundation of the surrounding areas exists and this limit should be identified for various storm events. The potential physical impacts to the existing channel associated with any changes in flow rates and velocities, and diversions or concentrations of flows should be evaluated in a detailed hydrologic/hydraulic analysis. The hydraulic analysis should also demonstrate the effects of the 1,500 CFS release on the Perris Valley Channel design water surface elevation. The need for and any potential impacts associated with any offsite drainage improvements, such as energy dissipaters, should be evaluated in the EIR as well. The District's access along the Perris Valley Channel will need to be preserved. Any work that involves District right of way, easements or facilities will require an encroachment permit or other approval from the District. Any construction within road right-of-way that may impact District's existing facilities should also be coordinated with the District. To obtain further information on encroachment permits or existing facilities, contact Ed Lotz of the District's Encroachment Permit Section at 951.955.1266.

3. A portion of the proposed Emergency Outlet Release Facility near the Perris Valley Channel is located within the 100-year Zone A floodplain as delineated on the Federal Flood Insurance Rate Map (FIRM), Community Panel Number 060258 0005D, issued in conjunction with the National Flood Insurance Program (NFIP). The previously recommended hydrology/hydraulic analysis should fully evaluate any potential impacts to the mapped floodplain. The City of Perris is responsible for compliance with the FEMA floodplain management regulations within the city limits. For additional information regarding this matter please contact the City of Perris or Mekbib Degaga of the District's Floodplain Management Section at 951.955.1265.

4. The District is a permittee under the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). For purposes of procuring an encroachment permit or other District approval, the project proponent will need to demonstrate that all project related activities within the District right-of-way is consistent with the MSHCP. To accomplish this, the CEQA document should include a MSHCP consistency report with all of its supporting documents and provide adequate surveys and mitigation in accordance with all applicable MSHCP requirements. Please be advised that the proposed project would affect MSHCP public/quasi public lands associated with the Perris Valley Channel right of way. The MSHCP consistency report should address, at a minimum, Sections 3.2, 3.2.1, 6.1.2, 6.1.3, 6.1.4, 6.3.2, 7.5.3 and Appendix C of the MSHCP.

5. The proposed project may impact jurisdictional features (e.g. waters of the United States, streambeds, wetlands) that are regulated by State and Federal agencies through Sections 404 and 401 of the federal Clean Water Act and Section 1602 of the State Fish and Game Code. The EIR should address potential impacts to jurisdictional features. Any regulatory permits obtained by the project proponent will need to be reviewed and approved by the District prior to the District's approval of activities within existing District facilities.

Thank you for the opportunity to review the Notice of Preparation. Please forward any subsequent environmental documents regarding the project to my attention at this office. Any further questions concerning this letter may be referred to Randy Sheppeard at 951.955.1306 or me at 951.955.1233.

Very truly yours,

TERESA TUNG
Senior Civil Engineer

c: TLMA
Attn: David Mares
Ed Lotz
Mark Wills
Mekbib Degaga

RS:mcv
P8\114592

SIERRA CLUB
FOUNDED 1892

SAN GORGONIO CHAPTER

4079 Mission Inn Avenue, Riverside, CA 92501 (951) 684-6203
Membership/Outings (951) 686-6112 Fax (951) 684-6172

Regional Groups Serving Riverside and San Bernardino Counties: Big Bear, Los Serranos, Mojave, Moreno Valley, Mountains, Tahquitz.

Mr. Tom Barnes
707 Wilshire Blvd., Suite 1450
Los Angeles CA 90017

July 2, 2007

Re: Lake Perris Dam Remediation Notice of Preparation

The Sierra Club appreciates this opportunity to express some concerns that need to be addressed in this Draft EIR.

Will the lake's footprint increase its size over its size prior to your intentional downsizing? Or will it allow for an increase in size? If the answer is yes, then the DEIR must analyze the impacts on animals, plants and park usage. For example, have Stephens' Kangaroo Rats (SKR) populated lands that were once under water, and will your plan again flood those areas? What happens to SKR when the lake is increased in size beyond its historic high levels?

It is the Sierra Club's understanding that the San Jacinto Wildlife (SJWA) is both an SKR reserve and a multi-species reserve, as is Lake Perris. How are you going to avoid impacts to the SJWA and its mission when Fish and Game owns and manages the land at the west side of the dam's base? How will you maintain the riparian habitat found therein for both the short and the long term?

An accurate map of both the SJWA and Lake Perris properties must be included. You must indicate on the maps which areas will be impacted during the remediation process and a detailed explanation of the causes and size of the impacts and what habitat will be disturbed or destroyed. This includes roadways and staging areas. How will the project mitigate for what will be a significant impact? What is the cumulative impact on all the natural resources?

Each impacted natural resource should have several alternatives provided in the DEIR, which will lessen the impact to these multi-species reserves.

Given that you are spending millions on this project, where is the $212,000 annual monies that the California State Parks and Recreation and the California Department of Fish and Game promised to give towards the management of SKR? How much take of SKR and other endangered or threatened species will occur during and after this project?

What measures will be taken to lessen impacts on air quality from diesel fuel, dust, and other causes? What project alternatives could lessen these impacts?

Please make sure that I receive a hard copy of both the DEIR and the Final EIR, as well as timely notice of all meetings that relate to this project.

Sincerely,

George Hague

George Hague
Conservation Chair
Moreno Valley Group of the Sierra Club
26711 Ironwood Avenue
Moreno Valley, California 92555-1906
Phone: 951-924-0816
Fax: 951-243-7678

use this address for sending documents and information.

STARWEST MOTOCROSS PARK

June 29, 2007

Mr. Tom Barnes
ESA Water
707 Wilshire Blvd.
Suite 1450
Los Angeles, CA 90017

VIA EXPRESS MAIL
VIA EMAIL: tbarnes@esaassoc.com
VIA FACSIMILE: 213-599-4301

Dear Mr. Barnes:

I am responding on behalf of Dover Images, Ltd. dba Starwest Motocross Park, in opposition to the proposed Lake Perris Dam emergency runoff channel. Even though information that has been made available to us has been very limited, and varies depending on who we are talking to from your organization, we understand an emergency flood channel is proposed to run from Ramona Expressway onto the Fairgrounds' property, approximately 150 feet from the edge of the blacktop.

Starwest Motocross Park has been on the Lake Perris Fairgrounds since 1991. It currently enjoys approximately a quarter million visitors annually. 85% of who are families and kids ranging from 5 to 17 year of age, boys and girls alike. In many cases, the father and the children all ride. Moreover, all riders are required to be a member of the American Amateur Racer Association, which provides insurance cards with an additional excess medical benefit available to each member. There are presently over 40,000 members which pay an annual fee to join.

In the last three years, Starwest has made hundreds of thousands of dollars in tenant improvements, including planting scenic dust and noise filtering trees and irrigation in the proposed path of this channel. Our entire infrastructure runs along the front portion closest to the street, including lights, electrical, transformers, sprinkler timers, and our 4-foot sewer line and manhole covers. One very important aspect to the success of all the businesses on the fairgrounds is the aesthetic value as you drive by on Ramona Expressway and the excitement you feel entering the fairgrounds for its many activities. The proposed channel would affect the fairgrounds' marquee sign that all the businesses advertise on. The fairgrounds and its related businesses, such as Starwest, battle with parking issues every year. The proposed path of this flood channel would eliminate more parking than the grounds and its businesses can withstand.

STARWEST MOTOCROSS PARK

The motocross park and other businesses on the fairgrounds, along with the Fair, have really come alive in the last few years. None of the businesses could withstand even the extensive construction of the proposed flood channel, not to mention dust, dirt, debris, and the blockage of entrance roads all the way down through three signal lights. We desperately need to work together to devise a plan that obviously allows your very important project to be completed without wiping out one of the most popular recreation areas in Southern California with our visitors coming from all around the nation, Europe, Australia, South Africa, Asia, Canada, and Latin America. Not only would the loss of over a million visitors a year to the fairgrounds have a striking blow on its tenants, but it would have enormous economic impact on the surrounding business communities.

We look forward to the opportunity of meeting and working with you on an equitable solution for all parties.

Sincerely,

Malcolm McCassy

cc: Robert D. Coviello, Esq.
Vince Agnifili, Fairgrounds General Manager

18700 Lake Perris Drive • Gate A • Perris, California 92571 • 951-943-4535

Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

Dear Mr. Barnes,

Pursuant to the "Notice of Preparation of Environmental Impact Report" for the Perris Dam Remediation Project I would like to make the following comments.

I own and operate the Perris Auto Speedway located on the Lake Perris Fairgrounds. We have been a Renter on the Fairgrounds for the past twelve years. We host and produce a minimum of 45 events and shows beginning in February each year and conclude our schedule in late November. After reviewing the Notice of Preparation it is not clear if our operations will be impacted during the remediation project. However, once the details on the emergency outlet are completed it may have a potential impact. Should there be an impact we would request that every option be explored as to minimize any adverse impacts.

The Fairgrounds is very dependent on the success of their Renters. Any impacts that adversely affect the Renters will directly impact the Fairgrounds as well.

Thank you for your attention to this very important project.

Sincerely,

Don A. Kazarian
President
Oval Entertainment, LLC
Perris Auto Speedway

FRIENDS OF THE NORTHERN SAN JACINTO VALLEY
P.O. Box 9097
Moreno Valley, CA 92552-9097

2 July 2007

Via FAX (213-599-4301) and E-Mail

Mr. Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

Dear Mr. Barnes:

RE: Notice of Preparation (NOP) for the Perris Dam Remediation Project, Riverside County, CA

The Friends of the Northern San Jacinto Valley are providing the following comments in response to the Notice of Preparation (NOP) for the Perris Dam Remediation Project. The California Department of Water Resources (DWR) is the Lead Agency for this project pursuant to the California Environmental Quality Act (CEQA). We are concerned that the NOP fails to acknowledge a number of important wildlife conservation milestones and issues of mandatory significance associated with the Lake Perris project site.

The lands in front of the Lake Perris Dam are presently included within the Department of Fish and Game's (DFG) San Jacinto Wildlife Area. These lands were transferred to the DFG as a result of the "Memorandum of Agreement Regarding Mitigation of State Water Project (SWP) Wildlife Losses in Southern California" date October 23, 1979. The 1979 Mitigation Agreement entered into by DWR, DFG, and the Metropolitan Water District (MWD) provides in part :

"The following acreage of SWP lands in Southern California (Lake Perris) shall be designated and made available for wildlife mitigation purposes. Uses of these lands for other purposes will not be allowed if such use impinges upon the maintenance of wildlife populations, except as needed for SWP operations. If DWR requires any of these lands for SWP operations, DWR will replace such lands taken with other lands acceptable to DFG."

The Draft EIR needs to examine the extent to which this project will impinge upon the maintenance of wildlife populations on the designated mitigation lands in front of the Lake Perris dam and the proposed rock quarry site in the Bernasconi Hills. This analysis should specifically address the need for wildlife mitigation replacement lands.

In 1995, a substantial amount of the lands in front of the Lake Perris dam were included with the Stephens' kangaroo rat (SKR) habitat reserve pursuant to the federal/state SKR Habitat Conservation Plan (Riverside County Habitat Conservation Agency, RCHCA). It appears project construction activities in front of the dam as well as the soil excavation operations at the east end of the lake will result in

additional take of SKR contrary to the HCP and the federal Endangered Species Act. We are concerned this project on a cumulative basis may well place the SKR in jeopardy of extinction. Cumulative impacts of concern include the recent loss of the March SKR Reserve, the overlay of the western Riverside County MSHCP on the SKR reserve system, and future SWP operational needs at Lake Perris. The Draft EIR needs to provide an adequate cumulative analysis of this SKR issue.

In 2004, Lake Perris State Recreation Area was included as a principal reserve in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The existing riparian habitat on the east end of the lake comprises approximately 50 acres of important habitat. In addition approximately 20 acres of riparian habitat has developed in front of the dam due to the dam seepage problem. Both of these areas provide critical habitat for numerous species including the endangered Least Bell's vireo. We anticipate the repair of the seepage problem will eliminate the riparian habitat in front of the dam. In addition it appears the proposed excavation of the east end of the lake will adversely impact the extensive riparian values located there. The Draft EIR needs to recognize and apply the MSHCP policies and procedures for the Protection Of Species Associated with Riparian/Riverine Area (MSHCP Section 6.2.1).

We appreciate the opportunity to comment on this project and look forward to reviewing the Draft EIR.

Sincerely,

Ann L. Turner-McKibben, President
(951) 924-8150
e-mail: northfriends@northfriends.org

McCANNA RANCH
WATER COMPANY

Department of Water Resources

C/o Tom Barnes

707 Whilshire Blvd., Suite 1450
Los Angeles, Ca 90017

June 20, 2007

Re; Lake Perris Dam Remediation

The McCanna Ranch Water Company has been authorized as a public necessity to serve the Villages of Avalon through a pre-existing underground stream. This stream has historically been producing water to the local ground water basin allowing for a large area of farmlands and now residential neighborhoods, parks and schools.

The concern of the MCRWC and such repairs to the foundation to the Perris dam are related to the depth of the repairs and the soils mixing that are proposed. The water source for the MCRWC is the ancient streambed underneath the pre existing sub-grade to the Dam foundation. We need to be assured the flow of the ancient stream is not impacted.

As importantly I anticipate a common sense approach will be utilized as we look at such a significant project. Water resources are a significant value to the region. I believe a common sense approach to such long-term improvements would be to expand the water capacity of Lake Perris. This could allow for less of a need for a future storage facility as well as providing more recreational amenities.

Lou Ochoa

McCanna Ranch Water Co.
Development Manager
5950 Priestly Dr
Carlsbad, Ca 92009

JUN 26 2007

LAKE PERRIS FAIRGROUNDS

STATE OF CALIFORNIA
46TH DISTRICT AGRICULTURAL ASSOCIATION
18700 LAKE PERRIS DRIVE • PERRIS, CALIFORNIA 92571
Telephone (951) 657-4221 • FAX (951) 657-5412
www.SoCalFair.com • info@SoCalFair.com

June 29, 2007

Perris Dam Remediation Project EIR
c/o Tom Barnes, ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

VIA FEDEX
VIA EMAIL: tbarnes@esassoc.com
VIA FACSIMILE: 213.599.4301

Reference: Perris Dam Remediation Project

Dear Mr. Barnes:

We are responding to the Notice of Preparation (NOP) of Environmental Impact Report (EIR) for the Department of Water Resources (DWR) *Perris Dam Remediation Project.*

The Lake Perris Fairgrounds (Fairgrounds)/Southern California Fair (Fair) is operated and managed by the 46th District Agricultural Association (DAA) with the California Department of Food and Agriculture (CDFA), Division of Fairs & Expositions (F&E) providing fiscal and policy oversight. The DAA is governed by a Board of Directors appointed by the Governor of the State of California and managed by a CEO. The DAA while a State agency is virtually self-supporting, receiving no general funding from the State of California. The physical property and location are among the most valuable assets of the DAA and were determining factors in our re-location to the site in 1987.

Our general understanding is that DWR is proposing to construct an emergency release channel paralleling the North edge of Ramona Expressway and extending North 150' to 200', the channel may be lined or un-lined and would flow to the Perris Valley Storm Drain.

The DAA is ***exceptionally concerned about impacts both known and unknown*** in connection with the development of the proposed project. The mere act of filing the NOP of the EIR has already resulted in tangible and intangible implications on our ongoing business. We certainly would insist that the EIR study include and address the following impacts prior to moving forward with any construction announcements or determinations as to the approval of the Perris Dam Remediation Project.

1. The Fairgrounds is approaching 1 million visitors each year.

2. The Ramona Expressway visibility of the Fairgrounds provides priceless value to the property.

3. The Fairgrounds provides unique agricultural, educational, economic, social, entertainment and recreational opportunities and when called upon acts as an emergency resource.

4. The DAA is dependent upon income generated from the annual Southern California Fair, an Off-Track Horse Racing facility, facility rentals, parking revenues, associated revenue streams and sponsorships, leases and rental income from renters for economic stability.

5. The DAA has long-term contracts with a number of individual renters that would certainly be adversely affected.

6. The DAA also contracts with other interim renters for the use of parking lots and facilities. This may include but not limited to; circus, tent sales, consumer shows, concerts, rodeos, RV rallies, receptions, parties and car shows.

7. Parking is located in controlled and specific areas for each event or activity, with many having restricted access depending on the event. Parking is charged for most public events.

8. Traffic ingress and egress is through designated gates; four gates on Lake Perris Drive and one controlled gate on Ramona Expressway.

9. Existing infrastructure located within 150' to 200' of the North edge of Ramona Expressway includes but is not limited to:

    a. Water main and backflow
    b. High voltage electrical
    c. Sanitary sewer lines
    d. Sanitary sewer lift station
    e. Sanitary sewer pressurized lines
    f. Irrigation systems
    g. Landscape
    h. Lighting
    i. Electronic message center
    j. Control fencing and gates

10. The DAA has no additional land available to develop.

11. Ongoing development of the property/programs and future ability to generate revenue will substantially be impacted.

12. The project may cumulatively and irreversibly affect the DAA's ability to sustain normal business operations.

13. The prospect of the project moving forward has already depreciated the value of our property and our ability to negotiate with current and future generation of renters. In addition our planned and un-planned investment in capital improvements/repairs to the property takes on an entirely new dimension of uncertainty.

14. There are certainly many other considerations that will require thorough identification.

The Project Background specifically identifies the recreational opportunities at Lake Perris State Recreation Area (LPSRA) and has already disregarded in the preparation of NOP the agricultural, educational, economic, and social, entertainment and recreational opportunities the Fairgrounds offers. It is imperative that complete context and social analysis be applied to the EIR process to insure all areas are studied. The proposed NOP of EIR as presented merely mentions the Land Use issue of the fairgrounds and does even less to address Recreation while stating "recreational activities (at the LPSRA) would return to historic levels, or would even increase".

Questions regarding the proposed Emergency Outlet Release Channel follow;

1. The project will upgrade the State Water Project (SWP) infrastructure to meet current seismic standards and minimize the risks associated with seismic hazards; why is it necessary to construct the Emergency Release Channel now when the dam has been in continual operation since 1974?

2. There is a system of pipelines in place already; could these pipelines be used to perform a controlled drawdown of the lake? And what other systems are already in place? Can modifications be made to existing systems?

3. In the event of a catastrophic failure would an emergency drawdown through the proposed Emergency Outlet make a substantial difference to public safety?

4. What are the risks and consequences of not constructing the channel?

5. Project Description states "All three projects will be constructed without draining the lake in an effort to maintain the beneficial use of the State Recreation Area." What will be done to maintain the beneficial use of the Fairgrounds?

6. What are the construction specifics of the channel, i.e. design, alignment, timetables, security/safety, maintenance and what will be done to minimize impacts to the Fairgrounds?

7. Could the Emergency Release be through an underground pipe system?

8. Could a retention basin system be excavated outside the lake or in front of the Dam to provide greater ecological habitat?

9. Who will maintain the channel?

10. What security measures and features will be built into the project?

11. How will DWR address the short-term, long-term, adverse and permanent factors on the Fairgrounds business model both on a tangible and intangible basis?

12. Why do Project Objectives fail to mention mitigating impacts to the Fairgrounds while specifically identifying an objective to "Maximize the beneficial uses of the LPSRA by restoring the reservoir to its pre-drawdown water levels."?

13. How can the construction of the channel not have substantial detrimental effects to the Fairgrounds?

14. What resources are available to the DAA to mitigate the damage that has already been put in motion and may further occur?

DWR's plan to upgrade the dam by removing and replacing foundation material along a portion of the dam toe and adding a stability berm are obvious life safety issues and the DAA supports actions taken to protect, upgrade and restore the water delivery system.

Given the information that we have; at this point, we view the release channel project as permanently detrimental to all activities and request Project Objectives require extensive examination to incorporate acceptable objectives that reach beyond those identified in the NOP.

Sincerely,

Vince Agnifili
Chief Executive Officer
46th District Agricultural Association
Southern California Fair

Cc:
Board of Directors
Lisa Drury, Division of Fairs & Expositions
Jess Cummings, California Construction Authority

CYBERNET
Consulting Inc.

SCADA SYSTEMS ♦ COMMUNICATIONS ♦ SOFTWARE ENGINEERING

June 27, 2007

Tom Barnes, ESA
707 Wilshire Boulevard Ste 1450
Los Angeles, CA 90017

Dear Tom,

CyberNet is pleased to submit our Statement of Qualifications in response to DWR's solicitation for input into the information to be studied related to the Perris Dam Remediation Project. We are an Engineering Services company in the water/wastewater industry specializing in all aspects of SCADA Systems, including instrumentation, Communications Networks (including radio systems), and Software Implementation (programming of PLCs and HMI). CyberNet has been recently selected by the Santa Clara Valley Water District to provide them with the design and software implementation of an automatic data acquisition system (ADAS) for their dam safety monitoring and compliance needs. The project includes four dams and will extend to six more dams in the future. CyberNet is teaming with Geomation, Inc. (Golden, CO), an acknowledged global leader in remote data acquisition and control, dedicated to the founding purpose of helping customers overcome the barriers inherent in taking physical measurements in harsh and remote environments. We would be happy to provide you with additional information at your request.

From our inception in 1993, CyberNet Consulting has been providing exceptional engineering and construction support services, primarily to City, County Utilities and Special Districts. With today's rapid technology obsolescence / advancement, coupled with physical and cyber security concerns, having direct access to industry experts is of paramount importance. CyberNet can offer your agency the following benefits:

- Increased access to a highly knowledgeable pool of experts in the fields of SCADA System Design, Information Technology, Radio Communications, Cyber Security, Software Engineering and Project Management.

- Solid, real-world experience in facility automation and upgrades for plant control, DCS / SCADA, information, and security systems. Most of our engineers have hands-on systems integration experience.

- Unbiased engineering solutions – we are not connected to any particular product or vendor and will specify the right equipment for your specific project.

Tom, we recognize the objectives for these projects include protecting, upgrading and restoring the SWP water delivery system. CyberNet is a well qualified firm and is committed to our clients and the quality of the service we provide. We would welcome an opportunity to discuss how we can contribute to your projects' success. Let us know how we can help.

Regards,
CyberNet Consulting, Inc.

Mary Ellen Krut, MBA

Corporate Office – San Diego
5927 Balfour Court, Ste. 208
Carlsbad, CA 92008
(760) 603-1250

Northern California
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www.cybernet-consulting.com (800) 482-9237 info@cybernet-consulting.com

Tom Barnes
ESA
707 Wilshire Boulevard, Ste. 1450
Los Angeles, CA 90017

July 1, 2007

Sent via email to: tbarnes@esassoc.com

Re: Perris Dam Remediation Project NOP

For over 20 years I have been a resident of Riverside County and a geologist at U.C. Riverside, concerned with geologic hazards in the Inland Empire. The following issues need to be addressed in the Perris Dam remediation Project EIR:

1) The quarry area (33°50'22"N, 117°10'05"W) used for construction of the dam in the early 1970s appears to have overly steep quarry walls that exceed more recent regulatory limits for mine and quarry slope stability as dictated by local, state and federal agencies (Riverside County Geologist; California State Mining and Geology Board; California Office of Mine Reclamation; U.S. Mine Safety and Health Administration; U.S. Army Corps of Engineers; Surface Mining and Reclamation Act of 1975). Any proposal for renewed usage and expansion of this quarry must be reviewed by the appropriate agencies for adherence to the modern slope stability and reclamation regulations.

2) The Big Rock climbing area (33 °50'17"N, 117 °10'22.5"W) and related granitic rocks to the east (immediately adjacent to the quarry area) are not only popular with rock climbers but are also used as important historical geological features: they contain rare migmatite outcrops and the largest disaggregating xenolith outcrop in California (Morton and Miller, 2006). Numerous geology classes, including those at the University of California, Riverside, have visited this educational outcrop yearly since the 1960s. These outcrops thus have historical and cultural significance and must not be disturbed by the planned dam project.

3) The proposed location of the stability berm lies partly within current wetlands and other types of wildlife habitat. The impacts on, and mitigation of the loss of, such habitat must be fully addressed by the EIR. In addition, the effect of increased gravitational loading caused by this berm on the potential for more widely-manifested hydrologic changes, soil collapse and liquefaction also must be addressed. The potential for amplification/resonance in seismic shaking of the dam (during both vertical and lateral ground acceleration) and possible structural collapse, resulting from different proposed berm designs, must also be addressed.

4) The NOP states on p. 10 that "Seepage from Perris Lake has significantly raised the local groundwater table and improved groundwater quality downstream of Perris Dam". However, the NOP fails to note that by causing rises in the groundwater table such seepage has also significantly increased liquefaction potential in and around the Lake Perris area, particularly in areas where new housing developments are being proposed for the Perris, Lakeview and San Jacinto areas. The cumulative and related risk issues of dam seepage, rising groundwater tables, and dam breeches/flooding on increased

liquefaction potential in rapidly developing areas are thus of great public health and safety significance and must be addressed thoroughly in the project EIR.

Please keep me informed as to all scoping sessions, workshops, proceedings, meetings, hearings, staff reports, technical reports, public documents, DEIRs, EIRs and decisions in regard to this project.

Sincerely,

Michael A. McKibben, Ph.D.
23296 Sonnet Drive
Moreno Valley, CA 92557
(951) 924-8150
mamckibben@adelphia.net

Reference cited:

Morton, D.M., and Miller, F. K., 2006, Geologic map of the San Bernardino and Santa Ana 30' x 60' quadrangles, California; USGS Open File Report 1271, 2006, http://pubs.usgs.gov/of/2006/1217/

Tom Barnes

From: Robert Whitaker [27trackt@sbcglobal.net]
Sent: Friday, June 22, 2007 4:05 PM
To: Tom Barnes
Subject: NOP re Perris Dam Remediation Project

Mr. Barnes:

Please consider the impact this project would have if it were to interfere with the operation of the Perris Auto Speedway (PAS), which is located within the fairgrounds property and in close proximity to the dam remediation work. I am a race fan and regularly attend events at this venue. At any given event there might be many hundreds to thousands of fans in attendance. In addition to taking away this form of recreation from the fans, if remediation actitivities or the end result of them were to cause operations at the PAS to cease, there would be significant job losses, and also the loss of the economic benefits from travel, lodging, dining, and the like that the racing community brings to the Perris area.

Please recognize these significant impacts while you are designing and planning, and try to incorporate a plan that will leave the Perris Auto Speedway intact and able to continue operation.

Thank you, Bob Whitaker

5740 Greens Drive
Riverside, CA 92509
(951)681-4462

JMK rec'd 7/18/07

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

Maureen F. Gorsen, Director
5796 Corporate Avenue
Cypress, California 90630

Arnold Schwarzenegger
Governor

July 12, 2007

Ms. Jeanne Kuttel
Department of Water Resources
1416 Ninth Street
Sacramento, California 95814

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT (EIR) FOR THE PERRIS DAM REMEDIATION AT LAKE PERRIS DRIVE PROJECT (SCH. NO. 2007061004)

Dear Ms. Kuttel:

The Department of Toxic Substances Control (DTSC) has received your submitted Notice of Preparation of an EIR and Initial Study (IS) for the above-mentioned project. The following project description is stated in your document: "The Perris Dam Remediation Project includes three separate projects: (1) Perris Dam Remediation Project, (2) Outlet Tower Retrofit, and (3) Emergency Outlet Release Facility." DTSC provides comments as follows:

1) The EIR should identify the current or historic uses at the project site that may have resulted in a release of hazardous wastes/substances.

2) The EIR should identify the known or potentially contaminated sites within the proposed Project area. For all identified sites, the EIR should evaluate whether conditions at the site may pose a threat to human health or the environment. Following are the databases of some of the regulatory agencies:

- National Priorities List (NPL): A list maintained by the United States Environmental Protection Agency (U.S.EPA).

- Envirostor (formerly CalSites): A Database primarily used by the California Department of Toxic Substances Control, accessible through DTSC's website (see below).

- Resource Conservation and Recovery Information System (RCRIS): A database of RCRA facilities that is maintained by U.S. EPA.

- Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS): A database of CERCLA sites that is maintained by U.S.EPA.

- Solid Waste Information System (SWIS): A database provided by the California Integrated Waste Management Board which consists of both open as well as closed and inactive solid waste disposal facilities and transfer stations.

- Leaking Underground Storage Tanks (LUST) / Spills, Leaks, Investigations and Cleanups (SLIC): A list that is maintained by Regional Water Quality Control Boards.

- Local Counties and Cities maintain lists for hazardous substances cleanup sites and leaking underground storage tanks.

- The United States Army Corps of Engineers, 911 Wilshire Boulevard, Los Angeles, California, 90017, (213) 452-3908, maintains a list of Formerly Used Defense Sites (FUDS).

3) The EIR should identify the mechanism to initiate any required investigation and/or remediation for any site that may be contaminated, and the government agency to provide appropriate regulatory oversight. If necessary, DTSC would require an oversight agreement in order to review such documents. Please see comment No.17 below for more information.

4) All environmental investigations, sampling and/or remediation for the site should be conducted under a Workplan approved and overseen by a regulatory agency that has jurisdiction to oversee hazardous substance cleanup. The findings of any investigations, including any Phase I or II Environmental Site Assessment Investigations should be summarized in the document. All sampling results in which hazardous substances were found should be clearly summarized in a table.

5) Proper investigation, sampling and remedial actions overseen by the respective regulatory agencies, if necessary, should be conducted at the site prior to the new development or any construction. All closure, certification or remediation approval reports by these agencies should be included in the EIR.

6) If any property adjacent to the project site is contaminated with hazardous chemicals, and if the proposed project is within 2,000 feet from a contaminated site, then the proposed development may fall within the "Border Zone of a Contaminated Property." Appropriate precautions should be taken prior to construction if the proposed project is within a Border Zone Property.

7) Your document states: "The EIR will assess the potential for encountering such hazards at Perris Dam and will develop mitigation measures if necessary to ensure that any hazards encountered during construction would be handled in accordance with applicable regulations." If buildings or other structures, asphalt or concrete-paved surface areas are being planned to be demolished, an investigation should be conducted for the presence of other related hazardous chemicals, lead-based paints or products, mercury, and asbestos containing materials (ACMs). If other hazardous chemicals, lead-based paints or products, mercury or ACMs are identified, proper precautions should be taken during demolition activities. Additionally, the contaminants should be remediated in compliance with California environmental regulations and policies.

8) The project construction may require soil excavation or filling in certain areas. Sampling may be required. If soil is contaminated, it must be properly disposed and not simply placed in another location onsite. Land Disposal Restrictions (LDRs) may be applicable to such soils. Also, if the project proposes to import soil to backfill the areas excavated, sampling should be conducted to ensure that the imported soil is free of contamination.

9) Human health and the environment of sensitive receptors should be protected during the construction or demolition activities. If it is found necessary, a study of the site and a health risk assessment overseen and approved by the appropriate government agency and a qualified health risk assessor should be conducted to determine if there are, have been, or will be, any releases of hazardous materials that may pose a risk to human health or the environment.

10) If it is determined that hazardous wastes are, or will be, generated by the proposed operations, the wastes must be managed in accordance with the California Hazardous Waste Control Law (California Health and Safety Code, Division 20, Chapter 6.5) and the Hazardous Waste Control Regulations (California Code of Regulations, Title 22, Division 4.5).

11) If it is determined that hazardous wastes are or will be generated and the wastes are (a) stored in tanks or containers for more than ninety days, (b) treated onsite, or (c) disposed of onsite, then a permit from DTSC may be required. If so, the facility should contact DTSC at (714) 484-5423 to initiate pre-application discussions and determine the permitting process applicable to the facility.

12) If it is determined that hazardous wastes will be generated, the facility should obtain a United States Environmental Protection Agency Identification Number by contacting (800) 618-6942.

13) Certain hazardous waste treatment processes may require authorization from the local Certified Unified Program Agency (CUPA). Information about the requirement for authorization can be obtained by contacting your local CUPA.

14) If the project plans include discharging wastewater to a storm drain, you may be required to obtain an NPDES permit from the overseeing Regional Water Quality Control Board (RWQCB).

15) If during construction/demolition of the project, the soil and/or groundwater contamination is suspected, construction/demolition in the area would cease and appropriate health and safety procedures should be implemented.

16) If the site was used for agricultural or related activities, onsite soils and groundwater might contain pesticides, agricultural chemical, organic waste or other related residue. Proper investigation, and remedial actions, if necessary, should be conducted under the oversight of and approved by a government agency at the site prior to construction of the project.

17) Envirostor (formerly CalSites) is a database primarily used by the California Department of Toxic Substances Control, and is accessible through DTSC's website. DTSC can provide guidance for cleanup oversight through an Environmental Oversight Agreement (EOA) for government agencies, or a Voluntary Cleanup Agreement (VCA) for private parties. For additional information on the EOA please see www.dtsc.ca.gov/SiteCleanup/Brownfields, or contact Maryam Tasnif-Abbasi, DTSC's Voluntary Cleanup Coordinator, at (714) 484-5489 for the VCA.

If you have any questions regarding this letter, please contact Ms. Teresa Hom, Project Manager, at (714) 484-5477 or email at thom@dtsc.ca.gov.

Sincerely,

Greg Holmes
Unit Chief
Southern California Cleanup Operations Branch - Cypress Office

cc: Governor's Office of Planning and Research
State Clearinghouse
P.O. Box 3044
Sacramento, California 95812-3044

CEQA Tracking Center
Department of Toxic Substances Control
Office of Environmental Planning and Analysis
1001 I Street, 22nd Floor, M.S. 22-2
Sacramento, California 95814

CEQA#1703

STATE OF CALIFORNIA – THE RESOURCES AGENCY

Arnold Schwarzenegger, *Governor*

COLORADO RIVER BOARD OF CALIFORNIA
770 FAIRMONT AVENUE, SUITE 100
GLENDALE, CA 91203-1068
(818) 500-1625
(818) 543-4685 FAX

August 1, 2007

Mr. Tom Barnes
ESA Associates
707 Wilshire Boulevard, Suite 1450
Los Angeles, CA 90017

Regarding: Notice of Preparation of an Environmental Impact Report (EIR) for the proposed California Department of Water Resources (DWR) Perris Dam Remediation Project, Riverside County, California

Mr. Barnes:

The Colorado River Board of California (CRB) has received a copy of Notice of Preparation of an Environmental Impact Report (EIR) for the proposed DWR Perris Dam Remediation Project, Riverside County, California. Perris Dam, which impounds Lake Perris, is located 15 miles south of the City of Riverside in Riverside County and approximately 65 miles east of Los Angeles.

At this juncture, the CRB has determined that it has no comments regarding the proposed project. If you have any questions, please contact me at (818) 500-1625.

Sincerely,

Gerald R. Zimmerman
Executive Director

RECEIVED
AUG 0 2 2007
ENVIRONMENTAL SCIENCE ASSOC.
LOS ANGELES

DEPARTMENT OF TRANSPORTATION
DISTRICT 8
PLANNING AND LOCAL ASSISTANCE (MS 722)
464 WEST 4th STREET, 6th FLOOR
SAN BERNARDINO, CA 92401-1400
PHONE (909) 383-6040
FAX (909) 383-6890
TTY (909) 383-6300

RECEIVED
OCT 0 2 2007
ENVIRONMENTAL SCIENCE ASSOC.
LOS ANGELES

Flex your power!
Be energy efficient!

September 27, 2007

C/O Tome Barnes, ESA
707 Wilshire Boulevard
Los Angeles, CA 90017

Proposed Perris Dam Remediation - The project includes (1) Perris Dam Remediation Project, (20 Outlet Tower Retrofit, and (3) Emergency Outlet Release Facility.
08-SR215-PM near R030.933

Dear Mr. Barnes,

The California Department of Transportation (Department) received the Notice of Preparation (NOP) for the above noted proposal. Unfortunately, the notice did not include a State Clearinghouse number.

The project does not have adverse impacts to the State Highway System. However, please consider the following comments:

Construction and Traffic Handling Plan

- The Construction and Traffic Handling Plan should show how traffic along the Ramona Expressway, and the I-215 interchange/mainline would be affected and handled. There must be minimal interruption to traffic on I-215.

Cumulative impacts

- The cumulative impacts of other proposed developments in the area may have considerable impact on the regional transportation system. In cooperation with the County of Riverside, appropriate road improvements must be planned to mitigate increases in visitor traffic demand as a result of the proposed project deepening the eastern lakebed and enlarging the capacity for boating, water skiing and jet skiing. Land-use planning must include transportation planning in order to maintain the desired level of service and to promote economic vitality in the region.

Drainage

- Existing capacity of affected State drainage systems cannot be exceeded. Should 100-year project water run-off volume be determined to exceed the maximum capacity of the existing State drainage facilities, construction of on-site detention basins, new drainage systems or other impact mitigation would be required.

The California Department of Transportation reserves the right to comment on any future revisions to this project. Should you have any concerns regarding the information contained in this letter, please do not hesitate to coordinate with Victoria Green victoria.c.green@dot.ca.gov (909) 383.4032 or me at (909) 383.6040.

Sincerely,

Nathaniel H. Pickett
Office Chief
Regional Planning, Riverside IGR/CEQA Review

C: Manuel Jabson, Operations-Surveillance Region A

V. Green

-----Original Message-----
From: Tom Williams [mailto:ctwiliams@yahoo.com]
Sent: Tuesday, August 07, 2007 9:59 PM
To: perrisdam@water.ca.gov
Cc: davegoodward@earthlink.net; drew-f@att.net
Subject: DWR Environmental Assessment and NOP for Perris Dam Project

DWR
The Project -
  best and most feasible repair options
  address the seismic concerns at Perris Dam.
  Finalized repair plan
  Upgrading dam by replacing the foundation material
  Reinforcing it with a stability berm placed on top
of the improved foundation.
  Return to its previous maximum operating pool
elevation after construction.

Repair plan include constructing a new outlet tower
and emergency outlet release facility.

Construction is estimated to begin in the fall of
2008.

Dam completion is expected by fall 2010.

All projects concerning the Perris Dam are anticipated
to be complete by fall 2012.

Lake Perris is located in northern Riverside County,
and is the southernmost State Water Project Facility
and the southern terminus of the East Branch of the
California aqueduct.

The Lake Perris State Recreation Area is one of the
state's most popular recreation destinations, with an
average attendance of 1.1 million visitors.

We will convey our comments and questions soon for
your considerations.

We would like to receive current updates regarding the
Perris Dam remediation project.

Dr. Tom Williams
Conservation Committee
Los Angeles Audubon Society
and Others

Nicolle Ianelli Steiner

From: Kathleen Browne [KBROWNE@rctlma.org]
Sent: Tuesday, August 14, 2007 1:02 PM
To: Tom Barnes
Subject: Notice of Preparation DWR Perris Dam Remediation Project EIR

Dear Mr. Barnes,

I apologize for the lateness of my response to the above notice. The County of Riverside Planning Department would like to receive a copy of the Draft environmental document once completed for review and comment. If you should have any questions, please contact me at 951-955-4949 or at my return email address.

Sincerely,

Kathleen Browne
Special Projects

Appendix B
Air Quality Appendix

ESA

Appendix B1
URBEMIS Output

ESA

6/23/2009 8:54:13 AM

Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Berm.urb924

Project Name: Perris Berm

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	9.88	99.06	46.43	0.09	200.31	4.74	205.05	41.87	4.36	46.23	12,984.66
2012 TOTALS (lbs/day unmitigated)	5.36	29.68	67.73	0.09	200.01	1.54	201.55	41.77	1.42	43.19	10,339.28
2013 TOTALS (lbs/day unmitigated)	4.90	23.22	63.33	0.09	0.39	1.39	1.78	0.14	1.26	1.40	10,338.54

6/23/2009 8:54:42 AM

Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Berm.urb924

Project Name: Perris Berm

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 3/1/2011-12/1/2011 Active Days: 198	**9.88**	**99.06**	46.43	0.09	**200.31**	**4.74**	**205.05**	**41.87**	**4.36**	**46.23**	**12,984.66**
Mass Grading 03/01/2011-12/01/2011	9.88	99.06	46.43	0.09	200.31	4.74	205.05	41.87	4.36	46.23	12,984.66
Mass Grading Dust	0.00	0.00	0.00	0.00	200.00	0.00	200.00	41.77	0.00	41.77	0.00
Mass Grading Off Road Diesel	5.11	39.07	21.20	0.00	0.00	2.32	2.32	0.00	2.14	2.14	3,651.00
Mass Grading On Road Diesel	4.70	59.86	23.03	0.08	0.30	2.40	2.71	0.10	2.21	2.31	9,053.83
Mass Grading Worker Trips	0.07	0.13	2.20	0.00	0.01	0.01	0.02	0.00	0.01	0.01	279.83
Time Slice 12/2/2011-12/30/2011 Active Days: 21	3.95	31.68	18.04	0.00	200.01	1.69	201.70	41.77	1.55	43.32	3,162.94
Fine Grading 12/02/2011-02/01/2012	3.95	31.68	18.04	0.00	200.01	1.69	201.70	41.77	1.55	43.32	3,162.94
Fine Grading Dust	0.00	0.00	0.00	0.00	200.00	0.00	200.00	41.77	0.00	41.77	0.00
Fine Grading Off Road Diesel	3.91	31.61	16.82	0.00	0.00	1.68	1.68	0.00	1.55	1.55	3,007.48
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.07	1.22	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.46

6/23/2009 8:54:42 AM

Time Slice 1/2/2012-2/1/2012 Active Days: 23	3.74	29.68	17.37	0.00	200.01	1.54	201.55	41.77	1.42	43.19	3,162.91
Fine Grading 12/02/2011-02/01/2012	3.74	29.68	17.37	0.00	200.01	1.54	201.55	41.77	1.42	43.19	3,162.91
Fine Grading Dust	0.00	0.00	0.00	0.00	200.00	0.00	200.00	41.77	0.00	41.77	0.00
Fine Grading Off Road Diesel	3.71	29.61	16.24	0.00	0.00	1.54	1.54	0.00	1.42	1.42	3,007.48
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.43
Time Slice 2/2/2012-3/30/2012 Active Days: 42	3.09	24.70	15.89	0.00	0.01	1.28	1.29	0.00	1.17	1.18	2,995.34
Trenching 02/02/2012-04/01/2012	3.09	24.70	15.89	0.00	0.01	1.28	1.29	0.00	1.17	1.18	2,995.34
Trenching Off Road Diesel	3.05	24.62	14.52	0.00	0.00	1.27	1.27	0.00	1.17	1.17	2,808.82
Trenching Worker Trips	0.04	0.08	1.36	0.00	0.01	0.01	0.01	0.00	0.00	0.01	186.52
Time Slice 5/2/2012-12/31/2012 Active Days: 174	5.36	25.25	**67.73**	**0.09**	0.39	1.54	1.93	0.14	1.40	1.54	10,339.28
Building 05/02/2012-02/01/2013	5.36	25.25	67.73	0.09	0.39	1.54	1.93	0.14	1.40	1.54	10,339.28
Building Off Road Diesel	3.14	14.81	10.52	0.00	0.00	1.04	1.04	0.00	0.95	0.95	1,621.20
Building Vendor Trips	0.69	7.55	6.61	0.02	0.06	0.31	0.37	0.02	0.28	0.31	1,784.94
Building Worker Trips	1.53	2.89	50.60	0.07	0.33	0.19	0.52	0.12	0.16	0.28	6,933.14
Time Slice 1/1/2013-2/1/2013 Active Days: 24	4.90	23.22	63.33	**0.09**	0.39	1.39	1.78	0.14	1.26	1.40	10,338.54
Building 05/02/2012-02/01/2013	4.90	23.22	63.33	0.09	0.39	1.39	1.78	0.14	1.26	1.40	10,338.54
Building Off Road Diesel	2.88	13.91	10.20	0.00	0.00	0.93	0.93	0.00	0.86	0.86	1,621.20
Building Vendor Trips	0.63	6.67	6.10	0.02	0.06	0.27	0.34	0.02	0.25	0.27	1,785.03
Building Worker Trips	1.39	2.64	47.03	0.07	0.33	0.19	0.52	0.12	0.16	0.28	6,932.32

Phase Assumptions

Phase: Fine Grading 12/2/2011 - 2/1/2012 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 40

Maximum Daily Acreage Disturbed: 10

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 3/1/2011 - 12/1/2011 - Default Mass Site Grading/Excavation Description
Total Acres Disturbed: 40
Maximum Daily Acreage Disturbed: 10
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 2136.14
Off-Road Equipment:
2 Dumpers/Tenders (16 hp) operating at a 0.38 load factor for 8 hours per day
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
2 Rollers (95 hp) operating at a 0.56 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 2/2/2012 - 4/1/2012 - Default Trenching Description
Off-Road Equipment:
4 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Building Construction 5/2/2012 - 2/1/2013 - Default Building Construction Description
Off-Road Equipment:
1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day
2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day
1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

6/23/2009 8:55:01 AM

Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Berm.urb924

Project Name: Perris Berm

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	1.02	10.14	4.79	0.01	21.93	0.49	22.42	4.58	0.45	5.03	1,318.69
2012 TOTALS (tons/year unmitigated)	0.57	3.06	6.43	0.01	2.33	0.18	2.51	0.49	0.16	0.66	998.79
2013 TOTALS (tons/year unmitigated)	0.06	0.28	0.76	0.00	0.00	0.02	0.02	0.00	0.02	0.02	124.06

6/23/2009 8:55:41 AM

Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Channel.urb924

Project Name: Perris Outlet Channel

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	5.50	43.58	25.65	0.01	395.82	2.48	398.30	82.67	2.28	84.95	4,581.89
2012 TOTALS (lbs/day unmitigated)	7.88	41.08	126.86	0.18	395.81	2.41	397.96	82.66	2.19	84.64	19,513.32
2013 TOTALS (lbs/day unmitigated)	7.19	37.46	118.49	0.18	0.77	2.18	2.95	0.28	1.97	2.25	19,511.85

6/23/2009 8:56:04 AM

Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Channel.urb924

Project Name: Perris Outlet Channel

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 3/1/2011-12/1/2011 Active Days: 198	5.50	**43.58**	25.65	0.01	**395.82**	**2.48**	**398.30**	**82.67**	**2.28**	**84.95**	4,581.89
Mass Grading 03/01/2011-12/01/2011	5.50	43.58	25.65	0.01	395.82	2.48	398.30	82.67	2.28	84.95	4,581.89
Mass Grading Dust	0.00	0.00	0.00	0.00	395.80	0.00	395.80	82.66	0.00	82.66	0.00
Mass Grading Off Road Diesel	5.24	40.84	22.92	0.00	0.00	2.37	2.37	0.00	2.18	2.18	3,963.89
Mass Grading On Road Diesel	0.21	2.65	1.02	0.00	0.01	0.11	0.12	0.00	0.10	0.10	400.35
Mass Grading Worker Trips	0.05	0.10	1.71	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.64
Time Slice 12/2/2011-12/30/2011 Active Days: 21	5.29	40.94	24.63	0.00	395.81	2.37	398.18	82.66	2.18	84.85	4,181.53
Fine Grading 12/02/2011-02/01/2012	5.29	40.94	24.63	0.00	395.81	2.37	398.18	82.66	2.18	84.85	4,181.53
Fine Grading Dust	0.00	0.00	0.00	0.00	395.80	0.00	395.80	82.66	0.00	82.66	0.00
Fine Grading Off Road Diesel	5.24	40.84	22.92	0.00	0.00	2.37	2.37	0.00	2.18	2.18	3,963.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.05	0.10	1.71	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.64

6/23/2009 8:56:04 AM

Time Slice 1/2/2012-2/1/2012 Active Days: 23	4.98	38.28	23.89	0.00	395.81	2.15	397.96	82.66	1.98	84.64	4,181.50
Fine Grading 12/02/2011-02/01/2012	4.98	38.28	23.89	0.00	395.81	2.15	397.96	82.66	1.98	84.64	4,181.50
Fine Grading Dust	0.00	0.00	0.00	0.00	395.80	0.00	395.80	82.66	0.00	82.66	0.00
Fine Grading Off Road Diesel	4.93	38.19	22.31	0.00	0.00	2.15	2.15	0.00	1.98	1.98	3,963.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.05	0.09	1.59	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.61
Time Slice 2/2/2012-3/1/2012 Active Days: 21	1.83	15.29	8.92	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.98
Trenching 02/02/2012-03/01/2012	1.83	15.29	8.92	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.98
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.03	0.05	0.91	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.35
Time Slice 3/2/2012-3/30/2012 Active Days: 21	5.74	23.99	13.56	0.02	0.06	1.71	1.76	0.02	1.57	1.59	2,861.62
Asphalt 03/02/2012-04/01/2012	5.74	23.99	13.56	0.02	0.06	1.71	1.76	0.02	1.57	1.59	2,861.62
Paving Off-Gas	2.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.55	15.48	9.17	0.00	0.00	1.37	1.37	0.00	1.26	1.26	1,272.41
Paving On Road Diesel	0.68	8.45	3.26	0.01	0.05	0.33	0.38	0.02	0.31	0.32	1,433.78
Paving Worker Trips	0.03	0.06	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.01	155.43
Time Slice 4/2/2012-12/31/2012 Active Days: 196	**7.88**	41.08	**126.86**	**0.18**	0.77	2.41	3.19	0.28	2.19	2.46	**19,513.32**
Building 04/02/2012-02/01/2013	7.88	41.08	126.86	0.18	0.77	2.41	3.19	0.28	2.19	2.46	19,513.32
Building Off Road Diesel	3.48	20.42	13.62	0.00	0.00	1.42	1.42	0.00	1.31	1.31	2,259.28
Building Vendor Trips	1.38	14.93	13.09	0.03	0.12	0.62	0.74	0.04	0.56	0.61	3,532.60
Building Worker Trips	3.02	5.72	100.15	0.14	0.65	0.37	1.02	0.23	0.32	0.55	13,721.44
Time Slice 1/1/2013-2/1/2013 Active Days: 24	7.19	37.46	118.49	**0.18**	0.77	2.18	2.95	0.28	1.97	2.25	19,511.85
Building 04/02/2012-02/01/2013	7.19	37.46	118.49	0.18	0.77	2.18	2.95	0.28	1.97	2.25	19,511.85
Building Off Road Diesel	3.19	19.04	13.34	0.00	0.00	1.26	1.26	0.00	1.16	1.16	2,259.28
Building Vendor Trips	1.25	13.21	12.07	0.03	0.12	0.54	0.66	0.04	0.49	0.54	3,532.76
Building Worker Trips	2.75	5.22	93.08	0.14	0.65	0.38	1.03	0.23	0.32	0.55	13,719.81

Phase Assumptions

Phase: Fine Grading 12/2/2011 - 2/1/2012 - Default Fine Site Grading/Excavation Description
Total Acres Disturbed: 79.16
Maximum Daily Acreage Disturbed: 19.79
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 3/1/2011 - 12/1/2011 - Default Mass Site Grading/Excavation Description
Total Acres Disturbed: 79.16
Maximum Daily Acreage Disturbed: 19.79
Fugitive Dust Level of Detail: Default
20 lbs per acre-day
On Road Truck Travel (VMT): 94.46
Off-Road Equipment:
1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 2/2/2012 - 3/1/2012 - Default Trenching Description
Off-Road Equipment:
2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day
1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day
1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 3/2/2012 - 4/1/2012 - Default Paving Description

Acres to be Paved: 19.79

Off-Road Equipment:

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/2/2012 - 2/1/2013 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Channel.urb924

Project Name: Perris Outlet Channel

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	0.60	4.74	2.80	0.00	43.34	0.27	43.61	9.05	0.25	9.30	497.51
2012 TOTALS (tons/year unmitigated)	0.91	4.88	12.94	0.02	4.63	0.29	4.92	0.98	0.26	1.24	2,009.75
2013 TOTALS (tons/year unmitigated)	0.09	0.45	1.42	0.00	0.01	0.03	0.04	0.00	0.02	0.03	234.14

6/23/2009 8:59:25 AM

Urbemis 2007 Version 9.2.4

Summary Report for Summer Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Outlet Tower.urb924

Project Name: Perris Outlet Tower

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	2.88	23.76	13.03	0.00	0.21	1.19	1.39	0.04	1.09	1.14	2,411.59
2012 TOTALS (lbs/day unmitigated)	1.83	15.29	8.92	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.98

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Unmitigated Emissions (Pounds/Day)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Outlet Tower.urb924

Project Name: Perris Outlet Tower

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Unmitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 3/1/2011-12/1/2011 Active Days: 198	**2.88**	**23.76**	**13.03**	**0.00**	**0.21**	**1.19**	**1.39**	**0.04**	**1.09**	**1.14**	**2,411.59**
Mass Grading 03/01/2011-12/01/2011	2.88	23.76	13.03	0.00	0.21	1.19	1.39	0.04	1.09	1.14	2,411.59
Mass Grading Dust	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.04	0.00	0.04	0.00
Mass Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,247.32
Mass Grading On Road Diesel	0.02	0.26	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	39.90
Mass Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
Time Slice 12/2/2011-12/30/2011 Active Days: 21	2.86	23.49	12.93	0.00	0.21	1.18	1.38	0.04	1.08	1.13	2,371.69
Fine Grading 12/02/2011-01/01/2012	2.86	23.49	12.93	0.00	0.21	1.18	1.38	0.04	1.08	1.13	2,371.69
Fine Grading Dust	0.00	0.00	0.00	0.00	0.20	0.00	0.20	0.04	0.00	0.04	0.00
Fine Grading Off Road Diesel	2.83	23.44	11.96	0.00	0.00	1.17	1.17	0.00	1.08	1.08	2,247.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.06	0.98	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.37
Time Slice 1/2/2012-3/1/2012 Active Days: 44	1.83	15.29	8.92	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.98
Trenching 01/02/2012-03/01/2012	1.83	15.29	8.92	0.00	0.01	0.74	0.74	0.00	0.68	0.68	1,838.98
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.03	0.05	0.91	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.35

Time Slice 3/2/2012-6/29/2012 Active Days: 86	1.03	7.89	4.63	0.00	0.00	0.49	0.49	0.00	0.45	0.45	902.99
Building 03/02/2012-07/01/2012	1.03	7.89	4.63	0.00	0.00	0.49	0.49	0.00	0.45	0.45	902.99
Building Off Road Diesel	1.03	7.87	4.56	0.00	0.00	0.49	0.49	0.00	0.45	0.45	893.39
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.97
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.64
Time Slice 7/2/2012-8/1/2012 Active Days: 23	0.89	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30
Coating 07/02/2012-08/01/2012	0.89	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30
Architectural Coating	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.30

Phase Assumptions

Phase: Fine Grading 12/2/2011 - 1/1/2012 - Fine Site Grading/Excavation

Total Acres Disturbed: 0.04

Maximum Daily Acreage Disturbed: 0.01

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 3/1/2011 - 12/1/2011 - Mass Site Grading/Excavation

Total Acres Disturbed: 0.04

Maximum Daily Acreage Disturbed: 0.01

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 9.41

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 1/2/2012 - 3/1/2012 - Trenching

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Building Construction 3/2/2012 - 7/1/2012 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 7/2/2012 - 8/1/2012 - Architectural Coating

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Summary Report for Annual Emissions (Tons/Year)

File Name: C:\Documents and Settings\dsa\Application Data\Urbemis\Version9a\Projects\Perris Outlet Tower.urb924

Project Name: Perris Outlet Tower

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	0.31	2.60	1.43	0.00	0.02	0.13	0.15	0.00	0.12	0.12	263.65
2012 TOTALS (tons/year unmitigated)	0.10	0.68	0.40	0.00	0.00	0.04	0.04	0.00	0.03	0.03	79.30

Appendix B2
Health Risk Assessment

ESA

DWR PERRIS DAM REMEDIATION PROGRAM

Health Risk Assessment

The sources of diesel particulate matter (DPM) analyzed in this study include emissions from equipment used for construction activities associated with the Perris Dam Remediation, the Outlet Tower Replacement and the Emergency Outlet Extension. Emissions from these activities were input to the United States Environmental Protection Agency (USEPA) approved dispersion model AERMOD to calculate ambient air concentrations at receptors in the project vicinity. Meteorological data representative of the project site were used along with estimated DPM emissions to calculate pollutant concentrations at various receptor locations. The meteorological station nearest to the project site that would represent wind conditions at the project site and that has data reduced for model input is located in Riverside, approximately 13.5 miles northwest of Lake Perris. The data from this station were supplemented with opaque cloud cover data from the Los Angeles International Airport for use in the meteorological preprocessor, AERMET, to prepare hourly surface data files for use in AERMOD.

