APPENDICES A, G, AND I HAVE BEEN OMITTED THEY HAVE BEEN SUBMITTED UNDER CONFIDENTIAL COVER

Appendix 4.4-A

Biological Technical Report

Biological Technical Report

TL695/6971 Reconductor Project
Aboard Marine Corps Base Camp Pendleton
San Diego and Orange Counties, California



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November 2015

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ACRONYMS AND ABBREVIATIONS

BGEPA	Bald and Golden Eagle Protection Act
BMPs	Best Management Practices
BTR	Biological Technical Report
CCA	California Coastal Act of 1972
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CNPS	California Native Plant Society
CNDDB	California Natural Diversity Database
CPUC	California Public Utilities Commission
RWQCB	California Regional Water Quality Control Boards
CWA	Clean Water Act
CZMA	Coastal Zone Management Act of 1972
CFR	Code of Federal Regulations
ESA	Endangered Species Act
INRMP	Integrated Natural Resources Management Plan
MCB	Marine Corps Base Camp Pendleton
MBTA	Migratory Bird Treaty Act
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NCCP	Natural Communities Conservation Plan
OCRM	Office of Ocean and Resource Management
PEA	Proponent's Environmental Assessment
PSA	Proposed Survey Area
PTC	Permit to Construct
SDG&E	San Diego Gas & Electric Company
SWRCB	State Water Resources Control Board
SWPPP	Storm Water Pollution Prevention Plan
ACOE	U.S Army Corps of Engineers
U.S.C.	United States Code
DoD	United States Department of Defense
USFWS	United States Department of the Interior Fish and Wildlife Service
EPA	United States Environmental Protection Agency

1.0 INTRODUCTION

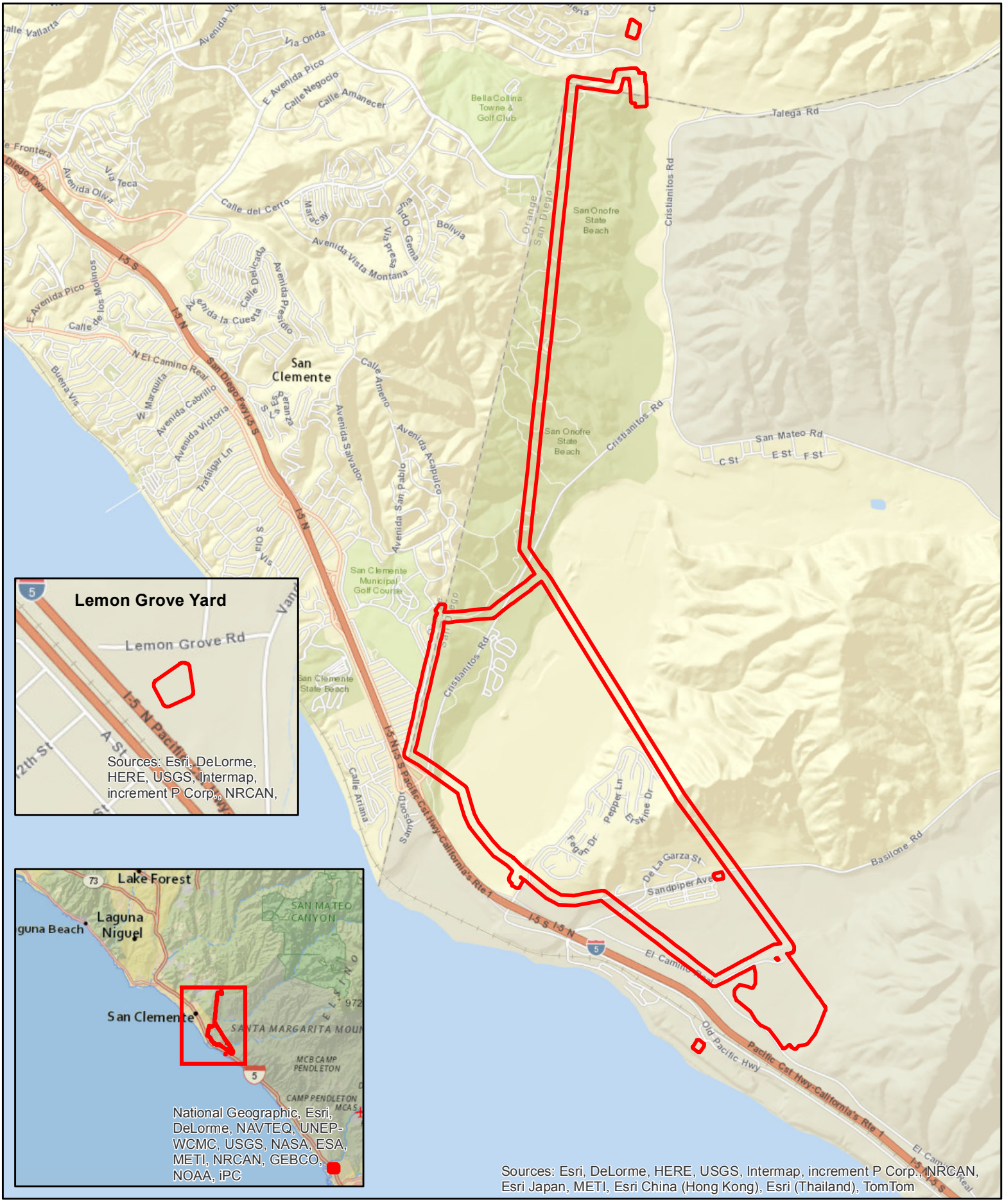
San Diego Gas & Electric Company (SDG&E) is a regulated public utility that provides electric service to over three million customers within its 4,100 square mile service territory, which covers portions of southern Orange County, San Diego County, and western Imperial County in California. In an effort to provide service reliability for its customers within Marine Corps Base (MCB) Camp Pendleton and southern Orange County, SDG&E is proposing to construct the TL695/6971 Reconductor Project (Project), which involves the reconductoring of an approximately 10 mile-long 69 kilovolt (kV) power line in northern San Diego County, near its northwest border with Orange County (Figure 1). The power line is located primarily on federal military lands aboard the northwestern portion of MCB Camp Pendleton. The proposed Project includes the removal of existing wood poles; the installation of new dull galvanized steel poles; reconductoring; and other improvements. The Project alignment runs generally north to south, from SDG&E's Talega Substation to its Basilone Substation, with one section of the Project heading southeast from the San Mateo Junction, and the other heading southeast from the Basilone Substation to the SDG&E Japanese Mesa Substation, in the San Onofre Nuclear Generation Station (SONGS) Mesa area.

SDG&E has retained Pangea Biological (Pangea) to conduct biological resource surveys (including special-status plant and wildlife surveys) and a jurisdictional waters/wetland study within the proposed Project. Analysis of biological and water/wetland resources included a 300-foot-wide (150 feet on either side of the project alignment) survey corridor along the proposed Project alignment, as well additional work areas outside of the project corridor.

The purpose of this Biological Technical Report (BTR) is to document the findings of both reconnaissance-level and focused biological and jurisdictional water and wetland surveys conducted for the proposed Project, and to analyze the potential and actual impacts that could occur as a result of construction of the proposed Project. This report will be included as an attachment to SDG&E's Proponent's Environmental Assessment (PEA), and filed as part of its application for a Permit to Construct (PTC) that will be submitted to the California Public Utilities Commission (CPUC). Pangea has prepared this report on behalf of SDG&E.

2.0 PROJECT DESCRIPTION

The proposed reconductoring, pole structure removal, and pole structure installation will occur within existing utility corridors and power line alignments. Reconductoring will also take place at existing substations. The new dull galvanized steel pole structures will consist of both direct bury and foundation pole structures. New pole structures will be placed in new holes and/or set in existing holes. The Proposed Project will also involve removing existing conductor; topping existing pole structures above distribution and communication lines; stringing new conductor onto existing structures; installing new cable pole structures; and placing conductor in a new underground alignment. Construction activities will be facilitated through the use of various temporary facilities, including stringing sites, guard structures, work/staging/turnaround areas, helicopter Incidental Landing Areas (ILAs), and staging yards.



0 0.25 0.5 0.75 1 Mile

Created by Pangea Biological, September 2015
Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

25240 TL 695/6971 Reconductor Project
Figure 1: Tie Line 695/6971 Project Location Overview

Survey_corridor

Pangea Biological

Access for construction activities will be provided by existing dirt access roads, overland travel routes, and footpaths. One new dirt access road segment, approximately 50 feet in length, will be required to access a proposed pole structure. Helicopters will also be used for construction, and will land as needed at ILAs and/or staging yards. Refer to Chapter 3, Project Description, of the TL 695/6971 Reconductor Project Proponent's Environmental Assessment for a detailed description of construction activities, including the dimensions of temporary workspaces that may affect special status plant or wildlife species and/or their habitat.

Project Components

Overhead Construction

The existing wooden poles will be replaced with new dull galvanized steel-wood (SW) poles, which consist of directly-embedded, tubular light-duty and heavy-duty steel poles, and engineered steel poles with pier foundations. Construction-related activities associated with the proposed Project include installing or replacing direct bury wood and steel pole structures, installing pier foundation pole structures, installing pier foundation cable poles, removing existing poles from service, conducting overhead pole top work at poles or pole structures, installation of new conductor along a section of existing lattice structures, installation of new underground line, installation and temporary use of temporary guard structures, accessing stringing sites and staging yards, as well as replacing existing overhead conductor. Once the new pole structures have been installed, the new conductor will be installed, either replacing the existing conductor or adding new conductor to the pole or structure. Wherever possible, activities will occur within existing paved or unpaved access roads or other previously disturbed areas.

Pole Installation and Replacement

Direct Bury Steel Poles

In general, temporary impact areas were evaluated based on anticipated geometric work spaces around each proposed work location. Construction work spaces are dynamic in nature and may require minor modifications during the construction phase of the Proposed Project in order to facilitate worker safety and to avoid impacts to natural resources, including sensitive habitats. Therefore, the proposed temporary impact areas are estimated based on the "best information available at the time of this report." To account for shifts in construction approaches, potential temporary impact areas were evaluated based on a 20-foot radius surrounding each direct bury steel pole. It is anticipated that installation of direct bury steel poles will occur within an approximately 10-foot work area radius around the pole within the larger 20-foot potential temporary impact area. Thus, the resulting evaluated total impact area includes 1,240 square feet of temporary impacts and approximately 16 square feet of permanent impacts as a result of the pole. Installation and/or replacement of H-frame poles and 3-pole angle structures will require additional temporary and permanent workspace per pole. However, because many of the new poles will be located in the immediate vicinity of existing poles, the actual proposed work areas for pole replacements will often be much smaller, as existing disturbed areas, temporary work areas, and access roads will be used during installation and/or replacement of poles as much as possible. These work spaces provide a safe working area for equipment, vehicles and materials during pole installation and maintenance.

Pier Foundation Steel Poles

Concrete pier foundation poles will utilize a 6- to 8-foot-diameter hole dug approximately 30 to 40 feet by a large truck-mounted auger. A rebar cage is lowered into the hole, and an anchor bolt cage is inserted within the rebar cage. The hole is then filled with concrete, with the exposed final foundation remaining approximately two feet above ground level. The new engineered steel pole is then bolted to the foundation. New steel single-pole concrete pier foundation structures will require an approximately 75-foot by 75-foot (5,625 square feet) temporary workspace at each pole. The installation of new H-frame foundation poles will require additional temporary and permanent workspace per pole.

Pier Foundation Steel Cable Poles

Concrete pier foundation cable poles are similar to regular pier foundation poles; however, the base of the foundation includes underground connections for transition of overhead to underground conductor. New steel cable pole pier foundations require a larger temporary workspace to construct (approximately 150 feet by 150 feet, or 22,500 square feet) at each pole.

Pole Removal

In addition to the installation of new poles and replacement of existing pole structures, some existing poles are to be removed for the proposed project. Pole removals will typically be completed from existing access roads or disturbed areas or with the use of a helicopter. Temporary workspace for pole removals will typically require an approximately 10-foot radius work area around each pole (314 square feet of temporary work area). However, if work is conducted from an existing disturbed area or access road, then the temporary impacts are expected to be lower.

Lattice Tower Work

Installation of new conductor along a section of existing lattice towers will require a temporary workspace of approximately 314 square feet, or a 10-foot radius around the tower leg closest to the existing access road nearest the structure. Work is intended to be conducted primarily from construction vehicles parking within the existing access road and/or from helicopter, which will result in lower impacts in this area. However, if climbing the tower is necessary, SDG&E has included foot traffic impacts and equipment staging around one of the tower legs in order to access the tower on foot, if necessary.

Pole Top Work

Some of the existing poles within the proposed Project will not be completely replaced; however, materials and equipment on the pole (such as guy wires, insulators, conductor, etc.) will be modified, replaced, or removed. For those locations that only require work on the pole (or pole top), crews will require access to the site, but will either use construction vehicles (such as a bucket or line truck) to access the pole, or will climb the pole to perform construction activities. Vehicle access to these sites will be from existing access roads and/or existing disturbed areas, and temporary impacts may result from crews walking around the base of the poles and/or structures and the laydown of materials (insulators, stringing rollers, etc.), hand tools, and other equipment at the base of the pole/structure. Temporary workspace required for pole top work will include an approximately 10-foot radius work area around each pole (314 square feet of temporary work area); however, the impacts to these areas may be lower depending on the positioning of construction vehicles, equipment and materials required to conduct the work.

Stringing and Pulling Sites

The setup and use of proposed stringing sites will be necessary during construction of the proposed Project. In general, stringing sites will range in size from approximately 40 feet by 80 feet (3,200 square feet), 80 feet by 80 feet (6,400 square feet), 15 to 30 feet by 100 to 150 feet (1,500 to 3,000 square feet), to some sites in disturbed and paved areas up to 10,000 square feet in size. Stringing sites will generally be located directly in line or slightly offset from the existing conductor. It is not anticipated that grading of the stringing sites will be necessary; however, stringing sites located within vegetated areas may be mowed or vegetation trimmed prior to use to minimize the potential for fire, or damage to native vegetation during construction.

Guard Structures

Temporary guard structure sites will be set up and used during the reconductoring of the power line. Guard structures will be used where the overhead line will cross existing roads or sensitive resources that require additional protection from potential contact with conductor that is being installed or removed. These structures may consist of a single wood pole with a cross-beam attached to side extensions, a two-pole wood structure with a cross-beam, or a boom truck. The temporary work area impacts for a guard structure include an approximately 6-foot by 6-foot workspace per pole installed (approximately 72 square feet) for the temporary installation of the guard pole in anticipation of wire pulling.

Underground Construction

To accommodate the installation of the underground duct banks located along the underground portion of the TL695/6971 Double Circuit Steel Pole Line section, temporary workspaces centered on the duct bank alignments would be established. These areas would be cleared and graded, as needed, to provide a safe working space for the operation of construction equipment. The duct banks would require an approximately 30-foot-wide workspace (approximately 15 feet on each side of the line), for the length of the proposed underground segment.

Two underground pull sites would be established to provide a safe working space for the installation of the underground portion of the TL695/6971 Double Circuit Steel Pole Line section. These pull sites will be located on either end of the underground segment and would be located directly in line or offset with the conductor, adjacent to the cable poles that transition from underground to overhead line.

Substation Modifications

Modifications to the Talega, Basilone, and Japanese Mesa substations will be required to accommodate the new conductor being installed as part of the proposed Project. These modifications will be completed within the existing footprint of each substation and will not require any additional temporary workspace outside of the existing substation boundaries.

Staging Yards

The proposed Project includes six temporary construction staging areas: Basilone Road, Lemon Grove, San Mateo, SDG&E SONGS Lot 4, SONGS Mesa, and Talega Staging Yard. Staging yards may be used for refueling areas for vehicles and construction equipment by a mobile fueling truck, pole framing and assembly, open storage of material and equipment, construction trailers, portable restrooms, parking, lighting and may include generator use for temporary power in construction trailers. Construction

workers typically meet at the staging area each morning and park their vehicles at the yard. In-ground fencing will be installed at the staging yards in cases where it is not already installed. Gravel, class II base, or other BMP may be used to line the ground at staging yards to avoid the creation of unsafe mud conditions and unnecessary sediment transport off site. SDG&E has attempted to identify a reasonable number of staging yards commensurate with the size, location, and scope of the proposed Project.

The Basilone Road Staging Yard is approximately 1 acre (43,560 square feet) in size and is located south of Basilone Road and approximately 230 feet southeast of the intersection of Basilone Road and Meadowlark Drive.

The Lemon Grove Staging Yard is approximately 1.5 acres (65,340 square feet) and is located south of Lemon Grove Road, and approximately 950 feet southwest of the intersection of Vandergrift Boulevard and Lemon Grove Road.

The San Mateo Staging Yard is approximately 0.75 acre (32,670 square feet) in size and is located east of Calle Bahia, and approximately 0.5 mile east of the intersection of El Camino Real and East Avenida Magdalena.

The SDG&E SONGS Lot 4 Staging Yard is a paved parking lot located south of Old Pacific Highway and approximately 1.3 miles southeast of the intersection of Interstate 5 and Basilone Road. It is approximately 1 acre (43,560 square feet) in size and consists of paved ground.

The SDG&E SONGS Mesa Staging Yard is approximately 80 acres in size (3,484,800 square feet) and is located north of El Camino Real and approximately 0.7 mile southeast of the intersection of Basilone Road and Morgan Street.

The Talega Staging Yard is approximately 1.5 acres (65,340 square feet) and is located northeast of Corte Cristianitos and approximately 0.2 mile northeast of the intersection of Avenida Pico and Camino La Pedriza.

Helicopter Usage During Construction

Helicopters will be used during construction for activities including (but not necessarily limited to) stringing of overhead conductor, installation or removal of structures and/or materials, and transportation of equipment associated with the proposed Project. SDG&E anticipates that light- or medium-duty helicopters may be used. Helicopters will be used during daylight hours, and flight paths will generally be limited to the existing alignment except for ingress and egress from helicopter landing areas (including local airports, staging yards, and ILAs). Any helicopter use will comply with all relevant usage permits including the U. S. Department of Defense (DoD), and Federal Aviation Administration (FAA). SDG&E and/or the construction contractor will coordinate with local air traffic control, and comply with applicable FAA regulations regarding helicopter use to prevent conflict with air traffic in the vicinity.

ILAs are used for short-term helicopter operations, such as framing of poles and structures, and transport of poles, conductor or other equipment to specific locations within the proposed Project. Helicopters will typically be staged out of local airports (such as McClellan-Palomar, Oceanside, Montgomery, and Gillespie), and can use construction staging areas as ILAs. Helicopter staging activities, such as maintenance and repair, will be conducted at the local airport(s). Helicopter refueling may be

required at proposed Project ILAs. Proposed ILA locations will typically be adjacent to existing access roads to facilitate transport of equipment and materials to and from an ILA during construction. ILAs will typically be located in previously disturbed or developed areas, however, surveys for potential biological and wetland/water resources will be conducted in and in the vicinity of proposed ILA sites during the spring of 2016 to determine any resources that could be impacted as a result of set up and use of any ILA.

Project Access

SDG&E currently maintains a network of existing paved and unpaved access roads on MCB Camp Pendleton that are used to maintain and operate the existing power lines within their easements. In coordination with MBC Camp Pendleton, this network of roads will be used to access all temporary work areas required during construction. Most work areas are accessible by vehicle in paved/developed areas, or unpaved SDG&E-maintained access roads; however, SDG&E has identified new permanent access roads, turnout areas, overland travel routes, and footpaths that will be required for use during construction. These areas will allow construction personnel and/or vehicles and equipment to be able to access each of the project work areas that are not directly accessible by existing access roads. Any recently added project components outside the project study area for this report will be surveyed in the spring of 2016 to determine any biological and water/wetland resources that may be affected as a result of construction.

3.0 REGULATORY SETTING

The following federal, state and local regulations and policies pertaining to biological resources for the proposed Project are described below.

3.1 Federal Regulations

Federal Endangered Species Act

The federal Endangered Species Act (ESA) was enacted to protect plant and wildlife species from extinction by eliminating or reducing the threats to these species and by aiding in the recovery and/or maintenance of existing species populations. Species that are designated (listed) as endangered or threatened, as well as species that are candidates for listing, are protected from unauthorized "take" under the ESA. The ESA prohibits take of endangered wildlife, where "take" is defined as to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct" (16 United States Code [U.S.C.] §§ 1532(19), 1538). For plants, this statute governs removing, possessing, maliciously damaging, or destroying any listed plant on federal land and removing, cutting, digging-up, damaging, or destroying any listed plant on non-federal land in knowing violation of state law (16 U.S.C. § 1538(c)). The ESA also designates critical habitat for federally listed species and protects these species from interference with vital breeding and behavioral activities and from critical habitat degradation.

The ESA is administered by the United States Department of the Interior Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS). Under Section 7 of the ESA, federal agencies are required to consult with the USFWS if their actions, including permit approvals or funding, could adversely affect a listed species or its critical habitat. Through consultation and the issuance of a Biological Opinion, the USFWS may issue an incidental take statement, allowing take of the species that is incidental to another authorized activity, provided that the action would not jeopardize the continued existence of the species. Section 10 of the

ESA provides for issuance of incidental take permits to private parties with the development of a Habitat Conservation Plan (HCP) or Natural Communities Conservation Plan (NCCP), such as SDG&E's existing NCCP for work conducted in its service territory.

A person, defined as an "individual, corporation, partnership, trust, association, or any other private entity; or any officer, employee, agent, department, or instrumentality of the Federal Government, of any State, municipality, or political subdivision of a State, or of any foreign government; any State, municipality, or political subdivision of a State; or any other entity subject to the jurisdiction of the United States", is prohibited from taking a listed species until an appropriate permit pursuant to Section 7, 9, and/or 10 of the ESA has been obtained from the USFWS and/or NMFS.

Clean Water Act

The U.S. Environmental Protection Agency (EPA) administers the Clean Water Act (CWA), which regulates potential impacts to wetlands, Waters of the U.S., and Waters of the State resulting from discharge of dredged materials by implementing pollution control measures to maintain water quality in these waterways. The purpose of the CWA is to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." Some sections of the CWA, including Sections 404 and 401, are administered by agencies other than the EPA.

The U.S. Army Corps of Engineers (ACOE) administers Section 404 of the CWA, which is the regulation of the discharge of dredged or fill material into navigable waters, including wetlands and other Waters of the U.S. The definition of Waters of the U.S. includes rivers, streams, estuaries, territorial seas, ponds, lakes, and wetlands. Wetlands are defined as those areas "that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR § 328.3(b)). The ACOE is responsible for issuing general and individual permits and for making determinations on whether an area is considered jurisdictional. Substantial impacts to Waters of the U.S. may require an Individual Permit. Projects that only minimally affect Waters of the U.S., may meet the conditions of one of the existing Nationwide Permits, provided such permits' other respective conditions are satisfied.

A Water Quality Certification or waiver pursuant to Section 401 of the CWA is required for Section 404 permit actions. The SWRCB, in conjunction with the nine California Regional Water Quality Control Boards (RWQCB), administers Section 401 of the CWA, which is a requirement of a State Water Quality Certification or waiver for any activity requiring a Section 404 permit. The State Water Quality Certification ensures the activity will not violate any established State water quality standards. The SWRCB and/or RWQCB are responsible for issuing permits pursuant to the Section 401 Water Quality Certification Program. For the proposed Project, this certification or waiver would need to be issued by the San Diego Regional Water Quality Control Board (RWQCB).

Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA) is administered by the Office of Ocean and Resource Management (OCRM) of NOAA. It was established as a national policy to preserve, protect, develop, and where possible, enhance or restore the coastal zone in the U.S. The federal consistency provision, Section 307 of the CZMA, allows states to join the Coastal Zone Management Program (CZMP), which takes a comprehensive approach to coastal resource management by balancing the often competing

and occasionally conflicting demands of coastal resource use, economic development, and conservation, and allows states to issue applicable permits. California implements a federally approved CZMP, which is administered by the California Coastal Commission (CCC, see below).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA, 50 Code of Federal Regulations [CFR] Parts 13 and 21) implements international treaties between the U.S. and other countries for the protection of migratory bird species that spend all or a portion of their lives in the United States. It protects species and any of their parts, eggs, and nests from activities such as hunting, pursuing, capturing, killing, selling, and shipping unless expressly authorized in the regulations or by permit. As authorized by the MBTA, the USFWS issues permits to qualified applicants for activities such as falconry, raptor propagation, scientific collection, rehabilitation, education, migratory game bird propagation, salvage, take of depredating birds, taxidermy, and waterfowl sale and disposal.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) prohibits the "take" of either the bald eagle (*Haliaeetus leucocephalus*) or the golden eagle (*Aquila chrysaetos*), including their parts, nests, or eggs. The definition of take in the BGEPA is to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb" any bald or golden eagle. The USFWS administers the BGEPA, and limited take authorizations are allowed for qualifying activities. Persons who "take, possess, sell, purchase, barter, offer to sell, transport, export or import, at any time in any manner, any bald eagle (or any golden eagle), alive or dead, or any part, nest, or egg thereof" with prior approval by the USFWS will be subject to criminal penalties.

3.2 State Regulations

California Endangered Species Act

The California Endangered Species Act (CESA) generally parallels the main provisions of the ESA. Section 2080 of the Fish and Game Code prohibits the taking, possession, purchase, sale, and import or export of endangered, threatened, or candidate species, unless otherwise authorized by permit or in the regulations. Take is defined in Section 86 of the Fish and Game Code as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful projects. State lead agencies are required to consult with the CDFW to ensure that any action they undertake is not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse modification of essential habitat.

Fish and Game Code

The State of California began to designate species as "fully protected" prior to the creation of the CESA and the ESA. Lists of fully protected species were initially developed to provide protection to those animals that were rare or faced possible extinction, including fish, amphibians, reptiles, birds, and mammals. Many fully protected species have since been listed as threatened or endangered under the CESA and/or the ESA. Fully protected species may not be taken or possessed at any time (Fish and Game Code § 4700).

Section 2081 of the California Fish and Game Code gives the California Department of Fish and Wildlife (CDFW) the authority to issue an incidental take permit for projects that have the potential for take on a special-status species, including state-listed species, as long as the impacts are minimized and fully mitigated and will not jeopardize the continued existence of a state-listed species. The measures required to minimize and fully mitigate impacts must be roughly proportional to the extent of the proposed impact to the species and must be capable of successful implementation while maintaining the applicant's objectives to the greatest extent feasible.

Sections 1601 through 1606 of the Fish and Game Code require that a Notification of Lake or Streambed Alteration Agreement Application be submitted to the CDFW for "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake." The CDFW reviews the proposed actions and, if necessary, submits (to the applicant) a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by the CDFW and applicant is a Lake or Streambed Alteration Agreement. The State of California has incorporated the protection of birds and nests in Sections 3503, 3503.5, 3513, and 3800 of the Fish and Game Code.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (Fish and Game Code §§ 1900–1913) was created with the intent to "preserve, protect, and enhance rare and endangered plants in this State." The NPPA is administered by the CDFW. The CDFW Commission has the authority to designate native plants as "endangered" or "rare" and to protect them from take.

Porter-Cologne Water Quality Act

The intent of the Porter-Cologne Act is to protect water quality and the beneficial uses of water, and applies to both surface and ground water. Under this law, the SWRCB develops statewide water quality plans, and the RWQCBs develop basin plans, which identify beneficial uses, water quality objectives, and implementation plans. The RWQCBs have the primary responsibility to implement the provisions of both statewide and basin plans. Waters regulated under Porter-Cologne, referred to as "Waters of the state," include isolated waters that are no longer regulated by the ACOE. Any person discharging, or proposing to discharge, waste to Waters of the state must file a Report of Waste Discharge and receive either waste discharge requirements (WDRs) or a waiver to WDRs before beginning the discharge.

California Coastal Act

The California Coastal Act of 1972 (CCA) was enacted to provide the standards for balancing development and conservation of resources within the coastal zone, which includes approximately 1.5 million acres along the Pacific Coast of the U.S. The CCA is administered by the CCC to regulate the short and long-term conservation and use of coastal resources through responsible development.

The CCC protects Environmentally Sensitive Habitat Areas (ESHAs) per Section 30240 of the CCA, which states that "environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on such resources shall be allowed within such areas." An ESHA is defined as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments."

ESHA designations are often based on the presence of rare habitats, or on areas that support populations of rare, sensitive, or especially valuable species or habitats. The CDFW identifies rare habitats in their List of California Terrestrial Natural Communities Recognized by the CNDDB (CDFW 2015a). Rare species are defined as those that are listed under the CESA or ESA, those that are on Lists 1, 2, 3, or 4 of the California Native Plant Society (CNPS), and those for which there is other compelling evidence of rarity such as published academic studies.

California currently has a federally approved CZMP, which is administered through state and local governments. Throughout southern California, there are two state coastal management agencies, the California Coastal Conservancy, and the CCC. The California Coastal Conservancy is responsible for purchasing, protecting, restoring, and enhancing coastal resources, and the CCC manages development within the coastal zone. The CCA encourages local municipalities to establish Local Coastal Programs (LCPs) to make decisions on behalf of the CCC, and to protect public access and coastal resources on a local level. After certification of an LCP, authority to issue a Coastal Development Permit is delegated to the local government, but the CCC maintains permit jurisdiction over specific lands (such as tidelands, submerged islands, and lands of public trust), and can appeal permits approved by local governments in certain geographical locations. Development within the coastal zone may not commence until the CCC or the local government with a certified LCP has issued a Coastal Development Permit.

3.3 Local and Other Regulations

MCB Camp Pendleton Integrated Natural Resources Management Plan

The MCB Camp Pendleton Integrated Natural Resources Management Plan (INRMP) is a planning document that guides the management and conservation of natural resources on lands falling within MCB Camp Pendleton control, including federally listed threatened or endangered species and their habitats. INRMPs are intended principally to guide the effective management of an installation's natural resources to ensure that its lands remain available and in good condition to support the installation's military mission, and with "no net loss" in the capability of military installation land to support the military mission of the installation. The MCB Camp Pendleton INRMP was developed as an "umbrella" document that encompasses all elements of natural resources management applicable to MCB Camp Pendleton, including compliance with the Terms and Conditions of relevant USFWS Biological Opinions and ongoing stewardship activities. SDG&E's currently works under numerous leases/right-of-way agreements for electric and gas utility lines/service on MCB Camp Pendleton, and in these areas are subject to the requirements of the INRMP. MCB Camp Pendleton's Assistant Chief of Staff, Environmental Security provides the lead and overall coordination of environmental compliance and natural resources management at MCB Camp Pendleton.

SDG&E Subregional Natural Communities Conservation Plan

Under Section 10(a) of the ESA, SDG&E developed a comprehensive sub-regional multiple species and habitat Natural Communities Conservation Plan (NCCP) to effectively preserve and enhance covered sensitive species and their habitats within SDG&E's service territory, during the operation, maintenance, and expansion of its electric and natural gas distribution and transmission systems. For operations and maintenance activities as well as the completion of some capital projects, SDG&E's NCCP constitutes a permit issued pursuant to Fish and Game Code Section 20817 with an implementation agreement with the CDFW for the management and conservation of multiple species and their associated habitats as established according to the California ESA (CESA) and the state's NCCP Act. The purpose of the

Subregional NCCP is to establish and implement a long-term agreement between SDG&E, USFWS, and CDFW for the preservation and conservation of sensitive species and their habitats, while allowing SDG&E to develop, install, maintain, operate, and repair facilities necessary to provide energy services to customers living in SDG&E's service area. Fifty-two plant species and 58 wildlife species, some of which are federally and/or state listed, are covered under the NCCP. Under the NCCP, incidental take of a covered species would be authorized during otherwise lawful activities. The NCCP also provides steps to minimize and mitigate any potential impacts to covered species and their habitats.

While the proposed Project falls within the area in which SDG&E's utility operations are governed by SDG&E's NCCP, SDG&E will not use the take authority granted by the USFWS and the CDFW in the NCCP for impacts to covered species. Potential take of state and federally listed species will be handled through consultation with the USFWS and CDFW in accordance with applicable sections of the federal ESA and the CESA. The proposed Project will incorporate the Operational Protocols incorporated in the NCCP to avoid and minimize impacts to sensitive species and habitats in their project design features and Ordinary Construction/Operating Restrictions.

The NCCP identifies 61 Operational Protocols designed to avoid and minimize potential impacts to sensitive species and their habitats, and to provide appropriate mitigation where such impacts are unavoidable in order to ensure survivability and conservation of protected species and their habitat. These 61 protocols include provisions for personnel training, pre-activity studies, maintenance, and repair and construction of facilities, including access roads, and emergency repairs. SDG&E's NCCP does not exempt projects subject to permits from the California Public Utilities Commission, the CCC, or several other federal and state agencies. Therefore, many SDG&E projects, including the proposed Project, would also be subject to National Environmental Policy Act (NEPA) and California Environmental Quality Act review. The NCCP is intended to form the basis for evaluating impacts to sensitive species and their habitats in subsequent environmental reviews. SDG&E's NCCP has also defined habitat enhancement measures. In addition, SDG&E would implement Project specific measures to further minimize potential impacts, to ensure the protection and conservation of listed and covered species and their habitats.

4.0 METHODS

4.1 Project Study Area

The Project Study Area (PSA) primarily includes an approximately 300-foot survey corridor (approximately 150 feet on either side of the centerline of the proposed route) along the entire 10 mile length of the proposed Project. Also included in the impacts analysis for this report are the proposed Basilone, Lemon Grove, San Mateo, SDG&E Lot 4, SONGS Mesa, and Talega (1) staging yards.

A study "corridor" was established for biological resource surveys in order to accommodate minor changes in project design (such as changes to work areas and/or additions/deletions or changes to the locations of pole/structures), while minimizing the need to conduct additional surveys. The methods used to conduct the studies within the PSA are detailed below.

Subsequent changes to the Proposed Project have resulted in new project components (Talega staging yard (2), stringing sites, turnaround areas, etc.) outside of the PSA that have been added after initial surveys had been conducted. These additional components will be surveyed in spring 2016, to

determine the biological and jurisdictional resources within these areas. The results of these surveys will be submitted as a supplement to this BTR.

4.2 Literature and Existing Data Review

Literature Search

A number of recent studies (from reconnaissance-level constraints analysis studies to site- and species-specific focused surveys) have been conducted within and in the immediate vicinity of the PSA. As part of the initial data review for the proposed Project, a literature review of reference materials was conducted, including existing management plans, aerial photography of the region, the CDFW Natural Diversity Database (CNDDB), a search of the CNPS Inventory of Rare and Endangered Vascular Plants of California, the USFWS website and Federal Register regarding federally listed species, U. S Geological Survey topographic maps, National Wetland Inventory maps, review of the reports of previous biological resource surveys conducted within and in the vicinity of the project, and manuals, guides, and other environmental documentation and resources for California plants and wildlife.

Pertinent planning documents relevant to the proposed Project were also referenced, including MCB Camp Pendleton's INRMP and SDG&E's Subregional NCCP. Environmental documents for work previously conducted in the vicinity of the proposed Project on MCB Camp Pendleton were also reviewed.

Special Status Species Lists

In order to develop a potential list of special status plant and wildlife species that occur or could potentially occur within the proposed Project, a search of the CNDDB RareFind 5 program, maintained by the CDFW, was conducted for special status species that lie within one mile of the proposed Project area. Other resources that were queried included the USFWS website, CNPS Inventory of Rare and Endangered Vascular Plants of California, the SDG&E Subregional NCCP, existing MCB Camp Pendleton environmental documentation and electronic data, and San Diego County Bird Atlas. Records for known special status plants and wildlife within one mile of the proposed Project were compiled and reviewed. Species were considered special status if they met the following criteria:

- Species are included on CNPS List 1B.1, 1B.2, 1B.3, 2.1, 2.2, 2.3, 3, or 4;
- Species are federally listed as endangered, threatened, or are a candidate for listing status;
- Species are state-listed as endangered, threatened, a California Species of Special Concern, or fully protected; or
- Species are considered sensitive by MCB Camp Pendleton.

Approximately 66 special status plants and wildlife species have been identified as occurring or potentially occurring within or in the immediate vicinity of the proposed Project. These species are described in Section 5.0. When formal Section 7 consultation is established with the USFWS, the proposed Project will receive a final list of species (listed or candidate species) that are of concern from the USFWS.

Determination of the potential for listed, or other sensitive plant and/or wildlife species to occur within the PSA was assessed based on a few criteria:

- Low Potential for Occurrence – There are no recent historical records for this species within or in the immediate vicinity of the PSA, and any habitat or specific environmental conditions needed to support the species do not exist or are of poor quality

- Moderate Potential for Occurrence – 1) Historical records exist for the species within or adjacent to the PSA, however, either no suitable habitat exists, or only poor quality habitat occurs within or in the immediate vicinity of the PSA, or 2) No previous historical records for this species have been recorded within or in the immediate vicinity of the PSA. However, suitable habitat exists for the species within or in the immediate vicinity of the PSA.

- High Potential for Occurrence – Historical records exist for the species within or adjacent to the PSA and suitable habitat for the species exists for the species within or in the immediate vicinity of the PSA.

- Present – The species has been observed within or in the immediate vicinity of the PSA.

- Not Detected During Survey – Protocol-level surveys were conducted for the species and suitable habitat exists, however, the species was not detected during the surveys or during other incidental surveys conducted for the proposed Project.

Critical Habitat

A search of the USFWS Critical Habitat Portal was conducted to identify whether the proposed Project area is located within any USFWS-designated critical habitat areas. In addition, recovery plans for listed species and Geographic Information System data from the USFWS website were also reviewed. The MCB Camp Pendleton INRMP was also reviewed and cross referenced with the USFWS Critical Habitat Portal to determine which lands (covered by the INRMP) have been precluded from Critical Habitat designation.

4.3 Resource Agency Correspondence

SDG&E conducted informal initial discussions with the USFWS during the spring and summer of 2015 regarding biological resources with potential to occur in the vicinity of the proposed Project. Initial discussions with the USFWS included a dialogue regarding potential species of concern that could occur in the vicinity of the PSA, and the need and types of protocol-level surveys that would be required for the proposed Project. Pangea and the USFWS permitted biologists working with the Pangea team have also coordinated with the USFWS regarding surveys for special status plant and wildlife species within the PSA by submitting notifications to conduct protocol-level surveys, as a condition of their USFWS permit to survey these species.

To comply with the requirements of NEPA for the proposed Project, it is assumed that MCB Camp Pendleton will be the lead Federal Agency for the proposed Project, and authorized representatives from MCB Camp Pendleton will conduct formal Section 7 Consultation with the USFWS (with support from SDG&E and its consultants) during the course of the environmental documentation and approval process.

4.4 Surveys

During the numerous field surveys conducted within the PSA, biologists noted any general and special-status plant and wildlife species occurring within the PSA. Species were detected by direct observation, but also through signs, such as parts of plants that had grown in previous seasons or earlier in the growing season, and scat, tracks, burrows, and vocalizations of wildlife species. Methods used for focused, protocol-level special status plant and wildlife species surveys conducted are described below, and in the survey reports included as part of the appendices.

Initial Constraints Analysis

An initial survey and analysis of biological and jurisdictional resource constraints was conducted in April 2013 to identify the presence of, or potential to occur, of special-status biological and jurisdictional water resources along SDG&E's TL695 (LSA Associates, Inc., 2013). Reconnaissance-level surveys were conducted to determine the potential or presence of vernal pools and/or sensitive branchiopods, federally listed plant species, least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Pacific pocket mouse (*Perognathus longimembris pacificus*), coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), and potential jurisdictional resources that could be affected from the construction of the proposed Project (Appendix A).

Biological Resource Surveys/Vegetation Mapping

At the request of SDG&E, a general biological resource survey was conducted in July and August 2014 to determine the vegetation communities located within the PSA, and determine the potential federal, state, and/or NCCP Sensitive (covered) species that occur or have potential to occur (AECOM 2014a). At the time of this survey, SDG&E was still considering using the take authority granted by the USFWS and the CDFW in the NCCP for impacts to covered species. Surveys were conducted to map vegetation communities, and to determine potential habitat areas for the sensitive species listed as potentially occurring in the PSA. Additional information on locations of basins within the PSA that could potentially support sensitive branchiopod species was also provided. Vegetation community classifications used in this report follow Holland's Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland, 1986), as modified by Oberbauer (Oberbauer et. al., 2008, Appendix B).

As part of special status plant surveys conducted in the spring of 2015 (Cardno 2015a), vegetation types were reviewed and updated to reflect the most current conditions within the PSA. The vegetation communities identified in the current PSA alignment have been digitized and used as the preliminary vegetation community base for this BTR (Appendix C).

Rare Plant Surveys

Rare Plant Surveys within the PSA were conducted during the spring of 2015. Reconnaissance level field surveys were conducted throughout the project area for all potential rare plants. Focused surveys for thread-leaved brodiaea (*Brodiaea filifolia*, BRFI) were conducted according to the "Brodiaea filifolia Inventory Protocol," prepared by the MCB Camp Pendleton Environmental Security Department, Land Management Section (MCB Camp Pendleton 2015a). Potential BRFI habitat GIS data was provided by SDG&E (SDG&E 2015). During the course of surveys, Cardno biologists identified areas that were categorized as potential BRFI habitat in the GIS (SDG&E 2015), but that did not contain suitable BRFI habitat; therefore, such areas were not surveyed (Cardno 2015a, Appendix C). All suitable BRFI habitats

within the project area were surveyed at least every two weeks for three complete surveys. Surveys were conducted from March 31 through May 21, 2015.

Special Status Wildlife Surveys

Branchiopod Survey

Wet season fairy shrimp surveys within the PSA were conducted during the spring of 2015 (Cardno 2015b, Appendix D). Before initiating the wet season surveys, a 15-day notice of intent (notification) letter was sent to the USFWS Carlsbad Field Office requesting permission to conduct surveys for the presence of listed fairy shrimp.

Wet season fairy shrimp surveys were conducted in accordance with the Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Branchiopods (USFWS 1996). After wet season fairy shrimp surveys began, the USFWS published updated survey guidelines for wet and dry season surveys for these species (USFWS 2015b). As a result, the wet season fairy shrimp surveys continued to be conducted under the original (1996) guidelines, with the dry season surveys to be completed under the updated guidelines from 2015.

Surveys were conducted by USFWS-permitted fairy shrimp and vernal pool biologists. Before beginning focused surveys, site reconnaissance surveys were conducted to determine suitable habitat. All potential basins were documented and mapped in the field using a global positioning system unit with a sub-meter level accuracy receiver. Documentation and GIS locations of potential habitat was provided by SDG&E prior to initiating fairy shrimp surveys.

Initial location data provided by SDG&E included seven basins in the PSA. During the course of wet season sampling, any unexpected and undocumented ponded features encountered within the survey area were also inspected for potential vernal pool characteristics or diagnostic species. If warranted, these basins were surveyed for fairy shrimp presence.

Wet season sampling commenced following a substantial rainfall event at the end of February 2015, and subsequent permission to proceed from the USFWS. Sampling events occurred between the dates of March 6 and May 20, 2015. During that time, basins identified as having potentially suitable fairy shrimp habitat were mapped, photographed, and then surveyed for the duration of the wet season. During the wet season, each basin was surveyed up to 10 times, approximately once every two weeks and/or after rain events. Only sexually mature individuals were collected. If a federally-listed fairy shrimp was recovered from any of the basins during the wet season sampling, the fairy shrimp survey for that basin would have been considered complete under the protocol guidelines.

Dry season protocol fairy shrimp surveys were completed in September 2015. Fairy shrimp soil collection was conducted in accordance with the *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996) with incorporation of the most recent guidance (USFWS 2015) wherever possible. Soil collection was conducted by USFWS permitted fairy shrimp and vernal
pool biologists (Cardno 2015b, Appendix D).

Arroyo Toad
Protocol surveys for the arroyo toad (*Anaxyrus californicus*) within the PSA were conducted during the spring of 2015. The surveys followed the protocol established by the USFWS (USFWS 1999). Both daytime and nighttime surveys were conducted between March 24 and June 14, 2015 to determine an accurate assessment of the presence or absence of the species in the PSA. Six surveys were conducted during the breeding season, per the USFWS protocols. At least one survey was conducted each month in April, May, and June with at least seven days between surveys (Bloom 2015a, Appendix E).

Burrowing Owl
Protocol surveys for the western burrowing owl (*Athene cunicularia hypugaea*; BUOW) were conducted in the fall and winter of 2014-2015. A focused assessment of suitable BUOW habitat within the PSA was conducted in November 2014, to determine areas within the PSA that could be utilized by BUOW and where nonbreeding BUOW burrow surveys should be conducted (AECOM 2015, Appendix F).

Potential BUOW habitat was mapped within three main areas of the PSA. Four nonbreeding BUOW season (September 1 through January 31) surveys were conducted per the guidelines set forth by the Staff Report on Burrowing Owl Mitigation (CDFW 2012). This report reflects the most recent regulatory agency/industry standard protocols for BUOW surveys. Nonbreeding BUOW surveys generally occurred over a one- or two-day period per survey. The first nonbreeding BUOW survey was conducted on December 18 and 19, 2014; the second survey on December 29, 2014; the third survey on January 8 and 9, 2015; and the fourth survey on January 22 and 23, 2015. Surveys were conducted approximately 10 days to two weeks apart.

Coastal Cactus Wren (Breeding Surveys)
A total of four breeding surveys for the coastal cactus wren within the PSA were conducted between April 8 and June 13, 2015, to determine locations of potential breeding habitat for the species and to detect breeding coastal cactus wren pairs within the PSA. The first two surveys were dedicated to surveying the entire PSA for suitable habitat and to conducting the initial breeding surveys in areas of potential habitat. The last two surveys focused on detecting nests and birds in habitat within the PSA (Bloom 2015b, Appendix G).

Coastal California Gnatcatcher
Protocol-level presence/absence surveys were conducted for the coastal California gnatcatcher (*Polioptila californica californica,* CAGN) within the PSA in 2014. The surveys were part of an initial review of the proposed Project, and were conducted to determine where suitable habitat exists for CAGN within the PSA, as well as locations where CAGN were observed (AECOM 2014b, Appendix H). Before conducting the surveys, a habitat assessment and vegetation mapping of the PSA was conducted (AECOM 2014a) to outline potentially suitable CAGN habitat and to delineate the vegetation community boundaries. Potentially suitable CAGN habitat was then digitized onto maps to establish the areas to conduct protocol-level surveys. CAGN surveys were completed during the 2014 breeding season per USFWS guidelines (USFWS 1997). Since the CAGN surveys were conducted within SDG&E's service territory, protocol surveys were conducted per SDG&E's NCCP. The protocol required three surveys to be conducted during the breeding season (February 15 through August 30). Surveys were conducted within suitable CAGN habitat between August 11 and August 27, 2015.

Least Bell's Vireo

Protocol surveys for the least Bell's vireo within the PSA were conducted during the spring of 2015. A total of eight presence/absence least Bell's vireo surveys were conducted between April 10 and June 21, 2015, in accordance with Service protocol (USFWS 2001). All potential least Bell's vireo habitat and riparian areas within the PSA were surveyed eight times during the breeding season (April 10 to July 31), with a minimum of ten days between survey visits (Bloom 2015a, Appendix E). Some least Bell's vireo surveys were conducted in the same survey areas, simultaneously with southwestern willow flycatcher surveys (see below).

Southwestern Willow Flycatcher

Protocol surveys for the southwestern willow flycatcher within the PSA were conducted during the spring and summer of 2015. A total of five surveys were conducted between May 21 and July 2, 2015, according to the revised protocol for project-related surveys for Southwestern Willow Flycatcher (Sogge et al. 2010). All potentially suitable habitat for the southwestern willow flycatcher was surveyed once during Period 1 (May 15 to May 31), two times during Period 2 (June 1 to June 24), and twice during Period 3 (June 25 to July 17). Surveys were conducted at least five days apart and during morning hours (Bloom 2015a, Appendix E). Some southwestern willow flycatcher surveys were conducted in the same survey areas, simultaneously with least Bell's vireo surveys.

Western Yellow-billed Cuckoo

Surveys for the yellow-billed cuckoo (*Coccyzus americanus*) were not conducted, as Federal 10(a)(1)(A) Recovery Permits for this species had been issued to only a few individuals prior to the finalization of the survey protocol for this species. A final draft survey protocol for the yellow-billed cuckoo was published on April 22, 2015 (Halterman et al. 2015). During surveys for other riparian bird species, such as the least Bell's vireo and the southwestern willow flycatcher, Bloom Biological biologists also evaluated potential habitat for, and the potential for the occurrence of the yellow-billed cuckoo within the PSA. Although protocol-level surveys could not be conducted, any incidental sightings of the yellow-billed cuckoo would be reported.

Pacific Pocket Mouse

Protocol surveys for the Pacific Pocket Mouse (PPM) in suitable habitat areas in the vicinity of the PSA were conducted by permitted biologist Scott Tremor during the summer of 2013. Trapping efforts were conducted in the northern section of the PSA near Talega Substation, and north of Basilone Road, near the Basilone Substation from July 21 through July 31, 2013. The surveys were conducted in accordance with established survey requirements/protocols defined in Mr. Tremor's Federal 10(a)(1)(A) Recovery Permit (TE-787716-7) (Tremor 2013a, 2013b, Appendix I).

Jurisdictional Resources

Jurisdictional Delineation

A wetland delineation of wetland and non-wetland waters within the PSA was conducted between June 1 and June 5, and on October 2, 2015. Methodology followed the ACOE Regional Supplement Wetland Delineation Manual: Arid West Region (Version 2.0) guidelines, and consisted of preliminary data gathering and research, field assessment surveys, digital mapping, and documentation of final boundary determinations (Pangea and Borcher 2015, Appendix J).