Emission Rates

Emission rates from construction activities were estimated using the URBEMIS 2007 model. This model incorporates emission factors from the California Air Resources Board's (ARB's) OFFROAD and EMFAC2007 models to estimate construction emissions. Annual off road exhaust emissions of particulate matter less than 2.5 microns in diameter (PM2.5) were used to represent DPM emission rates. According to the project description, nearly 70 percent of all haul truck trips would remain on the project site. Therefore, on road truck emissions were also estimated for haul trucks that would be used on the project site for construction of the Perris Dam Remediation portion of the project. It was assumed that all off road equipment and on road haul trucks would be diesel fueled, and therefore all PM2.5 exhaust emissions would be DPM. This represents a conservative worst case analysis.

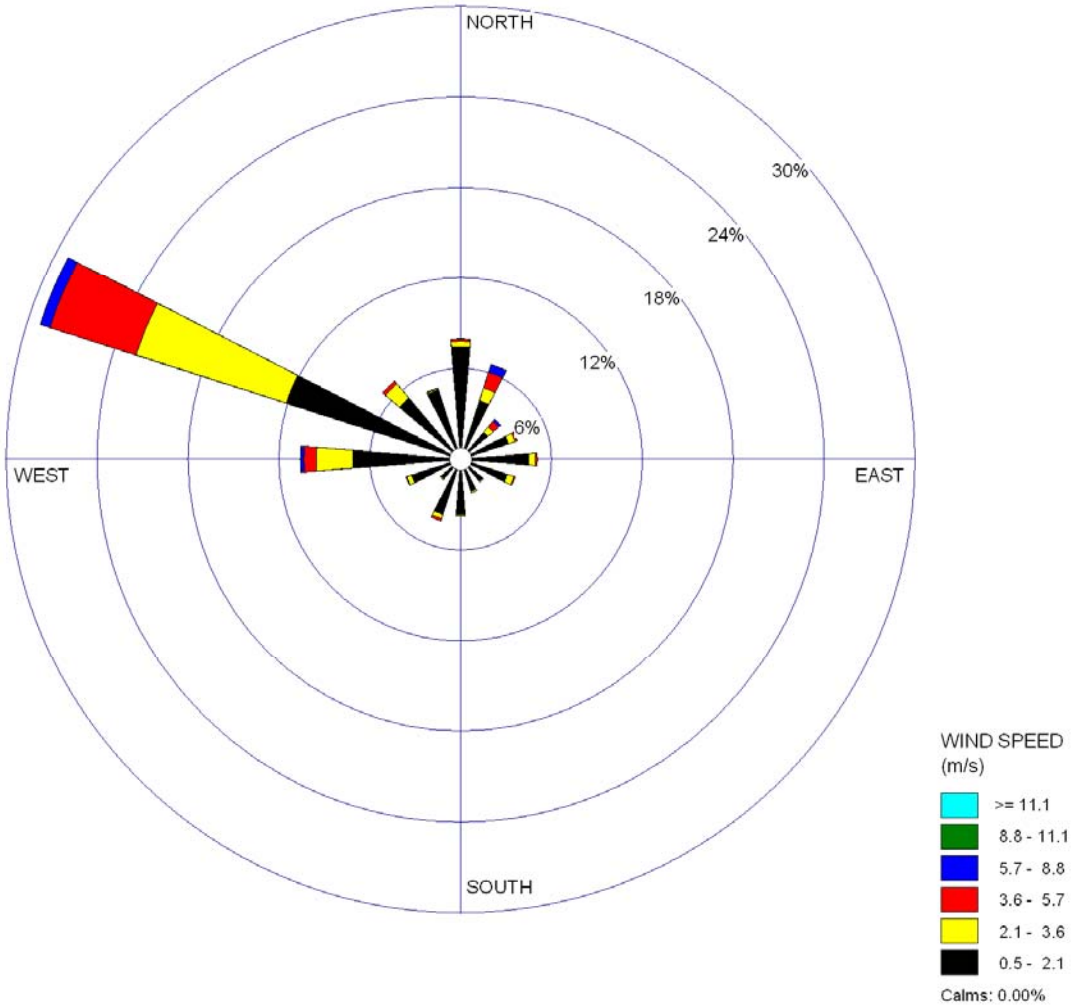
Model Inputs and Results

Geographic information systems (GIS) were used to determine the geographic locations of the emissions sources and sensitive receptors for the proposed project. To determine the worst case exposure, receptors were modeled at ground level breathing height.

As discussed previously, meteorological data from the Riverside meteorological station was used with opaque cloud cover data from the Los Angeles International Airport to prepare hourly

surface files for use in AERMOD. Figure 1 presents a wind rose of the area, and it represents the data used in the model.

Figure 1
Windrose for the Riverside Meteorological Station
(Wind Direction - Blowing From)



Source and receptor elevations were derived from the Perris 7.5 minute digital elevation model. These elevations were processed and imported using AERMAP, an accessory program to AERMOD. Construction equipment emissions were modeled as a series of volume sources. A release height of 5 meters was assumed in accordance with methods recommended by the SCAQMD. This release height is representative of the mid-range of expected plume rise of

exhaust emissions from typical construction equipment during daytime atmospheric conditions (SCAQMD, 2003).

Based on modeling results, emissions from equipment used for the Perris Dam Remediation would result in annual average DPM concentrations of approximately 0.02µg/m^3 at the maximum exposed sensitive receptor. Emissions from construction of the Emergency Outlet Extension would result in annual average DPM concentrations of approximately 0.12µg/m^3 at the maximum exposed receptor and emissions from the Outlet Tower Replacement construction would result in concentrations of approximately 0.048µg/m^3.

Health Risks from Exposure to DPM

The maximum incremental cancer risk from exposure to DPM was calculated following the guidelines established by California Office of Environmental Health Hazard Assessment (OEHHA, 2003). The equation used to determine exposure to DPM through inhalation is demonstrated below:

$$\text{Dose-inh} = \frac{C_{air} * \{DBR\} * A * EF * ED * 10^{-6}}{AT}$$

Where:

- Dose-inh = Dose of the toxic substance through inhalation in milligrams per kilogram of body weight per day (mg/kg-day)
- 10^{-6} = Micrograms to milligrams conversion, Liters to cubic meters conversion
- C_{air} = Concentration in air (µg/m^3)
- {DBR} = Daily breathing rate (L/kg body weight – day)
- A = Inhalation absorption factor
- EF = Exposure frequency (days/year)
- ED = Exposure duration (years)
- AT = Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)

Since the exposure duration for construction emissions would be less than a 70 year lifetime, the 95th percentile child breathing rate of 581 L/kg-day was used in the equation, rather than the 80th percentile adult breathing rate of 302 L/kg-day. The exposure frequency was assumed to be 365 days per year. For construction the Perris Dam Remediation and Emergency Outlet Extension portions of the project, it was assumed that construction activities would last up to 22 months and therefore the exposure duration would be approximately 1.8 years. It was assumed that construction activities associated with the Outlet Tower Replacement would take approximately 18 months and therefore the exposure duration would be 1.5 years. The modeled concentrations discussed previously were used to represent the concentration of DPM in the air. The inhalation absorption factor was assumed to be 1.

To determine incremental cancer risk the estimated dose through inhalation was multiplied by cancer potency slope factor for DPM, 1.1 $(mg/kg\text{-}day)^{-1}$. It should be noted that the cancer potency slopes established by OEHHA were determined based on a minimum exposure duration of 9 years. There is a large degree of uncertainty regarding cancer risk from short term high exposures versus long term lower exposures (OEHHA, 2003). Since cancer risk was evaluated for periods less than nine years there is some uncertainty in the actual cancer risk that would result from DPM emissions generated during construction of the proposed project. As shown below, the maximum incremental cancer risk to sensitive receptors in the project area would be approximately 3 in one million:

Risk from Perris Dam Remediation Activities

Dose-inhalation $= \frac{0.02\ \mu g/m^3 * 581\ L/kg\text{-}day * 1 * 365\ days/year * 1.8\ years * 10^{-6}}{(25{,}550\ days)}$

$= 0.299 * 10^{-6}$

Cancer Risk $= 0.299 * 10^{-6}\ mg/kg\text{-}day * 1.1\ (mg/kg\text{-}day)^{-1}$

$= 0.329 * 10^{-6}$

~ 0.3 in one million

Risk from Emergency Outlet Extension Construction Activities

Dose-inhalation $= \frac{0.12\ \mu g/m^3 * 581\ L/kg\text{-}day * 1 * 365\ days/year * 1.8\ years * 10^{-6}}{(25{,}550\ days)}$

$= 1.793 * 10^{-6}$

Cancer Risk $= 1.793 * 10^{-6}\ mg/kg\text{-}day * 1.1\ (mg/kg\text{-}day)^{-1}$

$= 1.972 * 10^{-6}$

~ 2.0 in one million

Risk from Outlet Tower Replacement Construction Activities

Dose-inhalation $= \frac{0.048\ \mu g/m^3 * 581\ L/kg\text{-}day * 1 * 365\ days/year * 1.5\ years * 10^{-6}}{(25{,}550\ days)}$

$= 0.598 * 10^{-6}$

Cancer Risk $= 0.598 * 10^{-6}\ mg/kg\text{-}day * 1.1\ (mg/kg\text{-}day)^{-1}$

$= 0.658 * 10^{-6}$

~ 0.7 in one million

Total Risk from All Activities = approximately 3 in one million

It should be noted that assuming the 95th percentile child breathing rate and continuous exposure for the entire duration of construction renders this an extremely conservative analysis. Furthermore, maximum concentrations from each individual activity were used to calculate risk, regardless of where the maximum concentration was located. Therefore, the maximum risk of 3 in one million actually represents risk at three separate receptors and actual risk to an individual receptor would likely be less. Nevertheless, as demonstrated in the equation above, risk to children at residential receptors from DPM emissions generated by construction of the proposed project would be below the SCAQMD significance threshold of 10 in one million. Therefore it can be assumed that risk to all sensitive receptors in the project area would be below 10 in one million and impacts would be less than significant.

References

Jones and Stokes Associates, 2007. *Software User's Guide: URBEMIS2007 for Windows Version 9.2 Emissions Estimate for Land Use Development Projects,* November 2007.

Office of Environmental Health Hazards Assessment (OEHHA), 2003. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* available online at: http://www.oehha.org/air/hot_spots/pdf/HRAguidefinal.pdf, accessed April 29, 2008.

South Coast Air Quality Management District (SCAQMD), 2003. *Localized Significance Threshold Methodology*, June 2003.

United States Environmental Protection Agency (USEPA), 2004. *Users Guide for the AMS/EPA Regulatory Model – AERMOD,* EPA-454/B-003-01, September 2004.

PROJECT TITLE:

Perris Dam Remediation Program
Risk From Perris Dam Remediation Construction Activities

PLOT FILE OF ANNUAL VALUES FOR SOURCE GROUP: PERRIS DAM REMEDIATION — CANCER RISK

0.000 0.050 0.100 0.150 0.200 0.250 0.300

COMMENTS: Cancer risk expressed in incremental risk per million. Emission sources for dam remediation are shown in orange.	SOURCES: **4**	COMPANY NAME: **Environmental Science Associates**	
	RECEPTORS: **401**		
		SCALE: 1:25,000 0 1 km	
	MAX: **0.33262 CANCER RISK**	DATE: **11/14/2008**	

PROJECT TITLE:

Perris Dam Remediation Program
Risk From Emergency Outlet Extension Construction Activities

PLOT FILE OF ANNUAL VALUES FOR SOURCE GROUP: EMERGENCY OUTLET EXTENSION — CANCER RISK

0.000 0.250 0.500 0.750 1.000 1.250 1.500 1.750

COMMENTS: Cancer risk expressed in incremental risk per million. Emission sources for emergency outlet extension construction activities are shown in yellow.	SOURCES: **4**	COMPANY NAME: **Environmental Science Associates**	
	RECEPTORS: **401**		
		SCALE: 1:25,000 0 1 km	
	MAX: **1.97339 CANCER RISK**	DATE: **11/14/2008**	

PROJECT TITLE:

Perris Dam Remediation Program
Risk From Emergency Outlet Tower Replacement Activities

PLOT FILE OF ANNUAL VALUES FOR SOURCE GROUP: OUTLET TOWER REPLACEMENT — CANCER RISK

0.000 0.100 0.200 0.300 0.400 0.500

COMMENTS: Cancer risk expressed in incremental risk per million. Emission sources for outlet tower replacement activities are shown in green.	SOURCES: **4**	COMPANY NAME: **Environmental Science Associates**	
	RECEPTORS: **401**		
		SCALE: 1:25,000 0 1 km	
	MAX: **0.65791 CANCER RISK**	DATE: **11/14/2008**	

ISC-AERMOD View - Lakes Environmental Software

Appendix C
Biological Resources Appendix

ESA

Appendix C1
Biological Resource Evaluation

ESA

BIOLOGICAL RESOURCE EVALUATION OF THE LAKE PERRIS DAM REMEDIATION PROJECT

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LIST OF ABBREVIATIONS

BMPs	Best Management Practices
CDFG	California Department of Fish and Game
CDSM	cement-deep-soil mixing
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
cy	cubic yards
DWR	California Department of Water Resources
LPSRA	Lake Perris State Recreation Area
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
MSHCP	Multi-Species Habitat Conservation Plan
msl	mean sea level
MWD	The Metropolitan Water District of Southern California
OHWM	ordinary high water mark
RCA	Regional Conservation Authority
RWQCB	Regional Water Quality Control Board
USACOE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WTI	Wetland Training Institute

1.0 Introduction

Lake Perris is an earthfill embankment-constructed fresh-water reservoir that was completed in 1974. The embankment is approximately 11,600 feet long, with a maximum structural height of 128 feet. The fill material was originally obtained from sediments in what was to become the lake bed and from a quarry constructed within the Bernasconi Hills just east of the dam within the Lake Perris State Recreation Area (LPSRA). The normal maximum operating water level on the lake is 1,588 feet above mean sea level (msl), 108 feet above reservoir bottom (note: all elevations shown in this report are based on the National Geodetic Vertical Datum of 1929). The spillway crest is at 1,590 feet msl and the dam crest elevation is at 1,600 feet msl. The designed reservoir capacity is 127,000 acre-feet with a surface area of 2,292 acres.

Lake Perris is the final link in a series of reservoirs and canals comprising the California Water Project, which was conceived to provide an additional drinking water supply to Southern California residents. Perris Dam impounds Lake Perris which is entirely within the LPSRA, 15 miles south of the City of Riverside in Riverside County, California. The water storage and conveyance facilities are owned and operated by California Department of Water Resources (DWR), in cooperation with The Metropolitan Water District of Southern California (MWD). The LPSRA, which surrounds and encompasses Lake Perris, opened in 1973 and is operated as a part of the California Department of Parks and Recreation (State Parks). The LPSRA welcomes approximately 1.1 million visitors each year and receives intense recreational use including: water skiing, jet skiing, fishing, camping, hiking, rock climbing, horseback riding, hunting (in season), bicycling, and wildlife watching. In addition to recreation use, Lake Perris provides water uses, wildlife enhancement, emergency water storage, and incidental flood protection.

In 2005, DWR completed a foundation study of the Perris Dam. Results of the detailed liquefaction analysis of the Perris Dam foundation indicated that seismically-induced ground shaking could result in embankment deformations due to the liquefaction potential of sediments under the dam at several locations along the 2,300-foot-long segment along the southern span (left reach) of the dam. With the lake filled to its design capacity, a seismic event could result in overtopping of the dam during a strong ground shaking event. Based on the results of this stability analysis, DWR lowered the reservoir water surface elevation by 25 feet to 1,563 feet msl until a long-term remedial solution can be implemented. This reduction in surface elevation reduced the storage capacity of the lake approximately 40 percent from 126,841 acre-feet to 72,000 acre-feet.

As a result of the above study, in August 2005, DWR initiated the drawdown of Lake Perris from 1,588 feet msl to 1,563 feet msl. The drawdown was complete by November 2005. The water removed from the lake was delivered to MWD for delivery or storage in other facilities.

However, in an effort to maintain recreational activities on the lake, DWR ensured that the marina remained in the lowered lake and constructed a causeway from the shore across the exposed lakebed, providing full access to the marina facility. DWR imported 14,171 tons of sand to the Perris Beach area to enhance beach-going recreational uses near the location of the previous beaches. A thick riparian habitat existed along the eastern edge of Lake Perris prior to the drawdown. DWR installed a two-mile long drip-line irrigation system connected to State

Park water pumps to convey lake water to the existing riparian habitat along the eastern edge of the original lakeshore, in an effort to maintain that riparian community during the temporary drawdown of the lake level. As a result of the drawdown, newly exposed lake-bottom soils were exposed. Consequently, vegetation invaded the previously inundated area creating several plant communities that previously did not exist in that area.

DWR proposes the Lake Perris Dam Remediation Program (proposed project) to upgrade the Lake Perris Dam, replace the outlet tower, and extend the outlet conveyance extension to connect with the Perris Valley Storm Drain. The proposed project is one project with three elements. The project is being proposed to address seismic safety concerns and to bring the facilities up to current safety standards in order to ensure maximum public safety for those using the LPSRA and those living downstream of the lake.

In support of the proposed project, Psomas biologists conducted an analysis of biological resources potentially associated with the proposed project to establish the existing conditions of these resources. A literature review, agency consultation and field surveys were conducted to assess the presence or absence of endangered, threatened, or sensitive species and jurisdictional areas on the proposed project site and adjacent areas. Psomas biologists and subconsultant biologists visited the LPSRA a total of fifty-nine times from May 2007 to July of 2008 to conduct the following surveys:

- habitat assessment
- general vegetation surveys
- focused sensitive plant surveys
- general wildlife surveys
- focused wildlife surveys for the following species:
    - southwestern willow flycatcher (*Empidonax traillii extimus*)
    - least Bell's vireo (*Vireo bellii pusillus*)
    - coastal California gnatcatcher (*Polioptila californica californica*)
    - Stephens's kangaroo rat (*Dipodomys stephensi*)
    - Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
- jurisdictional plant community determination

The purpose of this biological resources report is to address concerns expressed by DWR and other resource agencies that the proposed project has the potential to result in direct and/or indirect impacts to biological resources and jurisdictional waters. Specifically, this report assesses the potential presence of sensitive biological resources and jurisdictional waters, analyzes the potential impacts to those resources from proposed project implementation. This report provides a summary of the biological resources present including plant communities, the potential occurrence of listed and sensitive plant and wildlife species, the potential occurrence of jurisdictional waters and identifies and analyzes the potential biological significance of site construction and development in view of federal, state, and local laws and regulations. This report was prepared based upon results of a literature review, agency consultation, and field surveys.

1.1 Proposed Project Location

1.1.1 Lake Perris State Recreation Area (LPSRA)

Lake Perris is located within the LPSRA in the City of Perris, within the Inland Empire of Riverside County, California (Figure 1, *Regional Map*). LPSRA is located 11 miles south of the City of Riverside and approximately 65 miles east of Los Angeles. The LPSRA is located via Highway 60 or Interstate 215. The address of LPSRA is: 17801 Lake Perris Drive, Perris, CA 92571.

Lake Perris is situated in a valley at an elevation of 1,560 feet msl. It is ringed by hills and small mountains. The lake is 3 miles long and 2 miles across with about 10 miles of accessible shoreline. The lake is approximately 2,320 acres. It inundates 125,000 acre feet of water behind a 2 mile long, 128 foot tall, chevron-shaped earthfill dam.

Small, unnamed hills (sometimes referred to as Russell Mountains) and Moreno Valley is located to the north; the Badlands (mountains) and San Jacinto Valley is located to the northeast; Bernasconi Hills are located to the east and south; and Perris Valley is located to the southwest and west (Figure 2, *Vicinity Map*). The Perris Fairgrounds immediately adjacent to the LPSRA to the west supports a motor sports complex. The San Jacinto Valley and the San Jacinto Wildlife Area is located immediately east of the Bernasconi Hills and the LPSRA. The surrounding area around the LPSRA is composed of a mosaic of suburban, developed land and open space/natural areas (Figure 3, *LPSRA Site Overview*).

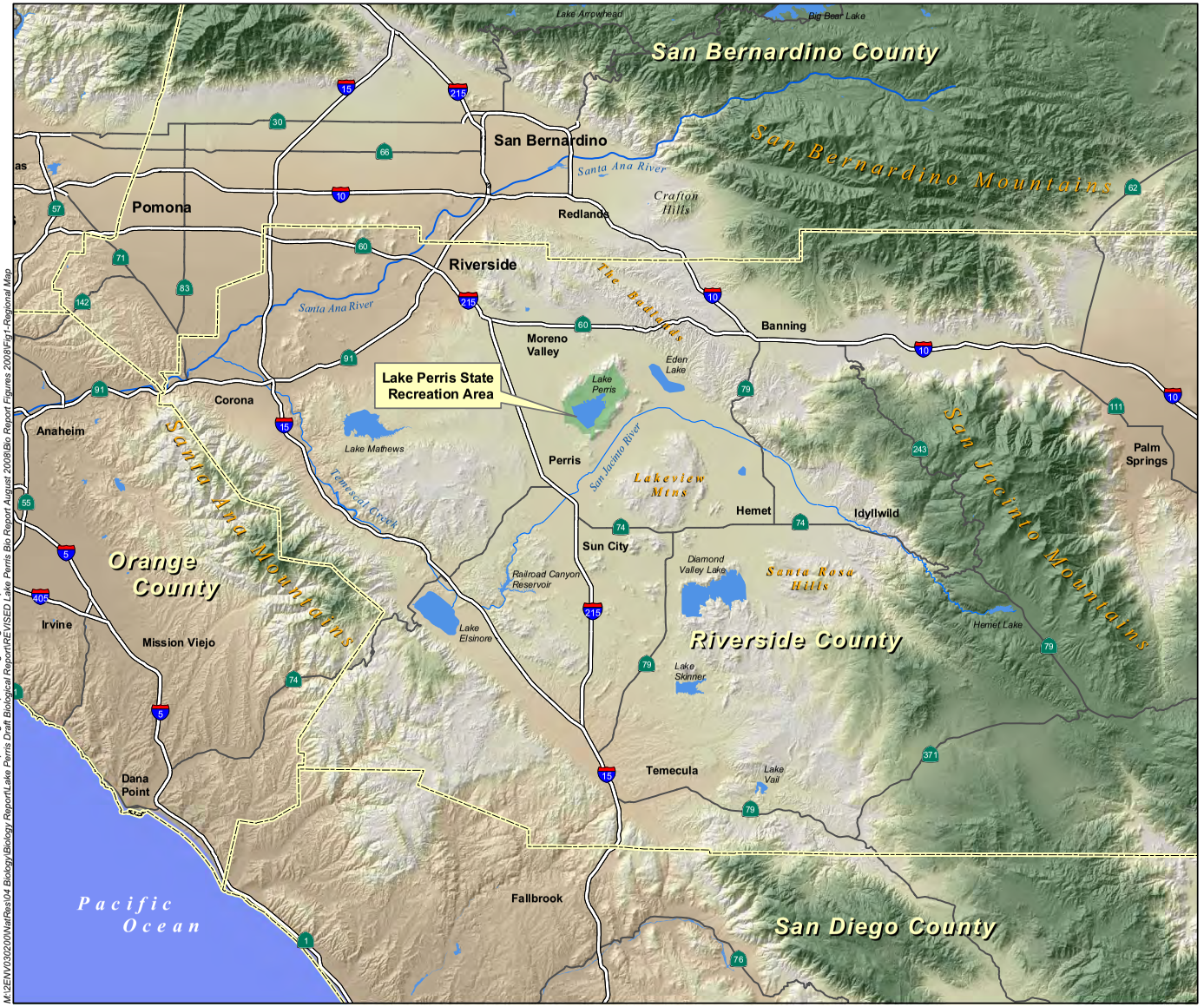
The LPSRA is graphically depicted on the United States Geological Survey (USGS) 7.5 Minute Perris and Sunnymead Topographic Quadrangle maps (Figure 4, *USGS Topographic Map*). Table 1-1, *Lake Perris State Recreation Area Location*, describes where the LPSRA is located on the USGS 7.5 Minute Topographic Map, and the Township, Range, and Sections in which it is located.

Table 1-1
Lake Perris State Recreation Area Location

USGS 7.5 Minute Topographic Quadrangle	Township	Range	Section(s)
Perris	3 S	3 W	25, 26, 33, 34, 35, 36
Perris	4 S	3 W	1, 2, 3, 4, 9, 10, 11, 12, 14, 15
Sunnymead	3 S	3 W	13, 14, 22, 21
Sunnymead	3 S	3 W	Fractional Sections 24, 25, 26
Sunnymead	3 S	3 W	Unsurveyed Land – San Jacinto Nuevo y Potrero just north of Fractional Sections 24, 25, 26
Sunnymead	3 S	2 W	18, 19, 30

Source: USGS 1967 Photorevised 1979 and USGS 1967 Photorevised 1980

Biological Resource Evaluation of the Lake Perris Dam Remediation Project



Legend

- County Boundary
- Lake Perris State Recreation Area (LPSRA)
- Interstates/Major Highways
- State Highways

N
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Miles

CA State Plane, Zone 6, NAD 83

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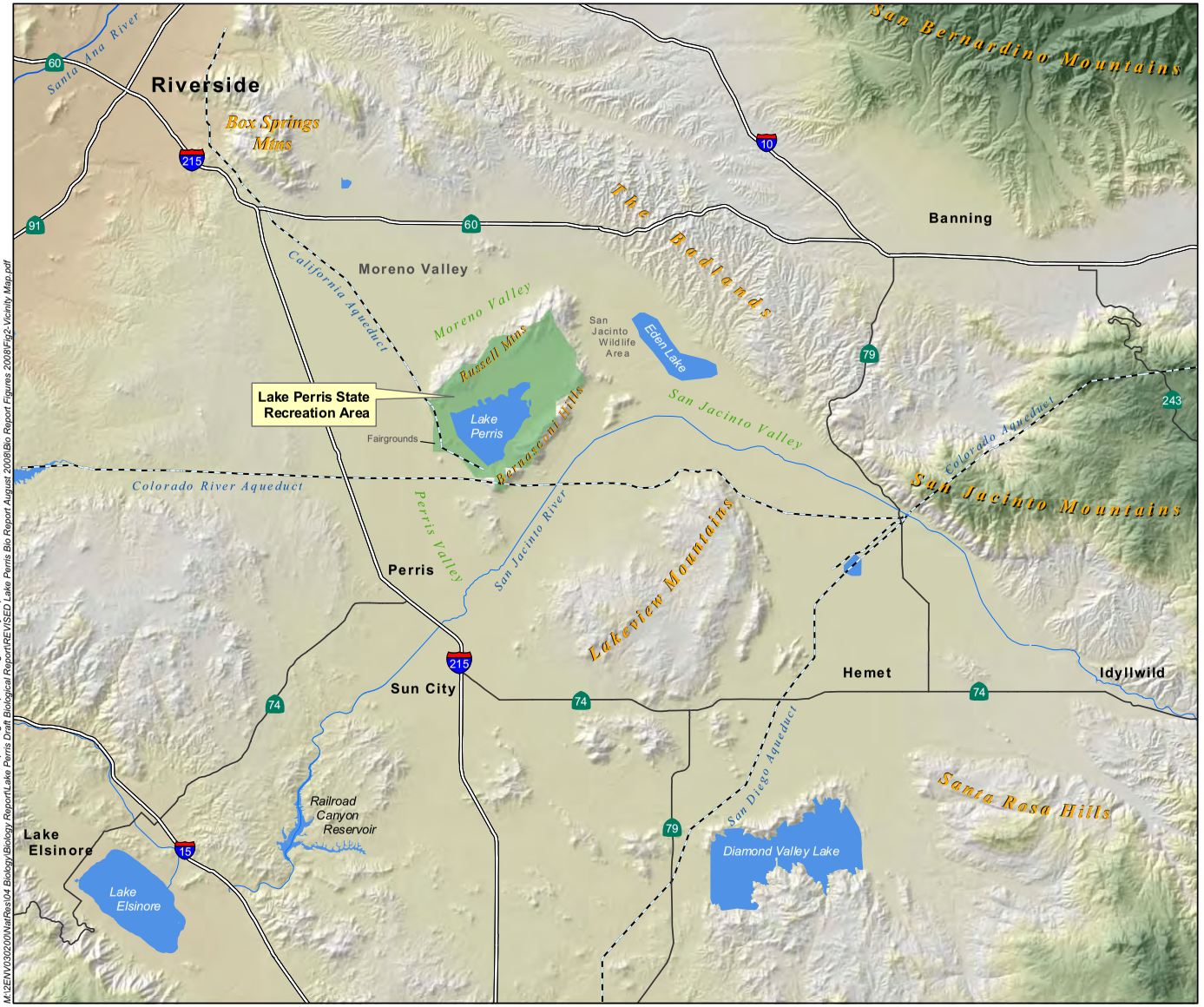
Regional Map

PSOMAS

Figure 1

Biological Resource Evaluation of the Lake Perris Dam Remediation Project



Legend

- Lake Perris State Recreation Area (LPSRA)
- Regional Lakes
- Aqueducts
- Interstate/Major Highways
- State Highway

N W E S

0 1.25 2.5 5 Miles

CA State Plane, Zone 6, NAD 83

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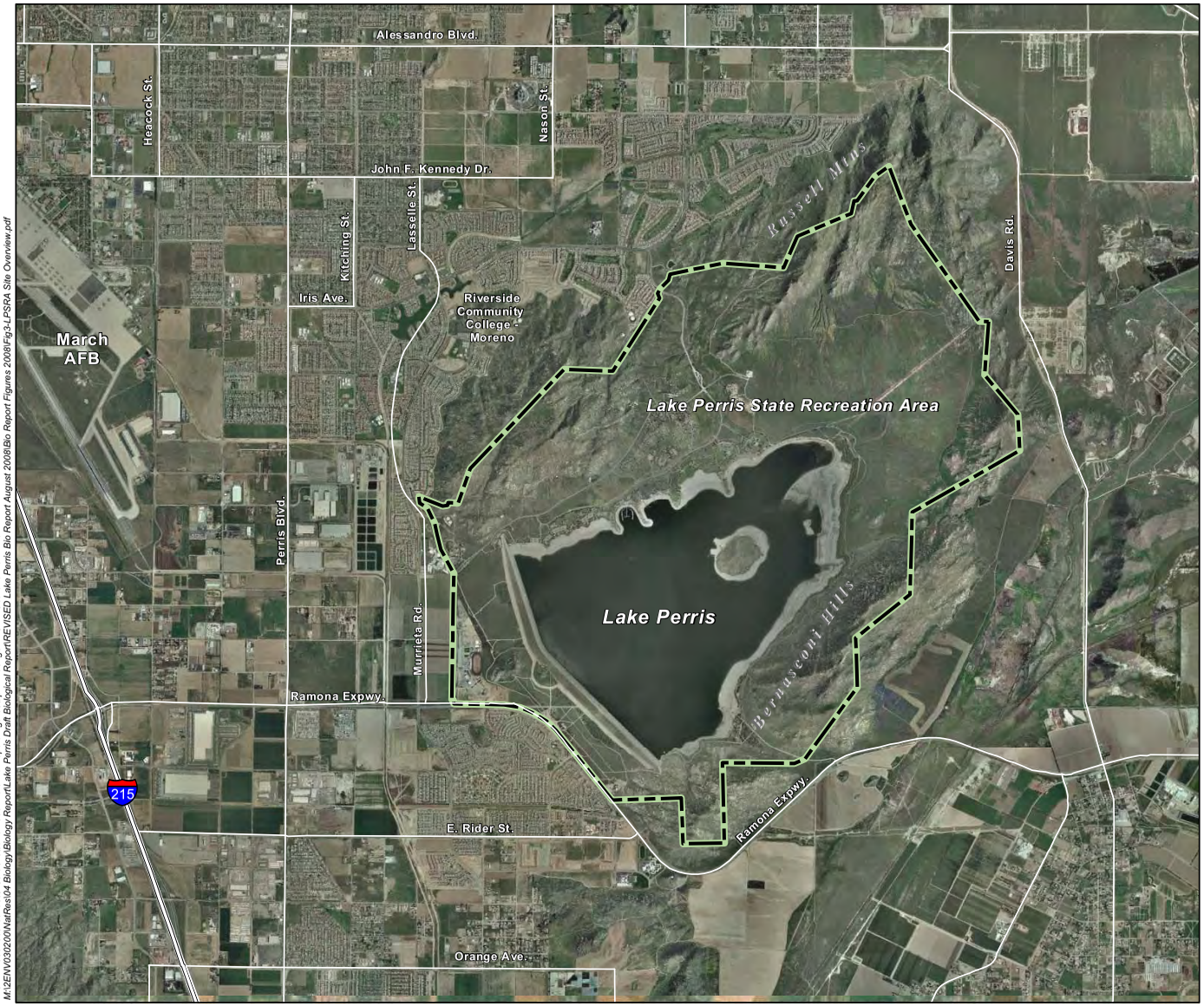
Vicinity Map

PSOMAS

Figure 2



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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

Lake Perris State Recreation Area (LPSRA)

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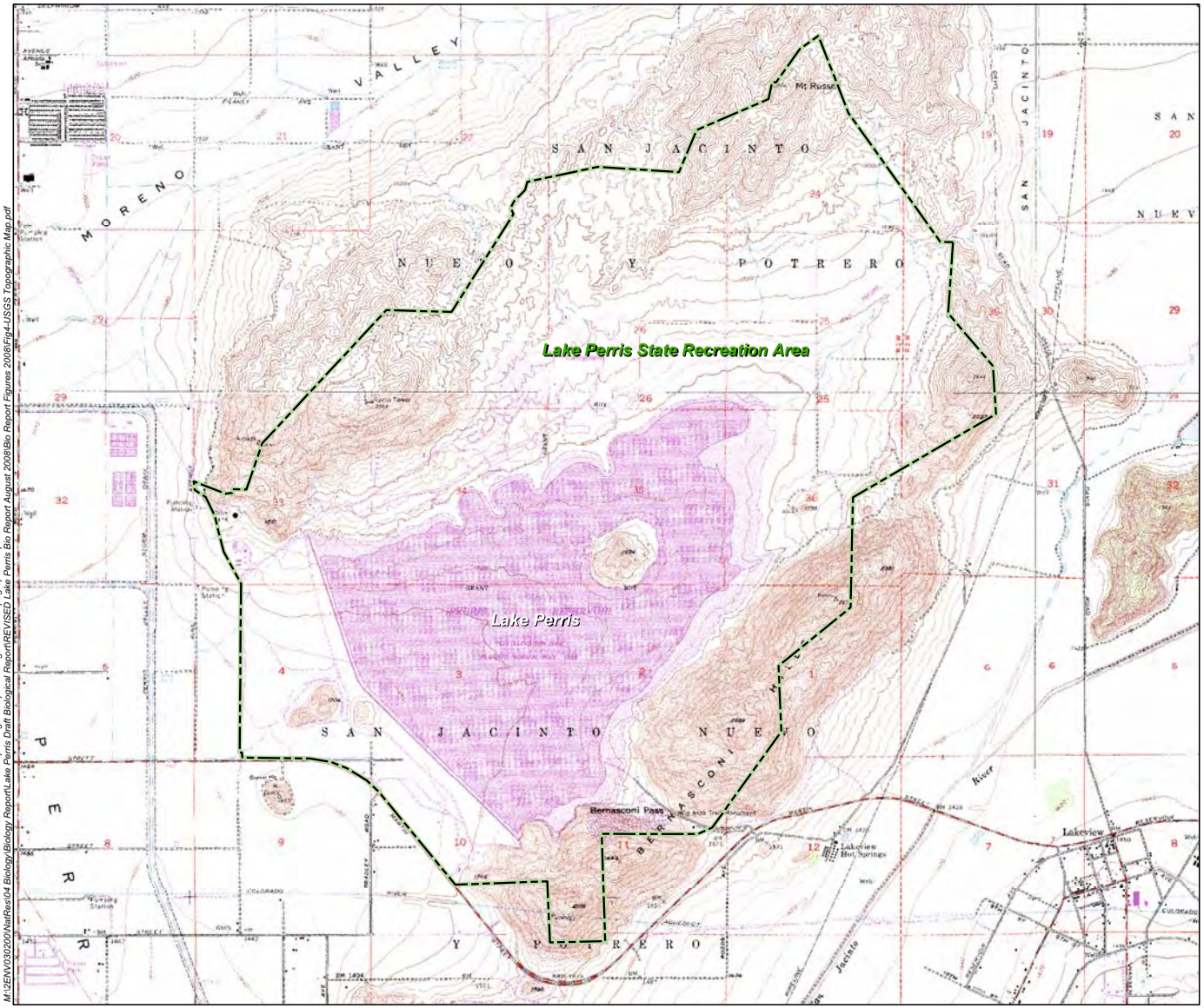
State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

LPSRA Site Overview

PSOMAS

Figure 3



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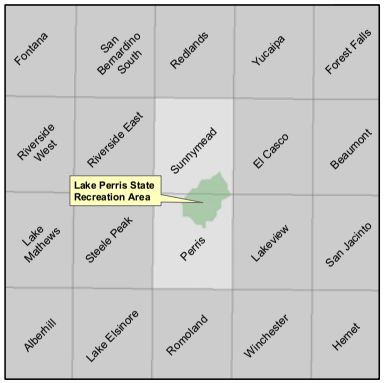
Source: USGS Topographic Quadrangles 7.5 minute; Perris and Sunnymead

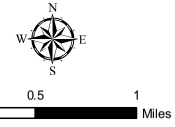
Biological Resource Evaluation of the Lake Perris Dam Remediation Project



USGS 7.5 Minute Topographic Map Quadrangles

Legend

Lake Perris State Recreation Area (LPSRA)



CA State Plane, Zone 6, NAD 83

USGS Topographic Map

PSOMAS

Figure 4

The LPSRA also falls within the boundaries of the area covered by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP is a comprehensive, multi-jurisdictional habitat conservation plan focusing on conservation of species and their associated habitats in western Riverside County. The MSHCP establishes a framework and mechanism for projects to comply with state and federal endangered species regulations.

1.1.2 Proposed Project Site Location

The proposed project site is located wholly within the LPSRA and consists of a soils excavation area, a haul road, rock quarry, construction staging area, emergency outlet extension site, and an earthen berm site (Figure 5, *Proposed Project Site*). The soils excavation area and most of the haul road are located on shoreline exposed by the drawdown. The haul road over the Bernasconi Hills, the construction staging area, the berm, and drain are located in upland habitats.

More specifically, the proposed project site is approximately 340 acres in size and consists of:

- The stability berm area on the southeastern reach of the dam, (the "left reach") and a 200-foot wide area below the reach.
- A 20-acre staging area.
- The borrow area in the lakebed at the east end of the lake.
- The rock quarry area in the original rock quarry south of the lake in the Bernasconi Hills.
- The haul road from the east side of the lake, along the lakebed on the south side of the lake, and over a low spot on the Bernasconi Hills near the dam's left abutment.
- The approximately two mile long emergency outlet channel from the existing outlet valve along the north edge of Ramona Expressway to the Perris Valley Storm Drain.

1.1.3 Biological Survey Area

At a meeting between the United States Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), State Parks, DWR, ESA, and Psomas, it was determined that the survey area for biological resources would include the all of the immediate habitats surrounding Lake Perris and especially the habitats surrounding the proposed project site. These areas included portions of the grassland and sage scrub habitats within the Bernasconi Hills adjacent to the proposed haul road; the riparian and marsh habitats adjacent to the proposed haul road and the soil excavation area; the habitats below the dam; and the habitats surrounding the proposed Perris drain extension. This area is referred to as the Biological Survey Area (Figure 6, *Biological Survey Area*), and includes area outside of the proposed project area. All the field surveys were conducted within this Biological Survey Area.

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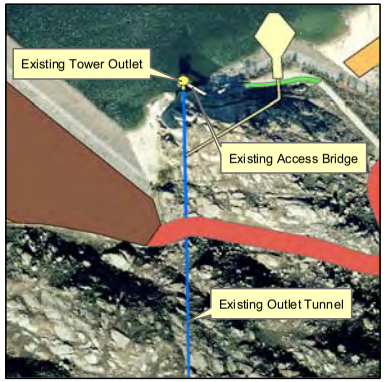

Existing Structures Enlargement

Legend

Existing Structures
- Existing Outlet Tower
- Existing Outlet Tunnel
- Existing Access Bridge

Proposed Project Components
- Dam Stabilization
- Primary Borrow
- Secondary Borrow
- Haul Road
- Access Road
- Existing Roads/Developed Areas
- Staging Area
- Proposed Outlet Entrance
- Proposed Outlet Tunnel
- Outlet Channel - Open
- Outlet Channel - Covered
- Quarry Excavation

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Proposed Project Site

PSOMAS *Figure 5*

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

Biological Survey Area

N
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0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Biological Survey Area

PSOMAS

Figure 6

2.0 Proposed Project Description

As a result of the recent studies described in Section 1.0, DWR has determined that Perris Dam, its outlet tower, and emergency drain outlet require repair to address seismic safety concerns and to bring the facilities up to current safety standards. The repairs are required to ensure maximum public safety for those using the LPSRA and those living downstream of the lake. The Lake Perris Dam Remediation Program (proposed project) is being proposed to upgrade the Lake Perris Dam, replace the outlet tower, and extend the outlet conveyance extension to connect with the Perris Valley Storm Drain. The proposed project is one project with three elements. This section describes the three elements of the proposed project.

2.1 Description of Proposed Project Elements

2.1.1 Perris Dam Remediation

DWR proposes to seismically upgrade the dam by improving the foundation material with cement-deep-soil-mixing (CDSM) methods, excavating the toe of the dam to remove the liquefiable foundation material, replacing the foundation material with re-compacted engineered fill, and then constructing a stability berm on top of the replaced foundation. This remediation strategy would allow Lake Perris to return to its previous maximum operating pool elevation of 1,588 feet msl after construction.

Following deep soil mixing, the groundwater would be lowered by an array of pumping wells to facilitate the excavation and replacement of the uppermost liquefiable soils. Some of the dewatering wells would become permanent and replace the existing relief wells, thereby preventing seepage from ponding on the ground surface once the lake level is returned to its original elevation. The wells would maintain a stable groundwater elevation south of the dam. The water pumped from the wells during construction would discharge into a solid pipe leading out to the flow meter and on toward MWD's delivery system. After construction, gravity drainage from the extended drainage blanket and the new wells would also flow through the existing flow meter on toward MWD's system.

Approximately 700,000 cy of soil would be excavated from the shallow foundation at the toe of the dam. Drain rock would be placed in the bottom lifts of the excavation to extend the existing drainage blanket to the new toe of the stability berm. The excavated material would be stockpiled on site and recompacted as excavation backfill and as part of the stability berm. Approximately 800,000 tons of drain rock and 300,000 cy of soil would be backfilled into the excavation area.

A stability berm would be constructed atop the re-compacted foundation along the downstream toe of the dam. The berm would consist of approximately 1.75 million cy of soil and one million tons of rock. The soil for the stability berm would be excavated from within the lakebed at the east end of the lake, and the rock would be quarried from the original rock quarry east of Lake Perris in Bernasconi Hills. To convey the soil and rock to the downstream face of the dam, a haul road would be constructed from the east side of the lake, along the lakebed on the south side of the lake, and over a low spot on the Bernasconi Hills near the dam's left abutment. Soil and

rock hauled to the toe of the dam may be stockpiled near the construction area or applied directly to the construction activity as they are quarried and delivered.

The borrow area would be located entirely within the lakebed exposed by the temporary drawdown. Similarly, the haul road would be constructed entirely within the exposed lakebed from the borrow area to just north of the dam. The haul road would continue over a portion of the Bernasconi Hills to the downstream side of the dam. The haul road in this location will become a permanent, paved maintenance road at the end of construction. The borrow area and remaining portions of the haul road will be submerged when the lake is refilled.

2.1.2 Outlet Tower Replacement

DWR is proposing to construct a new outlet structure as a replacement facility, because the existing tower may fail during a major earthquake. The new outlet facility would be located approximately 400 feet from the existing tower. An area on the southern shore between the hill and the lake would be excavated and the new outlet tower constructed using dry construction methods and underwater blasting. Excavated material would be hauled to the dam remediation construction area and used in the stability berm. Blasting into hard rock would be required. A 600-foot long, 12.5-foot diameter tunnel would be constructed to connect the new outlet facility to the existing underground tunnel that connects to MWD's delivery system. A staging area would be needed near the construction area to stockpile construction material and equipment. Once the new outlet structure and the tunnel are constructed, a 300-foot long approach channel would be constructed to open the new outlet to the lake. A buoy line would be set in the lake approximately 300 feet from the shore limiting access to the vicinity of the facility. The old outlet tower would remain in place and would not be deconstructed.

2.1.3 Emergency Outlet Extension

DWR is proposing to either retrofit the existing valve or add a new valve to reduce emergency releases to a maximum 1,500 cfs. DWR would also construct a new emergency outlet extension that would completely contain and convey the maximum release from the dam to the Perris Valley Storm Drain.

The proposed outlet extension would be approximately two miles long and would redirect flow away from Ramona Expressway and the Perris Fairgrounds by connecting the outlet structure to the Perris Valley Storm Drain. The initial portion of the extension would consist of a 2,000-foot long, 20-foot wide concrete rectangular channel that would tie into the existing outlet structure. A 20-foot wide service road would run parallel to the channel. Overall, the affected width (channel and service road) would be 50 feet. After approximately 1,600 feet, the channel will transition from a concrete rectangular channel to an unlined trapezoidal channel with a bottom width of 100 feet and side slope (H:V) of 2:1. The trapezoidal channel would be approximately 8,800-feet long and would travel parallel to Ramona Expressway to the Perris Valley Channel. The total affected width along this section, channel and service road, would be 160 feet.

The alignment crosses the MWD's buried 10-foot diameter pipe. This section of channel would be lined with concrete to protect the MWD's pipeline. The concrete-lined area will also provide

an area where vehicles can cross the channel. The alignment crosses three roads which run perpendicular to Ramona Expressway: Fair Way, Lake Perris Drive, and Evans Road. Each road crossing would have reinforced concrete box culverts to allow vehicle traffic across the channel. A reinforced concrete box culvert would also be used to pass flow into the Perris Valley Channel. Rip-rap would be placed on the upstream and downstream slopes of the Perris Valley Channel to reduce localized scour.

2.2 Construction Scenario

The proposed project would require an approximately four-year total construction period to be completed in 2012. Table 2-1, *Construction Duration*, summarizes proposed construction activities for each element of the proposed project and provides an estimate of the duration for those activities. Listed activities for each project are generally sequential, with each of the elements potentially overlapping. As shown in Table 2-1, each of the three main facilities included in the proposed project would require approximately two years each to construct.

Table 2-1
Construction Duration

Construction Activity	Duration (Months)		
	Perris Dam Remediation	Outlet Tower Replacement	Emergency Outlet Extension
preliminary activities and site preparation	2	2	2
relocate utilities	-	-	6
excavation	4	3	2
blasting	7	1	-
CDSM treatment	15	-	-
structure improvements	6.5	3	5
embankment fill and additional improvements	8.5	-	-
construct outlet release extension	-	-	3
construct culverts	-	-	6
construct delivery tunnel	-	3	-
construct outlet tower	-	8	-
site restoration and demobilization	3	2	3
total construction duration per project	**22**	**18**	**22**

Table 2-2, *Construction Sequence and Equipment*, highlights a proposed construction sequence and the required equipment for each project. In general, construction activities would occur between 7:00 a.m. and 7:00 p.m., five days per week (Monday through Friday), although weekend and nighttime work may be required during some periods of construction activity. CDSM activities for the dam remediation element of the proposed project would require two CDSM rigs working a 10-hour shift per day.

Large haul truck trips to and from the site would be generally limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Friday, although some haul truck trips to and from the site could occur on weekends. Deliveries from off site would include cement, concrete, reinforcing steel, fencing, other construction materials, and construction equipment.

Table 2-2
Construction Sequence and Equipment

Project Element	Proposed Construction Sequence	Required Equipment
Dam Remediation	• mobilize • delineate and fence equipment and work areas • grade buttress area below dam • grade new haul road • clear embankment, borrow , and stockpile/staging areas • blasting at quarry • excavate borrow area • excavate below dam • cement deep soil mixing • haul soil and rock to toe of dam • construct and compact stability berm	• excavators • scrapers • graders • loaders • bulldozers • CDSM rigs • vibrating rollers • Sheepfoot rollers • hydraulic backhoes • end-dumps and belly-dumps • dump trucks • large trucks (importing material cement to the site) • generators
Outlet Tower	• mobilize and clear staging area • excavate (blasting) • construct new outlet tower • tunnel to existing outlet tunnel • remove granite plug, joining new tower to lake	• bulldozers • graders • scrapers • water trucks • concrete trucks • excavator • dump trucks • personal vehicles • large trucks (importing material cement to the site) • generators
Emergency Outlet Extension	• mobilize • clear and grub project area • identify and remove or relocate existing buried utilities • excavate and grade canal • construct ramps over canal along Old Ramona Road • culverts at Fair Way, Lake Perris Drive and Evans Road • tie-in to Perris Valley storm drain	• bulldozers • graders • scrapers • Sheepfoot rollers • water trucks • concrete trucks • excavators • dump trucks • lumber truck • forklift • asphalt paver • tandem roller • Pneum roller • personal vehicles

3.0 Study Methods

Studies of the biological resources included a review of available literature, consultation with resource agencies and field surveys. Psomas contacted the local field offices of Regional Conservation Authority (RCA), CDFG, and USFWS to identify any agency concerns regarding the Biological Survey Area. This effort was followed by on-site field surveys.

The purpose of the field surveys were to describe and map vegetation communities, determine the presence of sensitive plant communities, assess wildlife use of the area, determine whether special status plant and wildlife species occur or could potentially occur within or adjacent to the proposed project area, and determine the extent of United States Army Corps of Engineers (USACOE) and CDFG jurisdictional waters and associated vegetation communities. During the field surveys, biologists searched for potentially occurring listed and sensitive plant and wildlife species, as well as habitat with the potential to support those species.

3.1 Agency Consultation

The USFWS and CDFG were consulted at the beginning of the project. Primary consultation concerning the contents and scope of this report took place at a meeting on May 23, 2007 at the Lake Perris State Recreation Area. Meeting participants included representatives from DWR, USFWS, CDFG, State Parks, ESA, and Psomas. The USFWS and CDFG expressed concerns regarding impacts to the southwestern willow flycatcher, least Bell's vireo, coastal California gnatcatcher, Los Angeles little pocket mouse, fisheries, and bats. CDFG also expressed concerns that wildlife and plant surveys required to satisfy the requirements of California Environmental Quality Act (CEQA) be performed. Both CDFG and the USFWS stated that the existing conditions for the proposed project be the lake level prior to drawdown and that this condition would also apply to any jurisdictional permitting from CDFG.

A second meeting between DWR, ESA, and CDFG took place on August 17, 2007 in Sacramento. At that meeting CDFG provided its guidance on the mitigation they and the USFWS would require from DWR. Additional coordination was performed by e-mail and telephone between Psomas and the resource agencies.

Consultation between ESA and the USACOE determined that Lake Perris is subject to jurisdiction of the USACOE pursuant to the federal Clean Water Act, section 404 because Lake Perris is a traditionally navigable water, following the Rapanos decision.

3.2 Literature Review

3.2.1 Soils

The Soil Survey of Western Riverside Area, California (USDA 1971) was review to determine the soil types associated with the LPSRA and the Biological Survey Area.

3.2.2 Plant Communities

Prior to field surveys, the California Natural Diversity Database (CNDDB) (CDFG 2008a, 2007a), a database that inventories status and locations of sensitive plant communities, rare plants, wildlife, and habitats in California, was used to identify the sensitive plant communities that may exist in the Biological Survey Area. Psomas conducted a query for the USGS 7.5 Minute Topographic Map Perris Quadrangle and the eight quadrangles surrounding the Perris Quadrangle. The CNDDB identified four sensitive plant communities having the potential to occur within the vicinity of the Biological Survey Area, including:

- southern coast live oak riparian forest (Element Code 61310)
- southern cottonwood-willow riparian forest (Element Code 61330)
- southern riparian scrub (Element Code 63000)
- southern sycamore alder riparian woodland (Element Code 62400)

Generally, classifications of habitat types or vegetation communities were based on *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986).

3.2.3 Special Status Species Identification

Prior to the field surveys, available literature regarding listed endangered, threatened, candidate, and other sensitive plant and wildlife species was reviewed to identify special status plant and wildlife species having the potential to occur within the Biological Survey Area. Literature reviewed and consulted included the following listed below.

- CNDDB search for the USGS 7.5 Minute Topographic Map Perris Quadrangle and the eight quadrangles surrounding the Perris Quadrangle (CDFG 2008a, 2007a):
    - Elsinore Quadrangle
    - Romoland Quadrangle
    - Winchester Quadrangle
    - Lakeview Quadrangle
    - El Casco Quadrangle
    - Sunnymead Quadrangle
    - Riverside East Quadrangle
    - Steele Peak Quadrangle
- The USFWS list of Endangered and Threatened Species for Riverside County (USFWS 2008b, 2007b).
- California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California (CNPS 2008, 2007). Quadrangle search for:
    - Perris
    - Sunnymead
- The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) (RCIP 2003).

An inventory of listed endangered, threatened, candidate, and other sensitive plant and wildlife species was derived from the literature review and agency consultation. This, in addition to the query of the CNDDB for reported locations of listed and sensitive plant and wildlife species and sensitive natural communities, identified the known locations of rare, threatened, and endangered species and significant natural communities in the region and assisted in identifying the potential for on-site occurrence of such species. The life history and survey requirements for listed, candidate and sensitive plant and wildlife species were identified through the literature review.

3.2.4 Endangered, Threatened, or Candidate Species

3.2.4.1 Endangered, Threatened, Candidate or State Rare Plant Species

As a result of the literature review and agency consultation, 18 plant species listed as endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the region of the Biological Survey Area. These listed, candidate and state rare plant species are listed below.

- San Diego button-celery (*Eryngium aristulatum* var. *parishii*)
- dwarf burr ambrosia (San Diego ambrosia) (*Ambrosia pumila*)
- Parish's daisy (Parish's fleabane) (*Erigeron parishii*)
- Nevin's barberry (*Berberis nevinii*)
- marsh sandwort (*Arenaria paludicola*)
- San Jacinto Valley crownscale (*Atriplex coronata* var. *notatior*)
- Coachella Valley milk-vetch (*Astragalus lentiginosus* var. *coachellae*)
- triple-ribbed milk-vetch (*Astragalus tricarinatus*)
- Brand's star phacelia (Brand's phacelia) (*Phacelia stellaris*)
- Hidden Lake bluecurls (*Trichostema austromontanum* ssp. *compactum*)
- Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*)
- Moran's navarretia (spreading navarretia) (*Navarretia fossalis*)
- slender-horned spineflower (*Dodecahema leptoceras*)
- Vail Lake ceanothus (*Ceanothus ophiochilus*)
- salt marsh bird's-beak (*Cordylanthus maritimus* ssp. *maritimus*)
- Munz' onion (*Allium munzii*)
- thread-leaved brodiaea (threadleaf clusterlily) (*Brodiaea filifolia*)
- California Orcutt grass (*Orcuttia californica*)

3.2.4.2 Endangered, Threatened or Candidate Wildlife Species

As a result of the literature review and agency consultation, 30 wildlife species listed as endangered, threatened or candidate pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the region of the Biological Survey Area. These listed and candidate wildlife species are listed below.

- vernal pool fairy shrimp (*Branchinecta lynchi*)
- Riverside fairy shrimp (*Streptocephalus woottoni*)
- Delhi sands flower-loving fly (*Rhaphiomidas terminatus abdominalis*)

- quino checkerspot butterfly (*Euphydryas editha quino*)
- bonytail (*Gila elegans*)
- Colorado pikeminnow (Colorado squawfish) (*Ptychocheilus lucius*)
- Santa Ana sucker (*Catostomus santaanae*)
- razorback sucker (humpback sucker) (*Xyrauchen texanus*)
- desert pupfish (*Cyprinodon macularius*)
- California tiger salamander (*Ambystoma californiense*)
- desert slender salamander (*Batrachoseps major aridus*)
- arroyo toad (*Bufo californicus*)
- California red-legged frog (*Rana aurora draytonii*)
- Sierra Madre yellow-legged frog (mountain yellow-legged frog) (*Rana muscosa*)
- desert tortoise (*Gopherus agassizii*)
- Coachella Valley fringe-toed lizard (*Uma inornata*)
- southern rubber boa (rubber boa) (*Charina umbratica*)
- California brown pelican (*Pelecanus occidentalis californicus*)
- bald eagle (*Haliaeetus leucocephalus*)
- American peregrine falcon (*Falco peregrinus anatum*)
- Yuma clapper rail (*Rallus longirostris yumanensis*)
- California least tern (*Sternula antillarum browni*)
- western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)
- southwestern willow flycatcher (*Empidonax traillii extimus*)
- least Bell's vireo (*Vireo bellii pusillus*)
- coastal California gnatcatcher (*Polioptila californica californica*)
- Palm Springs round-tailed ground squirrel (*Spermophilus tereticaudus chlorus*)
- San Bernardino kangaroo rat (*Dipodomys merriami parvus*)
- Stephens's kangaroo rat (*Dipodomys stephensi*)
- Peninsular bighorn sheep (Distinct Population Segment) (*Ovis canadensis nelsoni* DPS)

3.2.5 Sensitive and Locally Important Species

3.2.5.1 Sensitive and Locally Important Plant Species

Twenty-two sensitive and locally important plant species were identified by the literature review and agency consultation as having the potential to occur within the region of the Biological Survey Area. These sensitive and locally important plant species are listed below.

- San Bernardino aster (*Symphyotrichum defoliatum*)
- smooth tarplant (*Centromadia pungens* ssp. *laevis*)
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)
- chaparral ragwort (rayless ragwort) (*Senecio aphanactis*)
- Wright's trichocoronis (*Trichocoronis wrightii* var. *wrightii*)
- Payson's jewel-flower (Payson's wild cabbage) (*Caulanthus simulans*)
- Robinson's pepper-grass (*Lepidium virginicum* var. *robinsonii*)
- South Coast saltscale (*Atriplex pacifica*)

- Parish's brittlescale (Parish's saltbush) (*Atriplex parishii*)
- Davidson's saltscale (Davidson's saltbush, bractscale) (*Atriplex serenana* var. *davidsonii*)
- many-stemmed dudleya (*Dudleya multicaulis*)
- round-leaved filaree (large-leaf filaree) (*California macrophylla*)
- mud nama (mud fiddeleaf) (*Nama stenocarpum*)
- salt spring checkerbloom (mountain sidalcea) (*Sidalcea neomexicana*)
- chaparral sand-verbena (*Abronia villosa* var. *aurita*)
- Parry's spineflower (*Chorizanthe parryi* var. *parryi*)
- long-spined spineflower (knotweed spineflower) (*Chorizanthe polygonoides* var. *longispina*)
- little mousetail (*Myosurus minimus* ssp. *apus*)
- Parish's desert-thorn (*Lycium parishii*)
- Plummer's mariposa lily (*Calochortus plummerae*)
- intermediate mariposa lily (Weed's mariposa lily) (*Calochortus weedii* var. *intermedius*)
- vernal barley (*Hordeum intercedens*)

3.2.5.2 Sensitive and Locally Important Wildlife Species

Forty-eight sensitive and locally important wildlife species were identified by the literature review and agency consultation as having the potential to occur within the region of the Biological Survey Area. These sensitive and locally important wildlife species are listed below.

- western spadefoot (*Spea hammondii*)
- southwestern pond turtle (southern Pacific pond turtle) (*Actinemys marmorata pallida*)
- San Diego banded gecko (*Coleonyx variegatus abbotti*)
- coast (San Diego) horned lizard (*Phrynosoma coronatum* (*blainvillii* population))
- orange-throated whiptail (*Aspidoscelis hyperythra*)
- coastal whiptail (coastal western whiptail) (*Aspidoscelis tigris stejnegeri*)
- silvery legless lizard (*Anniella pulchra pulchra*)
- coastal rosy boa (*Charina trivirgata roseofusca*)
- San Bernardino ring-necked snake (*Diadophis punctatus modestus*)
- northern red-diamond rattlesnake (*Crotalus ruber ruber*)
- double-crested cormorant (*Phalacrocorax auritus*)
- white-faced ibis (*Plegadis chihi*)
- osprey (*Pandion haliaetus*)
- white-tailed kite (*Elanus leucurus*)
- northern harrier (*Circus cyaneus*)
- sharp-shinned hawk (*Accipiter striatus*)
- Cooper's hawk (*Accipiter cooperii*)
- ferruginous hawk (*Buteo regalis*)
- golden eagle (*Aquila chrysaetos*)
- mountain plover (*Charadrius montanus*)
- burrowing owl (*Athene cunicularia*)
- long-eared owl (*Asio otus*)
- loggerhead shrike (*Lanius ludovicianus*)

- California horned lark (*Eremophila alpestris actia*)
- purple martin (*Progne subis*)
- San Diego cactus wren (coastal cactus wren) (*Campylorhynchus brunneicapillus sandiegensis*)
- yellow warbler (*Dendroica petechia brewsteri*)
- yellow-breasted chat (*Icteria virens*)
- southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)
- Bell's sage sparrow (*Amphispiza belli belli*)
- tricolored blackbird (*Agelaius tricolor*)
- Lawrence's goldfinch (*Carduelis lawrencei*)
- Dulzura pocket mouse (*Chaetodipus californicus femoralis*)
- northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)
- Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
- Bryant's woodrat (*Neotoma bryanti intermedia*) (formally known as San Diego desert woodrat [*Neotoma bryanti intermedia*])
- southern grasshopper mouse (*Onychomys torridus ramona*)
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)
- California leaf-nosed bat (*Macrotus californicus*)
- western mastiff bat (western bonneted bat) (*Eumops perotis californicus*)
- pocketed free-tailed bat (*Nyctinomops femorosaccus*)
- western red bat (*Lasiurus blossevillii*)
- western yellow bat (*Lasiurus xanthinus*)
- Townsend's big-eared bat (*Corynorhinus townsendii*)
- spotted bat (*Euderma maculatum*)
- pallid bat (*Antrozous pallidus*)
- mountain lion (*Puma concolor*)
- American badger (*Taxidea taxus*)

3.2.6 Critical Habitat

The USFWS' online service for information regarding Threatened and Endangered Species final Critical Habitat designation within California was reviewed to determine if the Biological Survey Area is within any species' designated Critical Habitat (USFWS 2008a, 2007a).

3.2.7 Jurisdictional Waters

The USGS 7.5 Minute Topographic Map Perris and Sunnymead Quadrangles and aerial photographs were reviewed to determine the potential presence or absence of blue-line streams, wetland areas, their location within watersheds associated with the proposed project site, and other features that might contribute to federal or state jurisdictional authority located within watersheds associated with the Biological Survey Area.

In addition, the following published and grey literature was reviewed and consulted:

- 1996 National List of Vascular Plant Species that occur in Wetlands (USFWS 1996).
- *2006 U.S. Army Corps of Engineers Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.*
- *Field Guide for Wetland Delineation* (1987 USACOE Manual) prepared by the Wetland Training Institute (WTI 1999).
- *A Field Guide to Lake and Streambed Alteration Agreements* (CDFG 1994).

However, during the meeting on May 23, 2007, CDFG and USFWS stated that the jurisdictional line for waters of the state and U.S. for the purposes of analysis for this proposed project would be the pre-drawdown regulated level at 1,588 feet msl. Therefore, Psomas used the USGS topographic map as the primary method to determine the extent of jurisdiction for the USACOE and CDFG. The other literature and guidelines described below were used to determine the extent of jurisdictional wetlands or associated riparian plant communities that would be subject to the jurisdiction of either CDFG or the USACOE or both.

3.2.7.1 U.S. Army Corps of Engineers Jurisdiction

Section 404 of the federal Clean Water Act applies to "Waters of the United States." Presently, "Waters of the United States" are defined to include waterways, streams, and wetlands that have a connection to navigable waters, and tributaries to these waters. In non-tidal waters, the limits of jurisdiction under the category of "Waters" are "ordinary high water marks" (OHWM) that are identified through field observation of features such as shelving and debris deposits. Where wetlands occur above high water marks, they are considered "adjacent wetlands", and are included within USACOE jurisdiction, as long as such features are connected hydrologically to navigable waters or their tributaries.

As a result of the recent Rapanos decisions the USACOE now has jurisdiction over traditional navigable waters, wetlands adjacent to traditional navigable waters, non-navigable tributaries of traditional navigable waters that are relatively permanent where tributaries typically flow year-round, and wetlands that directly abut such tributaries.

3.2.7.2 California Department of Fish and Game Jurisdiction

Section 1600, et. seq., of the California Fish and Game Code are applied to lakes and streams. CDFG has interpreted jurisdictional boundaries to be limited to the tops of stream banks (i.e., the limit of stream influence) and/or the limit of the canopy of riparian vegetation that is hydrologically connected to the stream, whichever is greatest. Isolated wetlands not associated with a stream or body of water are not protected under Sections 1600 et seq. of the Fish and Game Code, although other sections of the Code pertaining to rare species, game, and other categories can apply if these resources are present.

3.2.7.3 Wetlands/Jurisdictional Riparian Communities

The USACOE's technical guidelines for defining wetlands are provided in their *2006 U.S. Army Corps of Engineers Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Supplemental Manual).* The 1987 Wetlands Delineation Manual was used as a secondary resource for the proposed project. Wetlands are a subset of the "Waters

of the United States" that may be subject to regulation under Section 404. One key feature of the definition of wetlands is that, under normal circumstances, they support a "prevalence of vegetation typically adapted to life in saturated soil conditions." The USACOE defines a wetland as a site that is "inundated or saturated…at a frequency and duration sufficient to support…vegetation typically adapted for life in saturated soil conditions…" Soil saturation deprives plant roots of oxygen, limiting the types of plants that can grow. Absence of oxygen leads to "reducing" chemical conditions and to the development of unique soil types, called hydric soils. The USACOE's technical guidelines outlined in the 1987 Manual (pages 13-14) define three criteria for delineating a feature as a "wetland:" hydrology, soils, and vegetation. Under the procedures and criteria in the 1987 Manual, a feature must normally satisfy all three criteria to be classified as a wetland. The Supplemental Manual was also used to help identify and delineate wetlands and jurisdictional areas.

Typically, CDGG uses only one of the three above criteria to determine the presence of a jurisdictional wetland adjacent to waters of the State.

3.3 Field Survey Methods

Psomas biologists and subconsultant biologists visited the Biological Survey Area a total of fifty-nine times from May 2007 to July of 2008 to conduct the following surveys:

- habitat assessment
- general vegetation surveys
- focused sensitive plant surveys
- general wildlife surveys
- focused wildlife surveys for the following species:
    - southwestern willow flycatcher
    - least Bell's vireo
    - coastal California gnatcatcher
    - Stephens's kangaroo rat
    - Los Angeles pocket mouse
- jurisdictional plant community determination

The dates of these surveys can be found in Table 3-1, *Biological Resource Survey Dates and Types*.

Table 3-1
Biological Resource Survey Dates and Types

Survey Date	Survey Type
2007 Surveys	
May 9, 2007	HA, GVS, GWS, JD
May 30, 2007	HA, GVS, GWS, JD
May 31, 2007	SWFL, LBV
June 5, 2007	HA, GVS, GWS, JD
June 7, 2007	SWFL, LBV
June 12, 2007	HA, GVS, GWS, JD
June 14, 2007	HA, GVS, GWS, LBV
June 21, 2007	SWFL, LBV
June 26, 2007	HA, GVS, GWS, JD
June 27, 2007	LBV
June 28, 2007	SWFL
July 5, 2007	LBV, CAGN
July 11, 2007	SWFL
July12, 2007	LBV, CAGN
July 18, 2007	LBV, CAGN
July 26, 2007	LBV, CAGN
August 1, 2007	HA, GWS, CAGN
August 17, 2007	CAGN
August 26, 2007	HA, GVS, GWS, JD
September 2, 2007	HA, GVS, GWS, JD
September 10, 2007	CAGN
September 20, 2007	HA, GVS, GWS
September 24, 2007	LAPM
September 25, 2007	LAPM
September 26, 2007	LAPM
September 27, 2007	LAPM
September 28, 2007	CAGN, LAPM
September 29, 2007	LAPM
October 11, 2007	CAGN
October 24, 2007	CAGN
November 8, 2007	CAGN
2008 Surveys	
April 17, 2008	LBV, CAGN
April 18, 2008	LBV
April 24, 2008	CAGN
April 29, 2008	LBV, FSPS
May 2, 2008	LBV, CAGN

Survey Date	Survey Type
May 10, 2008	CAGN
May 12, 2008	LBV
May 16, 2008	LBV, CAGN
May 23, 2008	CAGN
May 30, 2008	LBV
May 31, 2008	SWFL
June 2, 2008	LBV, FSPS
June 9, 2008	LBV, SWFL
June 13, 2008	LBV
June 15, 2008	SKR
June 16, 2008	SKR
June 17, 2008	SKR
June 18, 2008	SKR
June 19, 2008	SKR
June 20, 2008	SKR
June 23, 2008	LBV, SWFL
June 24, 2008	LBV
July 2, 2008	SWFL
July 3, 2008	LBV
July 8, 2008	LBV
July 11, 2008	SWFL
July 14, 2008	LBV
July 18, 2008	LBV
Legend	
HA: habitat assessment	**LBV:** focused least Bell's vireo survey
GVS: general vegetation survey	**CAGN:** focused coastal California gnatcatcher survey
GWS: general wildlife survey	**LAPM:** focused Los Angeles pocket mouse survey
FSPS: focused sensitive plant survey	**SKR:** focused Stephens's kangaroo rat survey
SWFL: focused southwestern willow flycatcher survey	**JD:** jurisdictional plant community determination

3.3.1 Habitat Assessment

During the field surveys, Psomas biologists walked and/or drove the entire Biological Survey Area to assess the habitat present. The biologists paid special attention to those habitat areas that appeared to provide suitable habitat for the species listed in Section 3.2.4 and Section 3.2.5 and sensitive plant communities. Focus was placed on locating sensitive biological resources including listed and sensitive plant and wildlife species listed in Section 3.2.4 and Section 3.2.5 and their habitats, assessing the quality of habitat present on site for potentially occurring sensitive biological resources, and assessing potential impacts from proposed project activities.

Habitat assessment field surveys were conducted by Psomas biologists (Dr. Brad Blood, Ms. Jennifer Campbell-Young, Ms. Cathleen Weigand, Mr. Gregg Miller, Ms. Amanda Weinberg,

Mr. Duane Haselfeld, and Ms. Alicia Williams). The habitat assessment surveys were conducted on the following dates:

- May 9, 2007
- May 30, 2007
- June 5, 2007
- June 12, 2007
- June 14, 2007
- June 26, 2007
- August 1, 2007
- August 26, 2007
- September 2, 2007
- September 20, 2007

The plant communities in the Biological Survey Area were identified and mapped in the field directly on ortho-corrected GIS aerial photos. Aerial photographs were used to assist in the delineation of plant community boundaries. Biologists also searched for sensitive plant communities to determine whether they occur within the Biological Survey Area. Following field mapping, plant communities were digitized and entered into a GIS database. Photographs were taken by field biologists to document existing conditions within the Biological Survey Area.

3.3.2 General Vegetation Surveys

Psomas biologists walked and/or drove the entire Biological Survey Area to assess the vegetation present. During the field surveys, focus was placed on locating sensitive biological resources including listed, candidate, state rare and sensitive plant species listed in Section 3.2.4 and Section 3.2.5 and their habitats and assessing the quality of habitat present on site for potentially occurring sensitive biological resources. The purpose of the field surveys was not to extensively search for every plant species occurring within the study area, but to ascertain general conditions and identify habitat areas that could be suitable for listed, candidate, state rare or sensitive plant species. During the field surveys, the potential for plant species listed in Section 3.2.4 and Section 3.2.5 to occur was assessed as low, moderate, or high.

General vegetation field surveys were conducted by Psomas biologists (Dr. Brad Blood, Ms. Jennifer Campbell-Young, Ms. Cathleen Weigand, and Ms. Amanda Weinberg). The general vegetation surveys were conducted on the following dates:

- May 9, 2007
- May 30, 2007
- June 5, 2007
- June 12, 2007
- June 14, 2007
- June 26, 2007
- August 26, 2007

- September 2, 2007
- September 20, 2007

The biologists paid special attention to those habitat areas that appeared to provide suitable habitat for the species listed in Section 3.2.4 and Section 3.2.5. All plant species encountered during the field surveys were identified and recorded in field notes. All common plant species were readily identified by visual characteristic and morphology in the field. Unusual and less familiar plants were later identified using taxonomical guides. Taxonomic nomenclature used in this study follows the California Native Plant Society (CNPS) nomenclature and *The Jepson Manual* (Hickman 1993). Plant field guides and photographs were used to assist with identification of plant species during surveys.

3.3.2.1 General Vegetation Field Survey Limitations

Conducting the field surveys in the late spring, summer and fall decreased the detection of winter and early spring blooming plant species. There were a number of plants in bloom, but there were also a number of plants not yet in bloom and a number of plants that had already bloomed and gone to seed. Therefore, a number of plant species could not be identified, and some annuals had not yet appeared, or the blooming period was missed. An effort was made to determine presence or absence of potentially suitable habitat for those plants that could not be identified at that time.

3.3.3 2008 Focused Sensitive Plant Surveys

Psomas biologist conducted focused sensitive plant surveys around the areas of impact immediately around the dam. Psomas biologists walked the entire survey area to assess the vegetation present. During the field surveys, focus was placed on locating sensitive plant resources and their habitats and assessing the quality of habitat present on site for potentially occurring sensitive plant resources. The purpose of the focused sensitive plant surveys was to search for the listed, candidate, state rare and sensitive plant species listed in Section 3.2.4 and Section 3.2.5.

Focused sensitive plant surveys were conducted by Psomas biologists (Ms. Cathleen Weigand and Ms. Amanda Weinberg). The focused sensitive plant surveys were conducted on the following dates:

- April 29, 2008
- June 2, 2008

The biologists paid special attention to those habitat areas within the survey area that appeared to provide suitable habitat for the species listed in Section 3.2.4 and Section 3.2.5. All plant species encountered during the field surveys were identified and recorded in field notes. All common plant species were readily identified by visual characteristic and morphology in the field. Unusual and less familiar plants were later identified using taxonomical guides. Taxonomic nomenclature used in this study follows the CNPS nomenclature and *The Jepson Manual* (Hickman 1993). Plant field guides and photographs were used to assist with identification of plant species during surveys.

3.3.3.1 Focused Sensitive Plant Survey Limitations

Conducting the field surveys in the late spring decreased the detection of early spring, summer, fall and winter spring blooming plant species. Due to the early summer, dry conditions at Lake Perris during the time of the surveys, there were a number of plants that had already bloomed and gone to seed. Therefore, a number of plant species could not be identified, and some annuals had not yet appeared, or the blooming period was missed.

3.3.4 General Wildlife Surveys

Psomas biologists walked and/or drove the entire Biological Survey Area to assess the wildlife present. During the wildlife field surveys, focus was placed on locating sensitive biological resources including listed and sensitive wildlife species listed in Section 3.2.4 and Section 3.2.5 and their habitats and assessing the quality of habitat present on site for potentially occurring sensitive biological resources. The purpose of the field surveys was not to extensively search for every wildlife species occurring within the Biological Survey Area, but to ascertain general conditions and identify habitat areas that could be suitable for listed, candidate or sensitive wildlife species. During the field surveys, the potential for wildlife species listed in Section 3.2.4 and Section 3.2.5 to occur was assessed as low, moderate, or high.

General wildlife field surveys were conducted by Psomas biologists (Dr. Brad Blood, Mr. Gregg Miller, and Ms. Amanda Weinberg). The general wildlife surveys were conducted on the following dates:

- May 9, 2007
- May 30, 2007
- June 5, 2007
- June 12, 2007
- June 14, 2007
- June 26, 2007
- August 1, 2007
- August 26, 2007
- September 2, 2007
- September 20, 2007

The methods used to detect and identify wildlife included: sight, scat, animal tracks, burrows, nests, and vocalizations. Binoculars were used to aid in the identification of observed wildlife. Wildlife field guides and photographs were used to assist with identification of wildlife species during the field surveys. All wildlife species encountered during the field surveys were identified and recorded in field notes. Incidental wildlife observations were also made during the focused wildlife surveys that are described below in the following sections.

The rock quarry at LPSRA was surveyed during early morning hours August 1, 2007 and evening hours of September 2, 2007 by Psomas biologist Gregg Miller to assess bat use of the quarry. The surveys were conducted by observing bat activity and searching the quarry for potential bat roost sites such as deep protected crevices and hollows.

3.3.4.1 General Wildlife Field Survey Limitations

Conducting the field surveys in the late spring, summer and fall decreased the detection potential for some wildlife species. Therefore, an effort was made to determine presence or absence of potentially suitable habitat for those wildlife species that could not be identified at that time.

The field surveys were conducted during the daytime to maximize the detection of most wildlife. Birds represent the largest component of the fauna, and because most birds are active in the daytime, diurnal surveys maximize the number of observations of this portion of the fauna. In contrast, daytime surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe. Many wildlife species are secretive and nocturnal, such as some reptiles, amphibians and small mammals.

During the field surveys, many species of wildlife that could potentially utilize the proposed project site may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. A single day survey cannot be used to conclusively determine presence or absence of a species; therefore assessments of presence/absence were made based on the presence suitable habitat to support the species, diagnostic signs (burrows, scat, tracks, vocalizations and nests), known records or occurrence within the area, known distributional and elevational range, and habitat utilization from the relevant literature.

3.3.5 2007 and 2008 Focused Southwestern Willow Flycatcher Surveys

Surveys for the southwestern willow flycatcher were conducted following protocol approved by the USFWS (Sogge et al. 1997), and updated by the California/Nevada Operations Office (USFWS 2000). The surveys were conducted by wildlife biologist Mr. John Konecny, and authorized by USFWS section 10(a) permit number TE837308-4, and a CDFG Memorandum of Understanding (MOU). Mr. Konecny is familiar with southwestern willow flycatcher songs, calls, scolds, and plumage characteristics of adult and juvenile flycatchers. The purpose of these surveys was to determine the presence/absence of southwestern willow flycatchers within the Biological Survey Area.

Pursuant to USFWS approved protocol, five focused southwestern willow flycatcher surveys were conducted between May 31 and July 11, 2007 and five focused southwestern willow flycatcher surveys were conducted between May 31 and July 11, 2008. Conducting surveys in May and early June allowed the biologist to look for flycatchers when they are most vocal. Conducting surveys in late June and July allowed the biologist verify if flycatchers are nesting. Surveys were conducted on the following dates of 2007 and 2008:

2007 Focused Southwestern Willow Flycatcher Surveys

- May 31, 2007
- June 7, 2007

- June 21, 2007
- June 28, 2007
- July 11, 2007

2008 Focused Southwestern Willow Flycatcher Surveys

- May 31, 2008
- June 9, 2008
- June 23, 2008
- July 2, 2008
- July 11, 2008

Surveys for the southwestern willow flycatcher were usually begun at or just before sunrise and lasted approximately three hours. Surveys were conducted during weather conducive to observing southwestern willow flycatcher. Surveys were not conducted during inclement weather. Surveys were conducted in two areas in the Biological Survey Area: within the southern willow woodland and scrub along the eastern lakeshore and the southern willow woodland and scrub immediately west and below the dam (Figure 7, *Focused Biological Survey Site Locations*).

The surveys were conducted by walking slowly within and/or along the riparian habitat and stopping at approximately 50 foot (15 meters) intervals, listening and watching for flycatchers. If flycatchers were not detected passively, a digital vocalization of the species ("fitz-bew") was played with a MP3/iPod player and amplified speakers for approximately 15 seconds. A response was listened for in the next two-minute interval. The digital vocalization was used to elicit a vocal response from flycatchers, and to subsequently observe behaviors that indicate nesting (e.g. establishing and defending territories, soliciting mates, acquiring/carrying nest material, etc.). Locations of flycatcher observations were taken with a hand held GPS unit. If flycatchers were not detected, this procedure was repeated again before proceeding to the next station. Detailed notes and all avian species encountered during the field surveys were identified and recorded in field notes.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area
- 2007 & 2008 Least Bell's Vireo and Southwestern Willow Flycatcher Survey Areas
- 2007 & 2008 Coastal California Gnatcatcher Survey Area
- 2007 Los Angeles Pocket Mouse Survey Area
- 2008 Stephens' Kangaroo Rat Survey Area (Transects)

N
W E
S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Focused Biological Survey Site Locations

PSOMAS

Figure 7

3.3.6 2007 and 2008 Focused Least Bell's Vireo Surveys

The 2007 focused least Bell's vireo surveys were performed by Psomas Senior Biologist (Mr. Gregg Miller) and Psomas' subconsultant biologist (Mr. John Konecny). The least Bell's vireo surveys were conducted following a modification of the federal Least Bell's Vireo Survey Guidelines (USFWS 2001). The modification was recommended by USFWS (Ms. Doreen Statdlander). The purpose of these surveys was to determine the presence/absence of least Bell's vireos within the Biological Survey Area.

In 2007, nine focused least Bell's vireo surveys were conducted between May 31 and July 26, 2007. This time period encompasses the period during which most vireo nesting activity occurs. The June 7, 2007 survey was conducted by Mr. Konecny. All others were conducted by Mr. Miller. Mr. Miller and Mr. Konecny are familiar with least Bell's vireo songs, calls, scolds, and plumage characteristics of adult and juvenile vireos. Surveys were conducted on the following dates in 2007:

- May 31, 2007
- June 7, 2007
- June 14, 2007
- June 21, 2007
- June 27, 2007
- July 5, 2007
- July 12, 2007
- July 18, 2007
- July 26, 2007

The 2008 focused least Bell's vireo surveys were performed by Psomas Senior Biologist (Mr. Gregg Miller). The least Bell's vireo surveys were conducted following the federal Least Bell's Vireo Survey Guidelines (USFWS 2001). The purpose of these surveys was to determine the presence/absence of least Bell's vireos within the Biological Survey Area.

In 2008, sixteen focused least Bell's vireo surveys were conducted between April 17 and July 18, 2008. This time period encompasses the period during which most vireo nesting activity occurs. In order to cover all the areas that needed to be surveyed in the time allotted for surveying for least Bell's vireos, it took sixteen days to complete all 8 surveys. Surveys were conducted on the following dates:

- April 17, 2008
- April 18, 2008
- April 29, 2008
- May 2, 2008
- May 12, 2008
- May 16, 2008
- May 30, 2008
- June 2, 2008

- June 9, 2008
- June 13, 2008
- June 23, 2008
- June 24, 2008
- July 3, 2008
- July 8, 2008
- July 14, 2008
- July 18, 2008

Surveys for the least Bell's vireo were usually begun near sunrise and lasted approximately three hours. Surveys were conducted during weather conducive to observing least Bell's vireo. Surveys were not conducted during inclement weather. Surveys were conducted in two areas in the Biological Survey Area: within the southern willow woodland and scrub along the eastern lakeshore and the southern willow woodland and scrub immediately west and below the dam (Figure 7).

The surveys were conducted by walking slowly within and/or along the riparian habitat and stopping at approximately 50 foot (15 meters) intervals, listening and watching for vireos. Vocalization tapes were not used during the surveys. Locations of vireo observations were taken with a hand held GPS unit.

The methods used to detect and identify least Bell's vireo included sight and vocalizations. Binoculars, wildlife field guides and photographs were used to assist with identification of wildlife species during the field surveys. Detailed notes and all wildlife species encountered during the field surveys were identified and recorded in field notes.

3.3.7 2007 and 2008 Focused Coastal California Gnatcatcher Surveys

Prior to conducting the coastal California gnatcatcher focused surveys in 2007 and 2008, Psomas searched the most recent version of the CNDDB output for the Perris Quadrangle (CDFG 2008a, 2007a), the Western Riverside County MSHCP (RCIP 2003) and MSHCP monitoring reports to determine if and to what extent the coastal California gnatcatcher occurs on and adjacent to the LPSRA. A 10-day pre-survey notification was sent to the USFWS Carlsbad Field Office (Ms. Sandy Marquez) on June 20, 2007 and on April 1, 2008. The purpose of these surveys was to determine the presence/absence of coastal California gnatcatchers within in areas that could potentially be impacted by the proposed project.

The 2007 and 2008 focused coastal California gnatcatcher surveys were performed by Psomas Senior Biologist, Mr. Gregg Miller (permit # TE834488-5). The 2007 coastal California gnatcatcher surveys were conducted pursuant to federal survey guidelines (USFWS 1997) for non-breeding season surveys. The 2008 coastal California gnatcatcher surveys were conducted pursuant to federal survey guidelines (USFWS 1997) for breeding season surveys. Mr. Miller is familiar with coastal California gnatcatcher songs, calls, scolds, and plumage characteristics of adult and juvenile gnatcatchers.

In 2007, a total of nine protocol non-breeding season surveys were conducted at least two weeks apart from July 5 to November 8, 2007. Two additional opportunistic surveys were conducted on July 12 and July 26, 2007. Surveys were conducted on the following dates:

- July 5, 2007
- July 12, 2007
- July 18, 2007
- July 26, 2007
- August 1, 2007
- August 17, 2007
- September 10, 2007
- September 28, 2007
- October 11, 2007
- October 24, 2007
- November 8, 2007

In 2008, a total of six protocol breeding season surveys were conducted at least one week apart from April 17 to May 23, 2008. Surveys were conducted on the following dates:

- April 17, 2008
- April 24, 2008
- May 2, 2008
- May 10, 2008
- May 16, 2008
- May 23, 2008

Surveys for the coastal California gnatcatcher were begun near sunrise and lasted approximately two hours. Surveys were conducted during weather conducive to observing coastal California gnatcatchers. Surveys were not conducted during inclement weather. Surveys were conducted within areas that contained suitable coastal sage scrub habitat in the Biological Survey Area that may be impacted by the proposed project (Figure 7).

The surveys were conducted by walking slowly within and/or along the coastal sage scrub habitat and stopping periodically, listening and watching for gnatcatchers. If gnatcatchers were not detected passively, a vocalization of the species was played. A response was listened for in the next two-minute interval. The vocalization was used to elicit a vocal response from gnatcatchers, and to subsequently observe behaviors. If gnatcatchers were observed, their locations were taken with a hand held GPS unit.

The methods used to detect and identify coastal California gnatcatcher included sight and vocalizations. Binoculars, wildlife field guides and photographs were used to assist with identification of wildlife species during the field surveys. Detailed notes and all wildlife species encountered during the field surveys were identified and recorded in field notes.

3.3.8 2008 Focused Stephens's Kangaroo Rat Surveys

The habitat assessment and live-trapping surveys were performed by Dr. Phil Brylski (permit # TE14855-0), assisted by Mr. Steven Montgomery (permit # TE745541-8) and Psomas Senior Biologist Mr. Gregg miller (permit # TE834488-5). The Stephens's kangaroo rat surveys were conducted following protocols in federal Stephens's kangaroo rat permit conditions. The purposes of the Stephens's kangaroo rat surveys were to determine the presence or absence of Stephens's kangaroo rat in potential habitat in the proposed project site and in adjacent areas where Stephens's kangaroo rat had been previously observed, and to obtain information on the occurrence of other small mammal species.

Prior to the field surveys, available literature regarding Stephens's kangaroo rat and other sensitive mammal species was reviewed to determine if and to what extent Stephens's kangaroo rat occur on or adjacent to the proposed project site. The most recent version of the CNDDB (CDFG 2008a) was queried for the Perris Quadrangle. In addition, the Western Riverside MSHCP (RCIP 2003) and MSHCP monitoring reports (RCA 2007a, 2007b, 2006) were reviewed.

Before trapping took place, a reconnaissance-level habitat assessment was conducted by foot and vehicle of the proposed project site to assess the presence or absence of suitable habitat for Stephens's kangaroo rat, Los Angeles pocket mouse, and other sensitive mammal species within the project impact boundaries. The field team assessed and evaluated the condition of the plant communities on-site to assess the probability of their ability to support Stephens's kangaroo rat, Los Angeles pocket mouse, and other sensitive mammalian species. Site characteristics including soils, topography, the condition of the plant communities, and evidence of human use were assessed. Observations of sign of Stephens's kangaroo rat, Los Angeles pocket mouse and other sensitive mammalian species included scat, trails, tracks, dust baths, and burrows.

Following the habitat assessment, areas with suitable habitat and site conditions were chosen to conduct live-trapping surveys for Stephens's kangaroo rat (Figure 7). These survey areas included:

- The area that would be directly impacted by dam remediation, road building and improvements, and outlet flood protection activities.

- Areas adjoining and near to habitats that would be directly impacted by project activities. These areas were south of the dam and several areas north and east of the lake. The areas surveyed included two areas where Stephens's kangaroo rat had been live-captured under a previous monitoring effort (RCA 2007a).

The areas surveyed for Stephens's kangaroo rat and Los Angeles pocket mouse are within Township 3S, Range 3W, Section 36, and Township 4S, Range 3W, Sections 2, 4, 5 and 10.

The current USFWS permit conditions require five nights of trapping, conducted when Stephens's kangaroo rat are known to be active aboveground (at night and preferably during a new moon phase). The conditions also prohibit trapping when the nightly low temperature is

predicted to be 50°F or less. Trapping was conducted during suitable weather conditions on the following nights:

- June 15, 2008
- June 16, 2008
- June 17, 2008
- June 18, 2008
- June 19, 2008
- June 20, 2008

Within each survey area transects were placed predominantly along edges of dirt roads as loose soil conditions were conducive to rodent burrowing as indicated by sign. Transects were also placed in sparsely vegetated locations. Eleven traplines of 10 to 30 traps were set with traps approximately 10 meters apart. Traplines were placed within the proposed project site's most suitable habitat areas, and also outside the proposed project site in areas where MSHCP monitoring had previously captured Stephens's kangaroo rat. Individual traps were located near small mammal sign and/or suitable soils and vegetation for Stephens's kangaroo rat to maximize the probability of capture.

Traps were baited with birdseed placed at the back of the traps. The traps were left in place, opened at dusk each night, checked once during the night, and checked and closed at dawn the following morning. Traps were left closed during the day. Prior to closure all traps were examined to be sure no animals had become lodged under the treadle. All animals captured were identified to species, and released at the point of capture. Animals were not individually marked. The sex of each captured Stephens's kangaroo rat was recorded and its age was estimated based on pelage characteristics. Locations of any sensitive mammal species captures were taken with a hand held GPS unit.

3.3.9 2007 Focused Los Angeles Pocket Mouse Surveys

The purpose of the focused Los Angeles pocket mouse field surveys was to determine whether the Los Angeles pocket mouse occurs or could potentially occur on the proposed project site. Field surveys were conducted by a permitted wildlife biologist (Ms. Karen Kirtland, USFWS Permit TE068072-02), assisted by Psomas biologists (Ms. Alicia Williams and Dr. Brad Blood). Before trapping took place, the biologists conducted a preliminary driving and walkover survey of the Biological Survey Area to determine suitable areas for trapping the Los Angeles pocket mouse on September 24, 2007. During the reconnaissance surveys, the various plant communities and condition of the habitats onsite were noted. Based on this survey, four trapping locations were determined to be needed (Figure 7).

Trapping surveys were conducted following standard protocols for small mammals. The protocol specifies five consecutive nights of trapping conducted when the animals are active above ground at night and preferably during a new moon phase. The trap lines were placed in suitable habitat along the lake shore within the area of likely impact from project activities (NRA, Inc. 2008). The trap locations were placed in areas containing the most likely soils and vegetation for small mammals. All traplines were located below the high water mark of the

former shoreline of the lake. Traps lines utilized 30 to 40 - 12-inch Sherman folding live traps, set in lines or grids, with traps approximately five meters apart depending on the vegetation and substrate. Surveys were conducted on the following dates:

- September 24, 2007
- September 25, 2007
- September 26, 2007
- September 27, 2007
- September 28, 2007
- September 29, 2007

Surveys usually began at, or just before sunrise (5:15 am – 7:00 am) lasting approximately four hours, and at dusk, taking approximately three hours to re-set and bait all the traps. The traps were baited and set at dusk and inspected and closed at dawn. In the evening each trap was set and baited with a mixture of birdseed, placed at the back of the traps. At dawn, every trap was checked for animals, and then closed until re-setting the traps again in the evening. Upon trapping, each species name was recorded, along with the date and time, and the area in which it was found. All animals were identified and released at the point of capture. Photographs were taken to document the existing condition of the habitat and the species sampled.

3.3.10 Jurisdictional Waters and Associated Plant Communities

Because the resource agencies set the jurisdictional limit at the 1,588 feet mark, Psomas biologists surveyed to identify the furthest edge of associated jurisdictional wetlands and riparian communities, using the outer-most vegetation's drip line to determine the extent of jurisdiction for CDFG and USACOE. The surveyors also searched for the presence of wetland hydrology, wetland soils, and hydrophytic vegetation. Soil pits were determined not to be necessary due to the observed presence of hydrology and hydrophytic vegetation.

4.0 Results

Psomas biologists and subconsultant biologists visited the Biological Survey Area a total of fifty-nine times from May 2007 to July of 2008 to conduct the following surveys: habitat assessment; general vegetation surveys; focused sensitive plant surveys; general wildlife surveys; focused southwestern willow flycatcher surveys; focused least Bell's vireo surveys; focused coastal California gnatcatcher surveys; focused Stephens's kangaroo rat surveys; focused Los Angeles pocket mouse surveys; and jurisdictional plant community determination. Biological field surveys were conducted for the purpose of collecting data on habitat communities, identifying listed and sensitive plant and wildlife species, and providing a base line data for the determination of potential project impacts.

4.1 Field Surveys

Field surveys for the habitat assessment, general vegetation, focused sensitive plant surveys, general wildlife and jurisdictional plant communities of the Biological Survey Area were conducted as described in Table 4-1, *Habitat Assessment, General Vegetation, Focused Sensitive Plant, General Wildlife, and Jurisdictional Plant Community Determination Field Survey Information*.

Table 4-1
Habitat Assessment, General Vegetation, Focused Sensitive Plant, General Wildlife, and Jurisdictional Plant Community Determination Field Survey Information

Survey Date	Survey Time	Approximate Temperature	Cloud Cover
May 9, 2007	8:00 am – 4:00 pm	70°F	clear
May 30, 2007	8:00 am – 4:00 pm	80°F	clear
June 5, 2007	8:00 am – 4:00 pm	66°F - 90°F	clear
June 12, 2007	8:00 am – 4:00 pm	80°F	clear
June 14, 2007	8:30 am – 3:00 pm	80°F	clear
June 26, 2007	7:30 am – 3:00 pm	80°F	clear
August 1, 2007	6:05 am – 7:30 am	68°F	high overcast
August 26, 2007	4:00 pm – 9:00 pm	80°F	high overcast
September 2, 2007	3:00 pm – 7:00 pm	60°F	clear
September 20, 2007	8:00 am – 4: 00 pm	70°F	clear
April 29, 2008	7:00 am – 1:00 pm	68°F - 88°F	clear
June 2, 2008	7:30 am – 11:00 pm	71°F - 78°F	clear

The 2007 focused field surveys for the southwestern willow flycatcher were conducted as described in Table 4-2, *2007 Focused Southwestern Willow Flycatcher Field Survey Information*.