Prior to conducting the field delineation assessment, the following information sources were reviewed to evaluate potential ACOE, CDFW, RWQCB, and CCC jurisdiction:

- SDG&E's aerial photographs;
- United States Geologic Survey (USGS) 7.5-degree minute topographic quadrangle maps;
- United States Department of Agriculture Natural Resources Conservation Service (NRCS) soil survey maps;
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory GIS data; and,
- USGS National Hydrological Dataset GIS data for modeling of streams to evaluate possible stream features.

Field assessment surveys were conducted to confirm the potential jurisdictional areas identified in the in-office reconnaissance process and to delineate those areas of interest within the survey area for the potential presence of water resources. To assist with the field analysis, a customized data dictionary was uploaded onto the Global Positioning System (GPS) unit to allow field surveyors to select specific feature data.

In the field, boundaries and dimensions of jurisdictional wetland and water features were recorded utilizing a sub-meter GPS unit, on field maps, and field notes. Features within the survey area were investigated for the presence of drainages, including culverts, water bodies, riparian vegetation, potential wetlands, and connectivity to jurisdictional waters.

5.0 RESULTS AND DISCUSSION

5.1 Project Setting

The PSA ranges in elevation from approximately 25 feet to 545 feet above mean sea level (MSL), with lower elevations along the flat grassy plains southeast of San Mateo Creek and northwest of Basilone Road, and the highest portion occurring through the hilly terrain where the new line is proposed along the lattice towers north of Basilone Road. The terrain along the PSA is highly variable, and ranges from relatively flat topography, to rolling hills, to more steep and hilly terrain with ridges intermixed with drainages and canyons. The PSA crosses primarily undeveloped areas, as well as some developed areas and disturbed habitat, with a substantial network of existing dirt and paved roads providing access to most of the structures to be modified as a result of the proposed Project. Additional project components such as access, helicopter landing areas, and work on additional poles, have been identified that are outside the PSA, and surveys will be required to determine the biological resources associated with these additional components, and their potential to affect sensitive biological resources. These areas will be scheduled for survey and further analysis, and the additional information will be presented as an update to this BTR.

The TL695 corridor occurs in Orange and San Diego Counties, which are known for their biological diversity. In addition to the vegetation communities that occur within the survey area, suitable habitat for several special status plant and wildlife species was also identified. This section identifies the vegetation communities identified within the PSA, as well as the plant and wildlife species that occur or potentially occur within the PSA.

5.2 Vegetation Communities

Vegetation communities are assemblages of plant species that commonly coexist in the wild. The classification of vegetation communities is based on the life form of the dominant species within that community and the associated flora. Vegetation was mapped in accordance with Holland (Holland 1986), as modified by Oberbauer (Oberbauer et.al. 2008). Initial vegetation community mapping and habitat suitability mapping data were collected via geo-referenced polygons with a tablet unit, using GIS technology, and have been updated as the dimensions of the PSA have changed. The vegetation communities observed within the PSA are illustrated in Appendix C.

The PSA and other associated project components generally support 10 vegetation communities:

- Nonnative Grassland
- Diegan Coastal Sage Scrub
- Mulefat Scrub
- Non-vegetated Channel
- Southern Sycamore-Alder Riparian Woodland
- Southern Willow Scrub
- Eucalyptus Woodland
- Coast Live Oak Woodland
- Disturbed Habitat
- Urban/Developed

One potential plant community (vernal pool) was identified as potentially occurring at two locations within the PSA during the initial reconnaissance-level constraints analysis conducted in 2014 (AECOM 2014a). These areas were reviewed during focused botanical surveys and again during fairy shrimp surveys conducted in 2015, and it was determined that although two potential vernal pool indicator species were observed in and in the vicinity of these locations, neither of the sites would be considered as typical vernal pool habitat. This was primarily due to the disturbed nature of the sites, the site-specific topography, and the lack of other vernal pool indicator species at the sites and in the immediate vicinity.

A description of the plant communities occurring within the PSA are described below (Cardno 2015a) (AECOM 2014a). The plant communities observed within the PSA and the relative acreages of each plant community are provided in Table 5.1. Diegan coastal sage scrub is the dominant vegetation community within the PSA, with disturbed habitat and urban/developed areas comprising the second largest cover type within the PSA.

Plant Communities Within the PSA

Nonnative Annual Grassland (Holland Code 42200)

Nonnative annual grassland is characterized by a dense to sparse cover of annual grasses and forbs of Mediterranean origin, often with native and nonnative annual forbs (Holland 1986). This plant community generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season, and very dry during the summer and fall. Regionally, typical grasses include ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), soft chess

Table 5.1 Vegetation Communities Located Within the PSA

Vegetation Community	Approximate Area in Acres
Grassland	
Nonnative Grassland	9.16
Subtotal	*9.16*
Scrubland	
Diegan Coastal Sage Scrub	228.92
Subtotal	*228.92*
Riparian/Wetland	
Mulefat Scrub	7.23
Non-vegetated Channel	1.45
Southern Sycamore-Alder Riparian Woodland	12.13
Southern Willow Scrub	8.87
Subtotal	*29.68*
Upland Woodland	
Eucalyptus Woodland	0.37
Coast Live Oak Woodland	0.19
Subtotal	*0.56*
Disturbed/Developed/Unknown	
Disturbed Habitat	77.32
Urban/Developed	151.25
Subtotal	*228.57*
TOTAL	***496.89***

(*Bromus hordeaceus*), wild oats (*Avena* spp.), and rat-tail fescue (*Vulpia myuros*). Nonnative disturbance-related annuals such as filaree (*Erodium* sp.), and horseweed (*Erigeron canadensis*) are common to this community. This vegetation community is found alongside firebreaks along ridge tops, interspersed between Diegan coastal sage scrub, and around areas that have been historically disturbed. Nonnative annual grassland occurs throughout the project study area, primarily to the northeast, a few areas in the north, and in the southeast of the PSA.

Diegan Coastal Sage Scrub: Coastal Form (Holland Code 32510)
Diegan coastal sage scrub is a vegetation community dominated by relatively low-lying shrubs. It is typically less than 6 feet in height, soft-leaved, and drought-deciduous. Dominant species in these communities drop their leaves as the summer dry season progresses to reduce stress from lack of water. The coastal form of Diegan coastal sage scrub is similar to other forms of Diegan coastal sage scrub but is found at lower elevations, below 1,000 feet. California sagebrush is more dominant in coastal Diegan coastal sage scrub than in other Diegan coastal sage scrub varieties. The dominant species in this community is California sagebrush (*Artemisia californica*), but associated dominants can include California buckwheat (*Eriogonum fasciculatum* var. *fasciculatum*), laurel sumac (*Malosma laurina*), lemonadeberry (*Rhus integrifolia*), broom Baccharis (*Baccharis sarothroides*), and black sage (*Salvia mellifera*). Diegan coastal sage scrub is found throughout the project study area and is the dominant vegetation type.

Mulefat Scrub (Holland Code 63310)
Mulefat scrub is a riparian shrub community that is strongly dominated by mulefat (*Baccharis salicifolia*), often in association with several willow species. Mulefat scrub occurs along intermittent streams with a fairly coarse substrate and moderately deep water table. Understory vegetation is usually composed of nonnative, weedy species, or is lacking altogether. This community is maintained by frequent flooding. In the absence of periodic flooding, and over time, this community may develop into cottonwood- or sycamore-dominated riparian communities.

Within the survey area, mulefat scrub occupies floodplain areas of San Mateo and San Onofre Creeks. This community is strongly dominated by mulefat, with western ragweed (*Ambrosia psilostachya*) and willow dock (*Rumex salicifolia*) occupying the understory.

Non-Vegetated Channel (Holland Code 64200)
Non-vegetated channels are natural flood channels that are sparsely vegetated. The lack of significant vegetative cover in such areas can be attributed to either natural processes, such as flooding, or to human activities, such as vegetation clearing or stream channelization. Non-vegetated channels occur within San Mateo Creek, where annual scouring by rock and sand tend to prevent vegetation from growing in the channel.

Southern Sycamore-Alder Riparian Woodland (Holland Code 62400)
Sycamore alder riparian woodland is a tall, winter-deciduous, streamside woodland dominated by western sycamore (*Platanus racemosa*) and white alder (*Alnus rhombifolia*). These woodlands are commonly found along rocky stream beds that are subject to periodic high-intensity flooding. Vegetation associated with sycamore alder riparian woodland includes blue elderberry (*Sambucus mexicana*), Douglas mugwort (*Artemisia douglasiana*), scale-broom (*Lepidospartum squamatum*), poison

oak (*Toxicodendron diversilobum*), and willows (*Salix* sp.) This vegetation type is scattered in a few sections throughout the PSA but is primarily located along the more stabilized banks of the San Mateo and San Onofre Creeks.

Southern Willow Scrub (Holland Code 63320)
Southern willow scrub is a dense, closed-canopy scrub that occurs throughout California in association with riverine features. It is lacking in the taller trees that are characteristic of riparian forests. Dominant plant species include willows, mulefat, and coyote brush (*Baccharis pilularis*). There is typically not a substantial herbaceous understory within this vegetation community due to the dense shrub cover.

This community is dominated by mulefat and arroyo willow (*Salix lasiolepis*), with California sagebrush and western ragweed occasionally co-dominating in the dryer portions of the drainages. Within the PSA, southern willow scrub is associated with some small drainage features and within San Mateo and San Onofre Creeks. There is also a small portion of southern willow scrub in the far northeastern part of the project study area in Orange County.

Eucalyptus Woodland (Holland Code 79100)
This community is dominated by several species of eucalyptus (*Eucalyptus* spp.). These introduced species produce large amounts of leaf and bark litter, the chemical composition of which may inhibit the establishment and growth of other species, especially natives, in the understory. Often these species have been planted for aesthetic and horticultural purposes or as a windbreak, but many species of eucalyptus have become naturalized and have been quite successful in invading riparian areas. There is a small portion of eucalyptus woodland surrounded by Diegan coastal sage scrub in upland areas adjacent to San Onofre Creek.

Coast Live Oak Woodland (Holland Code 71160)
This community is well represented on MCB Camp Pendleton and can co-occur with Diegan coastal sage scrub, valley needlegrass grassland, and other types of oak woodland. Coast live oak woodland is an open to dense tree community with coast live oak (*Quercus agrifolia*) as the dominant tree species. The shrub understory of this community is well developed in undisturbed sites and may include blue elderberry, laurel sumac (*Malosma laurina*), poison oak, and toyon (*Heteromeles arbutifoloia*) (Holland 1986). An herbaceous stratum is usually present, including miner's lettuce (*Claytonia perfoliata* var. *perfoliata*), chickweed (*Stellaria media*), and nonnative grasses. Coast live oak woodland is located in the far northeastern part of the PSA, in Orange County.

Disturbed Habitat (Holland Code 11300)
Disturbed habitat includes vegetation and soils characterized by physical disturbance. Nonnative species are commonly introduced by humans in these sites. A physical disturbance may include clearing for fuel management, repeated grading, graded fire breaks, powerline access roads and areas around power poles, construction staging areas, or any repeated use areas. Examples of repeated use areas are trails, access roads, and dirt parking lots. Characteristic species of these communities include tocalote (*Centaurea melitensis*), Italian thistle (*Carduus pycnocephalus*), artichoke thistle (*Cynara cardunculus*), sow-thistle (*Sonchus* sp.), tumbleweed (*Salsola tragus*), telegraph weed (*Heterotheca grandiflora*), horehound (*Marrubium vulgare*), mustard (*Sisymbrium* spp.), radish (*Raphanus sativus*), Hottentot fig (*Carpobrotus edulis*), garland chrysanthemum (*Glebionis coronaria*), and fennel (*Foeniculum vulgare*). Annual grasses are not often included in this vegetation community and are considered more typical of nonnative annual grassland. Disturbed habitat occurs throughout the project study area primarily in the

form of dirt roads and trails and areas that were historically agriculture, as well as those areas regularly mowed and/or used as training areas.

Urban/Developed Land (Holland Code 12000)
Urban/developed areas within the PSA include buildings, paved areas, and ornamental landscaping. Areas of ornamental/landscape plantings occur throughout the PSA. These areas include lawns, parks, road medians, and roadsides. Common species in these areas include African daisy (*Arctotis* sp.), eucalyptus, Peruvian pepper tree (*Schinus molle*), myoporum (*Myoporum laetum*), and African fountain grass (*Pennisetum setaceum*). Other developed areas include graveled or paved parking lots similar to the area within the SONGS mesa. Urban/developed areas are not necessarily considered a vegetation community, and typically support no or very few biological resources.

Plant Communities - Other Project Components

Substations
There is no native habitat occurring within each existing substation (Talega, Basilone, and Japanese Mesa Substations). The areas within the substations are typically devoid of vegetation, with a heavy layer of gravel base, and are all considered Urban/Developed.

Staging Yards
Field and desktop evaluations of the habitats within proposed Staging Yards were conducted to determine potential vegetation communities occurring within each yard. These habitats will be confirmed in the field as the project components are finalized for the proposed Project.

The Basilone Road Staging Yard is an existing construction yard consisting primarily of bare ground and/or a gravel base, with no vegetation within the yard. The Basilone Road Staging Yard is located within a previously fenced yard and consists primarily of bare ground. The staging yard is surrounded to the north by Basilone Road and then coastal sage scrub habitat, to the south by coastal sage scrub habitat and a previously fenced yard, to the east by an access road and coastal sage scrub habitat, and to the west by development and landscape/ornamental vegetation.

The Lemon Grove Staging Yard is also a fenced existing construction yard consisting of a gravel base with no native vegetation within the yard. It is located within a previously fenced gravel yard. The staging yard is surrounded to the north by an access road and then disturbed habitat, to the south and west by disturbed habitat, and to the east by disturbed habitat and then railroad tracks.

The San Mateo Staging Yard consists of a fenced, inactive target practice/shooting range consisting primarily of bare ground. The yard is surrounded by landscape/ornamental vegetation to the north and west, the San Mateo Substation to the south, and native coastal sage scrub habitat to the east.

The SDG&E SONGS Lot 4 Staging Yard is located in pavement, wholly within a paved parking lot.

The SDG&E SONGS Mesa Staging Yard is located within fenced paved parking lots and gravel lots. It is surrounded to the north, south, east, and west by coastal sage scrub habitat.

The Talega Staging Yard is located within disturbed habitat and has been used previously on other construction projects for this same purpose. It is surrounded to the north by oak woodland habitat, to

the south by disturbed habitat, to the east by disturbed habitat (additional area previously used as a construction yard), and to the west by landscape/ornamental vegetation and then development.

5.3 Plant Species

Approximately 275 plant species have been observed within the PSA during surveys conducted in the area. A compendium list of plant species observed during studies in support of the proposed Project is included in Appendix K.

Special Status Plant Species

A total of six special status plant species were observed during surveys conducted in support of the proposed Project, and another 20 species were not observed during surveys but have potential to occur in the PSA. Figure 2 illustrates the locations of special status plant and wildlife species observed within the proposed Project area. Species observed included thread-leaved brodiaea (*Brodiaea filifolia*), California boxthorn (*Lycium californicum*), Coulter's matilija poppy (*Romneya coulteri*), paniculate tarweed (*Deinandra paniculata*), San Diego County viguiera (*Viguiera laciniata*), and western dichondra (*Dichondra occidentalis*).

Thread-leaved Brodiaea (Brodiaea filifolia, Federal Threatened, California Endangered, CNPS 1B.1)

Protocol-level surveys were conducted for thread-leaved brodiaea within the PSA in 2015 in support of the proposed Project. Four populations of thread-leaved brodiaea (BRFI) were observed during protocol surveys for this species. The location of each population is illustrated in Appendix C. Thread-leaved brodiaea is a perennial bulbiferous herb with a blooming period of April through May (occasionally extending from March through June) that typically occurs in clay soils around vernal pools and in openings in vernally moist grassland habitats.

California Boxthorn (Lycium californicum, CNPS 4.2)

California boxthorn is a perennial shrub with a blooming period of December through August that typically occurs in coastal bluff scrub and coastal scrub habitats. California boxthorn is a CNPS 4.2 (limited distribution). One fairly large population was observed (approximately 100 individuals) on the south side of Cristianitos Road in an area of sparse Diegan coastal sage scrub with sandy soil that had multiple, deep erosional channels running through the area.

Coulter's Matilija Poppy (Romneya coulteri, CNPS 4.2)

Coulter's matilija poppy is a perennial rhizomatous herb with a blooming period of March through July that typically occurs in coastal scrub and chaparral habitats. Coulter's matilija poppy is a CNPS 4.2 (limited distribution) perennial herb that is endemic to California. One population of approximately 150 individuals was observed on the south side of Basilone Road, just north of San Onofre Creek in sparse Diegan coastal sage scrub. This population is vouchered in the Consortium of California Herbaria (Consortium of California Herbaria 2015), and is documented as potentially being one of the only natural populations of this species in San Diego County.



0 0.25 0.5 0.75 1 Mile

25240 TL 695/6971 Reconductor Project
Figure 2: Special Status Species Observations

Thread-leaved brodiaea	Paniculate tarweed	Fairy Shrimp Basins	Least Bell's Vireo
California boxthorn	San Diego County Viguiera	Arroyo Toad	Survey Area
Coulter's matilija poppy	Western dichondra	Cactus Wren	

Created by Pangea Biological, November 2015
Coordinate System: NAD 1983 StatePlane California VI FIPS 0406 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983

Pangea Biological

Paniculate Tarweed (Deinandra paniculata, CNPS 4.2)
Paniculate tarweed is an annual herb with a blooming period of April through November that is typically found in vernally mesic soils or sandy soils in coastal scrub, vernal pools, and valley and foothill grassland habitats in southern California. Paniculate tarweed is a CRPR 4.2 (limited distribution). This species was observed in several locations in populations ranging from single individuals to hundreds of individuals. It was typically observed in nonnative grassland habitats and was often in disturbed areas, particularly along the side of dirt roads.

San Diego County Viguiera (Viguiera laciniata, CNPS 4.2)
San Diego County viguiera is a perennial shrub with a blooming period of February through August that is typically found in coastal scrub and chaparral habitats in coastal southern California. San Diego County viguiera is a CRPR 4.2 (limited distribution). A large population of hundreds of individuals was observed on the slopes surrounding the Talega Substation. It appears that this population was planted in this location, as there is irrigation equipment throughout the area.

Western Dichondra (Dichondra occidentalis, CNPS 4.2)
Western dichondra is a perennial rhizomatous herb with a blooming period of January through July that typically occurs in coastal scrub, chaparral, cismontane woodland, and valley and foothill grassland habitats in coastal southern California. Western dichondra is a CRPR 4.2 (limited distribution). A single population of approximately 250 individuals was observed in sparse Diegan coastal sage scrub and nonnative grassland.

Other special status plant species identified as having potential to occur within the PSA are listed in Table 5.2, and are discussed further below.

Blochman's Dudleya (Dudleya blochmaniae ssp. blochmaniae, CNPS 1B.1)
Blochman's dudleya is a perennial herb with a blooming period of April through June that typically occurs in rocky, clay, or serpentine soils in coastal bluff scrub, coastal scrub, chaparral, valley, and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

Chaparral Ragwort (Senecio aphanactis, CNPS 2B.2)
Chaparral ragwort is an annual herb with a blooming period of January through April that occurs in coastal scrub, chaparral, and woodland habitats. There is a moderate potential for this species to occur within the PSA.

Coastal Dune Milk-vetch (Astragalus tener var. titi, Federal Endangered, California Endangered, CNPS 1B.1)
Coastal dune milk-vetch, is an annual herb with a blooming period of March through May that typically occurs in vernally mesic soils in sandy depressions, vernal pools near the coast, on coastal bluffs, coastal dunes, and in coastal prairie habitats. There is a moderate potential for this species to occur within the PSA.

Coulter's Goldfields (Lasthenia glabrata ssp. coulteri, CNPS 1B.1)
Coulter's goldfields is an annual herb with a blooming period of February through June that can occur in vernal pools, coastal salt, and playa habitats. Due to a lack of suitable habitat in the vicinity of the proposed Project, there is a low potential for this species to occur within the PSA.

Table 5.2 Special Status Plant Species Potentially Occurring Within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Blochman's dudleya (*Dudleya blochmaniae* ssp. *blochmaniae*)	Rocky, clay, or serpentine soils in coastal bluff scrub, coastal scrub, chaparral, and valley and foothill grassland habitats	CNPS 1B.1	Moderate potential – Suitable habitat within PSA
California boxthorn (*Lycium californicum*)	Coastal bluff scrub and coastal scrub habitats	CNPS 4.2	Present
chaparral ragwort (*Senecio aphanactis*)	Coastal scrub, chaparral, and woodland habitats	CNPS 2B.2	Moderate potential – Suitable habitat within PSA
coastal dune milk-vetch (*Astragalus tener* var. *titi*)	Vernally mesic soils in sandy depressions, vernal pools near the coast, on coastal bluffs, coastal dunes, and in coastal prairie habitats	FE, SE, CNPS 1B.1	Moderate potential – Suitable habitat within PSA
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)	Coastal marsh and swamp, playas, and vernal pool habitats	CNPS 1B.1	Low potential – No suitable habitat within PSA
Coulter's matilija poppy (*Romneya coulteri*)	Coastal sage scrub and chaparral habitats	CNPS 4.2	Present
Coulter's saltbush (*Atriplex coulteri*)	Alkali or clay soils in coastal bluff scrub, coastal dunes, coastal scrub, and valley and foothill grassland habitats	CNPS 1B.2	Moderate potential – Suitable habitat with clay soils within PSA
estuary seablite (*Suadea esteroa*)	Coastal salt habitats	CNPS 1B.2	Low potential – No Suitable habitat within PSA
intermediate mariposa-lily (*Calochortus weedii* var. *intermedius*)	Rocky or calcareous soils in coastal scrub, chaparral, and valley and foothill grassland habitats	CNPS 1B.2	Moderate potential – Suitable habitat with rocky soils within PSA
little mouse tail (*Myosurus minimus* ssp. *apus*)	Vernal pools and alkaline marshes	CNPS 3.1	Moderate potential – Suitable habitat within PSA
many-stemmed dudleya (*Dudleya multicaulis*)	Clay or heavy soils on sandstone outcrops or rocky hillsides in chaparral, coastal scrub, coastal plains, and valley and foothill grassland habitats	CNPS 1B.2	Moderate potential – Suitable habitat with clay soils within PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Nuttall's acmispon (*Acmispon prostratus*)	Coastal dunes and coastal scrub with sandy soil habitats	CNPS 1B.1	Moderate potential – Suitable habitat within PSA
Nuttall's scrub oak (*Quercus dumosa*)	Sandy or clay loam soils in coastal scrub, chaparral, and coniferous forest habitats	CNPS 1B.1	Moderate potential – Suitable habitat within PSA
Palmer's grapplinghook (*Harpagonella palmeri*)	Dry, semi-barren sites and clay soils within coastal sage scrub, chaparral, and grassland habitats.	CNPS 4.2	Moderate potential – Suitable habitat with clay soils within PSA
paniculate tarweed (*Deinandra paniculata*)	Vernally mesic soils or sandy soils in coastal scrub, vernal pool, and valley and foothill grassland habitats	CNPS 4.2	Present
Pendleton button-celery (*Eryngium pendletonense*)	Vernal pools and marshes, or mesic areas within coastal sage scrub or valley and foothill grassland habitats	CNPS 1B.1	Moderate potential – Suitable habitat within PSA
prostrate vernal pool navarretia (*Navarretia prostrata*)	Mesic soils in coastal scrub, meadows and seeps, vernal pools, and valley and foothill grassland habitats	CNPS 1B.1	Moderate potential – Suitable habitat within PSA
San Diego button-celery (*Eryngium aristulatum* var. *parishii*)	Vernal pools and marshes, or mesic areas within coastal sage scrub or valley and foothill grassland habitats	FE, SE, CNPS 1B.1	Moderate potential – Suitable habitat within PSA
San Diego County viguiera (*Viguiera laciniata*)	Coastal scrub and chaparral habitats	CNPS 4.2	Present
south coast saltscale (*Atriplex pacifica*)	Coastal bluff scrub, coastal dunes, coastal scrub, playas	CNPS 1B.2	Moderate potential – Suitable habitat within PSA
spreading navarretia (*Navarretia fossalis*)	Vernal pools and vernal swales	FT, CNPS 1B.1	Moderate potential – Some suitable habitat within PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
sticky dudleya (*Dudleya viscida*)	Rocky soils and on rock cliffs in coastal bluff scrub, chaparral, cismontane woodland, and coastal scrub habitats	CNPS 1B.2	Moderate potential – Suitable habitat within PSA
thread-leaved brodiaea (*Brodiaea filifolia*)	Clay soils around vernal pools and in openings in vernally moist grassland habitats	FT, SE, CNPS 1B.1	Present
variegated dudleya (*Dudleya variegata*)	Clay soils on dry hillsides, mesas, and vernal pools, and openings in chaparral, coastal scrub, and valley and foothill grassland habitats	CNPS 1B.2	Moderate potential – Suitable habitat within PSA
western dichondra (*Dichondra occidentalis*)	Coastal scrub, chaparral, cismontane woodland, and valley and foothill grassland habitats	CNPS 4.2	Present
white-rabbit tobacco (*Pseudognaphalium leucocephalum*)	Sandy or gravelly soils in coastal scrub, chaparral, woodland, and riparian woodland habitats	CNPS 2B.2	Moderate potential – Suitable habitat within PSA

Notes: FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; CRPR = California Rare Plant Rank

Rank:
1A: Plants presumed extinct in California
1B: Plants rare, threatened, or endangered in California and elsewhere
2: Plant rare, threatened, or endangered in California, but more common elsewhere
3: Plants about which we need more information – A review list
4: Plants of limited distribution – A watch list

Threat Ranks:
0.1-Seriously threatened in California (high degree/immediacy of threat)
0.2-Fairly threatened in California (moderate degree/immediacy of threat)
0.3-Not very threatened in California (low degree/immediacy of threats or no current threats known)

Coulter's Saltbush (Atriplex coulteri, CNPS 1B.2)
Coulter's saltbush is a perennial herb with a blooming period of March through October that typically occurs in clay or alkaline soils in coastal dunes, coastal scrub, and valley and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

Estuary Seablite (Suaeda esteroa, CNPS 1B.2)
Estuary seablite is a perennial herb with a blooming period of May through January that occurs in coastal marsh and swamp habitats. Due to a lack of suitable habitat in the vicinity of the proposed Project, there is a low potential for this species to occur within the PSA.

Intermediate Mariposa-lily (Calochortus weedii var. intermedius, CNPS 1B.2)
Intermediate mariposa-lily is perennial bulbiferous herb with a blooming period of May through July that typically occurs in rocky or calcareous soils in sage scrub, chaparral, or valley and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

Little Mousetail (Myosurus minimus ssp. apus, CNPS 3.1)
Little mousetail is an annual herb with a blooming period of March through June and is typically associated with vernal pools and alkaline marshes. There is a moderate potential for this species to occur within the PSA.

Many-stemmed Dudleya (Dudleya multicaulis, CNPS 1B.2)
Many-stemmed dudleya is a perennial herb with a blooming period of April through July that typically occurs in clay or heavy soils on sandstone outcrops or rocky hillsides, and slopes away from the river in chaparral, coastal scrub, coastal plains, and valley and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

Nuttall's Acmispon (Acmispon prostratus, CNPS 1B.1)
Nuttall's acmispon is an annual herb with a blooming period of March through July that typically occurs in coastal dune and sandy soil coastal scrub habitats. There is a moderate potential for this species to occur within the PSA.

Nuttall's Scrub Oak (Quercus dumosa, CNPS 1B.1)
Nuttall's scrub oak is a perennial evergreen shrub with a blooming period of February through August that typically occurs in sandy or clay loam soils in coastal scrub, chaparral, and coniferous forest habitats. There is a moderate potential for this species to occur within the PSA.

Palmer's Grapplinghook (Harpagonella palmeri, CNPS 4.2)
Palmer's grapplinghook is an annual herb with a blooming period of March through April and is typically associated with dry, semi-barren sites and clay soils within coastal sage scrub, chaparral, and grassland habitats. There is a moderate potential for this species to occur within the PSA.

Pendleton Button Celery (Eryngium pendletonense, CNPS 1B.1)
Pendleton button celery is a perennial herb with a blooming period of April through June. It is typically associated with vernal pools, or mesic areas within coastal scrub and grassland. There is a moderate potential for this species to occur within the PSA.

Prostrate Vernal Pool Navarretia (Navarretia prostrata, CNPS 1B.1)
Prostrate vernal pool navarretia is an annual herb with a blooming period of April through July that typically occurs in vernal pools or in mesic soils around sage scrub, meadows, seeps, valley, and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

San Diego Button-celery (Eryngium aristulatum var. parishii, Federal Endangered, California Endangered, CNPS 1B.1)
San Diego button-celery may behave as an annual or perennial and has a blooming period of April to June. It is typically associated with vernal pools and marshes, or mesic areas within coastal sage scrub or valley, and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

South Coast Saltscale (Atriplex pacifica, CNPS 1B.2)
South coast saltscale is an annual herb with a blooming period of March through October that typically occurs in sage scrub, coastal dune, coastal bluff, and playa habitats. There is a moderate potential for this species to occur within the PSA.

Spreading Navarretia (Navarretia fossalis, Federal Threatened, CNPS 1B.1)
Spreading navarretia is an annual herb with a blooming period of April through June and is typically associated with vernal pools and vernal swales. There is a moderate potential for this species to occur within the PSA.

Sticky Dudleya (Dudleya viscida, CNPS 1B.2)
Sticky dudleya is a perennial herb with a blooming period of May through June that typically occurs in rocky soils and on rock cliffs in coastal bluff scrub, chaparral, cismontane woodland, and coastal scrub habitats. There is a moderate potential for this species to occur within the PSA.

Variegated Dudleya (Dudleya variegata, CNPS 1B.2)
Variegated dudleya is a perennial herb with a blooming period of April through June that typically occurs in clay soils on dry hillsides, mesas, and vernal pools, and openings in chaparral, coastal scrub, and valley and foothill grassland habitats. There is a moderate potential for this species to occur within the PSA.

White Rabbit-tobacco (Pseudognaphalium leucocephalum, CNPS 2B.2)
White rabbit-tobacco is a perennial herb with a blooming period of July through December that typically occurs in sandy or gravelly soils in sage scrub, chaparral, and woodland habitats. There is a moderate potential for this species to occur within the PSA.

5.5 Wildlife Species

Approximately 100 wildlife species have been observed within the PSA during surveys conducted in the area. A compendium list of wildlife species observed during studies in support of the proposed Project is included in Appendix K.

Special Status Wildlife Species Observed

A total of six special status wildlife species were observed within the PSA during focused and/or protocol surveys conducted in support of the proposed Project, and another 34 species were not observed during surveys but have potential to occur in the PSA. Species observed include the arroyo toad, the coastal cactus wren, the coastal California gnatcatcher, the least Bell's vireo, loggerhead shrike (*Lanius ludovicianus*), and Dulzura pocket mouse (*Chaetodipus californicus femoralis*).

Arroyo Toad (Federal Endangered, California Species of Special Concern)

The arroyo toad is found in streams with silt-free sandy streambeds, shallow pools or quiet runs, and nearby sandbars or sandy terraces. They prefer riparian habitat with mulefat, willow, western sycamore, and cottonwood (*Populus* sp.), but can also be found in streams within woodland and forest habitats with minimal riparian vegetation. The arroyo toad is primarily nocturnal within their stream habitats, and they are most active after seasonal rains in late winter and early spring. Their breeding season is generally from March through July, but this may vary depending on rainfall. The arroyo toad will travel into upland habitat (up to 3,000 feet from a stream) during the non-breeding season.

Protocol-level surveys were conducted for arroyo toad within the PSA in 2015 in support of the proposed Project. The surveys were conducted in habitats with the potential to support arroyo toad. One arroyo toad was observed in San Mateo Creek and three arroyo toads were observed in San Onofre Creek (both locations within the PSA) during the protocol surveys (Bloom Biological 2015a). Construction activities are not anticipated within either San Mateo or San Onofre creeks. The location of each observation is illustrated in Appendix E.

Coastal Cactus Wren (USFWS Bird of Conservation Concern, California Species of Special Concern)

The coastal cactus wren is only found in the San Diego County and southern Orange County in California. It inhabits arid and semiarid areas with coastal sage scrub habitat dominated by thickets of cactus (i.e. cholla or prickly-pear). It is dependent on these cactus stands, where it remains year-round maintaining its large, hollow, football-shaped nests. The nesting season for the coastal cactus wren is typically from March to mid-July, but it can be observed maintaining and roosting at their nests year-round.

Nesting surveys were conducted for coastal cactus wren within the PSA in 2015 in support of the proposed Project. The surveys were conducted in habitats with the potential to support coastal cactus wrens and their nests. One coastal cactus wren family ground and two nests were observed within the southern section of the PSA (Bloom 2015b). The location of each observation is illustrated in Appendix G.

Coastal California Gnatcatcher (Federal Threatened, California Species of Special Concern)

The coastal California gnatcatcher is only found in southern California within the United States. It is a year-round resident within coastal sage scrub habitat and prefers areas dominated by California sagebrush and California buckwheat. They may also forage and nest in other scrub habitats, such as chaparral and riparian scrub, if it is closely associated with nearby coastal sage scrub habitat. The nesting season for coastal California gnatcatcher is typically from March through August.

Protocol-level surveys were conducted for coastal California gnatcatcher within the PSA in 2014 in support of the proposed Project. The surveys were conducted in habitats with the potential to support coastal California gnatcatchers. A total of 108 coastal California gnatcatcher observations were made throughout the PSA (AECOM 2014b), and most if not all of the coastal sage scrub habitat within the PSA

should be considered occupied habitat for the coastal California gnatcatcher. Additional coastal California gnatcatcher surveys are anticipated to be conducted closer to the beginning of construction of the proposed Project, in order to better determine the most current locations of gnatcatchers prior to construction.

Least Bell's Vireo (Federal Endangered, California State Endangered)
The least Bell's vireo migrates into southern California during its breeding season from around mid-March through late September, and is typically associated with dense riparian woodland habitat with a dense upper canopy, where it forages, and a dense understory, where it nests. It may also forage in upland habitats up to 200 feet from the riparian edge.

Protocol-level surveys were conducted for least Bell's vireo within the PSA, in spring and summer 2015, in support of the proposed Project. The surveys were conducted in riparian habitats with the potential to support least Bell's vireo. A total of 52 least Bell's vireo observations were recorded within the PSA during the survey (Bloom 2015a). The location of each observation is illustrated in Appendix E.

Loggerhead Shrike (USFWS Bird of Conservation Concern, California Species of Special Concern)
The loggerhead shrike is an uncommon year-round resident to San Diego County that be found in grassland, open sage scrub, chaparral, and desert scrub habitats (Unitt 2004). Their nesting season can extend as early as January through July. Suitable grassland and coastal sage scrub habitat occur within the PSA. The loggerhead shrike was observed in the southern portion of the PSA (south of San Mateo Creek) during burrowing owl surveys conducted in December 2014 and January 2015 (AECOM 2015).

Dulzura Pocket Mouse (California Species of Special Concern)
The Dulzura pocket mouse is a solitary mouse that spends its days in burrows and its nights foraging for seeds. It is typically found in mature coastal sage scrub and chaparral habitats, but can also occur in desert grassland habitats. Suitable coastal sage scrub habitat occurs throughout the PSA. In addition, Dulzura pocket mouse was observed north and south of San Mateo Creek during trapping surveys for Pacific pocket mouse in July 2013 (Tremor 2013a, 2013b).

For purposes of this report, special status wildlife species include those that are either; listed or proposed for listing as threatened or endangered by the USFWS or the CDFW, species designated as "Birds of Conservation Concern" by the USFWS, those species designated as "fully protected" by the CDFW, species considered "species of special concern" by the CDFW, and/or those considered "taxa to watch" by the CDFW. Other special status wildlife species observed or with potential to occur in the PSA are identified in Table 5.3, and are discussed in further detail below.

Special Status Wildlife Species with Potential to Occur

Riverside Fairy Shrimp (Streptocephalus woottoni, Federal Endangered)
The Riverside fairy shrimp is a small aquatic crustacean found in moderate to deep (greater than 12 inches), longer-lived vernal pools and ephemeral freshwater wetland habitats, and is typically associated with vernal pool complexes. Vernal pool complexes are generally made up of between 5 to 50 pools, are hydrologically connected, and have similar species composition. It does not occur in riverine, marine, or other permanent water bodies. It occurs in San Diego, Orange, Riverside, and Ventura Counties, where they are found in both hardpan and claypan vernal pools.

Table 5.3 Special Status Wildlife Species Potentially Occurring Within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Invertebrates			
Riverside fairy shrimp (*Streptocephallus woottoni*)	Vernal pools and ephemeral freshwater wetland habitats, and is typically associated with vernal pool complexes	FE	Moderate potential – Suitable habitat observed within the PSA, and other non-sensitive fairy shrimp species observed during focused surveys in 2015
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	Shallow vernal pools and ephemeral freshwater wetland habitats, and is typically associated with vernal pool complexes	FE	Moderate potential – Suitable habitat observed within the PSA, and other non-sensitive fairy shrimp species observed during focused surveys in 2015
Fish			
southern steelhead (*Oncorhynchus mykiss*)	Ocean, estuaries, rivers, and watershed habitats	FE, SSC	Moderate potential within watersheds of San Mateo Creek and San Onofre Creek within the PSA
tidewater goby (*Eucyclogobius newberryi*)	Coastal lagoon and estuary habitats	FE, SSC	Low to moderate potential within watersheds of San Mateo Creek and San Onofre Creek within the PSA
Amphibians			
arroyo toad (*Anaxyrus californicus*)	Streams with silt-free streambeds, shallow pools or quiet runs, and nearby sandbars or sandy terraces – they prefer riparian habitat but can also be found in streams within woodland and forest habitats with minimal riparian vegetation	FE, SSC	Present – Observed during focus surveys and suitable habitat observed within the PSA
western spadefoot toad (*Spea hammondii*)	Mixed oak woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains	SSC	Moderate potential – Suitable habitat observed within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Reptiles			
coast patch-nosed snake (*Salvaroda hexalepis virgultea*)	Semi-arid brushy areas such as chaparral, coastal sagebrush, pinyon-juniper woodland, and desert scrub habitats	SSC	Moderate potential – Potential habitat observed within the PSA
Coronado island skink (*Plestiodon skiltonianus interparietalis*)	Pine forest, open woodland, grasslands, chaparral, and coastal sage scrub habitats and along creeks and rivers	SSC	Moderate potential – Suitable habitat exists within the PSA
northern red rattlesnake (*Crotalus ruber ruber*)	Coastal sage scrub, chaparral, desert slope scrub, thorn scrub, and woodland habitats below 5,000 feet	SSC	Moderate potential – Suitable habitat observed within the PSA
orange-throated whiptail (*Aspidoscelis hyperythrus*)	Semi-arid brushy areas typically with loose soil and rocks, including washes, stream sides, rocky hillsides, coastal chaparral, and coastal sage scrub habitats	SSC	Moderate potential – Suitable habitat observed within the PSA
San Diego horned lizard (*Phrynosoma coronatum blainvillei*)	Sage scrub, chaparral, grasslands, woodlands, and coniferous forest habitats	SSC	Moderate potential – Suitable habitat observed within the PSA
southwestern pond turtle (*Actinemys marmorata pallida*)	Ponds, lakes, rivers, streams, creeks, marshes, and irrigation ditches with emergent and floating vegetation	SSC	Low potential – Some suitable upland habitat for nesting and aestivation observed within the PSA
two-striped garter snake (*Thamnophis hammondii*)	Permanent or intermittent freshwater source, such as ponds, lakes, and temporary bodies of water – prefers riparian habitat with coastal sage scrub, and coniferous forest habitats	SSC	Moderate potential – Suitable habitat observed within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Birds			
bank swallow (*Riparia riparia*)	Low areas along rivers, streams, ocean coasts, or reservoirs with vertical cliffs or banks	ST	Moderate potential – Some suitable nesting habitat may occur in San Mateo Creek within the PSA
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	Salt marsh habitat dominated by pickleweed (*Salicornia* sp.)	SE	Low potential – No suitable nesting or foraging habitat observed within the PSA
burrowing owl (*Athene cunicularia*)	Grasslands and open scrub habitats, but may also be found in vacant lots and other open disturbed areas	BCC, SSC	Moderate potential – Suitable open scrub and grassland habitat was observed within the PSA
California least tern (*Sternula antillarum browni*)	Breeds on sand dunes and on sandbars close to lagoons, bays, and estuaries – may also forage at inland lakes and reservoirs	FE, SE, FP	Low potential – No suitable nesting or foraging habitat observed within the PSA
coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*)	Arid and semiarid areas with coastal sage scrub habitat dominated by thickets of cactus	BCC, SSC	Present – Observed during focused surveys in 2015, and suitable habitat observed within the PSA
coastal California gnatcatcher (*Polioptila californica californica*)	Coastal sage scrub habitat and prefers areas dominated by California sagebrush and California buckwheat – may also forage and nest in other scrub habitats, such as chaparral and riparian scrub	FT, SSC	Present – Observed during focused surveys in 2014 and suitable habitat (CSS) observed within the PSA
Cooper's hawk (*Accipiter cooperii*)	Riparian woodlands, oaks woodlands, and eucalyptus groves habitats	WL	Moderate – Suitable nesting and foraging habitat was observed within the PSA
ferruginous hawk (*Buteo regalis*)	Extensive grassland habitats and agricultural areas	WL	Low potential – Some open flat areas and potential grassland habitat observed within the PSA
grasshopper sparrow (*Ammondramus savannarum*)	Native and nonnative grasslands	SSC	Moderate potential – Suitable habitat observed within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
least Bell's vireo (*Vireo bellii pusillus*)	Riparian woodland habitats with a relatively dense tree canopy	FE, SE	Present – Observed during focused surveys and suitable habitat observed within the PSA
light-footed Ridgeway's rail (*Rallus obsoletus levipes*)	Saltwater and brackish marsh habitats	FE, SE, FP	Low potential – No suitable nesting or foraging habitat observed within the PSA
loggerhead shrike (*Lanius ludovicianus*)	Grassland, open sage scrub, chaparral, and desert scrub habitats	BCC, SSC	Present- Observed during surveys and suitable habitat observed within the PSA
northern harrier (*Circus cyaneus*)	Grassland and marsh habitats	SSC	Moderate potential – Some suitable foraging habitat observed within the PSA
southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	Coastal sage scrub, broken or burned chaparral, and arid, rocky hillsides in mature chaparral habitat	WL	Moderate potential – Suitable habitat observed within the PSA
southwestern willow flycatcher (*Empidonax traillii extimus*)	Riparian woodland/ forest habitats with some surface water	FE, SE	Moderate potential – Suitable habitat observed within the PSA
western snowy plover (*Charadrius alexandrinus nivosus*)	Beaches, dunes, dry mud or salt flats, and sandy shores of river, lakes and ponds	FT, BCC, SSC	Low potential – No suitable nesting or foraging habitat observed within the PSA
western yellow-billed cuckoo (*Coccyzus americanus*)	Riparian woodland habitats	FT, SE	Moderate potential – Suitable nesting and foraging habitat observed within the PSA
white-tailed kite (*Elanus leucurus*)	Grassland with adjacent riparian woodland, oak groves, or sycamore groves habitats	FP	Moderate potential – Suitable nesting and foraging habitat observed within the PSA.
yellow-breasted chat (*Icteria virens*)	Riparian woodland habitats	SSC	Moderate potential – Suitable habitat observed within the PSA
yellow warbler (*Dendroica petechia*)	Riparian woodland habitats	BCC, SSC	Moderate potential – Suitable habitat observed within the PSA
Mammals			
American badger (*Taxidea taxus*)	Drier and open stages of scrub, forest, and grassland habitats	SSC	Moderate potential – Suitable foraging and burrowing habitat observed within the PSA

Species	Habitat Requirements	Status	Potential to Occur within the PSA
Dulzura pocket mouse (*Chaetodipus californicus femoralis*)	Mature coastal sage scrub and chaparral habitats – it may also occur in desert grassland habitats	SSC	Present – Observed during focused trapping/surveys for Pacific Pocket Mouse. Suitable habitat observed within the PSA
Mexican long-tongued bat (*Choeronycteris mexicana*)	Desert shrubland, mountain canyons with deep riparian vegetation, woodlands, and tropical deciduous forest habitats	SSC	Low potential – Marginally suitable habitat observed within the PSA
northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	Sandy soils with rocks or coarse gravel in coastal sage scrub, chaparral, grassland, and sage scrub/grassland transitional habitats	SSC	Moderate potential – Suitable habitat observed within the PSA
Pacific pocket mouse (*Perognathus longimembris pacificus*)	Open coastal sage scrub habitat with fine-grain, sandy substrates	FE, SSC	High potential – Suitable habitat observed within the PSA, and species detected in and in the vicinity of the PSA during previous surveys
San Diego black-tailed jackrabbit (*Lepus californicus bennetti*)	Grassland, desert shrub, open forest, scrub, and chaparral habitats in coastal southern California	SSC	Moderate potential – Suitable foraging habitat observed within the PSA
San Diego desert woodrat (*Neotoma lepida intermedia*)	Coastal sage scrub, chaparral, woodland, and desert habitats	SSC	Moderate potential – Suitable habitat observed within the PSA
western mastiff bat (*Eumops perotis californicus*)	Semi-arid to arid habitats and woodland, coastal scrub, grassland, palm oases, chaparral, desert scrub, and urban habitats – roost in cliffs, buildings, trees, and tunnels	SSC	Moderate potential – Suitable foraging habitat observed within the PSA

USFWS: FE=Federal Endangered, FT=Federal Threatened, BCC= USFWS Birds of Conservation Concern, CDFW: FP=Fully protected, SE=State Endangered, ST=State Threatened, SSC=California Species of Special Concern, WL=CDFW Watch List

Protocol-level wet season surveys were conducted for Riverside fairy shrimp within the PSA in early 2015 in support of the proposed Project. Protocol-level dry season surveys were conducted in September 2015. The surveys were conducted in habitat with the potential to support Riverside fairy shrimp. No Riverside fairy shrimp have been detected during the surveys (Cardno 2015b, Appendix D).

San Diego Fairy Shrimp (Branchinecta sandiegonensis, Federal Endangered)
The San Diego fairy shrimp is a small aquatic crustacean found in more shallow vernal pools and ephemeral freshwater wetland habitats and is typically associated with vernal pool complexes. Vernal pool complexes are generally made up of between 5 to 50 pools, are hydrologically connected, and have similar species composition. It does not occur in riverine, marine, or other permanent water bodies. In the United States, the current range of the San Diego fairy shrimp is restricted to San Diego and Orange Counties.

Protocol-level wet season surveys were conducted for San Diego fairy shrimp within the PSA in early 2015 in support of the proposed Project. Protocol-level dry season surveys were conducted in September 2015. The surveys were conducted in habitat with the potential to support San Diego fairy shrimp. No San Diego fairy shrimp was detected during the surveys (Cardno 2015b, Appendix D).

Southern Steelhead (Oncorhynchus mykiss, Federal Endangered, California Species of Special Concern)
The southern steelhead is an anadromous fish and member of the salmon family that is native to southern California. The southern steelhead hatches in streams and rivers, and will spend part of their life cycle developing physiological changes that allow them to migrate back into saltwater to mature (NMFS 2011). The southern steel head will usually return to spawn in the same stream or river that they were hatched. San Mateo Creek and San Onofre Creek provide potentially suitable habitat when flowing; therefore, there is a moderate potential for southern steelhead to occur within the drainages that cross the PSA.

Tidewater Goby (Eucyclogobius newberryi, Federal Endangered, California Species of Special Concern)
The tidewater goby is endemic species to California coastal lagoons, estuaries, and marshes. It is a benthic species that prefers brackish waters, shallow lagoons, and lower streams reaches where the water is still but not stagnant. Tidewater gobies are generally found within the fresh-saltwater interface in the upper part of estuaries, but can often migrate as far as 0.5 mile upstream along tributaries from an estuary (USFWS 2005). San Mateo Creek and San Onofre Creek may provide some potential habitat when flowing; therefore, there is a moderate potential for tidewater goby to occur within the drainages that cross the PSA.

Western Spadefoot Toad (Spea hammondii, California Species of Special Concern)
The western spadefoot toad may be found in a wide range of habitats where favorable sandy or gravelly soils for burrowing are present. These habitats include mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Western spadefoot toads are mainly terrestrial returning to water only to breed. After heavy rains, temporary shallow rain pools are used for breeding, with a breeding season typically from January through May; however, they can breed at any time of the year if conditions are favorable. Outside of the breeding season the western spadefoot toad is rarely seen, spending its time underground in burrows. Suitable oak woodland, grassland, coastal sage scrub, and riparian habitats occur throughout the PSA; therefore, there is moderate potential for western spadefoot toad to occur within the PSA.

Coast Patch-nosed Snake (Salvadora hexalepis virgultea, California Species of Special Concern)
The coast patch-nosed snake is found in brushy or shrubby vegetation areas, such as coastal sage scrub and chaparral habitats. It is active during the day, hunting small vertebrates, such as lizards and small mammals, on the ground and sometimes pursuing prey up into shrubs. It will burrow into loose, sandy soils, but is quick to flee when it feels threatened. Suitable coastal sage scrub habitat occurs throughout the PSA; therefore, there is moderate potential for coast patch-nosed snake to occur within the PSA.

Coronado Island Skink (Plestiodon skiltonianus interparietalis, California Species of Special Concern)
The Coronado island skink prefers openings and clearings where rocks, logs, and other debris are present in pine forest, open woodland, and grassland habitats, and along creeks and rivers, but may also be found in chaparral and coastal sage scrub habitats. It is active during the day, somewhat secretive and rarely seen, but may be found foraging in leaf litter. When not foraging it takes refuge under bark, leaf litter, rocks, and in burrows. Suitable woodland, grassland, riparian, and coastal sage scrub habitats occur throughout the PSA; therefore, there is a moderate potential for Coronado island skink to occur within the PSA.

Northern Red Diamond Rattlesnake (Crotalus ruber ruber, California Species of Special Concern)
The northern red diamond rattlesnake, one of San Diego County's larger rattlesnakes, is generally a quiet, secretive rattlesnake. It is typically found in coastal sage scrub, chaparral, desert slope scrub, thorn scrub, and woodland habitats below 5,000 feet. It can occasionally be found in grassland habitats as well, but prefers areas with rocks and brush. Suitable woodland and coastal sage scrub habitats occur throughout the PSA; therefore, there is moderate potential for northern red diamond rattlesnake to occur within the PSA.

Orange-throated Whiptail (Aspidoscelis hyperythrus, California Species of Special Concern)
The orange-throated whiptail is a highly mobile species that can be found in brushy semi-arid areas typically with loose soil and rocks, including washes, streamsides, rocky hillsides, coastal chaparral, and coastal sage scrub habitats. Suitable riparian and coastal sage scrub habitats occur throughout the PSA; therefore, there is moderate potential for orange-throated whiptail to occur within the PSA.

San Diego Horned Lizard (Phrynosoma coronatum blainvillei, California Species of Special Concern)
The San Diego horned lizard is found within a variety of natural habitats in San Diego County that include sage scrub, chaparral, grasslands, woodlands, and coniferous forest and prefers habitats that are undisturbed, with open areas and patches of loose soils. It primarily eats native harvester ants and can frequently be found near anthills. Suitable coastal sage scrub, grasslands, and woodland habitats occur throughout the PSA, and the San Diego horned lizard has been documented in other parts of MCB Camp Pendleton; therefore, there is moderate potential for San Diego horned lizard to occur within the PSA.

Southwestern Pond Turtle (Actinemys marmorata pallida, California Species of Special Concern)
The southwestern pond turtle is San Diego County's only native freshwater turtle. It typically occurs near a permanent water source, but will also travel on land near water bodies. The southwestern pond turtle prefers ponds or water bodies with emergent and floating vegetation, such as cattails and algae mats, that supply food and protection for the turtle. The San Mateo Creek and San Onofre Creek within the PSA do not appear to flow as a permanent water source; however, nearby habitats could provide potential habitat for nesting and aestivation within the PSA. Therefore, there is a low potential for southwestern pond turtle to occur within the PSA.

Two-striped Garter Snake (Thamnophis hammondii, California Species of Special Concern)
The two-striped garter snake is a mostly aquatic snake generally found in or near a permanent or intermittent freshwater source, such as streams, ponds, lakes, and temporary bodies of water. They prefer riparian habitat with rocky streambeds and sandy riverbeds within oak woodland, chaparral, coastal sage scrub, and coniferous forest habitats. Suitable riparian habitat was observed in Cristianitos Creek, San Mateo Creek, and San Onofre Creek; therefore, there is a moderate potential for two-striped garter snake to occur within the PSA.

Bank Swallow (Riparia riparia, California State Threatened)
The bank swallow is a rare migrant to southern California that can be found in agricultural lands, wetland, and river habitats. The nesting season for the bank swallow is from April to June, with nests built, often in colonies, in vertical sandy riverbanks and bluffs. Some potential nesting habitat occurs within the PSA where it is crossed by San Mateo Creek; therefore, there is moderate potential for this species to occur within the PSA.

Belding's Savannah Sparrow (Passerculus sandwichensis beldingi, California State Endangered)
The Belding's savannah sparrow is a year-round resident of coastal southern California salt marsh habitat dominated by pickleweed (*Salicornia* sp.). The nesting season for the Belding's savannah sparrow is generally from March through mid-July, with nests built in dense marsh vegetation on or near the ground. No suitable salt marsh habitat was observed within the PSA; therefore, there is a low potential for this species to occur within the PSA.

Burrowing Owl (Athene cunicularia, USFWS Bird of Conservation Concern, California Species of Special Concern)
The burrowing owl can be found in grassland and open scrub habitats where it utilizes mammal burrows, and occasionally man-made structures such as culverts, for roosting and nesting. The species occurs in San Diego County year-round, with the breeding season generally February through August, but is more common in winter.

Suitable habitat for burrowing owl does occur within the PSA. Protocol-level surveys were conducted for burrowing owl within the PSA during the 2014-2015 non-breeding season in support of the proposed Project. The surveys were conducted in habitats with the potential to support burrowing owls. No burrowing owls or their sign were observed within the PSA during the survey (AECOM 2015).

California Least Tern (Sternula antillarum browni, Federal Endangered, California State Endangered, California Fully Protected)
The California least tern is a year-round resident of coastal southern California, though most breeding occurs on off-shore islands. They are usually seen foraging and roosting along the coast and in coastal bays, harbors, and tidal lagoon, but can occasionally be found on more inland freshwater lakes and reservoirs. No suitable foraging or nesting habitat occurs within the PSA; therefore, there is a low potential for California least tern to occur within the PSA.

Cooper's Hawk (Accipiter cooperii, CDFW Watch List)
The Cooper's hawk is a year-round resident of riparian woodlands, oak woodlands, and more recently of eucalyptus groves in California. This hawk typically nests in tall trees such as oaks and eucalyptus, but may utilize other trees as well. The nesting season for Cooper's hawk occurs from as early as January

through June. This species was not documented within one mile of the project by the CNDDB, however, there is suitable nesting and foraging habitat within the PSA, and there is a moderate potential for this species to occur. Suitable coast live oak woodland and eucalyptus woodland habitats for nesting were observed within the PSA; therefore, there is potential for Cooper's hawk to occur within the PSA.

Ferruginous Hawk (Buteo regalis, CDFW Watch List)
The ferruginous hawk is an uncommon winter visitor to southern California from October through February and it is not known to breed in San Diego County according to the *San Diego County Bird Breeding Atlas* (Unitt 2004). While wintering in the area, it prefers to hunt in extensive tracts of grassland habitat and agricultural areas. Potential migratory foraging habitat such as the grassland habitat south of San Mateo Creek could provide areas for foraging; therefore, there is a low potential for ferruginous hawk to occur within the PSA.

Grasshopper Sparrow (Ammodramus savannarum, California Species of Special Concern)
The grasshopper sparrow generally migrates into San Diego County to breed, but it has been recorded in the county in the winter months. It is generally restricted to native grassland habitat dominated by bunchgrass of the genus *Nassella*, but has been documented in nonnative grassland habitat as well. The native grassland that it inhabits usually has some scattered native coastal sage shrubs. The nesting season for grasshopper sparrow is from April through June. Some potential nonnative grassland habitat occurs within the northern and southern portions of the PSA; therefore, there is moderate potential for grasshopper sparrow to occur within the PSA.

Light-footed Ridway's Rail (Rallus obsoletus levipes, Federal Endangered, California State Endangered and Fully Protected)
The light-footed Ridgway's rail is a year-round resident of salt-water and brackish marsh habitats along coastal California. California cord grass (*Spartina foliosa*) is their preferred nesting habitat and material though pickleweed and tumbleweed are sometimes used if California cord grass is limited. Light-footed Ridway's rails may sometimes nest in freshwater marshes, but with limited success. Their nesting season can extend from March through July. No suitable marsh habitat occurs within the PSA; therefore, there is low potential for light-footed Ridgway's rail to occur within the PSA.

Northern Harrier (Circus cyaneus, California Species of Special Concern)
The northern harrier is a year-round resident of southern California, but is more numerous as a winter visitor. Northern harriers forage in open grassland and marsh habitats and build nests on the ground in marshes or other dense vegetation. Their nesting season typically extends from April through June. Suitable foraging grassland habitat occurs within the PSA; therefore, there is a moderate potential for northern harrier to occur within the PSA.

Southern California Rufous-crowned Sparrow (Aimophila ruficeps canescens, CDFW Watch List)
The southern California rufous-crowned sparrow is a year-round resident of California that rarely ventures far from its preferred habitats of coastal sage scrub, broken or burned chaparral, and arid, rocky hillsides in mature chaparral. Its nesting season extends from March through July, with nests typically found on or near the ground at the bases of low shrubs. Suitable coastal sage scrub habitat occurs throughout the PSA; therefore, there is moderate potential for southern California rufous-crowned sparrow to occur within the PSA.

Southwestern Willow Flycatcher (Empidonax traillii extimus, Federal Endangered, California State Endangered)
The southwestern willow flycatcher is a migratory species that spends the breeding season in the southwestern United States. While in the United States, the southwestern willow flycatcher is a strict inhabitant of the dense vegetation associated with riparian woodland/forest habitats with some surface water. In San Diego County, southwestern willow flycatchers start arriving in May to breed in riparian woodland/forest habitats and starts migrating south by the end of August.

Protocol-level surveys were conducted for southwestern willow flycatcher during May through July 2015 in support of the proposed Project. The surveys were conducted in habitats with the potential to support southwestern willow flycatcher. No willow flycatcher or any subspecies, including the southwestern willow flycatcher, were detected within the PSA during the surveys (Bloom 2015a).

Western Snowy Plover (Charadrius alexandrinus nivosus, Federal Threatened, USFWS Bird of Conservation Concern, California Species of Special Concern)
The western snowy plover is a year-round resident along the California coast and inhabits beaches, dunes, dry mud or salt flats, and sandy shores of rivers, lakes, ponds. The nesting season for western snowy plover extends from March through September when it nests in shallow scrapes on the ground in sand or dried mud. No suitable beaches, dunes, dry mud or salt flats, sandy shores of rivers, lakes, or ponds occur within the PSA; therefore, there is low potential for western snowy plover to occur within the PSA.

Western Yellow-billed Cuckoo (Coccyzus americanus Federal Threatened, California State Endangered)
The western yellow-billed cuckoo is an uncommon summer resident in San Diego County that typically inhabits riparian habitats. Western yellow-billed cuckoos breed in riparian woodlands with cottonwoods and willows. The breeding season for western yellow-billed cuckoo in California is from late June to late July, but could being as early as May and may continue into late August. Potential habitat occurs within the PSA in San Mateo Creek and San Onofre Creek; however, no evidence of the Western yellow-billed cuckoo was observed during other protocol-level species surveys for special status riparian avian and amphibian species. Therefore, there is moderate potential for western yellow-billed cuckoo to occur within riparian habitats crossing the PSA.

White-tailed Kite (Elanus leucurus, California Fully Protected)
The white-tailed kite is a common year-round resident in San Diego County and typically inhabits riparian woodlands, oak woodlands, and grassland habitats. It typically nests in oaks, but may utilize other trees as well. The nesting season for white-tailed kite occurs as early as January through August. Suitable riparian woodland and grassland habitats occur within the PSA; therefore, there is a moderate potential for white-tailed kite to occur within the PSA.

Yellow-breasted Chat (Icteria virens, California Species of Special Concern)
The yellow-breasted chat is a summer visitor to southern California and typically inhabits riparian woodland habitats where it nests in thickets of dense vegetation. The breeding season for yellow-breasted chat occurs as early as April through as late as July. Suitable riparian habitat occurs within the PSA in San Mateo Creek and San Onofre Creek; therefore, there is moderate potential for yellow-breasted chat to occur within the PSA.

Yellow Warbler (Dendroica petechia, USFWS Bird of Conservation Concern, California Species of Special Concern)
The yellow warbler is a summer visitor to southern California and typically inhabits riparian woodland habitats where it nests in upright forks of twigs. The breeding season for yellow warbler occurs from mid-April through July. Suitable riparian habitat occurs within the PSA in San Mateo Creek and San Onofre Creek; therefore, there is moderate potential for yellow warbler to occur within the PSA.

American Badger (Taxidea taxus, California Species of Special Concern)
The American badger occurs throughout California and is most often found in drier and open stages of shrub, forest, and grassland habitats, where friable soils, suitable for digging burrows, are present. Suitable coastal sage scrub and grassland habitats occur within the PSA; therefore, there is moderate potential for American badger to occur within the PSA.

Mexican Long-tongue Bat (Choeronycteris mexicana, California Species of Special Concern)
The Mexican long-tongue bat is found in desert shrubland, mountain canyons with deep riparian vegetation, woodland, and tropical deciduous forest habitats. It feeds primarily on nectar and pollen, and it typically roosts in buildings, mines, caves, tunnels, or rock crevices. Marginally suitable riparian habitat for foraging occurs where San Mateo Creek and San Onofre Creek cross the PSA; therefore, there is a low potential for Mexican long-tongue bat to occur within the PSA.

Northwestern San Diego Pocket Mouse (Chaetodipus fallax fallax, California Species of Special Concern)
The Northwestern San Diego pocket mouse is found in a wide variety of habitats in southern California, including chaparral, coastal sage scrub, grassland, and sage scrub/grassland transitional habitats. This mouse has a strong affinity for habitats that have sandy soils where rocks and/or coarse gravel are present. Suitable coastal sage scrub and grassland habitats occur within the PSA; therefore, there is moderate potential for northwestern San Diego pocket mouse to occur within the PSA.

Pacific Pocket Mouse (Perognathus longimembris pacificus, Federal Endangered, California Species of Special Concern)
The Pacific pocket mouse is currently known from only four locations (three on MCB Camp Pendleton and one in Dana Point). These remaining populations occur within open coastal sage scrub habitat with fine-grain, sandy substrates. Historically this pocket mouse was known to inhabit coastal sage scrub, coastal strand, coastal dune, and river alluvium habitats within approximately 2.5 miles of the ocean. Historical records of Pacific pocket mouse observations have been documented in the vicinity of the proposed reconductor segment along existing lattice towers in the hills north of Basilone Road, as well as coastal sage scrub habitat south of the San Mateo Substation.

Protocol-level surveys were conducted for Pacific pocket mouse within the PSA in 2013, in areas of suitable habitat that had not previously been documented as occupied by Pacific pocket mouse. The surveys were conducted in habitats with the potential to support Pacific pocket mouse near San Mateo Creek and San Onofre Creek. No Pacific pocket mouse were captured or observed during the surveys (Tremor 2013a, 2013b); however, there is a high potential that this species occurs within the proposed Project area. No trapping was conducted in known occupied Pacific pocket mouse habitat, in order to minimize potential disturbance to the species. MCB Camp Pendleton and the U.S. Geological Survey have been conducting extensive surveys in Pacific pocket mouse habitat to determine population locations, densities, and other pertinent ecological information for this species at MCB Camp Pendleton.

SDG&E will use the latest data from these studies to determine specific Pacific pocket mouse locations within the PSA. In coordination with MCB Camp Pendleton and the USFWS, additional surveys will be conducted as necessary to determine the most recent areas occupied by Pacific pocket mouse within the PSA, in order to avoid or minimize potential impacts to this species as a result of construction.

San Diego Black-tailed Jackrabbit (Lepus californicus bennettii, California Species of Special Concern)
The San Diego black-tailed jackrabbit occurs in grassland and desert shrub habitats, as well as open/early stages of forest, scrub, and chaparral habitats in coastal southern California. It prefers more open scrub habitat without a dense understory and is rarely found in closed canopy habitats. Suitable grassland and coastal sage scrub habitats occur throughout the PSA; therefore, there is moderate potential for San Diego black-tailed jackrabbit to occur within the PSA.

San Diego Desert Woodrat (Neotoma lepida intermedia, California Species of Special Concern)
The San Diego desert woodrat may be found within a variety of habitats within southern California including coastal sage scrub, chaparral, woodland, and desert habitats, especially in rocky areas. They build rather large, and sometime elaborate nests from sticks, cacti, rocks, bits of plant material, and sometime with man-made trash or debris. These nests are called middens and are located above ground, often under rock outcrops, in a rock pile, under shrubs, or within the center of cactus or agave patches. No woodrat middens were observed during any of the wildlife surveys; however, suitable coastal sage scrub and coast live oak woodland habitat occurs within the PSA. Therefore, there is moderate potential for San Diego desert woodrat to occur within the PSA.

Western Mastiff Bat (Eumops perotis californicus, California Species of Special Concern)
The western mastiff bat is typically found in open semi-arid to arid habitats such as woodland, coastal scrub, grassland, palm oases, chaparral, desert scrub, and urban areas. It typically roosts in high buildings, trees, tunnels, and cliff crevices. Suitable coat live oak woodland, coastal sage scrub and grassland habitats for foraging occur within the PSA. In addition, potential buildings for roosting occur within and in the vicinity of the PSA; therefore, there is moderate potential for western mastiff bat to occur within the PSA.

5.7 Critical Habitat

Under the ESA, to the extent prudent and determinable, the USFWS is required to designate Critical Habitat for endangered and threatened species (16 U.S.C. § 1533 (a)(3)). Critical Habitat is defined as areas of land, water, and air space containing the physical and biological features essential for the survival and recovery of endangered and threatened species. Designated Critical Habitat includes sites for breeding and rearing, movement or migration, feeding, roosting, cover, and shelter.

Designated Critical Habitats require special management and protection of existing resources, including water quality and quantity, host animals and plants, food availability, pollinators, sunlight, and specific soil types. Critical habitat designation delineates all suitable habitat occupied or not, that is essential to the survival and recovery of the species.

Most of the Proposed Project is within MCB Camp Pendleton. According to USFWS policy, if adequate special management or protection is provided by a legally operative plan that addresses the maintenance and improvement of the primary constituent elements important to the species and manages for the long-term conservation of the species, habitat identified as essential to the protection

and recovery of a species may be omitted from federal critical habitat designation. "Benefit" to the species is determined by these three criteria 1) The plan provided a conservation benefit to the species; 2) the plan provided certainty that the management plan will be implemented; and 3) the plan provides certainty that the conservation effort will be effective. MCB Camp Pendleton's INRMP meets these three criteria for all federally listed species except the California brown pelican, which is currently proposed for federal delisting (MCB Camp Pendleton 2012).

The northernmost portion of the PSA which lies outside of the boundaries of MCB Camp Pendleton, falls within or crosses designated Critical Habitat for both the arroyo toad and coastal California gnatcatcher. Project components within critical habitat for these species include stringing sites, poles and conductor to be replaced, a helicopter ILA, and Talega Staging Yard 1.

In the USFWS 2003 Proposed Rule to Revise Designation of Critical Habitat for the Coastal California Gnatcatcher, the USWFS considered but did not propose as critical habitat, pursuant to sections 3(5)(A) and 4(b)(2) of the Act, reserve lands covered by three completed and approved regional/subregional HCPs (68 FR 20228). These lands include SDG&E right-of-way (ROW) within SDG&E's NCCP. Although these areas were not included in the proposed critical habitat, the USFWS sought public review and comment on these lands, provided maps to facilitate the public's ability to comment, and alerted the public that the lands could potentially be included in the final designation. Lands considered but not proposed for designation were also analyzed for potential economic impacts in the Draft Economic Analysis.

In 2007, USFWS issued the Revised Final Rule, reaffirming exclusion of lands within approved regional and subregional HCPs under section 4(b)(2) of the FESA. The USFWS determined that lands owned by SDG&E and covered under SDG&E's NCCP provided greater benefits to coastal California gnatcatcher than other areas designated as critical habitat. As such, the USFWS designation of critical habitat for the coastal California gnatcatcher specifically excludes SDG&E ROW within SDG&E's NCCP area.

5.8 Wildlife Movement Corridors

Wildlife corridors are defined as areas that connect suitable habitat in a region otherwise fragmented by rugged terrain, changes in vegetation, or human disturbance. Natural features, such as canyon drainages, ridgelines, or areas with dense vegetation cover can provide corridors for wildlife travel. Wildlife corridors are important to mobile species because they provide access to individuals to find shelter, mates, food, and water; allow the dispersal of individuals away from high population density areas; and by allowing immigration and emigration of individuals to other populations they allow for gene flow between populations. Wildlife corridors are considered sensitive by resource and conservation agencies. Terrestrial wildlife species may travel along natural drainages, such as San Mateo and San Onofre Creeks, which could provide protective cover from predators, as well as a consistent water and food source. Migrating avian species will use native habitat areas as stopovers on their journey through the area to wintering sites south of the project, and north to nesting areas to the north.

In its INRMP, MCB Camp Pendleton has noted that many of the open space areas within and adjacent to Camp Pendleton, and to the northeast within the Cleveland National Forest, are generally large enough to support varied and abundant resident plant and wildlife populations and provide for unrestricted movement between the Base and adjacent open space lands. Also the large habitat areas on Base generally allow unrestricted access to the north toward permanently designated open space areas of the

Cleveland National Forest, Casper's Wilderness Park, O'Neill Regional Park, Rancho Mission Viejo Land Conservancy, and Thomas F. Riley Wilderness Park.

While there are likely a number of preferred travel routes and landscape features that larger and more mobile wildlife species may use to move within and between permanent open space areas, wildlife "corridors" have not been formally studied and documented within the open space habitat areas on Camp Pendleton nor surrounding the Base, except for the Santa Ana – Palomar Mountain Linkage.

Wildlife movement on Base is facilitated by the fact that Camp Pendleton contains several watersheds and several small coastal drainages. Although water flows are intermittent across these drainages, they support abundant riparian woodland, scrub, and wetland vegetation communities within the floodplain areas, and coastal sage, chaparral or grassland vegetation on canyon slopes and along ridgelines. These areas provide food and cover for many wildlife species on the Base, in addition to facilitating wildlife movement base wide. Potential east-west wildlife movement on Camp Pendleton can occur along the Santa Margarita River and Las Flores, Aliso, and San Onofre canyons, portions of the San Mateo and San Luis Rey Rivers, and along several small coastal drainages. San Onofre Creek, San Mateo Creek, and the Santa Margarita River offer the best direct connection for wildlife, albeit highly restricted by the I-5 corridor, to the beaches and coastal bluffs of Camp Pendleton.

Potential north-south wildlife movement occurs on Camp Pendleton through the inland mountains situated along the eastern half of the Base, and those of the coastal belt located just east of the I-5 corridor. Other potential north-south wildlife movement on Camp Pendleton may include the areas along the beaches, coastal benches/bluffs, and foothills that are, for the most part, unconstrained by development and other artificial barriers (MCB Camp Pendleton 2007).

While local wildlife movements may be temporarily disrupted during construction of the proposed Project, the temporary and permanent impacts as a result of construction are not expected to significantly affect the movement of wildlife through MCB Camp Pendleton or along any existing or potential wildlife movement corridors within the base or specifically within the PSA. Although the proposed project is over 10 miles in length, work on each individual power pole and/or tower will be localized and of relatively short duration, and should not result in large-scale impacts across an extensive section of native habitat. In addition, work is to be conducted primarily within existing SDG&E utility corridors, with existing transmission and distribution lines. New and replacement pole and tower structure placement for the proposed Project will occur in the vicinity of existing structures within the ROW, and would result in minimal additional loss of protective cover, roosting or foraging habitat, or movement corridors by maintaining existing wide natural areas that allow for movement of species. The proposed Project will also avoid or span existing drainages that can serve as wildlife movement corridors; therefore, impacts to wildlife movement corridors as a result of construction of the proposed Project are anticipated to be less than significant.

5.9 Environmentally Sensitive Habitat Areas

As discussed in Section 3.0 Regulatory Setting (specifically the California Coastal Act), ESHAs are defined as "any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments". Proposed development within and adjacent to an ESHA must be located and designated to prevent significant impacts to the functions and values of the ESHA.

Native vegetation communities within the PSA can be considered ESHAs if they provide potential habitat for a number of sensitive plant and wildlife species. For example, upland habitats such as coastal sage scrub habitat could support the Coastal California gnatcatcher and Pacific pocket mouse, while grassland habitat can provide suitable nesting and/or roosting habitat for the western burrowing owl and other potential raptor species. Riparian habitats such as those found within San Mateo or San Onofre Creeks could potentially provide suitable nesting and/or roosting habitat for species such as the least Bell's vireo and arroyo toad. Areas such as compacted bare ground and areas of high disturbance would not typically be considered ESHAs. However, these are areas that could retain water during storm events, resulting in potential habitat for sensitive fairy shrimp species.

5.10 Jurisdictional Resources

The PSA contains wetland and non-wetland water features that may be subject to regulation by federal and state resource agencies. All wetlands and riparian areas identified within the PSA continue outside of the survey area and are either part of the San Mateo Creek or San Onofre Creek systems that flow directly into the Pacific Ocean. All waters, streambed, wetland and riparian features delineated were jurisdictional, and if impacted during construction will require permits/agreements from ACOE, RWQCB, and CDFW. In addition to ACOE, RWQCB, and CDFW, all features identified within the Coastal Zone are also jurisdictional to the CCC, and if impacted may require a coastal development permit.

Twenty-six features were identified jurisdictional to ACOE, RWQCB, and CDFW including five jurisdictional to the CCC during surveys conducted in June and October 2015. Some features supported areas determined to be ACOE, RWQCB, and CDFW wetland, but also supported non-wetland open channel, and CDFW jurisdictional adjacent riparian vegetation.

Two locations of potential vernal pool habitat were identified within the PSA during the initial reconnaissance-level constraints analysis conducted in 2014 (AECOM 2014a). These areas were reviewed during focused botanical surveys and again during fairy shrimp surveys conducted in 2015, and it was determined that in their present condition, neither site would be considered as potential vernal pool habitat, therefore, a jurisdictional determination at these two locations was not conducted.

Within the survey area, a total of approximately 141,572 square feet (3.250 acres) of ACOE Waters of the U.S., RWQCB Waters of State, and CDFW Streambed, 548,384 square feet (12.589 acres) of ACOE Wetland, RWQCB Wetland, and CDFW Wetland, 72,881 square feet (1.673 acres) of RWQCB Waters of State, and CDFW Streambed, 14,622 square feet (0.336 acre) of ACOE wetland and RWQCB Wetland Waters of the State, 258,372 square feet (5.931 acres) of CDFW Riparian, and 58,420 square feet (1.341 acres) of CCC Wetland were identified during the survey. A summary of the Jurisdictional Features observed, as well as the jurisdiction for each feature and approximate size within the PSA, are listed in Table 5.5 below.

The proposed Project has been designed to avoid impacts to jurisdictional resources whenever possible. Most of the features identified above are expected to be avoided during construction. A footpath is proposed for crews to access Poles 125 and 124, located within the riparian habitat north of the Basilone Substation. The vegetation along the footpath will be trimmed to facilitate access to the poles, and the vegetation around each pole will also be trimmed to facilitate access when the 69kV line is removed from this section of the project. No ground excavation or grubbing of vegetation is expected

for work conducted along the proposed footpath and at these two poles sites, therefore, no additional permits or authorizations from jurisdictional agencies are expected as a result of vegetation trimming in this area.

6.0 IMPACTS

Potential impacts associated with the proposed Project can be classified as temporary or permanent, and direct or indirect. Temporary impacts generally include impacts associated with construction activities, including the use of vehicles or helicopters to assemble and install new facilities and remove and/or replace old equipment, the use of temporary workspace, storage of construction materials and equipment, or vegetation removal in areas to conduct construction activities. These areas are intended to be restored once construction is complete. Permanent impacts generally include impacts associated with construction and installation of a new facility, such as new poles and underground vaults.

Direct impacts include the physical loss or removal of vegetation due to the installation of new facilities or work at staging/laydown areas. Indirect impacts during construction may include the interruption of normal nesting or foraging behaviors, loss of prey items, such as insects or food resources, or the suppression of growth due to excessive dust or noise. Impacts to special status species may occur either through temporary or permanent habitat loss, interruption of normal species routines, or through direct mortality.

Potential impacts to special status species associated with the proposed Project were assessed by analyzing species-specific requirements, including necessary vegetative habitat, elevational range, foraging needs, denning or breeding requirements, migratory trends, current ranges, and known occurrences or records.

6.1 Project Specific Impacts

The following describes the potential for impacts to sensitive resources during construction of the proposed Project. During the construction and operations and maintenance phases of the proposed Project, SDG&E would operate in compliance with all State and federal laws, regulations, permit conditions, and requirements.

The proposed Project has been designed to avoid sensitive habitat areas that may support special-status species and sensitive biological resources when possible, including not placing poles or other facilities in drainage areas or other sensitive habitats, using existing access roads to the greatest extent possible, and placing staging areas, laydown areas, and guard structures outside of sensitive habitats where feasible. Where avoidance of sensitive habitat areas supporting sensitive species is not possible, or where sensitive habitat areas exist adjacent to proposed Project work areas, SDG&E would implement additional mitigation measures to minimize project impacts in these areas.

Table 5.5 Summary of Jurisdictional Wetlands and Riparian Areas in the PSA

Wetland	Jurisdiction	Total Area In Square Feet	Total Area In Acres
Feature 1	ACOE/RWQCB/CDFW Waters	439	0.010
	RWQCB/CDFW Streambed	869	0.020
Feature 2	ACOE/RWQCB/CDFW Waters	834	0.019
	RWQCB/CDFW Streambed	840	0.019
Feature 3	ACOE/RWQCB/CDFW Wetland	6,001	0.138
	CDFW Riparian	6,705	0.154
Feature 4	ACOE/RWQCB/CDFW Waters	405	0.009
	RWQCB/CDFW Streambed	818	0.019
Feature 5	ACOE/RWQCB/CDFW Wetland	2,444	0.056
Feature 6	ACOE/RWQCB/CDFW Waters	1,071	0.025
	RWQCB/CDFW Streambed	1,075	0.025
Feature 7	ACOE/RWQCB/CDFW Waters	521	0.012
	RWQCB/CDFW Streambed	522	0.012
Feature 8	ACOE/RWQCB/CDFW Waters	5,120	0.118
	RWQCB/CDFW Streambed	10,274	0.236
Feature 9	ACOE/RWQCB/CDFW Waters	1,301	0.030
	RWQCB/CDFW Streambed	1,301	0.030
Feature 10	ACOE/RWQCB/CDFW Waters	1,233	0.028
	CDFW Riparian	31,349	0.720
Feature 11	ACOE/RWQCB/CDFW Waters	458	0.011
	RWQCB/CDFW Streambed	459	0.011
Feature 12	ACOE/RWQCB/CDFW Waters	600	0.014
	RWQCB/CDFW Streambed	1,207	0.028
Feature 13 (San Mateo East)	ACOE/RWQCB/CDFW Waters	66,508	1.527
	ACOE/RWQCB/CDFW Wetland	23,602	0.542
	CDFW Riparian	107,006	2.457
Feature 14	ACOE/RWQCB/CDFW Waters	1,259	0.029
	RWQCB/CDFW Streambed	1,261	0.029
Feature 15 (San Onofre East)	ACOE/RWQCB/CDFW Waters	44,226	1.015
	RWQCB/CDFW Streambed	44,194	1.015
Feature 16	ACOE/RWQCB/CDFW Waters	979	0.022
	RWQCB/CDFW Streambed	2,956	0.068
Feature 17	ACOE/RWQCB/CDFW Wetland	8,909	0.205
	ACOE/RWQCB/CDFW Waters	2,002	0.046
	RWQCB/CDFW Streambed	2,016	0.046
Feature 18	ACOE/RWQCB/CDFW Wetland/CCC Wetland	40,714	0.935

Wetland	Jurisdiction	Total Area In Square Feet	Total Area In Acres
Feature 19 (San Onofre West)	ACOE/RWQCB/CDFW Wetland/CCC Wetland	109,695	2.518
	ACOE/RWQCB/CDFW Waters/CCC Wetland	9,793	0.225
	CDFW Riparian/CCC Wetland	33,820	0.776
Feature 20	ACOE/RWQCB/CDFW Waters/CCC Wetland	991	0.023
	RWQCB/CDFW Streambed/CCC Wetland	1,419	0.033
Feature 21	ACOE/RWQCB/CDFW Wetland/CCC Wetland	196,489	4.511
Feature 22 (San Mateo West)	ACOE/RWQCB/CDFW Wetland/CCC Wetland	160,532	3.685
	CDFW Riparian/CCC Wetland	58,420	1.341
Feature 23	ACOE/RWQCB/CDFW Waters	1,829	0.042
	RWQCB/CDFW Streambed	3,062	0.070
	CDFW Riparian	21,072	0.484
Feature 24	ACOE/RWQCB/CDFW Waters	2,001	0.046
	RWQCB/CDFW Streambed	607	0.014
Feature 25	ACOE/RWQCB Wetland	6,307	0.145
Feature 26	ACOE/RWQCB Wetland	8,315	0.191
	Total ACOE/RWQCB/CDFW Waters	***141,572***	***3.250***
	Total ACOE/RWQCB/CDFW Wetland	***548,384***	***12.589***
	Total RWQCB/CDFW Streambed	***72,881***	***1.673***
	Total ACOE/RWQCB Wetland	***14,622***	***0.336***
	Total CDFW Riparian	***258,372***	***5.931***
	Total CCC Wetland	***58,420***	***1.341***

Permanent Impacts

Permanent impacts include the placement of either a direct bury steel pole, pier foundation steel pole, pier foundation steel cable pole, or underground conductor vault. Permanent impacts would also include access road modifications; however, no modifications to existing access roads are anticipated by SDG&E for the proposed Project.

Direct Bury Steel Poles

Permanent impacts resulting from the installation of directly embedded steel poles were calculated with an assumption that each pole location would require up to an approximately 54-inch diameter hole for the replacement pole and that each pole would measure up to approximately 30 inches at ground level, which would result in approximately 16 square feet of permanent impact per pole, including the permanent impact from the concrete annulus backfill surrounding the pole.

Pier Foundation Steel Poles

The anticipated permanent impacts for the installation of concrete pier foundation poles were calculated with an assumption that each concrete pier foundation would be no larger than 7 feet in

diameter, for a permanent impact area of approximately 39 square feet for each of the new pier foundation cable poles.

Pier Foundation Steel Cable Poles

The anticipated permanent impacts for the installation of concrete pier foundation cable poles were calculated with an assumption that each concrete pier foundation would be no larger than 8 feet in diameter, for a permanent impact area of approximately 51 square feet for each of the new pier foundation cable poles.

Underground Conduit Vaults

Two underground conductor vaults are proposed for the underground portion of the project. The anticipated permanent impacts for the installation of the underground vaults are the dimensions of the vaults themselves (approximately 10 feet by 18 feet in size). Therefore, the estimated permanent impacts for the installation of the underground vaults is 1,800 square feet per vault or a total of 3,600 square feet.

Temporary Impacts

Direct Bury Steel Poles

In general, temporary impact areas were evaluated based on anticipated geometric work spaces around each proposed work location. Construction work spaces are dynamic in nature and may require minor modifications during the construction phase of the proposed Project to facilitate worker safety and to avoid impacts to natural resources, including sensitive habitats. Therefore, the proposed temporary impact areas below are estimated based on the "best information available at the time of this report." To account for minor shifts in construction approaches, potential temporary impact areas were evaluated based on a 20-foot radius surrounding each directly embedded pole. Thus, the resulting evaluated total impact area will include a 1,256 square foot temporary impact area around each pole and a permanent impact area of 16 square feet, resulting in the approximate calculated 1,240 square feet of potential temporary impact area for each pole.

Pier Foundation Steel Poles

Crews will use a temporary work area of approximately 75 feet by 75 feet for a total impact area of approximately 5,625 square feet per location. A 39 square foot permanent impact area was subtracted from the 5,625 square feet of temporary work area, resulting in approximately 5,586 square feet of total temporary impacts for each new concrete pier foundation pole site. An enlarged work area is required for concrete pier foundation poles due to the wider base associated with the pole structure and associated equipment required to complete construction. However, these temporary impacts will be limited to only the space necessary to install the foundation and pole, and will generally be smaller than 75 feet by 75 feet.

Pier Foundation Steel Cable Poles

Crews will use a temporary work area of approximately 150 feet by 150 feet for a total impact area of approximately 22,500 square feet per location. A 51 square foot permanent impact area was subtracted from the 22,500 square feet of temporary work area, resulting in approximately 22,499 square feet of total temporary impacts for each new concrete pier foundation cable pole site. An enlarged work area is required for concrete pier foundation cable poles due to the wider base associated with the pole structure and associated equipment required to complete construction. However, these temporary

impacts will be limited to only the space necessary to install the foundation and pole; and will generally be smaller than 150 feet by 150 feet.

Project Access

SDG&E will utilize existing access roads to the extent possible during construction. SDG&E has identified a number of disturbed areas adjacent to existing access roads to utilize for turnouts for construction vehicles to be able to pass along the narrow access road system. Where existing access roads are damaged, repairs may be made by blading and smoothing the existing access road as applicable, avoiding drainage crossings and any other jurisdictional resources located within roads. Importing and compacting more stable materials on existing facilities in unstable areas may also be required. Generally, access roads would be smoothed level to allow construction equipment and vehicles to access each site safely. SDG&E would continue to utilize BMPs to minimize dust and erosion.

As part of the proposed project, permanent access roads, turnout areas, overland travel routes, and access footpaths have been identified for use during construction. These areas will allow construction personnel and/or vehicles and equipment to be able to access each of the project work areas that are not directly accessible by existing access roads.

Stringing Sites, Staging Yards, Incidental Landing Areas

The proposed Project will require the use of stringing sites to facilitate the stringing of new conductor. Vehicles, equipment, and personnel will remain within the SDG&E ROW, existing paved or unpaved access roads, and previously disturbed areas to the greatest extent possible. Temporary staging yards will be utilized during construction of the project. The Project may also require the use of ILAs in support of helicopter operations.

Pole Removal, Lattice Tower Work, Pole Top Work

During construction, some poles will be completely removed from service and not replaced. The temporary impact areas for the removal of each wood pole location is expected to be a maximum of 10-foot radius around the pole, or 314 square feet per site.

Approximately 11 existing steel lattice towers will be accessed during construction to add new conductor to the towers. Work is intended to be conducted primarily from construction vehicles parking on the existing access road and/or from helicopter; however, climbing off the tower may be necessary. The temporary impact areas for access to and equipment staging around one leg of the tower is expected to be a maximum of 10-foot radius around the base leg, or 314 square feet per site. As part of the proposed project, pole top work will be conducted at numerous existing pole locations. The temporary impact areas for pole top work is expected to be a maximum of 10-foot radius around each pole, or 314 square feet per site.

Guard Structures

Temporary guard structures will also be utilized during construction at various locations where the proposed Project crosses public roads or sensitive resources. The guard structures are necessary to provide for safety while the conductor is pulled through the line. Two wooden poles with a wooden cross-arm (an H-frame design) may be erected during wire pulling activities, at the junction where public roads or other sensitive resources intersect the existing Project, and will be removed upon completion of wire pulling, sagging, and clip in. Approximately 72 square feet will be temporarily impacted to install each of the guard structures.

Underground Power Line

The installation of new underground power line will require a 30–foot-wide workspace for the entire length of the line. Temporary impacts associated with trenching and installation of the proposed underground power line section are anticipated during construction.

6.2. Impacts to Vegetation Communities

Anticipated Project impacts were calculated based on vegetation mapping, site-specific conditions, and proposed impact areas described above for features included in the proposed Project design. Construction work spaces are dynamic in nature and may require minor modifications during the construction phase of the proposed Project to facilitate worker safety and avoid impacts to natural resources, including sensitive habitats. Therefore, the proposed permanent and temporary impact areas discussed below are estimated and may shift or be modified within the existing PSA.

Estimated permanent and temporary construction impacts to specific vegetation communities associated with the proposed Project were calculated using anticipated permanent and temporary impact work areas described above. The anticipated impact areas per vegetation community are shown in detail in Table 6.1 below.

The project has been designed to avoid sensitive habitat areas wherever possible, including placing poles outside of drainage areas, using existing access roads, and placing any new facilities, staging areas, or access roads outside sensitive habitats where feasible. In some locations, work areas have been modified to avoid known sensitive resources and are therefore irregularly shaped. These modified work spaces still follow the total maximum impact areas for the type of work at the site, but the overall impacts are expected to be less.

Sensitive habitats are considered naturally occurring plant assemblages or restored habitats that are reasonably expected to support natural diversity and carrying capacities of sensitive species in the region. Non-sensitive habitat types are those typically of a lower biological value and include bare ground, heavily disturbed areas, developed and urban areas (paved), and landscaping. These areas are not typically expected to have a major ecological value, contribute to the function of natural habitats and open space areas in the region, or support special status plant and wildlife species addressed in this report. A summary of estimated impacts to sensitive and non-sensitive habitat types is provided in Table 6.2.

Table 6.1 Estimated Construction Impacts to Vegetation Community

Vegetation Community	Anticipated Area of Impact in Square Feet	Anticipated Area of Impact in Acres
Temporary Impacts		
Nonnative Grassland	61,791	1.42
Diegan Coastal Sage Scrub	178,674	4.10
Southern Sycamore-Alder Riparian Woodland	2,241	0.05
Disturbed Habitat	128,933	2.96
Urban/Developed	3,915,311	89.88
Total Estimated Temporary Impacts	***4,286,950***	***98.41***
Permanent Impacts		
Nonnative Grassland	381	0.009
Diegan Coastal Sage Scrub	1,515	0.035
Southern Sycamore Alder Riparian Woodland	0	0
Disturbed Habitat	682	0.016
Urban/Developed	652	0.015
Total Estimated Permanent Impacts	***3,230***	***0.075***
**Note: These calculations do not include some work areas outside of the PSA recently added to the proposed Project. These areas will be surveyed prior to construction, and the information will be updated for this report.*		

Table 6.2 Estimated Impacts to Sensitive and Non-Sensitive Habitats

Type of Impact	Total Estimated Area of Impact in Square Feet	Total Estimated Area of Impact in Acres
Temporary Impacts		
Total Estimated Temporary Impacts to Native Vegetation Communities (Diegan Coastal Sage Scrub, Nonnative Grassland, Southern Sycamore-Alder Riparian Woodland)	242,706	5.57
Total Estimated Temporary Impacts to Non-Sensitive Vegetation Communities (Disturbed, Developed, Bare Ground, and Landscape/Ornamental Areas)	4,044,244	92.84
Total Estimated Temporary Impacts	***4,286,950***	***98.41***
Permanent Impacts		
Total Estimated Permanent Impacts to Native Vegetation Communities (Diegan Coastal Sage Scrub, Nonnative Grassland, Southern Sycamore-Alder Riparian Woodland)	1,896	0.044
Total Estimated Permanent Impacts to Non-Sensitive Vegetation Communities (Disturbed, Developed, Bare Ground, and Landscape/Ornamental Areas)	1,334	0.031
Total Estimated Permanent Impacts	***3,230***	***0.075***
**Note: These calculations do not include some work areas outside of the PSA recently added to the proposed Project. These areas will be surveyed prior to construction, and the information will be updated for this report.*		

6.3 Special Status Plant Species

Construction activities could potentially impact special status plant species, depending on the final location of proposed facilities. Approximately 26 special status plant species have been observed or have potential to occur within the PSA. Permanent impacts to sensitive plant species could include the removal of plants during construction, population fragmentation, and the introduction of nonnative species that may out-compete native plant species. Temporary impacts may include crushing or damaging plants, runoff, or sedimentation and erosion that could adversely impact plant populations by altering site conditions. Construction related dust could also reduce the rates of photosynthesis and hinder normal plant growth.

Impacts to thread-leaved brodiaea, California boxthorn, Coulter's matilija poppy, paniculate tarweed, San Diego County viguiera, and western dichondra can be minimized by avoiding these species to the extent possible. These areas can be avoided by flagging or fencing the area off during construction to minimize impacts to these species.

6.4 Special Status Wildlife Species

Construction activities could potentially impact special status wildlife species, depending on the final location of the proposed facilities. Approximately 40 special status wildlife species have been observed

or have potential to occur within the PSA. Permanent impacts to special status wildlife species could include the removal of suitable habitat with project facilities, or direct mortality to individuals, nests, burrows, and young as a result of construction. Temporary impacts may include temporary construction activities that alter normal behavior patterns, including migration and dispersal, courtship and mating, and foraging and roosting.

Invertebrates

Construction activities could potentially impact two special status invertebrate species, if present. Protocol-level surveys have been conducted for the San Diego fairy shrimp and Riverside fairy shrimp, however these species have not been observed on the proposed Project. These species have a moderate potential to occur in suitable habitat within the PSA. Wet and dry season surveys have been completed for these species, and neither species were detected during the surveys. In addition, neither species has been identified previously within the PSA, although non-sensitive fairy shrimp species have been observed in the PSA. Potential habitat for fairy shrimp species occurs within vernal pools, ponded areas, and road ruts within and adjacent to proposed Project access roads. In addition to SDG&E access for this proposed Project, the access roads are also utilized and maintained by other utilities and by military personnel.

The proposed Project has been designed to avoid permanent impacts to special status fairy shrimp species wherever possible. Impacts to fairy shrimp species as a result of temporary work areas such as stringing sites and equipment staging yards will be avoided. Impacts to fairy shrimp as a result of normal access road use are not anticipated with standard avoidance and minimization measures in place.

Fish

The southern steelhead and tidewater goby have a moderate potential to occur on the proposed Project, and construction activities could potentially impact these species, if present. Suitable habitat exists in San Mateo Creek and San Onofre Creek during periods of surface water flow. Although no focused surveys were conducted, these species were not observed during surveys conducted in the area, and the proposed Project has been designed to avoid riparian and jurisdictional areas. Therefore, the impacts to these two species, if present on the project, are expected to be minimal.

Amphibians

Construction of the proposed Project has the potential to impact both the arroyo toad and western spadefoot. The arroyo toad was observed in San Mateo Creek and San Onofre Creek during protocol-level surveys in 2015, and the western spadefoot has a moderate potential to occur. The proposed Project has been designed to avoid impacts to potential breeding habitat such as the drainages within the PSA; however, construction activities have the potential to impact upland foraging and aestivation habitat, such as grasslands. Construction activities could include impacts such as pole hole excavation, pole installation and removal, wire installation activities, and temporary staging or storage of equipment and construction vehicles in suitable habitat.

Reptiles

Construction activities could potentially impact seven special status reptile species. One of these species, the southwestern pond turtle, inhabits permanent freshwater sources that were not observed during surveys within the PSA. There is a low potential for this species to occur, and no impacts to this

species are anticipated. The coast horned lizard, coast patch-nosed snake, Coronado Island skink, northern red diamond rattlesnake, orange-throated whiptail, San Diego horned lizard, and two-striped garter snake have a moderate potential to occur. Impacts to these species may include individual mortality due to construction traffic or entrapment during construction activities, and loss of potential foraging and breeding habitat due to the installation of project components. Impacts such as disruption of foraging behavior from active temporary work areas for installation of new poles, staging yards and stringing sites may also occur.

Birds

Construction activities could potentially result in impacts to foraging and/or nesting habitat for 20 special status avian species that have either been observed within the PSA or have the potential to occur. Proposed Project activities that could result in impacts to avian species include removal of vegetation to facilitate pole hole excavation, pole installation and removal, wire installation activities, and temporary staging or storage of equipment and construction vehicles in suitable habitat. Other potential impacts to special status avian species include noise from construction equipment and vehicles.

The coastal cactus wren was observed within the PSA during nesting surveys conducted in 2015, and there is a potential for impacts to this species as a result of construction of the proposed Project. Protective measures to minimize impacts to stands of cactus (the primary breeding and perching habitat for this species) should be implemented during construction to help minimize impacts to this species.

Numerous individuals of the coastal California gnatcatcher were observed during protocol surveys conducted in 2014 (as well as numerous incidental sightings during surveys conducted in 2015), and much of the coastal sage scrub habitat within the proposed Project can be considered occupied gnatcatcher habitat. Additional surveys are recommended closer to construction to determine the most current coastal California gnatcatcher distribution within the proposed Project, and protective measures for the coastal California gnatcatcher should be implemented during construction to help minimize impacts to this species.

Least Bell's vireo was observed in riparian habitats within the PSA during protocol-level surveys conducted in 2015, and there is a potential for impacts to this species as a result of the construction of the proposed Project. The proposed Project has been designed to avoid impacts to potential breeding habitat, such as the drainages within the PSA, which could lower the potential for impacts to least Bell's vireo during construction activities.

The loggerhead shrike was observed during surveys conducted for the western burrowing owl in December 2014 and January 2015, and there is a potential for impacts to this species as a result of the construction of the proposed Project.

Protocol surveys for southwestern willow flycatcher were conducted in suitable riparian habitat within the PSA during the spring of 2015. No southwestern willow flycatchers were detected during the protocol surveys. In addition, the proposed Project has been designed to avoid impacts to potential breeding habitat, such as the drainages found within the PSA, which also lowers the potential to impact this species (if present) during construction activities. Although there is a moderate potential for this

species to occur within the proposed Project due to the presence of suitable riparian habitat, if the species does not occur in the area, then the potential for impacts to this species is minimal.

Nonbreeding season protocol surveys for the western burrowing owl were conducted within suitable habitat areas within the proposed Project in December 2014 and January 2015. No burrowing owls or their sign were detected during the surveys. Although there is a moderate potential for this species to occur within the proposed Project due to the presence of suitable habitat (grassland and other open areas), if the species does not occur in the area, then the potential for impacts to this species is minimal.

Focused surveys for the Western yellow-billed cuckoo were not conducted for the proposed Project, however, protocol-level surveys were conducted for other special status avian species within potential riparian habitat areas within the proposed Project. No Western yellow-billed cuckoo were detected during any of the previous surveys conducted for the Project; however, suitable riparian habitat does occur onsite, and there is a moderate potential for this species to occur. The proposed Project has been designed to avoid impacts to potential breeding habitat, such as the drainages found within the PSA, which also lowers the potential impacts to this species during construction activities.