Table 4-2
2007 Focused Southwestern Willow Flycatcher Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
May 31, 2007	6:05 am – 9:35 am	58°F - 78°F	3 - 5 mph	overcast
June 7, 2007	5:50 am – 9:10 am	57°F - 84°F	3 - 5 mph	overcast
June 21, 2007	7:00 am – 10:10 am	59°F - 82°F	1 - 3 mph	slight overcast
June 28, 2007	5:15 am – 8:05 am	60°F - 72°F	1 - 3 mph	clear
July 11, 2007	5:20 am – 8:10 am	67°F - 71°F	4 - 7 mph	slight overcast

The 2008 focused field surveys for the southwestern willow flycatcher were conducted as described in Table 4-3, *2008 Focused Southwestern Willow Flycatcher Field Survey Information*.

Table 4-3
2008 Focused Southwestern Willow Flycatcher Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
May 31, 2008	6:00 am – 9:25 am	49°F - 66°F	1 - 7 mph	overcast
June 9, 2008	5:55 am – 9:20 am	52°F - 85°F	1 – 5 mph	slightly overcast
June 23, 2008	5:40 am – 9:00 am	62°F - 86°F	3 – 5 mph	clear
July 2, 2008	5:25 am – 8:35 am	58°F - 87°F	1 – 5 mph	clear
July 11, 2008	5:20 am – 8:30 am	67°F - 78°F	5 - 7mph	clear

The 2007 focused field surveys for the least Bell's vireo were conducted as described in Table 4-4, *2007 Focused Least Bell's Vireo Field Survey Information*.

Table 4-4
2007 Focused Least Bell's Vireo Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
May 31, 2007	7:00 am – 8:30 am	58°F - 78°F	3 – 5 mph	overcast
June 7, 2007	5:50 am – 9:10 am	57°F - 84°F	3 – 5 mph	overcast
June 14, 2007	6:30 am – 10:45 am	65°F	0 mph	clear
June 21, 2007	6:00 am – 9: 50 am	60°F	0 mph	clear

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
June 27, 2007	5:45 am – 11:00 am	60°F	0 mph	clear
July 5, 2007	7:30 am – 10:45 am	70°F	0 mph	clear
July 12, 2007	6:00 am – 10:45 am	60°F	0 mph	clear
July 18, 2007	6:30 am – 11:15 am	68°F	0 mph	clear
July 26, 2007	6:15 am – 11:15 am	70°F	0 mph	clear

The 2008 focused field surveys for the least Bell's vireo were conducted as described in Table 4-5, *2008 Focused Least Bell's Vireo Field Survey Information*.

Table 4-5
2008 Focused Least Bell's Vireo Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
April 17, 2008	7:00 am – 9:00 am	65°F	5-10 mph	clear
April 18, 2008	7:00 am – 9:10 am	55°F	0 mph	clear
April 29, 2008	6:30 am – 10:30 am	56°F	0 mph	clear
May 2, 2008	9:30 am – 10:30 am	60°F	0 mph	clear
May 12, 2008	6:30 am – 9:45 am	52°F	0 -12 mph	overcast
May 16, 2008	9:15 am – 10:00 am	82°F	0 -18 mph	clear
May 30, 2008	6:30 am – 10:00 am	55°F	0 mph	clear
June 2, 2008	10:00 am – 11:30 am	70°F	0 - 5 mph	clear
June 9, 2008	6:15 am – 9:40 am	58°F	0 mph	clear
June 13, 2008	8:00 am – 9:30 am	68°F	0 mph	clear
June 23, 2008	7:00 am – 8:15 am	68°F	0 mph	clear
June 24, 2008	6:45 am – 10:10 am	65°F	0 mph	clear
July 3, 2008	6:30 am – 9:00 am	69°F	0 mph	clear
July 8, 2008	6:15 am – 9:45 am	68°F	0 mph	clear
July 14, 2008	6:40 am – 8:30 am	67°F	0 mph	partly cloudy
July 18, 2008	7:15 am – 10:00 am	68°F	0 mph	partly cloudy

The 2007 focused field surveys for the coastal California gnatcatcher were conducted as described in Table 4-6, *2007 Focused Coastal California Gnatcatcher Field Survey Information*.

Table 4-6
2007 Focused Coastal California Gnatcatcher Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
July 5, 2007	6:15 am – 7:15 am	68°F	0 mph	clear
July 12, 2007	7:00 am – 8:00 am	70°F	0 mph	clear
July 18, 2007	7:40 am – 8:45 am	75°F	0 mph	clear
July 26, 2007	7:10 am – 8:30 am	70°F	0 mph	clear
August 1, 2007	6:05 am – 7:30 am	68°F	0 – 5 mph	high overcast
August 17, 2007	6:10 am – 8:00 am	70°F	0 mph	clear
September 10, 2007	7:10 am – 8:30 am	70°F	0 – 5 mph	clear
September 28, 2007	8:15 am -10:30 am	63°F	0 – 5 mph	overcast
October 11, 2007	7:15 am – 9:15 am	51°F	0 – 3 mph	high overcast
October 24, 2007	7:45 am – 9:55 am	78°F	5 – 10 mph	clear
November 8, 2007	7:00 am – 9:40 am	55°F	0 – 4 mph	overcast, light fog

The 2008 focused field surveys for the coastal California gnatcatcher were conducted as described in Table 4-7, *2008 Focused Coastal California Gnatcatcher Field Survey Information*.

Table 4-7
2008 Focused Coastal California Gnatcatcher Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
April 17, 2008	9:15 am – 10:55 am	70°F	0 mph	clear
April 24, 2008	7:15 am – 9:40 am	49°F	0 mph	overcast
May 2, 2008	7:00 am – 8:45 am	55°F	0 mph	clear
May 10, 2008	6:30 am – 8:45 am	55°F	0 mph	overcast
May 16, 2008	6:45 am – 9:00 am	65°F	0 mph	clear
May 23, 2008	6:30 am – 8:20 am	50°F	0 mph	overcast

The 2008 focused field surveys for Stephens's kangaroo rat were conducted as described in Table 4-8, *2008 Focused Stephens's Kangaroo Rat Field Survey Information*. Weather conditions were conducive to capture Stephens's kangaroo rat, with generally warm temperatures and no precipitation.

Table 4-8
2008 Focused Stephens's Kangaroo Rat Field Survey Information

Survey Date	Morning Temperature	Night Temperature	Cloud Cover
June 15, 2008	66°F	55°F	clear
June 16, 2008	67°F	58°F	clear
June 17, 2008	68°F	59°F	clear
June 18, 2008	66°F	55°F	clear
June 19, 2008	67°F	56°F	clear
June 20, 2008	70°F	60°F	clear

The 2007 focused field surveys for the Los Angeles pocket mouse were conducted as described in Table 4-9, *2007 Focused Los Angeles Pocket Mouse Field Survey Information*.

Table 4-9
2007 Focused Los Angeles Pocket Mouse Field Survey Information

Survey Date	Survey Time	Temperature	Wind	Cloud Cover
September 24, 2007	8:00 am – 6:00 pm	50°F - 80°F	0 mph	clear
September 25, 2007	8:00 am – 6:00 pm	50°F - 80°F	0 mph	clear
September 26, 2007	8:00 am – 6:00 pm	40°F - 80°F	0 mph	clear
September 27, 2007	8:00 am – 6:00 pm	40°F - 80°F	0 mph	clear
September 28, 2007	8:00 am – 6:00 pm	55°F - 80°F	8 - 10 mph	overcast
September 29, 2007	8:00 am – 6:00 pm	50°F - 80°F	5 - 6 mph	mostly cloudy

4.2 Soils

Soils and soil types are important in determining which plant species, and hence which plant communities occur in any region. For example, an absence of alkaline soils means that plants adapted to alkaline conductions would not be likely to occur. According to the Soil Survey of Western Riverside Area, California (USDA 1971), the soils of the Bernasconi Hills and Russell Mountains consist of Cieneba-Rock Land-Fallbrook Association. The soils of this association are on granitic rock islands and on uplands. They are well drained and somewhat excessively drained, undulating to steep, very shallow to moderately deep soils that have a surface layer of sandy loam and fine sandy loam; on granitic rock.

The soils of the land between the Bernasconi Hills and Russell Mountains consist of Hanford-Tujunga-Greenfield Association. These soils formed in granitic alluvium washed from the uplands. Soils of this association are very deep, well-drained to excessively drained, nearly level to moderately steep soils that have a surface layer of sand to sandy loam, and occur on alluvial fans and flood plains.

Soils around the lakeshore of Lake Perris differ from those found on the ground surface between the Bernasconi Hills and the Russell Mountains. They are sandy soils from deeper below the ground surface, deposited on the surface as a result of dredging and excavation activities associated with the creation of the lake.

None of the soils associated with the Biological Survey area are alkaline. Alkaline soils are absent from the Biological Survey Area.

4.3 Plant Communities and Non-Vegetated Features

The Biological Survey Area and the proposed project site are located in the southwestern California subregion of the California floristic province (Hickman 1993). Lake Perris is situated in a valley and ringed by hills and small mountains. The Russell Mountains and Moreno Valley are located to the north; the Badlands (mountains) and San Jacinto Valley are located to the northeast; Bernasconi Hills are located to the east and south; and Perris Valley is located to the southwest and west. Lake Perris has hot, dry summers and cool, moist winters. Rainy weather is limited almost completely to the months between November and April. The area lies at a crossroads of weather influences. Coastal fog comes from the west, while strong, hot, dry Santa Ana winds come from the deserts to the east and northeast.

Habitats around the Biological Survey Area are greatly influenced by natural biotic and abiotic features and elements as well as human-related activities. Except near Lake Perris, much of the area is relatively dry. Coastal sage scrub is the predominant plant community on the slopes of the Russell Mountains and Bernasconi Hills; it is characterized by shrubby plants including brittlebush (*Encelia californica*), California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), and deerweed (*Lotus scoparius*). A sparse association of grasses, forbs and scattered sage scrub shrubs are found in the flatter areas near the toes of the surrounding mountain slopes. Riparian woodland and scrub habitats surround Lake Perris on the eastern shoreline.

This section describes the general plant communities and non-vegetated features determined to be present within the Biological Survey Area as a result of the literature review and field surveys. Generally, classifications of habitat types or vegetation communities were based on the *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) with modifications to better represent existing conditions. Ten plant communities, 13 associated sub-communities, and four non-vegetated features were observed within the Biological Survey Area during the field surveys (Figure 8, *Plant Communities and Non-Vegetated Features*). For clarity, only the primary plant community designation is mapped on Figure 8. These plant communities, sub-communities and non-vegetated features with acreages mapped are described in Table 4-10, *Plant Communities and Non-Vegetated Features found within the Biological Survey Area*. Characteristics of each plant community and non-vegetated feature are described in detail below from Section 4.3.3 to Section 4.3.17.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area

Plant Communities & Non-Vegetated Features

- Southern Willow Woodland and Scrub/ Mule Fat Scrub/Heliotrope Scrub/Sandbar
- RSS — Riversidean Sage Scrub
- SWS — Southern Willow Woodland and Scrub
- MFS — Mule Fat Scrub
- FWM — Freshwater Marsh
- CBS — Coyote Bush Scrub
- HS/S — Heliotrope Scrub/Sandbar
- NNG — Non-Native Grassland
- EW — Eucalyptus Woodland
- R — Ruderal
- AG — Agriculture
- NVF — Non-Vegetated Features

Plant Communities and Non-Vegetated Features	Total Acres
SWilwScrb/MlftScrb/HeliScrb/Sand	44
Riversidean Sage Scrub	595
Southern Willow Woodland and Scrub	78
Mule Fat Scrub	47
Freshwater Marsh	68
Coyote Bush Scrub	13
Heliotrope Scrub/Sandbar	134
Non-Native Grassland	347
Eucalyptus Woodland	28
Ruderal	10
Agriculture	9
Non-Vegetated Features	606
Total	1,977

N, W, E, S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Plant Communities and Non-Vegetated Features

PSOMAS

Figure 8

Table 4-10
Plant Communities and Non-Vegetated Feature found within the Biological Survey Area

Habitat Type	Acres Mapped Within the Biological Survey Area
Plant Communities and Sub-Communities	
Riversidean sage scrub	511.1
• disturbed Riversidean sage scrub	27.8
• burned Riversidean sage scrub	0.6
• California buckwheat dominate Riversidean sage scrub	14.2
• brittlebush dominate Riversidean sage scrub	7
• Riversidean sage scrub/urban	18.6
• disturbed Riversidean sage scrub/urban	15.4
southern willow woodland and scrub*	76.6
• southern willow scrub/mule fat scrub*	1.2
mule fat scrub*	38.8
• mule fat scrub/rip-rap*	0.8
• mule fat scrub/freshwater marsh*	7.4
freshwater marsh*	45.5
• disturbed freshwater marsh*	22.4
coyote bush scrub	12.6
heliotrope scrub/sandbar*	7.7
• heliotrope scrub/tamarisk/sandbar*	126.4
non-native grassland	329.1
• burned non-native grassland	17.4
eucalyptus woodland	0.8
• eucalyptus woodland/disturbed Riversidean sage scrub	26.7
ruderal	10
agriculture	8.9
southern willow woodland and scrub/mule fat scrub/heliotrope scrub/sandbar*	44.5
Non- Vegetated Features	
sand	88.2
rip-rap	18.9
urban areas	464.9
rock quarry	33.6
Legend	
* sensitive plant community	

4.3.1 Lake Perris Drawdown and Subsequent Habitats

In 2005, DWR completed a foundation study of the Perris Dam. Based on the results of the stability analysis, DWR lowered the reservoir water surface elevation by 25 feet. In August 2005, DWR initiated the drawdown of Lake Perris from 1,588 feet msl to 1,563 feet msl. The lake drawdown was complete by November 2005. This resulted in non-vegetated lake shore being made available for colonization by plants, and the subsequent establishment of plant communities that hitherto were not present, or were unable to expand.

Table 4-11, *Plant Communities and Non-Vegetated Features: Pre- and Post-Drawdown at Lake Perris;* presents Psomas' determination of a variety of the pre- and post-drawdown plant community structure.

Table 4-11
Plant Communities and Non-Vegetated Features:
Pre- and Post- Drawdown at Lake Perris

Habitat Type	Existed in Pre-Lake Perris Drawdown Conditions	Created by Lake Perris Drawdown
Plant Communities and Sub-Communities		
Riversidean sage scrub	X	
• disturbed Riversidean sage scrub	X	
• burned Riversidean sage scrub	X	
• California buckwheat dominate Riversidean sage scrub	X	
• brittlebush dominate Riversidean sage scrub	X	
• Riversidean sage scrub/urban	X	
• disturbed Riversidean sage scrub/urban	X	
southern willow woodland and scrub	X	X
• southern willow scrub/mule fat scrub	X	X
mule fat scrub	X	X
• mule fat scrub/rip-rap	X	X
• mule fat scrub/freshwater marsh	X	X
freshwater marsh	X	X
• disturbed freshwater marsh	X	X
coyote bush scrub	X	
heliotrope scrub/sandbar	X	X
• heliotrope scrub/tamarisk/sandbar	X	X
non-native grassland	X	
• burned non-native grassland	X	
eucalyptus woodland	X	
• eucalyptus woodland/disturbed Riversidean sage scrub	X	
ruderal	X	

Habitat Type	Existed in Pre-Lake Perris Drawdown Conditions	Created by Lake Perris Drawdown
agriculture	X	
mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar	X	X
Non- Vegetated Features		
open water/Lake Perris	X	
sand	X	X
rip-rap	X	X
urban areas	X	

4.3.2 Sensitive Plant Communities

Sensitive plant communities are those that are considered to support unique vegetation, sensitive plant species and/or wildlife species, are riparian associated, or function as corridors for wildlife movement. The CNDDB identified four sensitive plant communities having the potential to occur within the vicinity of the Biological Survey Area. These sensitive plant communities are listed below.

- southern coast live oak riparian forest (Element Code 61310)
- southern cottonwood-willow riparian forest (Element Code 61330)
- southern riparian scrub (Element Code 63000)
- southern sycamore alder riparian woodland (Element Code 62400)

4.3.2.1 Holland Designated Sensitive Plant Communities and Sub-Communities

Three plant communities and their sub-communities are associated with the Holland designated southern riparian scrub (Element Code 63000). These plant communities were observed within the Biological Survey Area during the field surveys and are sensitive. These sensitive plant communities are listed below.

- southern willow woodland and scrub
    - o southern willow scrub/mule fat scrub
- mule fat scrub
    - o mule fat scrub/rip-rap
    - o mule fat scrub/freshwater marsh
- mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar

4.3.2.2 Wetland Associated Sensitive Plant Communities and Sub-Communities

In addition, five plant communities and their sub-communities are also considered sensitive plant communities because they are a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section

1600-1603 of the California Fish and Game Code; and/or the California Regional Water Quality Control Board (RWQCB) pursuant to Section 401 of the Clean Water Act. These plant communities were observed within the Biological Survey Area during the field surveys and are sensitive. These sensitive plant communities are listed below.

- southern willow woodland and scrub
    - o southern willow scrub/mule fat scrub
- mule fat scrub
    - o mule fat scrub/rip-rap
    - o mule fat scrub/freshwater marsh
- freshwater marsh
    - o disturbed freshwater marsh
- heliotrope scrub/sandbar
    - o heliotrope scrub/tamarisk scrub/sandbar
- mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar

4.3.3 Riversidean Sage Scrub

Approximately 594.5 acres of Riversidean sage scrub were mapped within the Biological Survey Area, of which 19.7 acres occur within the proposed project site. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) classifies this species assemblage as Riversidean sage scrub (Element Code 32700). Riversidean sage scrub is the dominant plant community observed on the slopes of the Russell Mountains and Bernasconi Hills surrounding Lake Perris, and is characterized by low shrubby plants. In the majority of areas in which this plant community was found, California buckwheat, brittlebush and California sagebrush were observed to be the dominant plant species. A sparse association of grasses, forbs and scattered sage scrub shrubs are found in the more level areas near the toes of the surrounding hills and mountain slopes.

Holland describes Riversidean sage scrub as the most xeric expression of coastal sage scrub south of Point Conception. Typical stands are fairly open and are generally dominated by brittlebush, California sagebrush, California buckwheat, and red brome (*Bromus madritensis* ssp. *rubens*), each attaining at least 20 percent cover. Riversidean sage scrub typically exist on xeric sites such as steep slopes, severely drained soils, or clay soils that release stored soil moisture only slowly. This plant community usually intergrades at slightly higher elevations with several southern California chaparrals.

Shrubs were less than three meters tall and the shrub canopy was continuous in most areas. The ground layer was open, but contained annual herbs and grasses throughout. Characteristic species of this plant community that were observed during the field surveys included: brittlebush, California sagebrush, California buckwheat, deerweed, coyote bush (*Baccharis pilularis*), black sage, annual bur ragweed (*Ambrosia acanthicarpa*), common California aster (*Corethrogyne filaginifolia*), bush monkeyflower (*Mimulus aurantiacus*), ripgut grass (*Bromus diandrus*), and red brome among others.

Six sub-communities of Riversidean sage scrub were mapped within the Biological Survey Area and are described in more detail below. These sub-communities include the following:

- disturbed Riversidean sage scrub
- burned Riversidean sage scrub
- brittlebush dominate Riversidean sage scrub
- California buckwheat dominate Riversidean sage scrub
- Riversidean sage scrub/urban
- disturbed Riversidean sage scrub/urban

4.3.3.1 Disturbed Riversidean Sage Scrub

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately 27.8 acres of disturbed Riversidean sage scrub were mapped. This disturbed Riversidean sage scrub plant community is similar in composition to Riversidean sage scrub, but is characterized by larger areas of bare ground, invasion by non-native species, or mechanical disturbance. This plant community was observed in the flatter areas near the toes of the surrounding hills and mountain slopes. Non-native shrubs, herbs and grasses such as brome grasses, tocalote (*Centaurea melitensis*), tree tobacco (*Nicotiana glauca*), prickly sow thistle (*Sonchus asper*), and Russian thistle (*Salsola tragus*), among others were observed within the disturbed Riversidean sage scrub. This disturbed plant community was observed in small areas around Lake Perris mostly adjacent to roads and developed areas.

4.3.3.2 Burned Riversidean Sage Scrub

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately 0.6 acre of burned Riversidean sage scrub was mapped. This burned Riversidean sage scrub is similar in composition to the disturbed Riversidean sage scrub, but was burned by the State Parks in order to restore habitat for the federally listed-endangered Stephens's kangaroo rat (*Dipodomys stephensi*) which is known to occur within the area. This community contains burned shrubs and large areas of bare ground. Riversidean sage scrub plant species are present in the burn areas; however due to the newly created open ground, non-native herbs, such as tocalote, and exotic grasses are beginning to dominate this plant community.

4.3.3.3 California Buckwheat Dominant Riversidean Sage Scrub

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately 14.2 acres of California buckwheat dominant Riversidean sage scrub were mapped. This California buckwheat dominant Riversidean sage scrub plant community is similar in composition to Riversidean sage scrub, but it is dominated solely by California buckwheat. This plant community was observed in areas in the north, east, and southwest around Lake Perris.

4.3.3.4 Brittlebush Dominant Riversidean Sage Scrub

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately seven acres of brittlebush Riversidean sage scrub were mapped. This brittlebush dominant Riversidean sage scrub plant community is similar in composition to Riversidean sage scrub, but it is dominated solely by brittlebush. This plant community was observed in the northwestern portion of Lake Perris.

4.3.3.5 Riversidean Sage Scrub/Urban

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately 18.6 acres of Riversidean sage scrub/urban habitat were mapped. This Riversidean sage scrub/urban plant community is similar in composition to Riversidean sage scrub; however it contains landscape plant species and it is within and/or surrounded by urban development, picnic areas, parking lots, lake and recreation facilities. It was also found in planters within parking lots.

4.3.3.6 Disturbed Riversidean Sage Scrub/Urban

Of the approximately 594.5 acres of Riversidean sage scrub found within the Biological Survey Area, approximately 15.4 acres of disturbed Riversidean sage scrub/urban habitat were mapped. This disturbed Riversidean sage scrub/urban plant community is similar in composition to the Riversidean sage scrub/urban plant community; however the habitat is more open with larger areas of bare ground, and has been invaded by non-native species and/or has been mechanically disturbed.

4.3.4 Southern Willow Woodland and Scrub

Approximately 77.8 acres of southern willow woodland and scrub were mapped within the Biological Survey Area, of which 11 acres occur within the proposed project site. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) classifies this species assemblage as southern willow scrub (Element Code 63320). Southern willow woodland and scrub was found in large areas around Lake Perris, especially around the eastern shoreline and below the dam.

Holland describes southern willow scrub as a dense, broadleafed, winter-deciduous riparian thickets dominated by several willow (*Salix*) species, with scattered emergent California sycamores (*Platanus racemosa*) and Fremont cottonwoods (*Populus fremontii*). Most stands are too dense to allow much understory development. The site factors for this plant community are loose, sandy or fine gravelly alluvium deposited near stream channels during flood flows. Southern willow scrub was formerly extensive along the major rivers of coastal southern California, but now much reduced by urban expansion, flood control, and channel improvements.

In this southern willow woodland and scrub plant community, more than one willow species was an important shrub or tree in the canopy. Characteristic species of this plant community that were observed during the field surveys included: red willow (*Salix laevigata*), Goodding's black willow (*Salix gooddingii*), narrowleaf willow (*Salix exigua*), Fremont's cottonwood, and mule

fat (*Baccharis salicifolia*). Understory species included: wild tarragon (*Artemisia dracunculus*), curly dock (*Rumex crispus*), annual bursage, southwestern spiny rush (*Juncus acutus*), and bromes.

Within the willow woodland areas, a tall overstory mix of mature willows were present along with random Fremont cottonwoods, with a dense understory of sapling willows and other native shrubs such as mule fat and coyote bush. These willows created dense woodlands. The willow trees were usually less than 32 feet tall and the canopy was continuous. Shrubs were sparse under the tree canopy and the ground layer was covered with thick leaf litter. This woodland community existed before the lake drawdown was implemented in 2005. The mature southern willow woodland along the eastern portion of the lake is being irrigated to compensate for water loss due to the lake drawdown. The southern willow woodland and scrub areas located in front of the dam are a result of seepage from the dam.

Within the willow scrub areas, the willows were young and shrubby. The willow scrub areas were created by the lake drawdown implemented in 2005. Given more time, this plant community could become a woodland. These willow scrub areas were created and seeded from the mature surrounding southern willow woodland which existed prior to the 2005 lake drawdown. Stands of cattails (*Typha* sp.) and other riparian stream plants were found in the lowest, wettest soils, and where water was present. Most areas within the willow scrub were dense with vegetation; however in some areas, vegetation was open with clumps of shrubby willows and mule fat, separated by open sandy sandbar with scattered herbaceous riparian species. The southern willow woodland and scrub areas located, behind the dam, are a result of seepage from the dam.

Southern willow woodland and scrub is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act. This plant community is also considered sensitive by the CNDDB.

One sub-community of southern willow woodland and scrub, southern willow scrub/mule fat scrub, was mapped within the Biological Survey Area and is described in more detail below.

4.3.4.1 Southern Willow Scrub/Mule Fat Scrub

Of the approximately 77 acres of southern willow woodland and scrub found within the Biological Survey Area, approximately 1.2 acre of southern willow scrub/mule fat scrub was mapped. This southern willow scrub/mule fat scrub plant community is similar in composition to southern willow scrub; however it is equally dominated by willow species and mule fat. Portions of the southern willow scrub/mule fat scrub along the shoreline of Lake Perris are a result of the lake drawdown implemented in 2005.

Southern willow scrub/mule fat scrub is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and

Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act. This plant community is also considered sensitive by the CNDDB.

4.3.5 Mule Fat Scrub

Approximately 47 acres of mule fat scrub were mapped within the Biological Survey Area, of which 7.9 acres occur within the proposed project site. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) classifies this species assemblage as mule fat scrub (Element Code 63310). This mule fat scrub plant community is similar in composition to southern willow scrub; however mule fat is the sole or dominant shrub in the canopy. Other willow species and other trees and shrubs are also present.

Holland describes mule fat scrub as a depauperate, tall, herbaceous riparian scrub strongly dominated by mule fat. This early seral community is maintained by frequent flooding. Site factors for this plant community include intermittent stream channels with fairly coarse substrate and moderate depth to the water table. This plant community frequently occurs as a patchy understory in light gaps in forests and woodlands.

Within the Biological Survey Area shrubs were usually less than four meters tall and the canopy was usually continuous. The ground layer was sparse. Characteristic species of this plant community that were observed during the field surveys included: mule fat, Goodding's black willow, red willow, rushes (*Juncus* sp.), narrow-leaved cattail (*Typha angustifolia*), wild tarragon, and bush monkey flower. Other species present in the community include annual bursage, hoary nettle (*Urtica dioica*), and bromes.

Mule fat scrub was mapped in numerous areas in the Biological Survey Area. Portions of the mule fat scrub habitat mapped along the northwestern, north, northeastern, and southeastern lakeshore of Lake Perris are a result of the lake drawdown implemented in 2005. The mule fat scrub in front of the dam is a result of seepage from the dam.

Mule fat scrub is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act. This plant community is also considered sensitive by the CNDDB.

Two sub-communities of mule fat scrub, mule fat scrub/rip-rap and mule fat scrub/freshwater marsh, were mapped within the Biological Survey Area and are described in more detail below.

4.3.5.1 Mule Fat Scrub/Freshwater Marsh

Of the approximately 47 acres of mule fat scrub found within the Biological Survey Area, approximately 7.4 acres of mule fat scrub/freshwater marsh was mapped. This mule fat scrub/freshwater marsh plant community is similar in composition to mule fat scrub; however it is intermixed with freshwater marsh species such as narrow-leaved cattail, bulrush (*Scirpus* sp.), rushes, willows, and willow herb (*Epilobium ciliatum* ssp. *ciliatum*) along the newly exposed shore areas around Lake Perris. Portions of the mule fat scrub/freshwater marsh habitat mapped

along the north and northeastern lakeshore of Lake Perris are a result of the lake drawdown implemented in 2005.

Mule fat scrub/freshwater marsh is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act. This plant community is also considered sensitive by the CNDDB.

4.3.5.2 Mule Fat Scrub/Rip-Rap

Of the approximately 47 acres of mule fat scrub found within the Biological Survey Area, approximately 0.8 acre of mule fat scrub/rip-rap was mapped. This mule fat scrub/rip-rap plant community is similar in composition to mule fat scrub; however it is intermixed with rip-rap along the shore areas around Lake Perris. Portions of the mule fat scrub/rip-rap habitat along the shoreline of Lake Perris are a result of the lake drawdown implemented in 2005.

Mule fat scrub/rip-rap is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act. This plant community is also considered sensitive by the CNDDB.

4.3.6 Freshwater Marsh

Approximately 67.9 acres of freshwater marsh were mapped within the Biological Survey Area, of which 16.5 acres occur within the proposed project site. Narrow-leaved cattail is the dominant plant species found within this plant community. The cattail vegetation association observed closely fits the coastal and valley freshwater marsh (Element Code 52410) described in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986). The freshwater marsh plant community is found along the shoreline of Lake Perris.

Holland describes coastal and valley freshwater marsh as dominated by perennial, emergent monocots such as cattail and bulrush, 4 – 5 meters tall. It often forms completely closed canopies. Site factors for this plant community include quiet sites (lacking significant current) permanently flooded by fresh water (rather than brackish, alkaline, or variable). Prolonged saturation permits accumulation of deep, peaty soils. This plant community is found occasionally along the coast and in coastal valleys near river mouths and around the margins of lakes and springs.

Within the Biological Survey Area the cattails were usually less than 5 meters tall and the canopy was continuous. Characteristic species of this plant community that were observed during the field surveys included: narrow-leaved cattail, bulrush, rushes, willows, Mediterranean tamarisk (*Tamarix ramosissima*), willow herb, alkali heliotrope (*Heliotropium curassavicum*), and poison hemlock (*Conium maculatum*).

A majority of the freshwater marsh habitat mapped along the shoreline of Lake Perris is a result of the lake drawdown implemented in 2005. The more mature areas of freshwater marsh in the northeastern portion of the Biological Survey Area and areas along the shallow water fringe were present prior to the drawdown; however at this time it is unclear as to how much of the habitat has been created due to the lake drawdown.

Freshwater marsh is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act.

One sub-community of freshwater marsh, disturbed freshwater marsh, was mapped within the Biological Survey Area and is described in more detail below.

4.3.6.1 Disturbed Freshwater Marsh

Of the approximately 67.9 acres of freshwater marsh found within the Biological Survey Area, approximately 22.4 acres of disturbed freshwater marsh was mapped. This disturbed freshwater marsh plant community is similar in composition to freshwater marsh; however it is more open with larger areas of bare ground (sand), and has been invaded by non-native species, namely Mediterranean tamarisk. Non-native shrubs, herbs and grasses such as bromes, prickly sow thistle, tree tobacco, and Russian thistle, among others were also observed within the disturbed freshwater marsh habitat. This disturbed plant community was observed and mapped in small areas around Lake Perris. Portions of the disturbed freshwater marsh habitat mapped along the lake shore of Lake Perris are a result of the lake drawdown implemented in 2005.

Disturbed freshwater marsh is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.7 Coyote Bush Scrub

Approximately 12.6 acres of coyote bush scrub were mapped within the Biological Survey Area, of which 0.7 acre occurs within the proposed project site. Within this plant community, coyote bush is the sole or dominant shrub in the canopy. The coyote bush vegetation association observed within the Biological Survey Area does not fit any classification described in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986). Although Holland does not recognize coyote bush scrub habitat in their literature, this habitat type is persistent in California where coyote bush dominates the landscape. This plant association is part of the coastal scrub series with plant species common to those observed and mapped within the Riversidean sage scrub habitat.

Within the Biological Survey Area, coyote bush scrub was found below the dam. The canopy tends to be continuous to intermittent with sparse ground cover. Characteristic species of this plant community that were observed during the field surveys included: coyote bush, mule fat, wild tarragon, bush monkey flower, annual bursage, and bromes.

4.3.8 Heliotrope Scrub/Sandbar

Approximately 134 acres of heliotrope scrub/sandbar were mapped within the Biological Survey Area, of which 51.4 acres occur within the proposed project site. Alkali heliotrope was the dominant plant species found in the exposed sandbar areas surrounding the lake. The heliotrope vegetation association observed within the Biological Survey Area does not fit any classification described in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986). Although Holland does not recognize heliotrope scrub/sandbar habitat in their literature, this habitat type is persistent in California where alkali heliotrope dominates sandbar and lake shore areas.

Heliotrope scrub/sandbar was mapped in numerous areas along the shoreline of Lake Perris. Portions of the heliotrope scrub/sandbar habitat mapped along the northwestern, north, northeastern, eastern, and southeastern lakeshore are a result of the lake drawdown implemented in 2005. Characteristic species of this plant community that were observed during the field surveys included: alkali heliotrope, Mediterranean tamarisk, mule fat, mugwort (*Artemisia douglasiana*), and bromes.

Heliotrope scrub/sandbar is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act.

One sub-community of heliotrope scrub/sandbar, heliotrope scrub/tamarisk scrub/sandbar, was mapped within the Biological Survey Area and is described in more detail below.

4.3.8.1 Heliotrope Scrub/Tamarisk Scrub/Sandbar

Of the approximately 134 acres of heliotrope scrub/sandbar found within the Biological Survey Area, approximately 126.4 acres of heliotrope scrub/tamarisk scrub/sandbar were mapped. This heliotrope scrub/tamarisk scrub/sandbar plant community is similar in composition to the heliotrope scrub/sandbar habitat; however it is dominated by Mediterranean tamarisk. This plant community was observed along the banks of Lake Perris; portions of the heliotrope scrub/tamarisk/sandbar habitat along the banks of Lake Perris are a result of the lake drawdown implemented in 2005. Characteristic species of this plant community that were observed during the field surveys included: alkali heliotrope, Mediterranean tamarisk, mule fat, mugwort, and bromes.

Heliotrope scrub/tamarisk scrub/sandbar is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.9 Mix of Southern Willow Woodland and Scrub, Mule Fat Scrub and Heliotrope Scrub/Sandbar

Approximately 44.5 acres of a mixed habitat combining elements of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar vegetation were mapped within the Biological Survey Area; 42 acres of this mixed habitat occur within the proposed project site.

The vegetation mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/tamarisk scrub/sandbar is considered a sensitive plant community because it is a wetland associated plant community within the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and/or the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.10 Non-Native Grassland

Approximately 346.5 acres of non-native grassland were mapped within the Biological Survey Area, of which 49.3 acres occur within the proposed project site. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) classifies this species assemblage as non-native grassland (Element Code 42200). This non-native grassland was found in the flatter areas of the Biological Survey Area and near the toes of the surrounding mountain slopes.

Holland describes non-native grassland as a dense to sparse cover of exotic, annual grasses often associated with numerous species of native annual forbs (wildflowers), especially in years with plentiful rain. Seed germination occurs with the onset of the late fall rains. Growth, flowering, and seed-set occur from winter through spring. Typically, plants are dead through the dry summer and early fall, persisting as seeds. Soil conditions associated with this community include fine-textured, usually clay soils, moist or even water-logged during the winter rainy-season and very dry during the summer and early fall. In general, the species composition of this community varies among stands. Fall temperatures and precipitation are major factors that determine dominant species, along with light intensity limited by shading from plants and litter, and differences in microtopography. The result of this assemblage is that it is highly unique by locality.

The characteristic grass species which dominated the non-native grassland within the Biological Survey Area include: soft chess (*Bromus hordeaceus*), wild oats, red brome, ripgut grass, and foxtail barley (*Hordeum murinum*). Other exotic plant species found in this plant community include: tocalote, black mustard (*Brassica nigra*), sweet fennel (*Foeniculum vulgare*), and filaree (*Erodium* sp.) among others. Random native Riversidean sage scrub plants were also found in this plant community.

One sub-community of non-native grassland, burned non-native grassland, was mapped within the Biological Survey Area and is described in more detail below.

4.3.10.1 Burned Non-Native Grassland

Of the approximately 346.5 acres of non-native grassland found within the Biological Survey Area, there are approximately 17.4 acres of burned non-native grassland. This burned non-native grassland is similar in composition to the non-native grassland described above, however it was burned by State Parks in order to restore habitat for the federally listed-endangered Stephens's kangaroo rat that known to occur within the area. This community contains large areas of bare ground due to the burn with patches of non-native grasses and shrubs.

4.3.11 Eucalyptus Woodland

Approximately 27.5 acres of eucalyptus woodland were mapped within the Biological Survey Area, of which 0.2 acres occur within the proposed project site. Eucalyptus trees (*Eucalyptus* sp.) dominate this habitat. The eucalyptus woodland vegetation association observed within the Biological Survey Area does not fit any classification described in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986). Although Holland does not classify eucalyptus woodland as a habitat type, this habitat type is persistent in California where eucalyptus trees are dominant.

Eucalyptus trees were the sole or dominant trees in the canopy in this association, with few other species present. Trees tended to have a continuous canopy. Riversidean sage scrub shrubs were infrequent and the ground layer was sparse.

One sub-community of eucalyptus woodland, eucalyptus woodland/disturbed Riversidean sage scrub was mapped within the Biological Survey Area and is described in more detail below.

4.3.11.1 Eucalyptus Woodland/Disturbed Riversidean Sage Scrub

Of the approximately 27.5 acres of eucalyptus woodland found within the Biological Survey Area, there are approximately 26.7 acres of eucalyptus woodland/disturbed Riversidean sage scrub. Eucalyptus woodland/disturbed Riversidean sage scrub is similar in composition to the eucalyptus woodland described above; however the eucalyptus canopy was open and not continuous. This plant community also had a high density of Riversidean sage scrub associated plant species and a denser ground cover of exotic herbs and grasses.

4.3.12 Ruderal

Approximately ten acres of ruderal vegetation were mapped within the Biological Survey Area, of which one acre occurs within the proposed project site. Ruderal refers to those open areas where vegetation has been affected by human activities resulting in a dominance of weedy annual dicot species. The ruderal vegetation association observed within the Biological Survey Area does not fit any classification described in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986). Although Holland 1986 does not recognize this ruderal habitat in their literature, this habitat type is persistent in California where habitat has been affected by human activities resulting in a dominance of weedy annual, non-native dicot species. The characteristic ruderal plant species observed during the field surveys include: bromes, mustards (*Brassica* sp. and *Sisymbrium* sp.), filaree, and tocalote.

4.3.13 Agriculture

Approximately 8.9 acres of agriculture were mapped within the Biological Survey Area, none of which occur within the proposed project site. Agriculture describes field areas laying either fallow or being actively used for agriculture practices. Although the *Preliminary Descriptions of the Terrestrial Communities of California* (Holland 1986) does not recognize agriculture in their literature, this habitat type is persistent in California where habitat has been affected by human activities. Agriculture was found along the Ramona Expressway and the existing outlet tunnel.

4.3.14 Open Water/Lake Perris

Open water/Lake Perris describes Lake Perris. Lake Perris is a man-made, dammed lake with no inlet or outlet to natural water sources. The lake is used for recreation purposes and fishing year-round. Water flow is slow within the lake.

Open water/Lake Perris is under the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.15 Sand

Approximately 88.2 acres of sand were mapped within the Biological Survey Area. Sand describes the shoreline and beach areas around Lake Perris. The sand areas tended to either be depauperate of vegetation, or very sparsely vegetated with both native and non-native plant species. Plant species identified within theses areas included small mule fat and willow saplings, alkali heliotrope, scattered tamarisk, and bromes. Significant portions of the sand habitat mapped within the Biological Survey Area were exposed as a result of the lake drawdown implemented in 2005.

The sand areas within the Biological Survey Area are under the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG pursuant to Section 1600-1603 of the California Fish and Game Code; and the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.16 Rip-Rap

Approximately 18.9 acres of rip-rap were mapped within the Biological Survey Area. Rip-rap describes the areas along the banks and shore of Lake Perris where un-grouted rip-rap has been placed for bank stabilization. Rip-rap is found within one of the mule fat scrub plant communities mentioned above. Sparse vegetation, between the rip-rap and boulders and along the lake edge includes mule fat and willow saplings, rushes, bromes, and alkali heliotrope, among others. Portions of the rip-rap mapped within the Biological Survey Area, mainly the lower areas along the shoreline of Lake Perris, were exposed as a result of the lake drawdown implemented in 2005.

The rip-rap areas within the Biological Survey Area are under the jurisdiction of the USACOE pursuant to Section 404 of the Clean Water Act; the CDFG, pursuant to Section 1600-1603 of the California Fish and Game Code; and the California RWQCB pursuant to Section 401 of the Clean Water Act.

4.3.17 Urban Areas

Approximately 464.9 acres of urban areas were mapped within the Biological Survey Area. Urban areas describe land occupied by structures, paving and other impermeable surfaces, and/or areas where landscaping has been installed and is maintained. Within the Biological Survey Area, urban areas describes the associated lake recreation areas, camping facilities, picnic areas, boat docks, paved roads, unpaved road, trails, launch ramps, and surrounding residences. These urban areas also contained landscaped trees such as: eucalyptus, myoporum (*Myoporum laetum*), Peruvian pepper tree (*Schinus molle*), and pines (*Pinus* sp.). These trees were found around many recreation facilities and within the parking lots.

4.3.18 Rock Quarry

The rock quarry, which lies within the Biological Survey area, comprises 33.6 acres.

4.3.19 Plant Communities and Non-Vegetated Features found within the Proposed Project Site

Table 4-12, *Plant Communities and Non-Vegetated Features found within the Proposed Project Site* describes each proposed project site location and what plant community and/or non-vegetated feature is found there.

Table 4-12
Plant Communities and Non-Vegetated Features found within the Proposed Project Site

Habitat	Soils Excavation Area	Rock Quarry	Haul Road	Emergency Outlet Extension	Construction Staging Area	150' Wide Clearing of Vegetation	Stability Berm
Plant Communities and Sub-Communities							
Riversidean sage scrub (19.7 acres)		X	X	X	X	X	
southern willow woodland and scrub (11 acres)				X		X	
mule fat scrub (7.9 acres)	X				X		
freshwater marsh (16.5 acres)	X						
coyote bush scrub (0.7 acre)						X	

Habitat	Soils Excavation Area	Rock Quarry	Haul Road	Emergency Outlet Extension	Construction Staging Area	150' Wide Clearing of Vegetation	Stability Berm
Plant Communities and Sub-Communities							
heliotrope scrub/sandbar (51.4 acres)	X		X				
non-native grassland (49.3 acres)				X	X	X	
eucalyptus woodland (0.2 acres)							
ruderal (1 acre)			X				
agriculture (0 acres)				X			
mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar (42 acres)	X						
non-vegetated feature (140.4 acres)		X		X	X	X	X

4.4 Plants

As a result of the literature review and agency consultation, 18 plant species listed as endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the region of the proposed project site. Twenty-two sensitive and locally important plant species were identified by the literature review and agency consultation as having the potential to occur within the region of the proposed project site.

4.4.1 Listed, Candidate and Sensitive Plant Species Having the Potential to Occur Within the Biological Survey Area

Each of the plant species mentioned above and listed in Section 3.2.4.1 and Section 3.2.5.1 were assessed for their potential to occur within the Biological Survey Area based on each species' known distributional and elevational ranges. A species was determined to have no potential to occur within the Biological Survey Area if the Biological Survey Area was located outside the species' known distributional range, and/or the species' known elevational range. A number of plant species were determined to have no potential to occur within the Biological Survey Area and were therefore eliminated from further evaluation. A complete listing of these species evaluation can be found in Appendix A, *Plant and Wildlife Species Potential Occurrence Determination*.

Plant species determined to have the potential to occur within or adjacent to the Biological Survey Area are presented in Table 4-13, *Listed, Candidate and Sensitive Plant Species Having the Potential to Occur within the Biological Survey Area*. Table 4-13 also summarizes conclusions from analysis and field surveys regarding the potential occurrence of listed and sensitive plant species within the Biological Survey Area. The table provides the taxonomic and common names of each potentially occurring species, describes each species' status, describes each species' preferred habitat and general distribution, and analyzes the species' potential to occur within the Biological Survey Area.

During the field surveys, the potential for species listed in Table 4-13 to occur was assessed as low, moderate, or high based on the following criteria:

- *Low*: species with a low potential for occurrence are those for which the Biological Survey Area is on the boundary of the known distributional and/or the elevational range of the species, or those for which the Biological Survey Area is within the boundary of the known range of the species and for which suitable habitat in the Biological Survey Area is not known to be used by the species, or for which there are no known recorded occurrences of the species within or adjacent to the Biological Survey Area.

- *Moderate*: species with a moderate potential for occurrence are those for which suitable habitat is present at the Biological Survey Area, the Biological Survey Area is within the known distributional and elevational range of the species, and one or more surveys did not detect the species. No nearby occurrences of the species are known. Failure to detect the species is not definitive, and may be due to variable effects associated with migration, weather, fire, and/or time of day and year.

- *High*: species with a high potential for occurrence are those for which suitable habitat is present at the Biological Survey Area, the Biological Survey Area is within the known distributional and elevational range of the species, and the species has been observed in similar habitat in the region by a qualified biologist.

Table 4-13 summarizes results and conclusions from the field surveys and the literature review with regard to the potential for the occurrence of listed, candidate, state rare and sensitive plant species within areas potentially impacted by the proposed project.

A standard in the professional practice of botany is to conclude species absence in only a few limited instances:

- Where the species is detectable without flowers or fruits (e.g., perennial shrubs with distinctive vegetative features).
- Suitable habitat to support the species is clearly absent.
- Numerous surveys over many years have not detected the species.

In general and outside of these limited cases, even with field surveys, botanists assess probability of occurrence rather than make a definitive conclusion about species presence or absence. Failure to detect the presence of the species is not definitive, and may be due to variable effects

associated with fire, rainfall patterns, and/or season. For example, plant species with a moderate potential for occurrence are considered to be those for which suitable habitat is present to support the species, the Biological Survey Area is within the known distributional and elevational range of the species, and one or more surveys did not detect the presence of the species.

The timing of the field surveys was considered suitable for the identification of most, but not all plant species. Conducting the field surveys in the late spring, summer and fall decreased the detection of winter and early spring blooming plant species. There were a number of plants in bloom, but there were also a number of plants not yet in bloom and a number of plants that had already bloomed and gone to seed. Therefore, an effort was made to determine presence or absence of potentially suitable habitat for those plants that could not be identified at that time.