Suitable habitat exists for the bank swallow, Cooper's hawk, grasshopper sparrow, northern harrier, Southern California rufous-crowned sparrow, white-tailed kite, yellow-breasted chat, and yellow warbler; however, none of these species were observed during the current surveys. There is a moderate potential for these species to occur within the proposed Project. If present, there is also a potential for impacts to these species as a result of construction activities.

There is a low potential for impacts to Belding's savannah sparrow, California least tern, ferruginous hawk, light-footed Ridgeway's rail, and western snowy plover as a result of the proposed project, due to the lack of suitable habitat in or in the vicinity of the project. None of these species were observed during project surveys, and the potential for these species to be affected by implementation of the proposed Project is low.

Mammals

Proposed construction activities may result in permanent and temporary impacts to eight special status mammal species that are either present or have a potential to occur within the proposed Project. Proposed construction activities, including removing and installing power poles and clearing vegetation during creation of work areas and stringing sites, may cause both permanent and temporary impacts to special status mammal species, if present. Permanent impacts from these activities may include a reduction of foraging, burrowing, and nesting (woodrat) habitat from the installation of new facilities or the replacement of existing facilities. Temporary impacts may result from trimming of native vegetation for temporary work areas, construction noise, and ground vibration, as mammals may be deterred from inhabiting or foraging in areas during construction activities.

The Dulzura pocket mouse was detected during trapping surveys conducted in 2013 within portions of the PSA. Construction of the proposed Project may result in impacts to individuals or habitat of the Dulzura pocket mouse, and protective measures for this species should be implemented during construction to help minimize impacts to this species.

Historically, the Pacific pocket mouse has been well documented as occurring in the vicinity of the proposed Project; however, no Pacific pocket mouse were detected during surveys conducted in suitable habitat within the PSA that had not previously been documented as occupied by Pacific pocket mouse (Tremor 2013a, 2013b). No trapping was conducted in known occupied Pacific pocket mouse habitat, in order to minimize potential disturbance to the species. MCB Camp Pendleton and the U.S. Geological Survey have been conducting extensive surveys in Pacific pocket mouse habitat to determine population locations, densities, and other pertinent ecological information for this species at MCB Camp Pendleton. SDG&E will use the latest data from these studies to determine specific Pacific pocket mouse locations within the PSA. In coordination with MCB Camp Pendleton and the USFWS, additional surveys will be conducted as necessary to determine the most recent areas occupied by Pacific pocket mouse within the PSA, in order to avoid or minimize potential impacts to this species as a result of construction. Additional protective measures for the Pacific pocket mouse should be implemented during construction to help minimize impacts to this species.

Suitable habitat exists for the American badger, northwestern San Diego pocket mouse, San Diego black-tailed jackrabbit, San Diego desert woodrat, and western mastiff bat, however, none of these species were observed during the current surveys. There is a moderate potential for these species to occur within the proposed Project. If present, there is also a potential for impacts to these species as a result of construction activities.

There is a low potential for impacts to Mexican long-tongued bat as a result of the proposed Project, due to the lack of suitable habitat in or in the vicinity of the project. This species was not observed during project surveys, and the potential for this species to be affected by implementation of the proposed Project is low.

6.5. Critical Habitat

Proposed pole replacement areas, stringing sites, and staging yards within the PSA outside of MCB Camp Pendleton are located within critical habitat for the coastal California gnatcatcher and the arroyo toad. Construction activities at pole replacement areas could result in both permanent and temporary impacts to critical habitat, and other construction activities at stringing sites and staging yards could result in temporary impacts to critical habitat for these species. The USFWS determined that lands owned by SDG&E and covered under SDG&E's NCCP provided greater benefits than other areas designated as critical habitat. Therefore, the USFWS designation of critical habitat specifically excludes SDG&E ROW within SDG&E's NCCP area.

6.6 Wildlife Movement Corridors

The proposed Project is not expected to result in significant permanent or temporary impacts to local or regional wildlife movement corridors, including migratory bird routes. The proposed Project is located along an existing SDG&E powerline alignment with conductor already present and other utility corridors in the vicinity. New structure placement for the proposed Project will occur in the immediate vicinity of existing structures within the ROW, and due to their relatively small footprint, would result in minimal loss of protective vegetative cover, roosting sites, foraging habitat, or potential movement corridors, as portions of the proposed Project are located within extensive areas of natural habitat that would allow for the continued movement of wildlife species through the area. Although local wildlife movement may be affected during construction activities, no permanent effects to wildlife movement patterns are expected, and species movements are expected to return at the completion of construction. Therefore,

impacts to any wildlife movement corridors in the vicinity of the proposed Project are expected to be less than significant.

6.7 Environmentally Sensitive Habitat Areas

Similar to potential wildlife movement corridors described above, work on each individual power pole and/or tower will be localized and of relatively short duration, and will be conducted primarily within existing SDG&E utility corridors, therefore, construction of the proposed Project should not result in large-scale impacts across an extensive section of any particular native habitat. The proposed Project will also avoid or span existing drainages to the extent possible. Therefore, construction of the proposed Project is not expected to result in significant impacts to the functions and values of the ESHA.

6.8 Jurisdictional Resources

The proposed Project has been designed to avoid impacts to jurisdictional resources whenever possible. The proposed footpath to access Poles 125 and 124, located within the riparian habitat north of the Basilone Substation will consist of trimming of vegetation to access the poles, and no permanent impacts for this activity are anticipated. Vegetation trimming activities within this area are therefore not expected to require additional permits or authorizations by resource agencies.

No other pole structures or stringing sites are anticipated to be located within existing jurisdictional waters or wetlands, and existing access roads will be used to the greatest extent possible. Staging areas, laydown areas, guard structures, and other project components will also be located outside jurisdictional resources. If a project component is located in the vicinity of an existing jurisdictional feature, proper erosion control measures will be taken and BMPs will be implemented during construction to ensure the protection of the resource. If unavoidable impacts to jurisdictional features are identified during the establishment of final workspace and/or changes to the proposed Project, SDG&E would obtain the required authorizations and/or permits from the applicable regulatory agency prior to construction. Through implementation of all conditions specified in permits obtained for the proposed Project, impacts to jurisdictional resources are expected to be less than significant.

7.0 REFERENCES

AECOM

2015. Nonbreeding Season Western Burrowing Owl Survey Report for Transmission Line 695 Wood to Steel Pole Replacement Project, Marine Corps Base Camp Pendleton, San Diego County, California.

AECOM

2014a. Biological Resource Surveys for the Transmission Line 695 Wood to Steel Pole Replacement Project, San Diego and Orange Counties, California. Letter Report to T. Easley, *SDG&E November 4.*

AECOM

2014b. Transmission Line 695 Wood to Steel Replacement Project, Coastal California Gnatcatcher 45-Day Summary Report, Orange and San Diego Counties, California. October 6.

Bloom Biological

2015a. Results of protocol surveys for Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Least Bell's Vireo (*Vireo bellii pusillus*), and Arroyo Toad (*Anaxyrus californicus*) for the San Diego Gas & Electric TL695/6971 Reconductor Project in Orange and San Diego Counties, California. Letter Report to the USFWS.

Bloom Biological

2015b. Results of Coastal Cactus Wren (*Campylorhynchus brunneicapillus*) breeding surveys for the San Diego Gas & Electric TL695/6971 Reconductor Project in Orange and San Diego Counties, California. Letter Report to Pangea Biological.

California Department of Fish and Wildlife (CDFW, formerly California Department of Fish and Game - CDFG)

2015. Wildlife and Habitat Data Analysis Branch, Habitat Conservation Division. CNDDB. Rare Find Version 5 (Subscription). State and Federally Listed Endangered and Threatened Animals of California Database.

CDFW

2015b. State and Federally Listed Endangered, and Threatened Animals of California.

CDFW

2015c. State and Federally Listed Endangered, Threatened, and Rare Plants of California.

CDFW

2012. Staff Report on Burrowing Owl Mitigation (Dept. of Fish and Game, March 7, 2012). Available at http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html.

California Native Plant Society

2015. Electronic Inventory of Rare and Endangered Vascular Plants of California.

Cardno

2015a. Rare Plant Survey Report for TL695/6971 Reconductor Project, San Diego Gas & Electric Company, July.

Cardno

2015b. 90-Day Wet Season Fairy Shrimp Report for TL695/6971 Reconductor Project, San Diego Gas & Electric Company, July.

Consortium of California Herbaria

2015. Specimen Number SD221677.
http://ucjeps.berkeley.edu/cgibin/new_detail.pl?accn_num=SD221677&YF=1. Accessed on 18 June.

Halterman, M.D., M.J. Johnson, J.A. Holmes and S.A. Laymon

2015. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: U.S. Fish and Wildlife Techniques and Methods, 45 p.

Hickman, J.C. (ed.)
1993. The Jepson Manual, Higher Plants of California. Berkeley: University of California Press.

Holland, R. F.
1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. Nongame Heritage Program, State of California Department of Fish and Game.

Lichvar, R. W.
2014. The National Wetland Plant List. ERDC/CRREL TR-12-11. Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory.

Lightner, James
2011. 3rd. ed. San Diego County Native Plants San Diego Flora.

LSA Associates, Inc.
2013. 25240 – TL695, Wood to Steel, Camp Pendleton (LSA Project No. SGE1301), Letter Report to T. Easley and J. Kapchinkske, SDG&E May 7.

Marine Corps Base (MCB) Camp Pendleton
2015. Brodiaea filifolia Inventory Protocol. Marine Corps Base Camp Pendleton, Environmental Security Department, Land Management Section. March.

Marine Corps Base (MCB) Camp Pendleton
2007. Integrated Natural Resources Management Plan, Marine Corps Base Camp Pendleton. March. With 2012 chapter and appendix updates per http://www.cpp.usmc.mil/base/environmental/inrmp.asp.

Nafis, G.
2015. A Guide to the Amphibians and Reptiles of California-Belding's Orange-throated Whiptail - Aspidoscelis hyperythra beldingi. Retrieved from http://www.californiaherps.com/lizards/pages/a.h.beldingi.html

National Marine Fisheries Service (NMFS)
2011. South-Central/Southern California Coast Steelhead Recovery Document, 5-Year Review: Summary and Evaluation of *Southern California Coast Steelhead Distinct Population Segment*. November.

Oberbauer, T., M. Kelly, and J. Buegge
2008. Draft Vegetation Communities of San Diego County. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California," Robert F. Holland, Ph.D., October 1986.

Pangea Biological and Borcher Environmental Management, Inc.
2015. San Diego Gas & Electric Company TL695/6971 Reconductor Project Preliminary Jurisdictional Delineation Report.

SDG&E
2015. Geographic Information System Data Layers.

SDG&E
1995. Subregional Natural Community Conservation Plan. October 1995.

Sogge, M.K., Ahlers, Darrell, and Sferra, S.J.
2010. A natural history summary and survey protocol for the southwestern willow flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 pages.

Stebbins, Robert C.
2003. A Field Guide to Western Reptiles and Amphibians. Third edition. Boston: Houghton Mifflin Company.

Tremor, S.
2013(a). 45-day report on the results of surveys. Focused Surveys for the Endangered Pacific Pocket Mouse (*Perognathus longimembris pacificus*) at locations at or near San Mateo North on Camp Pendleton, San Diego County. September 8.

Tremor, S.
2013(b). 45-day report on the results of surveys Focused Surveys for the Endangered Pacific Pocket Mouse (*Perognathus longimembris pacificus*) at San Mateo South on Camp Pendleton, San Diego County. September 10.

Unitt, P.
2004. San Diego County Bird Atlas. San Diego Natural History Museum, San Diego, California.

United States Army Corps of Engineers
2008. Wetlands Regulatory Assistance Program Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). Retrieved from http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/trel08-28.pdf

U.S. Fish and Wildlife Service
2015. Survey Guidelines for the Listed Large Branchiopods. Pacific Southwest Region. May 31.

U.S. Fish and Wildlife Service
2005. Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*). U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Fish and Wildlife Service
2001. Least Bell's Vireo survey guidelines protocol, as amended January 2001.

U.S. Fish and Wildlife Service
1999. Survey Protocol for the Arroyo Toad. May 19, 1999.

U.S. Fish and Wildlife Service
1997. Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Guidelines February 28, 1997.

U.S. Fish and Wildlife Service
1996. Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods. 19 August.

Appendix A – Constraints Survey and Report LSA 2013

THIS APPENDIX HAS BEEN OMITTED – IT HAS BEEN SUBMITTED UNDER CONFIDENTIAL COVER

Appendix B – Biological Resource Survey Report AECOM 2014

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November 4, 2014

Mr. Todd Easley
San Diego Gas & Electric
8315 Century Park Court - CP21E
San Diego, CA 92123

Subject: Biological Resource Surveys for the Transmission Line 695 Wood to Steel Pole Replacement Project, San Diego and Orange Counties, California

Dear Mr. Easley:

The purpose of this letter is to summarize for San Diego Gas & Electric (SDG&E) the biological resource surveys that AECOM conducted in August 2014 for the Transmission Line (TL) 695 Wood to Steel Pole Replacement Project, San Diego and Orange Counties (Figure 1). This letter includes the methods used to assess biological resources, including the list of potential sensitive species evaluated, the survey results for vegetation mapping and suitable habitat, and biological constraints and recommendations. Potential jurisdictional areas are not discussed within this document.

As part of the scope of work for TL 695 described in our letter dated June 20, 2014 and approved by SDG&E in late July 2014, protocol surveys for coastal California gnatcatcher were also performed. The results of these surveys will be reported under separate cover.

Project Description

The TL 695 Wood to Steel Pole Replacement Project (Project) would involve the replacement of existing wooden structures with steel poles. Some wooden poles and associated anchors would be completely removed and not replaced due to the longer span between the steel poles. The Project would be covered by the SDG&E Natural Community Conservation Plan (NCCP) and would include a 150-foot survey buffer around the TL centerline for a total Project width of approximately 300 feet. There are also several stringing sites located throughout the Project that include a 150-foot buffer. The staging area is located in an urban/developed area and therefore no buffer was placed around the staging area. The Project is located along the northern boundary of Marine Corps Base Camp Pendleton (MCBCP) with the northern end in Orange County and the southern end near the San Onofre Nuclear Generating Station.

Methods for Assessing Biological Resources

A search of the relevant regional databases for sensitive biological resources in the vicinity of the Project was conducted prior to conducting field surveys. This included a search of the California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) and a search of the California Native Plant Society's Electronic Inventory. Additionally, historical biological survey data from MCBCP (herein referred to as Basewide survey data) were reviewed to determine the presence and location of federally listed plant and wildlife species. Basewide survey data are a

compilation of historical data on points and polygons of federally listed plant and wildlife species within the boundaries of MCBCP. This database contains several decades of biological survey data and is the most comprehensive database of federally listed species on MCBCP. It includes locations and findings of vernal pool surveys; surveys for various construction and expansion projects; research survey data; incidental data; and data of known breeding territories, plant locations, and so forth. These data are provided confidentially to SDG&E for planning purposes; AECOM has not requested permission from MCBCP to utilize these data for SDG&E.

Additionally, AECOM has conducted multiple years of surveys (2008 until present) in the general vicinity and overlapping areas for various projects (Basewide Utilities Infrastructure Improvement Projects and Basewide Water Improvement Projects) on MCBCP. Vegetation mapping that had been conducted by AECOM for these various projects in addition to Basewide vegetation mapping was used to assist in creating a vegetation map. No permission is needed to utilize these data, as they belong to AECOM.

On July 30, 31, and August 4, 2014, a field assessment of the Project was conducted by AECOM biologists Andrew Fisher and Joey Betzler to map vegetation communities and provide a baseline of biological resources that occur or have the potential to occur in or around the Project. AECOM biologists used existing data (from previous AECOM projects and Basewide vegetation mapping) to assist in completing the vegetation mapping. For purposes of this report, the term “project study area” refers to the proposed TL corridor, stringing sites, staging areas, and a 150-foot survey buffer around the TL corridor and stringing sites.

Vegetation communities and land cover types are summarized in Table 1 and described below. Vegetation community classifications used in this report follow Holland’s *Preliminary Descriptions of the Terrestrial Natural Communities of California* (1986), as modified by Oberbauer (2008); a cross-walk to the SDG&E NCCP vegetation communities is provided for each community and in Table 1.

Potential suitable habitat for sensitive plant and wildlife species, focused on federally listed and state-listed species and NCCP species (including Narrow Endemic species), was identified within the project study area and mapped using geographic information system (GIS) technology.

Vegetation Mapping and Suitable Habitat Survey Results

Vegetation Communities

Vegetation types or plant communities are assemblages of plant species that commonly coexist. The classification of vegetation communities is based on the life form of the dominant species within that community and the associated flora. Vegetation was mapped in accordance with Holland (1986) as modified by Oberbauer (2008) and used a minimum mapping unit of 1.0 acre for upland vegetation communities and 0.5 acre for

riparian communities. During vegetation mapping, habitat suitability was identified for special-status species that may require focused surveys. Vegetation community mapping and habitat suitability mapping data were collected via geo-referenced polygons with a tablet unit, using GIS technology.

The project study area generally supports 12 vegetation communities: mulefat scrub, southern willow scrub, sycamore alder riparian woodland, vernal pool, coast live oak woodland, Diegan coastal sage scrub, eucalyptus woodland, nonnative annual grassland, valley needlegrass grassland, disturbed habitat, nonvegetated channel, and urban/developed. Table 1 summarizes the acreages for each vegetation community within the TL corridor, stringing sites, staging area, and 150-foot buffer. The vegetation communities are illustrated in Figures 2a through 2j. Descriptions and locations of the vegetation communities are summarized below.

Riparian and Wetlands (NCCP-Covered Habitats)

Mulefat Scrub (Holland Code 63310); Riparian Scrub (NCCP)

Mulefat scrub is a riparian shrub community that is strongly dominated by mulefat (*Baccharis salicifolia*), often in association with several willow species. Mulefat scrub occurs along intermittent streams with a fairly coarse substrate and moderately deep water table. Understory vegetation is usually composed of nonnative, weedy species or is lacking altogether. This community is maintained by frequent flooding. In the absence of periodic flooding, this community may develop into cottonwood- or sycamore-dominated riparian communities (Holland 1986).

Within the survey area, mulefat scrub occupies floodplain areas of San Mateo and San Onofre Creeks (Figures 2d, 2g, 2h, and 2i). This community was strongly dominated by mulefat, with western ragweed (*Ambrosia psilostachya*) and willow dock (*Rumex salicifolia*) occupying the understory.

Southern Willow Scrub (Holland Code 63320); Riparian Scrub (NCCP)

Southern willow scrub is a dense, closed-canopy scrub that occurs throughout California in association with riverine features. It is lacking in the taller trees that are characteristic of riparian forests. Dominant plant species include willows (*Salix* spp.), mulefat, and coyote brush (*Baccharis pilularis*). There is typically not a substantial herbaceous understory within this vegetation community due to the dense shrub cover (Oberbauer et al. 2008).

This community was dominated by mulefat and arroyo willow (*Salix lasiolepis*), with California sagebrush (*Artemisia californica*) and western ragweed occasionally co-dominating in the dryer portions of the drainages. Within the survey area, southern willow scrub is associated with some small drainage features and within San Mateo and San Onofre Creeks. There is also a small portion of southern willow scrub in the far northeastern part of the project study area in Orange County (Figures 2b, 2c, 2e, and 2i).

Sycamore Alder Riparian Woodland (Holland Code 62400); Riparian Forest/Riparian Woodland (NCCP)

Sycamore alder riparian woodland is a tall, winter-deciduous, streamside woodland dominated by western sycamore (*Platanus racemosa*) and white alder (*Alnus rhombifolia*). These woodlands are commonly found along rocky stream beds that are subject to periodic high-intensity flooding. Vegetation associated with sycamore alder riparian woodland includes blue elderberry (*Sambucus mexicana*), Douglas mugwort (*Artemisia douglasiana*), scale-broom (*Lepidospartum squamatum*), poison oak (*Toxicodendron diversilobum*), and willows (*Salix* sp.).

This vegetation type was scattered in a few sections throughout the project study area, but primarily was located along the more stabilized banks of San Mateo and San Onofre Creeks (Figures 2d, 2e, 2s, and 2g).

Vernal Pool (Holland Code 44322); Hardpan Vernal Pool (NCCP) – occurring in disturbed habitat

At least four depressions occur in the clay inclusions within the project study area; however, no native vernal pool indicator species (such as woolly marbles [*Psilocarphus brevissimus* var. *brevissimus*] and spikerush [*Eleocharis* spp.]) were observed at the time of surveys. Other common species include nonnative annual grasses and weedy species such as black mustard (*Brassica nigra*).

Within the survey area, the vernal pools are associated with disturbed habitat, surrounded by Diegan coastal sage scrub and nonnative annual grassland communities. Two vernal pools located in the northeastern part of the project study area appeared highly degraded and were choked with black mustard that had senesced (Figure 2c). The surrounding Diegan coastal sage scrub appeared to have begun to encroach and take over the vernal pool. At least one potential pool was located within a dirt road adjacent to San Onofre Creek (Figure 2g). This depression will hold water and may support vernal pool branchiopods, but is unlikely to support vernal pool plant indicator species due to its location within a disturbed dirt roadway. There is the potential for additional pools or basins to form in dirt roadways throughout the length of the project study area as winter rains fill compacted areas. Although these features are unlikely to support vernal pool plants due to their disturbed nature, they may support vernal pool branchiopods. The fourth potential vernal pool is located in the far southern end of the project study area (Figure 2h). This depression was created by an excavator and is almost a perfect rectangle with the depression of the excavator still evident. This depression is slowly beginning to look more natural and may support vernal pool branchiopods.

Uplands (NCCP-Covered Habitats)

Coast Live Oak Woodland (Holland Code 71160); Coast Live Oak Forest (NCCP)

This community is well represented on MCBCP and can co-occur with Diegan coastal sage scrub, valley needlegrass grassland, and other types of oak woodland. Coast live oak woodland is an open to dense tree community with coast live oak (*Quercus agrifolia*) as the dominant tree species. The shrub understory of this community is well developed in undisturbed sites and may include blue elderberry, laurel sumac (*Malosma laurina*), poison oak, and toyon (*Heteromeles arbutifoloia*) (Holland 1986). An herbaceous stratum is usually present, including miner's lettuce (*Claytonia perfoliata* var. *perfoliata*), chickweed (*Stellaria media*), and nonnative grasses.

Coast live oak woodland was located in the far northeastern part of the project study area in Orange County (Figure 2b).

Diegan Coastal Sage Scrub: Coastal Form (Holland Code 32510); Coastal Sage Scrub (NCCP)

Diegan coastal sage scrub is a vegetation community dominated by relatively low-lying shrubs. It is less than 6 feet in height, soft-leaved, and drought-deciduous. Dominant species in these communities drop their leaves as the summer dry season progresses to reduce stress from lack of water. Approximately eight rare plant and 11 rare animal species occur in Diegan coastal sage scrub at MCBCP (Zedler et al. 1997).

The coastal form of Diegan coastal sage scrub is similar to other forms of Diegan coastal sage scrub but is found at lower elevations, below 1,000 feet. California sagebrush is more dominant in coastal Diegan coastal sage scrub than in other Diegan coastal sage scrub varieties. The dominant species in this community is California sagebrush, but associated dominants can include California buckwheat (*Eriogonum fasciculatum* var. *fasciculatum*), laurel sumac, lemonadeberry (*Rhus integrifolia*), broom baccharis (*Baccharis* spp.), and black sage (*Salvia mellifera*).

Diegan coastal sage scrub is found throughout the project study area and is the dominant vegetation type (Figures 2b through 2i).

Eucalyptus Woodland (Holland Code 79100 and NCCP)

This community is dominated by several species of eucalyptus (*Eucalyptus* spp.). These introduced species produce large amounts of leaf and bark litter, the chemical composition of which may inhibit the establishment and growth of other species, especially natives, in the understory. Generally, these species were planted for aesthetic and horticultural purposes, but many species of eucalyptus have become naturalized and have been quite successful in invading riparian areas. There is a small portion of eucalyptus woodland surrounded by Diegan coastal sage scrub in upland areas adjacent to San Onofre Creek (Figure 2f).

Nonnative Annual Grassland (Holland Code 42200); Grassland (NCCP)

Nonnative annual grassland is characterized by a dense to sparse cover of annual grasses and forbs of Mediterranean origin, often with native and nonnative annual forbs (Holland 1986). This plant community generally occurs on fine-textured loam or clay soils that are moist or even waterlogged during the winter rainy season and very dry during the summer and fall. Regionally, typical grasses include ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), soft chess (*Bromus hordeaceus*), wild oats (*Avena* spp.), and rat-tail fescue (*Vulpia myuros*). Nonnative disturbance-related annuals such as filaree (*Erodium* sp.), and horseweed (*Erigeron canadensis*) are common to this community.

This vegetation community is found alongside firebreaks along ridge tops, interspersed between Diegan coastal sage scrub, and around areas that have been historically disturbed. Nonnative annual grassland occurred throughout the project study area, but was located in the far northeast, a few areas in the north, and in the southeast (Figures 2b, 2c, 2d, 2h, and 2i).

Valley Needlegrass Grassland (Holland Code 42110); Grassland (NCCP)

MCBCP has extensive areas of intact perennial grasslands, which compose a significant portion of the native grasslands left in coastal Southern California. Valley needlegrass grassland is a community of annual and perennial herbs and grasses dominated by native perennial bunchgrasses such as purple needlegrass (*Stipa pulchra*) and nodding needlegrass (*Stipa cernua*).

Within the project study area, purple needlegrass is the exclusive determinant for classifying an area as valley needlegrass grassland. As defined in Appendix I of the MCBCP Integrated Natural Resources Management Plan, the threshold for discerning valley needlegrass grassland from nonnative annual grassland is one perennial native bunchgrass per square meter (USMC 2007).

This association generally occurs on fine-textured clay soils that are moist or wet in winter but very dry in summer. Shrubs are infrequent, probably due to the unstable clay soils. The degree of habitat quality in native grasslands such as valley needlegrass grassland varies greatly depending on the history of grazing, cultivation, and other disturbance factors. Nonnative annual grasses such as bromes (*Bromus* spp.), wild oats, wild barley (*Hordeum* spp.), and rat-tail fescue commonly make up a significant portion of the cover on disturbed sites. Native and introduced herbs occur between the needlegrass, often exceeding the bunchgrass in cover (Holland 1986). Perennial herb species found in this community type may include blue-eyed grass (*Sisyrinchium bellum*), and bulb species such as the federally listed thread-leaved *brodiaea* (*Brodiaea filifolia*) and other native lilies (*Brodiaea* spp., *Calochortus* spp., and *Fritillaria* sp.). Native annual species found in this community include wildflowers such as graceful tarweed (*Holocarpha virgata*), fascicled tarplant (*Deinandra fasciculata*), clarkias (*Clarkia* sp.), and fiddlenecks (*Amsinckia* spp.). Throughout the survey area, there are extensive

stands of common fennel (*Foeniculum vulgare*), a noxious weed species that has invaded this habitat. Other common nonnative annuals include filaree, sow-thistle (*Sonchus* spp.), and tocalote (*Centaurea melitensis*).

A small portion of valley needlegrass grassland exists in the southern part of the project study area (Figure 2h).

Other Cover Types

Disturbed Habitat (Holland Code 11300 and NCCP)

Disturbed habitat includes vegetation and soils characterized by physical disturbance. Nonnative species are commonly introduced by humans in these sites. A physical disturbance may include clearing for fuel management, repeated grading, graded fire breaks, powerline access roads and areas around power poles, construction staging areas, or any repeated use areas. Examples of repeated use areas are trails, access roads, and dirt parking lots. Characteristic species of these communities include tocalote, Italian thistle (*Carduus pycnocephalus*), artichoke thistle (*Cynara cardunculus*), sow-thistle, tumbleweed (*Salsola tragus*), telegraph weed (*Heterotheca grandiflora*), horehound (*Marrubium vulgare*), mustard (*Sisymbrium* spp.), radish (*Raphanus sativus*), hottentot fig (*Carpobrotus edulis*), garland chrysanthemum (*Glebionis coronaria*), and fennel. Annual grasses are not often included in this vegetation community and are considered more typical of nonnative annual grassland.

Disturbed habitat occurs throughout the project study area primarily in the form of dirt roads and trails and areas that were historically agriculture, but are now bare and regularly mowed and used as a training area (Figures 2b through 2i).

Nonvegetated Channel (Holland Code 64200 and NCCP)

Nonvegetated channels are natural flood channels that are sparsely vegetated. The lack of significant vegetative cover in such areas can be attributed to either natural processes, such as flooding, or to human activities, such as vegetation clearing or stream channelization. Nonvegetated channel occurs within San Mateo Creek where annual sourcing by rock and sand prevent vegetation from growing in the channel (Figure 2e).

Urban/Developed Land (Holland Code 12000); Bare Ground, Pavement, and Landscape/Ornamental (NCCP)

Urban/developed areas within the survey area include buildings, paved areas, and ornamental landscaping. Areas of ornamental/landscape plantings occur throughout the project study area. These areas include lawns, parks, freeway medians, and roadsides. Common species in these areas include African daisy (*Arctotis* sp.), eucalyptus, Peruvian pepper tree (*Schinus molle*), myoporum (*Myoporum laetum*), and African fountain grass (*Pennisetum setaceum*). These areas occur throughout the project

footprint primarily as paved roads and buildings. The staging area at the south end of the project study area is a fully enclosed gravel lot, which is considered developed. It is not considered a vegetation community and typically supports no or very few biological resources (Figure 2b through 2j).

The acreages of the vegetation communities and cover types within the TL 695 project study area are listed below in Table 1 and shown on Figures 2a through 2j.

Table 1. Vegetation Communities and Cover Types within the TL 695 Project

Vegetation Communities	NCCP Vegetation Communities	Acres within Stringing Sites (Acres)	Acres within Buffer of TL Centerline and Stringing Sites (Acres)	Survey Area Total (Acres)
Riparian and Wetlands				
Mulefat Scrub	Riparian Scrub	0.9	19.0	19.9
Sycamore Alder Riparian Woodland	Riparian Forest/ Riparian Woodland	0.6	21.9	22.5
Southern Willow Scrub	Riparian Scrub	0.4	21.1	21.5
Vernal Pool	Hardpan Vernal Pool	-	0.2	0.2
Uplands				
Coast Live Oak Woodland	Coast Live Oak Forest	0.4	7.2	7.6
Diegan Coastal Sage Scrub	Coastal Sage Scrub	11.8	393.4	405.2
Eucalyptus Woodland	Eucalyptus Woodland	-	0.4	0.4
Nonnative Annual Grassland	Grassland	0.9	23.8	24.7
Valley Needlegrass Grassland	Grassland	-	2.8	2.8
Other Cover Types				
Disturbed Habitat	Disturbed Habitat	1.9	88.0	89.9
Nonvegetated Channel	Nonvegetated Channel	-	2.9	2.9
Urban/Developed	Bare Ground, Pavement, and Landscape/Ornamental	5.5	69.4	74.9
Urban/Developed (Staging Yard)	Bare Ground	-	-	1.5
Grand Total		**22.4**	**650.2[1]**	**674.1[1]**

[1]Numbers may not sum completely due to rounding.

Potential Sensitive Species

Table 2 lists the federal, state, and/or NCCP sensitive plant and wildlife species that have potential to occur within the project study area based on the habitat evaluations conducted in July and August 2014, the CNDDB records search, a review of historical Basewide survey data, and biological knowledge of the area. It describes each species NCCP status, Federal or State Listing status, and whether it was detected during coastal California gnatcatcher surveys, or is known to occur within the project study area based on Basewide survey data (includes Federally listed species only).

No U.S. Fish and Wildlife Service (USFWS) mapped critical habitat exists for any wildlife species within the project study area.

Sensitive Plant Species

Suitable habitat was observed for all five sensitive plant species with the potential to occur in the project study area. Potential to occur for these species ranged from high to low based on soil characteristics, level of disturbance observed in vegetation (nonnative species, trails from humans, etc.), size of patch of habitat, and connectivity to other similar vegetation and/or open space. In addition, thread-leaved brodiaea (*Brodiaea filifolia*), a federally threatened and NCCP covered species, is known to occur in the northeastern part of the project study area based on Basewide survey data.

Table 2. Federal, State, and/or NCCP Sensitive Species Detected or with Potential to Occur within the TL 695 Project

Potential Sensitive Species		NCCP Covered or Narrow Endemic[1]	Federal or State Listing[2]	Detected during Survey[3]	Known to Occur within the Project[4]
Common Names	**Scientific Names**				
Plants					
Many-stemmed dudleya	*Dudleya multicaulis*	NC	-	no	no
Palmer's grapplinghook	*Harpagonella palmeri*	NC	-	no	no
Pendleton button celery	*Eryngium pendletonense*	NC	-	no	no
Thread-leaved brodiaea	*Brodiaea filifolia*	NC	FT	no	yes
Variegated dudleya	*Dudleya variegata*	NC	-	no	no
Wildlife					
American badger	*Taxidea taxus*	NC	CSC	no	no
Arroyo toad	*Anaxyrus californicus*	NC	FE	no	yes
Coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	NC, NE	CSC	yes	no
Coastal California gnatcatcher	*Polioptila californica californica*	NC	FT/CSC	yes	yes
Coast patch-nosed snake	*Salvadora hexalepis virgultea*	NC	CSC	no	no
Coastal rosy boa	*Lichanura trivigata roseofusca*	NC	-	no	no
Cooper's hawk	*Accipiter cooperii*	NC	-	yes	no
Coronado island skink	*Plestiodon skiltonianus interparietalis*	NC	CSC	no	no
Dulzura pocket mouse	*Chaetodipus californicus femoralis*	NC	CSC	no	no
Ferruginous hawk	*Buteo regalis*	NC	-	no	no
Grasshopper sparrow	*Ammodramus savannarum*	NC	CSC	no	no
Least Bell's vireo	*Vireo bellii pusillus*	NC	FE/CE	yes	yes
Mountain lion	*Puma concolor*	NC	-	no	no

Potential Sensitive Species		NCCP Covered or Narrow Endemic[1]	Federal or State Listing[2]	Detected during Survey[3]	Known to Occur within the Project[4]
Common Names	**Scientific Names**				
Northern harrier	*Circus cyaneus*	NC	CSC	no	no
Northern red-diamond rattlesnake	*Crotalus ruber ruber*	NC	CSC	no	no
Northwestern San Diego pocket mouse	*Chaetodipus fallax fallax*	NC	CSC	no	no
Orangethroat whiptail	*Aspidoscelis hyperythra beldingi*	NC	CSC	no	no
Pacific pocket mouse	*Perognathus longimembris pacificus*	NC, NE	FE	no	yes
Riverside fairy shrimp	*Streptocephalus woottoni*	NC	FE	no	no
San Diego black-tailed jackrabbit	*Lepus californicus bennetti*	NC	CSC	no	no
San Diego horned lizard	*Phrynosoma coronatum blainvillii*	NC	CSC	no	no
San Diego fairy shrimp	*Branchinecta sandiegonensis*	NC	FE	no	no
San Diego ring-necked snake	*Diadophis punctatus similis*	NC	-	no	no
Southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	NC	-	yes	no
Southern mule deer	*Odocoileus hemionus*	NC	-	yes	no
Southern western pond turtle	*Actinemys pallida*	NC	CSC	no	no
Southern steelhead	*Oncorhynchus mykiss irideus*	NC	FE	no	yes
Southwestern willow flycatcher	*Empidonax traillii extimus*	NC	FE	no	yes
Two-striped garter snake	*Thamnophis hammondii*	NC	CSC	no	no
Western bluebird	*Sialia mexicana*	NC	-	yes	no
Western burrowing owl	*Athene cunicularia hypugea*	NC, NE	CSC	no	no
Western spadefoot toad	*Spea hammondii*	NC	CSC	no	no
Western yellow-billed cuckoo (Distinct Population Segment)	*Coccyzus americanus*	-	FT	no	no

[1] NC = NCCP Covered Species; NE = Narrow Endemic per NCCP

[2] FE = federal endangered; FT = federal threatened; FC = federal candidate; CE = state endangered; CT = state threatened; CSC = California Species of Special Concern.

[3] Species were detected during coastal California gnatcatcher surveys in August 2014.

[4] Species known to occur within the project study area based on Basewide survey data, which applies only to federally listed species.

Table 3 provides approximate acreage within both the stringing sites and the buffer areas that the five sensitive plant species may occur within the project study area. Rare plant surveys have not been conducted within the project study area and therefore the exact location or verification of the presence or absence of these five species has not been conducted. According to Basewide survey data there are known populations of thread-leaved brodiaea within and adjacent to the northeastern portion of the project study area. Within this area, 0.02 acre of a known population occurs within the project study area. The known locations and potential areas where thread-leaved brodiaea occur are shown in Figure 3.

Table 3. Sensitive Plant Species Acreage within Components of the Project

Potential Sensitive Species		Vegetation Communities Where They Occur	Acres within Stringing Sites (Acres)	Acres within Buffer of TL Centerline and Stringing Sites (Acres)	Survey Area Total (Acres)[1]
Common Names	**Scientific Names**				
Plants					
Many-stemmed dudleya	*Dudleya multicaulis*	Diegan coastal sage scrub and grasslands	12.8	420.1	**432.8**
Palmer's grapplinghook	*Harpagonella palmeri*	Diegan coastal sage scrub and grasslands	12.8	420.1	**432.8**
Pendleton button celery	*Eryngium pendletonense*	Diegan coastal sage scrub and grasslands	12.8	420.1	**432.8**
Thread-leaved brodiaea	*Brodiaea filifolia*	Diegan coastal sage scrub and grasslands	10.0	283.3	**293.3**
Variegated dudleya	*Dudleya variegata*	Diegan coastal sage scrub and grasslands	12.8	420.1	**432.8**

[1]Numbers may not sum completely due to rounding.

Sensitive Wildlife Species

Suitable habitat was observed for all 33 sensitive wildlife species within the project study area. Table 4 provides the acreage of potentially suitable habitat identified for each of these species within the project study area. The potentially suitable habitat for each species was defined based on the vegetation type(s) where that species is known to occur. Some large-bodied species (and some birds) have wide-ranging territories that cover many different vegetation types, while some generally smaller-bodied species have more specific vegetation community types where they may occur. For some species, such as narrow endemic species, specific habitat mapping was conducted and is shown on Figure 4. For the Pacific pocket mouse, Basewide survey data was used to delineate the boundary of occupied habitat and additional potentially suitable habitat was delineated nearby. Potentially suitable habitat for each species is further broken down

between the stringing sites and buffer areas within the total area of the project study area.

It should be noted that some species, such as southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus*) are known to migrate through various areas of MCBCP, but have very specific nesting/breeding territories. Southwestern willow flycatcher primarily breed along the Santa Margarita River (outside the project study area), and western yellow-billed cuckoos are only know to migrate through MCBCP, primarily within the Santa Margarita River.

Table 4. Potentially Suitable Habitat for Sensitive Wildlife Species within the TL 695 Project

Common Name of Species Detected or Potentially Present within the Project Study Area	Vegetation Communities and Other Cover Types Where the Species May Occur[1]	Acres within Stringing Sites (Acres)	Acres within Buffer of TL Centerline and Stringing Sites (Acres)	Survey Area Total (Acres)
American badger	grasslands, disturbed areas	1.7	66.9	**68.6**
Arroyo toad (includes both breeding [San Mateo and San Onofre Creeks] and aestivation [in all upland habitats within 0.6 mile of known breeding location])	San Mateo and San Onofre Creeks, and nearby woodlands and Diegan coastal Sage Scrub	2.5	155.4	**157.9**
Coastal cactus wren	cactus patches within Diegan coastal sage scrub	-	33.9	**33.9**
Coastal California gnatcatcher	Diegan coastal sage scrub	11.8	393.4	**405.2**
Coast patch-nosed snake	Diegan coastal sage scrub	11.8	393.4	**405.2**
Coastal rosy boa	Diegan coastal sage scrub	11.8	393.4	**405.2**
Cooper's hawk	all vegetation types	22.4	650.2	**672.6**
Coronado island skink	Diegan coastal sage scrub, coast live oak woodlands, southern willow scrub, mulefat scrub, sycamore alder riparian woodland	14.0	462.6	**476.6**
Dulzura pocket mouse	Diegan coastal sage scrub	11.8	393.4	**405.2**
Ferruginous hawk	grasslands, disturbed areas	1.7	66.9	**68.6**
Grasshopper sparrow	grasslands	0.9	26.7	**27.6**
Least Bell's vireo	southern willow scrub, mulefat scrub, sycamore alder riparian woodland	2.2	64.2	**66.4**
Mountain lion	All vegetation community types except urban/developed	16.9	580.8	**597.7**

Common Name of Species Detected or Potentially Present within the Project Study Area	Vegetation Communities and Other Cover Types Where the Species May Occur[1]	Acres within Stringing Sites (Acres)	Acres within Buffer of TL Centerline and Stringing Sites (Acres)	Survey Area Total (Acres)
Northern harrier	Diegan coastal sage scrub, grasslands, disturbed areas, southern Willow scrub, mulefat scrub, sycamore alder riparian woodland	15.3	522.3	**537.6**
Northern red-diamond rattlesnake	Diegan coastal sage scrub	11.8	393.4	**405.2**
Northwestern San Diego pocket mouse	Diegan coastal sage scrub	11.8	393.4	**405.2**
Orangethroat whiptail	Diegan coastal sage scrub, southern willow scrub, mulefat scrub, sycamore alder riparian woodland	13.6	455.4	**469.0**
Pacific pocket mouse (suitable habitat)	Diegan coastal sage scrub to east of San Onofre Housing Area on Mouse Mountain	0.5	19.4	**19.9**
Pacific pocket mouse (occupied habitat based on Basewide survey data)	Diegan coastal sage scrub to east of San Onofre Housing Area on Mouse Mountain	0.5	48.8	**49.3**
Riverside fairy shrimp	vernal pools	-	0.2	**0.2**
San Diego black-tailed jackrabbit	Diegan coastal sage scrub, grasslands, disturbed areas	14.7	508.1	**522.8**
San Diego horned lizard	Diegan coastal sage scrub	11.8	393.4	**405.2**
San Diego fairy shrimp	vernal pools	-	0.2	**0.2**
San Diego ring-necked snake	Diegan coastal sage scrub and coast live oak woodlands	12.2	400.6	**412.9**
Southern California rufous-crowned sparrow	Diegan coastal sage scrub	11.8	393.4	**405.2**
Southern mule deer	all vegetation community types except urban/developed	16.9	580.8	**597.7**
Southern western pond turtle	San Mateo and San Onofre Creeks	0.3	5.4	**5.7**
Southern steelhead	San Mateo and San Onofre Creeks	0.3	5.4	**5.7**
Southwestern willow flycatcher	sycamore alder riparian woodland and southern willow scrub	0.6	22.0	**22.6**
Two-striped garter snake	Diegan coastal sage scrub, southern willow scrub, mulefat scrub, sycamore alder riparian woodland	13.6	455.4	**469.0**

Common Name of Species Detected or Potentially Present within the Project Study Area	Vegetation Communities and Other Cover Types Where the Species May Occur[1]	Acres within Stringing Sites (Acres)	Acres within Buffer of TL Centerline and Stringing Sites (Acres)	Survey Area Total (Acres)
Western bluebird	southern willow scrub, sycamore alder riparian woodland, disturbed areas	1.7	83.2	**84.9**
Western burrowing owl[2]	grasslands, disturbed areas	1.7	66.9	**68.6**
Western spadefoot toad	vernal pools, Diegan coastal sage scrub, and grasslands	12.7	420.2	**432.9**
Western yellow-billed cuckoo (Distinct Population Segment)[3]	sycamore alder riparian woodland	0.6	21.9	**22.5**

[1] Grasslands include both nonnative annual and valley needlegrass grassland. Species listed as occurring in disturbed areas excludes dirt roads.
[2] This species is only know to spend the winter on MCBCP, and has not been recorded nesting or breeding on MCBCP since the 1990's (London *pers comm*. 2014).
[3] This species has not been detected breeding on MCBCP, and has only been detected migrating through MCBCP.

Table 5 details the protocol surveys and survey windows for various federally listed and narrow endemic species where potentially suitable (and in some cases occupied) habitat occurs within the project study area. Surveys for certain species are conducted by MCBCP annually and therefore may not be required for the Project if MCBCP allows SDG&E to utilize their data for permitting purposes. Table 5 lists those species for which surveys are normally conducted by MCBCP. For some species, such as the Pacific pocket mouse, surveys may not be required in areas that are already known to be occupied.

Table 5. Potential Protocol Surveys and Survey Windows

Sensitive Species		Federal or State Listing[1]	NCCP Covered	Survey Window[2]	MCBCP Surveys Conducted and Basewide Data Available
Common Names	Scientific Names				
Thread-leaved brodiaea	*Brodiaea filifolia*	FT	Yes	April through May (100% coverage of entire area on 3 separate surveys)	No
Arroyo toad	*Anaxyrus californicus*	FE	Yes	March 15 through July 1 (6 surveys)[3]	Yes
Coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	CSC, NE	Yes	No formal survey protocol; however, 3 surveys recommended during the breeding season, generally March 15 through June 30	No
Coastal California	*Polioptila californica*	FT	Yes	February 15 through August 31	No

Sensitive Species		Federal or State Listing[1]	NCCP Covered	Survey Window[2]	MCBCP Surveys Conducted and Basewide Data Available
Common Names	Scientific Names				
gnatcatcher	*californica*			(3 surveys)	
Least Bell's vireo	*Vireo bellii pusillus*	FE	Yes	April 10 and July 31 (8 surveys)[3]	Yes
Western yellow-billed cuckoo	*Coccyzus americanus*	FT	No	June through August (4 surveys)	No
Pacific pocket mouse	*Perognathus longimembris pacificus*	FE, NE	Yes	5 consecutive trap nights or until captured during April through July	No
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE	Yes	May 15 through July 17 (5 surveys)[3]	Yes
Western burrowing owl	*Athene cunicularia hypugea*	CSC, NE	Yes	Breeding Season: February – August (4 surveys) Nonbreeding Season: September through January (4 surveys spaced evenly apart)	No
Vernal pool branchiopods	*Branchinecta sandiegonensis, Streptocephalus woottoni*	FE	Yes	Either 1 wet and 1 dry season survey or 2 wet season surveys within a 5-year period.	No

[1] FE = Federal endangered; FT = Federal threatened; CSC = California Species of Special Concern; and NE = Narrow Endemic per NCCP

[2] This is a typical survey window; optimal survey times vary by species and by year.

[3] Usually Basewide survey data are used to determine the occupied habitat for these species, and project-specific surveys may not be required.

Biological Constraints and Recommendations

The TL 695 corridor occurs in a portion of San Diego County known for its biological diversity. In addition to the vegetation communities that occur within the survey area, suitable habitat for several sensitive plant and wildlife species was also identified. This section identifies the constraints for these potential resources and provides recommendations for designing the Project to minimize and avoid impacts to them, including constraints associated with permitting the Project under SDG&E's existing NCCP, since this is the preferred method. If it is determined that the NCCP would not be used for permitting, then the constraints and recommendations in this section would need to be revisited.

Vegetation Communities

Twelve vegetation communities and cover types were mapped within the project study area. Eight of these communities require mitigation under the NCCP, and one (vernal pools) must be completely avoided. Diegan coastal sage scrub is the dominant

vegetation community within the TL corridor, with smaller amounts of several other NCCP covered vegetation communities (Table 1). In general, impacts to NCCP-covered vegetation communities, as indicated in Table 1 and Figures 2a through 2j, should be minimized to the greatest extent possible, with temporary impacts favorable over permanent impacts. Table 6 provides specific constraints and recommendations for NCCP-covered vegetation communities, nonnative annual grassland, coastal sage scrub, and riparian habitats.

Vegetation community mapping for the project study area also provides a baseline for preparing the preliminary impact analysis. This analysis will provide SDG&E with an idea about the Project's potential mitigation needs, and allow the project team to determine a path forward for permitting (e.g., using SDG&E's existing NCCP permit or pursuing project permits outside the NCCP). If requested by SDG&E, a preliminary impact analysis could be prepared for your review; however, this analysis is not part of this scope of work, once the project design has progressed enough for an adequate analysis (e.g., identification of permanent and temporary impact areas).

Sensitive Plant Species

Suitable habitat for five sensitive plant species (many-stemmed dudleya, Palmer's grapplinghook, Pendleton button celery, thread-leaved brodiaea, and variegated dudleya) was identified within the project study area and potentially suitable habitat for the only federally listed species, thread-leaved brodiaea is shown in Figure 3. Focused botanical surveys and rare plant surveys are recommended and would need to be conducted during the appropriate blooming periods for each of these species to determine presence/absence. These surveys would need to occur at the appropriate time in spring.

It is recommended that potential impacts to sensitive plant species (Figure 3) be minimized to the greatest extent possible, with temporary impacts favorable over permanent impacts. Table 6 provides specific constraints and recommendations for sensitive plant species suitable habitat.

Sensitive Wildlife Species

Suitable habitat for 33 sensitive wildlife species was identified within the Project (Table 4, Figures 4 and 5). Coastal California gnatcatcher surveys were conducted following the current USFWS survey protocol for the coastal California gnatcatcher (dated February 28, 1997, and amended July 28, 1997). AECOM biologists Andrew Fisher, Bonnie Hendricks, James McMorran, and Brennan Mulrooney conducted the surveys under Endangered Species Permit TE-820658. Since SDG&E has an active NCCP, only three surveys were conducted (at least 1 week apart) within approximately 405.2 acres of potentially suitable habitat (i.e., coastal sage scrub) between August 11, 2014, and August 27, 2014 (Figure 5). Many pairs, individuals, juveniles, and birds of unknown age and sex were detected throughout the entire Project. The summary results of CAGN

surveys, including exact locations of CAGN and areas of use, will be summarized in a 45-day report to USFWS that will be provided to SDG&E under separate cover.

Table 6 details the biological resource constraints and recommendations for various NCCP covered vegetation communities, and for sensitive plant and wildlife species. Table 6 does not address potential constraints and recommendations for vernal pools and federally listed fairy shrimp species; those are discussed in detail in Table 7, below.

Table 6. Biological Resources Constraints and Recommendations

Biological Resources within TL Corridor, Stringing Sites, and Staging Areas	Constraints	Recommendation for Design
Vegetation Communities		
NCCP-covered vegetation communities[1]	Requires mitigation at 2:1 ratio for permanent impacts and 1:1 ratio for temporary impacts.[1]	Minimize permanent and temporary impacts. Choose temporary impacts over permanent impacts when possible.
Nonnative annual grassland	Requires mitigation as indicated above, but can be restored on-site.	Place work pads and access roads in this community instead of others.
Coastal sage scrub	Requires mitigation as indicated above; more difficult to restore on-site within the 2-year timeframe of NCCP Enhancement Program.	Move work pads and access roads into nonnative annual grassland when possible.
Riparian vegetation communities (mulefat scrub and southern willow scrub)	Requires formal wetland delineation and additional permits and mitigation from the U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and Regional Water Quality Control Board, if impacted.	Avoid these vegetation communities, if possible. Place work pads and access roads at least 50 feet away from these features.
Sensitive Plant Species		
Five sensitive plants with potential to occur (many-stemmed dudleya, Palmer's grapplinghook, Pendleton button celery, thread-leaved brodiaea, and variegated dudleya)	Per NCCP, impacts to sensitive plant species should be avoided and minimized. No other mitigation, other than that above for vegetation communities, required under NCCP.	Minimize impacts in potential habitat. Choose temporary impacts over permanent impacts when possible. Conduct rare plant surveys (or specific thread-leaved brodiaea surveys) in spring 2015, the presence/absence of sensitive plants in relation to project footprint can be determined. It is possible to conduct protocol thread-leaved brodiaea surveys concurrently with rare plant surveys, since the other rare plant species would be present at the same time. In addition, rare plant surveys would be recommended for areas outside the thread-leaved brodiaea survey area.
Sensitive Wildlife Species		
Suitable habitat for various NCCP covered species.	Per the NCCP, impacts to sensitive wildlife species should be avoided and minimized. No other mitigation, other than that above for vegetation	Minimize impacts in areas that contain the potential for the most NCCP covered species. Choose temporary impacts over permanent

Biological Resources within TL Corridor, Stringing Sites, and Staging Areas	Constraints	Recommendation for Design
	communities, is required under the NCCP for all species.	impacts when possible. Once focused and general wildlife surveys are completed, the presence/absence of sensitive wildlife in relation to the project footprint can be determined.
Coastal cactus wren	Narrow endemic species are not covered under the NCCP; therefore, additional permitting and mitigation would be required from USFWS and CDFW. Per the NCCP, impacts must be avoided. Construction during breeding season could be limited if nests are within 500 feet of work areas.	Avoid coastal cactus wren habitat when possible. Choose temporary impacts over permanent impacts when possible.
Coastal California gnatcatcher	Per the NCCP, impacts should be avoided and minimized. Requires habitat mitigation as indicated above. Construction during breeding season could be limited if nests are within 500 feet of work areas.	Avoid coastal California gnatcatcher habitat when possible. Choose temporary impacts over permanent impacts when possible.
Western burrowing owl	Narrow endemic species are not covered under the NCCP; therefore, additional permitting and mitigation would be required from USFWS and CDFW if occupied burrows are identified and impacted. Mitigation includes passive relocation of owls off-site (e.g., one-way doors installed in active burrows), creation of new burrows at a 2:1 mitigation ratio for active burrows impacted, and preservation of habitat at a 1:1 ratio near impact area.	Suitable habitat identified within the TL buffer and stringing sites. Owl presence/absence will be confirmed through surveys conducted during the nonbreeding season (October 2014 through January 2015). Unoccupied burrows can become occupied if construction does not start right after surveys are complete; therefore, it is recommended that all potential owl burrows be avoided. A map of potential owl burrows across the survey area will be provided once surveys are complete.
Pacific pocket mouse	Narrow endemic species are not covered under the NCCP; therefore, additional permitting and mitigation would be required from USFWS and CDFW.	Occupied habitat is known within the TL buffer. Consultation with MCBCP and USFWS should be conducted to determine if trapping is necessary.
Raptors	Per the NCCP, impacts to raptors should be avoided and minimized. Requires habitat mitigation as indicated above. Construction during the breeding season could be limited if nests are within 500 feet of work areas.	Design of the TL towers should include the latest raptor protection equipment and conform to Reducing Avian Collisions with Powerlines (APLIC) 2012 guidelines.

[1] For the purposes of this report, MCBCP is being treated as a "preserve," or habitat considered as moderate, high, or very high quality in the absence of preserve boundaries. Habitat quality is based on plant species composition and connectivity with the surrounding natural vegetation communities.

[2] If total temporary impacts are less than 500 square feet, no mitigation would be required per Table 7.2 of NCCP; If total temporary impacts are between 500 and 1,000 square feet, mitigation would likely be achieved by withdrawing credits from the mitigation bank; if total temporary impacts are greater than 1,000 square feet, mitigation would likely be achieved through restoration on-site (e.g., enhancement or passive restoration).

It is recommended that western burrowing owl surveys be conducted in the winter of 2014 as this species is only known to winter on MCBCP (last breeding record was in the 1990's [London *pers comm*. 2014]), and nesting season surveys would not be useful for the project. It is recommended that a 500-foot buffer be placed around all Project features within areas of potential western burrowing owl habitat per the protocol survey guidelines for burrowing owl. A 150-foot buffer was surveyed around Project features during the habitat assessment described in this letter report. It is recommended that a habitat assessment for burrowing owl within the 500-foot buffer be conducted prior to initiating surveys. The increase to a 500-foot buffer would necessitate an additional habitat assessment.

Pacific pocket mouse trapping has been conducted in several spots in July 2013 by Scott Tremor (Tremor 2013a and 2013b) for SDG&E. These trapping locations were mutually agreed upon by SDG&E and the USFWS (William Miller). No Pacific pocket mice were captured at any of the trapping locations. Complete details of the trapping effort are located within the 45-day summary reports (Tremor 2013a and 2013b). The locations where trapping occurred are shown on Figure 4. Based on the habitat assessment conducted by AECOM for TL695, additional trapping may be necessary once the final Project features (such as stringing sites, access roads, and work areas where poles would be removed and replaced) are known.

Table 7 discusses potential vernal pools (referred to as basins since they have not had floral or fairy shrimp surveys conducted to date) that are known to occur within the Project. Some of the basins are documented from historical MCBCP Basewide data and some were found during the habitat assessment. A total of 7 basins are known to occur within the Project. Table 7 describes the potential fairy shrimp occupancy and past protocol survey history for each of the basins, including AECOM's recommendations for fairy shrimp and vernal pool/botanical surveys. The locations of these basins are shown on Figures 6, 7, and 8.

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Table 7. Fairy Shrimp Occupancy for Basins and Recommendations

Basin Number/MCBCP Spatial Identifier[1]	Historical Fairy Shrimp Occupancy (from Basewide Survey Data)	Protocol Fairy Shrimp Survey Conducted to Date (Yes/No)	Fairy Shrimp Survey Recommendations	Vernal Pool/Botanical Survey Recommendations
SP_69001	No Shrimp	No	More than 100-foot downhill from Project feature, no survey recommended	More than 100-foot downhill from Project feature, no survey recommended
SP_69002	No Shrimp	No	More than 100-foot downhill from Project feature, no survey recommended	More than 100-foot downhill from Project feature, no survey recommended
SO_83001	Lindahl's fairy shrimp	Yes	Avoid, but no additional surveys necessary	Conduct vernal pool survey
SO_83002	Lindahl's fairy shrimp	Yes	Avoid, but no additional surveys necessary	Conduct vernal pool survey
SO_84001	Lindahl's fairy shrimp	Yes	Avoid, but no additional surveys necessary	Conduct vernal pool survey
Basin 1	Unknown	No	Conduct protocol fairy shrimp surveys	Conduct vernal pool survey
Basin 2	Unknown	No	Conduct protocol fairy shrimp surveys	Conduct vernal pool survey

[1] Some historically mapped basins have spatial identifiers (IDs) provided by MCBCP, which are provided in this column where applicable. Those basins without spatial IDs are labeled as Basin 1 and 2.

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Basins SP_69001 and SP_69002 have not had protocol fairy shrimp surveys conducted. Based on historical data, a non-protocol survey was conducted but shrimp were not found. Therefore, their occupancy status is currently unknown. Since these basins are located more than 100 feet away from any project feature (such as a pole location or access road), complete avoidance during construction is possible (e.g., direct and indirect impacts). Best Management Practices should be in place to prevent run-off and sedimentation into these basins, especially since they are downhill from where construction activities would take place.

Basins SO_83001, SO_83002, and SO_84001 have had full protocol fairy shrimp surveys conducted for another overlapping project (Basewide Water Improvement Project) in 2010 and 2011. No federally listed fairy shrimp species were detected during dry or wet season surveys. The only species found was the common Lindahl's fairy shrimp (*Branchinecta lindahli*). These basins should have a vernal pool survey conducted to determine if there are vernal pool plants present that should be avoided.

Basin 1 was identified during the habitat assessment; therefore, no historical fairy shrimp surveys have been conducted. Basin 1 is located within a dirt access road that traverses San Onofre Creek, and this road could be utilized for construction during periods when the basin was dry. If it is necessary to drive along this access road for construction during the wet season, fairy shrimp surveys for Basin 1 would be recommended. In addition, vernal pool surveys would be recommended to determine if there were any sensitive plants present within the basin.

Basin 2 was also identified during the habitat; therefore, historical fairy shrimp data is not available for this basin. Basin 2 is located near a power pole that would be removed or replaced; therefore, fairy shrimp surveys would be recommended. In addition, vernal pool surveys would be recommended to determine if there were any sensitive plants present within the basin.

A geodatabase containing the data represented in the figures can be submitted separately via email, if needed. We look forward to continuing to work with you on this important project. Please contact us if you have any questions.

Sincerely,

Barbie Prine
Project Manager

Andrew Fisher
Wildlife Biologist

Attachments:
Figure 1: Vicinity Map
Figure 2a - 2j: Vegetation Communities
Figure 3: Thread-leaved Brodiaea Potentially Suitable and Occupied Habitat
Figure 4: Narrow Endemic Species Suitable Habitat

Figure 5: Coastal California Gnatcatcher Survey Areas
Figure 6: Fairy Shrimp Survey Area Detail Map 1 of 3
Figure 7: Fairy Shrimp Survey Area Detail Map 2 of 3
Figure 8: Fairy Shrimp Survey Area Detail Map 3 of 3

References

Avian Power Line Interaction Committee (APLIC)
2012 *Reducing Avian Collisions with Power Lines: The State of the Art in 2012.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C., and Sacramento, California.

Holland, R. F.
1986 *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Nongame Heritage Program, State of California Department of Fish and Game.

London, Kaye
2014 Personal email communication regarding last know breeding dates for western burrowing owl on Marine Corps Base Camp Pendleton.

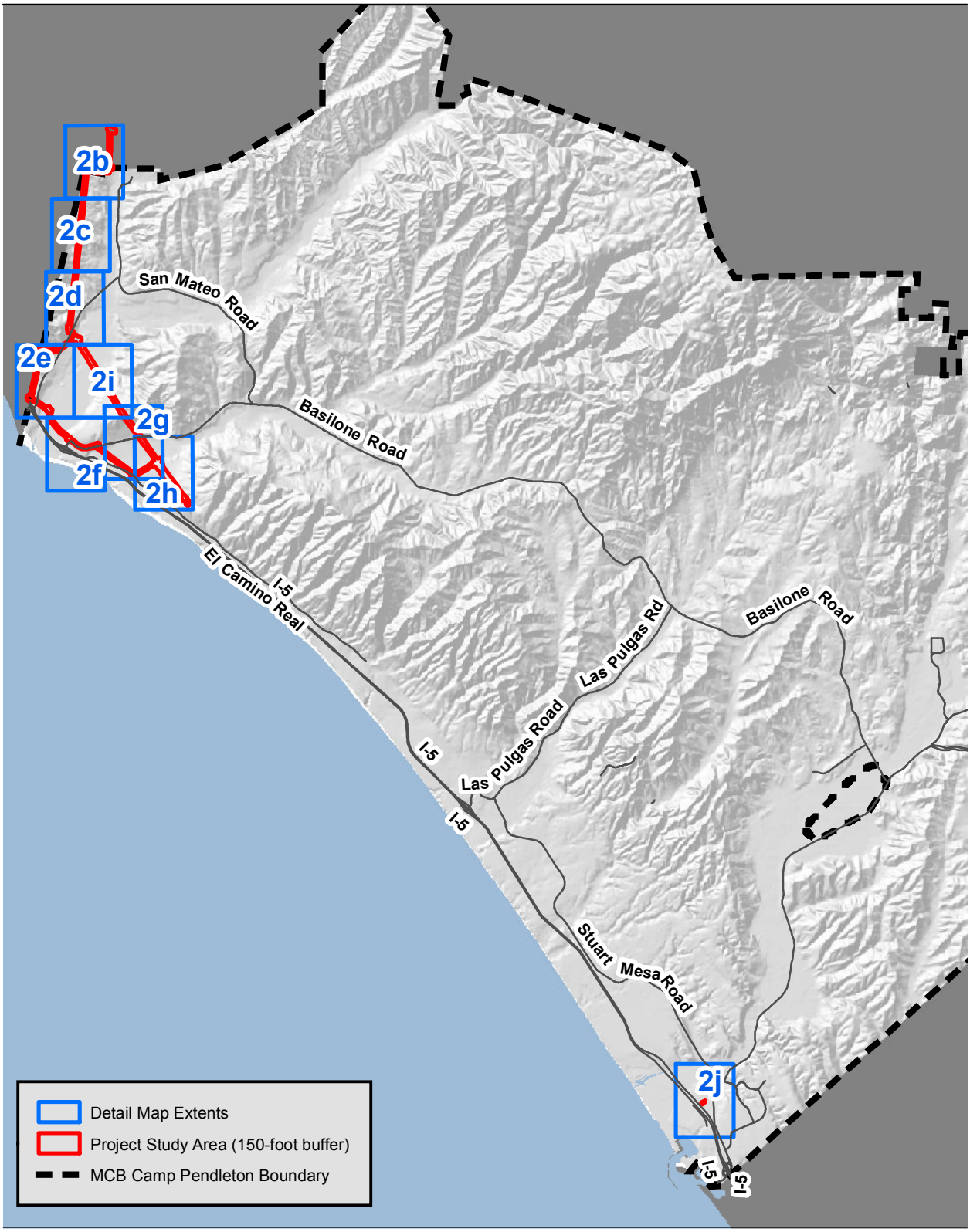
Oberbauer, T., M. Kelly, and J. Buegge
2008 *Draft Vegetation Communities of San Diego County*. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California," Robert F. Holland, Ph.D., October 1986.

Tremor, Scott
2013a 45-day report on the results of surveys Focused Surveys for the Endangered Pacific Pocket Mouse (*Perognathus longimembris pacificus*) at locations at or near San Mateo North on Camp Pendleton, San Diego County. September 8.

2013b 45-day report on the results of surveys Focused Surveys for the Endangered Pacific Pocket Mouse (*Perognathus longimembris pacificus*) at San Mateo South on Camp Pendleton, San Diego County. September 10.

U.S. Marine Corps (USMC)
2007 *Integrated Natural Resources Management Plan, Marine Corps Base Camp Pendleton*. March. With chapter and appendix updates per http://www.cpp.usmc.mil/ base/environmental/inrmp.asp.

Zedler, P., S. DeSimone, J. Giessow, D. Lawson, J. Else, and S. Bliss.
1997 The Plant Communities of Camp Pendleton Marine Corps Base, California. San Diego State University, Department of Biology.



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

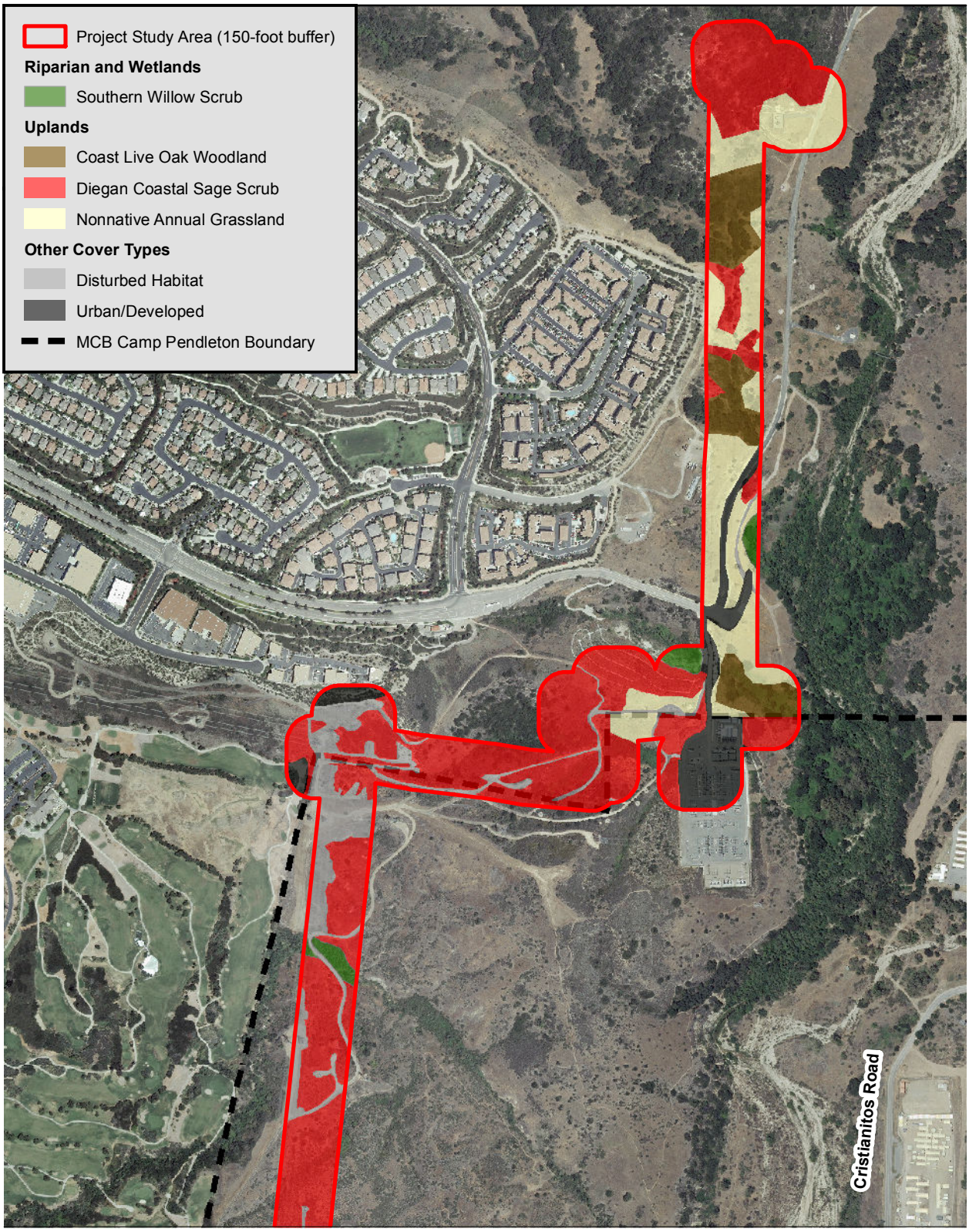
2.5 1.25 0 2.5 Miles

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Figure 2a
Vegetation Communities - Overview Map

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

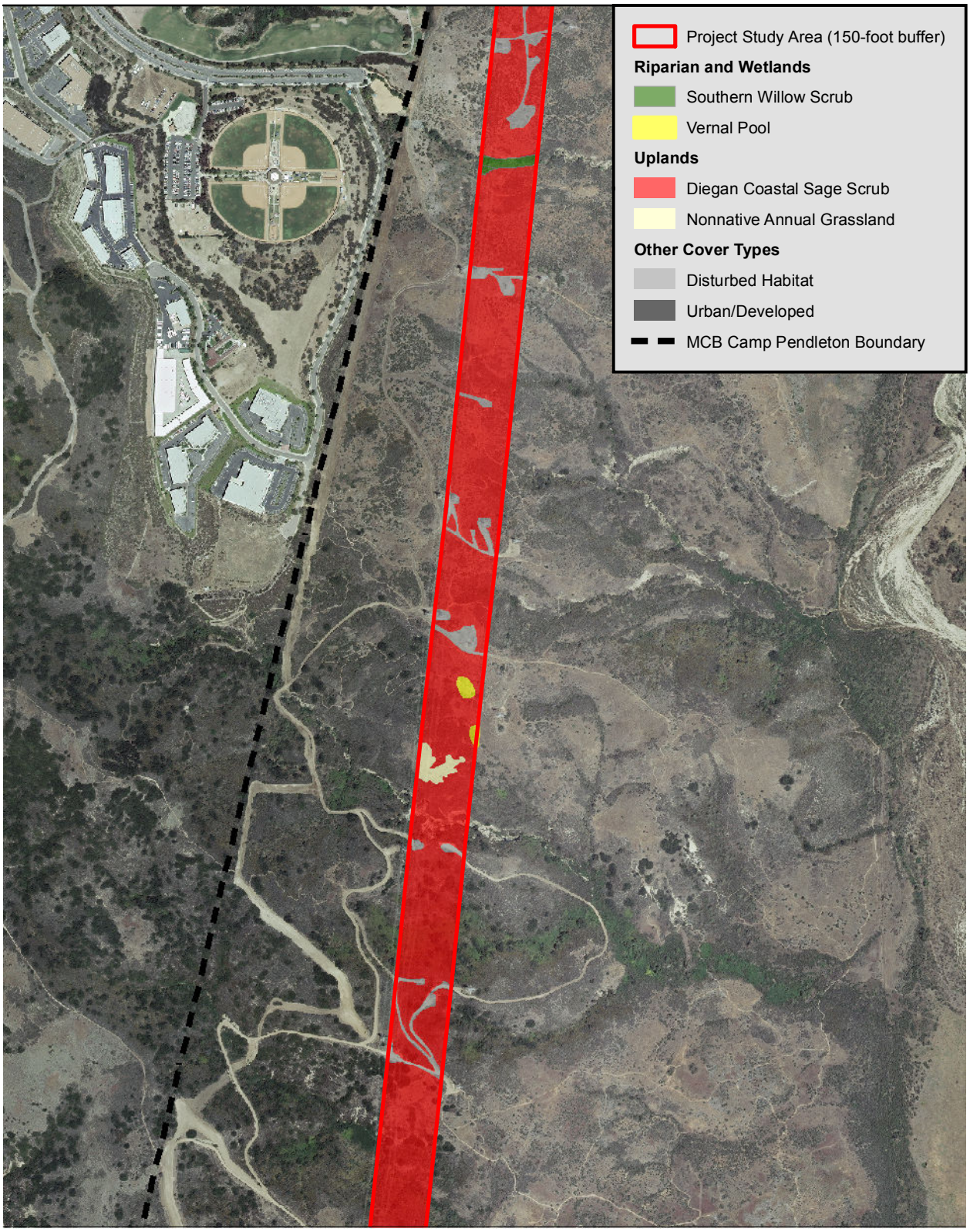
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Figure 2b
Vegetation Communities - Detail Map 1 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

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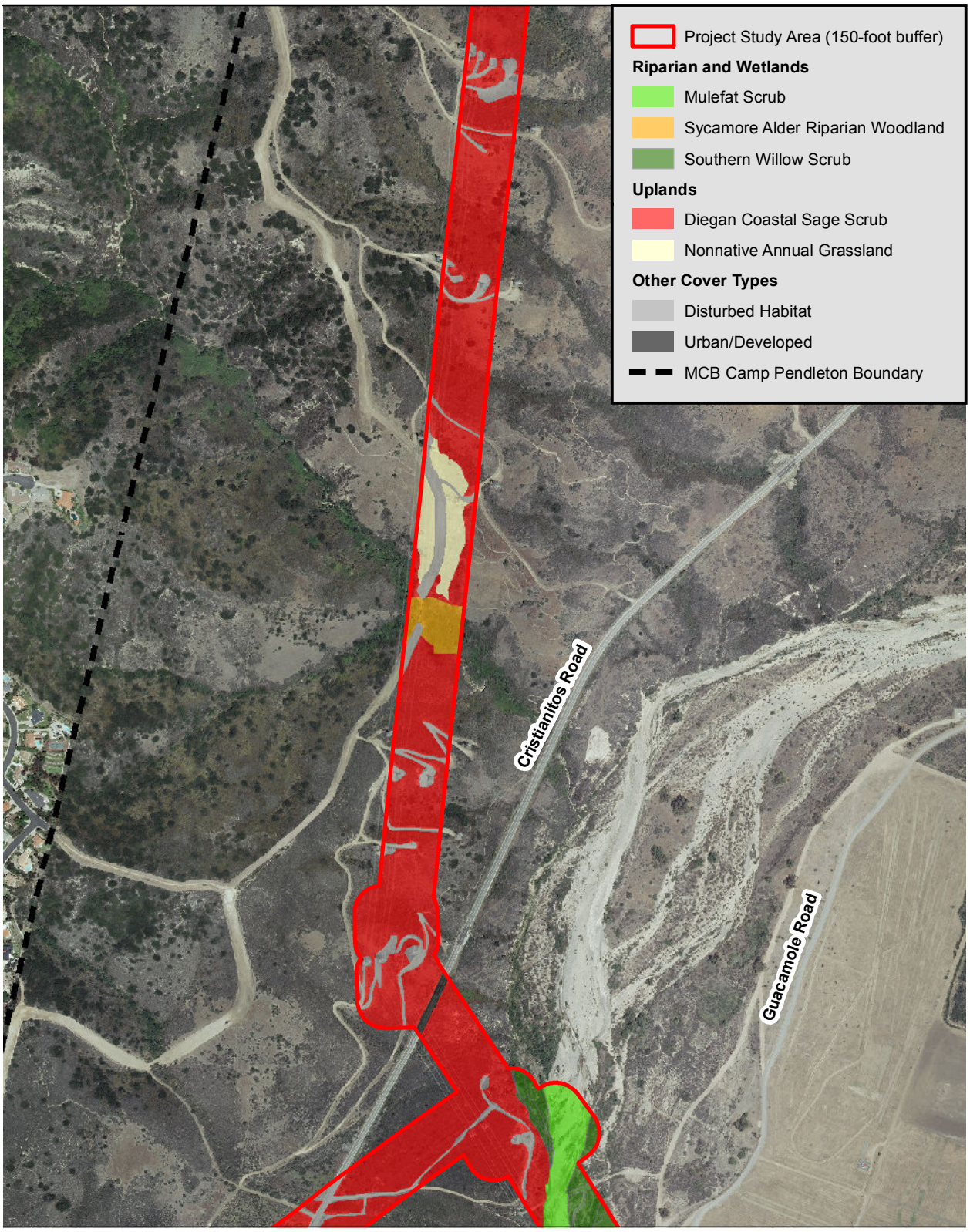
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Figure 2c

Vegetation Communities - Detail Map 2 of 9

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

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Scale: 1:9,600; 1 inch = 800 feet

Figure 2d

Vegetation Communities - Detail Map 3 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

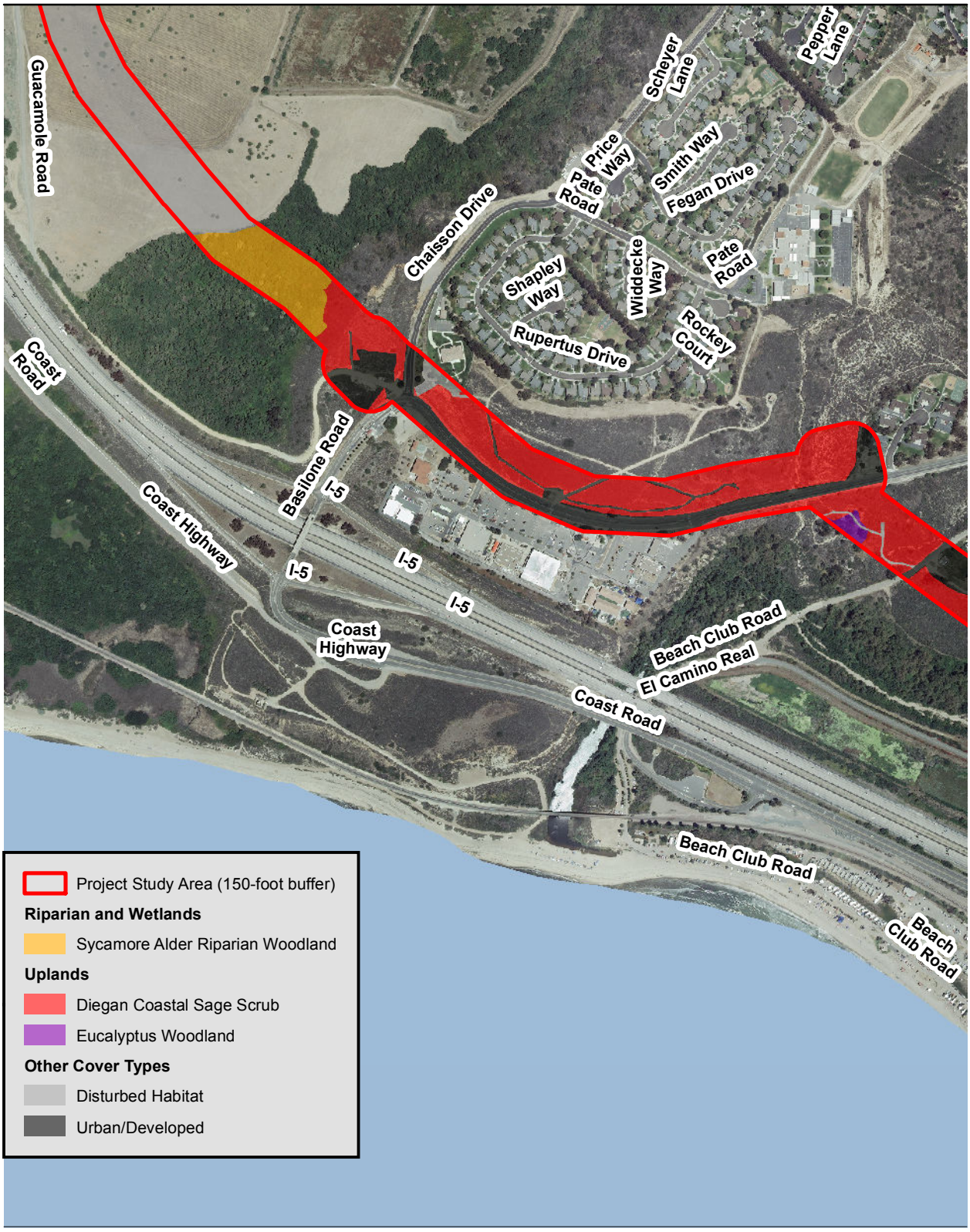
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Scale: 1:9,600; 1 inch = 800 feet

Figure 2e

Vegetation Communities - Detail Map 4 of 9

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

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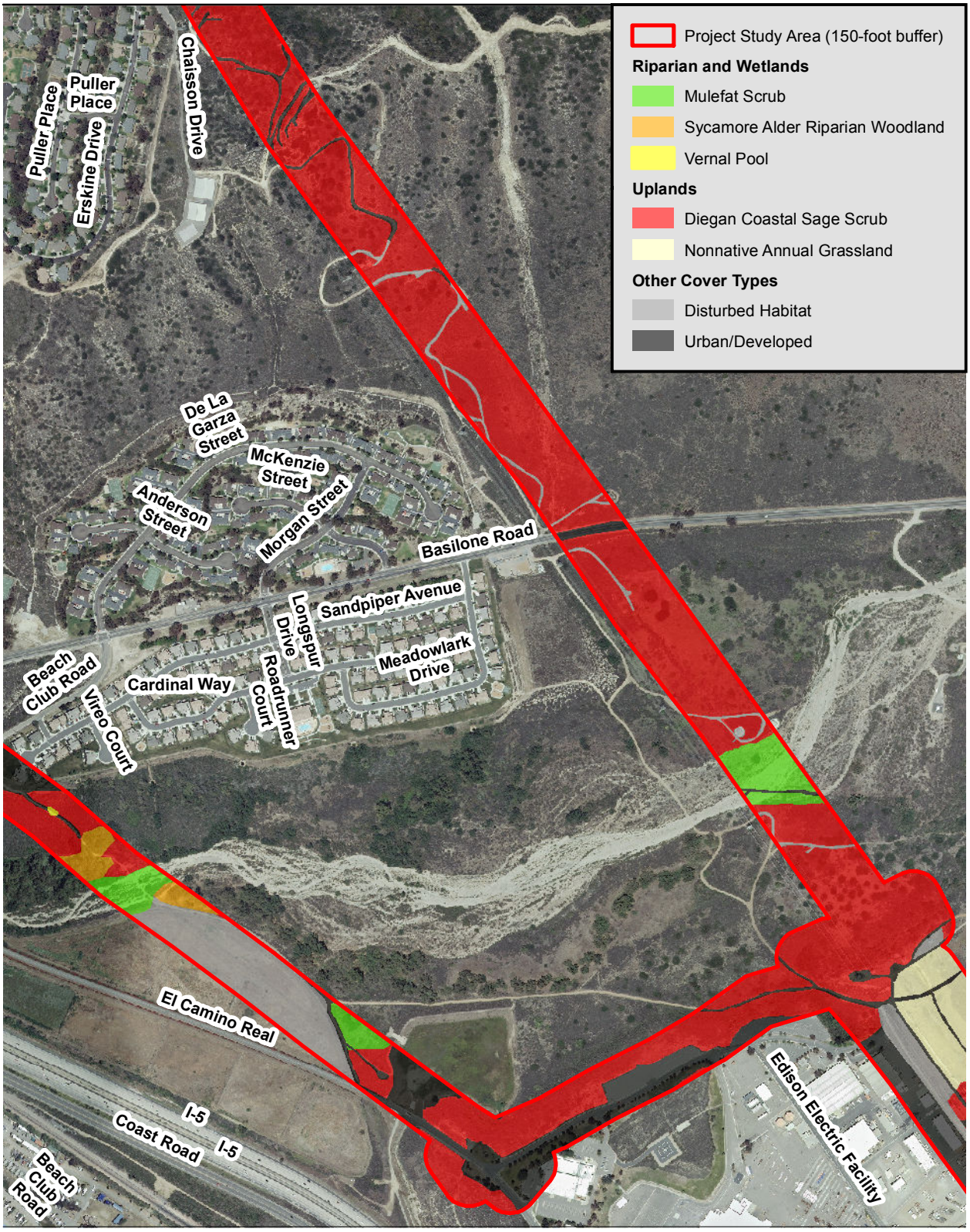
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Figure 2f

Vegetation Communities - Detail Map 5 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

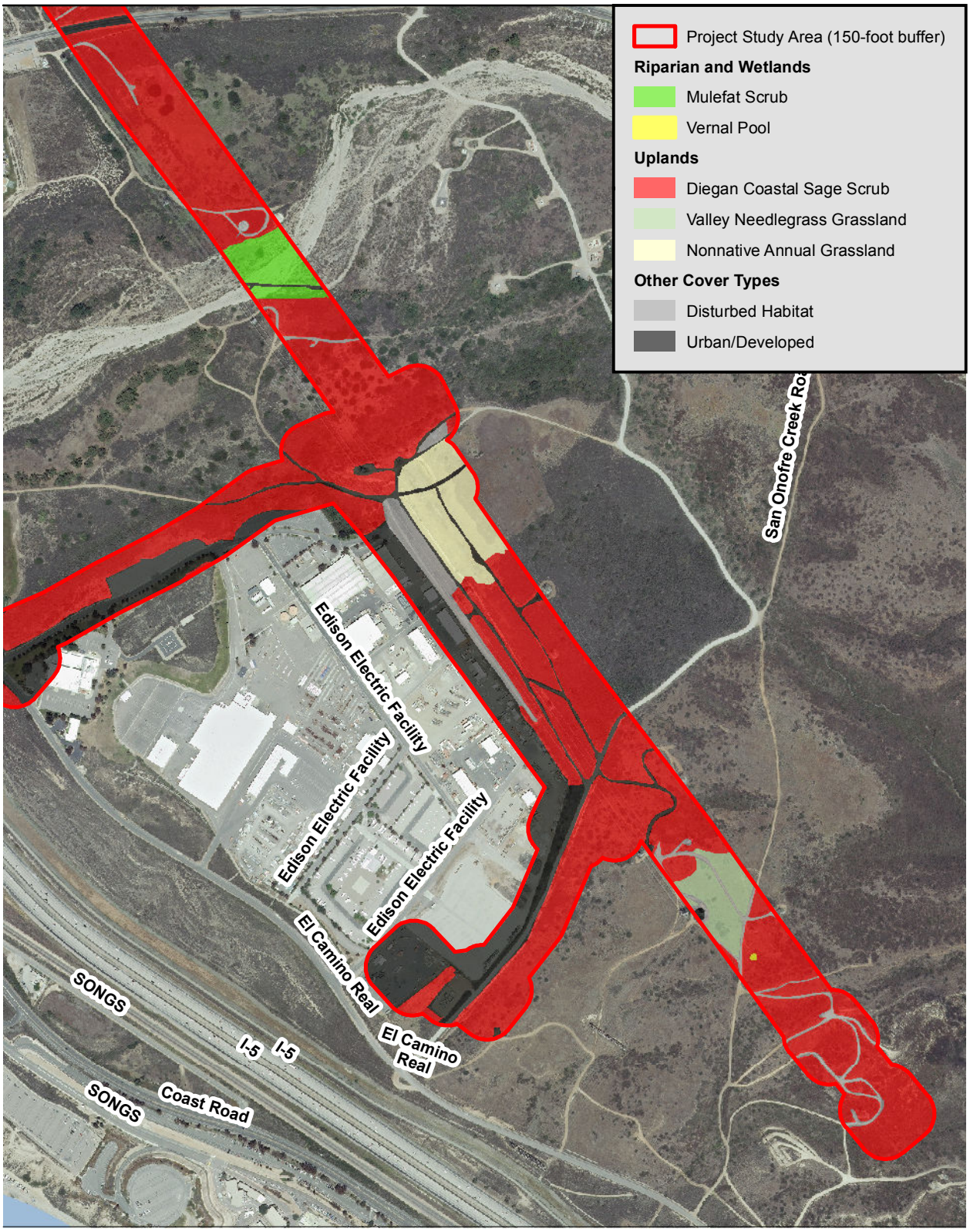
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Figure 2g

Vegetation Communities - Detail Map 6 of 9

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

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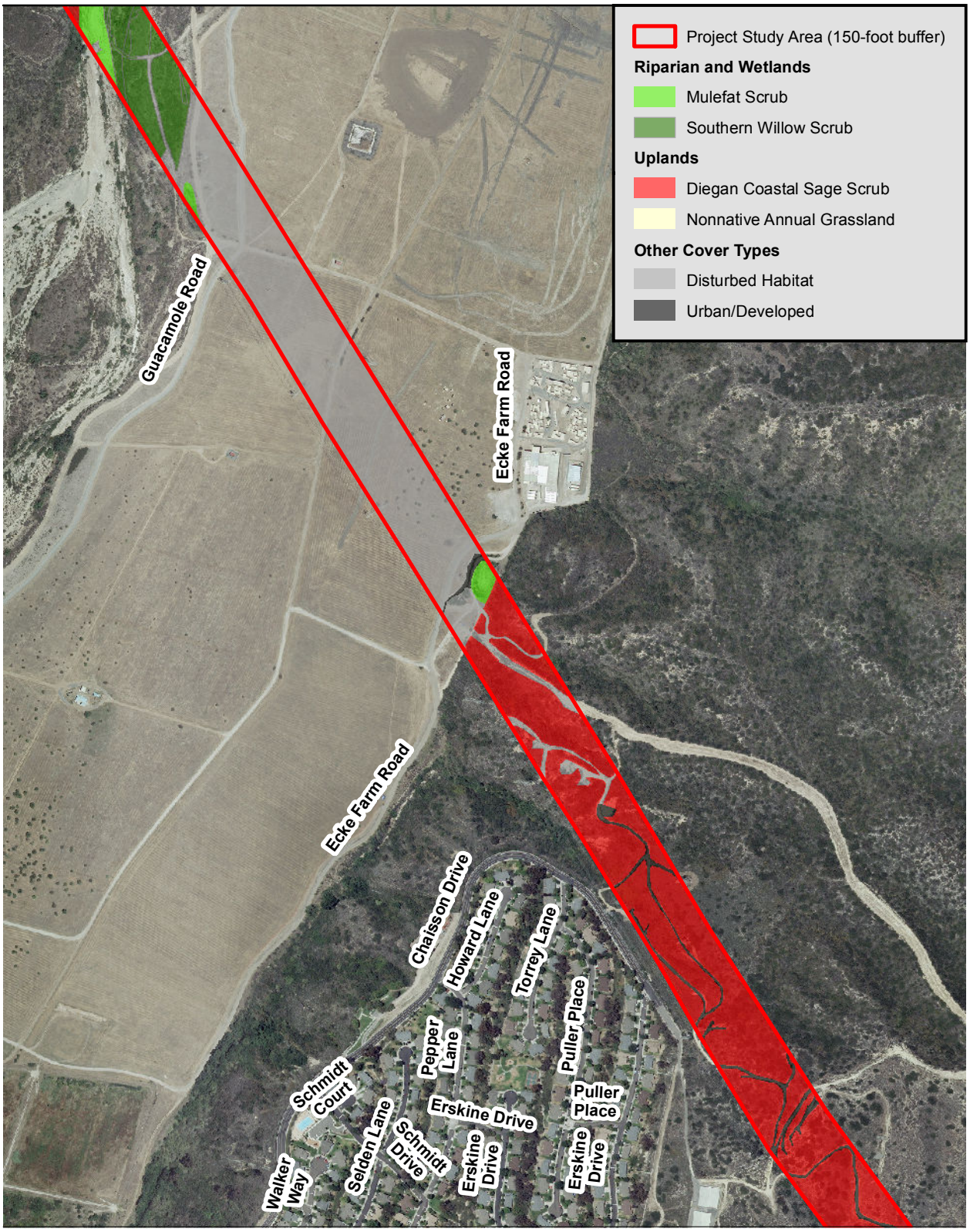
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Figure 2h

Vegetation Communities - Detail Map 7 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Results_Ltr\VegSeries.mxd, 9/22/2014, janssenn



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

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Scale: 1:9,600; 1 inch = 800 feet

Figure 2i

Vegetation Communities - Detail Map 8 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Results_Ltr\VegSeries.mxd, 9/22/2014, janssenn



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 2j

Vegetation Communities - Detail Map 9 of 9

TL 695 Wood to Steel Project Biological Constraints Evaluation and Survey

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Results_Ltr\VegSeries.mxd, 9/22/2014, janssenn

Appendix C – Rare Plant Survey Report Cardno 2015





Final

Rare Plant Survey Report for TL 695/6971 Reconductor Project

San Diego Gas & Electric Company

November 2015

Prepared for:
Pangea Biological

Prepared by:
Cardno

Acronyms and Abbreviations

BRFI	thread-leaved brodiaea (*Brodiaea filifolia*)
CNPS	California Native Plant Society
CLO	Coast Live Oak
CRPR	California Rare Plant Rank
DCSS	Diegan Coastal Sage Scrub
DEV	Urban/Developed
DIS	Disturbed Habitat
EW	Eucalyptus Woodland
GIS	geographic information system
GPS	global positioning system
ILA	Incidental Landing Area
kV	kilovolt
MCB	Marine Corps Base
MFS	Mulefat Scrub
NNG	Non-native Grassland
NVC	Non-vegetated Channel
PSA	Project Survey Area
SDG&E	San Diego Gas and Electric
SONGS	San Onofre Nuclear Generating Station
SSARW	Southern Sycamore-Alder Riparian Woodland
SWS	Southern Willow Scrub
TL	Tie Line
USFWS	United States Fish and Wildlife Service
VP	vernal pool

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1.0 INTRODUCTION

This Rare Plant Survey Report describes the results of rare plant surveys conducted in support of a Proponent's Environmental Assessment being prepared for San Diego Gas & Electric Company's (SDG&E) Proposed Tie Line (TL) 695/6971 Reconductor[1] Project (i.e., the Proposed Project) in northern San Diego County (Figure 1).

Cardno biologists surveyed for all federally listed, state listed, and California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 1B through 4 plant species with the potential to occur in the project area.

Surveys were conducted in accordance with the Marine Corps Base (MCB) Camp Pendleton *Thread-Leaved Brodiaea (Brodiaea filifolia [BRFI]) Inventory Protocol* (MCB Camp Pendleton 2015a) (Appendix A). In addition to BRFI, other potentially occurring rare plant species including many-stemmed dudleya (*Dudleya multicaulis*), Palmer's grapplinghook (*Harpagonella palmeri*), Pendleton button celery (*Eryngium pendletonense*), and variegated dudleya (*Dudleya variegata*), along with other CRPR 1B through 4 plant species were searched for during BRFI surveys (March through May 2015).

This report will provide information necessary for the minimization/avoidance of potential impacts to rare plants, and will be used to support California Environmental Quality Act and National Environmental Policy Act review of the Proposed Project.

2.0 PROPOSED PROJECT AND SURVEY AREA

2.1 Project Location and Description

SDG&E proposes to reconductor a 69-kilovolt (kV) power line in northern San Diego County near the border of Orange County. The power line is located primarily on federal military lands in the western portion of MCB Camp Pendleton (Figure 1). The proposal also includes removing wood poles, installing steel poles, and reconductoring within existing utility corridors and other areas devoted to electric utilities. The 69-kV power line will be reconductored between SDG&E's Talega, Basilone, and Japanese Mesa Substations.

While the Proposed Project components are located primarily in the westerly portion of MCB Camp Pendleton, in San Diego County, California; a portion of the power line alignment extends into the eastern area of the city of San Clemente, in Orange County, California.

As depicted in Figure 1, the northern limit of the reconductor project is located outside MCB Camp Pendleton, to the north and west of the Talega Substation. From this point, the Proposed Project area runs west before turning south into MCB Camp Pendleton toward the San Mateo Junction (i.e., west of the Sierra Training Area) along the ridge tops of steep hills located to the north and west of Cristianitos Road. The hills in this area lie along the border of San Diego and Orange counties, and occur on lands that have been leased by the federal government to the California Department of Parks and Recreation. From San Mateo Junction, the Proposed Project runs in a southeasterly direction toward the northeastern corner of San Onofre Nuclear Generating Station (SONGS) Mesa. From this point, the Proposed Project extends to the northwest to the Basilone Substation, and to the southwest to the Japanese Mesa Substation. The Proposed Project includes approximately 27 miles of existing dirt roads that will be utilized to access various elements of the Proposed Project for construction activities.

[1] Reconductoring is a term used by utilities to describe the replacement of existing wires with new wires.