Table 4-13
Listed, Candidate, and Sensitive Plant Species
Having the Potential to Occur within the Biological Survey Area

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Listed Endangered, Threatened, Candidate and State Rare Plants						
Ambrosia pumila	dwarf burr ambrosia (San Diego ambrosia)	FE, CNPS:1B.1	San Diego ambrosia occurs in open habitats such as chaparral and coastal sage scrub in coarse substrates near drainages, and in upland areas on clay slopes or on the dry margins of vernal pools. This species occurs in a variety of associations that are dominated by sparse grasslands or marginal wetland habitats such as river terraces, pools, and alkali playas. In Riverside County, San Diego ambrosia is associated with open, gently-sloped grasslands and is generally associated with alkaline soils. Blooming period: Apr – Oct.	San Diego ambrosia is distributed from western Riverside County and western San Diego County, California south in widely scattered populations along the west coast of Baja California, Mexico. The majority of the California populations occur in San Diego County, where approximately 11 distinct populations have been reported along with two transplanted populations. San Diego ambrosia generally occurs at low elevations generally less than 1,600 feet in the Riverside populations and less than 600 feet in San Diego County.	Covered (b)	**No potential to occur.** The Biological Survey Area lacks suitable soils and substrates to support this species. This species is also not known to occur within the LPSRA or the immediate region.
Berberis nevinii	Nevin's barberry	FE, SE, CNPS:1B.1	Grows in alluvial scrub community on sandy and gravelly substrates along the margins of dry washes. In the chaparral community, it grows on steep, north-facing slopes with coarse soils and rocky slopes. It has also been found in cismontane woodlands, riparian scrub, and coastal sage scrub. Occurs in wetlands in another region, but occurs almost always under natural conditions in non wetlands in California. Blooming period: Mar – Apr.	Nevin's barberry is endemic to southwestern cismontane southern California. It occurs in restricted localized populations from the interior foothills of the San Gabriel Mountains of Los Angeles County and San Bernardino County southeast to near the foothills of the Agua Tibia Mountains of southwestern Riverside County. Scattered naturalized populations have been established outside this range in San Diego County. Elevational range: 970 – 2,700 feet MSL.	Covered (b, d)	**Low potential to occur.** Potentially suitable habitats and substrates are present within the Biological Survey Area. This species was not observed. Another species of barberry, Fremont's barberry (*Berbis fremontii*) was observed during the surveys. Nevin's barberry is not known to occur within the LPSRA or the immediate region.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Atriplex coronata var. *notatior*	San Jacinto Valley crownscale	FE, CNPS:1B.1	San Jacinto Valley crownscale occurs primarily in floodplains (seasonal wetlands) on moist, alkaline soils dominated by alkali chenopod scrub, alkali playas, vernal pools, and, to a lesser extent, alkali grasslands. Blooming period: Apr – Aug.	This species is restricted to the San Jacinto Valley, Perris Valley, Elsinore Valley and Menifee Valley of western Riverside County. The majority of known occurrences are in the vicinity of Hemet on white-clay soils along the San Jacinto River and Old Salt Creek tributary drainages. Elevational range: 455 – 1,640 feet MSL.	Covered (a, d)	**Low potential to occur.** The Biological Survey Area lacks suitable floodplains habitat and suitable alkaline soils to support this species.
Navarretia fossalis	Moran's navarretia (spreading navarretia)	FT, CNPS:1B.1	The primary habitat for this species is vernal pools and depressions and ditches in areas that once supported vernal pools in saline-alkaline soils. It can also be found in artificial roadside ditches. It has been found in alkaline or saline scrubs (chenopod scrub) and playas, shallow freshwater marshes and swamps. Occurs almost always under natural conditions in wetlands. Blooming period: Apr – Jun.	Fewer than 30 occurrences exist throughout its range in Los Angeles, Riverside and San Diego counties to Baja California, Mexico. Most populations occur in three locations: on Otay Mesa, southwestern San Diego County; along the San Jacinto River in western Riverside County; and near Hemet also in Riverside County. Elevational range: 98 – 4,265 feet MSL.	Covered (a, b)	**Low potential to occur.** The Biological Survey Area lacks appropriate vernal pools habitat and saline-alkaline soils to support this species.
Allium munzii	Munz' onion	FE, ST, CNPS:1B.1	Munz' onion is found on mesic exposures or seasonally moist microsites in grassy openings in coastal sage scrub, chaparral, juniper woodland, cismontane woodland, valley and foothill grasslands in clay soils. Blooming period: Mar – May.	Fewer than 15 occurrences of Munz' onion remain. All are located in western Riverside County. Found from Corona through Temescal Canyon and along the Elsinore Fault Zone to the southwestern foothills of the San Jacinto Mountains. Elevational range: 984 – 3,510 feet MSL.	Covered (b)	**Low potential to occur.** The Biological Survey Area does not contain suitable habitat and it lacks appropriate clay soils to support this species. However, this species is known to occur within the immediate region of the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Brodiaea filifolia	thread-leaved brodiaea (threadleaf clusterlily)	FT, SE, CNPS:1B.1	This species typically occurs on gentle hillsides, valleys, and floodplains in semi-alkaline mudflats, vernal pools, mesic southern needlegrass grassland, mixed native-nonnative grassland and alkali grassland plant communities in association with clay, loamy sand, or alkaline silty-clay soils. This plant grows on various substrates ranging from clay to fine sand. It occurs in open valley and foothill grasslands, at the edge of vernal pools, flood plains, playas and openings in chaparral, cismontane woodlands or coastal scrub. It is equally likely to occur in wetlands or non wetlands. Blooming period: Mar – Jun.	Thread-leaved brodiaea occurs in a few scattered localities within Los Angeles, Orange, western Riverside, and northwestern San Diego counties. Small populations of the species occur on Fish and Game's lands at the San Jacinto Wildlife Area in Riverside County and Carlsbad Highlands in San Diego County. A significant population occurs on The Nature Conservancy's Santa Rosa Plateau in western Riverside County and a small population occurs in Aliso-Wood Canyons Regional Park in Orange County. Elevational range: 82 – 2,821 feet MSL.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area contains suitable grassland and coastal sage scrub habitats with suitable soils and substrates to support this plant. This species is also known to occur within the immediate region of the LPSRA.
Sensitive and Locally Important Plants						
Symphyotrichum defoliatum (=*Aster bernardinus*)	San Bernardino aster	CNPS:1B.2	Found in cismontane woodlands, coastal scrub, lower montane coniferous forests, meadows and seeps, marshes and swamps, and vernally mesic valley and foothill grasslands. Can be found near ditches, streams, springs or disturbed areas. Grows in seasonally moist fine alluvial soils. Blooming period: Jul – Nov.	Found in Kern, Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Elevational range: 6 – 6,691 feet MSL.	X	**Moderate potential to occur**. The Biological Survey Area contains suitable coastal sage scrub habitat to support this species. This species is also known to occur within the immediate region of the LPSRA.
Centromadia pungens ssp. *laevis* (=*Hemizonia pungens* ssp. *laevis*)	smooth tarplant	CNPS:1B.1	Smooth tarplants occur in a variety of habitats including alkali scrub, alkali playas, riparian woodland, watercourses, and grasslands with alkaline affinities. Also found on disturbed places. Blooming period: Apr – Sept.	Found in Riverside, Orange, San Diego and San Bernardino counties. Western Riverside County accounts for over 60 percent of the reported populations: the San Jacinto Wildlife Area, Salt Creek, the City of Hemet and San Jacinto, and in the Murrieta/Temecula area.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area lacks suitable alkaline habitat. However, this species is known to occur within the immediate region of the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
				Elevational range: 0 – 1,574 feet MSL.		
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	CNPS:1B.1	Coulter's goldfields are associated with low-lying alkali habitats along the coast and in inland valleys. The majority of the populations are associated with coastal salt marsh. Coulter's goldfields occur primarily in the alkali vernal plains community. These are floodplains dominated by alkali scrub, alkali playas, vernal pools, and, alkali grasslands. These habitats form mosaics that are largely dependent on salinity and micro-elevational differences. Blooming period: Feb – Jun.	Coulter's goldfields are distributed from coastal San Luis Obispo County south through coastal Santa Barbara County, Ventura County, Los Angeles to San Diego County and northwestern Baja California. Interior valley populations have been recorded from the Carrizo Plain of San Luis Obispo County south through Tehachapi (Kern County), Twenty Nine Palms (San Bernardino County), and cismontane western Riverside County, to the Ojos Negros Valley east of Ensenada, Mexico. Elevational range: 3 – 4,002 feet MSL.	Covered (a, b, d)	**Low potential to occur.** The Biological Survey Area lacks appropriate alkali habitats and soils to support this species. However, this species is known to occur within the immediate region of the LPSRA.
Senecio aphanactis	chaparral ragwort (rayless ragwort)	CNPS: 2.2	Chaparral, cismontane woodland, coastal scrub (sometimes alkaline) and drying alkaline flats. Blooming period: Jan – Apr.	Found in Alameda, Contra Costa, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, Santa Barbara, Santa Clara, San Diego, San Luis Obispo, Solano, and Ventura counties. Elevational range: 50 – 2,624 feet MSL.	X	**Moderate potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species. This species is also known to occur within the immediate region of the LPSRA.
Trichocoronis wrightii var. *wrightii*	Wright's trichocoronis	CNPS: 2.1	Found in meadows and seeps, marshes and swamps, riparian forest and vernal pools/alkaline. Also found on mud flats of vernal lakes, drying river beds, and alkali meadows. In Riverside County, Wright's trichocoronis is found in the alkali vernal plains and associated with alkali playa, alkali annual grassland, and alkali vernal pool	Found in Riverside and Merced counties. Nearly extirpated in the Central Valley. This species is known only from four locations along the San Jacinto River from the vicinity of the Ramona Expressway and San Jacinto Wildlife Area and along the northern shore of Mystic Lake. Only two locations on either side of the	Covered (a, b)	**Low potential to occur.** The Biological Survey Area lacks suitable alkali habitats and soils to support this species.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			habitats. It is highly dependent on alkaline soils that are saturated for extended periods of time. Blooming period: May – Sept	Ramona Expressway have been seen in recent years. Elevational range: 16 – 1,426 feet MSL.		
Lepidium virginicum var. *robinsonii*	Robinson's pepper-grass	CNPS:1B.2	Dry soils on chaparral and coastal sage scrub. Blooming period: Jan – Jul.	Found in Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Elevational range: 3 – 2,903 feet MSL.	X	**Low potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species; however this species is not known to occur within the region of the LPSRA.
Dudleya multicaulis	many-stemmed dudleya	CNPS: 1B.2	Many-stemmed dudleya is often associated with clay soils in barrens, rocky places, and ridgelines as well as thinly vegetated openings in chaparral, valley and foothill grassland, and coastal sage scrub in heavy soils, often clay. Blooming period: Apr – Jul.	Many-stemmed dudleya is endemic to southwestern California from western Los Angeles County south through extreme southwestern San Bernardino, Orange, and western Riverside Counties south to extreme northern San Diego County. Elevational range: 50 – 2,591 feet MSL.	Covered (b)	**Low potential to occur.** The Biological Survey Area contains suitable coastal sage scrub and grassland habitat to support this species; however it does not support suitable clay soils. This species is not known to occur within the region of the LPSRA.
California macrophylla (=*Erodium macrophyllum*)	round-leaved filaree (large-leaf filaree)	CNPS:1B.1	This species is restricted to open cismontane woodland and valley and foothill grassland habitats on very friable clay soils. Blooming period: Mar – May.	In southern California, found in Kern, Los Angeles, Riverside, San Diego, and Ventura counties. Elevational range: 50 – 3,937 feet MSL.	Covered (d)	**Low potential to occur.** The Biological Survey Area generally lacks suitable habitats with friable clay soils to support this species. This species is known to occur within the region of the LPSRA.
Nama stenocarpum	mud nama (mud fiddeleaf)	CNPS: 2.2	Found along marshes, swamps, lake shores, river banks, stream banks and intermittently wet areas. Blooming period: Jan – Jul.	Found in Los Angeles, Orange, Riverside, Imperial and San Diego counties. Elevational range: 16 – 1,640 feet MSL.	Covered (a, b, d)	**Moderate potential to occur.** The Biological Survey Area contains marshes along the lake shore; However, these

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
						soils are sandy and wekk drained. This species is not known to occur within the region of the LPSRA.
Sidalcea neomexicana	salt spring checkerbloom (mountain sidalcea)	CNPS: 2.2	Found in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, alkali playas, and brackish marshes. Blooming period: Mar – Jun.	Found in Kern, Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, and Ventura counties. Elevational range: 50 – 5,018 feet MSL.	X	**Low potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat to support this species; however this species is not known to occur within the region of the LPSRA.
Abronia villosa var. *aurita*	chaparral sand-verbena	CNPS:1B.1	Found in sandy soils of chaparral, coastal scrub, and desert dunes. Blooming period: Jan – Sept.	Found in Riverside, San Bernardino and San Diego counties. Elevational range: 262 – 5,249 feet MSL.	X	**Moderate potential to occur.** The Biological Survey Area contains suitable coastal sage scrub habitat. This species is known to occur within the region of the LPSRA.
Chorizanthe polygonoides var. *longispina*	long-spined spineflower (knotweed spineflower)	CNPS:1B.2	Long-spined spineflower is associated primarily with heavy, often rocky, clay soils in valley and foothill grasslands, and openings in coastal sage scrub, and chaparral. Occasionally this species is associated with mountain meadows in sandy loam soil as at Cuyamaca State Park or in sandy or gravelly soils as on Kearney Mesa or Cutca Valley in San Diego County. Blooming period: Apr – Jul.	Populations found in Orange, western Riverside, San Diego and Santa Barbara counties. Elevational range: 100 – 4,760 feet MSL.	Covered	**Moderate potential to occur.** The Biological Survey Area contains suitable soils, valley and foothill grasslands and coastal sage scrub habitats to support this species. This species is also known to occur within the region of the LPSRA.
Myosurus minimus ssp. *apus*	little mousetail	CNPS: 3.1	In southern California, little mousetail occurs in association with vernal pools and within the alkali vernal pools and alkali annual grassland components of alkali	Found in Riverside, San Bernardino, San Diego, Alameda, Contra Costa, Colusa, Lake, Merced, Solano, Tulare, Baja California, and Oregon.	Covered (a, b, d)	**No potential to occur.** The Biological Survey Area lacks suitable vernal pools and associated alkali habitats and soils to

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			vernal plains. Little mousetail is found in areas that have semi-regular inundation. Blooming period: Mar – Jun.	Most southern California populations are relatively small. The two largest concentrations of little mousetail are on the Otay Mesa of San Diego County and at Salt Creek west of Hemet in Riverside County. Elevational range: 65 – 2,100 feet MSL.		support this species. This species is not known to occur at LPSRA.
Lycium parishii	Parish's desert-thorn	CNPS: 2.3	Found in coastal sage scrub and Sonoran desert scrub. Blooming period: Mar – Apr.	Found in Riverside, San Diego and Imperial counties. Elevational range: 1,000 – 3,280 feet MSL.	X	**Low potential to occur.** The Biological Survey Area lacks suitable desert habitat to support this species. Coastal sage scrub habitat is present; this species is not known to occur within the region of the LPSRA.
Calochortus plummerae	Plummer's mariposa lily	CNPS:1B.2	This plant prefers openings in chaparral, foothill woodland, coastal sage scrub, valley and foothill grasslands, cismontane woodland, lower montane coniferous forest and yellow pine forest. They are found on dry, rocky slopes and soils and brushy areas. Can be very common after fire. Blooming period: May – Jul.	Found in Los Angeles, Orange, Riverside, San Bernardino, and Ventura counties. Elevational range: 330 – 5,580 feet MSL.	Covered (e)	**Moderate potential to occur.** The Biological Survey Area supports suitable habitats and substrates to support this species. This species is known to occur within the region of the LPSRA.
Hordeum intercedens	vernal barley	CNPS: 3.2	Vernal barley is associated with mesic grasslands, vernal pools, and large saline flats or depressions. In Riverside County, vernal barley is associated with alkali flats and flood plains within the alkali vernal plains community. Within this community vernal barley is primarily associated	Vernal barley occurs in scattered locations bordering the Central Valley of central California. In southern California it has been reported from Santa Barbara, Ventura, Los Angeles, Orange, Riverside, and San Diego Counties. Elevational range: 16 – 3,280 feet	Covered (a)	**No potential to occur.** The Biological Survey Area lacks suitable alkaline habitats and soils to support this species. This species is known to occur within the region of the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			with alkali annual grasslands and vernal pools and to a lesser extent alkali scrub and alkali playa. Can also be found on coastal dunes, coastal scrub, and alkaline valley/foothill grasslands. Blooming period: Mar – Jun.	MSL.		

Legend

Federal Status

FE = federally endangered: any species, subspecies, or variety of plant or animal that is in danger of extinction throughout all or a significant portion of their range. Species become officially listed as endangered and receive explicit protection under the Federal Endangered Species Act (ESA) upon publication of final rule for listing in the Federal Register.

FT = federally threatened: any species, subspecies, or variety of plant or animal that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future. Once listed in the Federal Register, threatened species receive discretionary protection under the Endangered Species Act.

California State Status

SE = California state endangered: any species, subspecies, or variety of plant or animal that 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, overexploitation, predation, competition, or disease.

ST = California state threatened: any species, subspecies, or variety of plant or animal that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

California Native Plant Society Status

CNPS 1B = California Native Plant Society List 1B plants are native California species, subspecies or varieties that are rare, threatened, or endangered in California and throughout its range.

CNPS 2 = California Native Plant Society List 2 plants are native California species, subspecies or varieties that are rare, threatened or endangered in California, but more common outside of the state.

CNPS 3 = California Native Plant Society List 3 plants are native California species, subspecies or varieties that more information is needed to assign them to one list or another or to reject them.

California Native Plant Society Threat Codes

0.1 means it is seriously endangered in California.

0.2 means it is fairly endangered in California.

0.3 means it is not very endangered in California.

Western Riverside County MSHCP

Covered: No further surveys are required.

Covered (a): Surveys may be required for these species as part of wetlands mapping (Section 6.1.2 of MSHCP).

Covered (b): Surveys may be required for these species within Narrow Endemic Plant Species survey area (Section 6.1.3 of MSHCP)

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Covered (d): Surveys may be required for these species within Criteria Area as (Section 6.3.2 of MSHCP) **Covered (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 objectives for these species are presented in Section 9.0 of the MSHCP. Please refer to Table 9-3 of the MSHCP for specific conservation objectives that must be met for the 16 species prior to including them on the list of Covered Species Adequately Conserved. **X** Not covered by the MSHCP, but identified by the CNDDB and other literature.						

Sources for Table 4-13:

- California Natural Diversity Database (CDFG 2008a, 2007a).
- State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFG 2008e).
- Species Accounts from CDFG website (CDFG 2008b, 2007b).
- CNPS Inventory of Rare and Endangered Plants of California (CNPS 2008, 2007).
- Calflora website (Calflora 2008, 2007).
- *The Jepson Manual: Higher Plants of California* (Hickman 1993).
- *A Flora of Southern California* (Munz 1974).
- Understanding the Plants and Animals of Western Riverside County MSHCP) (Dudek and Associates 2003).

4.4.2 Plant Species Observed During the Field Surveys

Plant species observed during the field surveys are common in the surrounding areas. A complete list of plant species observed by Psomas within the Biological Survey Area during the field surveys is provided in Table 4-14, *Plant Species Observed during Field Surveys*.

Table 4-14
Plant Species Observed During Field Surveys

Scientific Name	Common Name
Gymnosperms	
Cupressaceae	**Cypress Family**
Cupressus sp.	cypress
Pinaceae	**Pine Family**
Pinus radiata	Monterey pine
Angiosperm Dicots	
Amaranthus	**Pigweed, Amaranth Family**
*Amaranthus albus**	tumble pigweed
Anacardiaceae	**Sumac or Cashew Family**
Rhus trilobata	skunkbrush (squawbush, basketbush)
*Schinus molle**	Peruvian pepper tree (California pepper tree)
Toxicodendron diversilobum	poison oak
Apiaceae	**Carrot Family**
*Conium maculatum**	poison hemlock
*Foeniculum vulgare**	fennel
Asteraceae	**Sunflower Family**
Acourtia microcephala	perezia (sacapellote)
Ambrosia acanthicarpa	annual bur ragweed (annual bur-sage)
Artemisia californica	California sagebrush
Artemisia douglasiana	mugwort
Artemisia dracunculus	wild tarragon (tarragon)
Artemisia tridentata	Great Basin sagebrush (big sagebrush)
Baccharis emoryi	Emory's baccharis
Baccharis pilularis	coyote bush
Baccharis salicifolia	mule fat
Bebbia juncea	sweetbush
Brickellia californica	California brickellbush
Brickellia desertorum	desert brickellbush
*Centaurea melitensis**	tocalote (Malta star thistle)
*Chamomilla suaveolens**	pineapple weed (rayless chamomile)
Cirsium occidentale var. *occidentale*	cobweb thistle
Conyza canadensis	horseweed (mare's tail)

Scientific Name	Common Name
Conyza coulteri	Coulter's horseweed
*Cotula coronopifolia**	brass-buttons
Encelia farinosa	brittlebush (incienso)
Ericameria palmeri	grassland goldenbush
Erigeron foliosus var. *foliosus*	fleabane aster
Eriophyllum confertiflorum var. *confertiflorum*	golden-yarrow
Filago californica	California filago (fluff weed)
*Filago gallica**	narrow-leaved filago
Gnaphalium bicolor	two-toned everlasting (bicolored cudweed)
Gnaphalium californicum	California everlasting (green everlasting)
Gnaphalium canescens ssp. *microcephalum*	felt-leaf everlasting (white everlasting)
Gutierrezia californica	California matchweed (snakeweed)
Helianthus annus	common sunflower
Deinandra paniculata	paniculate tarplant (slender tarweed)
Heterotheca grandiflora	telegraph weed
Isocoma menziesii	Menzies' goldenbush (white flowered goldenbush)
*Lactuca serriola**	prickly lettuce (wild lettuce)
Oncosiphon piluliferum (=Matricaria globifera)	stink-net
Pluchea sericea	arrow weed
*Senecio vulgaris**	common groundsel
*Sonchus oleraceus**	common sow-thistle
Stephanomeria virgata	virgate wreath-plant (twiggy wreath-plant)
Berberidaceae	**Barberry Family**
Berberis fremontii	Fremont's barberry
Boraginaceae	**Borage Family**
Amsinckia menziesii var. *intermedia*	common fiddleneck
Cryptantha microstachys	Tejon cryptantha
Heliotropium curassavicum	alkali heliotrope (wild heliotrope)
Brassicaceae	**Mustard Family**
Brassica geniculata (*=Hirschfeldia incana*)*	short-podded mustard (Mediterranean mustard)
*Brassica nigra**	black mustard
*Capsella bursa-pastoris**	shepherd's purse
*Sisymbrium orientale**	Oriental mustard (Oriental sisymbrium)
Thysanocarpus laciniatus	lacepod (fringepod)
Cactaceae	**Cactus Family**
Opuntia littoralis	coastal prickly pear
Opuntia prolifera	coast cholla
Capparaceae	**Caper Family**
Isomeris arborea (*=Cleome isomeris*)	bladderpod

Scientific Name	Common Name
Caprifoliaceae	**Honeysuckle Family**
*Lonicera japonica**	Japanese honeysuckle
Adoxaceae	**Elderberry Family**
Sambucus mexicana	blue elderberry (Mexican elderberry)
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	fourwing saltbush
*Chenopodium album**	white goosefoot (lamb's quarters)
*Salsola tragus**	Russian thistle (tumbleweed)
Suaeda nigra (= *S. mosquinii*)	bush seepweed (iodine weed)
Convolvulaceae	**Morning-Glory Family**
*Convolvulus arvensis**	bindweed
Crassulaceae	**Stonecrop Family**
Dudleya lanceolata	lance-leaved dudleya (lance-leaved live-forever)
Cucurbitaceae	**Gourd Family**
Cucurbita foetidissima	stinking gourd (wild gourd, coyote melon)
Marah macrocarpus	wild cucumber (manroot)
Cuscataceae	**Dodder Family**
Cuscuta californica	dodder (California witch's hair)
Euphorbiaceae	**Spurge Family**
Croton californicus	California croton
Croton setigerus (=*Eremocarpus setigerus*)	turkey mullein (doveweed)
Euphorbia albomarginata (=*Chamaesyce albomarginata*)	rattlesnake spurge (rattlesnake weed)
*Ricinus communis**	castor bean
Fabaceae	**Legume Family**
*Acacia longifolia**	Sydney golden wattle
Lotus agrophyllus	silverleaf lotus (silver lotus)
Lotus salsuginosus	coastal lotus (alkali lotus)
Lotus scoparius	deerweed (California broom)
Lupinus sp.	lupine
*Medicago polymorpha**	California bur clover (bur-clover)
*Melilotus albus**	white sweet clover
*Melilotus officinalis**	yellow sweet clover
*Parkinsonia aculeata**	Mexican palo verde
Fagaceae	**Oak Family**
Quercus agrifolia	coast live oak
Garryaceae	**Silk Tassel Family**
Garrya flavescens	pale silk tassel
Geraniaceae	**Geranium Family**
*Erodium cicutarium**	red-stemmed filaree

Scientific Name	Common Name
Grossulariaceae	**Gooseberry Family**
Ribes aureum	golden currant
Ribes indecorum	white-flowered currant (white chaparral currant)
Hydrophyllaceae	**Waterleaf Family**
Eucrypta chrysanthemifolia	common eucrypta
Phacelia cicutaria	caterpillar phacelia
Phacelia distans	common phacelia
Juglandaceae	**Walnut and Pecan Family**
Juglans californica	California black walnut
Lamiaceae	**Mint Family**
*Marrubium vulgare**	horehound
Salvia columbariae	chia
Salvia leucophylla	purple sage
Salvia mellifera	black sage
Lauraceae	**Laurel Family**
*Cinnamomum camphorum**	camphor tree
Malvaceae	**Mallow Family**
Malacothamnus fasciculatus	bush mallow (chaparral bush mallow)
Myoporaceae	**Myoporum Family**
*Myoporum laetum**	myoporum
Myrtaceae	**Myrtle Family**
*Eucalyptus globulus**	blue gum eucalyptus
Eucalyptus sp.*	eucalyptus
Nyctaginaceae	**Four O'Clock Family**
Mirabilis laevis	wishbone bush
Oleaceae	**Olive Family**
Fraxinus velutina	Arizona ash (velvet ash)
*Olea europaea**	common olive
Onagraceae	**Evening Primrose Family**
Epilobium ciliatum ssp. *ciliatum*	willow herb
Papaveraceae	**Poppy Family**
Eschscholzia californica	California poppy
Platanaceae	**Plane Tree, Sycamore Family**
*Platanus hybrida**	London planetree
Platanus racemosa	California sycamore (western sycamore)
Polygonaceae	**Buckwheat Family**
Eriogonum fasciculatum	California buckwheat
Eriogonum fasciculatum var. *polifolium*	California buckwheat
Eriogonum sp.	buckwheat
Polygonum lapathifolium	willow weed
*Rumex acetosella**	sheep sorrel

Scientific Name	Common Name
*Rumex crispus**	curly dock
Portulacaceae	**Purslane Family**
Calyptridium monandrum	common pussypaws
Ranunculaceae	**Buttercup Family**
Clematis lasiantha	pipestems (virgin's bower)
Rhamnaceae	**Buckthorn Family**
Ceanothus crassifolius	hoary-leaved ceanothus (thick-leaved ceanothus)
Rhamnus ilicifolia	holly-leaf redberry
Rosaceae	**Rose Family**
Heteromeles arbutifolia	toyon (Christmas-berry, California holly)
Prunus ilicifolia	hollyleaf cherry
Rubiaceae	**Madder Family**
Galium angustifolium	narrow-leaved bedstraw
Galium nuttallii	climbing bedstraw
Salicaceae	**Willow Family**
Populus fremontii	Fremont cottonwood
Salix exigua	narrow-leaved willow (sandbar willow)
Salix gooddingii	black willow (Goodding's black willow)
Salix laevigata	red willow
Scrophulariaceae	**Figwort Family**
Antirrhinum coulterianum	white snapdragon
Keckiella antirrhinoides	yellow bush penstemon (yellow keckiella)
Keckiella cordifolia	heart-leaved bush penstemon
Mimulus aurantiacus	bush monkey flower (sticky monkey flower)
Penstemon centranthifolius	scarlet bugler
Penstemon sp.	penstemon
Scrophularia californica	California figwort (bee plant)
*Veronica anagalis-aquatica**	great water speedwell
Solanaceae	**Nightshade Family**
Datura wrightii	sacred datura (false jimson weed)
*Nicotiana glauca**	tree tobacco
*Solanum nigrum**	black nightshade
Sterculiaceae	**Cacao Family**
Fremontodendron californicum	flannelbush
Tamaricaceae	**Tamarisk Family**
*Tamarix ramosissima**	Mediterranean tamarisk
Urticaceae	**Nettle Family**
Urtica dioica	hoary nettle (stinging nettle)
Angiosperm Monocots	
Arecaceae	**Palm Family**
*Phoenix canariensis**	Canary Island date palm

Scientific Name	Common Name
*Washingtonia filifera**	California fan palm
Cyperaceae	**Sedge Family**
Carex sp.	sedge
*Cyperus involucratus**	umbrella sedge
Scirpus sp.	bulrush
Juncaceae	**Rush Family**
Juncus acutus	spiny rush
Juncus sp.	rush
Liliaceae	**Lily Family**
Bloomeria crocea	golden stars
Agavaceae	**Agave Family**
Yucca whipplei	our lord's candle (chaparral yucca, Spanish bayonet)
Poaceae	**Grass Family**
*Agrostis stolonifera**	creeping bentgrass
*Avena barbata**	slender oat
*Avena fatua**	wild oat
*Bromus diandrus**	ripgut grass
*Bromus hordeaceus**	soft chess (soft brome)
Bromus madritensis ssp. *rubens**	red brome(foxtail chess)
*Bromus tectorum**	cheatgrass (downy brome)
*Cynodon dactylon**	Bermuda grass
Distichlis spicata	salt grass
*Hordeum murinum**	foxtail barely
*Lamarckia aurea**	goldentop
Poa secunda	perennial bluegrass (pine bluegrass)
*Polypogon monspeliensis**	rabbitfoot grass (annual beard grass)
*Schismus barbatus**	a'bu ma shi' (father of the earth)
*Vulpia myuros**	rattail fescue
Typhaceae	**Cattail Family**
Typha angustifolia	narrow-leaved cattail
Legend	
* exotic plant species	

4.4.3 Listed Endangered, Threatened, Candidate and State Rare Plant Species

No plant species listed as endangered, threatened, candidate, or state rare pursuant to the federal or state Endangered Species Act were observed within or adjacent to the Biological Survey Area during the field surveys. However, because of the time of year in which the surveys took place, a habitat assessment was performed for potentially suitable habitat conditions to support listed plant species, especially for annual species that appear above ground in a vegetative stage earlier

or later in the year. As a result of the field surveys and the literature review, it was concluded that one listed plant species has a moderate potential to occur within the Biological Survey Area (Table 4-9):

- thread-leaved brodiaea (threadleaf clusterlily)

4.4.4 Sensitive and Locally Important Plant Species

No plant species designated as sensitive or locally important were observed within or adjacent to the Biological Survey Area during the field surveys. However, because of the time of year in which the surveys took place, a habitat assessment was performed for potentially suitable habitat conditions to support sensitive plant species, especially for annual species that appear above ground in a vegetative stage earlier or later in the year. As a result of the field surveys and the literature review, it was concluded that seven sensitive plant species have a moderate potential to occur within the Biological Survey Area (Table 4-9). These sensitive and locally important plant species are listed below:

- San Bernardino aster
- smooth tarplant
- chaparral ragwort (rayless ragwort)
- mud nama (mud fiddeleaf)
- chaparral sand-verbena
- long-spined spineflower (knotweed spineflower)
- Plummer's mariposa lily

4.5 Wildlife

The plant communities within the Biological Survey Area and the surrounding landscape provide a variety of habitats that support a diverse array of terrestrial wildlife species. Floristic characteristics contribute to the complexity and diversity of the wildlife habitat in the Biological Survey Area and also help support a wildlife community representative of the region. More than 100 species of birds have been observed at Lake Perris. Many are migratory, and stop at the park briefly during their travels, while others make their permanent residence here. Many varieties of waterfowl, shorebirds, and waterbirds use the lake to forage. Many different species of birds, reptiles, and mammals use the open lake, lake shoreline, riparian habitats, coastal sage scrub habitats and the grassland habitats to forage, roost, and breed.

The vegetation communities form the basis of the wildlife habitats of the Biological Survey Area. These habitats provide the primary plant productivity upon which wildlife depends, along with nesting and denning sites, escape and movement cover, and protection from adverse weather. Some species are habitat specific for all their life history requirements, while many wildlife species that occur in the area move freely between plant communities to obtain all their life history needs.

In general, more complex natural communities, with more vegetation layers and more plant species, provide higher value wildlife habitat than less complex vegetation communities. More complex communities have more niches for wildlife and usually support more animal species than less complex communities. Although simple communities may support few wildlife species, they may provide habitat for great numbers of those few species.

4.5.1 Listed, Candidate and Sensitive Wildlife Species Having the Potential to Occur Within the Biological Survey Area

As a result of the literature review and agency consultation, 30 wildlife species listed as endangered, threatened or candidate pursuant to the federal or state Endangered Species Acts were identified as having the potential to occur within the region of the proposed project site. Forty-eight sensitive and locally important wildlife species were identified by the literature review and agency consultation as having the potential to occur within the region of the proposed project site.

Each of the wildlife species mentioned above and listed in Section 3.2.4.2 and Section 3.2.5.2 were assessed for their potential to occur within the Biological Survey Area based on each species' known distributional and elevational ranges. A species was determined to have no potential to occur within the Biological Survey Area if the Biological Survey Area was located outside the species' known distributional range, and/or the species' known elevational range. A number of wildlife species were determined to have no potential to occur within the Biological Survey Area and were therefore eliminated from further evaluation. A complete listing of these species can be found in Appendix A.

Wildlife species determined to have the potential to occur within or adjacent to the Biological Survey Area are presented in Table 4-15, *Listed, Candidate and Sensitive Wildlife Species Having the Potential to Occur within the Biological Survey Area*. Table 4-15 also summarizes conclusions from analysis and field surveys regarding the potential occurrence of listed and sensitive wildlife species within the Biological Survey Area. The table provides the taxonomic and common names of each potentially occurring species, describes each species' status, describes each species' preferred habitat and general distribution, and analyzes the species' potential to occur within the Biological Survey Area.

During the field surveys, the potential for species listed in Table 4-15 to occur was assessed as low, moderate, or high based on the following criteria:

- *Low*: species with a low potential for occurrence are those for which the Biological Survey Area is on the boundary of the known distributional and/or the elevational range of the species, or those for which the Biological Survey Area is within the boundary of the known range of the species and for which suitable habitat in the Biological Survey Area is not known to be used by the species, or for which there are no known recorded occurrences of the species within or adjacent to the Biological Survey Area.

- *Moderate*: species with a moderate potential for occurrence are those for which suitable habitat is present at the Biological Survey Area, the Biological Survey Area is within the

known distributional and elevational range of the species, and one or more surveys did not detect the species. No nearby occurrences of the species are known. Failure to detect the species is not definitive, and may be due to variable effects associated with migration, weather, fire, and/or time of day and year.

- *High*: species with a high potential for occurrence are those for which suitable habitat is present at the Biological Survey Area, the Biological Survey Area is within the known distributional and elevational range of the species, and the species has been observed in similar habitat in the region by a qualified biologist.

A standard in the professional practice of wildlife biology is to conclude species absence in only a few limited instances.

- Where the species known distributional range and historic range is over 25 miles from the Biological Survey Area, with generally unsuitable habitat in between.
- Suitable habitat to support the species is clearly absent.
- Numerous surveys over many years have not detected the species.

In general and outside of these limited cases, even with field surveys, wildlife biologists assess probability of occurrence rather than make definitive conclusions about species presence or absence. Failure to detect the species is not definitive, and may be due to variable effects associated with migration, weather, fire, and/or time of day and year. For example, wildlife species with a moderate potential for occurrence are considered to be those for which suitable habitat is present to support the species, the Biological Survey Area is within the known distributional and elevational range of the species, and one or more surveys did not detect the species.

In general, the time of year was favorable for conducting a wildlife survey. The field survey was conducted during the daytime to maximize the detection of most wildlife. Birds represent the largest component of the fauna, and because most birds are active in the daytime, diurnal surveys maximize the number of observations of this portion of the fauna. In contrast, daytime surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe. Many wildlife species are secretive and nocturnal, such as some reptiles, amphibians and small mammals.

During the field surveys, many species of wildlife that could potentially utilize the Biological Survey Area may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. A single day survey cannot be used to conclusively determine presence or absence of a species; therefore assessments of presence/absence were made based on the presence suitable habitat to support the species, diagnostic signs (burrows, scat, tracks, vocalizations and nests), known records or occurrence within the area, known distributional and elevational range, and habitat utilization from the relevant literature.

Table 4-15
Listed, Candidate, and Sensitive Wildlife Species
Having the Potential to Occur within the Biological Survey Area

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Listed Endangered, Threatened, and Candidate Wildlife						
Amphibians						
Bufo californicus	arroyo toad	FE, SSC	A toad of sandy riverbanks, streams, washes, and arroyos. Breeds in and near streams. It frequents riparian areas grown to mule fat, willows, cottonwoods, and/or sycamores or coast live oaks in valley-foothill and desert riparian as well as a variety of more arid habitats including desert wash, palm oasis, and Joshua tree, mixed chaparral and sagebrush. It requires shallow (3 -10 inches deep), exposed streamside, quiet water stretches, or overflow pools with silt-free sandy or gravelly bottoms especially favored for breeding. Nearby sandy terraces, dampened in places by capillary action, and with some scattered vegetation providing surface sheltering and burrowing sites and foraging areas.	The arroyo toad is found in the coastal plain, coastal slopes and coastal mountain streams of southern California west of the desert in southern Monterey County (San Antonio River) southward through the Transverse and Peninsular ranges to the Rio Santo Domingo (Baja California, Mexico). They also occupy a few drainages on the desert slopes of the San Gabriel and San Bernardino ranges. Desert populations found along lower Whitewater River in Riverside County and Mojave River in San Bernardino County. Its known elevational range extended from near sea level to 4,600 feet msl in California.	Covered (a, c)	**No potential to occur.** The Biological Survey Area does not contain suitable breeding water and substrate habitats to support this species. It is a toad of sandy riverbanks, streams, washes, and arroyos. Human disturbance and exotic species make presence unlikely. This species is not known to occur within the LPSRA, however it is known from the immediate region.
Birds						
Haliaeetus leucocephalus	bald eagle	SE, Fully Protected (nesting and wintering)	Range-wide, bald eagles occur primarily in or near seacoasts, rivers, wetlands swamps, and large lakes. Requires large bodies of water, or free flowing rivers with abundant fish, and adjacent snags or other perches and nesting sites	Bald eagles breeds mostly in low mountain areas up to 7,000 feet msl in the northern third of the state. Most breeding territories are in northern California, but the eagles also nest in scattered locations in the central and	Covered (a)	**Known to occur seasonally at LPSRA.** The Biological Survey Area provides potential foraging and roosting habitat for this species during winter migration.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			to support them. Perching sites need to be composed of large trees or snags with heavy limbs or broken tops. It roosts communally in winter in dense, sheltered, remote conifer stands. The State's breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers.	southern Sierra Nevada mountains and foothills, in several locations from the central coast range to inland southern California, and on Santa Catalina Island. They winter throughout California, except in the highest mountains and the driest southern deserts; however it is found along parts of the Colorado River.		Bald eagles are known to use the LPSRA during the winter. The bald eagle is primarily a winter migrant within western Riverside County. Bald eagles have attempted to breed at LPSRA, but were unsuccessful.
Falco peregrinus anatum	American peregrine falcon (nesting)	SE, Fully Protected	Peregrines are found in a large variety of open habitats, including tundra, marshes, seacoasts, savannahs and high mountains. The species breeds mostly in woodland, forest, wetlands, cities, agricultural areas and coastal habitats. Open ledges, caves, and potholes on high, vertical cliffs, generally 100 to 300 feet in height that overlook rivers, lakes, or the ocean provide peregrines with suitable nesting sites.	The range includes most of California, except in deserts, during migrations and in winter. During the breeding season, the birds are most often sighted along the coastline of the entire state, in the Sierra Nevada, and in other mountains of northern California. In winter, found inland throughout the Central Valley, and occasionally on the Channel Islands. Migrants occur along the coast and in the western Sierra Nevada in spring and fall.	Covered (a)	**Present.** Observed during the field surveys by Psomas and known to occur seasonally at LPSRA. The peregrine falcon is primarily a rare spring and fall transient and a casual visitant during other seasons of the year. There are no breeding records documented for the species in the BSA.
Empidonax traillii extimus	southwestern willow flycatcher (nesting)	FE, SE	Southwestern willow flycatchers arrive in southern California in April and adults depart from the breeding territory in mid-August to early September. They utilize riparian woodlands along streams and rivers with mature, dense stands of willows and cottonwoods. Riparian habitat provides both breeding and foraging habitat for the species. They nest from zero to 13 feet above ground in thickets of trees.	It occurs from near sea level to over 8,500 feet msl, but is primarily found in lower elevation riparian habitat in southern California. Breeds in California from the Mexican border north to the Owens Valley, the South Fork Kern River, and Santa Ynez River in Santa Barbara County.	Covered (a)	**Absent.** This species was not observed during the 2007 and 2008 focused SWFL surveys. However, this species has been observed within the LPSRA. The Biological Survey Area contains suitable breeding and foraging riparian woodland habitat to support this species.
Vireo bellii	least Bell's	FE,	Least Bell's vireos primarily occupy	A spring and summer resident of	Covered (a)	**Present.** Observed

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
pusillus	vireo (nesting)	SE	riverine riparian habitats that typically feature dense cover within 1-2 m of the ground and a dense, stratified canopy. Typically it is associated with southern willow scrub, cottonwood-willow forest, mule fat scrub, sycamore alluvial woodland, coast live oak riparian forest, arroyo willow riparian forest, or mesquite in desert localities. It uses habitat which is limited to the immediate vicinity of water courses. 2,000 feet elevation in the interior.	southern California. The subspecies is currently restricted to southern California south of the Tehachapi Mountains, along the coast and the western edge of the Mojave Desert to northwestern Baja California below 2,000 feet in elevation. Breeding pairs have been observed in the counties of Monterey, San Benito, Inyo, Santa Barbara, San Bernardino, Ventura, Los Angeles, Orange, Riverside, and San Diego.		during the 2007 and 2008 focused LBV field surveys by Psomas and known to occur seasonally at LPSRA. During the focused LBV surveys, this species was observed below the dam and near the proposed project area in the riparian band on the east shore of the lake.
Polioptila californica californica	coastal California gnatcatcher	FT, SSC	A non-migratory, permanent resident of coastal sage scrub habitat, which is a broad category of vegetation. They also use adjacent chaparral, grassland and riparian habitats for foraging.	They are restricted to coastal slopes of southern California from Ventura and western San Bernardino counties south to northern Baja below 1,500 feet msl. May still occur along lower, coastal slopes of San Gabriel and San Bernardino Mountains in Los Angeles and San Bernardino counties, but status is uncertain. Their breeding period is from February to August.	Covered	**Known to occur at LPSRA.** CAGN was not observed during the focused CAGN surveys conducted by Psomas (2007). However, this species has been observed within the LPSRA. Suitable foraging and breeding coastal sage scrub habitat is present within the Biological Survey Area.
Mammals						
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE, SSC	The San Bernardino kangaroo rat typically is found in early to intermediate stage alluvial fan sage scrub along river and stream terraces, and flood plains. Sandy loam substrates allow for the digging of simple, shallow burrows. They require open, sparse shrub vegetation and they actively avoid	The San Bernardino kangaroo rat occurs in scattered, isolated patches of alluvial sage scrub habitat throughout San Bernardino and Riverside counties. The remaining three locations (Santa Ana River, Lytle Creek Wash and Cajon Creek Wash, and San Jacinto River) contain the largest	Covered (c)	**Low potential to occur.** The Biological Survey Area does not contain suitable habitats to support this species.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			rocky substrates and areas with dense vegetation.	extant concentrations of San Bernardino kangaroo rats.		
Dipodomys stephensi	Stephens's kangaroo rat	FE, ST	The Stephens's kangaroo rat is found in open annual and perennial grasslands or sparse shrublands such as coastal sage scrub with cover of less than 50%. They avoid areas with dense grass cover. They require friable soils and avoid rocky soils and they use flatter slopes.	Stephens's kangaroo rat is restricted to the San Jacinto Valley and adjacent areas in western Riverside County and northern-central San Diego County. It is found at elevations ranging from approximately 180 feet msl on Camp Pendleton in San Diego County to 4,100 feet in the Anza Valley.	Covered	**Present.** The Biological Survey Area below the dam contains suitable grassland and coastal sage scrub habitat with suitable soils to support this species. This species is known to occur within the LPSRA.
Sensitive and Locally Important Wildlife						
Amphibians						
Spea hammondii	western spadefoot	SSC	A vernal pool associated species that uses upland areas such as coastal sage scrub, and grasslands habitats for aestivation. They require rain pools/vernal pools in which to reproduce and that persist with more than three weeks for metamorphosis. Pools must lack fish, bullfrogs, and crayfish.	It is a California near endemic ranging from Shasta County southward into Baja California restricted to west of the Sierran-desert range axis. The western spadefoot ranges throughout the Central Valley and adjacent foothills. In the Coast Ranges it is found from Point Conception, Santa Barbara County, south to the Mexican border. Elevations of occurrence extend from near sea level to 4,471 feet in the southern Sierra foothills.	Covered (a)	**Low potential to occur.** The Biological Survey Area does not support vernal pools or other ponding areas that the spadefoot needs in order to reproduce. This species is not known to occur within the LPSRA, but found within the immediate region.
Reptiles						
Actinemys marmorata pallida (=*Emys marmorata pallida*)	southwestern pond turtle	SSC	Inhabits slow moving permanent or intermittent streams, small ponds, small lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and sewage treatment lagoons. Pools are the preferred habitat within streams. Abundant	Currently, it ranges south of San Francisco Bay to northern Baja California, Mexico.	Covered (a)	**No potential to occur.** Human disturbance and exotic species make presence unlikely. This species is not known to occur within the LPSRA or the immediate region.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			logs, rocks, submerged vegetation, mud, undercut banks, and ledges are necessary habitat components for cover as well as a water depth greater than 2 m.			
Coleonyx variegatus abbotti	San Diego banded gecko	ND	This species is found in granite or rocky outcrops in coastal scrub and chaparral habitats within coastal and cismontane southern California.	In California, this gecko is found in the interior southern coastal region, generally west of the Peninsular Ranges and South of the Transverse Ranges, and north up the coast to Ventura County. It ranges beyond California south into Baja California.	Covered	**Moderate potential to occur.** The Biological Survey Area supports suitable coastal sage scrub with rock outcrops to support this species. This species is not known to occur within the LPSRA; however they are known from immediate region of Moreno Valley and San Jacinto.
Phrynosoma coronatum (*blainvillii* population)	coast (San Diego) horned lizard	SSC	Found in a wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest. In inland areas, this species is restricted to areas with pockets of open microhabitat with loose, fine soils with a high sand fraction; and abundance of native ants.	It ranges from the Transverse Ranges southward to the Mexican border west of the deserts. The known elevation range of this species is from 32 – 6,990 feet msl.	Covered	**Known to occur at LPSRA.** The Biological Survey Area supports habitat to support this species. This species is known to occur within the LPSRA and all over western Riverside County.
Aspidoscelis hyperythra (=*Cnemido-phorus hyperythrus*)	orange-throated whiptail	SSC	This subspecies is found within semi-arid brushy areas typically with loose soil and rocks, including washes, stream sides, rocky hillsides, and coastal chaparral. Habitat types include low elevational chaparral, non-native grassland, coastal sage scrub, juniper woodland and oak woodland. Associations include	Belding's orange-throated whiptail is uncommon to fairly common over much of its range in Orange, Riverside, and San Diego counties. Also occurs in southwestern San Bernardino County near Colton. They extend from near sea level to 3,412 feet msl (northeast of Aguanga, Riverside County).	Covered	**Known to occur at LPSRA.** The Biological Survey Area contains suitable habitats. This species is known to occur within the LPSRA and throughout western Riverside County.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			alluvial fan scrub and riparian areas.			
Aspidoscelis tigris stejnegeri (=*Cnemido-phorus tigris stejnegeri*)	coastal whiptail (coastal western whiptail)	ND	The coastal western whiptail is found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage such as deserts, chaparral and semiarid. Also found in woodland and riparian areas. The western whiptail can be found in open, often rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations. The ground may be firm soil, sandy, or rocky.	This subspecies is found in coastal Southern California, mostly west of the Peninsular Ranges and south of the Transverse Ranges, and north into Ventura County. Ranges south into Baja California.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable soils and open, rocky areas with little vegetation or sunny microhabitats within shrub or grassland associations to support this species. This species is known to occur within the LPSRA and all over western Riverside County.
Anniella pulchra pulchra	silvery legless lizard	SSC	This species is common in several habitats. It is found primarily in areas with sandy or loose organic soil or where there is plenty of leaf litter. Usually associated with friable soils with some moisture content and some vegetative cover. They are often found under surface objects.	This California endemic ranges throughout California. It generally occurs west of the desert.	X	**Moderate potential to occur.** The Biological Survey Area contains habitat with leaf litter However this species is not known to occur within the LPSRA, but it is known to occur within the immediate region.
Charina trivirgata roseofusca	coastal rosy boa	ND	The coastal rosy boa inhabits arid and semi-arid shrublands, canyons, and other rocky areas. Appears to be common in riparian areas, but does not require permanent water. It is absent from grasslands. It appears to prefer moderate to dense vegetative cover with rocks. They have been found under rocks, in boulder piles, and along rock outcrops and	The coastal rosy boa occurs in southwestern California to the coastal slopes of the San Gabriel and San Bernardino mountains, and across the Peninsular Ranges into the desert in San Diego County. They only occur west of the desert below approximately 3,937 feet msl in elevation.	X	**Known to occur within the LPSRA.** The Biological Survey Area contains suitable rocky scrub and riparian habitats to support this species. This species is known to occur within the LPSRA and throughout western Riverside County.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			vertical canyon walls.			
Crotalus ruber ruber	northern red-diamond rattlesnake	SSC	It is most commonly associated with heavy brush with large rocks or boulders. They need rodent burrows, cracks in rocks or surface cover objects.	The known range of northern red-diamond rattlesnake extends from Morongo Valley in San Bernardino County southward on both coastal and desert sides of the Peninsular Ranges to Baja California, Mexico. Its known elevational range extends from near sea level to about 5,000 feet msl.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable coastal sage scrub and rock habitats to support this species. This species is known to occur within the LPSRA and throughout western Riverside County.
Birds						
Pelacanus erythrorhynchos	American white pelican (nesting colony)	SSC	This species nest sat large freshwater and salt water lakes, usually on small islands or remote dikes. The nest-site must be flat or gently sloping, lacking shrubs or other obstructions that would impede taking flight, free of human disturbance, and usually with loose earth suitable for nest-mounds.	In California, they nest only at large lakes in the Klamath Basin. They are common spring and fall migrants at the Salton Sea, the Colorado River, Morro Bay, and San Diego Bay. Migrant flocks pass overhead almost any month, but mainly in spring and fall throughout the state, especially in southern California.	X	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lake habitat to support this species during the migration season. This species is known to occur within the LPSRA, but do not nest.
Phalacrocorax auritus	double-crested cormorant (rookery site)	WL	They require lakes, rivers, reservoirs, estuaries, or ocean for foraging. They require undisturbed nest-sites beside the water, on islands or the mainland. Double-crested cormorants nest in tall trees (live or dead), wide rock ledges on cliffs, or rugged slopes near (or in) the aquatic environments. The suitable nest-site must be within 5 -10 miles of a dependable food supply.	A yearlong resident along the entire coast of California and on inland lakes. During August to May, it is fairly common to locally very common along the coast and in estuaries and salt ponds. Rookeries are extremely scarce away from the Salton Sea, the Colorado River, and the Channel Islands.	Covered (a)	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lake habitat to support this species. This species is known to occur within the LPSRA. They are not known to breed at the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Plegadis chihi	white-faced ibis (rookery site)	WL	Migrant and wintering white-faced ibis may be found foraging in shallow lacustrine waters, muddy ground of wet meadows, marshes, ponds, lakes, rivers, flooded fields, and estuaries.	The white-faced ibis is an uncommon summer resident in sections of southern California. This species no longer breeds regularly anywhere in California except at a few local spots in Riverside County, the Salton Sea, the Central Valley and northeastern California.	Covered (a)	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging lakeshore mudflat habitat to support this species. This species is known to occur within the LPSRA.
Pandion haliaetus	osprey (nesting)	WL	Strictly restricted to ocean shores, bays, freshwater lakes, rivers, large streams, reservoirs, and large waters supporting fish with surrounding or nearby forest habitats.	A common winter species in southern California. Within California, breeding populations reside in the Cascade and Sierra Mountain ranges and along the coast south to Marin County. An uncommon breeder along southern Colorado River. Wintering habitat is found along the California coast south of San Francisco.	Covered (a)	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable lake habitat. As a transient species and potential nesting bird, the osprey has been recorded at LPSRA.
Elanus leucurus	white-tailed kite (nesting)	Fully Protected	The white-tailed kite inhabits low elevation, open grasslands, savannah-like habitats, agricultural areas, wetlands, oak woodlands and riparian areas adjacent to open areas. Open grasslands, meadows, or marshes are used for foraging close to isolated, dense-topped trees for nesting and perching. Substantial groves of dense, broad-leafed deciduous trees are used for cover, nesting and roosting.	In California, the white-tailed kite is a common to uncommon, year-long resident in coastal and valley lowlands. It is found in virtually all lowlands of California west of the Sierra Nevada range and the southeast deserts. It is common in the Central Valley and along the entire California coast.	Covered (a)	**Known to occur at LPSRA.** The Biological Survey Area contains suitable foraging grassland habitat and suitable nesting riparian habitat to support this species. This species is known to occur within the LPSRA as a year long resident.
Circus cyaneus	northern harrier	SSC	Frequents open fresh and saltwater wetlands, grasslands, pastures, upland prairies, dry	In California, it occurs from annual grassland up to lodgepole pine and alpine meadow habitats, as high as	Covered (breeding)	**Present.** Observed during the field surveys by Psomas.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
	(nesting)		uplands, croplands, shrub-steppe, meadows, desert sinks. It uses tall grasses and forbs in wetlands, for cover and it roosts on ground. It is mostly found in flat, open areas of tall, dense grasses, moist or dry shrubs, in the vicinity of marshes, rivers, ponds, or grassy valleys for nesting, cover, and feeding.	10,000 feet msl. It breeds from sea level to 5,700 feet msl in the Central Valley and Sierra Nevada.		The Biological Survey Area contains suitable foraging and nesting grassland habitat to support this species. This species is known to occur within the LPSRA
Accipiter striatus	sharp-shinned hawk (nesting)	WL	Habitats include riparian deciduous, ponderosa pine, black oak, mixed conifer, and Jeffrey pine. The species uses dense near open areas. It roosts in intermediate to high-canopy forest. For nesting they occur in dense tree stands which are cool, moist, well shaded and usually near water. For hunting habitat, they often use openings at the edges of woodlands.	It is a fairly common migrant and winter resident throughout California, except in areas with deep snow.	Covered	**Known to occur at LPSRA.** The Biological Survey Area contains suitable breeding and foraging riparian habitat. This species is known to occur within the LPSRA. It is a common migrant and wintering species within western Riverside County.
Accipiter cooperii	Cooper's hawk (nesting)	WL	The Cooper's hawk breeds primarily in riparian areas and oak woodlands. It frequents landscapes where wooded areas occur in patches and groves. Dense stands with moderate crown-depths are usually used for nesting. They hunt in broken woodland and habitat edges. Within the range in California, it most frequently uses dense stands of live oak, riparian deciduous or other forest habitats near water. They are also found and can breed in suburban and urban settings.	A breeding resident throughout most of the wooded portion of the state. In southern California, the species is present year-round.	Covered (a)	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable breeding and foraging riparian habitat to support this species. This species is known to occur within the LPSRA.
Buteo regalis	ferruginous hawk	WL	Within southern California, ferruginous hawks typically winter	In the winter, ferruginous hawks can be found throughout California,	Covered	**Known to occur seasonally at LPSRA.**