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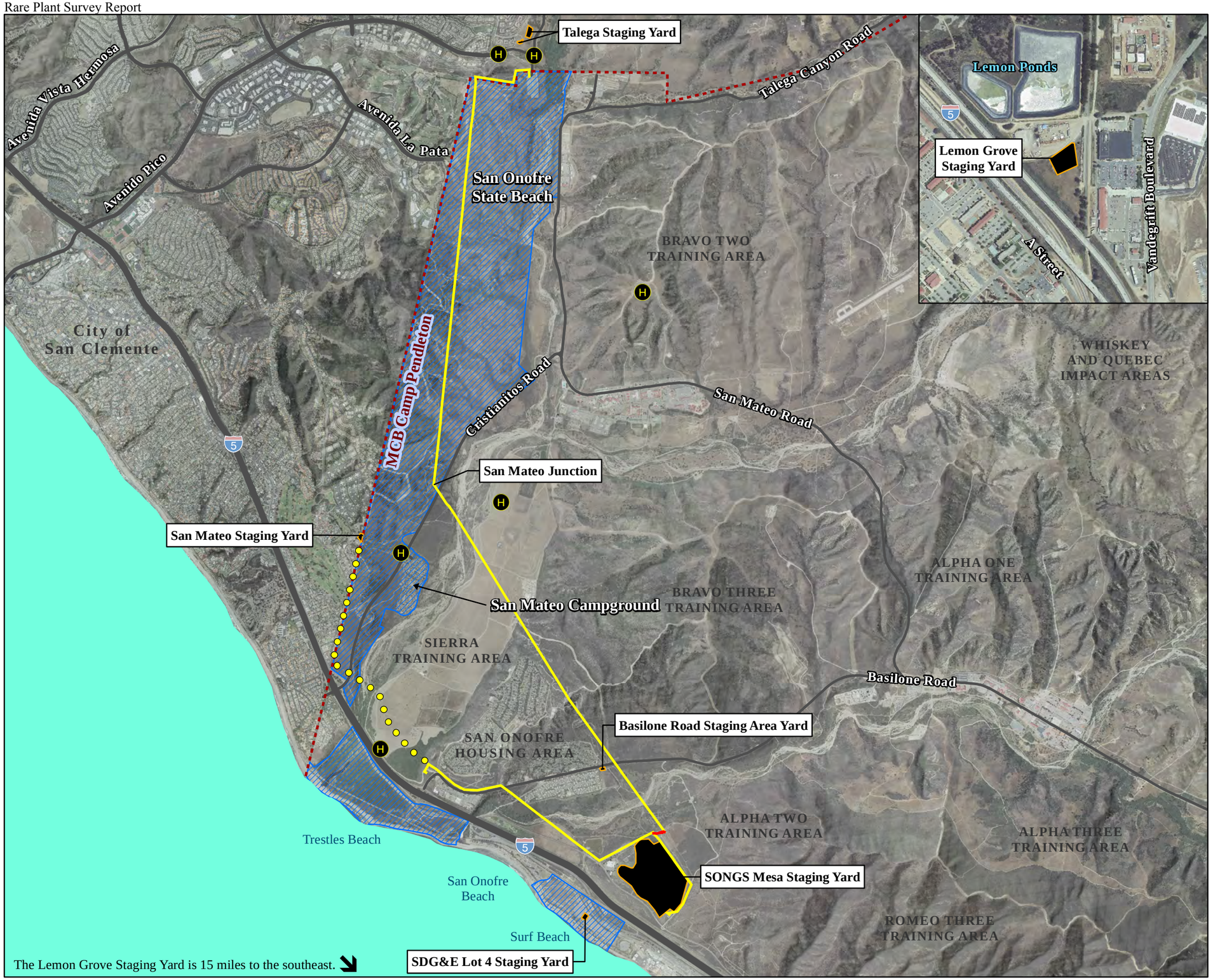


Figure 1
TL695/6971 Proposed Project Area

LEGEND

- MCB Camp Pendleton Boundary
- Proposed Project Overhead Route
- Proposed Project Underground Route
- Proposed Power Line Removal Segement
- Staging Yard
- Helicopter Incidental Landing Area
- State Parks Lease Area



Kilometers
0 2
0 1
Miles

Sources: City of San Clemente 2015, ESRI 2015

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2.2 Project Survey Area

The Project Survey Area (PSA) for rare plant surveys consists of a 300-foot buffer that originates from the tie line (150-foot buffer on each side of the tie-line) and a 50-foot buffer around all staging areas, substations, and stringing sites. In addition, a 20-foot buffer was used on both sides of dirt access roads, of which 11.8 miles occur within the main 300-foot survey buffer and 15.4 miles occur outside of the 300-foot survey buffer[2]. Table 1 details the PSA.

Table 1. TL 695/6971 Rare Plant Project Survey Area

Project Component	Area
Power Line (including 300-foot survey buffer)	393.70 acres
Substations (including 50-foot survey buffer)	
Basilone Substation	1.14 acres
Japanese Mesa Substation	0.28 acres
Talega Substation	7.87 acres
Staging Yards (including 50-foot survey buffer)	
Basilone Staging Yard	1.17 acres
Talega Staging Yard 1 of 2*	3.72 acres
San Mateo Staging Yard	1.31 acres
SONGS Mesa Staging Yard	80.87 acres
SDG&E Lot 4 Staging Yard	1.88 acres
Lemon Grove Staging Yard	2.75 acres
Stringing Sites (including 50-foot buffer)	2.23 acres
TOTAL	**496.90 acres**

Note: *Talega Staging Yard 2 of 2 is a component that was added to the Proposed Project but is located outside of the PSA.

3.0 BACKGROUND

Rare plant surveys were conducted in accordance with the MCB Camp Pendleton BRFI protocol (MCB Camp Pendleton 2015a). Therefore, BRFI biological and occurrence information is emphasized in this document. BRFI is a federally threatened bulbiferous perennial that occurs at elevations between 30 feet and 2,500 feet (United States Fish and Wildlife Service [USFWS] 2009). In San Diego County, occurrences of BRFI are highly correlated with clay soils or clay lens inclusions in a loamy matrix, such as generally occur on mesas and hillsides with gentle to moderate slopes, or in association with vernal pools. These soils are generally vegetated with open native or non-native grassland, open coastal sage scrub, or open coastal sage scrub-chaparral communities (USFWS 2011).

The surface soil layers where MCB Camp Pendleton BRFI populations occur vary greatly and include loam, clay loam, sandy clay loam, sandy clay, and clay. BRFI populations on MCB Camp Pendleton occur in areas with shrink-swell soils where surface cracks are common (MCB Camp Pendleton 2012). The areas on MCB Camp Pendleton with the highest potential to have BRFI exhibit the following features:

- soil series mapped as a clay soil or with a clay subsoil;
- grassland and coastal sage scrub plant communities;
- less than 60 percent slopes;
- all slope aspects (north, south, east, and west); and

[2] Vegetation community data will be subsequently identified and incorporated into this report as it becomes available.

- less than 2,600 feet elevation (MCB Camp Pendleton 2012).

On MCB Camp Pendleton, BRFI typically blooms between April and June (MCB Camp Pendleton 2012). However, during the unusually dry spring of 2015, BRFI was first observed blooming on March 23, the earliest recorded blooming on MCB Camp Pendleton (MCB Camp Pendleton 2015b).

Threats to BRFI include loss of habitat from urbanization and agricultural conversion; alteration of hydrologic conditions and channelization; impacts from livestock grazing; unauthorized off-highway vehicle use; disking for fire suppression; and competition from non-native plants (USFWS 2009).

4.0 METHODS

4.1 Plant Community Data and Classification

Plant community geographic information systems (GIS) data for the project area was provided to Cardno by SDG&E (2015). Plant communities in portions of the project area were not mapped in the GIS (SDG&E 2015). Where plant communities were not mapped, Cardno conducted plant community mapping during the course of rare plant surveys and incorporated this supplemental data[3] into the GIS. Plant communities occurring in the project area are described below. Plant community definitions, classifications, and categories are based on Holland (1986) as updated by Oberbauer et al. (2008) for San Diego County. Respective areas of plant communities within the project area are provided in Section 5.0, Results.

Plant Communities

Grassland

- **Non-native Grassland** (NNG) is dominated by non-native annual grasses and weedy herbaceous forbs. Dominant exotic species include ripgut brome (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), wild oats (*Avena* spp.), wild barleys (*Hordeum* spp.), Italian ryegrass (*Festuca perennis*), filarees (*Erodium* spp.), and soft chess brome (*Bromus hordeaceus*). Areas consisting of NNG typically have experienced past disturbance or are subject to regular disturbance.

Scrub

- **Diegan Coastal Sage Scrub** (DCSS) is the dominant scrub community in coastal southern California. It occurs on dry slopes with clay-rich soils and is typically dominated by California sagebrush (*Artemisia californica*) and other drought-tolerant, woody shrubs including California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), California sunflower (*Encelia californica*), and sages (*Salvia* spp.). This community typically intergrades with grassland communities at lower elevations and chaparral communities at higher elevations.

[3] Although Cardno has modified the GIS to include plant communities within 300-foot buffer around the power line alignment that were not included within the data provided by SDG&E, Cardno did not revise any of the plant community data originally provided by SDG&E.

Riparian/Wetland

- **Mulefat Scrub** (MFS) is a riparian scrub community, with greater than 50 percent ground cover, that typically occurs on coarse alluvial soils in intermittent streambeds and on floodplains. It is generally a species-poor community dominated by mulefat (*Baccharis salicifolia*) and often represents an early seral stage in the establishment of willow- or sycamore-dominated riparian forests. Patches of MFS are typically found along the outer edges of other riparian communities.
- **Non-vegetated Channel** (NVC) is sandy, gravelly, or rocky fringe of waterways or flood channels. Vegetation may exist but is usually less than 10 percent total cover.
- **Southern Sycamore-Alder Riparian Woodland** (SSARW) is a tall, open winter-deciduous streamside woodland dominated by California sycamore (*Platanus racemosa*) and/or white alder (*Alnus rhombifolia*). This community is typically found along very rocky streambeds subject to seasonally high-intensity flooding. Stands of this type seldom form closed canopy woodlands. Primary understory species include blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), and native and non-native grasses.
- **Southern Willow Scrub** (SWS) is a dense, winter-deciduous riparian scrub community with greater than 60 percent ground cover found in loose, sandy, or gravelly alluvium deposited near stream channels. In the project area, it is typically dominated by arroyo willow (*Salix lasiolepis*) and may include other willow species (e.g., western sand bar willow [*Salix exigua*]) and mule-fat). Associated understory species include poison oak, western ragweed (*Ambrosia psilostachya*), and non-native species such as giant reed (*Arundo donax*) and poison hemlock (*Conium maculatum*).
- **Vernal Pool** (VP) includes seasonally flooded depressions that support a distinctive living community adapted to extreme variability in hydrologic conditions (seasonally very dry and very wet conditions).

Upland Woodland

- **Eucalyptus Woodland** (EW) is a type of non-native woodland dominated by large planted or naturalized gum trees (*Eucalyptus* spp.). Very little understory occurs in this community.
- **Coast Live Oak Woodland** (CLO) is a dense woodland community dominated by coast live oak with a closed, or nearly-closed, canopy. This community typically occurs on north facing slopes or shaded canyons and ravines. Common understory species include poison oak, blue elderberry (*Sambucus nigra* ssp. *caerulea*), laurel sumac, and toyon (*Heteromeles arbutifolia*).

Disturbed/Developed

- **Disturbed Habitat** (DIS) is where past or present physical disturbance is prevalent such that an area is no longer recognizable as a native or naturalized vegetation association. Typically, if vegetation is present, it is nearly exclusively composed of non-native plant species that take advantage of the disturbance. Examples of disturbed land include areas that have been disked or graded, and/or experienced repeated use that prevents natural revegetation; recently cleared firebreaks; construction staging areas; off-road vehicle trails; and old building sites.
- **Urban/Developed** (DEV) areas do not support native vegetation and are characterized by permanent or semi-permanent structures. Examples include buildings, parking lots, pavement, concrete, freeways, maintained dirt roads, and railways.

4.2 Field Investigations

Reconnaissance level field surveys were conducted throughout the project area for all potential rare plants. Surveys were conducted within suitable habitat throughout the PSA, including areas that were not included within the GIS data provided by SDG&E. Focused surveys for BRFI were conducted according to the *Brodiaea filifolia* Inventory Protocol prepared by the MCB Camp Pendleton Environmental Security Department, Land Management Section (MCB Camp Pendleton 2015a). Potential BRFI habitat GIS data was provided by SDG&E (2015). Areas of plant communities occurring within potential BRFI habitat are provided in Table 2. During the course of surveys, Cardno biologists identified areas that were categorized as potential BRFI habitat in the GIS (SDG&E 2015), but that did not contain suitable BRFI habitat; therefore, such areas were not surveyed. These excluded areas identified by Cardno biologists are described below and are shown on figures in Appendix B.

Table 2. Area Identified as Potential BRFI Habitat

Plant Community	Area
DCSS	163.6 acres
NNG	7.5 acres
TOTAL	**171.1 acres**

Source: SDG&E 2015.

All suitable BRFI habitats within the project area were surveyed at least every 2 weeks for three complete surveys. Survey teams were led by Cardno biologists (primary surveyors) and were supported by Cardno global positioning system (GPS)/biological technicians. Table 3 presents the complete list of BRFI survey team members.

Table 3. Cardno Rare Plant Surveyors

Surveyor Name	Surveyor Duty
Clint Scheuerman (CS)	Biologist – Primary Surveyor
Richard Stolpe (RS)	Biologist – Primary Surveyor
Melissa Tu (MT)	Biologist – Primary Surveyor
Shannon Brown (SB)	GPS/Biological Technician
Caitlin Jafolla (CJ)	GPS/Biological Technician

Surveys were initiated on March 31, 2015, following notification by MCB Camp Pendleton Environmental Security on March 23, 2015 that the BRFI flowering season had begun. The final survey took place on May 21, 2015. See Table 4 for complete survey details.

Note: Initially there were areas mapped as vernal pools but when the Cardno vernal pool biologist visited the sites, they were not in fact vernal pools.

Table 4. TL695/6971 Rare Plant Survey Details

Survey	Date	Survey Team	Surveyors	Project Area Component
1	March 31	5-person team	CS, RS, MT, CJ, SB	Main Survey Area
1	April 1	2-person team	CS, SB	Access Roads
1	April 2	4-person team	CS, SB, CJ, RS	Main Survey Area
1	April 3	2-person team	CS, SB	Access Roads
1	April 6	4-person team	CS, SB, RS, CJ	Main Survey Area
1	April 7	4-person team	CS, SB, RS, CJ	Main Survey Area
1	April 9	2-person team	CS, SB	Access Roads
2	April 14	3-person team	CS, CJ, SB	Main Survey Area
2	April 15	2-person team	CS, SB	Access Roads
2	April 16	4-person team	CS, SB, RS, CJ	Main Survey Area
2	April 17	2-person team	CS, SB	Access Roads
2	April 20	4-person team	CS, SB, RS, CJ	Main Survey Area
2	April 21	3-person team	CS, SB, RS	Main Survey Area
2	April 23	2-person team	CS, SB	Access Roads
3	April 28	4-person team	CS, SB, RS, CJ	Main Survey Area
3	April 29	2-person team	CS, SB	Access Roads
3	April 30	4-person team	CS, SB, RS, CJ	Main Survey Area
3	May 1	2-person team	CS, SB	Access Roads
3	May 4	2-person team	CS, SB	Main Survey Area
3	May5	3-person team	CS, SB, RS	Main Survey Area
3	May 21	2-person team	CS, CJ	Main Survey Area and Access Roads

All surveys were completed by teams of two to five surveyors walking parallel transects within suitable BRFI habitat in the project area. Surveyors were spaced 15 feet apart per the 100 percent survey methodology required by MCB Camp Pendleton (2015a). Transects were mapped using GPS units with sub-meter level accuracy receivers (one surveyor in each survey team carried the GPS unit at the end of the transect team). Each surveyor walked while in visual and verbal communication with the other surveyor(s) to confirm coverage of the area while collecting streaming GPS data for the transect lines. Transects were conducted in a parallel fashion where possible. However, because of the linear nature of the survey area through many areas of rough, mountainous terrain, transect routes were often conducted in a meandering fashion to provide full coverage of suitable habitat. The resulting transect lines were incorporated into GIS layers. Appendix B shows the BRFI transect lines for all three survey events. GPS transect data is to be provided separately on a compact disc. GPS data was stored in California State Plane, Zone VI coordinates, North America Datum of 1983, United States Survey Feet measure.

Transects were restricted to the survey area. However, populations of all rare plants observed within the project area were mapped to their full extent, including those portions that extended outside of the buffers. In addition, populations that were incidentally observed outside of the project area buffer during surveys were mapped. Consistent with MCB Camp Pendleton rare plant mapping procedures (MCB Camp Pendleton 2015a), populations of rare plants were mapped using a 23-foot minimum polygon rule. All rare plants of the same species occurring within 23 feet of each other were mapped as, and considered to be, one population. Any plant(s) that occurred more than 23 feet from another population was mapped as a separate population.

As discussed above, Cardno biologists determined that some areas categorized as containing suitable habitat for BRFI did not in fact contain suitable habitat, and therefore surveys were not conducted in these areas. These areas, described below, included dense stands of scrub communities (e.g., DCSS with no herb layers) (Photo 1), dense stands of NNG-broadleaf dominated (Photo 2), riparian stands, highly disturbed areas (e.g., roads, mowed areas), and steep areas having slopes of approximately 60 percent or greater.

Dense stands of scrub communities, primarily DCSS, often completely dominated by woody shrubs and subshrubs that contain little to no herbaceous understory and are more or less impassable on foot, were not surveyed (Photo 1). Many of these areas were dominated by sclerophyllous species such as lemonade berry (*Rhus integrifolia*) and laurel sumac. However, all areas where grasslands intergraded with such habitats (i.e., where understories were present) were surveyed. Also, all grassland patches within and amongst dense scrub communities were surveyed.



Photo 1. Example Dense DCSS Stand that was not Surveyed

Dense stands of NNG-broadleaf dominated, often found bordering and/or within grassland communities and that are entirely dominated by one or more herbaceous, broad-leaved exotic species, were not surveyed (Photo 2). The dominance of broadleaved exotics reflects previous disturbance, and within these habitat patches, the extreme density of exotic species and associated plant litter typically prevents the establishment of understory species. Areas that that were only partially dominated by non-native, broad-leaved species were fully surveyed.



Photo 2. Example Dense NNG-Broadleaf Dominated Stand that was not Surveyed

Riparian stands typically occurring in bottomlands and/or along aquatic systems and dominated by willows (*Salix* spp.), mule-fat, and other riparian trees and shrubs were not surveyed. Fringe riparian areas that bordered suitable habitat were surveyed up until vegetation became too dense for BRFI.

Highly disturbed areas, including roads, man-made structures, and habitats altered to the point that native vegetation no longer persists there, were not surveyed.

Steep areas having slopes of approximately 60 percent or greater were excluded for safety reasons and because BRFI is not known to occur on such slopes.

5.0 RESULTS

This section presents the 2015 TL 695/6971 rare plant survey results. Prior to surveys, a list of rare plants potentially occurring within the project area based on potential suitable habitat was provided to Cardno by SDG&E so that these species would also be included in the survey. As discussed above in Section 1.0, Introduction, those species included BRFI, many-stemmed dudleya (*Dudleya multicaulis*), Palmer's grapplinghook (*Harpagonella palmeri*), Pendleton button celery (*Eryngium pendletonense*), and variegated dudleya (*Dudleya variegata*), of which only BRFI was observed in the project area. All rare plant observations are described below. A complete list of all plant species encountered within the project area is provided in Appendix C.

5.1 BRFI Populations and Plant Community Mapping

Four populations of BRFI were observed during TL 695/6971 rare plant surveys. In accordance with MCB Camp Pendleton protocol, the project area was surveyed once every 2 weeks for a total of three complete survey events (MCB Camp Pendleton 2015a). Once BRFI populations were located and documented, they were revisited during subsequent survey events and numbers of individuals were counted. Table 5 presents the BRFI populations observed during 2015 surveys.

Table 5. BRFI Populations Observed in 2015

BRFI Population	Location	Appendix B Figure #	# of Individuals (Phenology[1])			Max. #
			Survey Event 1	Survey Event 2	Survey Event 3	
01	33.4424° N -117.5789° W	B-12	54 (21 FB, 33 FL)	257 (FL)	61 (58 FR, 3 S)	257
02	33.4245° N -117.5765° W	B-22	123 (21 FB, 102 FL)	281 (103 FL, 178 FR)	54 (26 FR, 28 S)	281
03	33.4210° N -117.5810° W	B-25	116 (15 FB, 101 FL)	60 (3 FL, 57 FR)	19 (3 FR, 16 S)	116
04	33.4430° N -117.5809° W	B-12	NO	39 (3 FB, 36 FL)	43 (33 FL, 10 FR)	43

Notes: [1]Phenology (phase of plant's life cycle): FB = flower bud, FL = flowering, FR = fruiting, S = senescent; NO = not observed.

As described in Section 4.0, Methods, plant community GIS data for the project area was provided to Cardno by SDG&E (2015). Where there were gaps in plant community GIS data, Cardno mapped plant communities during the course of rare plant surveys. Areas of plant communities within the project area are provided in Table 6.

Locations of all BRFI populations observed during surveys are presented on figures in Appendix B. Habitat data for each BRFI population is presented in Tables 7-10, which are derived from and based on the standards of *Data Sheet for Rare Plant Points and Polygons* (MCB Camp Pendleton 2015a) (Appendix A).

5.2 Other Rare Plants Observed During Surveys

A number of CNPS CRPR List 4 (plants of limited distribution, a watch list) plant species were observed within the survey area; these species are described below. Datasheets were not completed for the List 4 species.

California boxthorn (*Lycium californicum*) is a CRPR 4.2 (limited distribution) shrub that occurs in coastal shrub communities throughout coastal southern California. One fairly large population was observed (roughly one hundred individuals) on the south side of Cristianitos Road in an area of sparse DCSS with sandy soil that had multiple, deep erosional channels running through it (Appendix B, Figure B-27).

Coulter's matilija poppy (*Romneya coulteri*) is a CRPR 4.2 (limited distribution) perennial herb that is endemic to California. One population of approximately 150 individuals was observed on the south side of Basilone Road, just north of San Onofre Creek in sparse DCSS. This population is vouchered in the Consortium of California Herbaria (2015) and is documented as potentially being one of the only natural populations of this species in San Diego County (Appendix B, Figure B-49).

Paniculate tarweed (*Deinandra paniculata*) is a CRPR 4.2 (limited distribution) annual herbaceous species that occurs in grassland communities in southern California. This species was observed in several locations in populations ranging from single individuals to hundreds of individuals. It was typically observed in NNG and was often in disturbed areas, particularly along the side of dirt roads (Appendix B, Figures B-3, B-4, B-11, B-12, B-17, B-67, and B-68).

Table 6. Plant Communities in the TL 695/6971 Project Area

Plant Community	Area (Acres)											
	Power Line	*Substations*			*Staging Yards*						*Stringing Sites*	***TOTAL***
		Basilone	*Japanese Mesa*	*Talega*	*Basilone*	*Talega 1 of 2*	*San Mateo*	*SONGS Mesa*	*SDG&E Lot 4*	*Lemon Grove*		
Grassland												
Non-native Grassland	6.30	0.00	0.00	0.17	0.00	2.63	0.00	0.00	0.00	0.0	0.06	9.16
Subtotal	**6.30**	**0.00**	**0.00**	**0.17**	**0.00**	**2.63**	**0.00**	**0.00**	**0.00**	**0.0**	**0.06**	**9.16**
Scrub												
Diegan Coastal Sage Scrub	226.18	0.00	0.07	2.08	0.00	0.00	0.13	0.05	0.00	0.0	0.41	228.92
Subtotal	**226.18**	**0.00**	**0.07**	**2.08**	**0.00**	**0.00**	**0.13**	**0.05**	**0.00**	**0.0**	**0.41**	**228.92**
Riparian/Wetland												
Mulefat Scrub	7.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.15	7.23
Non-vegetated Channel	1.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	1.45
Southern Sycamore-Alder Riparian Woodland	12.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	< 0.01	12.13
Southern Willow Scrub	8.87	0.00	0.00	0.00	0.00	0.00	< 0.01	0.00	0.00	0.0	< 0.01	8.87
Subtotal	**29.53**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**< 0.01**	**0.00**	**0.00**	**0.0**	**0.16**	**29.68**
Upland Woodland												
Eucalyptus Woodland	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0	0.00	0.37
Coast Live Oak Woodland	0.01	0.00	0.00	0.03	0.00	0.15	0.00	0.00	0.00	0.0	0.00	0.19
Subtotal	**0.38**	**0.00**	**0.00**	**0.03**	**0.00**	**0.15**	**0.00**	**0.00**	**0.00**	**0.0**	**0.00**	**0.56**
Disturbed/Developed												
Disturbed Habitat	75.87	0.00	0.00	0.00	0.00	0.93	0.05	0.00	0.00	0.0	0.47	77.32
Urban/Developed	55.46	1.14	0.21	5.59	1.17	0.00	1.13	80.81	1.88	2.75	1.13	151.25
Subtotal	**131.33**	**1.14**	**0.21**	**5.59**	**1.17**	**0.93**	**1.18**	**80.81**	**1.88**	**2.75**	**1.60**	**228.67**
TOTAL	**393.70**	**1.14**	**0.28**	**7.86**	**1.17**	**3.72**	**1.31**	**80.87**	**1.88**	**2.75**	**2.23**	**496.90**

Sources: Cardno 2015, SDG&E 2015.
Notes: Talega Staging Yard 2 of 2 is a component that was added to the Proposed Project but is located outside of the PSA.

San Diego County viguiera (*Viguiera laciniata*) is a CRPR 4.2 (limited distribution) shrub that occurs in chaparral and coastal sage scrub in coastal southern California. A large population of hundreds of individuals was observed on the slopes surrounding the Talega Substation. It appears that the species was planted in this location, as there is irrigation equipment throughout the area (Appendix B, Figure B-4).

Western dichondra (*Dichondra occidentalis*) is a CRPR 4.2 (limited distribution) perennial herb that occurs in chaparral, grasslands, woodlands, and coastal sage scrub in coastal southern California. A single population of approximately 250 individuals was observed in sparse DCSS and VNG (Appendix B, Figure B-34).

Table 7. BRFI 01 Habitat Data

Habitat Type	Grasslands	**Plant Community**	Non-native Grassland
Soil Texture	Clay Loam	**Aspect**	SSE 1-4 percent
Disturbance Type(s)	Exotic Plants Predominant	**Disturbance Level**	Low
Disturbance History	Recent		
Notes	None		

Associated Plants

Species Name	Absolute percent Cover	Dominance Order	Dominant?	Native?
Herb				
Bromus hordeaceus	40	2	Y	N
Stipa pulchra	3	6	N	Y
Brassica nigra	5	5	N	N
Avena fatua	75	1	Y	N
Bloomeria crocea	10	4	N	Y
Centaurea melitensis	20	3	N	N
Deinandra fasciculata	10	4	N	Y
Brodiaea filifolia	3	6	N	Y
Total Herb Cover:	163			
50/20 Thresholds: 50 percent of total cover =	0.50 x 163 = ___**81.5**___ percent			
20 percent of total cover =	0.20 x **163** = ___**32.6**___ percent			
Shrub				
Baccharis pilularis	5	5	Y	Y
Total Shrub Cover:	5			
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
	0.20 x _____ = _____ percent			
Tree				
Total Tree Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
20 percent of total cover =	0.20 x _____ = _____ percent			



Photo 3. BRFI 01 Habitat

Table 8. BRFI 02 Habitat Data

Habitat Type	Grasslands	**Plant Community**	Non-native Grassland
Soil Texture	Clay Loam	**Aspect**	SE 3 percent
Disturbance Type(s)	Exotic Plants Predominant	**Disturbance Level**	Low
Disturbance History	Recent		
Notes	None		

Associated Plants

Species Name	Absolute percent Cover	Dominance Order	Dominant?	Native?
Herb				
Avena fatua	80	1	Y	N
Brassica nigra	15	3	N	N
Bromus diandrus	40	2	Y	N
Brodiaea filifolia	5	4	N	Y
Foeniculum vulgare	3	5	N	N
Deinandra fasciculata	1	6	N	Y
Total Herb Cover:	144			
50/20 Thresholds: 50 percent of total cover =	0.50 x 144 = ___72___ percent			
20 percent of total cover =	0.20 x **144** = ___28___ percent			
Shrub				
Total Shrub Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
	0.20 x _____ = _____ percent			
Tree				
Total Tree Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
20 percent of total cover =	0.20 x _____ = _____ percent			



Photo 4. BRFI 02 Habitat



Photo 5. BRFI 02

Table 9. BRFI 03 Habitat Data

Habitat Type	Grasslands	**Plant Community**	Non-native Grassland
Soil Texture	Clay Loam	**Aspect**	SSW 10 percent
Disturbance Type(s)	Exotic Plants Predominant, Road Affecting Population	**Disturbance Level**	Low
Disturbance History	Recent		
Notes	Scraped foot trail is only a couple feet away, potentially affecting population.		

Associated Plants

Species Name	Absolute percent Cover	Dominance Order	Dominant?	Native?
Herb				
Avena fatua	80	1	Y	N
Brassica nigra	5	3	N	N
Bromus diandrus	25	2	Y	N
Brodiaea filifolia	5	3	N	Y
Total Herb Cover:	115			
50/20 Thresholds: 50 percent of total cover =	0.50 x 115 = ___57.5___ percent			
20 percent of total cover =	0.20 x 115 = ___23___ percent			
Shrub				
Total Shrub Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
	0.20 x _____ = _____ percent			
Tree				
Total Tree Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
20 percent of total cover =	0.20 x _____ = _____ percent			



Photo 6. BRFI 03 Habitat



Photo 7. BRFI 03

Table 10. BRFI 04 Habitat Data

Habitat Type	Grasslands	**Plant Community**	Non-native Grassland
Soil Texture	Clay Loam	**Aspect**	SSE 4 percent
Disturbance Type(s)	Exotic Plants Predominant	**Disturbance Level**	Low
Disturbance History	Recent		
Notes	None		

Associated Plants

Species Name	Absolute percent Cover	Dominance Order	Dominant?	Native?
Herb				
Avena fatua	65	1	Y	N
Brassica nigra	5	3	N	N
Bromus diandrus	35	2	Y	N
Brodiaea filifolia	3	4	N	Y
Dichelostemma capitatum	3	4	N	Y
Total Herb Cover:	111			
50/20 Thresholds: 50 percent of total cover =	0.50 x 163 = ___**55.5**___ percent			
20 percent of total cover =	0.20 x **163** = ___**22.2**___ percent			
Shrub				
Total Shrub Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
	0.20 x _____ = _____ percent			
Tree				
Total Tree Cover:				
50/20 Thresholds: 50 percent of total cover =	0.50 x _____ = _____ percent			
20 percent of total cover =	0.20 x _____ = _____ percent			



Photo 8. BRFI 04 Habitat



Photo 9. BRFI 04

6.0 DISCUSSION

Four populations of BRFI were observed and documented in and/or adjacent to the TL 695-6971 project area. Five other rare plant species (CRPR 4.2) were observed in the project area. All rare plant species documented and/or mapped in this report, and the habits in which they occur, should be avoided to the maximum extent possible during project planning, development, and construction.

7.0 REFERENCES

Cardno. 2015. Geographic Information System Plant Community Data Layers.

Consortium of California Herbaria. 2015. Specimen Number SD221677. http://ucjeps.berkeley.edu/cgi-bin/new_detail.pl?accn_num=SD221677&YF=1. Accessed June 18.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California Resources Agency, Department of Fish and Game, Sacramento, CA. October.

MCB Camp Pendleton. 2012. Marine Corps Base Camp Pendleton Integrated Natural Resources Management Plan. http://www.pendleton.marines.mil/StaffAgencies/EnvironmentalSecurity/NaturalResourcesManagementPlan.aspx.

MCB Camp Pendleton. 2015a. *Brodiaea filifolia* Inventory Protocol. Marine Corps Base Camp Pendleton, Environmental Security Department, Land Management Section. March.

MCB Camp Pendleton. 2015b. Personal communication via email from G. Kenney (MCB Camp Pendleton Rare Plant and Vegetation Ecologist) to C. Scheuerman (Cardno Biologist). March 23.

Oberbauer, T., M. Kelly, and J. Buegge. 2008. Draft Vegetation Communities of San Diego County. Based on "Preliminary Descriptions of the Terrestrial Natural Communities of California" prepared by Robert F. Holland, Ph.D. (October 1986). March.

SDG&E. 2015. Geographic Information System Data Layers.

USFWS. 2009. *Brodiaea filifolia* (thread-leaved brodiaea) 5-Year Review: Summary and Evaluation. Carlsbad Fish and Wildlife Office. Carlsbad, California. August 13.

USFWS. 2011. Endangered and Threatened Wildlife and Plants; Final Revised Critical Habitat for Brodiaea filifolia (Thread-Leaved Brodiaea), Final Rule. 76 *Federal Register* 26 (February 8, 2011): 6848-6925.

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APPENDIX A

MCB Camp Pendleton Brodiaea filifolia Inventory Protocol and Data Sheet for Rare Plant Points and Polygons

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Brodiaea filifolia Inventory Protocol
Marine Corps Base Camp Pendleton
Environmental Security Department
Land Management Section
March 2015

1. TECHNICAL REQUIREMENTS

A. The surveyors shall have five years of experience with rare plant inventory and monitoring and a minimum of a Bachelor's degree in ecology, botany, biology or related field. The surveyors shall have at least one field season of experience surveying for the presence of *Brodiaea filifolia*. Staff shall possess the ability to distinguish *Brodiaea filifolia* from other similar species such as Kern brodiaea (*Brodiaea terrestris* ssp. *kernensis*), harvest brodiaea (*Brodiaea elegans* ssp. *elegans*), Orcutt's brodiaea (*Brodiaea orcuttii*), blue-eyed-grass (*Sisyrinchium bellum*), and blue dicks (*Dichelostemma capitatum*). All of these species are known to occur on the Base, except for harvest brodiaea. The resumes of all surveyors will be provided to the Land Management Section for approval prior to surveys.

B. The Contractor must have sufficient qualified staff to inventory all acreage within the short *Brodiaea filifolia* blooming period.

2. INVENTORY FOR PROJECT CLEARANCE

A. **Timing:** Land Management Section will visit two reference populations starting in mid-April to determine the appropriate inventory window. The southern population is in the Juliet Training Area and the central population is in the Oscar Two Training Area. *Brodiaea filifolia* blooms later than Kern brodiaea (*Brodiaea terrestris* ssp. *kernensis*); therefore, do not use it as a surrogate for determining the inventory window. An e-mail will be sent out to various contractors, U.S. Fish and Wildlife Service (USFWS), NAVFAC Southwest, and NAVFAC Atlantic when *Brodiaea filifolia* is observed. Any surveys completed for *Brodiaea filifolia* prior to this time will be invalid. This plant is a late spring to early summer blooming species with a short blooming window, typically mid-April through early-June. The three survey events will be conducted when *Brodiaea filifolia* is in bloom and overcast days will be avoided.

B. **Methods:** Inventory of *Brodiaea filifolia* for project clearance requires a 100% survey methodology in order to be accepted by the USFWS. The survey area will be surveyed once every two weeks for a minimum of three complete visits. The percent cloud cover and air temperature at the start and end of each survey date will be recorded and provided in the report as a table.

- **a. Transect Routes:** The inventory team members will walk parallel transects and each surveyor will be no more than 15 feet apart from each other. In portions of the inventory area where access is difficult, such as areas of relatively dense vegetation and/or steep slopes, care must be taken to ensure all accessible clearings are surveyed and the transect width can be expanded in these areas. For particularly large survey areas, the site can be divided into segments and those segments would be surveyed in the same order on subsequent survey events. The surveys during each survey event must be completed on consecutive dates, unless there is a conflict with Range Scheduling or there is inclement weather. All surveys must be performed when *Brodiaea filifolia* is in bloom. The survey routes from survey events 1, 2, and 3, along with the number of people that walked each transect, shall be documented with Geographical Positioning System (GPS) units that have sub-meter level of accuracy. This means that the GPS will collect streaming data as the botanists walk, rather than just collecting data at the beginning and end points of each transect. The transect routes from survey events 1, 2, and 3 shall be provided to the Land Management Section as a Geographical Information System (GIS) layer. It is expected

that the transect GIS dataset will appear as the parallel, naturally walked transect routes covering the entire survey area.

b. Surveyed and Excluded Areas: The GIS files and the report will clearly show the areas that were surveyed according to this protocol, and it will show the areas that were not surveyed and the reason for their exclusion (e.g., developed areas, dirt roads, riparian areas, etc.).

c. Population Boundaries: The population boundaries of all sensitive plants will be mapped using a GPS that has sub-meter level of accuracy. *Brodiaea filifolia* population boundaries will be mapped during each survey event. Sensitive plants will be mapped using the 7-meter mapping rule for each survey event. In other words, all plants located within 7 meters of each other would be considered one population, and plants located outside of the 7 meters would be a separate population. The GIS submittal to the Land Management Section will show the boundaries of the *Brodiaea filifolia* populations for each survey event and any other incidental sensitive plant populations.

d. Population Estimate: The number of *Brodiaea filifolia* individuals at each point and polygon location will be counted during each site visit and included in the GIS files as the pop_count. For large polygons that are difficult to count, the number of individuals within a polygon will be estimated by laying a one-meter-wide belt transect across the longest axis of the population polygon for each of the three visits. The highest number of individuals from the three visits will be used for the final population number for a particular point or polygon location and will be included in the GIS files as the plant_num (e.g, if 3 individuals were observed during survey event 1 in a particular *Brodiaea filifolia* population, 6 were observed in that population during survey event 2, and 4 were observed in that population during survey event 3, then the highest number observed for this particular population during the three survey events is 6). A table will be included in the results section of the report. The first column will include all *Brodiaea filifolia* populations within the survey area according to the 7-meter mapping rule, the next three columns will be the pop_count for survey events 1, 2, and 3, and the fifth column will show the highest number of individuals from the three visits (i.e., plant_num). In addition, the phenology of the *Brodiaea filifolia* plants will be estimated and provided in the GIS submittal. This includes the number of individuals in the vegetative stage, flower bud stage, flowering stage, fruiting and seed dispersal stage, and senescent stage (i.e., finished flowering and seed dispersal).

e. Field Data Collection: Field data for the sensitive plant populations shall include, but are not limited to, the following:

- **Date:** date the individuals were observed
- **Population Count:** total number of individuals
- **Phenology:** number of individuals in the vegetative stage, flowering bud stage, flowering stage, fruiting/seed dispersal stage, and senescent stage
- **Vegetation Community:** vegetation type following the most recent Vegetation Communities of San Diego County by Oberbauer

- **Dominant Plant Species:** The dominate plant species' scientific names listed in order of dominance using the nomenclature in The Jepson Manual, 2nd Edition. Dominant species shall be determined based on a 50/20 dominance rule per stratum, which is described in the United States Army Corps of Engineers Arid West Supplement (Page 22, Procedure for Selecting Dominant Species by the 50/20 Rule). An example table is provided below:

Stratum	Species Name	Absolute Percent Cover	Dominant?
Herb	*Ambrosia psilostachya*	3%	Yes
	Distichlis spicata	3%	Yes
	Bromus diandrus	2%	No
	Polypogon monspeliensis	2%	No
	Sisyrinchium bellum	1%	No
	Total Herb Cover	**11%**	
	50/20 Thresholds: 50% of total cover = 20% of total cover =	 0.50 x 11 = 5.5% 0.20 x 11 = 2.2%	
Shrub	*Artemisia californica*	10%	Yes
	Eriogonum fasciculatum	5%	Yes
	Isocoma menziesii	2%	No
	Total Shrub Cover	**17%**	
	50/20 Thresholds: 50% of total cover = 20% of total cover =	 50% x 17 = 8.5% 20% x 17 = 3.4%	
	Dominant species across all strata in order of dominance: *Artemisia californica, Eriogonum fasciculatum, Ambrosia psilostachya, Distichlis spicata*		

- **Abundance Codes:** A numerical value between 1 and 3 assigned to each dominant plant species based on absolute percent cover:
  1 = 1 to 33% cover
  2 = 34 to 67% cover
  3 = 68 to 100% cover
- **Vegetation Community:** The vegetation type following the most recent Vegetation Communities of San Diego County by Oberbauer.
- **Soil Texture:** Soil texture testing shall be conducted in each BRFI population using a "Simplified Key to Soil Texture" (Brewer and McCann 1982). State in the report and GIS if the soil texture agrees with the mapped Natural Resources Conservation Service (NRCS) soil type.

Simplified Key to Soil Texture (Brewer and McCann, 1982):
Place about three teaspoons of soil from the upper soil horizon in the palm of your hand. Take out any particles >2mm in size, moisten soil to saturation, and use the following key to figure out the soil texture

A1 Soil does not remain in a ball when squeezed ..... **sand**
A2 Soil remains in a ball when squeezed ..... B

B1 Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you push up over your finger. Soil makes no ribbon ..... **loamy sand**
B2 Soil makes a ribbon; may be very short C

C1 Ribbon extends less than 1" before breaking ..... D
C2 Ribbon extends 1" or more before breaking ..... E

D1 Add excess water to small amount of soil; soil feels at least slightly gritty ..... **loam or sandy loam**
D2 Soil feels smooth ..... **silt loam**

E1 Soil makes a ribbon that breaks when 1-2" long; cracks if bent into a ring ..... F
E2 Soil makes a ribbon more than 2" long; doesn't crack when bent into a ring ..... G

F1 Add excess water to small amount of soil; soil feels at least slightly gritty .. **sandy clay loam or clay loam**
F2 Soil feels smooth ..... **silty clay loam or silt**

G1 Add excess water to a small amount of soil; soil feels at least slightly gritty ..... **sandy clay or clay**
G2 Soil feels smooth ..... **silty clay**

- **Aspect:** Aspect will be identified using the cardinal points of a compass, along with descriptive information regarding the slope. Examples, Flat, N (steep, rocky cliffs), NW (very steep cliff-faces), S (almost vertical cliffs).
- **Disturbance Type:** New or historical disturbance impacting the species shall be recorded according to the following disturbance codes/types:

Disturbance Code	Disturbance Type	Description
0	**No Disturbance**	No other disturbance types from this list can be assigned to a given population.
1	**Fill**	Population is observed to be growing in imported (or "fill") soils due to development or dumping.
2	**Tire Ruts**	Tire ruts are seen within or near a population and these ruts are determined to have the potential to impact the population either directly or via modifications to local hydrology.
3	**Scraped Mounds**	Population is observed to be growing in an area where the local topography of mima mounds have been scraped or altered in some way.
4	**Trash/Dumping**	A significant quantity of debris (anthropogenic source) is observed within or near the population.

<table>
<tr><th>Disturbance Code</th><th>Disturbance Type</th><th>Description</th></tr>
<tr><td>5</td><td>Exotic Plants Predominant</td><td>Population is observed to be growing in an area with a >50% proportion of non-native dominant species. For example, if there is one native dominant species and one non-native dominant species in an area, and they add to 60% total cover, then the non-native dominant would have to have an absolute cover greater than 30% (or half of the total cover comprised by dominants as determined by the 50/20 rule) to qualify for this disturbance type. Use the following table:
<table>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td>Total Cover of Dominant Plants* from Assoc. Plants Table</td><td>Divide the value in Column 1 by 2</td><td>Cover of Dominant Native Plants*</td><td>Cover of Dominant Non-native Plants*</td><td>Exotic Plants Predominant? (value for Column 4 must be greater than the value for Column 2)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>6</td><td>Fire</td><td>Population tion is observed to be growing in an area affected by fire within a recent enough timeframe to still observe the fire’s effects.</td></tr>
<tr><td>7</td><td>Excavated Area</td><td>Population is observed to be growing in an excavated area, or if the population is determined to have been altered by nearby excavation.</td></tr>
<tr><td>8</td><td>Road Affecting Population</td><td>Population is observed to be growing in a road or trail, or if the population is determined to have been altered by nearby road or trail.</td></tr>
<tr><td>9</td><td>Scraped Area</td><td>Population is observed to be growing in a scraped area, or if the population is determined to have been altered by nearby scraping.</td></tr>
<tr><td>10</td><td>Mowing</td><td>Population is observed to be growing in an area that is mowed.</td></tr>
<tr><td>11</td><td>Thatch</td><td>This value is assigned if a population is observed to be growing in dense thatch.</td></tr>
<tr><td>12</td><td>Vehicle Activity</td><td>Population is observed to be growing in an area affected by off-road vehicles.</td></tr>
<tr><td>13</td><td>Firebreak</td><td>Population is observed to be growing in an area affected by firebreak grading, disking, mowing, or erosion.</td></tr>
<tr><td>14</td><td>Grazing</td><td>Population is observed to be growing in an area affected grazing by livestock (e.g., horses, cattle, sheep).</td></tr>
<tr><td>15</td><td>Small Mammal Soil Disturbance</td><td>Population is observed to be growing in an area affected by small mammals.</td></tr>
<tr><td>16</td><td>Erosion</td><td>Population is observed to be growing in an area affected by erosion.</td></tr>
<tr><td>17</td><td>Argentine Ants</td><td>Population growing in an area with argentine ants.</td></tr>
<tr><td></td><td></td><td>List any other disturbance types observed that do not fit any of the above categories.</td></tr>
</table>

- **Disturbance Level:**

Disturbance Level	Number of Disturbances	Description
Negligible	0–1 disturbances	The area does not have any disturbance affecting the BRFI population or negligible disturbances. If the area has 2 or more disturbances, a negligible disturbance level cannot be assigned.

Disturbance Level	Number of Disturbances	Description
Low	1–3 disturbances	The disturbance(s) slightly affect the BRFI population. If the area has 4 or more disturbances, a low disturbance level cannot be assigned.
Moderate	1–4 disturbances	The disturbance(s) is/are determined to have current or potential impacts to the BRFI population that may result in minor fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.
High	1 or more disturbances	The disturbance(s) is/are determined to cause severe impacts to the BRFI population resulting in fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.

- **Disturbance History:**

Disturbance History	Description
Recent	A disturbance occurring within the current or previous growing season.
Historical	A disturbance occurring more than one growing season ago.
NA	Not applicable.

- **Status:**

Status	Description
New	If the observed individual is not within 7 meters of a known population from the Base GIS data set, then this observed individual would be categorize as "New".
Historic	If the observed individual is within 7 meters of a known population from the Base GIS data set, then this individual would be categorized as "Historic".

- **Surveyors:** The names of the surveyor(s) shall be provided in the report and the GIS data set.
- **Photographs:** Photographs shall be provided of each special-status species observed within the survey area.

C. <u>Range Control</u>: The inventory crew must obtain a Range Facility Management Support System (RFMSS) reservation for the training area two weeks in advance and try every available day of that week to enter the training area if scheduling is difficult. One member of the survey team must be Range Safety Officer (RSO) certified. The RSO will checkout a radio from the Base and will keep in contact with Longrifle.

4. GPS AND GIS DATA DICTIONARIES

A. <u>GPS and GIS</u>: The Base GIS flora data dictionary is standardized for *Brodiaea filifolia.* It requires the collection of certain data in a certain format. This information could be entered into the GPS unit for easy upload into the GIS database. The following table shows the portions of the *Brodiaea filifolia* GIS flora data dictionary related to collection of field data for rare plant point and polygon locations.

Attribute Name	Description	Example Values
Rare Plant Populations (flora_special_species_area and flora_special_species_point):		
species_id	Primary Key. A unique, user defined identifier for each record or instance of an entity. [Format should include keyword given by CPEN (rp), four digit year of survey, abbreviated agency/contractor name (lowercase), and unique ID. Add enough leading zeros to the unique IDs so they all have the same number of digits.] (Text, 20)	rp_2010_aecom_01
feat_name	Scientific name of species observed. (Text, 30)	Brodiaea filifolia
pop_date	The date on which the population count was made. Format for date is YYYYMMDD. (Long, 4)	20100512
pop_count	Number of individuals observed at this location on this pop_date. Collect this information for each survey event. (Long, 4)	3
vegetative	The number of individuals in the vegetative stage. (Double)	0
flower_bud	The number of individuals with flower buds. (Double)	2
flowering	The number of individuals flowering. (Double)	1
fruiting	The number of individuals fruiting and setting seed. (Double)	0
senescent	The number of individuals that have finished flowering, fruiting, and setting seed. (Double)	0
hab_typ_d	Applicable domain coded values include: CHAPARRAL, CLEARING, CLIFF, COASTAL, CULTIVATED FIELD, DUNE, ESTUARINE, FOREST, GRASSLANDS, LAKE, LOWLAND, MARSH, MEADOW, NEARSHORE, OAK_WOODLAND, OTHER, POND, RIPARIAN, RIPARIAN_SCRUB, RIPARIAN_WOODLAND, RIPARIAN_FOREST, RIVER, SAGE_SCRUB, SHOAL, SHORE_ZONE, STREAM, SWAMP, SYCAMORE_GRASSLAND, UNVEG_SAND, UPLAND, URBAN_LAND, VEG_SAND, VERNAL_POOL, WETLANDS. (Text, 16, Uppercase)	GRASSLANDS
plant_comm	The vegetation type. Follow most recent Vegetation Communities of San Diego County by Oberbauer. (Text, 75)	Non-native Grassland: Broadleaf-dominated

<table>
<tr><th>Attribute Name</th><th>Description</th><th>Example Values</th></tr>
<tr><td>assoc_plants</td><td>Top four dominate plant species' scientific names separated with a comma. List in order of dominance using the 50/20 rule and add the abundance code in parenthesis after each species name. (Text, 150)
Abundance Codes:
1 = >0 to 33% cover
2 = >34 to 67% cover
3 = >68 to 100% cover</td><td>Brassica nigra (3), Hirschfeldia incana (2), Foeniculum vulgare (1), Avena barbata (1)</td></tr>
<tr><td>soil_texture</td><td>The soil texture using the Simplified Key to Soil Texture by Brewer and McCann (1982). State the texture with each word capitalized. (Text, 30)</td><td>Silty Clay</td></tr>
<tr><td>aspect</td><td>Fill in with N, S, E, W, NE, SE, NW, or SW followed in parenthesis with descriptive information. (Text, 40)
Examples:
N (Steep, rocky cliffs)
NW (Very steep cliff-faces)
S (Almost vertical cliffs)
Flat</td><td>Flat</td></tr>
<tr><td>disturb_type</td><td>The type of disturbance according to the disturbance type table in the methods section. It is acceptable to list other disturbances that are not included in the table. Separate multiples with a comma. (Text, 30)

<table><tr><th>Disturbance Code</th><th>Disturbance Type</th></tr><tr><td>0</td><td>No Disturbance</td></tr><tr><td>1</td><td>Fill</td></tr><tr><td>2</td><td>Tire Ruts</td></tr><tr><td>3</td><td>Scraped Mounds</td></tr><tr><td>4</td><td>Trash/Dumping</td></tr><tr><td>5</td><td>Exotic Plants Predominant</td></tr><tr><td>6</td><td>Fire</td></tr><tr><td>7</td><td>Excavated Area</td></tr><tr><td>8</td><td>Road Affecting Population</td></tr><tr><td>9</td><td>Scraped Area</td></tr><tr><td>10</td><td>Mowing</td></tr><tr><td>11</td><td>Thatch</td></tr><tr><td>12</td><td>Vehicle Activity</td></tr><tr><td>13</td><td>Firebreak</td></tr><tr><td>14</td><td>Grazing</td></tr><tr><td>15</td><td>Small Mammal Soil Disturbance</td></tr><tr><td>16</td><td>Erosion</td></tr><tr><td>17</td><td>Argentine Ants</td></tr></table></td><td>5, 8</td></tr>
</table>

<table>
<tr><th>Attribute Name</th><th>Description</th><th>Example Values</th></tr>
<tr><td>disturb_level</td><td>The disturbance level. Acceptable values include: Negligible, Low, Moderate, High. (Text, 16)

<table><tr><td>Negligible:</td><td>0–1 disturbances: The area does not have any disturbance affecting the BRFI population. If the area has 2 or more disturbances, a negligible disturbance level cannot be assigned.</td></tr><tr><td>Low:</td><td>1–3 disturbances: The disturbance(s) slightly affect the BRFI population. If the area has 4 or more disturbances, a low disturbance level cannot be assigned</td></tr><tr><td>Moderate:</td><td>1–4 disturbances: The disturbance(s) is/are determined to have current or potential impacts to the BRFI population that may result in minor fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.</td></tr><tr><td>High:</td><td>1 or more disturbances: The disturbance(s) is/are determined to cause severe impacts to the BRFI population resulting in fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.</td></tr></table></td><td>Low</td></tr>
<tr><td>disturb_hist</td><td>The disturbance history according to the table provided in the methods section. Acceptable values include: Recent, Historical. (Text, 16)<table><tr><td>Recent:</td><td>A disturbance occurring within the current or previous growing season.</td></tr><tr><td>Historical:</td><td>A disturbance occurring more than one growing season ago.</td></tr><tr><td>NA:</td><td>Not applicable.</td></tr></table></td><td>Historical</td></tr>
<tr><td>disturb_notes</td><td>Notes describing disturbances or threats observed within the population. (Text, 100)</td><td></td></tr>
<tr><td>surveynum</td><td>The survey event number. Examples, Survey 1, Survey 2, or Survey 3. (Text, 20)</td><td>Survey 1</td></tr>
<tr><td>surveyor</td><td>The company name and then followed with the name of the individual(s) who surveyed the feature. Use their lowercase initials and separate multiples with a comma. Write out names in the report. (Text, 50)</td><td>AECOM: km, bp</td></tr>
</table>

Attribute Name	Description	Example Values
Transect Routes (flora_study_line):		
fl_sty_id	A unique, user defined identifier for each record or instance of an entity. [Format should include key word given by CPEN (rp for rare plant), survey geometry (L for line), four digit year of survey, abbreviated agency/contractor name, and unique ID. Add enough leading zeros to the unique IDs so they all have the same number of digits.] (Text, 20)	rpL_2010_aecom_01
survey_date	Date the feature was surveyed. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915). (Long, 4, 10, 0)	20100512
survey_event	The survey event number for a particular area (e.g., Survey 1, Survey 2, Survey 3). (Text, 20)	Survey 1
trns_detail	State the number of people that walked the transect and how far apart. (Text, 100)	2 people 15 feet apart
surveyor	Name of the individual(s) who surveyed the feature. Use their initials, separate multiples with a comma and a space, and list in alphabetical order. Use lower case. Write out their names in the report. (Text, 50)	al, ap

B. GIS Geodatabase: The GIS files must meet Base specifications and follow the most current GIS flora data dictionaries and metadata requirements. The GIS specifications, data dictionaries, flora geodatabase template, and metadata requirements are available upon request from Environmental Security Department (GIS Specialist, 760-763-1990).

C. Differential Correction: The Contractor shall contact the Environmental Security Department GIS Specialist (760-763-1990) to get current information regarding differential correction.

D. HDOP: Report Horizontal Dilution of Precision values for each survey in the GIS metadata.

5. SURVEY VALIDITY

A. Survey Validity: The *Brodiaea filifolia* survey report and GIS files need to be reviewed by the Land Management Section and accepted as valid prior to any site disturbance. Inventories will not be accepted as valid if they did not follow the Base protocol. The survey report and the GIS files will be provided to the Land Management Section (Gwen Kenney, Ecologist, 760-763-6330, gwen.kenney@usmc.mil) within 30 days after completing field surveys.

DATA SHEET FOR RARE PLANT POINTS AND POLYGONS (Page 1 of 3)

Survey Name		**Datasheet No.**	
Contractor		**Contract No.**	
Survey Location		**Date** (YYYYMMDD)	
Surveyors		**Survey Event No.**	
		GPS Pop ID	
GPS Waypoints		**GIS PopID7m**	
Species Name		**VP Spatial ID**	

Individuals	# Individuals	Vegetative	Flower Bud	Flowering	Fruiting/Seed Dispersal	Senescent	Alt. ERPE Growth Habit

Gender	# Males		# Females	

hab_typ_d: (Pick Only One)

☐ Chaparral	☐ Marsh	☐ Riparian Woodland	☐ Unvegetated Sand
☐ Cliff	☐ Oak Woodland	☐ Sage Scrub	☐ Vegetated Sand
☐ Cultivated Field	☐ Ponds	☐ Stream	☐ Vernal Pool
☐ Dune	☐ Riparian Forest	☐ Sycamore Grassland	☐ Wetlands
☐ Grasslands	☐ Riparian Scrub		

Plant Community: (Pick One or Fill in Oberbauer Veg Type)

☐ **Valley Needlegrass Grassland:** 20% or greater cover of native herbaceous species are present

☐ **Non-native Grassland: Broadleaf-dominated:** more than 50% of the total vegetative cover of non-native broadleaf species (e.g., mustard, fennel, tocalote, Italian thistle, bull thistle, milk thistle, etc.)

☐ **Non-native Grassland** ☐ **Other:** _____

☐ **Vernal Pool:** Pool Type _____

Associated Plants:

1. Fill in Plants, Absolute % Cover, Dominance Order
2. Sum the % cover values to get the total herb, shrub, and tree cover
3. Do the 50/20 Thresholds math
4. Fill in Dominant Column:
   a. Add up the top ranked dominant plants until you just exceed the 50% of total cover value
   b. Then pick any other plants with cover that is equal to or greater than the 20% of total cover value
5. Fill in the Native column (necessary for Disturbance Type - Exotic Plants Predominant)

Abundance Codes:
1: 1-33% cover
2: 34-67% cover
3: 68-100% cover

Species Name	**Absolute % Cover**	**Dominance Order**	**Dominant?**	**Native?**
Herb				
Total Herb Cover:				
50/20 Thresholds: 50% of total cover =	0.50 x _____ = _____%			
20% of total cover =	0.20 x _____ = _____%			
Shrub				
Total Shrub Cover:				
50/20 Thresholds: 50% of total cover =	0.50 x _____ = _____%			
20% of total cover =	0.20 x _____ = _____%			
Tree				
Total Tree Cover:				
50/20 Thresholds: 50% of total cover =	0.50 x _____ = _____%			
20% of total cover =	0.20 x _____ = _____%			

Dominant species across all strata in order of dominance with abundance codes in parenthesis (GIS Field Associated Plants):

Soil Texture	
Aspect (Slope Description)	

Survey Name		**Datasheet No.**	
Species Name		**Date** (YYYYMMDD)	
GPS ID	**VP Spatial ID**		**GIS PopID7m**

Disturbance Type: (All Applicable)

	GIS Code	Disturbance Type	Description Population is growing in this disturbance type or is affected by this disturbance type:
☐	0	No Disturbance	
☐	1	Fill	
☐	2	Tire Ruts	Tire ruts are seen within or near a population and these ruts are determined to have the potential to impact the population either directly or via modifications to local hydrology
☐	3	Scraped Mounds	Local topography of mima mounds have been scraped/altered
☐	4	Trash/Dumping	
☐	5	Exotic Plants Predominant Are exotics impairing the ability for the rare plants to survive, expand, and set seed? ☐ Yes ☐ No	**Fill out table:** **1** Total Cover of Dominant Plants* from Assoc. Plants Table | **2** Divide the value in Column 1 by 2 | **3** Cover of Dominant Native Plants* | **4** Cover of Dominant Non-native Plants* | **5** Exotic Plants Predominant? (value for Column 4 must be greater than the value for Column 2) *Plants must have a "Yes" in the AssociatedPlants Dominants column.
☐	6	Fire	Population growing in an area affected by fire within a recent enough timeframe to still observe the fire's effects
☐	7	Excavated Area	Growing in excavated area or altered by nearby excavation
☐	8	Road Affecting Population	Growing in a road/ trail or altered by nearby road/trail
☐	9	Scraped Area	Growing in a scraped area or altered by nearby scraping.
☐	10	Mowing	Use Disturbance Type "13 Firebreak" if this in within a firebreak
☐	11	Dense Thatch	
☐	12	Vehicle Activity	
☐	13	Firebreak	Population affected by firebreak grading, disking, mowing, or erosion
☐	14	Grazing by livestock	
☐	15	Small Mammal Soil Disturbance	
☐	16	Erosion	Use Disturbance Type "13 Firebreak" if the erosion is due to a firebreak
☐	17	Argentine ants	Found on or next to the plant.
☐			
☐			

Disturbance Level: (Pick Only One)

	Disturbance Level	Number of Disturbances	Description
☐	**Negligible**	0–1	No to negligible disturbances
☐	**Low**	1–3	Disturbance slightly affects the population
☐	**Moderate**	1–4	Disturbance(s) is/are determined to have current or potential impacts to the population that may result in minor fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.
☐	**High**	1 or more	Disturbance(s) is/are determined to cause severe impacts to the population resulting in fragmentation, population reduction, and/or impedance of seed recruitment to surrounding areas.

Disturbance History: (Only One)

☐ **Recent:** A disturbance occurring within the current or previous growing season.
☐ **Historical:** A disturbance occurring more than one growing season ago.
☐ **N/A:** No disturbances

Notes:

Survey Name				**Datasheet No.**	
Species Name				**Date** (YYYYMMDD)	
GPS ID		**VP Spatial ID**		**GIS PopID7m**	

Vegetative	**Flower Bud**	**Flower**	**Fruit/Seed Dispersal**	**Senescent**
Place tally marks below				
Total	**Total**	**Total**	**Total**	**Total**

Total Number of Individuals:

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APPENDIX B

TL 695/6971 Rare Plant Survey Results

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Plant Communities in the TL 695/6971 Project Area

Acronym	Plant Community
CLOW	Coast Live Oak Woodland
DCSS	Diegan Coastal Sage Scrub
DEV	Urban/Developed
DIS	Disturbed Habitat
EW	Eucalyptus Woodland
MFS	Mulefat Scrub
NNG	Non-native Grassland
NVC	Non-vegetated Channel
SSARW	Southern Sycamore-Alder Riparian Woodland
SWS	Southern Willow Scrub
VP	Vernal Pool

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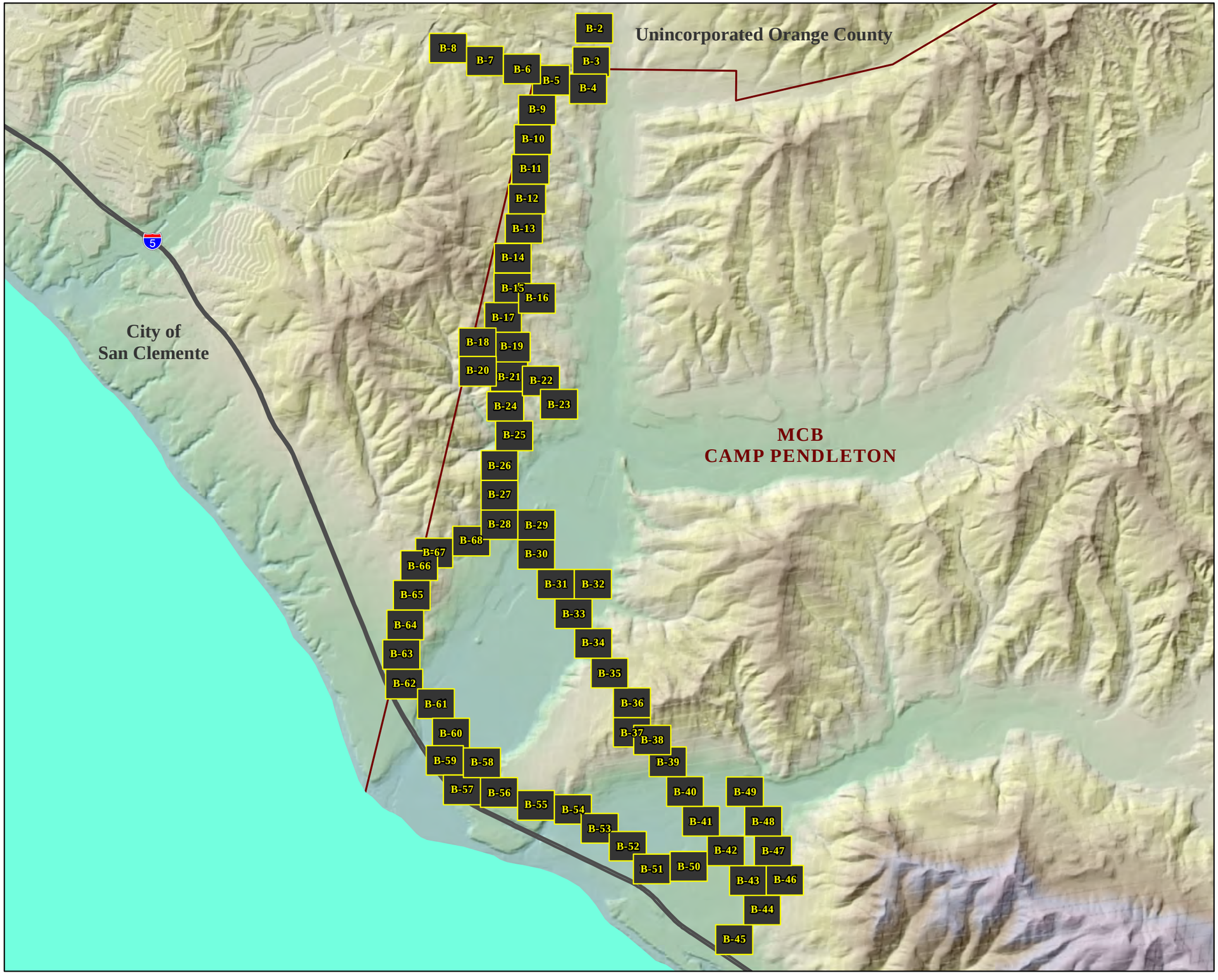
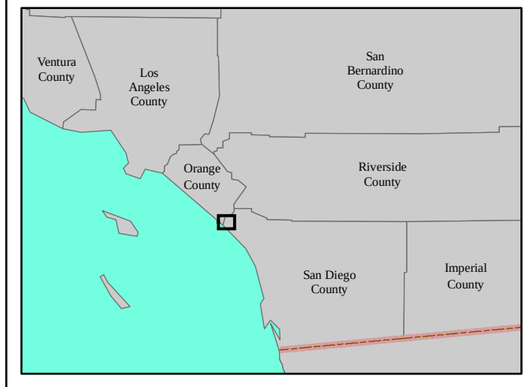


Figure B-1
TL695/6971 Rare Plant Survey Results Overview

LEGEND

- Appendix B Figure Extent
- MCB Camp Pendleton Boundary
- State Route or Interstate



Kilometers
0 2
0 1
Miles

Figure B-2
TL695/6971 Rare Plant Survey Results



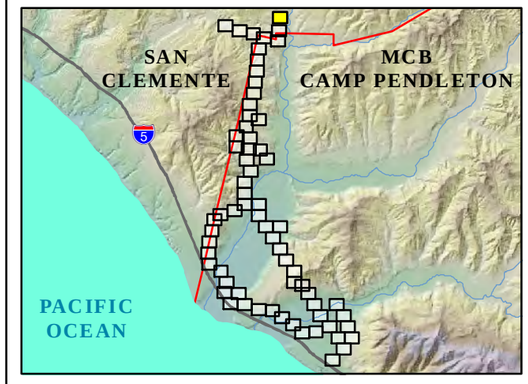
LEGEND

Project Features

- Project Survey Area
- Access Route
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-3
TL695/6971 Rare Plant Survey Results

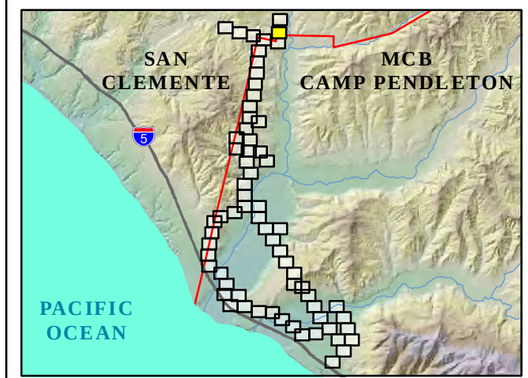


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

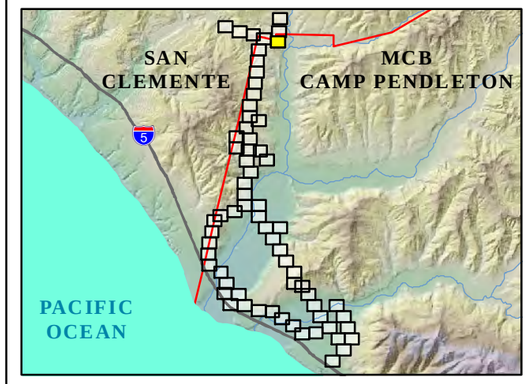
Figure B-4
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed
- San Diego County Viguiera

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

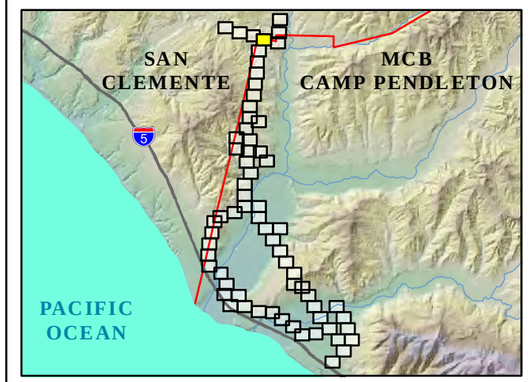
Figure B-5
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense NNGB
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

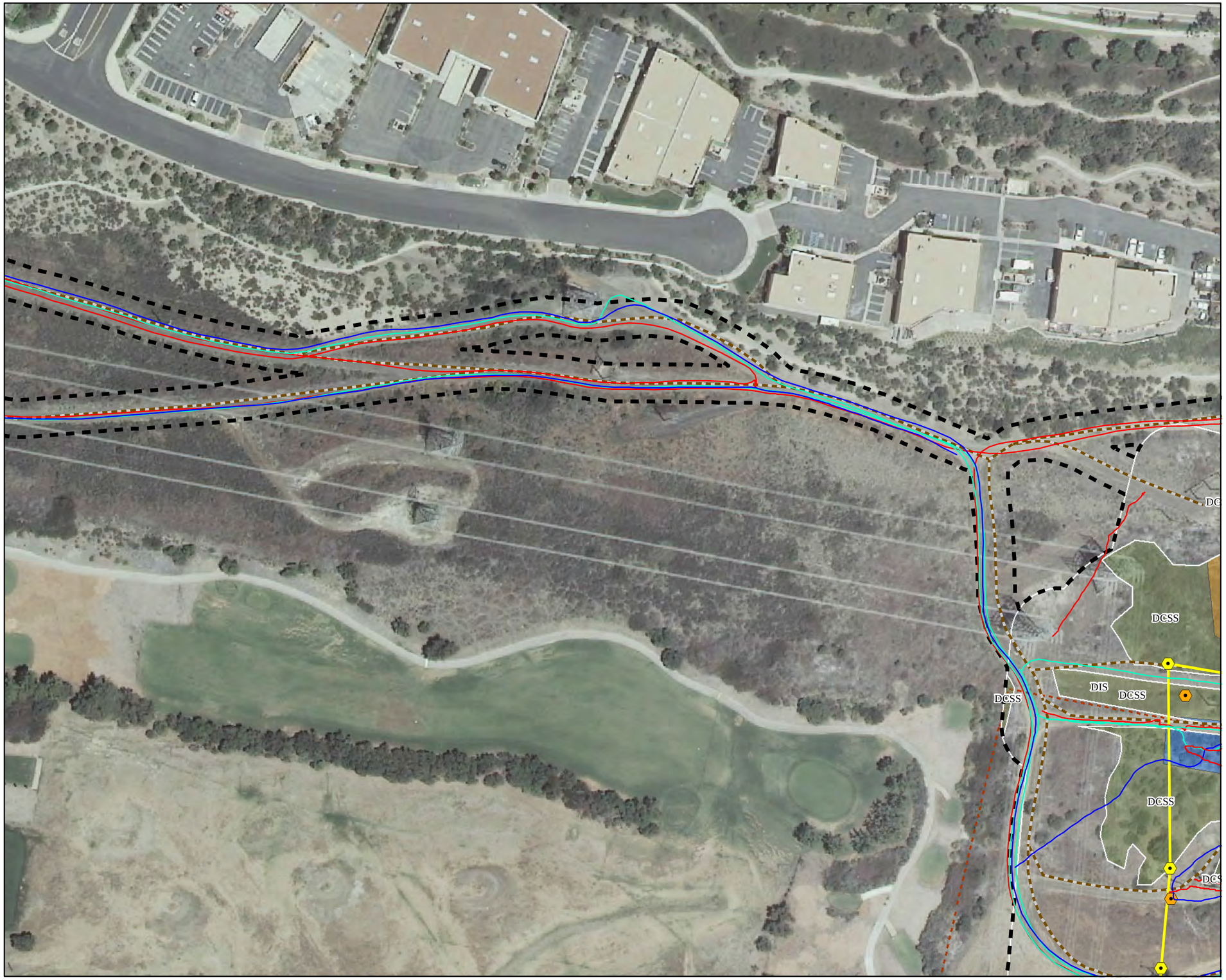


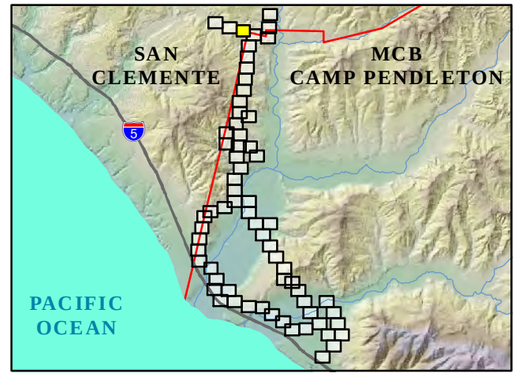
Figure B-6
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense NNGB
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-7
TL695/6971 Rare Plant Survey Results

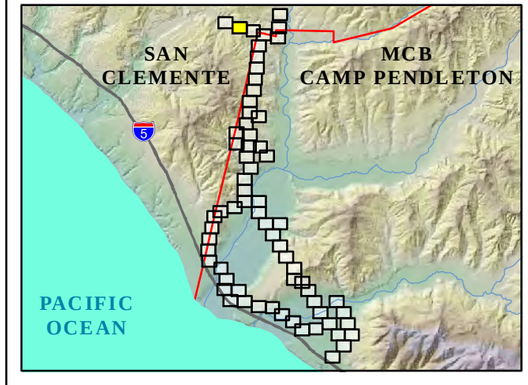
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-8
TL695/6971 Rare Plant Survey Results

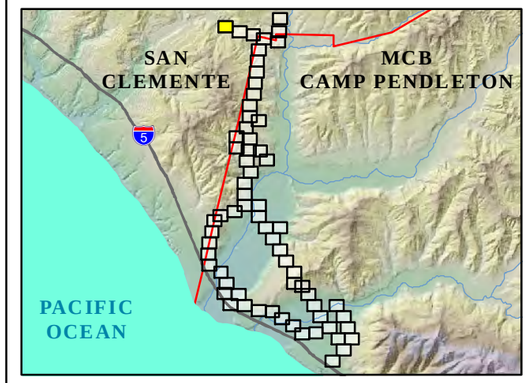
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-9
TL695/6971 Rare Plant Survey Results

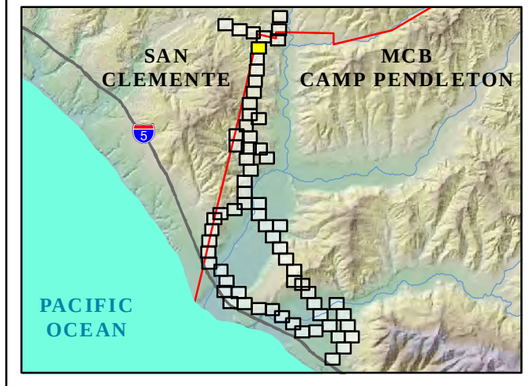
DCSS
DIS
DCSS
SWS
SWS
DCSS
DCSS
DIS
DIS

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



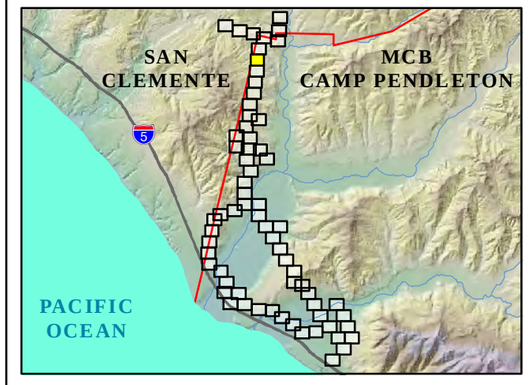
Figure B-10
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

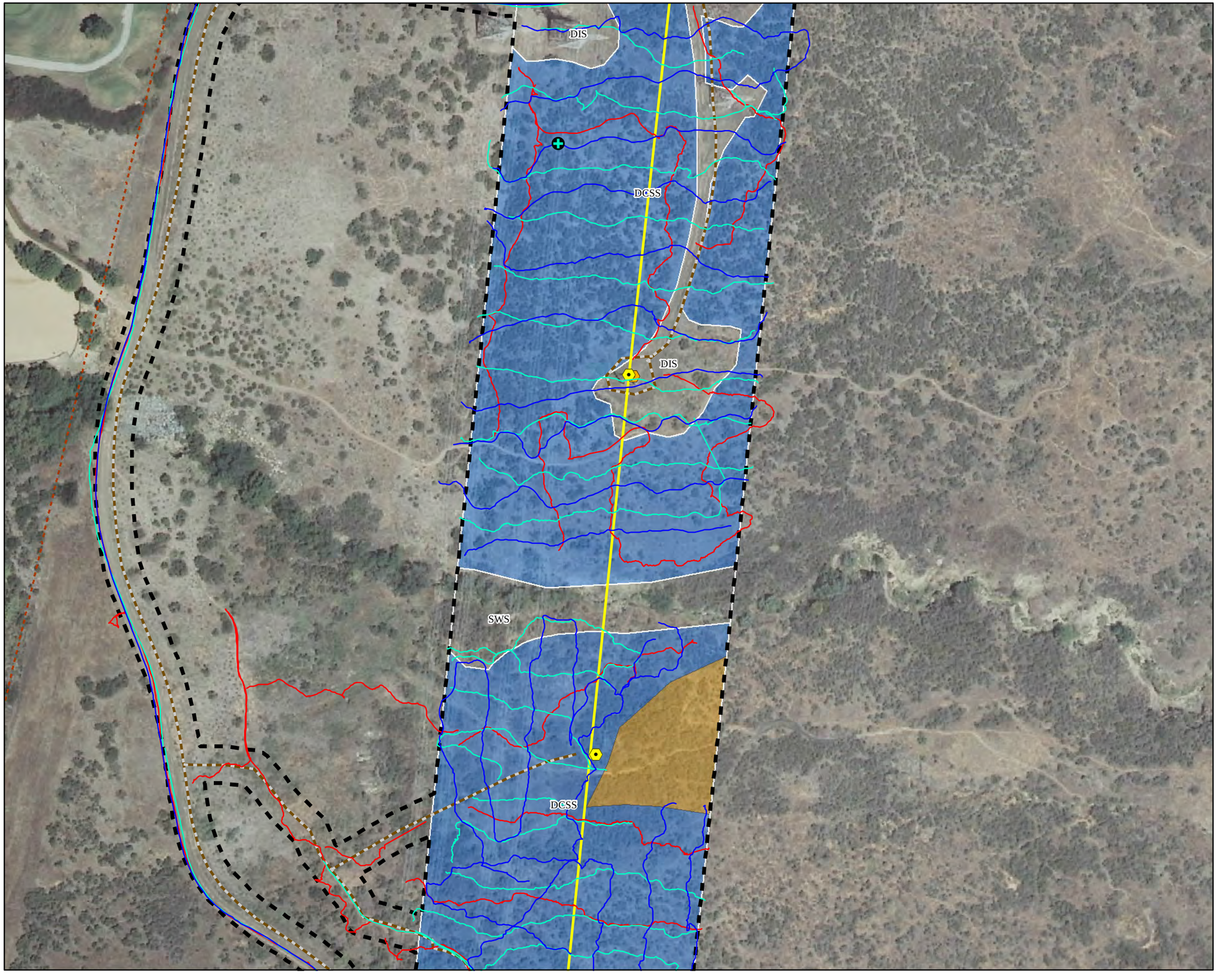


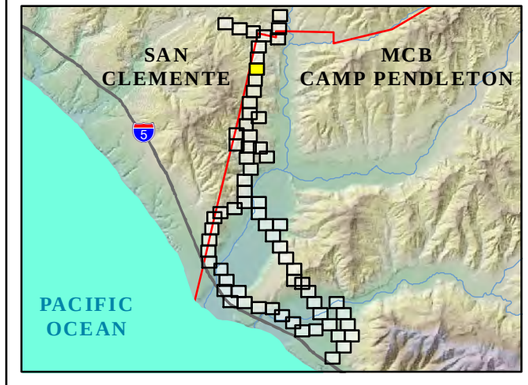
Figure B-11
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed

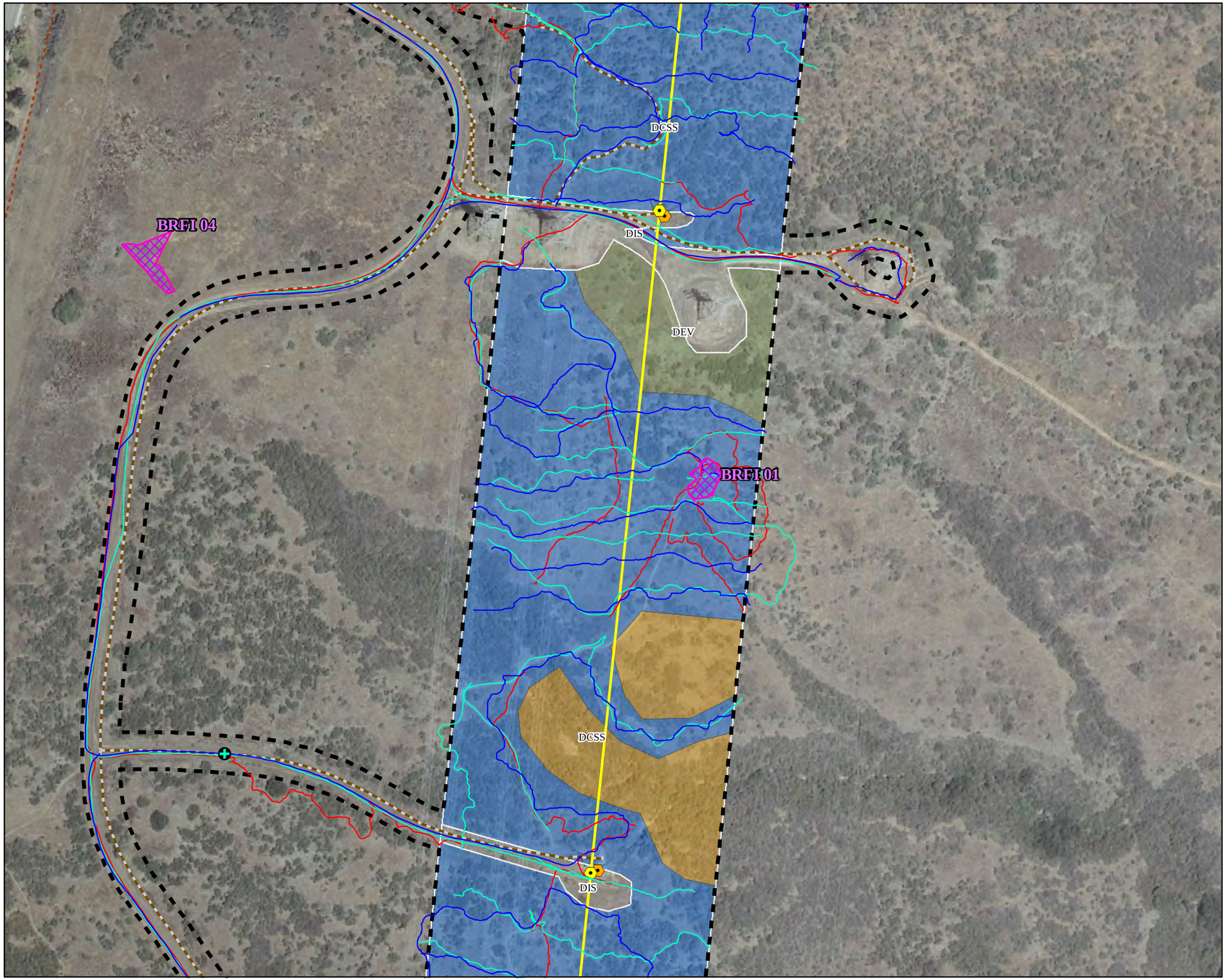
Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-12
TL695/6971 Rare Plant Survey Results

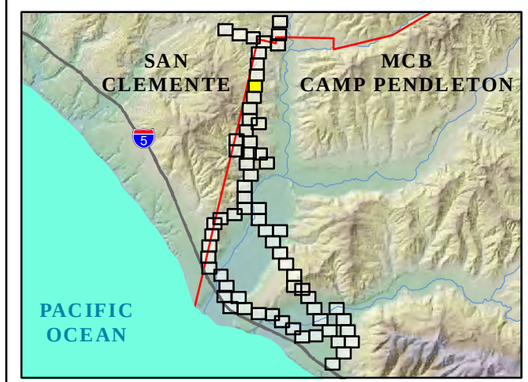


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- BRFI Population
- Paniculate Tarweed

Unsuitable Potential BRFI Habitat
- Dense NNGB
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

DCSS

DCSS

DIS

DCSS

Figure B-13
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features

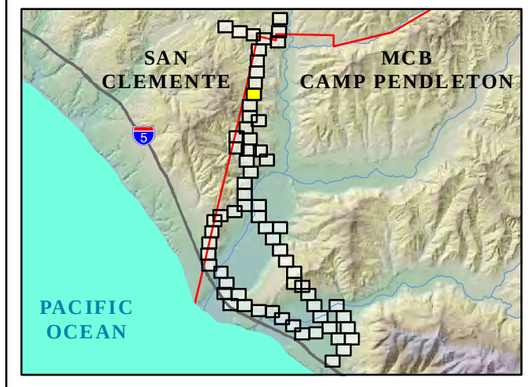
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat

- Dense DCSS



Meters

0 50

0 200

Feet

Source: SDG&E 2015



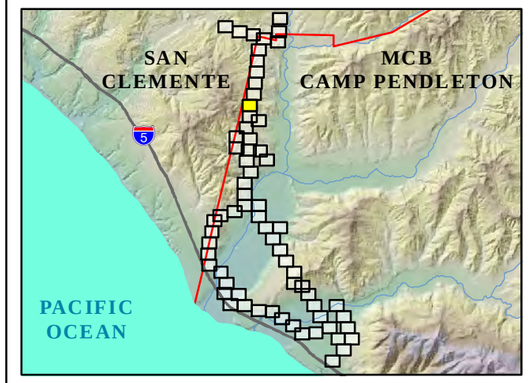
Figure B-14
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-15
TL695/6971 Rare Plant Survey Results

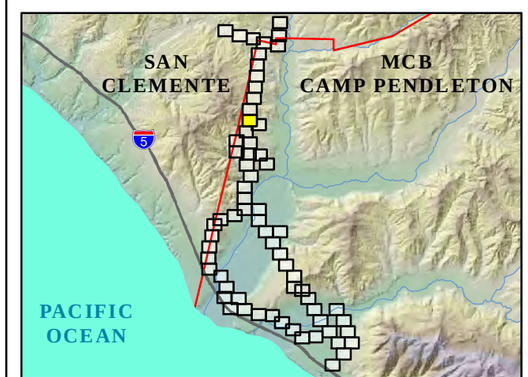


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



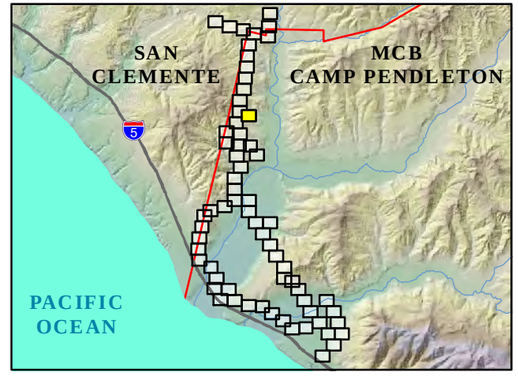
Figure B-16
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



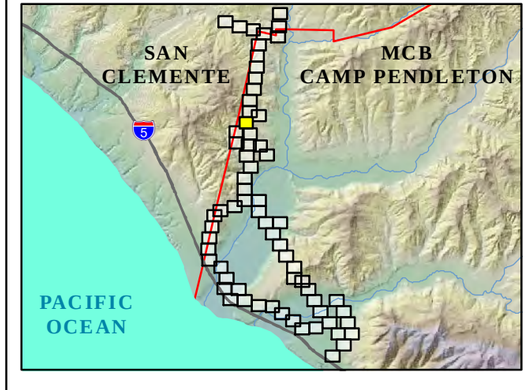
Figure B-17
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

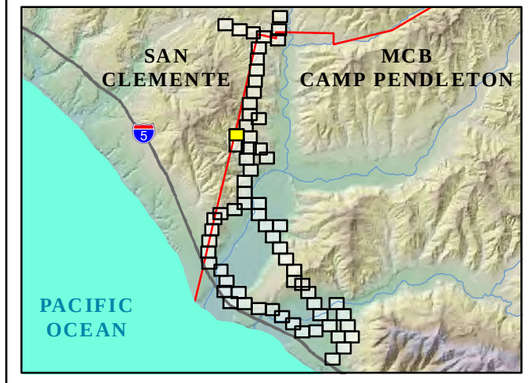
Source: SDG&E 2015

Figure B-18
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- MCB Camp Pendleton Boundary
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

N

Source: SDG&E 2015

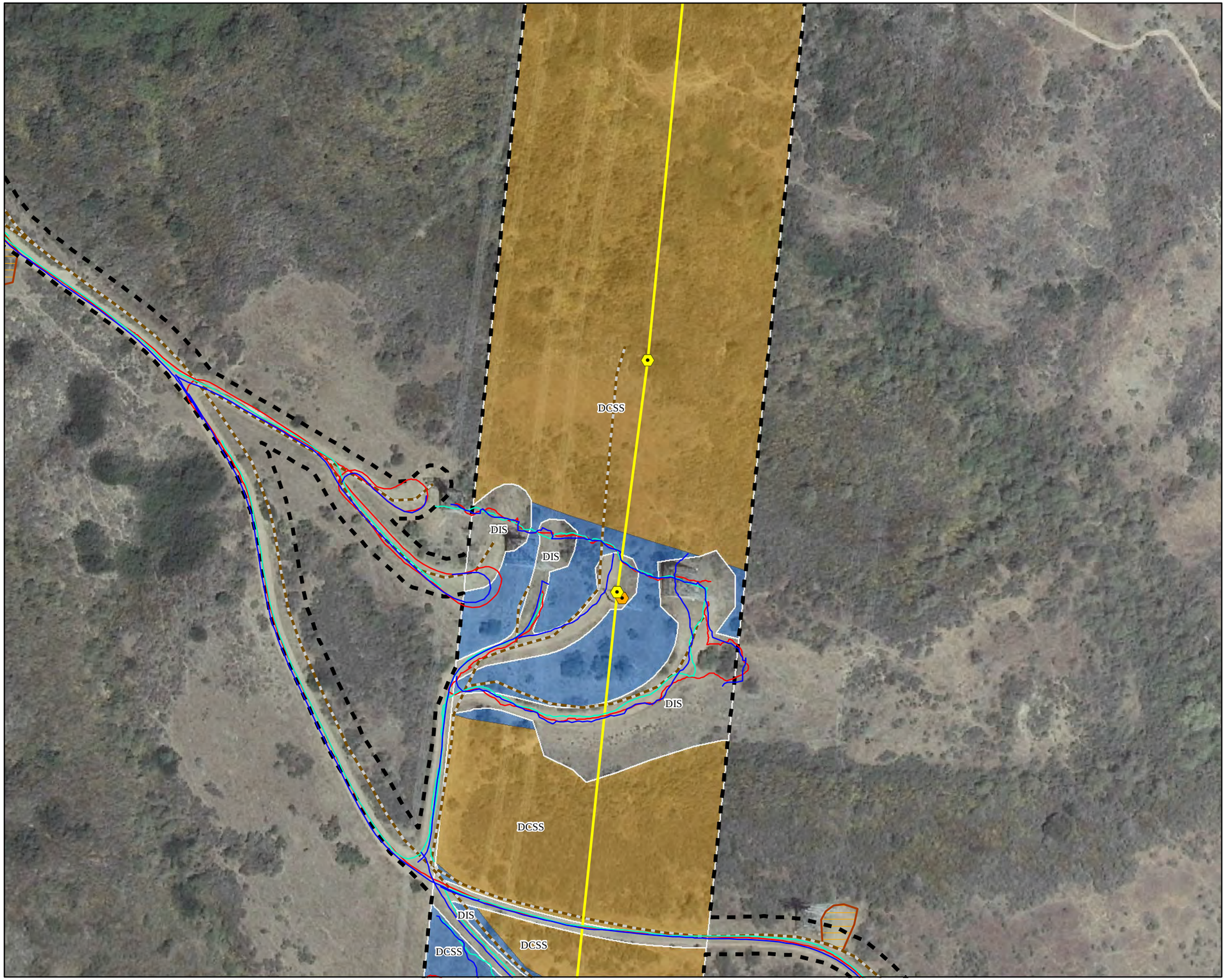


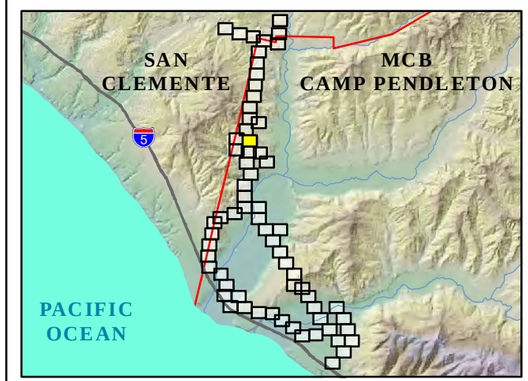
Figure B-19
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-20
TL695/6971 Rare Plant Survey Results

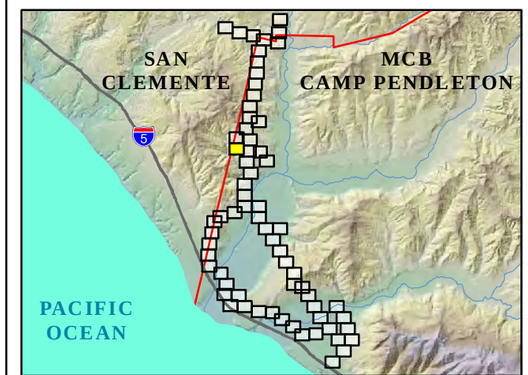
LEGEND

Project Features

- Project Survey Area
- Access Route
- MCB Camp Pendleton Boundary

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-21
TL695/6971 Rare Plant Survey Results

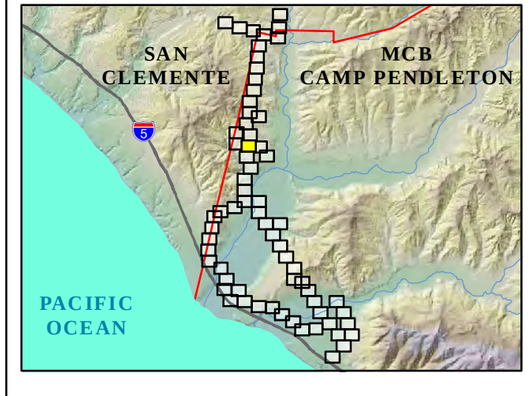
DIS
DCSS
DIS
DCSS
DIS
DIS
DCSS

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

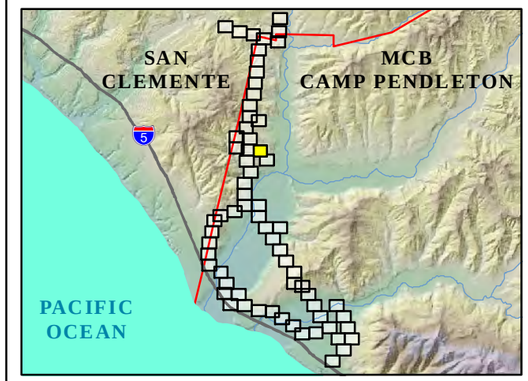
Figure B-22
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- BRFI Population

BRFI 02



Meters
0 50
0 200
Feet

Source: SDG&E 2015

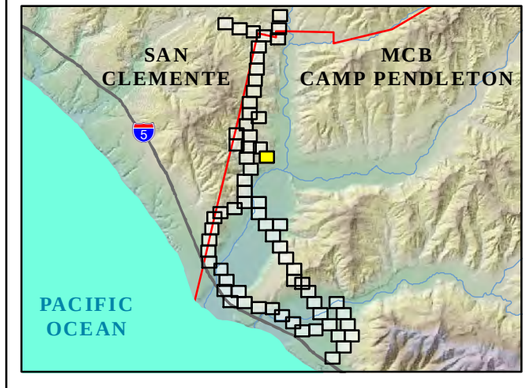


Figure B-23
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- BRFI Population



Meters
0 50
0 200
Feet

Source: SDG&E 2015

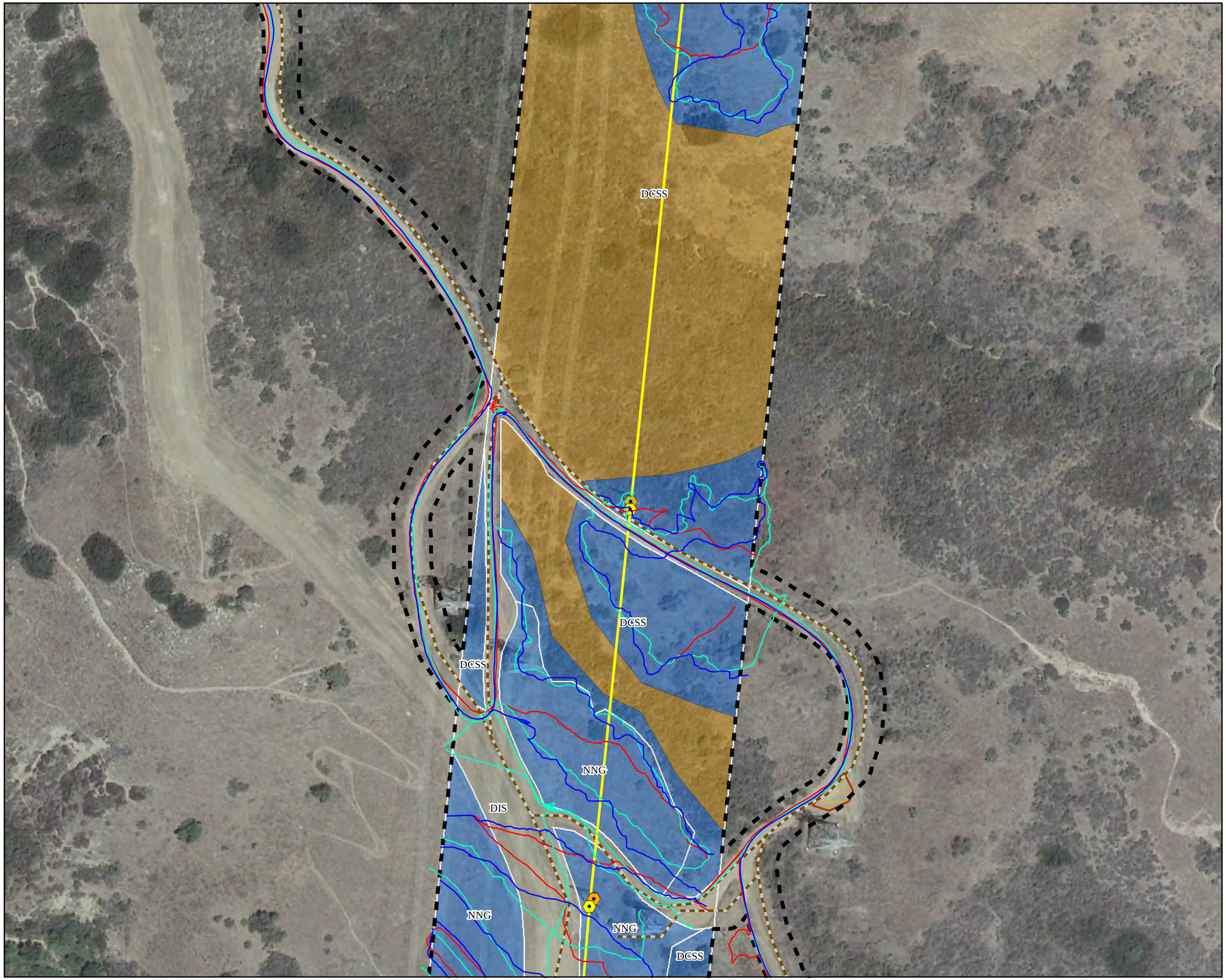


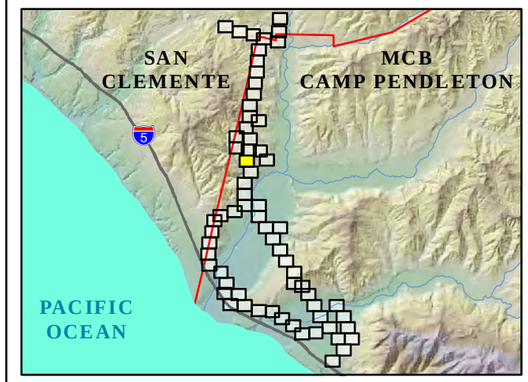
Figure B-24
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