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
	(wintering)		in open fields, grasslands, and agricultural areas. It roosts in open areas, usually in a lone tree or utility pole.	with the exception of the extreme northeastern and northwestern regions. However, they are most common in the southern region of the state. It is migratory; it generally arrives in California in September and departs by mid-April. There are no breeding records from California.		The Biological Survey Area contains suitable foraging and roosting habitat to support this species. It does not breed in southern California.
Aquila chrysaetos	golden eagle (nesting and wintering)	Fully Protected	Golden eagles occur locally in open country, especially in rolling foothills and mountainous regions. Within southern California, the species favors grasslands, brushlands, deserts, oak savannas, open coniferous forests, and montane valleys. Nesting is primarily restricted to rugged, mountainous country.	Within California the distribution, abundance, and seasonality of the golden eagle is described as: uncommon permanent resident and migrant throughout California, except center of Central Valley. It ranges from sea level up to 11,500 feet msl.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable foraging open country grassland habitat to support this species. This species is known to occur within the LPSRA, but it is not known to breed there.
Charadrius montanus	mountain plover (wintering)	SSC	Within southern California, the largest numbers of birds occur in short grasslands and agricultural areas in the interior, such as freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. The birds spend about 75 percent of their time on plowed fields, but prefer heavily grazed annual grasslands or burned fields. They prefer short vegetation, bare ground, flat topography, and areas with burrowing rodents.	It does not nest in California. It occurs within the state only during the wintering season. Currently, mountain plovers winter in flocks in the Sacramento and San Joaquin Valleys, in central and south-coastal California, east locally to the southwestern deserts and south to central Mexico.	Covered	**Known to occur seasonally within the LPSRA.** The Biological Survey Area contains suitable foraging short grass habitats and flat topography to support this species.
Athene cunicularia	burrowing owl (burrow sites	SSC	They require large open expanses of sparsely vegetated areas on gently rolling or level terrain with an	It is a year-long resident formerly common throughout the state. In California, burrowing owls are	Covered (c)	**Known to occur at LPSRA.** The Biological Survey Area contains

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
	and some wintering sites)		abundance of active small mammal burrows, most notably the California ground squirrel. As a critical habitat feature need, they require the use of rodent or other burrows for roosting and nesting cover. They may also use pipes, culverts, and nest boxes where burrows are scarce.	restricted to the central valley to San Diego.		suitable habitat and level terrain.
Asio otus	long-eared owl (nesting)	SSC	Breeding habitat generally consists of groves of oaks or riparian woodlands with a closed canopy. Hunting habitat consists of oak and sycamore woodlands. Appears to be more associated with forest edge habitat than open or forest habitat. During breeding, the species uses the hardwood deciduous forests and during the winter season.	Uncommon yearlong resident throughout the state except the Central Valley and southern California deserts where it is an uncommon winter visitor. It apparently makes only local movements in California, although some migration may occur. These may be seasonal movement westward from the Sierra Nevada foothills in fall.	X	**Known to occur seasonally at LPSRA.** The Biological Survey Area contains suitable habitats to support this species. The species has not been reported recently to occur in western Riverside County.
Lanius ludovicianus	loggerhead shrike (nesting)	SSC	The loggerhead shrike prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting. It is known to forage over open ground within areas of short vegetation. Individuals like to perch on posts, utility lines and often use the edges of denser habitats.	A common resident and winter visitor in lowlands and foothills throughout California.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains habitat to support this species. It occurs as a yearlong resident, in western Riverside County.
Eremophila alpestris actia	California horned lark	WL	A year-long resident within the state and within a variety of open habitats. Within southern California, California horned larks breed primarily in open fields, (short) grasslands, and rangelands. Grasses, shrubs, forbs, rocks, litter, clods of soil, and other surface irregularities provide	The species breeds and resides in the coastal region of California from Sonoma County southeast to the Mexican border.	Covered	**Known to occur at LPSRA.** The Biological Survey Area supports suitable habitat with sparse vegetation. This species is known to occur within the LPSRA. It occurs as a yearlong resident in western

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			cover.			Riverside County.
Progne subis	purple martin (nesting)	SSC	Purple martins inhabit open forests, woodlands, and riparian areas with snags in the breeding season. The birds typically breed in tall sycamores, and other large trees. They are secondary cavity nesters and typically nest in old woodpecker holes usually near a body of water. It forages and nests in riparian areas, forest, and woodlands. Purple martins may be found virtually anywhere in aerial habitat during migration	It is an uncommon to rare, local summer resident in a variety of wooded, low-elevation habitats throughout the state. In the south, it is now only a rare and local breeder on the coast and in interior mountain ranges.	Covered (a)	**Low potential to occur.** The Biological Survey Area contains suitable nesting riparian habitat and foraging grassland habitat to support this species. This species is not known to occur within the LPSRA, but is known to occur in the immediate region.
Campylo-rhynchus brunneicapillus sandiegensis	San Diego cactus wren (coastal cactus wren)	SSC (San Diego and Orange counties)	An obligate, non-migratory resident of the coastal sage scrub plant community. It frequents desert succulent shrub, Joshua tree, and desert wash habitats and other arid terrain with thickets, patches, or tracts of larger, branching cacti, stiff-twigged, thorny shrubs, and small trees. It is closely associated with three species of cacti and occurs almost exclusively in thickets of cholla and prickly pear dominated stands of coastal sage scrub.	The current range of the San Diego cactus wren occurs in cismontane southern California from southern Ventura County, east through coastal Los Angeles County to southwestern San Bernardino County, and south through Orange County, western Riverside County to coastal San Diego County, California and extreme northwestern Baja California, Mexico. Found below 1,500 feet msl in elevation.	Covered	**Known to occur at LPSRA.** The Biological Survey Area does not contain suitable cactus and desert habitat. However this bird is known to exist in the Bernasconi Hills.
Dendroica petechia brewsteri	yellow warbler (nesting)	SSC	Yellow warblers in southern California breed and forage in lowland and foothill riparian woodlands dominated by cottonwoods, sycamores, aspens, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland.	It usually arrives in California in April, and mostly is gone by October. Small numbers regularly overwinter in southern California lowlands. Breeding distribution includes several southern California mountain ranges and throughout most of San Diego County. Winters in Imperial and Colorado River valleys.	Covered (a)	**Known to occur seasonally at LPSRA.** The Biological Survey Area contains suitable nesting and foraging riparian habitat to support this species. This species is known to occur within the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Icteria virens	yellow-breasted chat (nesting)	SSC	In southern California they are found in tall, dense, relatively wide riparian woodlands and thickets of willows with well-developed understories. Nesting areas are associated with streams, swampy ground, and the borders of small ponds. Breeding habitat must be dense to provide shade and concealment.	In southern California, breeds locally on the coast and very locally inland. In migration, may be found in lower elevations of mountains in riparian habitat. It usually arrives in April and departs by late September for the wintering grounds in Mexico and Guatemala.	Covered (a)	**Moderate potential to occur.** The Biological Survey Area contains suitable nesting and foraging riparian habitat. This species is not known to breed within the LPSRA.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	WL	This species uses grass-covered hillsides, coastal sage scrub, and chaparral and often occur near the edges of the denser scrub and chaparral associations. Optimal habitat consists of sparse, low brush or grass, hilly slopes preferably interspersed with boulders and outcrops. The species may occur on steep grassy slopes without shrubs if rock outcrops are present.	The current range and distribution of this subspecies is extremely restricted to a narrow belt of semiarid coastal sage scrub and sparse chaparral from Santa Barbara south to the northwestern corner of Baja California.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable coastal sage scrub and rocky habitat. This species is known to occur within the LPSRA and throughout western Riverside County.
Amphispiza belli belli	Bell's sage sparrow (nesting)	WL	Bell's sage sparrow is a breeder in dry chaparral and coastal sage scrub along the coastal lowlands, inland valleys, and in the lower foothills of local mountains. In transmontane California, it occupies sagebrush, alkali desert scrub, desert scrub, and similar habitats. In cismontane California, it frequents chaparral dominated by chamise, and coastal scrub dominated by sage.	In summer, it is uncommon to common east of the Cascade Range and Sierra Nevada, in foothills bounding the Central Valley, and in the Transverse, Peninsular, and coastal ranges from Trinity County south to the Mexican border. It occurs only locally at montane elevations, mostly in southern California.	Covered	**Known to occur at LPSRA.** The Biological Survey Area contains suitable coastal sage scrub habitat. This species is known to occur throughout western Riverside County.
Agelaius tricolor	tricolored blackbird (nesting	SSC	The tricolored blackbird breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets	Mostly a resident in California. It is common locally throughout the Central Valley and in coastal districts from Sonoma County	Covered (colony)(a)	**Known to occur at LPSRA.** The Biological Survey Area contains suitable nesting marsh

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
	colony)		of willow, blackberry, wild rose, tall herbs and forages in grassland and cropland habitats. Colonies require nearby water, a suitable nesting substrate, and open-range foraging habitat of natural grassland, woodland, or agricultural cropland.	south. It breeds locally west of the Cascade Range, Sierra Nevada, south to extreme southwest San Bernardino County, western Riverside County and western and southern San Diego County.		habitat and suitable foraging grassland habitat. This species is known to breed within the LPSRA. This species is a year long resident in western Riverside County.
Mammals						
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	SSC	It inhabits coastal sage scrub, sage scrub/grassland ecotones, and chaparral communities. It generally exhibits a strong microhabitat affinity for moderately gravelly and rocky substrates. In western Riverside County, the San Diego pocket mouse also commonly is found in disturbed grassland and open sage scrub vegetation with sandy-loam to loam soils.	The northwestern San Diego pocket mouse occurs mainly in arid coastal and desert border areas in western San Diego County, in Riverside County southwest of Palm Springs, in San Bernardino County. Elevational range from sea level to 6,000 feet.	Covered	**Present.** Captured during the Los Angeles pocket mouse trapping surveys and the focused Stephens's kangaroo rat surveys. The Biological Survey Area contains suitable grassland and coastal sage scrub habitat. This species is known to occur within the LPSRA.
Perognathus longimembris brevinasus	Los Angeles pocket mouse	SSC	This species probably inhabits open ground of fine, sandy soils and may utilize these soil types for burrowing. It may be restricted to lower elevation grassland and coastal sage scrub. It probably prefers sparsely vegetated habitats.	The geographic range of Los Angeles Pocket mice is restricted to lower elevation grasslands and coastal sage associations in the Los Angeles Basin, from approximately Burbank and San Fernando (Los Angles County) on the northwest to San Bernardino (San Bernardino County) on the northeast, and Cabazon, Hemet, and Aguanga (Riverside County) on the east and southeast.	Covered (c)	**Present.** Captured during the focused Stephens's kangaroo rat surveys. This species was not captured during the focused LAPM surveys. The Biological Survey Area contains suitable grassland and coastal sage scrub habitat outside of the proposed project area. This species is known to occur within the LPSRA.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Neotoma bryanti intermedia	Bryant's woodrat	SSC	Bryant's woodrat is found in a variety of shrub habitats primarily associated with rock outcroppings, boulders, sage scrub, cactus, or other areas of dense undergrowth. Bryant's woodrats commonly inhabit Joshua tree woodlands, pinyon-juniper woodlands, mixed chaparral, coastal sage scrub, and coastal desert habitats seaward of the coastal mountain ranges. Bryant's woodrat is often associated with coastal sage scrub communities, rocky outcroppings and boulder-covered hillsides in chaparral or oak woodlands, and if present large cactus patches, like the prickly pear cactus.	The subspecies of Bryant's woodrat occurs from Alameda County east of the San Francisco Bay in Central California south along both inner and outer Coast Ranges, the western foothill of southern Sierra Nevada, Transverse, and Peninsular Ranges, as well as coastal southern California into northwester Baja California, at least as far as El Rosario.	Covered	**Present.** Captured during the focused Stephens's kangaroo rat surveys. The Biological Survey Area contains suitable coastal sage scrub habitat and rock outcrops. This species is known to occur within the LPSRA and throughout western Riverside County.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	SSC	The black-tailed jackrabbit is a habitat generalist occurring in open areas or semi-open country, typically in grasslands, agricultural fields or sparse coastal scrub. Jackrabbits typically are not found in high grass or dense brush.	San Diego black-tailed jackrabbit occurs only on the coastal side of the southern California mountains. This subspecies has been recorded from northern Baja California through San Diego, Orange, Los Angeles, Riverside, San Bernardino and Ventura Counties.	Covered	**Present.** Observed during the field surveys by Psomas. The Biological Survey Area contains suitable sparse habitat. This species is known to occur within the LPSRA and throughout western Riverside County.
Macrotus californicus	California leaf-nosed bat	SSC	In California, they occupy the low-lying desert areas of southern California. Habitats occupied include desert riparian, desert wash, desert scrub, desert succulent shrub, alkali desert scrub, and palm oasis. Needs rocky, rugged terrain with mines or caves for roosting. Day roosts usually are in deep mine tunnels or caves, occasionally in buildings or	The California leaf-nosed bat is found from Riverside, Imperial, San Diego, and San Bernardino counties south to the Mexican border. Former populations have disappeared from coastal basins, from Los Angeles to San Diego. Desert populations have declined, but this species is only common along the Colorado River. California records are below 2,000	X	**No potential to occur.** The Biological Survey Area does not contain suitable desert habitats to support this species. This species is not known to occur within the LPSRA or within the immediate region.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			bridges. The roost must provide shelter from heat and aridity. Night roosts may be in buildings, mines, bridges, rock shelters, or other sites with overhead protection. These bats often are found in large groups.	feet.		
Eumops perotis californicus	western mastiff bat	SSC	Western mastiff bats are found in a variety of habitats, such as semi-arid to arid habitats but is geomorphically restricted, occurring primarily where there are significant rock features offering suitable roosting habitat. A cliff dwelling species, found under exfoliating rock slabs and rock crevices along cliffs. Western mastiff bats can also be found in similar crevices in large boulders and buildings. When roosting in rock crevices they require a sizable drop from their roost in order to achieve flight. Western mastiff bats prefer deep crevices that are at least 15 or 20 feet above the ground.	In California, they have been recorded from Butte County southward through the southern California coastal basins and the western portions of the southeastern desert region.	X	**Low potential to occur.** The Biological Survey Area contains suitable foraging habitats, but it does not contain suitable roosting rock habitats. This species is not known to occur within the LPSRA, but it is known from the immediate region.
Nyctinomops femorosaccus	pocketed free-tailed bat	SSC	Habitats used include pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. Pocketed Free-tailed bats are characteristically associated with rocky, desert areas with relatively high cliffs. They generally use crevices in rocks and caves as day-roosts, although they sometimes are found in man-made structures.	The pocketed free-tailed bat is found in Riverside, San Diego, and Imperial counties. This species is rare in California, but is more common in Mexico. May occur in Orange County.	X	**Low potential to occur.** The Biological Survey Area does not contain suitable foraging or roosting desert habitats to support this species. This species is not known to occur within the LPSRA, but it has been observed within the immediate region.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
Lasiurus blossevillii	western red bat	SSC	Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging. Any mix of grassland, shrubs, forests, riparian areas and cropland are suitable. This bat is primarily solitary. It roosts in the foliage of trees. The space beneath the roost must be free of obstacles to allow the bats to drop into flight.	The red bat is locally common in some areas of California, from Shasta County to the Mexican border, west of the Sierra Nevada/Cascade crest and deserts. The winter range includes western lowlands and coastal regions south of San Francisco Bay. There is migration between summer and winter ranges.	X	**Low potential to occur.** The Biological Survey Area does contain suitable foraging and roosting riparian habitat. However, this species is not known to occur within the LPSRA.
Lasiurus xanthinus	western yellow bat	ND	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. This species occurs year-round in California. Roosts in trees. Has been captured roosting under palm trees. Roosts and feeds in, and near, palm oases and riparian habitats. Forages over water and among trees.	The southwestern yellow bat is uncommon in California, known only in Los Angeles and San Bernardino counties south to the Mexican border. This species has been recorded below 2,000 feet msl.	X	**Low potential to occur.** The Biological Survey Area does contain suitable habitat. However, this species is not known to occur within the LPSRA, but it is known from the immediate region.
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Townsend's big-eared bats live in a variety of communities, including coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Edge is preferred for foraging. Requires caves, mines, tunnels, buildings, or other human-made structures for roosting. May use separate sites for night and day. Maternity roosts are warm. Habitat for Townsend's big-eared bats must include appropriate roosting, maternity, and hibernacula sites free from disturbances by humans.	Townsend's big-eared bat is found throughout California, but the details of its distribution are not well known. This species may be found at any season throughout its range.	X	**Low potential to occur.** The Biological Survey Area does contain suitable foraging habitat, but not suitable roosting habitat. This species is not known to occur within the LPSRA.
Euderma maculatum	spotted bat	SSC	Little is known about the habitat requirements of this solitary	The spotted bat is mostly found in foothills, mountains and desert	X	**Low potential to occur.** The Biological

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			species. It appears to occupy a variety of habitats from dry deserts and grasslands through mixed conifer forests. They forage in a wide variety of habitats and feed over water and along washes, fields, marshes, and openings in coniferous forests. They roost mostly in rock crevices, and occasionally in caves and buildings. Cliffs provide optimal roosting habitat.	regions of southern California. Elevational range extends from below sea level in California to above 10,000 feet msl in New Mexico.		Survey Area contains suitable foraging and roosting habitats. However this species is not known to occur within the LPSRA or within the immediate region of the LPSRA.
Antrozous pallidus	pallid bat	SSC	Uses a wide variety of habitats including deserts, grasslands, shrublands, woodlands, and forests form sea level up through mixed conifer forests. They are most common in deserts, preferring areas of open, dry habitats, with rocky areas for roosting and water nearby. Night roosts may be in more open sites, such as porches and open buildings	The pallid bat is a locally common species of low elevations in California. It occurs throughout California except for the high Sierra Nevada. Local data suggest that this species may be most common at elevations below 6,000 feet msl on both coastal and desert sides.	X	**Low potential to occur.** The Biological Survey Area contains suitable foraging and roosting habitats to support this species; however this species is not known to occur within the LPSRA or within the immediate region of the LPSRA.
Puma concolor	mountain lion	Fully Protected	Mountain lions use many habitats, including desert scrub, chaparral, swamps, and forests. They avoid agricultural areas, flat shrubless desert, and other habitats that lack topographic or vegetative cover. It feeds primarily on mule deer and tends to be found where deer can be obtained. Mountain lions use rocky areas, cliffs, and ledges that provide cover within open woodlands and chaparral, as well as riparian areas that provide protective habitat connections for movement between fragmented	Mountain lions are a widespread, uncommon permanent resident, ranging from sea level to alpine meadows. They are found in nearly all habitats in California that support mule deer populations, except xeric regions of the Mojave and Colorado deserts that do not support mule deer populations and they are excluded from croplands in the Central Valley.	Covered	**Known to occur at LPSRA.** The Biological Survey Area contains suitable habitats to support this species. The LPSRA supports mule deer populations to support the mountain lion.

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
			core habitat.			
Taxidea taxus	American badger	SSC	Badgers occur from alpine meadows to elevations as low as Death Valley. In California, badgers occupy a diversity of habitats. The principal requirements seem to be sufficient food, friable soils, and relatively open, uncultivated ground. Badgers are generally associated with dry, open, treeless regions, prairies, parklands, and cold desert areas. They seem to occur primarily in areas of low to moderate slope.	In California, badgers ranged throughout the state except for the humid coastal forests of northwestern California. No current data exist on the status of badger populations in California. The badger's altitudinal range extends from below sea level in Death Valley to over 12,000 feet msl.	X	**Known to occur at LPSRA.** The Biological Survey Area contains suitable open grassland habitats and ground squirrel populations to support this species.

Legend

Federal Status

FE = federally endangered: any species, subspecies, or variety of plant or animal that is in danger of extinction throughout all or a significant portion of their range. Species become officially listed as endangered and receive explicit protection under the Federal Endangered Species Act (ESA) upon publication of final rule for listing in the Federal Register.

FT = federally threatened: any species, subspecies, or variety of plant or animal that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future. Once listed in the Federal Register, threatened species receive discretionary protection under the Endangered Species Act.

California State Status

SE = California state endangered: any species, subspecies, or variety of plant or animal that 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, overexploitation, predation, competition, or disease.

ST = California state threatened: any species, subspecies, or variety of plant or animal that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

SSC = species of special concern status applies to animals not listed under the federal Endangered Species Act or the California Endangered Species Act, but which nonetheless 1) are declining at a rate that could result in listing, or 2) historically occurred in low numbers and known threats to their persistence currently exist. The CDFG 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 decline 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.

fully protected: animal species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Fish and Game Code.

WL = CDFG watch list. This list includes taxa that are not on the current special concern list that (1) formerly were on the prioritized 1978 or unprioritized 1992 special

Scientific Name	Common Name	Status	General Habitat Description	General Distribution	Western Riverside County MSHCP	Potential For Occurrence
concern lists and are not currently listed as state threatened and endangered, (2) have been removed (delisted) from either the state or federal threatened and endangered lists (and remain on neither), or (3) are currently designated as "fully protected" in California. ***Other*** **ND** = no designation ***Western Riverside County MSHCP*** **Covered:** No further surveys are required. **Covered (a):** Surveys may be required for these species as part of wetlands mapping (Section 6.1.2 of MSHCP). **Covered (c):** Surveys may be required for this species within locations shown on survey maps (Section 6.3.2 of MSHCP) **X** Not covered by the MSHCP, but identified by the CNDDB and other literature.						

Sources for Table 4-15:

- California Natural Diversity Database (CDFG 2008a, 2007a).
- Special Animals List (CDFG 2008c).
- State and Federally Listed Endangered and Threatened Animals of California (CDFG 2008d).
- Species Accounts from CDFG website (CDFG 2008b, 2007b).
- *A Field Guide to Western Reptiles and Amphibians*, 3rd ed. (Stebbins 2003).
- California Reptiles and Amphibians (CaliforniaHerps.com website 2008, 2007).
- *Field Guide to the Birds of North America*, 4th Ed. (National Geographic Society 2002).
- *Reference Atlas to the Birds of North America* (National Geographic Society 2003).
- *Complete Birds of North America* (National Geographic Society 2006).
- *Lives of North American Birds* (Kaufman 1996).
- *The Sibley Field Guide to Birds of Western North America* (Sibley 2003).
- *Hawks of North America* (Clark, W. and B. Wheeler 2001).
- *Mammals of California* (Eder 2005).
- *Mammals of North America* (Kays et. al. 2002).
- *The Smithsonian Book of North American Mammals* (Wilson, D. and S. Ruff 1999).
- *California Mammals* (Jameson, E., and H Peeters 1988).
- *Life on the Edge: A Guide to California's Endangered Natural Resources. Wildlife* (Thelander 1994).
- Understanding the Plants and Animals of Western Riverside County MSHCP) (Dudek and Associates 2003).

4.5.2 Wildlife Species Observed During the Field Surveys

The wildlife species observed and detected during the field surveys are common in the surrounding areas. A complete list of wildlife species observed by Psomas within the Biological Survey Area during the field surveys is provided in Table 4-16, *Wildlife Species Observed during the Field Surveys*.

Table 4-16
Wildlife Species Observed During the Field Surveys

Scientific Name	Common Name
Amphibians	
Bufo boreas (Anaxyrus boreas)	western toad
Pseudacris regilla	Pacific treefrog
Reptiles	
Trachemys scripta elegans	red-eared slider
Sceloporus orcutti	granite spiny lizard
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard
Aspidoscelis tigris stejnegeri	coastal whiptail (coastal western whiptail)
Masticophis flagellum piceus	red racer (red coachwhip)
Masticophis lateralis	striped racer (California whipsnake)
Lampropeltis getula	common kingsnake
Crotalus ruber ruber	northern red-diamond rattlesnake *
Crotalus oreganus	western rattlesnake
Birds	
Anas americana	American wigeon
Anas platyrhynchos	mallard
Oxyura jamaicensis	ruddy duck
Phasianus colchicus	ring-necked pheasant
Callipepla californica	California quail
Podilymbus podiceps	pied-billed grebe
Aechmophorus occidentalis	western grebe
Pelecanus erythrorhynchos	American white pelican *
Phalacrocorax auritus	double-crested cormorant
Ardea herodias	great blue heron
Ardea alba	great egret
Egretta thula	snowy egret
Nycticorax nycticorax	black-crowned night-heron

Scientific Name	Common Name
Plegadis chihi	white-faced ibis
Cathartes aura	turkey vulture
Pandion haliaetus	osprey
Circus cyaneus	northern harrier *
Accipiter cooperii	Cooper's hawk
Buteo lineatus	red-shouldered hawk
Buteo jamaicensis	red-tailed hawk
Falco sparverius	American kestrel
Falco peregrinus anatum	American peregrine falcon (SE, FP)
Fulica americana	American coot
Charadrius vociferus	killdeer
Himantopus mexicanus	black-necked stilt
Recurvirostra americana	American avocet
Limnodromus sp.	dowitcher
Larus occidentalis	western gull
Hydroprogne caspia	Caspian tern
Sterna forsteri	Forster's tern
Columba livia	rock pigeon
Zenaida macroura	mourning dove
Geococcyx californianus	greater roadrunner
Bubo virginianus	great horned owl
Aeronautes saxatalis	white-throated swift
Calypte anna	Anna's hummingbird
Megaceryle alcyon	belted kingfisher
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	downy woodpecker
Colaptes auratus	northern flicker
Sayornis nigricans	black phoebe
Sayornis saya	Say's phoebe
Myiarchus cinerascens	ash-throated flycatcher
Tyrannus vociferans	Cassin's kingbird
Tyrannus verticalis	western kingbird
Lanius ludovicianus	loggerhead shrike *
Vireo bellii pusillus	least Bells' vireo (FE, SE)
Aphelocoma californica	western scrub-jay
Corvus brachyrhynchos	American crow
Corvus corax	common raven
Tachycineta thalassina	violet-green swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Petrochelidon pyrrhonota	cliff swallow
Hirundo rustica	barn swallow

Scientific Name	Common Name
Psaltriparus minimus	bushtit
Salpinctes obsoletus	rock wren
Catherpes mexicanus	canyon wren
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	house wren
Polioptila caerulea	blue-gray gnatcatcher
Chamaea fasciata	wrentit
Mimus polyglottos	northern mockingbird
Toxostoma redivivum	California thrasher
Sturnus vulgaris	European starling
Phainopepla nitens	phainopepla
Dendroica coronata	yellow-rumped warbler
Dendroica occidentalis	hermit warbler
Geothlypis trichas	common yellowthroat
Wilsonia pusilla	Wilson's warbler
Piranga ludoviciana	western tanager
Pipilo maculatus	spotted towhee
Pipilo crissalis	California towhee
Aimophila ruficeps canescens	southern California rufous-crowned sparrow
Melospiza melodia	song sparrow
Zonotrichia leucophrys	white-crowned sparrow
Junco hyemalis	dark-eyed junco
Pheucticus melanocephalus	black-headed grosbeak
Passerina caerulea	blue grosbeak
Agelaius phoeniceus	red-winged blackbird
Sturnella neglecta	western meadowlark
Xanthocephalus xanthocephalus	yellow-headed blackbird *
Molothrus ater	brown-headed cowbird
Icterus bullockii	Bullock's oriole
Carpodacus mexicanus	house finch
Carduelis psaltria	lesser goldfinch
Carduelis lawrencei	Lawrence's goldfinch
Carduelis tristis	American goldfinch
Passer domesticus	house sparrow
Mammals	
Spermophilus beecheyi	California ground squirrel
Dipodomys simulans	San Diego kangaroo rat (Dulzura kangaroo rat)
Dipodomys stephensi	Stephens's kangaroo rat (FE, ST)
Chaetodipus fallax fallax	northwestern San Diego pocket mouse *
Perognathus longimembris brevinasus	Los Angeles pocket mouse *

Scientific Name	Common Name
Thomomys bottae	Botta's pocket gopher
Neotoma bryanti intermedia	Bryant's woodrat *
Peromyscus boylii	brush mouse
Peromyscus maniculatus	deer mouse (North American deermouse)
Lepus californicus bennettii	San Diego black-tailed jackrabbit *
Sylvilagus audubonii	Audubon's cottontail (desert cottontail)
Pipistrellus hesperus	western pipistrelle
Canis latrans	coyote
Mephitis mephitis	striped skunk
Procyon lotor	northern raccoon
Odocoileus hemionus	mule deer (black-tailed deer)
Legend	
FE: federally endangered **FP:** federally protected **SE:** state endangered **ST:** state threatened ***** species of special concern	

4.5.3 Listed Endangered, Threatened and Candidate Wildlife Species

Three wildlife species listed as endangered pursuant to the federal and state Endangered Species Acts, were observed within the Biological Survey Area during the field surveys by Psomas. These species are listed below:

- American peregrine falcon (non-breeding migrant)
- least Bell's vireo (breeding migrant)
- Stephens's kangaroo rat (resident)

No other wildlife species listed as endangered, threatened or candidate pursuant to the federal or state Endangered Species Acts were observed within the Biological Survey Area during the field surveys. While none of these listed endangered, threatened, or candidate wildlife species were observed during the field surveys, potentially suitable habitat is also present for some of the listed endangered, threatened, or candidate wildlife species in Table 4-11.

During the field surveys, many species of wildlife that could potentially utilize the Biological Survey Area may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. There are a number of other listed wildlife species that were not observed during the field surveys, but are known to occur within the LPSRA, and therefore; potentially within the Biological Survey Area. These listed wildlife species could be residents or migrants and are listed below:

- bald eagle (non-breeding migrant)
- southwestern willow flycatcher (breeding migrant)
- coastal California gnatcatcher (breeding resident)

Appendix B, *Lake Perris Wildlife Species Accounts*, has detailed species accounts for those listed wildlife species that were observed within the Biological Survey Area by Psomas during the field surveys. Appendix B also has detailed species accounts for those listed wildlife species that are known to occur within the LPSRA.

4.5.4 Southwestern Willow Flycatcher

Surveys for the southwestern willow flycatcher were conducted following protocol approved by the USFWS. Psomas subconsulting biologist, Mr. John Konecny (10(a) permit number TE837308-4, and a CDFG MOU), conducted the surveys. Five focused southwestern willow flycatcher surveys were conducted between May 31 and July 11 of 2007 and 2008 in two areas in the Biological Survey Area: within the southern willow woodland and scrub along the eastern lakeshore and the southern willow woodland and scrub immediately west and below the dam. Conducting surveys in May and early June allowed the biologist to look for flycatchers when they are most vocal. Conducting surveys in late June and July allowed the biologists verify if flycatchers are nesting. See Appendix C, *2007 and 2008 Results of a Focused Survey for the Southwestern Willow Flycatcher at the Lake Perris State Recreational Area, Riverside County, California*.

4.5.4.1 Results of the 2007 Focused Southwestern Willow Flycatcher Surveys

No southwestern willow flycatchers were detected within the Biological Survey Area or within the LPSRA during the 2007 focused southwestern willow flycatcher surveys or any other surveys conducted in 2007. However, this species has been observed within the LPSRA in the past. The Biological Survey Area contains suitable breeding and foraging riparian woodland habitat to support this species. A minimum of one least Bell's vireo was detected in the east end of the survey area during these surveys. No other federal or state listed endangered or threatened wildlife species were detected during these surveys.

Suitable breeding riparian willow habitat for the flycatcher is present within the Biological Survey Area, and it is encouraging that least Bell's vireos are present. Because of the xeric conditions, it may be that 2007 was not a climatically favorable year for the species. Brown-headed cowbirds (*Molothrus ater*), documented nest parasites of the flycatcher, were detected in the Biological Survey Area as well. With environmentally sensitive management of the willow riparian habitat in the LPSRA, which may need to include brown-headed cowbird trapping; and habitat recovery and enhancement, it is possible that southwester willow flycatchers will someday colonize this area.

4.5.4.2 Results of the 2008 Focused Southwestern Willow Flycatcher Surveys

No southwestern willow flycatchers were detected within the Biological Survey Area or within the LPSRA during the 2008 focused southwestern willow flycatcher surveys or any other surveys conducted in 2008. However, a minimum of four least Bell's vireo territories were detected in the survey area. Three of these territories were located in the eastern section of the survey area, and one was located in the southern willow woodland below the dam. No other federal or state listed endangered or threatened species were detected.

The habitat requirements of the flycatcher are not as well understood as those of the vireo. Suitable willow habitat for the flycatcher is present within the area, and it is encouraging that Bell's vireos are present. Because of the xeric conditions, it may be that 2008 was not a climatically favorable year for the species. Brown-headed cowbirds, documented nest parasites of the flycatcher were detected in the area as well. With environmentally sensitive management of the willow riparian habitat in the LPSRA, which may need to include habitat recovery and enhancement, it is possible that flycatchers will someday colonize this area. It is recommended that brown-headed cowbird trapping be continued.

4.5.4.3 Occurrence within Western Riverside County

According to the MSHCP database, the southwestern willow flycatcher is sparsely located from the Prado Basin southeast to the Vail Lake region. It may also be located within Temescal Creek, Bautista Creek, Diamond Valley Reservoir area, and Vail Lake. Geographic locations include: Lake Perris, Hemet Lake, Lake Elsinore, Santa Rosa Plateau East, Vail Lake, Bautista Creek, Santa Ana River, Temecula Creek, Temescal Wash, Lake Mathews, Lake Skinner, Murrieta Creek, and Prado Park.

4.5.5 Least Bell's Vireo

The 2007 focused least Bell's vireo surveys were conducted following a modification of the federal Least Bell's Vireo Survey Guidelines (USFWS 2001). The modification was recommended by USFWS. In 2007, nine focused least Bell's vireo surveys were conducted between May 31 and July 26, 2007. Surveys were conducted in two areas in the Biological Survey Area: within the southern willow woodland and scrub along the eastern lakeshore and the southern willow woodland and scrub immediately west and below the dam.

The 2008 focused least Bell's vireo surveys were conducted following the federal Least Bell's Vireo Survey Guidelines (USFWS 2001). In 2008 sixteen focused least Bell's vireo surveys were conducted between April 17 and July 18, 2008. Surveys were conducted in two areas in the Biological Survey Area: within the southern willow woodland and scrub along the eastern lakeshore and the southern willow woodland and scrub immediately west and below the dam. The purpose of these surveys was to determine the presence/absence of least Bell's vireos within the Biological Survey Area.

4.5.5.1 Results of the 2007 Focused Least Bell's Vireo Surveys

Least Bell's vireos were detected within the Biological Survey Area a total of six times during the 2007 least Bell's vireo focused surveys. One least Bell's vireo was detected during the focused southwestern willow flycatcher surveys. Singing males were detected; however nests were not located. Although no nests were located and no fledglings were observed or detected, least Bell's vireo is believed to breed in Biological Survey Area due to the repeated observations of singing males during the breeding season. No banded individuals were observed during surveys. Based on the locations of the least Bell's vireo detections, there are a minimum of three least Bell's vireo territories in 2007: two in the southern willow woodland and scrub along the eastern lakeshore and one in the southern willow woodland and scrub immediately west of and below the dam (Figure 9, *2007 and 2008 Least Bell's Vireo Observations*).

4.5.5.2 Results of the 2008 Focused Least Bell's Vireo Surveys

Least Bell's vireos were detected within the Biological Survey Area a total of twelve times during the 2008 least Bell's vireo focused surveys. Singing males were detected; however nests were not located. Although no nests were located and no fledglings were observed or detected, least Bell's vireo is believed to breed in Biological Survey Area due to the repeated observations of singing males during the breeding season. No banded individuals were observed during surveys. Based on the locations of the least Bell's vireo detections, there are a minimum of four LBV territories in 2008: two in the southern willow scrub along the eastern lakeshore and two in the southern willow scrub immediately west of and below the dam (Figure 9).

4.5.5.3 Occurrence within Western Riverside County

According to the MSHCP database, the least Bell's vireo population in the Prado Basin (approximately 25 miles west of the Biological Survey Area) and contiguous (upstream and downstream) reaches of the Santa Ana River is the second largest population of this endangered species. Other observations of the species in the area and environs have occurred along Chino Creek, Temescal Wash, San Timoteo Creek, Alberhill Creek, Tucalota Creek, Murrieta and Temecula Creeks, along Wilson Creek, March Air Force Base, and in the vicinity of De Luz. Additional localities include the Santa Margarita River and Potrero Creek.

The key population areas include the Prado Basin as identified above. Other geographic locations that may serve as localized, yet important, populations of least Bell's vireo include: LPSRA, Alberhill, Lake Elsinore, Lake Mathews, March Air Reserve Base, Murrieta, Murrieta Hot Springs, Reche Canyon, Santa Rosa Plateau East, Vail Lake, Woodcrest, Bautista Creek, Cajalco Creek, Dawson Canyon, Murrieta Creek, Potrero, San Jacinto River, San Timoteo Creek, Santa Ana River, Santa Margarita River, Temecula Creek, Temescal Wash, Tucalota Creek, Wilson Creek, Lake Mathews Reserve, Lake Skinner Reserve, Santa Margarita Ecological Reserve, and Santa Ana River Regional Park.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area
- 2007 Least Bell's Vireo Observation Locations
- 2008 Least Bell's Vireo Observation Locations

N
W E
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0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

2007 and 2008 Least Bell's Vireo Observations

PSOMAS

Figure 9

4.5.6 Coastal California Gnatcatcher

The 2007 coastal California gnatcatcher surveys were conducted pursuant to federal survey guidelines for non-breeding season surveys. The 2008 coastal California gnatcatcher surveys were conducted pursuant to federal survey guidelines for breeding season surveys. A total of nine protocol non-breeding season surveys were conducted at least two weeks apart from July 5 to November 8, 2007. Two additional opportunistic surveys were conducted on July 12 and July 26, 2007. In 2008, a total of six protocol breeding season surveys were conducted at least one week apart from April 17 to May 23, 2008. Surveys were conducted within areas that contained suitable coastal sage scrub habitat in the Biological Survey Area that may be impacted by the proposed project.

4.5.6.1 Results of the 2007 Focused Coastal California Gnatcatcher Surveys

No coastal California gnatcatchers were detected during the 2007 focused coastal California gnatcatcher surveys; however suitable Riversidean coastal sage scrub occurs throughout the Biological Survey Area and the LPSRA to potentially support this species. Coastal California gnatcatchers are also known to exist on the other side of the Bernasconi Hills.

4.5.6.2 Results of the 2008 Focused Coastal California Gnatcatcher Surveys

No coastal California gnatcatchers were detected during the 2008 focused coastal California gnatcatcher surveys; however suitable Riversidean coastal sage scrub occurs throughout the Biological Survey Area and the LPSRA to potentially support this species. Coastal California gnatcatchers are also known to exist on the other side of the Bernasconi Hills.

4.5.6.3 Occurrence within Western Riverside County

According to the MSHCP database, the coastal California gnatcatcher is found throughout western Riverside County in coastal sage scrub habitat. It is known to occur within the Bernasconi Hills located within the LPSRA.

4.5.7 Stephens's Kangaroo Rat

The habitat assessment and live-trapping surveys were performed by Dr. Phil Brylski (permit # TE14855-0), assisted by Mr. Steven Montgomery (permit # TE745541-8) and Psomas Senior Biologist Mr. Gregg Miller (permit # TE834488-5). The Stephens's kangaroo rat surveys were conducted following protocols in federal Stephens's kangaroo rat permit conditions. The purposes of the Stephens's kangaroo rat surveys were to determine the presence or absence of Stephens's kangaroo rat in potential habitat in the proposed project site and in adjacent areas where Stephens's kangaroo rat had been previously observed, and to obtain information on the occurrence of other small mammal species. Trapping was conducted during suitable weather conditions from June 15 to June 20, 2008. The complete reporting of 2008 Stephens's kangaroo rat surveys is included in Appendix D, *2008 Stephens's Kangaroo Rat Survey for the Lake Perris Dam Remediation Project.*

4.5.7.1 Results of the 2008 Focused Stephens's Kangaroo Rat Surveys

Eight species of small mammal were captured during the focused Stephens's kangaroo rat surveys. Of the eight species captured, one species is listed and three species are sensitive. These species include:

Listed Species

- Stephens's kangaroo rat

Sensitive Species

- northwestern San Diego pocket mouse
- Los Angeles pocket mouse
- Bryant's woodrat (*Neotoma bryanti intermedia*, formerly San Diego desert woodrat [*Neotoma lepida imtermedia*], see Patton, Huckaby, and Alvarez-Castaneda, 2008)

No Status Species

- deer mouse (*Peromyscus maniculatis*)
- Dulzura kangaroo rat (*Dipodomys simulans*)
- California ground squirrel (*Spermophilus beecheyi*)
- Audubon's cottontail (*Sylvilagus audubonii*)

The survey trapping results are shown in Table 4-17, *Small Mammal Capture Summary*.

Table 4-17
Small Mammal Capture Summary

Trap-line	SKR	DKR	LAPM	CHFA	PEMA	NEBI	SPBE	SYAU
1	0	0	10	16	1	0	0	2
2	0	0	10	12	2	0	0	0
3	0	0	18	2	5	0	0	0
4	0	4	21	12	2	0	0	0
5	0	0	24	3	8	1	0	0
6	0	4	10	8	1	0	0	0
7	2	0	0	2	0	0	0	0
8	3	0	0	0	0	0	0	0
9	1	0	0	0	0	0	0	0
10	0	0	1	3	1	0	0	0
11	0	0	0	1	4	0	1	0
Totals	**6**	**8**	**94**	**59**	**24**	**1**	**1**	**2**

Legend	
SKR	Stephens's kangaroo rat (*Dipodomys stephensi*)
DKR	Dulzura kangaroo rat (*Dipodomys simulans*)
LAPM	Los Angeles pocket mouse (*Perognathus longimembris brevinasus*)
CHFA	northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)
PEMA	deer mouse (*Peromyscus maniculatis*)
NEBI	Bryant's woodrat (*Neotoma bryanti intermedia*)
SPBE	California ground squirrel (*Spermophilus beecheyi*)
SYAU	Audubon cottontail (*Sylvilagus audubonii*)

Stephens's kangaroo rat were captured a total of six times during the focused trapping surveys. Although captured individuals were not marked, all Stephens's kangaroo rat captures occurred during the first night of the trapping period and thus represent six individuals. Stephens's kangaroo rat was captured at Trapline 7, Trapline 8, and Trapline 9 on the first night of trapping these locations, and the traps at these locations were closed after the captures on the first day. Stephens's kangaroo rat capture information is shown in Table 4-18, *Stephen's Kangaroo Rat Capture Information*.

Table 4-18
Stephens's Kangaroo Rat Capture Information

Capture Number	Date	Trapline	Age	Sex
SKR 1	June 16	T7	adult	male
SKR 2	June 16	T7	adult	male
SKR 3	June 16	T8	adult	female
SKR 4	June 16	T8	adult	female
SKR 5	June 16	T8	adult	male
SKR 6	June 16	T9	adult	male

These sites where Stephens's kangaroo rat were captured are outside of the direct impact zone of the proposed project, and were trapped in part to determine whether Stephens's kangaroo rat were still present on or around the grid locations where they had been previously found. The capture locations are shown on Figure 10, *Stephens's Kangaroo Rat Captures*. The three areas where Stephens's kangaroo rat were captured: Trapline 7, Trapline 8, and Trapline 9, are areas of sparse non-native grassland where the dominant plant species is filaree (*Erodium* sp.), parts of which have exposed soil. One of these sites (Trapline 9) was located on the grid of a previous trapping effort that yielded Stephens's kangaroo rat captures, in the northeastern part of the study area (RCA 2007a). The other two (Trapline 7 and Trapline 8) are located in the western part of the study area in the vicinity of another grid where the previous survey yielded Stephens's kangaroo rat captures.

Los Angeles pocket mouse were captured a total of 94 times, and the capture locations are shown on Figure 11, *Sensitive Mammal Captures*. Los Angeles pocket mouse was captured both inside and outside the proposed project boundaries. Los Angeles pocket mouse is designated by CDFG as a species of special concern

The northwestern San Diego pocket mouse was captured a total of 59 times are shown on Figure 11. This species is designated by CDFG as a species of special concern.

Bryant's woodrat was captured only one time during the trapping nights is shown on Figure 11. This species is designated by CDFG as a species of special concern.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

2008 Stephens's Kangaroo Rat Captures

N
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0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Stephens's Kangaroo Rat Captures

PSOMAS

Figure 10

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Northwestern San Diego Pocket Mouse
- Bryant's Woodrat
- Los Angeles Pocket Mouse

N
W E
S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Sensitive Mammal Captures

PSOMAS

Figure 11

4.5.7.2 Occurrence within Western Riverside County

The Stephens's kangaroo rat occurs in patchy distributions in western Riverside County, ranging from the Corona/Norco Hills just west of Highway 91, to the Badlands in the north. According to the MSHCP database, the largest and key populations of the Stephens's kangaroo rats are known and are centered within the larger core reserves in western Riverside County: San Jacinto Wildlife Area-Lake Perris Reserve, Lake Skinner-Domenigoni Valley Reserve, Lake Mathews-Estelle Mountain Reserve, Motte-Rimrock Reserve, Sycamore Canyon-March Air Reserve Base Reserve, Steele Peak, Kabian Park, Anza/Cahuilla valleys, Potrero/Badlands area, and patches scattered throughout Wilson Creek, Sage, and Aguanga areas.

In 1996, the estimated acreage of occupied habitat in Riverside County was approximately 34,450 acres. Main populations occur in the larger core reserves for the kangaroo rat; Lake Mathews-Estelle Mountain core reserve (approximately 4,264 occupied acres), Lake Skinner-Domenigoni Valley core reserve (approximately 1,988 occupied acres), and San Jacinto-Lake Perris core reserve (approximately 3,640 occupied acres). Smaller populations occur in the other core reserves; Sycamore Canyon-March Air Reserve Base core reserve (approximately 1,300 occupied acres), Steele Peak core reserve (approximately 860 occupied acres), and Motte-Rimrock core reserve (approximately 335 occupied acres). Approximately 12,400 acres of occupied Stephens's kangaroo rat habitat are contained in these six core reserves. Other areas supporting substantial occupied habitat include the Anza/Cahuilla valleys (1,000+ acres) and Potrero (approximately 1,332 acres). It is estimated that another 3,400 acres of occupied habitat occur in the western County outside of the Stephens's kangaroo rat HCP area.

4.5.8 Sensitive and Locally Important Wildlife Species

Sixteen sensitive wildlife species were observed within the Biological Survey Area during the field surveys by Psomas. These sensitive and locally important wildlife species could be residents or migrants and are listed below:

- coastal whiptail (coastal western whiptail) (resident)
- northern red-diamond rattlesnake (resident)
- American white pelican (non-breeding migrant)
- double-crested cormorant (non-breeding resident)
- white-faced ibis (non-breeding migrant)
- osprey (potential breeding resident)
- northern harrier (breeding resident)
- Cooper's hawk (breeding resident)
- golden eagle (non-breeding resident)
- loggerhead shrike (breeding resident)
- southern California rufous-crowned sparrow (breeding resident)
- yellow-headed blackbird (breeding migrant)
- northwestern San Diego pocket mouse (resident)
- Los Angeles pocket mouse (resident) (resident)
- Bryant's woodrat (resident)

- San Diego black-tailed jackrabbit (resident)

During the field surveys, many species of wildlife that could potentially utilize the Biological Survey Area may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. There are a number of other sensitive wildlife species that were not observed during the field surveys, but are known to occur within the LPSRA. These species have been observed within the LPSRA by other biologists in the region and by LPSRA staff. These sensitive and locally important wildlife species could be residents or migrants and are listed below:

- coast (San Diego) horned lizard (resident)
- orange-throated whiptail (resident)
- coastal rosy boa (resident)
- white-tailed kite (breeding resident)
- sharp-shinned hawk (breeding resident)
- ferruginous hawk (non-breeding migrant)
- mountain plover (non-breeding migrant)
- burrowing owl (breeding resident)
- long-eared owl (non-breeding migrant)
- California horned lark (breeding resident)
- San Diego cactus wren (coastal cactus wren) (breeding resident)
- yellow warbler (breeding migrant)
- Bell's sage sparrow (breeding resident)
- tricolored blackbird (non-breeding resident)
- mountain lion (resident)
- American badger (resident)

Appendix B has detailed species accounts for those sensitive and locally important wildlife species that were observed within the Biological Survey Area by Psomas during the field surveys. Appendix B also has detailed species accounts for those sensitive and locally important wildlife species that are known to occur within the LPSRA.

As a result of the wildlife field surveys and literature review, it was concluded that three sensitive wildlife species have a moderate potential to occur within Biological Survey Area, either as residents or migrants (Table 4-11). These sensitive wildlife species are listed below:

- San Diego banded gecko (resident)
- purple martin (breeding migrant)
- yellow-breasted chat (breeding migrant)

4.5.9 Los Angeles Pocket Mouse

The purpose of the focused field surveys was to determine whether the Los Angeles pocket mouse occurs or could potentially occur on the proposed project site. Trapping surveys were conducted following standard protocols for small mammals. The protocol calls for five

consecutive nights of trapping conducted when the animals are active aboveground at night and preferably during a new moon phase. Five consecutive nights of trapping were conducted between September 25 and September 29, 2007. Psomas subconsulting biologist, Ms. Karen Kirtland, conducted the surveys, with assistance from Psomas biologists (Dr. Brad Blood and Ms. Alicia Williams). See Appendix E, *2007 Presence/Absence Trapping Studies, Sensitive Small Mammal Species, Lake Perris Improvement Project, Perris, California*.

4.5.9.1 Results of the 2007 Focused Los Angeles Pocket Mouse Surveys

No Los Angles pocket mouse or other listed mammals were captured or observed during trapping surveys. The San Diego kangaroo rat (Dulzura kangaroo rat), brush mouse (*Peromyscus boylii*), deer mouse and the northwestern San Diego pocket mouse were the only mammal species captured during the surveys (Table 4-19, *2007 Focused Los Angeles Pocket Mouse Survey Trapping Results*). One California towhee (*Pipilo crissalis*) was captured during the trapping and one San Diego black-tailed jackrabbit was observed visually during the surveys. The northwestern San Diego pocket mouse and the San Diego black-tailed jackrabbit are a species of special concern.

Table 4-19
2007 Focused Los Angeles Pocket Mouse Survey Trapping Results

Number of Trap Nights	Deer Mouse *(Peromyscus maniculatus)*	Brush Mouse *(Peromyscus boylii)*	San Diego Kangaroo rat (Dulzura Kangaroo Rat) *(Dipodomys simulans)*	Northwestern San Diego Pocket Mouse *(Chaetodipus fallax fallax)*	California Towhee *(Pipilo crissali)*
240	4	2	5	0	0
200	15	17	4	0	1
200	7	1	5	0	0
200	3	6	0	1	0
840*	**29***	**26***	**14***	**1***	**1***

*No animals were marked for identification; therefore, the total number of captures may include recaptures of previously trapped animals.

The proposed project site occurs within the Stephens's kangaroo rat fee area, and is known from the area, however, this species was not targeted during this trapping survey, and no Stephens's kangaroo rat were captured during the 2007 trapping surveys.

4.5.10 Bats

The quarry area was surveyed using visual observation by Psomas and ESA for potential bat use. Between four and ten bats were observed flying in the vicinity of the quarry by ESA. Exact identification is not possible, but because of the early hours of observation the bats were most likely western pipistrelle (*Pipistrellus hesperus*), which is an early emerging bat species.

The quarry has eight levels each approximately 15 to 20 feet high for an estimated height of 120 to 160 feet. The quarry is approximately 1/8 mile across. The vertical faces between levels are largely solid rock faces. The rock faces are a mixture of: 1) smooth, vertical and 2) rough, sloping surfaces. There are also scattered piles of rock rubble left from the quarry operations. The smooth, vertical faces are solid rock essentially without cracks or fissures. These faces offer no large roost sites for bats. The rough, sloping faces have a few natural cracks and fissures. Climbing predators such as raccoons, weasels and snakes could reach most locations on the rough sloping surfaces. There are very few natural cracks or fissures in the rock faces. There are numerous cracks from the quarry operation which are superficial and not deep.

No bat guano or rock staining from bats was found at the quarry during the field survey. No areas of whitewash or old bird nests were found, suggesting that predators can reach most areas of the quarry.

4.6 Critical Habitat

The Biological Survey Area is not located within designated critical habitat for any endangered or threatened species.

4.7 Jurisdictional Determination

This section describes those plant communities and other areas that were identified as subject to the regulatory authority of the USACOE as Waters of the U.S. pursuant to Section 404 of the federal Clean Water Act, and those plant communities and other areas that were identified as subject to the regulatory authority of the CDFG as Waters of State pursuant to Section 1600 et. seq. of the state Fish and Game Code. The plant communities, sub-communities and non-vegetated features determined to fall within the boundaries of jurisdictional areas include:

- southern willow woodland and scrub
- southern willow scrub/mule fat scrub
- mule fat scrub
- mule fat scrub/rip-rap
- mule fat scrub/freshwater marsh
- freshwater marsh
- disturbed freshwater marsh
- heliotrope scrub/sandbar
- heliotrope scrub/tamarisk scrub/sandbar
- open water/Lake Perris
- sand
- rip-rap

Table 4-20, *Approximate Acreages of Jurisdictional Areas Present within the Biological Survey Area* lists the approximate acreage of jurisdictional areas that were mapped within the Biological Survey Area.

Table 4-20
Approximate Acreages of Jurisdictional Areas Present within the Biological Survey Area

Plant Communities and Non-Vegetated Features	Acres of USACOE and CDFG Jurisdiction (Approximate)
southern willow woodland and scrub	77
mule fat scrub	45
freshwater marsh	68
heliotrope scrub/sandbar	134
mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar	44
coyote bush scrub	0.03
eucalyptus woodland	0.001
non-native grassland	0.07
ruderal	10
non-vegetated features	153
Total Jurisdictional Acres	**531**

4.7.1 U.S. Army Corps of Engineers Jurisdiction

Lake Perris is a Water of the U.S., which is subject to jurisdiction by the USACOE pursuant to Section 404 of the federal Clean Water Act because it is a traditionally navigable water body. As a result of the jurisdictional delineation it was determined that approximately 531 acres of plant communities and non-vegetated features within the Biological Survey Area are subject to USACOE jurisdiction, because they are hydrologically connected to the lake waters. The communities below the dam face are considered connected hydrologically because they are supported by the seepage from the lake. The areas of USACOE jurisdiction are graphically depicted in Figure 12, *USACOE and CDFG Jurisdictional Vegetation*.

4.7.2 California Department of Fish and Game Jurisdiction

Lake Perris and its associated riparian habitats and non-vegetated features are subject the jurisdiction of the CDFG pursuant to Section 1600 et. seq. The 531 acres of plant communities and non-vegetated features mentioned above have been determined to be hydrologically connected to Lake Perris and therefore subject to the jurisdiction of the CDFG. The areas of CDFG jurisdiction are graphically depicted in Figure 12.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area
- USACOE and CDFG Jurisdiction

Plant Communities and Non-Vegetated Features

- Southern Willow Woodland and Scrub/ Mule Fat Scrub/Heliotrope Scrub/Sandbar
- SWS — Southern Willow Woodland and Scrub
- MFS — Mule Fat Scrub
- FWM — Freshwater Marsh
- CBS — Coyote Bush Scrub
- HS/S — Heliotrope Scrub/Sandbar
- NNG — Non-Native Grassland
- R — Ruderal
- NVF — Non-Vegetated Features

Plant Communities and Non-Vegetated Features	Total Acres
SWilwScrb/MlftScrb/HeliScrb/Sand	44
Southern Willow Woodland and Scrub	77
Mule Fat Scrub	45
Freshwater Marsh	68
Coyote Bush Scrub	0.03
Heliotrope Scrub/Sandbar	134
Non-Native Grassland	0.07
Ruderal	10
Non-Vegetated Features	153
Total	**531**

N W E S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

USACOE and CDFG Jurisdictional Vegetation

PSOMAS

Figure 12

5.0 Conclusions

This section discusses the conclusions drawn from the literature review and field surveys, and assesses the potential for impacts to sensitive biological resources within and immediately adjacent to the proposed project area. Each subsection presents a discussion of potential direct and indirect impacts related to implementation of the proposed project. Direct impacts are those which affect a resource immediately, such as the removal of vegetation and habitat resulting from proposed project activities. Indirect impacts include those that result from the proposed project, but are not immediate effects, such as erosion created by the removal of vegetation.

In assessing direct and indirect impacts to biological resources which may occur as a result of implementation of the proposed project, Psomas biologists took into consideration results of the literature review and the 31 separate field surveys, all of which are documented in the sections above. The analysis of impacts was then undertaken against the backdrop of three conditions unique to this proposed project:

1. Many of the biological resources considered will be impacted by the return of the lake to its ordinary high water mark, effectively eliminating pioneering opportunities created by the 2005 drawdown. Pursuant to instructions from the USFWS and the CDFG, returning the lake to its pre-drawdown level is not to be considered an impact, because the existing condition is the state of the lake prior to the 2005 drawdown. Therefore, any impacts to pioneer habitats that may have taken advantage of lakebed exposed due to the 2005 drawdown are not considered.

2. The entire LPSRA (and therefore the Biological Survey Area within the LPSRA and, by extension, the proposed project site) is an impact of sorts, a result of human activity (i.e., construction of the dam and the eventual creation of Lake Perris, a water storage reservoir). From the standpoint of biological diversity and habitat quality, the creation of Lake Perris has been a net benefit, providing opportunities for multiple plant and animal species to develop and thrive that would not otherwise have existed.

3. In spite of the net benefit of the habitat opportunities created by Lake Perris, the impacts associated with the proposed project must still be mitigated for because the regulations that protect the resources that now exist at Lake Perris require it.

5.1 Potential Impacts to Plant Communities

The proposed project has the potential to directly impact plant communities from proposed construction activities. These impacts are graphically displayed in Figure 13, *Impacts to Plant Communities and Non-Vegetated Features*. Table 5-1, *Approximate Acreages of Potential Direct Impacts to Plant Communities and Non-Vegetated Features,* lists the approximate total acreages of plant communities that may be directly impacted by the proposed construction activities. It also lists the approximate acreage of the indirect impacts to southern willow woodland and scrub. Impacts to these plant communities would also result in impacts to those wildlife species that utilize those communities for all or a portion of their life cycle.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area
- Proposed Project Footprint

Plant Communities & Non-Vegetated Features

- Southern Willow Woodland and Scrub/ Mule Fat Scrub/Heliotrope Scrub/Sandbar
- RSS — Riversidean Sage Scrub
- SWS — Southern Willow Woodland and Scrub
- MFS — Mule Fat Scrub
- FWM — Freshwater Marsh
- CBS — Coyote Bush Scrub
- HS/S — Heliotrope Scrub/Sandbar
- NNG — Non-Native Grassland
- EW — Eucalyptus Woodland
- R — Ruderal
- NVF — Non-Vegetated Features

Plant Communities and Non-Vegetated Features	Impacted Acres
SWilw Scrb/MlftScrb/HeliScrb/Sand	42.0
Riversidean Sage Scrub	19.7
Southern Willow Woodland and Scrub	11.0
Mule Fat Scrub	7.9
Freshwater Marsh	16.5
Coyote Brush Scrub	0.7
Heliotrope Scrub/Sandbar	51.4
Non-Native Grassland	49.3
Eucalyptus Woodland	0.2
Ruderal	1.0
Non-Vegetated Features	140.4
Total	**340.1**

N, W, E, S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Impacts to Plant Communities and Non-Vegetated Features

PSOMAS

Figure 13

Table 5-1
Approximate Acreages of Potential Direct Impacts to Plant Communities and Non-Vegetated Features

Plant Community and Non-Vegetated Feature	Approximate Acreage of Potential Direct Impacts
Riversidean sage scrub	19.7
southern willow woodland and scrub	11
mule fat scrub	7.9
freshwater marsh	16.5
coyote bush scrub	0.7
heliotrope scrub/sandbar	51.4
non-native grassland	49.3
eucalyptus woodland	0.2
ruderal	1
agriculture	0
mix of southern willow woodland and scrub, mule fat scrub/heliotrope scrub/sandbar	42
non-vegetated features	140.4
Total Acres	**340.1**

5.1.1 Riversidean Sage Scrub

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 19.7 acres of Riversidean sage scrub would be directly impacted by construction of the haul road for the proposed project. These impacts would be permanent, as the road is intended to be maintained for use during operation of the proposed project. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; construction-related traffic; and maintenance-related traffic on the road.

5.1.2 Southern Willow Woodland and Scrub

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 11 acres of southern willow woodland and scrub would be directly impacted by construction activities. It is estimated that approximately 48 acres of southern willow woodland and scrub would be indirectly impacted by construction activities. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic.

Southern willow woodland and scrub is found at two separate locations within the proposed project area. One stand of 19 acres is located below the toe of the dam, and the other is located along the eastern edge of the lake. The southern willow woodland and scrub located below the toe of dam consists of approximately 19 acres. It is estimated that approximately 11 acres of southern willow woodland and scrub located below the toe of the dam would be directly

impacted by proposed project activities. These acres would be permanently lost because the placement of the reinforcement berm and associated maintenance road.

Approximately 48 acres of southern willow woodland and scrub along the lake's eastern shore have been indirectly impacted by the 2005 drawdown of the lake in anticipation of project implementation. Although drip irrigation was installed, may trees and branches have died back or have expressed signs of water stress, such as browning and wilting. It is assumed that this is a temporary indirect impact and that this area will recover naturally once the project has been completed and the water level returns to its pre-drawdown elevation. Field observations indicate that the current size of this southern willow woodland and scrub area is approximately the same as it was prior to lake lowering.

Impacts to this plant community have the potential to impact those wildlife species that depend on this habitat. For example, least Bell's vireo, a state and federally listed species, may utilize southern willow woodland and scrub for foraging and nesting activities.

Because the southern willow woodland and scrub is subject to the jurisdiction of USACOE and CDFG, impacts to this community will need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.1.3 Mule Fat Scrub

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 7.9 acres of mule fat scrub habitat would be directly impacted as a result of implementation of the proposed project. Direct impacts to this habitat would occur from the construction and use of the proposed haul road. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic.

Impacts to this plant community have the potential to impact those wildlife species that depend on this habitat. For example, least Bell's vireo, a state and federally listed species, may utilize mule fat scrub for foraging and nesting activities.

Because mule fat scrub is subject to the jurisdiction of USACOE and CDFG, impacts to this community will need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.1.3.1 Southern Willow Woodland and Scrub/Mule Fat Scrub/Heliotrope Scrub/Sandbar

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 42 acres of southern willow woodland and scrub/mule fat scrub/heliotrope scrub/sandbar habitat would be directly impacted as a result of implementation of the proposed project. Direct impacts to this habitat would occur from the construction and use of the proposed borrow area and haul road, and inundation of the site following completion of construction activities when the lake level is returned to its regulated

high water mark. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic.

Because southern willow woodland and scrub/mule fat scrub/heliotrope scrub/sandbar habitat is subject to the jurisdiction of USACOE and CDFG, impacts to this community need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.1.4 Freshwater Marsh

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 16.5 acres of freshwater marsh habitat would be directly impacted as a result of implementation of the proposed project. Direct impacts to this habitat would occur from the construction and use of the proposed borrow area and haul road, and inundation of the site following completion of construction activities when the lake level is returned to its regulated high water mark. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic.

Because freshwater marsh is subject to the jurisdiction of USACOE and CDFG, impacts to this community need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.1.5 Heliotrope Scrub/Sandbar

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. It is estimated that approximately 51.4 acres of heliotrope scrub/sandbar habitat would potentially be directly impacted as a result of implementation of the proposed project. Possible indirect impacts to this habitat would occur from increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic. In addition this habitat type will be inundated following proposed project activities and the lake is refilled to its regulated high water mark.

Because heliotrope scrub/sandbar is subject to the jurisdiction of USACOE and CDFG, impacts to this community will need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.1.6 Non Native Grassland

Direct impacts to this habitat would occur from the removal of the habitat from the site during project activities. Approximately 49.3 acres of non native grassland would be directly impacted by construction of the stability berm; construction lay down area and construction of the Lake Perris Drain for the proposed project. These impacts would be permanent, as the road is intended to be maintained for future use. Possible indirect impacts to this habitat would occur from

increased erosion or run-off entering the site from construction activities; and construction and maintenance-related traffic.

5.1.7 Other Plant Communities

Other plant communities would also be directly impacted by proposed project activities including 0.7 acre of coyote bush scrub, 0.2 acre of eucalyptus woodland, 1 acre of ruderal land, and 140.4 acres of unvegetated features.

5.1.8 Open Water/Lake Perris

Direct impacts to the open water/Lake Perris occurred from in the drawdown in preparation of the proposed project. In addition, the excavating of lake bed materials for the proposed dam levee will create deep water habitat where shallow water habitat existed previously. These impacts are considered potentially significant with reference to loss of spawning habitat for fish. Effects to fisheries are addressed by ESA in the Environmental Impact Report prepared in support of the proposed project.

Indirect impacts from dust and erosion might occur; therefore these potential indirect impacts will need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

5.2 Potential Impacts to Listed Endangered, Threatened, Candidate and State Rare Plants

No plants listed endangered, threatened, candidate or state rare pursuant to the federal or state Endangered Species Acts were observed during the field surveys and are known to occur within the proposed project site; therefore no impacts to listed endangered, threatened, candidate or state rare plant species are anticipated as a result of implementation of the proposed project.

5.3 Potential Impacts to Sensitive and Locally Important Plant Species

No sensitive or locally important plants were observed during the field surveys and are known to occur within the proposed project site; therefore no impacts to sensitive plants are anticipated as a result of implementation of the proposed project.

5.4 Potential Impacts to Listed Endangered, Threatened and Candidate Wildlife

Three wildlife species listed as endangered pursuant to the federal and state Endangered Species Acts, were observed within the Biological Survey Area during the field surveys by Psomas. These species are listed below:

- American peregrine falcon (non-breeding migrant)
- least Bell's vireo (breeding migrant)
- Stephens's kangaroo rat (resident)

Three additional listed wildlife species were not observed during the field surveys, but are known to occur within the LPSRA, and therefore; potentially within the Biological Survey Area. These listed wildlife species could be residents or migrants and are listed below:

- bald eagle (non-breeding migrant)
- southwestern willow flycatcher (breeding migrant)
- coastal California gnatcatcher (breeding resident)

5.4.1 Bald Eagle

This species was not observed or detected during the field surveys; however this species is known to occur at the LPSRA, especially during the winter. The Biological Survey Area provides potential foraging and roosting habitat for this species during winter migration. The bald eagle is primarily a migrant and wintering species within western Riverside County. Bald eagles have attempted to breed at the LPSRA, but were unsuccessful. There is a low potential for bald eagles to nest on the proposed project site due to the lack of suitable nesting habitat such as large conifers trees. Since the bald eagle was not observed on the proposed project site during the field surveys and they are not known to nest at the proposed project site, it is safe to say the bald eagle will not be impacted from the proposed project.

5.4.2 American Peregrine Falcon

American peregrine falcons were observed by Psomas during the field surveys and they are known to occur within the LPSRA because it has suitable foraging grounds with concentrated populations of waterfowl and shorebirds. Two American peregrine falcons were observed flying together over Lake Perris. The falcons were diving and tumbling in the air with one another while chattering loudly. One falcon perched on a fence above the dam on the Bernasconi Hills before flying off. It is safe to say the American peregrine falcon will not be impacted from the proposed project because the American peregrine falcon is primarily a rare spring and fall transient and a casual visitant during other seasons of the year. There are no breeding records documented for the species and it currently is not likely to breed in the area and at the LPSRA due to lack of suitable breeding habitat.

5.4.3 Southwestern Willow Flycatcher

No southwestern willow flycatchers were detected within the Biological Survey Area or within the LPSRA during the 2007 and 2008 focused southwestern willow flycatcher surveys or any other surveys. This species was determined to be absent from the proposed project site. Therefore, no impacts to southwestern willow flycatcher are expected from construction and operation of the proposed project. However, this species has been observed within the LPSRA

in the past by other biologists. The Biological Survey Area contains suitable breeding and foraging riparian woodland habitat to support this species.

5.4.4 Least Bell's Vireo

Least Bell's vireos were detected within the Biological Survey Area a total of six times during the 2007 least Bell's vireo focused surveys. One least Bell's vireo was detected during the focused southwestern willow flycatcher surveys. Singing males were detected; however nests were not located. Although no nests were located and no fledglings were observed or detected, least Bell's vireo is believed to breed in Biological Survey Area due to the repeated observations of singing males during the breeding season. No banded individuals were observed during surveys. Based on the locations of the least Bell's vireo detections, there are a minimum of three least Bell's vireo territories in 2007: two in the southern willow woodland and scrub along the eastern lakeshore and one in the southern willow woodland and scrub immediately west of and below the dam

Least Bell's vireos were detected within the Biological Survey Area a total of twelve times during the 2008 least Bell's vireo focused surveys. Singing males were detected; however nests were not located. Although no nests were located and no fledglings were observed or detected, least Bell's vireo is believed to breed in Biological Survey Area due to the repeated observations of singing males during the breeding season. No banded individuals were observed during surveys. Based on the locations of the least Bell's vireo detections, there are a minimum of four LBV territories in 2008: two in the southern willow scrub along the eastern lakeshore and two in the southern willow scrub immediately west of and below the dam.

Indirect impacts to 51 acres of southern willow woodland and scrub at the eastern shoreline of the lake which resulted from the 2005 drawdown and subsequent lowering of the ground water available to the plants can be considered temporary. Impacts resulting from the drawdown are temporary and did not prevent nesting by two pairs of least Bell's vireo which were observed during 2007 focused surveys. It is anticipated that once Lake Perris is returned to its pre-drawdown level, impacts to the southern willow woodland and scrub at the eastern shore of the lake will be ameliorated and the habitat will return to its pre-drawdown condition.

Construction of the proposed project will result in a direct loss of approximately 10 acres of southern willow woodland and scrub; approximately 8 acres mule fat scrub; and 40 acres of southern willow woodland and scrub/mule fat scrub/heliotrope scrub/sandbar habitat for least Bell's vireo, which constitutes a direct and significant impact.

Indirect impacts to listed least Bell's vireos could occur from increased noise, lighting, and dust during construction, which could adversely affect the breeding behavior of these birds.

Because Lake Perris is within the Western Riverside County MSHCP Area, mitigation for these impacts to habitat for least Bell's vireo will need to be negotiated by DWR with the appropriate resource agencies: USFWS, CDFG, and the RCA. Psomas also recommends that because project implementation will occur so close to the nesting habitat, monitoring of the area by

biologists be included in the protection measures for wildlife established for construction of the proposed project.

5.4.5 Coastal California Gnatcatcher

No coastal California gnatcatchers were detected during the 2007 and 2008 focused coastal California gnatcatcher surveys. Based on results of the directed surveys, no impacts to coastal California gnatcatcher are anticipated in association with construction of the proposed project. Suitable Riversidean coastal sage scrub occurs throughout the Biological Survey Area, but well outside the boundaries of the proposed project site. Suitable Riversidean coastal sage scrub also occurs throughout the LPSRA to potentially support this species.

With the removal of 23 acres of Riversidean sage scrub it was determined that there may be the potential for direct impacts to foraging and nesting habitat for the coastal California gnatcatcher. However, since there are ample available foraging areas and nesting areas adjacent to the proposed project site, any impacts are considered less-than-significant.

5.4.6 Stephens's Kangaroo Rat

Below the dam, the project would result in the loss of approximately 43 acres of non-native grassland. The area directly impacted by the project is not considered suitable habitat for the Stephens's kangaroo rat due to the relatively high density of vegetation. This area is currently occupied by Los Angeles pocket mouse and is not currently occupied by Stephens's kangaroo rat. However, this area is within the Lake Perris Stephens's Kangaroo Rat Core Reserve established by the Stephens's Kangaroo Rat Habitat Conservation Plan and covered by the MSHCP. Because impacts will occur within the core area and/or land owned by CDFG, additional mitigation may be required.

Two small mammal species that are California Species of Special Concern also occur within the impact zone below the dam: the Los Angeles pocket mouse and northwestern San Diego pocket mouse. The Los Angeles pocket mouse was also found in one of the areas surveyed in the northeastern part of the project area, along the existing access trail.

The project would occur within the Lake Perris Stephens's Kangaroo Rat Core Reserve established under the Stephens's Kangaroo Rat Habitat Conservation Plan, and is covered by the Riverside County MSHCP. Even though there would appear to be no direct impacts to Stephens's kangaroo rat by the project, mitigations to enhance Stephens's kangaroo rat habitat within the Reserve may be required by the agencies. Stephens's kangaroo rat habitat enhancement measures could include:

- Reduce vegetation density with controlled burns.
- Reduce vegetation density grazing by cattle or sheep or goats.
- Plant Riversidean sage scrub plant species.
- Remove non-native exotic plant species.
- Till/rip hard packed soil to allow burrowing.

Measures that improve habitat for Stephens's kangaroo rat could also improve habitat quality for Los Angeles pocket mouse to some extent. However, the distribution of Los Angeles pocket mouse on the project site is probably determined more by the presence of sandy or friable soils.

5.5 Potential Impacts to Sensitive and Locally Important Wildlife

Sixteen sensitive wildlife species were observed within the Biological Survey Area during the field surveys by Psomas. These sensitive and locally important wildlife species could be residents or migrants and are listed below:

- coastal whiptail (coastal western whiptail) (resident)
- northern red-diamond rattlesnake (resident)
- American white pelican (non-breeding migrant)
- double-crested cormorant (non-breeding resident)
- white-faced ibis (non-breeding migrant)
- osprey (potential breeding resident)
- northern harrier (breeding resident)
- Cooper's hawk (breeding resident)
- golden eagle (non-breeding resident)
- loggerhead shrike (breeding resident)
- southern California rufous-crowned sparrow (breeding resident)
- yellow-headed blackbird (breeding migrant)
- northwestern San Diego pocket mouse (resident)
- Los Angeles pocket mouse (resident) (resident)
- Bryant's woodrat (resident)
- San Diego black-tailed jackrabbit (resident)

During the field surveys, many species of wildlife that could potentially utilize the Biological Survey Area may not have been present because they occur only on a seasonal basis. Many species are nocturnal, move about a territory, or may have become dormant for the season. There are a number of other sensitive wildlife species that were not observed during the field surveys, but are known to occur within the LPSRA. These species have been observed within the LPSRA by other biologists in the region and by LPSRA staff. These sensitive and locally important wildlife species could be residents or migrants and are listed below:

- coast (San Diego) horned lizard (resident)
- orange-throated whiptail (resident)
- coastal rosy boa (resident)
- white-tailed kite (breeding resident)
- sharp-shinned hawk (breeding resident)
- ferruginous hawk (non-breeding migrant)
- mountain plover (non-breeding migrant)
- burrowing owl (breeding resident)

- long-eared owl (non-breeding migrant)
- California horned lark (breeding resident)
- San Diego cactus wren (coastal cactus wren) (breeding resident)
- yellow warbler (breeding migrant)
- Bell's sage sparrow (breeding resident)
- tricolored blackbird (non-breeding resident)
- mountain lion (resident)
- American badger (resident)

As a result of the wildlife field surveys and literature review, it was concluded that three sensitive wildlife species have a moderate potential to occur within Biological Survey Area, either as residents or migrants. These sensitive wildlife species are listed below:

- San Diego banded gecko (resident)
- purple martin (breeding migrant)
- yellow-breasted chat (breeding migrant)

With the removal of several habitats due to construction activities, it was determined that there may be the potential for direct impacts to foraging and breeding habitat for some sensitive bird species and other sensitive wildlife species. However, since there are ample available foraging areas and breeding areas adjacent to the proposed project site, any impacts are considered less-than-significant.

Indirect impacts to sensitive wildlife could occur from increased noise, lighting, and dust during construction, which could adversely affect the breeding behavior of some sensitive birds and other sensitive wildlife species.

Psomas recommends pre-construction surveys for presence of sensitive species along the construction right-of-way, and within construction impact areas. To further protect sensitive species the surveying biologist should stake and flag the limits of construction and monitor construction activity to reduce impacts to sensitive species that may be located next to the construction area. Further measures could include silt fencing to act as a barrier and daily pre-activity surveys to remove wildlife from the construction area.

5.5.1 Nesting Birds, Raptors, and Roosting Bats

The proposed project site contains habitat that provide nesting habitat for a number of bird species. This includes habitats that have been temporarily created due to project related lake lowering. Some of the potential nesting habitat will be directly impacted by implementation of the proposed project. Indirect impacts to breeding birds could occur from increased noise, lighting, and dust during construction, which could adversely affect the breeding behavior of some birds.

Because these trees and habitats will be impacted as the result of proposed project activities during the nesting season, DWR shall have a breeding bird survey conducted by a qualified biologist to identify any potential nesting activities, or nesting birds prior to construction

activities. Project related disturbance of active nests, either direct or indirect, if identified, will require concurrence with CDFG and a permit (or concurrence) from the Migratory Bird Treaty Act (MBTA) division of USFWS. These impacts would be considered significant, but can be reduced to a level that is less-than-significant with incorporation of the following mitigation measure.

Psomas recommends that a biologist perform pre-construction nesting bird and raptor surveys. The locations of each nest found to be present should be marked using a hand-held GPS unit, and an area of at least 100 feet surrounding each nest should be flagged. A qualified wildlife biologist should be present during construction to act as a monitor to ensure the minimization and/or avoidance of impacts to nesting birds and raptors.

Impacts to the quarry area would be limited to the bottom of the quarry where no roosting habitat for bats occurs. Although bats were observed flying near the proposed project site in the vicinity of the quarry, the species could not be determined, nor could the location of any roosting site. Because of the condition of the quarry, it is unlikely to provide suitable roosting habitat for bats. Therefore no direct impact to bats or their roosting habitat is anticipated. Indirect impacts to foraging bats from proposed project activities are not anticipated.

5.5.2 Los Angeles Pocket Mouse

The Los Angles pocket mouse is one of the covered species under the MSHCP; therefore; impacts to 43 acres of occupied Los Angles pocket mouse habitat can be mitigate according to the guidelines in the MSHCP. Impacts can be mitigated by replacement of impacted Los Angles pocket mouse habitat at a minimum ratio of 1:1 (replaced: impacted) and will meet the requirements of the MSHCP.

The proposed project is within the MSHCP area and in the Lake Perris State Recreation Area (LPSRA). The LPSRA is a Public/Quasi-Public Lands and is part of the MSHCP Conservation Area which is to be managed under the MSHCP for open space value and/or in a manner that contributes to the conservation of the Los Angles pocket mouse and other covered species. Under the MSHCP, impacts to Los Angles pocket mouse habitat in Public/Quasi-Public Lands must be replaced at a minimum ratio of 1:1 (replaced: impacted). The replacement land must be acquired or otherwise permanently protected and must be biologically equivalent or superior to the land that will be affected. An equivalency analysis describing the equivalent conservation must be prepared and must be approved by the USFWS and CDFG.

The equivalency analysis must address the following:

- Effects on habitats.
- Effects on covered species.
- Effects on MSHCP Core Areas, Linkages and Constrained Linkages.
- Effects on MSHCP Conservation Area configuration and management (such as increases or decreases in edge).

- Effects on ecotones (defined as areas of adjoining Vegetation Communities, generally characterized by greater biological diversity) and other conditions affecting species diversity (such as invasion by exotics).

The equivalency analysis must compare the effects and benefits of the proposed project including specific mitigation and compensation for lost conservation values, with the conditions prior to development. The analysis must consider specific project design features, including project siting and design guidelines and BMPs in the MSHCP and supporting documents.

5.6 Potential Impacts to Jurisdictional Areas

The proposed project would directly impact jurisdictional areas from grading and other construction related activities (Figure 14, *Impacts to USACOE and CDFG Jurisdictional Vegetation*). The potential impacts to areas of jurisdiction for the USACOE and CDFG is the same for this project because the extent of jurisdiction is equal.

Approximately 139 acres of area subject to the jurisdiction of the USACOE and CDFG would be directly impacted due to construction of the haul road and the soils excavation area. Table 5-2, *Impacts to USACOE and CDFG Jurisdictional Vegetation*, describes the acres of impact to plant communities associated with jurisdiction of the USACOE and CDFG that would occur through implementation of the proposed project.

Table 5-2
Impacts to USACOE and CDFG Jurisdictional Vegetation

Plant Communities and Non-Vegetated Features	Approximate Acres of USACOE and CDFG Jurisdiction	Approximate Acres of Impacts
southern willow woodland and scrub	77	10
mule fat scrub	45	8
freshwater marsh	68	26
heliotrope scrub/sandbar	134	55
mix of southern willow woodland and scrub, mule fat scrub and heliotrope scrub/sandbar	44	40
coyote bush scrub	0.03	0.003
eucalyptus woodland	0.001	0
non-native grassland	0.07	0.02
ruderal	10	1
non-vegetated Features	153	0.2
Total Jurisdictional Acres	**531**	**139**

These riparian associated habitats are subject to the jurisdiction of USACOE and CDFG. Impacts to these plant communities will need to be addressed in the USACOE 404 permit process and in the CDFG Stream and Lakebed Alteration Agreement process.

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Biological Resource Evaluation of the Lake Perris Dam Remediation Project

Legend

- Biological Survey Area
- USACOE and CDFG Jurisdiction
- Proposed Project Footprint

Plant Communities and Non-Vegetated Features

- Southern Willow Woodland and Scrub/ Mule Fat Scrub/Heliotrope Scrub/Sandbar
- RSS — Riversidean Sage Scrub
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- CBS — Coyote Bush Scrub
- HS/S — Heliotrope Scrub/Sandbar
- NNG — Non-Native Grassland
- R — Ruderal
- NVF — Non-Vegetated Features

Plant Communities and Non-Vegetated Features	Impacted Acres
Coyote Bush Scrub	0.003
Eucalyptus Woodland	0
Freshwater Marsh	26
Heliotrope Scrub/Sandbar	55
Mule Fat Scrub	8
Non-Native Grassland	0.02
Non-Vegetated Features	0.2
Ruderal	1
SWilwScrb/MlftScrb/HeliScrb/Sand	40
Southern Willow Woodland and Scrub	11
Total	**139**

N, W, E, S

0 0.25 0.5 1 Miles

State Plane NAD 83 Zone 6

Date of Aerial Photo: February 2006

Impacts to USACOE and CDFG Jurisdictional Vegetation

PSOMAS

Figure 14

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Appendix C2
Riparian Impacts

ESA

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memorandum

date May 26, 2009

to TCB

from MAT

subject Perris riparian impacts

Background: DWR operates and maintains the State Water Project (SWP), supplying water to 29 contracting agencies across the state. Lake Perris is the terminal reservoir for the East Branch of the California Aqueduct, providing a key water supply to the Metropolitan Water District of Southern California (MWD or Metropolitan). Lake Perris is located within the Lake Perris State Recreation Area (SRA) within Riverside County, providing several recreational opportunities including fishing, boating, picnicking, camping, nature study, rock climbing, horseback riding, and hiking. The water storage and conveyance facilities are owned and operated by DWR, in cooperation with Metropolitan.

Perris Dam is an earthfill embankment completed in 1974 containing approximately 25 million cubic yards of compacted fill. The lake's normal operating water level is 1588 feet above mean sea level (amsl). In 2005, DWR completed a foundation study of the Perris Dam. Results of the detailed liquefaction analysis of the Perris Dam foundation indicated that seismically-induced ground shaking could result in embankment deformations due to the liquefaction potential of sediments under the dam at several locations along the 2,300-foot-long segment along the southern span (left reach) of the dam. With the lake filled to its design capacity, this could result in overtopping of the dam during a strong ground shaking event. Based on the results of this stability analysis, DWR lowered the reservoir water surface elevation by 25 feet to 1563 feet amsl, until a long-term remedial solution can be implemented. DWR installed a 2-mile long irrigation system connected to State Park water pumps and drip-line system that conveys lake water to the pre-drawdown riparian habitat that exists along the eastern edge of the original lakeshore.

Purpose: The purpose of this memo is to present the methods and results of our assessment of the current status of the 49.3 acres of mature riparian vegetation along the upper fringe of the pre-drawdown Perris Reservoir shoreline (Figure 1). We quantify and discuss the riparian fringe that has developed since the drawdown occurred. We also present potential mitigation acreage and strategies for reducing temporal loss.

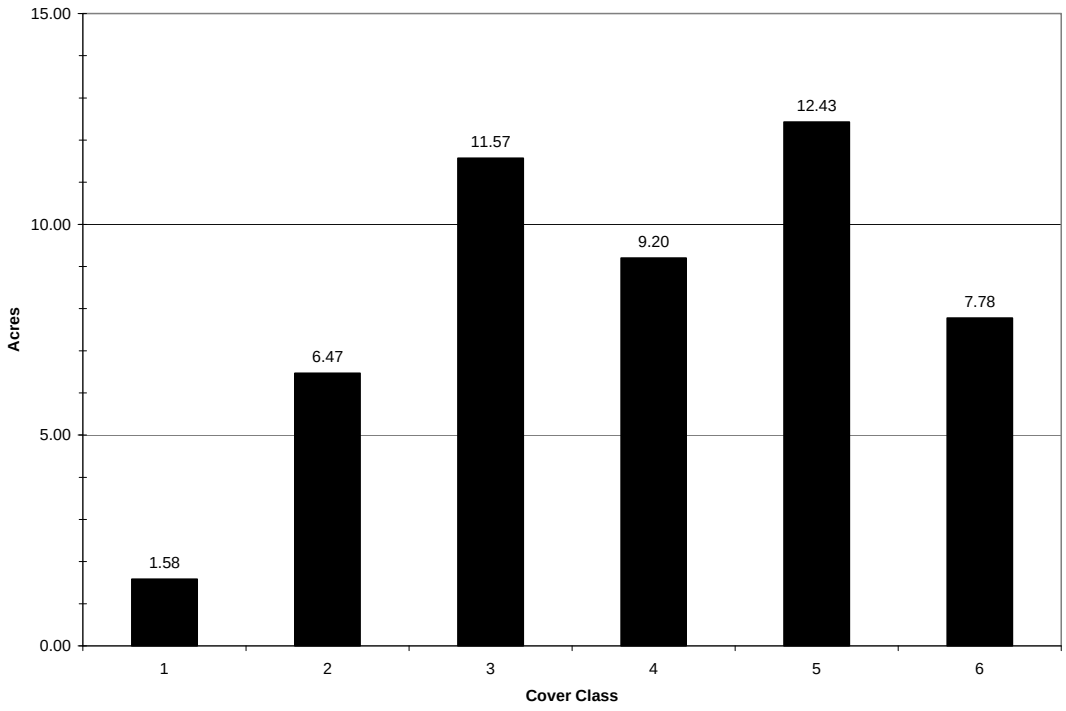
Methods: We conducted our assessment on March 31, 2009. We timed the survey to avoid the official least Bell's vireo (LBV) survey season and still have adequate regrowth; however the riparian vegetation was not fully leafed out at the time of the survey. In the field we observed that there were discrete and relatively easily distinguishable patches of riparian habitat in various conditions. We mapped the boundaries of the patches with a GPS unit (Figure 1). We used the categories shown in Table 1 to estimate survivorship in these patches.

TABLE 1
SURVIVORSHIP CLASSES

Survivorship Class	Range (%)	Midpoint (%)
1	0	0
2	1-20	10
3	21-40	30
4	41-60	50
5	61-80	70
6	81-100	90

Assumptions: We used survivorship estimates based on the assumption that surviving trees and shrubs would recover to an approximate pre-drawdown cover and condition when water levels are restored. This study did not assess change in cover because no baseline cover data were available.

We also make an assumption that survivorship estimates will be a reasonable surrogate for cover estimates when determining habitat loss and potential mitigation acreage. The relationship between cover and the percentage of living plants is expected to have the best fit when riparian vegetation is not water stressed. Due to the current drawdown conditions many of the surviving plants are not producing the amount of cover expected under post-project conditions. Therefore, the relationship between survivorship and cover will be better post-project than it is now. Since post-project condition is the bench mark for determining mitigation ratios for habitat loss we felt the assumption that survivorship was an acceptable surrogate for cover was reasonable (at least for the purposes of this assessment). It was easier, faster, and more accurate to make ocular estimates of survivorship of patches than to assess cover using more labor intensive and time-consuming methods such as line transects. We feel that the use of cover would have overestimated the likely post-project impact given the timing and conditions present at the time this survey.



Results: The number of acres in each assigned survivorship class varied between 1.58 and 12.43 acres (Table 2). Approximately 60% (29.4 acres) of the 49.3 acre survey area has 50% or greater survivorship (based on mid points). Severe mortality (defined as classes one and two) accounted for 16.3% (8.1 acres) of the 49.3 acre survey area. There did not appear to be an observable spatial pattern although no spatial statistics were run.

Mitigation: For ease of calculation we converted the survivorship midpoints to morality midpoints (mortality = 1-survivorship). Table 2 shows the acres affected by the drawdown for survivorship classes one through five. For the purposes of calculation we excluded class six because we would expect some level of mortality in a pre-drawdown and post-project condition, and requiring mitigation for areas that have maintained greater than 80% survivorship (with a 90% midpoint) seems unnecessary. Based on our assumptions and calculations we estimate that approximately 23.8 acres (or 48.3%) of the original riparian fringe has been affected (Table 2).

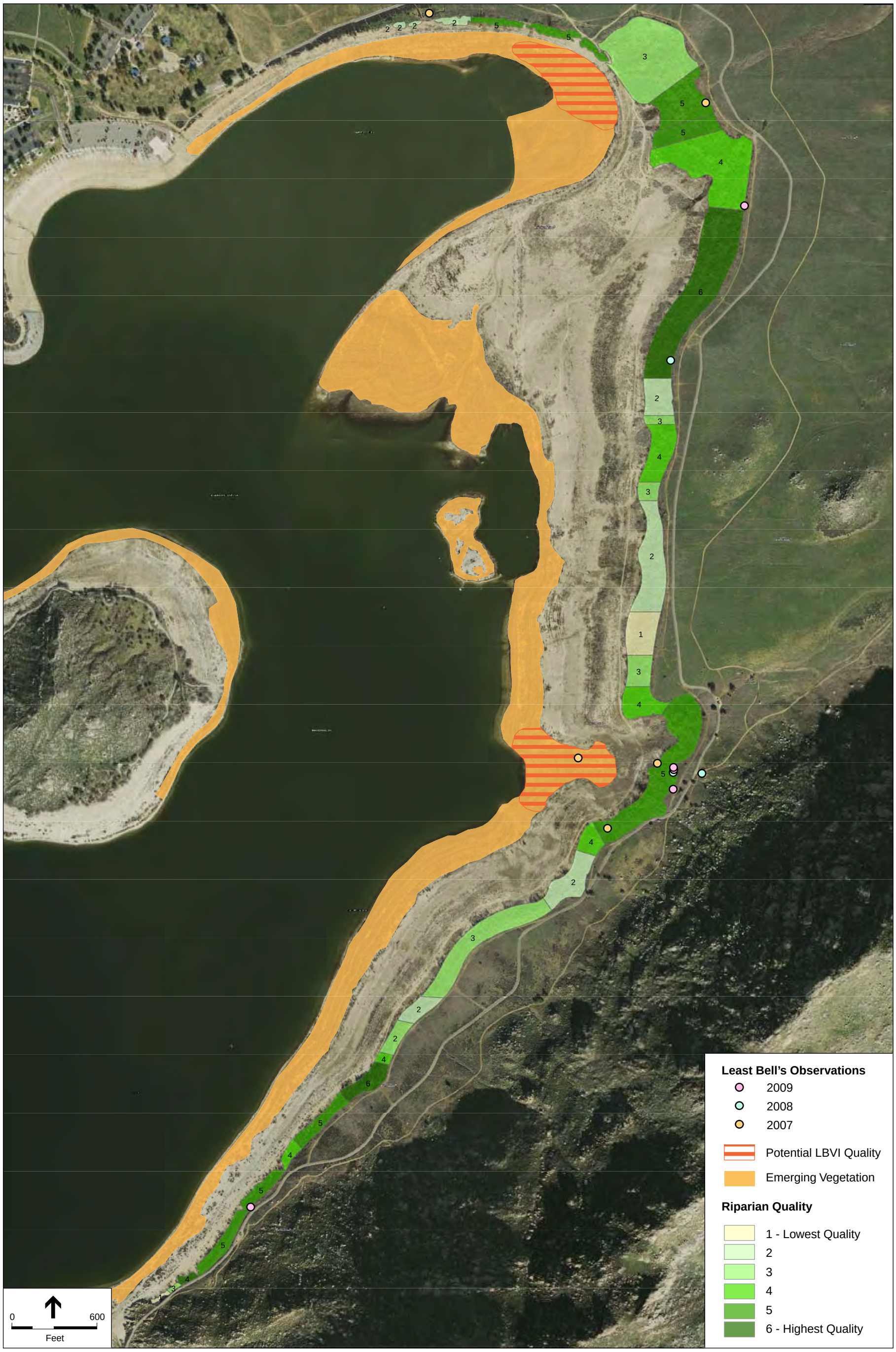
TABLE 2
CALCULATION OF MITIGATION ACREAGE

Survivorship Class	Acres in Class	Mortality	Acres Affected
1	1.58	1	1.580
2	6.47	0.9	5.823
3	11.57	0.7	8.099
4	9.20	0.5	4.600
5	12.43	0.3	3.729
		Total	**23.831**

Post-Drawdown Riparian Fringe: Since the drawdown, a new band of riparian habitat has established along the new shoreline. The acreage of the new band of habitat on the eastern shore exceeds the length of the original band (74.0 vs. 49.3 acres). While most of the habitat is relatively young, the structure and composition of the habitat in two separate areas are potentially suitable for use by LBV (Figure 1). We detected LBV in one of these patches incidentally while conducting our assessment and LBV were regularly detected in the patch during subsequent protocol surveys this year. The new growth is also providing habitat function for other riparian-associated species such as Bullock's orioles, Wilson warblers, blue grosbeak, common yellowthroat, ash-throated flycatcher, and other more cosmopolitan species. The post-drawdown riparian fringe appears to be providing some offset for the dieback of the pre-drawdown riparian fringe.

Mitigation Strategies to Offset Temporal Loss: It is our understanding that the new fringe will be left in place during construction and will not be removed until construction is complete and the refilling of the reservoir commences. We believe there is an opportunity to offset some of the temporal loss that will occur as a result of the lag between removal of the new fringe and the recovery of the old fringe.

Te general concept is to establish patches of restored habitat in the area of the pre-drawdown habitat mapped in survivorship categories 1-3 (essentially patches with <50% survivorship). Dead trees would be removed (leaving some in place as snags as needed) and the areas recontoured into planting basins of various sizes. Cuttings from the new fringe would be installed in the basins, and temporary irrigation used to flood the basins using reservoir water. Installation would occur prior to, or concurrent with, construction activities. The basic premise is to establish habitat patches that would be 2-4 years old by the time the reservoir is refilled. This would provide a seed source within the areas most affected by the drawdown and ultimately would provide structural and age class diversity in the post-construction stands. We also recommend considering salvaging material from the new fringe prior to its post-construction removal, and establishing an onsite nursery to grow material for infill planting when water levels are returned to pre-drawdown levels. A conceptual mitigation and monitoring plan should be developed to provide more details on implementation, construction, maintenance, and monitoring of restored habitat within the pre-drawdown riparian fringe.



SOURCE: DWR, 2009; ESA, 2009.

Perris Riparian Impacts . 206008.02

Figure 1

Riparian Vegetation Assessment

Appendix C3
Waterfowl Analysis

ESA

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memorandum

date May 27, 2009

to Tom Barnes

from Mark Tucker

subject Perris Waterfowl Analysis

Purpose: The purpose of the analysis is to determine the range and limits of depths required for foraging by various waterfowl species. This memo presents the purpose, methods, and results of our analysis of the foraging habits of waterfowl at Perris Reservoir and the effects of reducing the areal extent of the 10 to 25 foot depth contour.

Methods: Our methods included (1) categorizing the waterfowl species in the Audubon Christmas Bird Count (CBC) lists into feeding guilds, (2) reviewing pertinent literature on the feeding ecology of representative species of each guild, (3) developing literature-based foraging depth thresholds for each guild, and (4) applying our findings as they relate to the Lake Perris retrofit project and the 10 foot maximum depth definition for shallow water habitat.

There is not a consistent definition of shallow water in the literature but the maximum depth of the various definitions typically falls within the 5 cm-5 meter (0.16- 16.4 feet) range. For the purpose of this memo we define shallow water habitat as submerged areas less than 10 feet deep. We also consider the loss of the deeper water foraging habitat defined as 10-25 feet.

While recognizing that some bird species will routinely switch between multiple foraging strategies based on habitat conditions and prey availability, we used the predominant feeding method to place species in guilds. Our focus was on foraging within aquatic habitats and with the exception of Cattle Egrets and Canada Goose, we did not attempt to account for upland, non-aquatic foraging when determining guild membership.

Bird species are taken from the Audubon CBC List of Waterfowl and Waterbirds in the Lake Perris/San Jacinto Area. Rather than get into details of foraging styles and postures, for the purposes of this memo reported depths were obtained from Birds of North America (BNA) Online, unless otherwise indicated.

Results: Currently, areas which would become inundated post-project to depths of 0-10 feet and 10-25 feet encompass 92.8 acres and 180.6 acres, respectively. The current borrow area configuration would affect 24.33 acres (26.2%) of the 0-10 foot depth and 85.16 acres (47.2%) of the 10-25 foot area.

The following table presents categories of feeding guilds, species within guilds, and foraging depths. Values for foraging depths were taken from BNA accounts. Foraging depths between species within guilds varied therefore the maximum reported depths for each guild was used (i.e., foraging depths represent the deepest depth utilized by a member of a particular guild). All species in the guild may forage at shallower depths.

TABLE 1
FEEDING GUILDS TABLE (MODIFIED FROM WELLER 1999)

Guild	Description	Species	Foraging Depths (Citation)
Dabbling Ducks	Ducks in the Genus *Anas* and other surface swimmers	Gadwall Mallard Cinnamon Teal Northern Shoveler Northern Pintail American Green-winged teal	< 30 cm (11.8 inches)
Diving Ducks	Ducks in the Genus Athrys and other benthic divers	Canvasback Ring-necked Duck Lesser Scaup Bufflehead Ruddy Duck American Widgeon	<3 m (9.8 feet)
Waders	Shorebirds and other birds that forage on foot in shallow water	American Avocet Black-necked Stilt White-faced Ibis Least Sandpiper Long-billed Dowitcher Kildeer	<25 cm (9.8 inches)
Shallow Water Column Divers	Grebes and other birds that dive and forage throughout the water column	Eared Grebe Western Grebe American White Pelican	<3 m (9.8 feet)
Other Water Column Divers	Cormorants	Double-crested Cormorant	<8 m (26.2 feet)
Flight feeders	Gulls	Bonaparte's Gull Ring-billed Gull California Gull	N/A
Others	Dabbles and dives Grazes Aquatic and upland feeder	American Coot Canada Goose Cattle Egret	<6 m (19.7 feet) N/A <30 cm (11.8 cm)

The majority of species on the CBC list forage in shallow water habitat (as defined in this memo). These species have the potential to be affected by the loss of shallow water habitat, especially shallow water divers. While shallow water divers will forage throughout the water column they could be negatively affected if prey species tend to congregate near the bottom or in shallow water.

Species using deeper waters include the gulls and cormorants. Gulls typically feed in deeper water at or near the surface, and employ a number of different feeding methods. California gulls in particular are highly opportunistic, generalist feeders and would likely not be affected by the loss of waters 10-25 feet deep. Bonaparte's gulls typically forage away from shore near the center of the lake, and are not expected to be affected by the loss of either depth category.