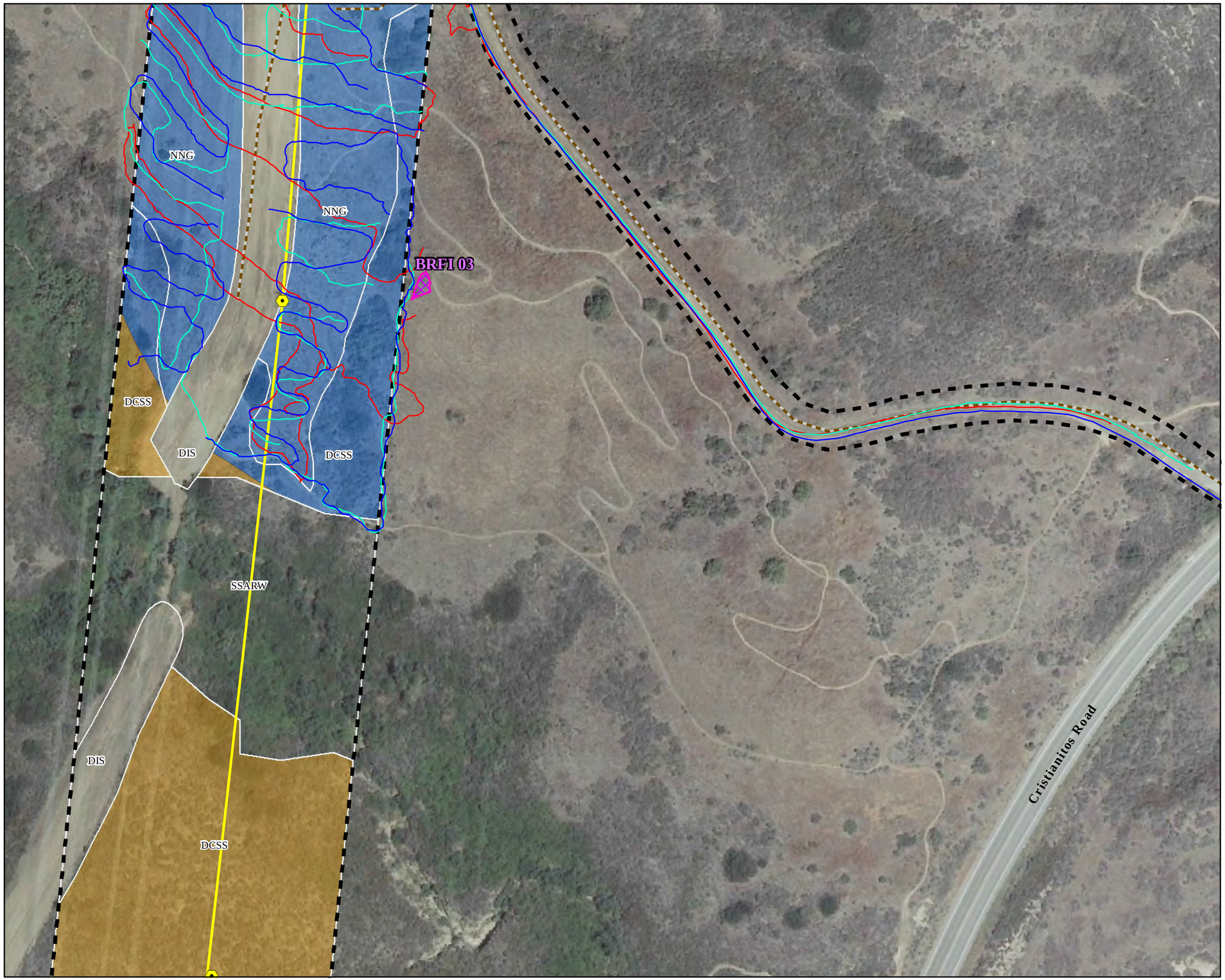
Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-25
TL695/6971 Rare Plant Survey Results

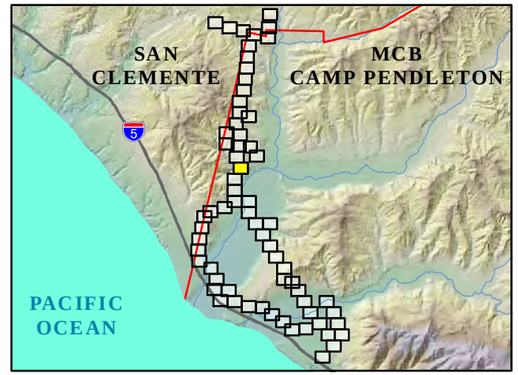


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- BRFI Population

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-26
TL695/6971 Rare Plant Survey Results

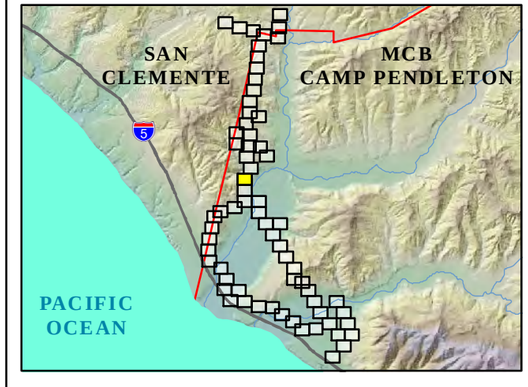
DCSS
DIS
DCSS
DIS
DIS
DCSS
DIS
DIS
DCSS
Cristianitos Road

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

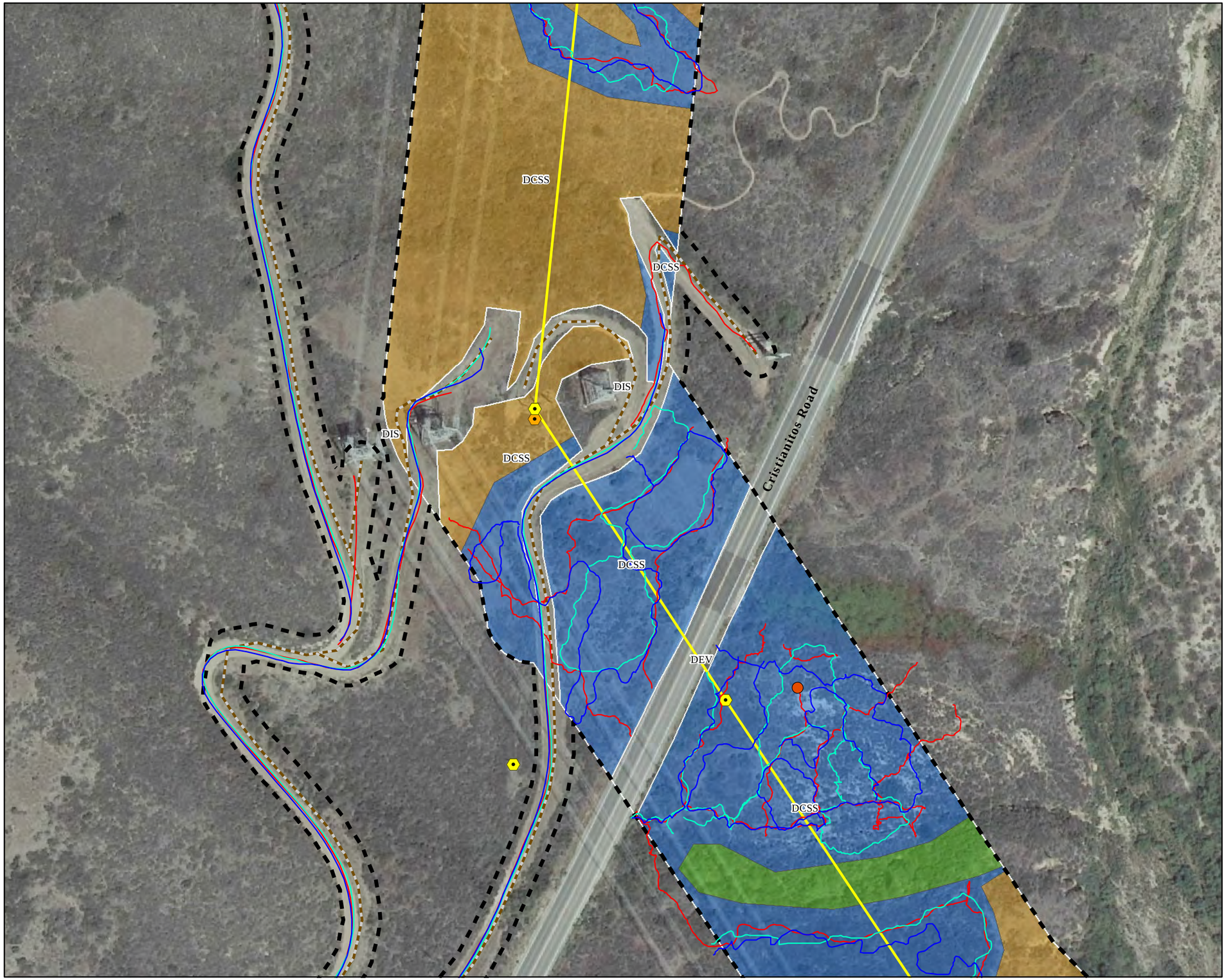


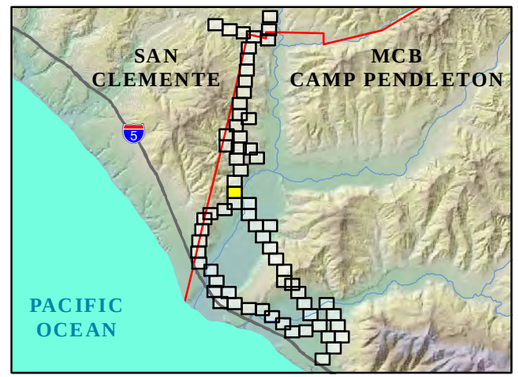
Figure B-27
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- California Boxthorn

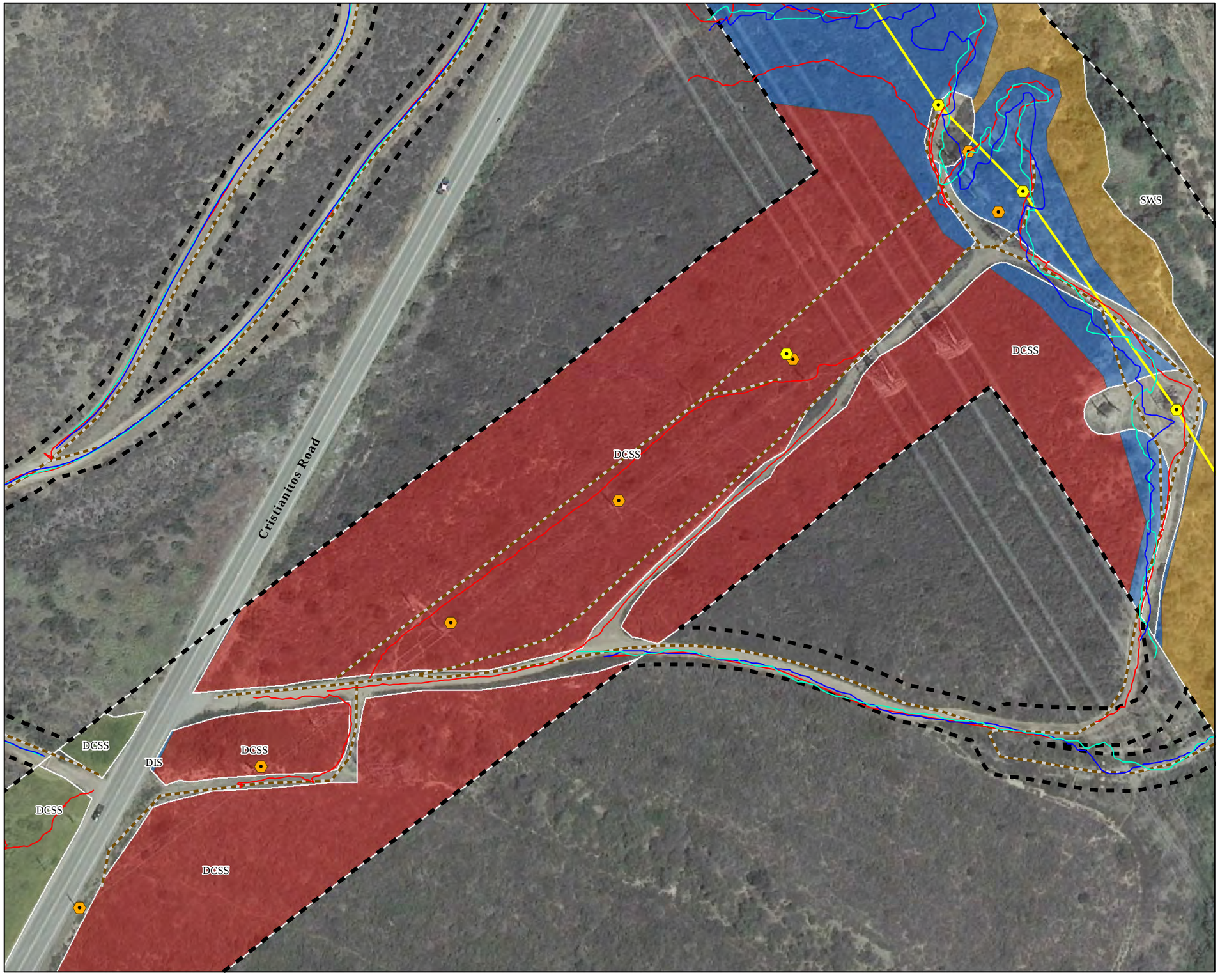
Unsuitable Potential BRFI Habitat
- Dense DCSS
- Riparian



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-28
TL695/6971 Rare Plant Survey Results

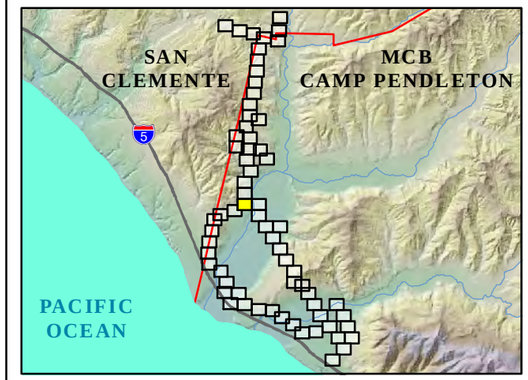


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense NNGB
- Dense DCSS/NNGB/Recently Burned
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



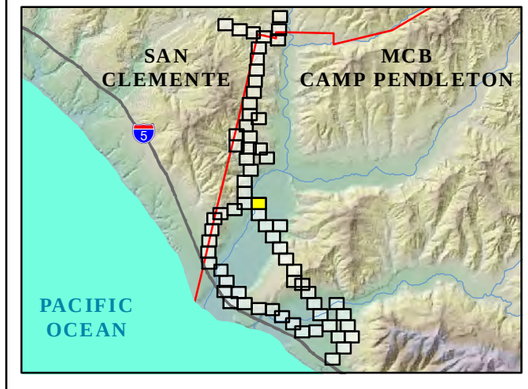
Figure B-29
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

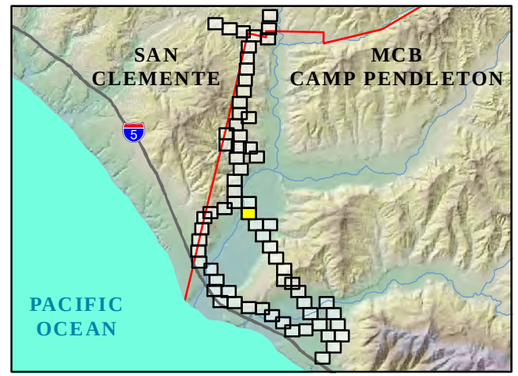


Figure B-30
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

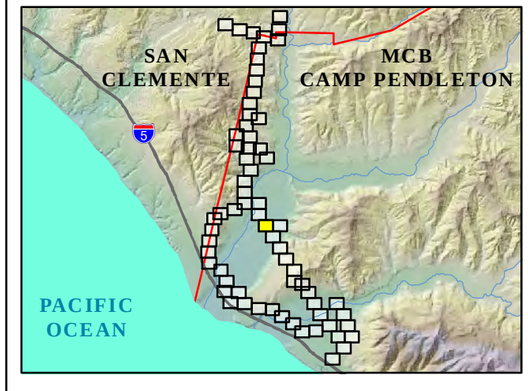


Figure B-31
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-32
TL695/6971 Rare Plant Survey Results

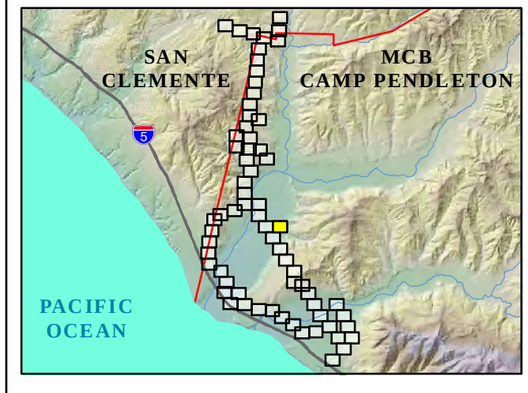
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015



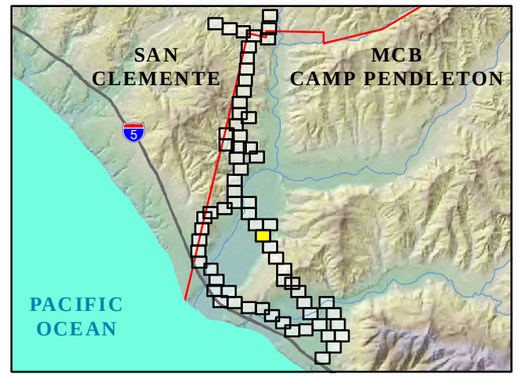
Figure B-33
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

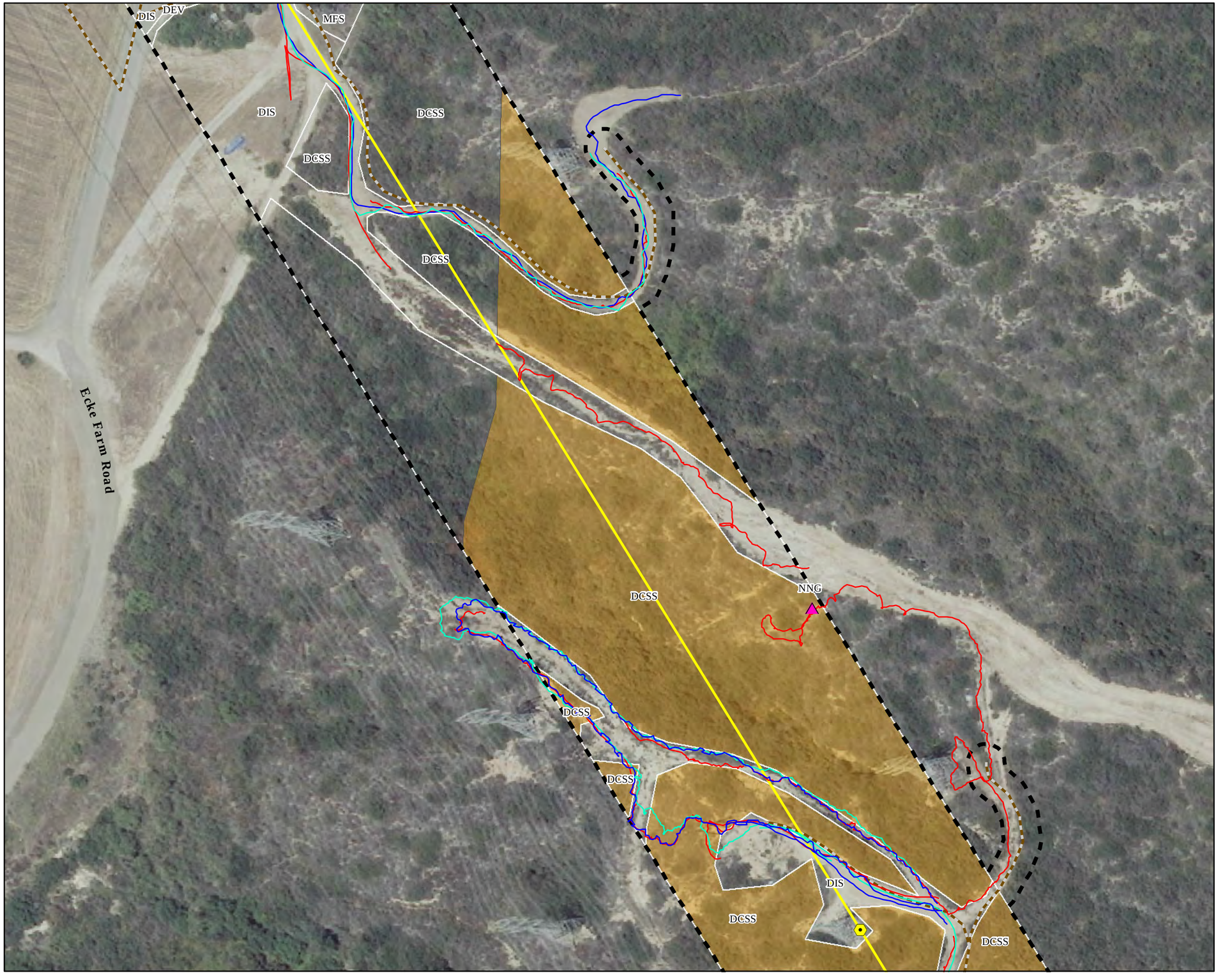
Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-34
TL695/6971 Rare Plant Survey Results



LEGEND

Project Features

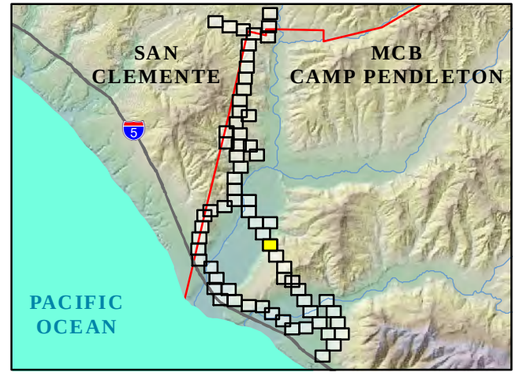
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Western Dichondra

Unsuitable Potential BRFI Habitat

- Dense DCSS



Meters

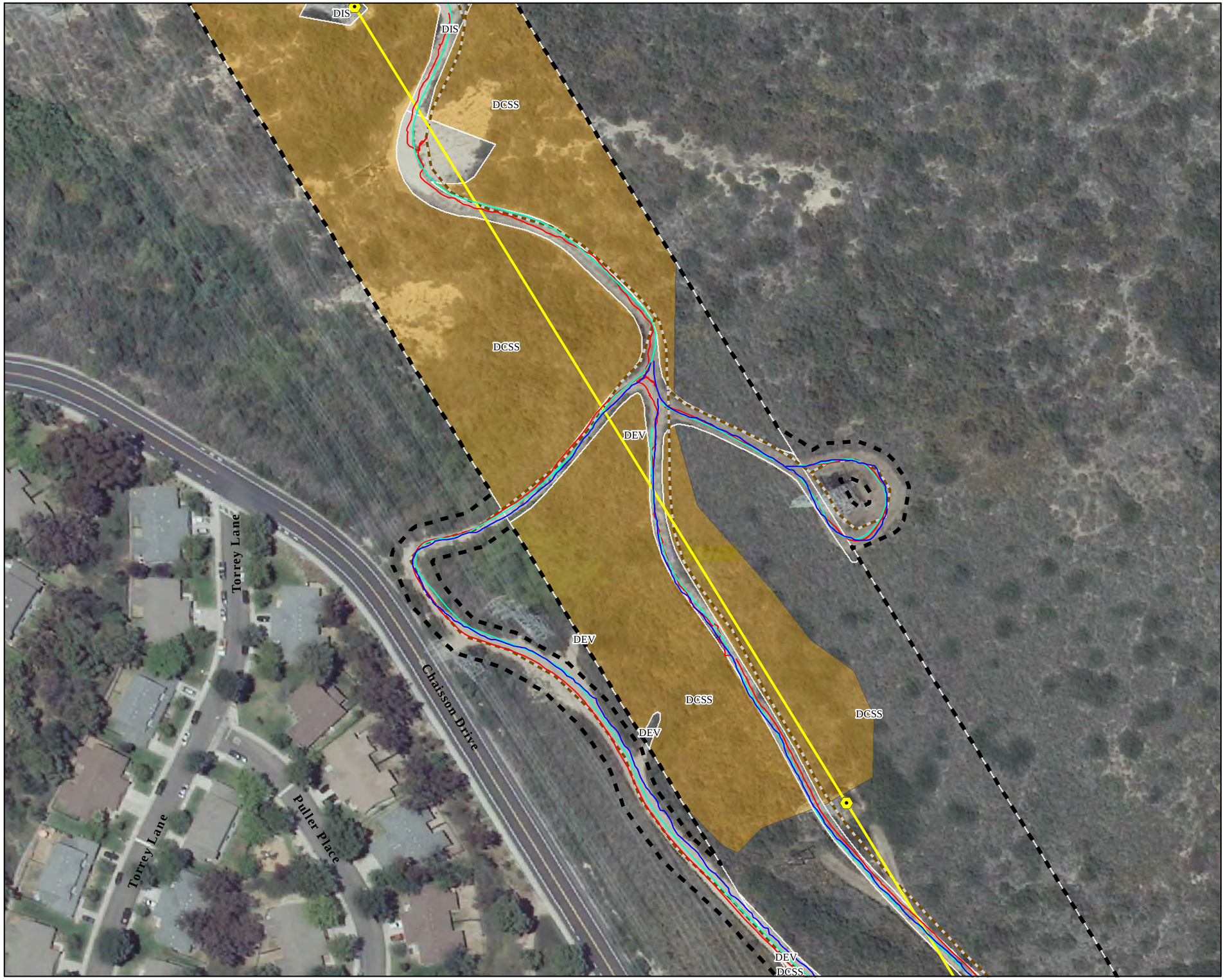
0 50

0 200

Feet

Source: SDG&E 2015

Figure B-35
TL695/6971 Rare Plant Survey Results

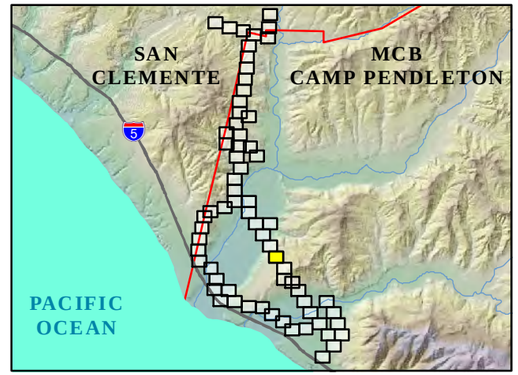


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-36
TL695/6971 Rare Plant Survey Results

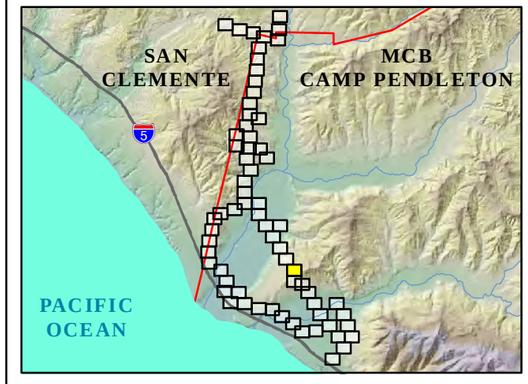


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-37
TL695/6971 Rare Plant Survey Results

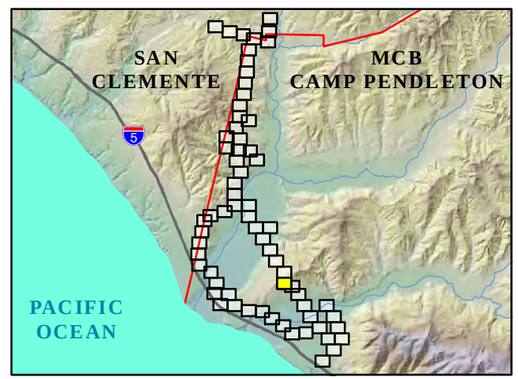
LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS

DEV
DCSS
DEV
DCSS
DCSS
DEV
DIS
DCSS
DIS
DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-38
TL695/6971 Rare Plant Survey Results

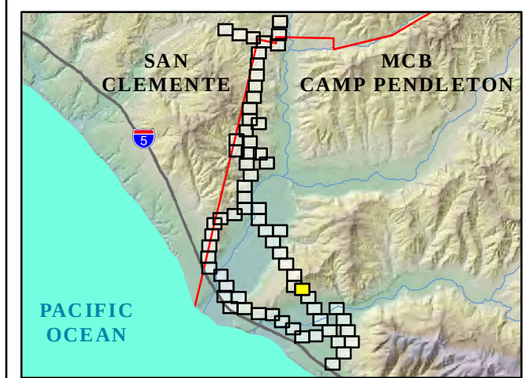
DEV
DCSS
DIS
DCSS
DEV
DIS
DCSS
DIS
DCSS
DIS
DCSS

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

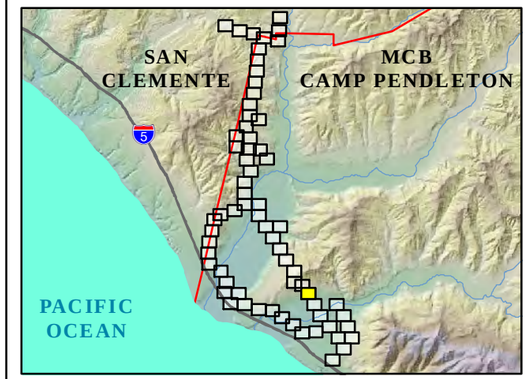
DCSS
DIS
DIS
DCSS
DCSS
DIS
DCSS
DIS
DCSS
DCSS
DEV
De La Garza Street

Figure B-39
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

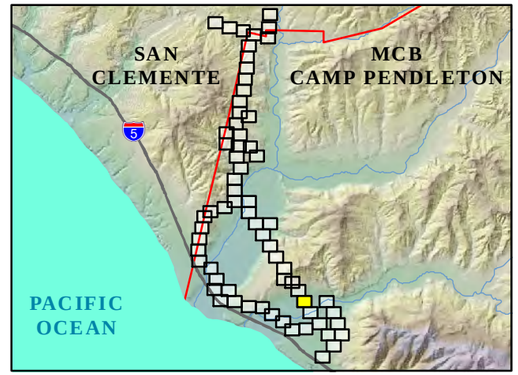


Figure B-40
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Staging Yard

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

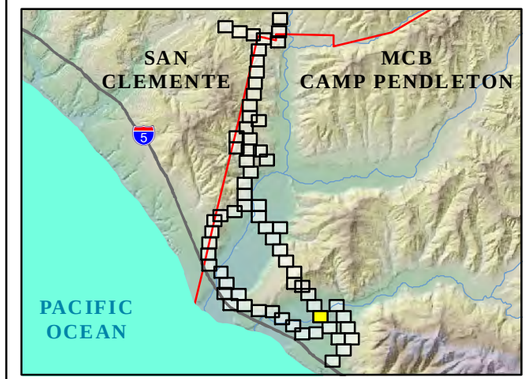


Figure B-41
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole

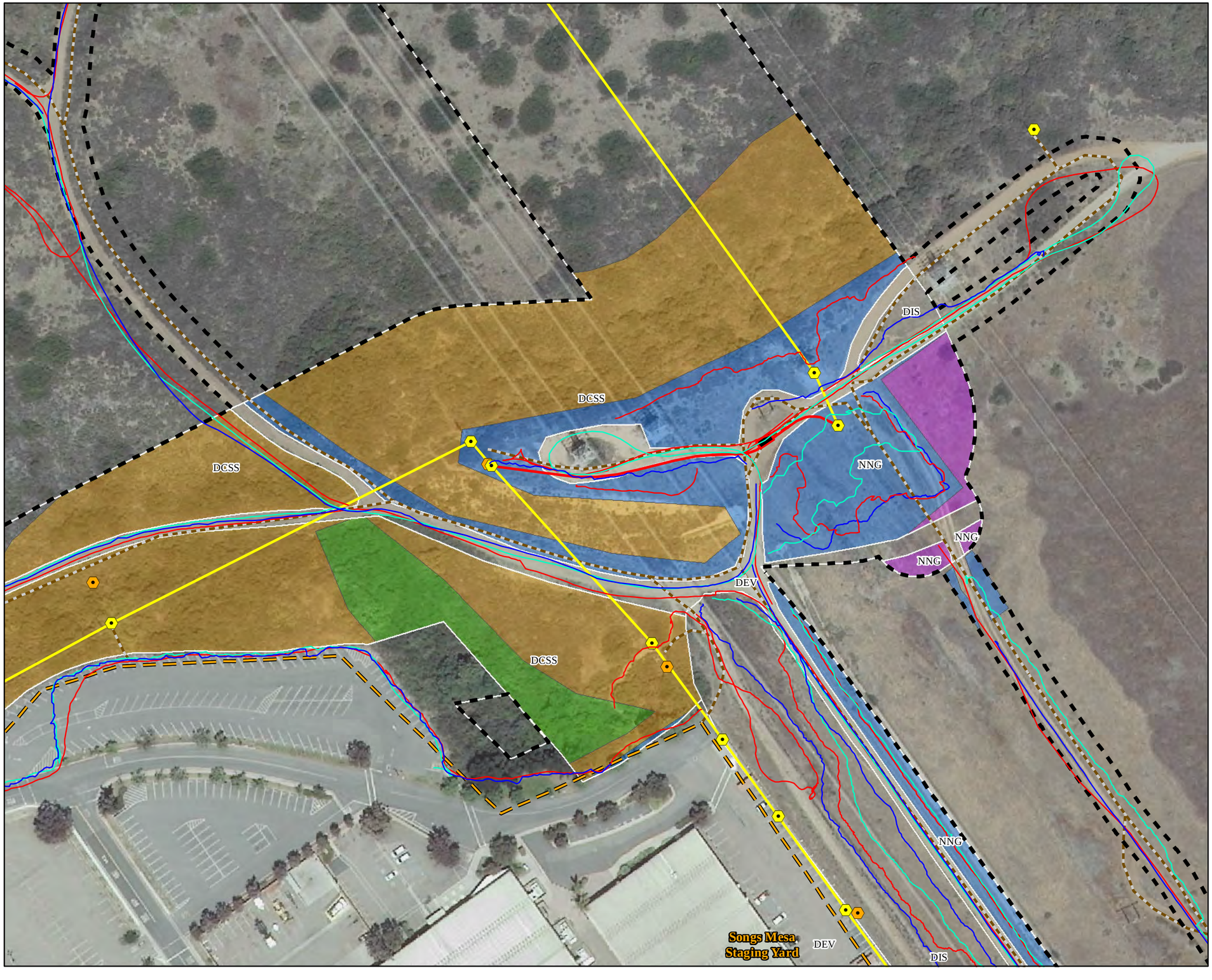
Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-42
TL695/6971 Rare Plant Survey Results

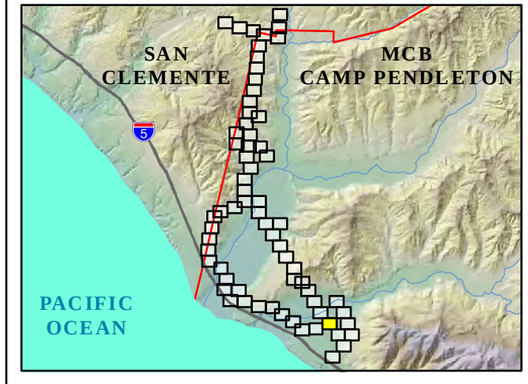


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Project Underground Route
- Proposed 69kV Vault
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS
- Disturbed
- Riparian



Meters
0 50
0 200
Feet

Source: SDG&E 2015

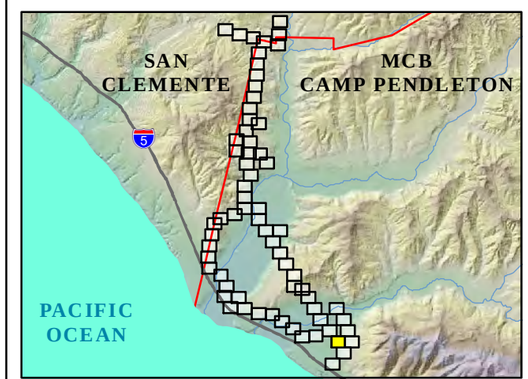


Figure B-43
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

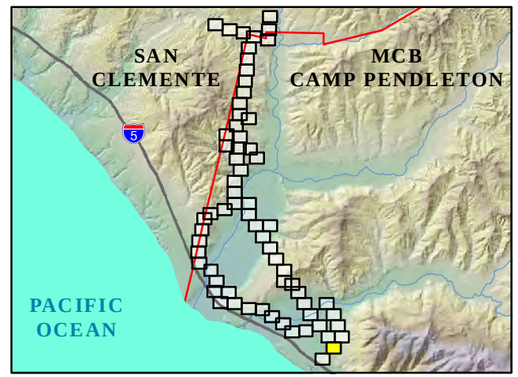


Figure B-44
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-45
TL695/6971 Rare Plant Survey Results



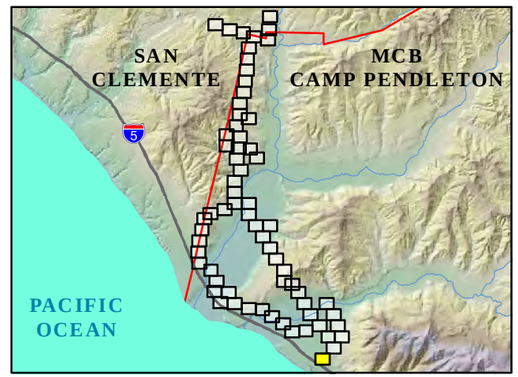
LEGEND

Project Features

- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

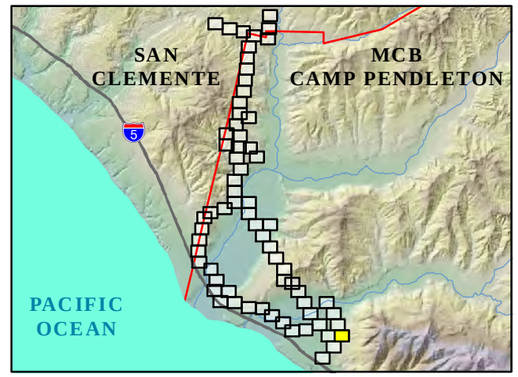


Figure B-46
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

N

Source: SDG&E 2015

Figure B-47
TL695/6971 Rare Plant Survey Results

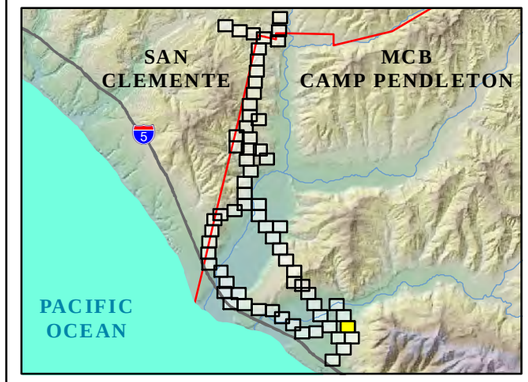
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

N

Source: SDG&E 2015

Figure B-48
TL695/6971 Rare Plant Survey Results

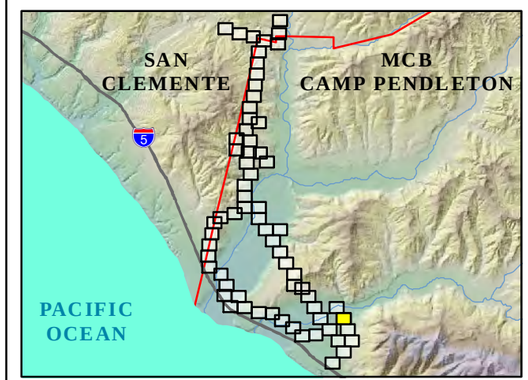
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters

0 50

0 200

Feet

Source: SDG&E 2015

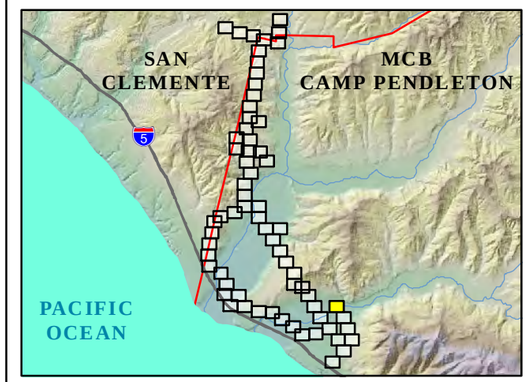


Figure B-49
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Coulter's Matilija Poppy



Meters
0 50
0 200
Feet

Source: SDG&E 2015



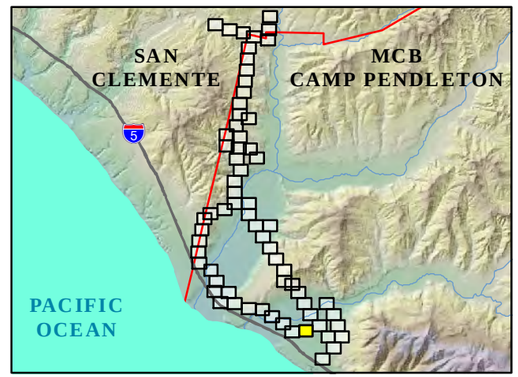
Figure B-50
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-51
TL695/6971 Rare Plant Survey Results

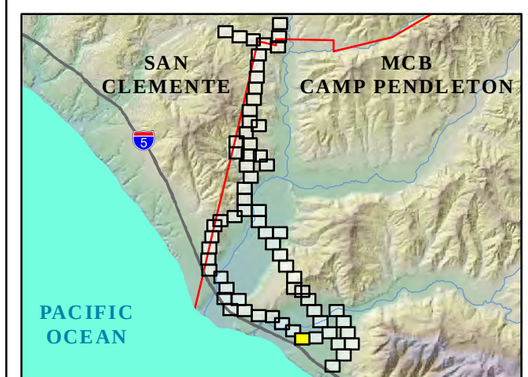


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-52
TL695/6971 Rare Plant Survey Results



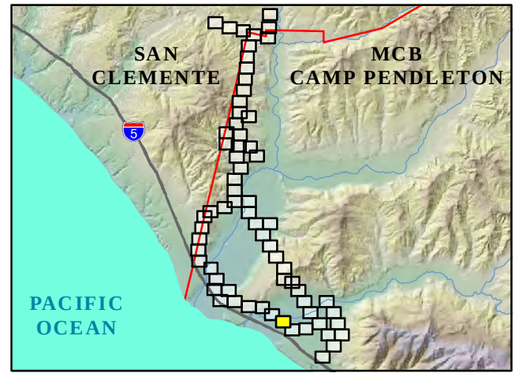
LEGEND

Project Features

- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-53
TL695/6971 Rare Plant Survey Results



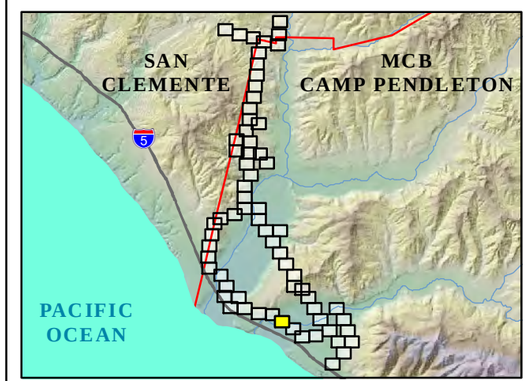
LEGEND

Project Features

- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results

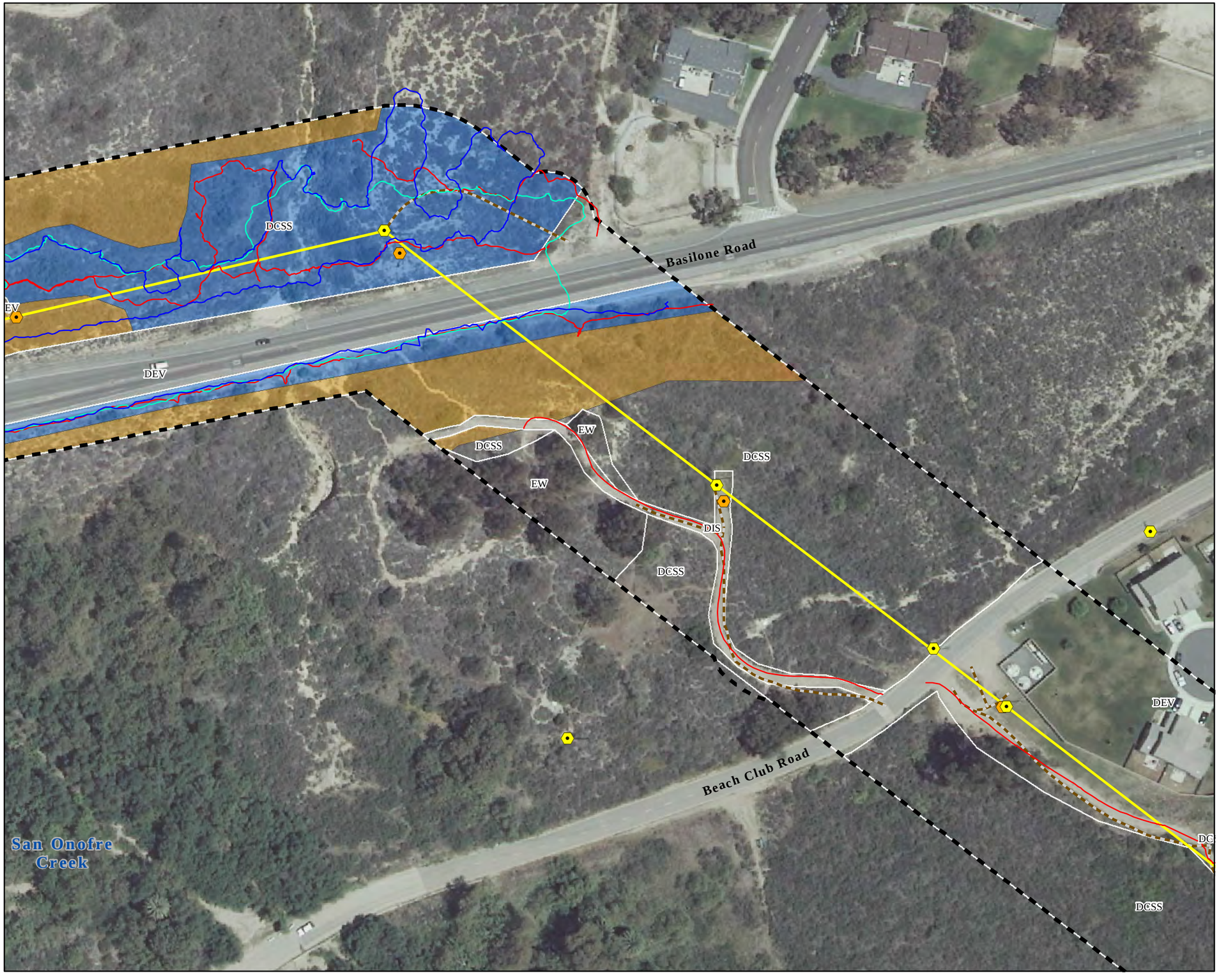
- Survey 1 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-54
TL695/6971 Rare Plant Survey Results

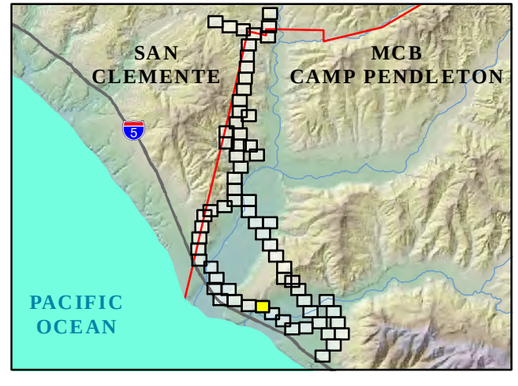


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



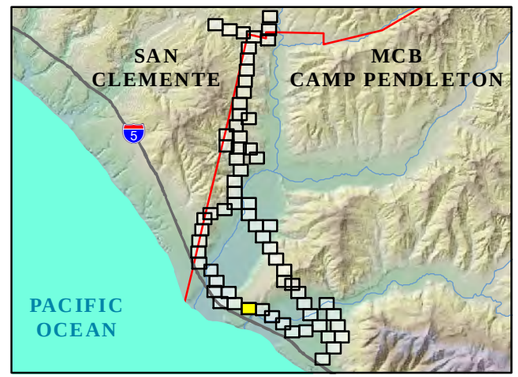
Figure B-55
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