Double-crested cormorants are the only species with the potential to be affected by the loss of waters 10-25 feet deep. Cormorants can forage below the reported depth but this increases transit time and decreases foraging time, making it more beneficial for them to feed in shallow water. However, cormorants are water column divers and

will take prey from within the water column regardless of the bottom depth. Optimal foraging models predict optimal foraging depth should be shallower than the depth of highest prey density, even if the depth of the highest prey density is within easy reach (Mori 1998). Given the prey availability and alternate forging sites at the reservoir, cormorants will likely continue to utilize Perris reservoir after project completion.

Conclusions: The excavation of the borrow area would result in the loss of much of the available freshwater marsh and shallow water habitat (i.e., water less than 10 feet deep) along the northeastern edge of the lake. The proposed project would reduce the shallow water habitat from approximately 93 acres under pre-drawdown conditions, to approximately 69 acres, a loss of 24 acres. We would expect some relationship between bird response and depth diversity. The remaining shallow water habitat is expected to continue to support waterfowl and waterbirds at some level, but the level of avian response to the loss of foraging habitat is unknown. It should be noted that DWR has funded 15 acres of a CDFG waterfowl pond rehabilitation project at the San Jacinto Wildlife Area to mitigate for the loss of waterfowl hunting opportunities at Lake Perris.

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SOURCE: DWR, 2009; ESA, 2009.

Perris Waterfowl Analysis . 206008.02

Figure 1

Aquatic Resources

Appendix C4
Fisheries Impact Analysis

ESA

Mike Podlech

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Memorandum

To: Tom Barnes, Environmental Science Associates

From: Mike Podlech, Aquatic Ecologist

CC:

Date: August 31, 2007

Re: Lake Perris Dam Retrofit Fisheries Impact Assessment

This technical memorandum presents an assessment of the potential and actual effects of a water storage drawdown on the fisheries resources of Lake Perris and offers mitigation recommendations. The assessment presented in this memorandum is based primarily on pre- and post-drawdown fish population data collected by the California Department of Fish and Game (CDFG 2006a, 2006b), personal observations of CDFG staff (Giusti, pers. comm.), and drawdown effects documented at other reservoirs.

Background

The Department of Water Resources (DWR) operates the State Water Project (SWP), which supplies water to numerous communities and millions of people throughout California. The SWP includes an extensive system of aqueducts and pipelines that convey water from the Feather River and Sacramento River watersheds through the Central Valley, terminating at Lake Perris in Riverside County. Lake Perris is entirely within the Lake Perris State Recreation Area (LPSRA) located between the cities of Moreno Valley and Perris in an unincorporated area of Riverside County, approximately 15 miles south of the City of Riverside and 65 miles east of the City of Los Angeles.

Perris Dam is an earthfill dam completed in 1974 that impounds the Lake Perris reservoir. The dam and lake are owned and operated by DWR, in cooperation with the Metropolitan Water District of Southern California (MWDSC), which supplies water for municipal and industrial uses throughout southern California. Water is conveyed from the East Branch Aqueduct of the SWP to Lake Perris via the Santa Ana Valley Pipeline. Lake Perris has a capacity of approximately 127,000 acre-feet (af) and a surface area of 2,292 acres when filled to normal design capacity, with a pool elevation of 1,588 feet above mean sea level (AMSL)[1]. The dam crest elevation is 1,600 feet AMSL. Lake Perris is a multi-purpose

[1] The elevations stated in this document are based on the National Geodedic Vertical Datum of 1929 which was used for the original construction of the dam. This remediation project will use NAVD 88. The difference is about 2.5 feet.

reservoir used for water supply, recreation, fish and wildlife habitat, and emergency water storage. The recreational opportunities at Lake Perris include swimming, boating, camping, hunting, fishing, horseback riding, hiking, rock climbing, and bird and animal watching. The LPSRA has approximately 1.1 million visitors each year.

In 2005, DWR completed a geotechnical investigation and seismic assessment of Perris Dam and concluded that the southeastern reach of the dam, (the "left reach"), is underlain by soil lenses prone to liquefaction. During strong seismic-related shaking, these soils could cause earthquake-induced deformation of the dam. The deformations could lower the dam crest enough to allow overtopping. As a safety precaution, the lake has been drawn down to a maximum elevation of 1,563 feet AMSL, resulting in a current surface area of 1,882 acres. Thus the current surface area of the lake is approximately 410 acres (18%) less than during normal reservoir operations. This water level restriction resulted in a capacity loss of approximately 52,000 af, leaving the reservoir operating at approximately 60% of its normal capacity. The surface area extent of the 2005 drawdown is depicted in Figure 1.

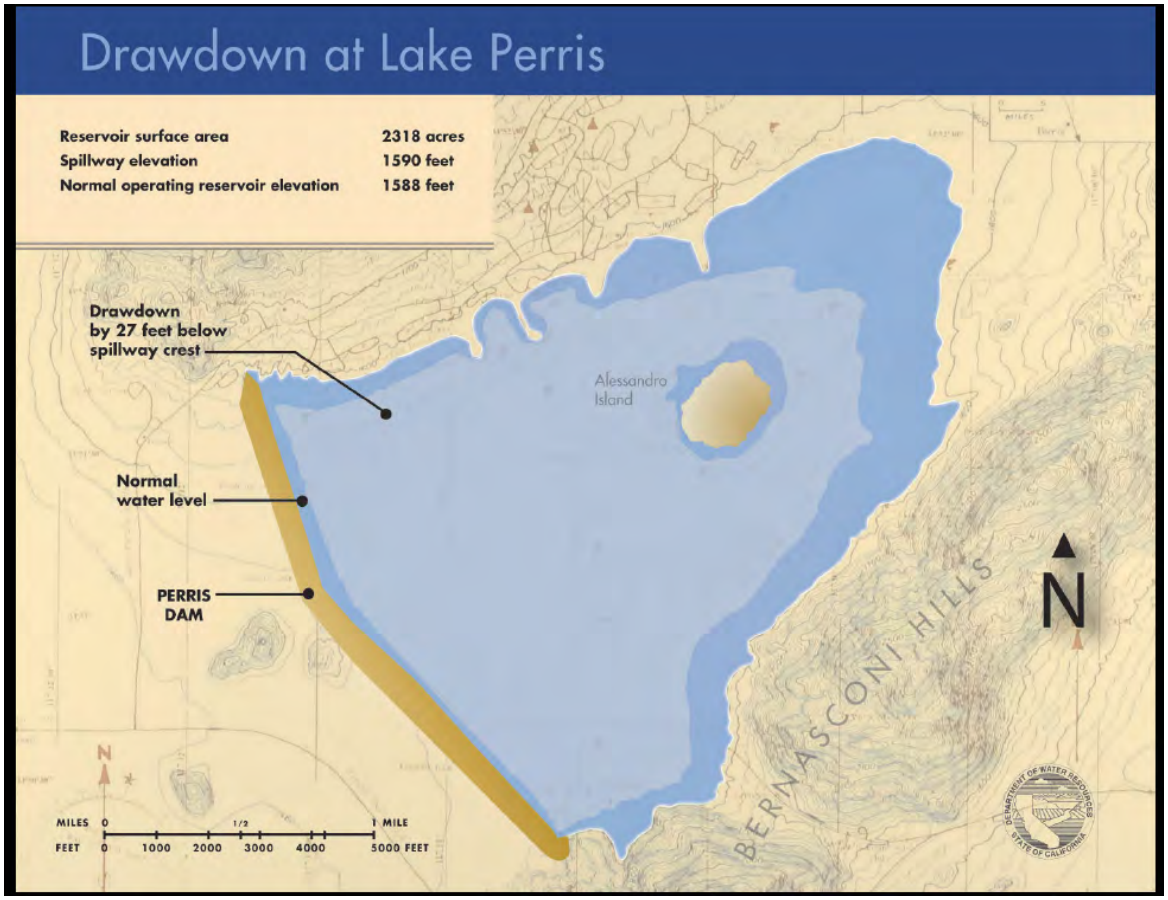

Figure 1. Extent of 2005 drawdown of Lake Perris (please note differences in elevation described in footnote 1)

DWR proposes to remediate the unsafe dam, construct a new outlet tower, and install a new emergency outlet release facility. The proposed project would seismically upgrade the dam and return the reservoir to its design capacity and water elevation. Approximately 2 million cubic yards of soil required for project construction will be excavated from within the currently exposed lakebed at the east end of the lake.

Fisheries Resources of Lake Perris

Lake Perris is managed for a recreational fishery. Largemouth bass (*Micropterus salmoides*), channel catfish (*Ictalurus punctatus*), and bluegill (*Lepomis macrochirus*) are commonly caught species. Other species that are known to occur in Lake Perris include spotted bass (*Micropterus punctulatus*), flathead catfish, (*Pylodictis olivaris*), green sunfish (*Lepomis cyanellus*), redear sunfish (*Lepomis microlophus*), and black crappie (*Pomoxis nigromaculatus*) (CDFG, 2006b; Drake 1985). Rainbow trout (*Oncorhynchus mykiss*) are planted by CDFG from October through May while water temperatures in the lake are sufficiently cool to support the species, but this species spawns in flowing water in streams and rivers and does not reproduce in lakes. Brief life history summaries for the three most abundant shallow water fish species in Lake Perris (CDFG, 2006b) are provided below.

Largemouth bass

Largemouth bass spawning occurs in the spring when water temperatures reach about 60°F. Males build the nests in two to eight feet of water. Largemouth bass prefer to nest in quieter, more vegetated water, but will use any substrate besides soft mud, including submerged logs. Once the female has laid eggs in the nest (2,000 to 43,000) she is chased away by the male who then guards the eggs. The young, called fry, hatch in five to ten days. Fry remain in a group or "school" near the nest and under the male's watch for several days after hatching. Juvenile largemouth bass may continue to congregate in schools, but adults are usually solitary. Largemouth bass hide among plants, roots or limbs to strike their prey. Fry feed primarily on zooplankton and insect larvae. At about two inches in length they become active predators. Adults feed almost exclusively on other fish and large invertebrates such as crayfish. Larger fish prey upon smaller bass. The average lifespan of largemouth bass is approximately 16 years.

Bluegill

Bluegills begin spawning when water temperatures reach about 70°F. Spawning may peak in May or June, but continues until water temperatures cool in the fall. Because of their long spawning season, bluegills have very high reproductive potential, which often results in overpopulation in the face of low predation or low fishing pressure. Nests are created in shallow water, one to two feet in depth, primarily in gravel substrates. Fifty or more nests may be crowded into a small area, thus creating a spawning bed. Males guard the nest until the eggs hatch and fry leave. Young fish feed on plankton, but as they grow the diet shifts to aquatic insects and larvae.

Redear sunfish

Redear sunfish spawn during the warm months of late spring and early summer, and in deeper water than most other sunfish, congregating in spawning beds. Nests are saucer-shaped depressions in gravel or silt, and are sometimes so close they almost touch. There are usually one or two peaks of activity during the spawning season. Redear sunfish feed primarily on snails as a major food item, although insect larvae may also be found in their diet. The species is usually found near the bottom in warm water with little current and abundant aquatic vegetation. Redears normally reach sexual maturity by the end of their second year.

General Lake Ecology

Lakes and reservoirs typically contain distinct zones of biological communities linked to their physical structure. The littoral zone is the near-shore area where sunlight penetrates all the way to the substrate and allows for aquatic plant growth. Light levels of about 1% or less of surface values usually define this depth. The 1% light level also defines the euphotic zone of the lake, which is the layer from the surface down to the depth where light levels become too low for photosynthesis. The higher plants (macrophytes) in the littoral zone, in addition to being a food source and a substrate for algae and invertebrates, provide important habitat for fish and other organisms.

The limnetic zone is the open water area where light does not generally penetrate all the way to the bottom. The bottom sediment, known as the benthic zone, has a surface layer abundant with organisms. Most of the organisms in the benthic zone are invertebrates, such as insect larvae (midges, mosquitoes, black flies, etc.) or small crustaceans. The productivity of this zone largely depends upon the organic content of the sediment, the amount of physical structure, and in some cases upon the rate of fish predation. Sandy substrates contain relatively little organic matter (food) for organisms and poor protection from predatory fish. Higher plant growth is typically sparse in sandy sediment, because the sand is unstable and nutrient deficient. A rocky bottom has a high diversity of potential habitats offering protection (refuge) from predators and substrate for attached algae. A flat mucky bottom offers abundant food for benthic organisms but is less protected and may have a lower diversity of structural habitats, unless it is colonized by higher plants.

In addition to light penetration, temperature and oxygen concentrations influence the extent and suitability of fisheries habitat in lakes and reservoirs (Hayes et al., 1999). The waters of shallow lakes tend to mix from top to bottom, resulting in constant temperature and oxygen concentrations with depth. Deeper water bodies, such as Lake Perris, however, generally stratify (i.e., have layers of different water temperature) during summer months. Typically, the epilimnion (surface layer) occupies the upper several feet of the lake and contains relatively warm temperatures and relatively high concentrations of dissolved oxygen. Warmwater littoral fishes such as largemouth bass and bluegill are generally found in the epilimnion. The metalimnion is the next layer and is characterized by a gradual decrease in water temperatures. Toward the bottom of the metalimnion, coldwater fish such as rainbow trout may be present. The extent of the metalimnion is highly variable and depends on lake size, wind exposure, and the time of year. The deepest layer in stratified lakes is the hypolimnion. This layer is the coolest part of the lake and may support coldwater fishes if sufficient oxygen is available. In lakes with low productivity, dissolved oxygen concentrations are often high in the metalimnion and hypolimnion; in productive lakes, decomposing organic material depletes oxygen, sometimes to the point that there is insufficient oxygen to support any fish species.

Effects of Reservoir Drawdown

Long-term drawdowns of reservoirs can adversely impact fish populations. The most significant effect is the loss of important spawning and rearing habitat through exposure of the littoral zone and the associated loss of macrophytes. The littoral zone also serves as important cover habitat for smaller fish, which are forced into deeper water habitat where they are more vulnerable to predation when water elevations are reduced. The reduction in surface area, shoreline length, and water volume associated with drawdowns leads to the concentration of fish into a smaller area, leading to increased competition for food sources and further vulnerability of small fish to predation. Physically, the reduction in reservoir volume may lead to changes in the stratified zones (e.g., reduction of metalimnion due to increased water temperatures), increased erosion of exposed shorelines through wave action, and water quality deterioration (e.g., increase of nutrient concentrations and decrease in dissolved oxygen due to lower dilution of nutrient-rich sediments).

CDFG has monitored fish population in Lake Perris since at least 1992, including in 2006 after the October 2005 drawdown (CDFG, 2006b). Data presented in two internal reports (CDFG, 2006a; CDFG, 2006b), as well as personal CDFG staff observations (Giusti, pers. comm.) provide indications of the initial response of the Lake Perris fish population to the drawdown. Based on survey data and statistical population estimates, CDFG concluded in 2006 that the pre-drawdown population of 12-inch or larger largemouth bass of approximately 20,000 had been reduced to approximately 12,000 to 13,000 fish in 2006 (CDFG, 2006a). The observed reduction in the bass population of approximately 43% is consistent with the percentage of water volume reduction in the lake. The relative abundance of largemouth bass has also decreased since the drawdown. In 1996, largemouth bass accounted for 55% of all fish sampled, but only 15% of sampled fish in 2006. The observed reduction in the bass population of the lake is at least partially responsible for a 75% reduction in bass tournaments held at Lake Perris (Giusti, pers. comm.).

CDFG has also observed a shift in the population structure of the Lake Perris fishery. The length frequency distribution of largemouth bass, bluegill, and redear sunfish has increased since the drawdown, suggesting that smaller-sized individuals of these species are being lost due to (a) increased predation and (b) reduced or eliminated recruitment due to the overall reduction in suitable spawning habitat (CDFG, 2006b). Furthermore, the rate at which fish were being captured during the 2006 surveys was significantly higher than during previous years, suggesting that the reduced volume of the lake has concentrated fish to the extent where they are easier to catch (CDFG, 2006b).

Similar effects of decreases in the overall abundance of littoral fish, decreased abundance of smaller (juvenile) fish, and an increase in the relative abundance of larger fish has been documented from other reservoirs experiencing long-term drawdowns (e.g., Paller, 1997).

In addition to the observed biological changes in Lake Perris, the drawdown has also resulted in observed physical changes. Shallow water habitat (3 to 10 feet in depth) in Lake Perris has been largely eliminated. Prior to the drawdown, the visibility in the water column ranged from approximately 6 to 8 feet, but is now typically less than 2 feet (Giusti, pers. comm.). It is unclear whether this increased turbidity of the water is due to increased erosion and sedimentation or algal blooms resulting from increased nutrient concentrations, or a combination of both.

Given the post-drawdown condition of the Lake Perris fishery through 2006, it appears likely that the observed conditions will continue to adversely affect the fish population. Unless a new littoral zone with adequate plant growth and cover can be established at the new lake surface, either naturally or through habitat restoration efforts, spawning success and recruitment will continue to be low for littoral species such as bass, bluegill, and redear sunfish. As larger fish die due to age, competitive pressures, or recreational capture, populations will likely continue to decline. Once the relative abundance of large fish is reduced and aquatic vegetation becomes re-established, spawning success and the survival of juvenile fish may increase again and populations may stabilize at the lower levels the reduced lake appears to be able to support.

In addition to the effects of the 2005 drawdown, the overall dam remediation project proposed by DWR is likely to further impact the fishery of Lake Perris. A further, albeit temporary, drawdown of the lake will likely occur during the construction phase of the project. This could adversely affect the rate at which aquatic vegetation and fish are able to colonize new habitat. Furthermore, a total of approximately 2 million tons of soil will be excavated from a borrow pit at the east end of the lake (Figure 2). The excavation will result in a reduction of shallow water habitat and a concomitant increase in deep water habitat in the lake once it is refilled.

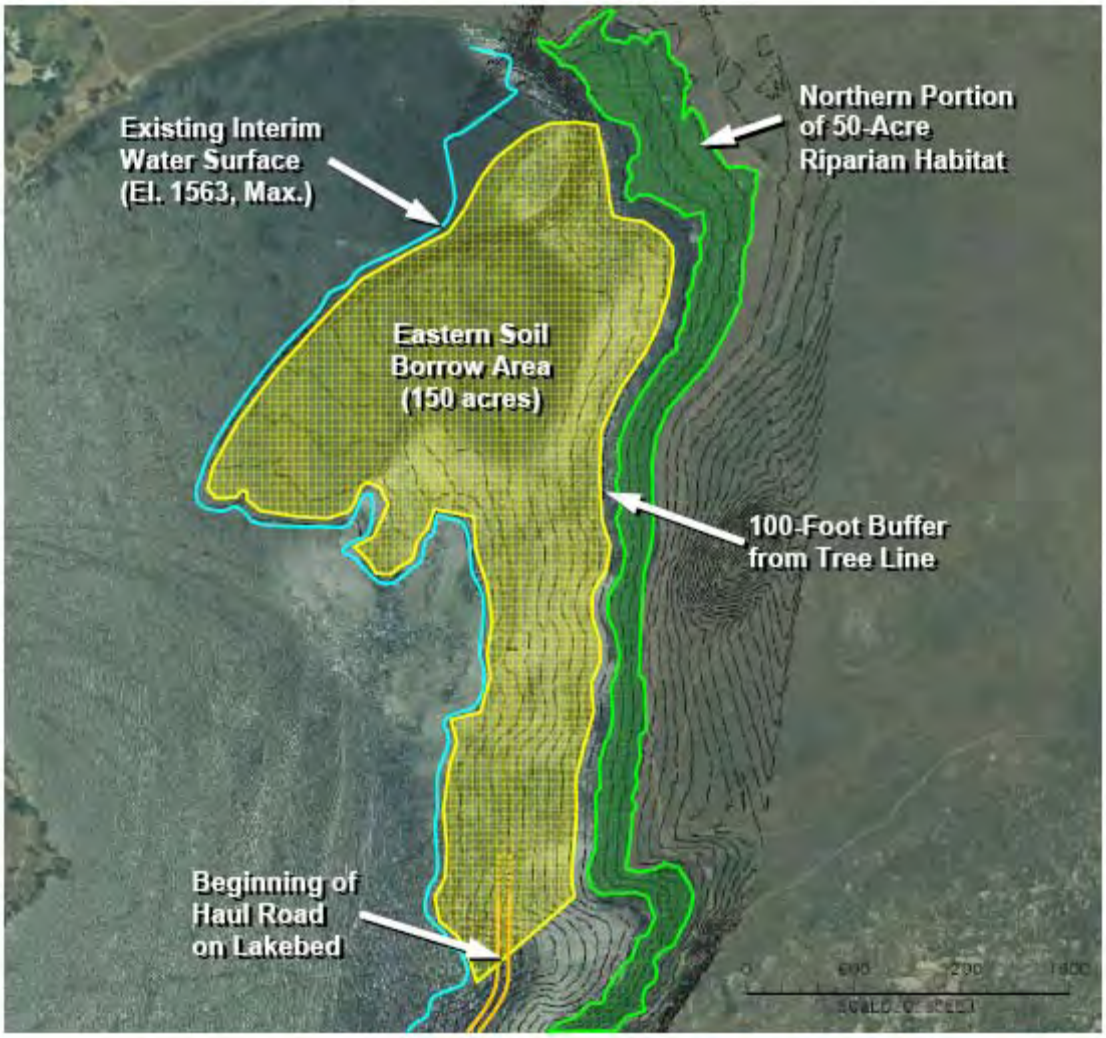

Figure 2. Proposed soil borrow pit at the eastern end of Lake Perris.

Mitigation Recommendations

Mitigation measures are intended to either (a) avoid adverse impacts on the environment from occurring or (b) to mitigate for unavoidable adverse impacts. In the case of the Lake Perris drawdown, the adverse impacts on the fishery have already occurred and are likely to continue. Thus, these effects may be temporarily mitigated through active habitat creation (e.g., aquatic vegetation plantings, installation of cover structures, etc.) and permanently mitigated once the lake is refilled (e.g., restoration of historic littoral zone). The potential effects of the proposed additional drawdown during project construction and the use of the eastern lake bed as a borrow pit, on the other hand, requires appropriate mitigation measures aimed at avoiding and/or reducing the extent and significance of those impacts. The following recommendations for mitigating the impacts of the Perris Dam Remediation Project are separated into (a) short-term measures intended on managing the fishery during the ongoing drawdown phase, (b) measures intended to avoid and minimize further impacts during project construction, and (c) post-construction measures intended to assist the recovery of the fish population.

With regards to mitigation category (c) above, it should be noted that some research has shown that natural recovery of fish populations after extended drawdowns may occur fairly rapidly even in the absence of mitigation/restoration measures. For example, Paller (1997) found that the drawdown of a reservoir in South Carolina to 50% of its original surface area and volume for 3.5 years resulted in significant reductions in fish abundance and species diversity, changes in relative fish abundance, and changes in the size structure of individual fish species. However, within 9 months of refilling the reservoir, the fish community had recovered in terms of number of species and overall fish abundance, and had nearly recovered in term of species composition. However, size structures after the refill were different from before the drawdown with large individuals being less abundant and smaller individuals being more abundant after refill (Paller, 1997). However, this rapid recover is in contrast to recent CDFG experiences at Lake Silverwood, where recovery from drawdown effects took approximately 10 years, even though mitigation measures such as stocking of largemouth bass and control of undesirable species such as common cap and goldfish were implemented (Giusti, pers. comm.).

(a) Short-term Measures

- Initiate a fishery assessment and monitoring program to establish pre-project conditions and provide baseline information to assist in the development of a fishery restoration plan and post-project adaptive management (see below).

- Initiate stocking program consisting of juvenile fish of desirable species (e.g., largemouth bass, bluegill, redear sunfish, and channel catfish) to maintain a balanced population structure.

- Temporarily modify recreational fishing size and bag limits to reduce recreational fishing pressures.

- Install habitat enhancement structures (e.g., hardwood brush shelters, pipe caves, rock reefs) in remaining shallow water areas to increase spawning success and survival of smaller fish.

(b) Construction Phase Measures

- A further construction-related drawdown should only be conducted outside the spring spawning and summer rearing season (i.e., during the winter).

- The proposed borrow pit should be located below the elevation of the original shallow water habitat areas (i.e., 0 to 10 feet water depth) to avoid the permanent loss of these areas.

- Install habitat enhancement structures (e.g., hardwood brush shelters, pipe caves, rock reefs) in currently exposed areas of the lake to aid recovery of the fishery after refilling.

(c) Post-filling Measures

- DWR should adaptively manage the Lake Perris fishery through recovery. Adaptive management efforts, conducted in coordination with CDFG, should be based on annual fish population monitoring data and may include activities such as stocking, habitat restoration, and control of undesirable species.

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Appendix C5
Least Bell's Vireo Survey

ESA

Date: July 2009

To: Environmental Science Associates.
(Mr. Tom Barnes, Mr. Mark Tucker)

From: Psomas
(Mr. Gregg Miller)

Subject: Lake Perris 2009 Least Bell's Vireo Surveys

The purpose of this memo is to document the results of the 2009 focused survey for least Bell's vireo (*Vireo bellii pusillus*) (LBV) at Lake Perris. The purpose of the LBV surveys is to determine the presence or absence of LBV in suitable habitat in the proposed project site. The survey was conducted at the request of DWR and was performed following U.S. Fish and Wildlife Service protocols.

Prior to conducting the focused surveys, Psomas searched the most recent version of the California Natural Diversity Data Base CNDDB output for the Perris Quadrangle (CDFG 2008), the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) (RCIP 2003), MSHCP monitoring reports (RCA 2007) and previous Lake Perris LBV survey reports (Psomas 2007, 2008) to determine to what extent LBV may occur on and adjacent to the site.

The surveys were conducted in two areas: 1) the southern willow scrub along the eastern lakeshore and 2) the southern willow scrub immediately west of and below the dam. The survey areas contains appropriate southern willow scrub habitat for the LBV. The characteristic plant species of the southern willow scrub habitat found within the survey areas include: Gooding's black willow (*Salix gooddingii*), red willow (*Salix laevigata*), mule fat (*Baccharis salicifolia*), tarragon (*Artemisia dracunculus*), dock (*Rumex crispus*), Fremont's cottonwood (*Populus fremontii*), and umbrella sedge (*Cyperus involucratus*). Where present in the southern willow scrub habitat, understory species included annual bur ragweed (*Ambrosia acanthicarpa*), southwestern spinyrush (*Juncus acutus*), and bromes (*Bromus diandrus*, *B. madritensis* ssp. *rubens*).

The surveys were performed by Psomas Senior Biologist; Mr. Gregg Miller. The LBV surveys were conducted following the federal survey guidelines (USFWS 2001). Eight (8) surveys for LBV were conducted on April 10, 13, 20, 23, May 1, 4, 11, 14, 21, 26, June 1, 9, 11, 15, 22, and 25, 2009.

Surveys were conducted by walking slowly watching and listening for LBV. Surveys were conducted in the morning between dawn and 11:00 AM, during weather conducive to observing LBV. Surveys were not conducted during inclement weather. Field notes in standard museum format were recorded during surveys. Locations of LBV observations were taken with a hand held GPS unit.

LBV were observed nine times in three distinct locations during the surveys. The general observation locations are shown on Figure 1 Least Bells Vireo Sightings (2009). Based on observed behavior, time and location of observations there is a minimum of one LBV territory in the southern willow scrub in the drawdown area along the eastern lakeshore.

Survey dates, times and conditions are shown in Table 1 *Survey Information*.

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Table 1
Survey Information

Survey Information						
Date	**Eastern Shore**	**Below Dam**	**Time**	**Temp.**	**Wind**	**Cloud Cover**
April 10, 2009	X		7:00 am – 9:00 am	65°F	5-10 mph	overcast
April 13, 2009		X	7:00 am – 9:10 am	55°F	0 mph	clear
April 20, 2009	X		6:30 am – 10:00 am	58°F	0 mph	clear
April 23, 2009		X	6:30 am – 8:00 am	55°F	0 mph	overcast
May 1, 2009	X		6:40 am – 9:45 am	55°F	0 mph	overcast
May 4, 2009		X	6:45 am – 8:00 am	60°F	0 mph	clear
May 11, 2009	X		6:15 am – 10:00 am	56°F	0-5 mph	clear
May 14, 2009		X	6:30 am – 8:15 am	56°F	0 mph	clear
May 21, 2009	X		6:15 am – 9:30 am	58°F	0 mph	clear
May 26, 2009		X	6:30 am – 8:15 am	58°F	0 mph	overcast
June 1, 2009	X		6:15 am – 9:45 am	60°F	0 mph	overcast, misty
June 9, 2009		X	9:00 am – 10:30 am	61°F	0-7 mph	overcast
June 11, 2009	X		6:45 am – 10:00 am	61°F	1-8 mph	overcast
June 15, 2009		X	8:30 am – 10:00 am	65°F	0-5 mph	overcast
June 22, 2009	X		6:20 am – 9:45 am	57°F	0 mph	clear
June 25, 2009		X	6:40 am – 8:30 am	67°F	0 mph	partly cloudy

Other species of wildlife observed during the surveys are included in Table 2, *Other Wildlife Observed*.

Table 2
Other Wildlife Observed

Scientific Name	Common Name
Reptiles	
Uta stansburiana	Northern side-blotched lizard
Cnemidophorus tigris	Western whiptail
Pituophis melanoleucus	Gopher snake
Birds	
Callipepla californica	California quail
Cathartes aura	Turkey vulture
Pandion haliaetus	Osprey
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	Red-tailed hawk
Falco sparverius	American kestrel
Zenaida macroura	Mourning dove
Geococcyx californianus	Greater roadrunner
Calypte anna	Anna's hummingbird
Picoides nuttallii	Nuttall's woodpecker
Sayornis nigricans	Black Phoebe

Sayornis saya	Say's phoebe
Myiarchus cinerascens	Ash-throated Flycatcher
Tyrannus vociferans	Cassin's kingbird
Tyrannus verticalis	Western kingbird
Vireo bellii pusillus	Least Bell's vireo
Corvus brachyrhynchos	American Crow
Corvus corax	Common raven
Tachycineta thalassina	Violet-green Swallow
Petrochelidon pyrrhonota	Cliff Swallow
Psaltriparus minimus	Bushtit
Thryomanes bewickii	Bewick's wren
Troglodytes aedon	House Wren
Phainopepla nitens	Phainopepla
Dendroica coronata	Yellow-rumped Warbler
Dendroica townsendi	Townsend's Warbler
Dendroica occidentalis	Hermit Warbler
Geothlypis trichas	Common Yellowthroat
Wilsonia pusilla	Wilson's Warbler
Piranga ludoviciana	Western Tanager
Pipilo maculatus	Spotted towhee
Pipilo crissalis	California towhee
Melospiza melodia	Song Sparrow
Pheucticus melanocephalus	Black-headed grosbeak
Passerina caerulea	Blue Grosbeak
Agelaius phoeniceus	Red-winged blackbird
Molothrus ater	Brown-headed Cowbird
Icterus bullockii	Bullock's Oriole
Carpodacus mexicanus	House finch
Carduelis psaltria	Lesser goldfinch
Carduelis lawrencei	Lawrence's goldfinch
Carduelis tristis	American goldfinch
Mammals	
Spermophilus beecheyi	California ground squirrel
Sylvilagus audubonii	Audubon's cottontail
Mephitis mephitis	Striped skunk
Canis latrans	Coyote

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LBV Sightings 2009
Biological Survey Area Boundary
Project Footprint

0 3,500
Feet

SOURCE: GlobeXplorer, 2007; ESA, 2010.

DWR - Perris Dam Remediation Program . 206008.02

Figure 1
Least Bell's Vireo Sightings (2009)

Appendix D
Hazardous Materials Appendix

ESA

APPENDIX D
Hazards and Hazardous Materials

This appendix supplements the information provided in Section 3.6 of the EIR. It provides an overview of wildland fire safety regulations related to construction activities and documents regulatory databases reviewed to identify permitted hazardous materials uses and environmental cases within ASTM International search distances from where substantial excavation would be conducted.

Wildland Fire Regulations

The California Public Resources Code includes fire safety regulations that would apply to construction activities at Perris Dam because the site is in an area designated by the California Department of Forestry and Fire Protection as a "Wildland Area That May Contain Substantial Forest Fire Risks and Hazards." These regulations are described below.

In accordance with Section 4427 of the Public Resources Code, the use of equipment from which a spark, fire, or flame may be produced is prohibited on days when burning permits are required unless: (1) all flammable material has been removed to a distance of 10 feet, and (2) appropriate fire suppression equipment including a round-point shovel and backpack pump water-type fire extinguisher are ready for use at the immediate area during the operation. The types of equipment covered by this restriction include any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices. This requirement does not apply to portable power saws and other portable tools powered by a gasoline-fueled internal combustion engine.

In accordance with Section 4428 of the Public Resources Code, the use of vehicles, machines, tools, or equipment powered by an internal combustion engine operated on hydrocarbon fuels in an industrial operation located near any forest, brush, or grass-covered land is prohibited from April 1 to December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining the appropriate equipment exclusively designated for firefighting purposes. The required equipment includes:

- A sealed box of tools located within the operating area, at a point accessible in the event of a fire. The tool box shall contain one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.

- One or more serviceable chain saws of 3½ or more horsepower with a cutting bar of 20 inches in length or longer shall be immediately available within the operating area, or a full set of timber felling tools shall be located in the fire tool box.

- Each passenger vehicle used on the operation shall be equipped with one shovel and one ax, and any other vehicle or tractor used in the operation shall be equipped with one shovel.

In accordance with Section 4431 of the Public Resources Code, the use of portable saws, augers, drills, tamper, or other portable tool powered by a gasoline fueled internal combustion engine is prohibited on forest-, brush-, or grass-covered lands within 25 feet of any flammable material when burning permits are required without providing the required fire suppression equipment. The required equipment includes one serviceable round-point shovel or one serviceable fire extinguisher; this equipment must be maintained within 25 feet of the operation of the tool, with unrestricted access for the operator from the point of operation.

In accordance with Section 4442 of the Public Resources Code, use of equipment equipped with an internal combustion engine that uses hydrocarbon fuels is prohibited on forest-, brush-, or grass-covered lands unless the equipment is equipped with a spark arrestor.[1]

Regulatory Database Review

A regulatory database review was conducted by EDR, Inc to identify permitted hazardous materials usage and environmental cases within ASTM International search distances from the Perris Dam Area (EDR, 2007). These databases are described in the following sections.

Federal Regulatory Databases

Federal agencies publish numerous lists of sites that track permitted uses of hazardous materials and environmental cases. The lists reviewed for this EIR are summarized in **Table D-1**. They include:

- The National Priority List (NPL), which is a subset of the CERCLIS database (described below) and includes priority sites for cleanup under the federal Superfund Program.

- The Proposed NPL sites (Proposed NPL), which includes sites proposed for addition to the NPL.

- Superfund Consent Decrees (CONSENT), which includes NPL sites with major legal settlements that establish responsibility and standards for cleanup.

- Records of Decision (ROD), list which includes NPL sites where a record of decision has been developed that mandates a permanent remedy and includes technical and health information to aid in the cleanup of the site.

[1] A spark arrestor is a device that prohibits exhaust gases from an internal combustion engine from passing through the impeller blades where they could cause a spark. A carbon trap is commonly used to retain carbon particles from the exhaust.

TABLE D-1
FEDERAL REGULATORY DATABASES REVIEWED

Name of List	Responsible Agency	Acronym	Date of List
National Priority List	USEPA	NPL	7/18/07
Proposed National Priority List Sites	USEPA	Proposed NPL	4/20/07
Superfund Consent Decrees	USEPA	CONSENT	4/13/07
Records of Decision	USEPA	ROD	6/8/07
National Priority List Deletions	USEPA	Delisted NPL	4/20/07
Comprehensive Environmental Response, Compensation, and Liability Information System	USEPA	CERCLIS	4/23/07
CERCLIS – No Further Remedial Action Planned	USEPA	CERCLIS NFRAP	6/21/07
Engineering Controls Site List	USEPA	US ENG CONTROLS	4/20/07
Sites With Institutional Controls	USEPA	US INST CONTROLS	4/20/07
Toxic Chemical Release Inventory System	USEPA	TRIS	12/31/05
Emergency Response Notification System	USEPA	ERNS	12/31/06
Hazardous Materials Information Reporting System	USDOT	HMIRS	3/5/07
Resource Conservation and Recovery Act	USEPA	RCRA	6/13/06
Biennial Reporting System	USEPA	BRS	12/31/05
RCRA Corrective Action Sites	USEPA	CORRACTS	6/26/07
RCRA Administrative Action Tracking System	USEPA	RAATS	4/17/95
Department of Defense Sites	USGS	DOD	12/31/05
Formerly Used Defense Sites	USACOE	FUDS	12/31/05
Facility Index System	USEPA	FINDS	4/12/07
PCB Activity Database System	USEPA	PADS	4/12/07
Toxic Substances Control Act	USEPA	TSCA	12/31/02
Federal Insecticide, Fungicide and Rodenticide Act/ TSCA	USEPA	FTTS	4/13/07
Federal Insecticide, Fungicide and Rodenticide Act/ TSCA	USEPA	FTTS INSP	4/13/07
Section 7 Tracking System	USEPA	SSTS	12/31/05
Material Licensing Tracking System	NRC	MLTS	4/5/07
Underground Storage Tanks on Indian Land	USEPA	INDIAN UST	6/18/07
Leaking Underground Storage Tanks on Indian Land	USEPA	INDIAN LUST	5/30/07
Indian Reservations	USGS	INDIAN RESERV	12/31/05
Mines Master Index File	MSHA	MINES	5/9/07
Uranium Mill Tailings Sites	USDOE	UMTRA	12/31/05
Open Dump Inventory	USEPA	ODI	6/30/85

SOURCE: EDR, 2007

- NPL Delisted sites (Delisted NPL), which includes sites that have been removed from the NPL because no further response is required in accordance with criteria contained in the National Oil and Hazardous Substances Pollution Contingency Plan.

- The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), which tracks potentially contaminated properties identified under the Comprehensive Environmental Response, Compensation, and Liability Act and the Superfund Amendments and Reauthorization Act.

- The CERCLIS No Further Action (CERCLIS-NFRAP) database, which lists sites where, following an initial investigation, no contamination was found, contamination was removed quickly, or the contamination was not serious enough to require federal Superfund action or NPL consideration. As part of the U.S. EPA's Brownfields Program, these sites have been removed from the CERCLIS database to lift unintended barriers to redevelopment.

- The Engineering Controls Site List (US ENG CONTROLS), which includes sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods that prevent human contact with or a release to the environment of hazardous materials left in place at a site.

- Sites with Institutional Controls (US INST CONTROLS), which includes sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post-remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of institutional controls.

- The Toxic Chemical Release Inventory System (TRIS), which identifies sites that release chemicals to the air, water, or land as required by Title III of the Superfund Amendments and Reauthorization Act of 1986.

- The Emergency Response Notification System (ERNS), which identifies spills of oil or hazardous substances reported pursuant to Section 103 of CERCLA as amended, Section 311 of the Clean Water Act, and Sections 300.51 and 300.65 of the National Oil and Hazardous Substances Contingency Plan.

- The Hazardous Materials Information Reporting System (HMIRS), which includes hazardous material spill incidents that were reported to the U.S. Department of Transportation.

- Resource Conservation and Recovery Act (RCRA), which includes facilities permitted to handle hazardous wastes under RCRA, including treatment, storage, and disposal facilities (RCRA-TSD); large-quantity generators that report generation of greater than 1,000 kilograms per month of nonacutely hazardous waste or 1 kilogram per month of acutely hazardous waste (RCRA-LQG); and small-quantity generators that report generation of less than 1,000 kilograms per month of nonacutely hazardous waste or 1 kilogram per month of acutely hazardous waste (RCRA-SQG).

- Biennial Reporting System (BRS), which is a national system administered by the U.S. EPA that collects data on the generation and management of hazardous wastes. RCRA large-quantity generators and treatment, storage, and disposal facilities are included.

- RCRA Corrective Action Sites (CORRACTS), which includes RCRA-permitted facilities that are undergoing corrective action. A corrective action order is issued when there has been a release of hazardous waste or constituents into the environment from a RCRA facility. Corrective actions may be required beyond the facility's boundary and can be required regardless of when the release occurred, even if it predates RCRA.

- RCRA Administrative Action Tracking System (RAATS), which includes enforcement actions taken under RCRA pertaining to major violations, including administrative and civil actions brought by the U.S. EPA.

- Department of Defense Sites (DOD), which includes federally owned or administered lands, administered by the Department of Defense, that have an area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

- Formerly Used Defense Sites (FUDS), which includes formerly used defense site properties where the U.S. Army Corps of Engineers is actively working or will take necessary cleanup actions.

- Facility Index System (FINDS), which includes facility information and "pointers" to other sources that contain more detail. The following databases are included in FINDS: Permit Compliance System (PCS), Aerometric Information Retrieval System (AIRS), Enforcement Dockets (DOCKET), Federal Underground Injection Control (FURS), Criminal Docket System (C-Docket), Federal Facilities Information System (FFIS), State Environmental Laws and Statutes (STATE), and PCB Activity Database System (PADS).

- PCB Activity Database System (PADS), which includes generators, transporters, commercial storers, and/or brokers and disposers of PCBs who are required to notify the U.S. EPA of such activities.

- Toxic Substances Control Act (TSCA) list, which includes manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list.

- Federal Insecticide, Fungicide, and Rodenticide Act/TSCA (FTTS) list, which includes administrative cases and pesticide enforcement actions and compliance actions related to the Federal Insecticide, Fungicide, and Rodenticide Act.

- Federal Insecticide, Fungicide, and Rodenticide Act/TSCA (FTTS INSP) list, which includes inspection information for cases regulated under the Federal Insecticide, Fungicide, and Rodenticide Act.

- Federal Insecticide, Fungicide, and Rodenticide Act/TSCA Section 7 Tracking System (SSTS) list, which includes registered pesticide-producing establishments required to submit a report to the U.S. EPA annually.

- The Material Licensing Tracking System (MLTS), which includes sites that possess or use radioactive materials that are subject to Nuclear Regulatory Commission licensing requirements.

- The Underground Storage Tanks on Indian Land (Indian UST) list, which includes permitted UST facilities on Indian land.

- Leaking Underground Storage Tanks on Indian Land (INDIAN LUST), which includes leaking underground storage tanks on Indian land in Arizona, California, New Mexico, and Nevada.

- Indian Reservations (INDIAN RESERV), which includes Indian administered lands of the United States that have an area equal to or greater than 640 acres.

- Mines Master Index File (MINES), which includes properties that have been involved in mining including coal mining, quarrying, or sand and gravel operations.

- Uranium Mill Tailings Sites (UMTRA), which includes former uranium ore mining sites where large piles of mill tailings remained after the uranium had been extracted from the ore.

- Open Dump Inventory (ODI), which is defined as a disposal facility that does not comply with one or more parts of Title 40 of the Federal Code of Regulations, Parts 257 or 258.

State Regulatory Databases

Regulatory databases to track the status of environmental cases are maintained by several state agencies. The state databases reviewed for this EIR are summarized in **Table D-2**. They include:

- The California Bond Expenditure Plan (CA BOND EXP PLAN) includes sites for which a site-specific expenditure plan has been prepared for the appropriation of California Hazardous Substance Cleanup Bond Act of 1984 funds. This list is no longer updated.

- The Spills, Leaks, Investigation, and Cleanup Cost Recovery Listing (SLIC Reg2), which include various sites within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board.

- Statewide SLIC Cases (SLIC), which is maintained by the State Water Resources Control Board and includes a statewide list of SLIC cases.

- Calsites (HIST CAL-SITES), which was previously referred to as the Abandoned Sites Program Information System (ASPIS), identifies potential hazardous waste sites, which are then screened by the Department of Toxic Substances Control (DTSC) for further action. Sites on this list that are designated for no further action by the DTSC were removed from this list in 1996.

- Voluntary Cleanup Program Properties (VCP), which includes low-threat-level properties with either confirmed or unconfirmed releases, and the project proponents have requested that the DTSC oversee investigation and/or cleanup activities.

- The Leaking Underground Storage Tank Information System (LUST), which is an inventory of sites with reported leaking underground storage tank incidents maintained by the State Water Resources Control Board.

- The Fuel Leak List (LUST Reg9), which tracks remediation status of known leaking underground tanks.

TABLE D-2
STATE AND LOCAL REGULATORY DATABASES REVIEWED

Name of List	Responsible Agency	Acronym	Date of List
California Bond Expenditure Plan	DHS	CA BOND EXP PLAN	1/1/89
Spills, Leaks, Investigation, and Cleanup Cost Recovery Listing	CRWQCB	SLIC Reg8	7/17/07
Statewide SLIC Cases	SWRCB	SLIC	8/3/07
Voluntary Cleanup Program Properties	DTSC	VCP	5/29/07
Leaking Underground Storage Tank Information System	SWRCB	LUST	7/10/07
Leaking Underground Storage Tank Report	CRWQCB	LUST Reg9	3/1/01
Waste Management Unit Database	SWRCB	WMUDS/SWAT	4/1/00
Cortese Hazardous Waste and Substances Sites List	Cal EPA	CORTESE	4/1/01
Toxic Pits Cleanup Act Sites	SWRCB	TOXIC PITS	7/1/95
Waste Discharge System	SWRCB	CA WDS	6/19/07
School Property Evaluation Program	DTSC	SCH	5/29/07
California Hazardous Material Incident Report System	Cal OES	CHMIRS	12/31/05
Hazardous Waste Information System	Cal EPA	HAZNET	12/31/05
Facility Inventory Database	Cal EPA	CA FID UST	10/31/94
Calsites Database	DTSC	HIST CAL-SITES	8/8/05
Dry Cleaner Facilities	DTSC	DRYCLEANERS	7/31/07
Emissions Inventory Data	CARB	EMI	12/31/05
Statewide Environmental Evaluation and Planning System	SWRCB	SWEEPS UST	6/1/94
EnviroStor Database	DTSC	ENVIROSTOR	5/29/07
Riverside County LUST Sites List	RCDPH	LUST	5/21/07

SOURCE: EDR, 2007

- The Waste Management Unit Discharge System (WMUDS/SWAT), which tracks waste management units. The list contains sites identified in the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, Solid Waste Assessment Test (SWAT) Program Information, SWAT Report Summary Information, Chapter 15 Information, Chapter 15 Monitoring Parameters, Toxic Pits Cleanup Act Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

- Cortese Hazardous Waste and Substances Sites List (CORTESE), which includes sites designated by the State Water Resources Control Board (LUST cases), Integrated Waste Board (SWF/LS), and the DTSC (CAL-SITES).

- Toxic Pits Cleanup Act Sites (TOXIC PITS), which includes sites suspected of containing hazardous substances where cleanup has not yet been completed.

- The Waste Discharge System (CA WDS), which lists sites that have been issued waste discharge requirements.

- School Property Evaluation Program (SCH), which includes proposed and existing school sites that are being evaluated by DTSC for possible hazardous material contamination. In some cases, these properties may be listed in the Cal-Sites category, depending on the level of threat they pose to public health and safety or to the environment.

- California Hazardous Materials Incident Reporting System (CHMIRS), which includes reported hazardous materials accidental releases or spills.

- The Hazardous Waste Information System (HAZNET), which includes facility and manifest data for sites that file hazardous waste manifests with the DTSC. The information contained in the database is based on manifests submitted without correction, and therefore may contain some invalid information.

- The Facility Inventory Database (CA FID UST), which is a historical listing of active and inactive underground storage tank locations. Local records should contain more current information.

- The Dry Cleaner Facilities database (DRY CLEANERS), which lists drycleaner-related facilities that have EPA identification numbers.

- Emissions Inventory Database (EMI), which includes sites for which the California Air Resources Board and local air pollution control agencies have collected toxic and criteria pollutant emission data.

- The Statewide Environmental Evaluation and Planning System (SWEEPS UST), which is a listing of underground storage tank sites that was prepared for the State Water Resources Control Board in the early 1980s, but is no longer maintained or updated.

- The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

- The Leaking Underground Storage Tank Incident Reports (LUST) records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Local Regulatory Databases

The Riverside County Department of Public Health Underground Storage Tank Cleanup Sites List (LUST) tracks sites in Riverside County with LUSTs. This database is listed in **Table D-2**.

Other Databases Reviewed and Features Identified

In addition to the regulatory databases described above, the database review included review of the Former Manufactured Gas Plants, Historical Auto Stations and Historical Cleaners databases provided by EDR, Inc. and identified oil/gas pipelines and electrical transmission lines, sensitive receptors, flood zones, and wetlands.

About Your Bill
Backflow Devices
Bill Payment Options
Pay Online Now
Starting Service
Ending Service
Recycled Water
Trash Service
Understanding Tiered Rates
Water & Sewer Rates
Water District
Water Facts
Water Quality
Water Sources
Emergency Assistance

Where the Water Comes From

The water from EMWD comes from several sources:

- imported water
- ground water
- recycled water
- water supply conditions

Imported Water

Approximately 75% of EMWD's potable water demand is supplied by imported water from Metropolitan Water District through its Colorado River Aqueduct and its connections to the State Water Project.

TOP

Ground Water

Contrary to the impression of groundwater being huge underground rivers and lakes, groundwater is the water that occupies the pores and cracks in soil and rock. The source of groundwater is either natural or artificial recharge. Natural recharge begins as rain or snow that seeps directly into the soil and rocks, or from rivers, streams, and lakes. Artificial recharge is the intentional recharge of water in ponds or spreading basins; or through the use of injection wells.

Groundwater Basins may be defined by geologic structures, such as earthquake faults or fault zones; or, they may be defined by administrative boundaries based on water quality or some other factor. Groundwater flow follows a path of least resistance (i.e. groundwater level gradient) to a point of equilibrium.

Approximately 25% of EMWD's potable water demand is supplied by EMWD groundwater wells. The majority of the groundwater produced by EMWD comes from its wells in the Hemet and San Jacinto area, where it is also served. Some of these wells have limited production as a result of the Fruitvale Judgment and Decree. EMWD also has wells in the Moreno Valley, Perris Valley, and Murrieta areas.

More Information

- Information About Groundwater Rights
- If You Pump Groundwater...
- State & County Agencies with Water Resources Regulatory Authorities

TOP

Water Supply Conditions

Find out more by clicking on the links below:

- EMWD Water Shortage Contingency Plan (Ordinance 117.2)
- EMWD Water Use Efficiency Ordinance (Ordinance 72.25)

- Riverside County Water Task Force website
- California State Department of Water Resources Drought website
- Metropolitan Water District of Southern California Water Reserve Alerts

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MAP SCALE 1" = 1000'

600 0 1000 2000

FEET

METER

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1435G

FIRM

FLOOD INSURANCE RATE MAP

RIVERSIDE COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 1435 OF 3805

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PERRIS, CITY OF	060258	1435	G
RIVERSIDE COUNTY	060245	1435	G

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06065C1435G

EFFECTIVE DATE
AUGUST 28, 2008

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov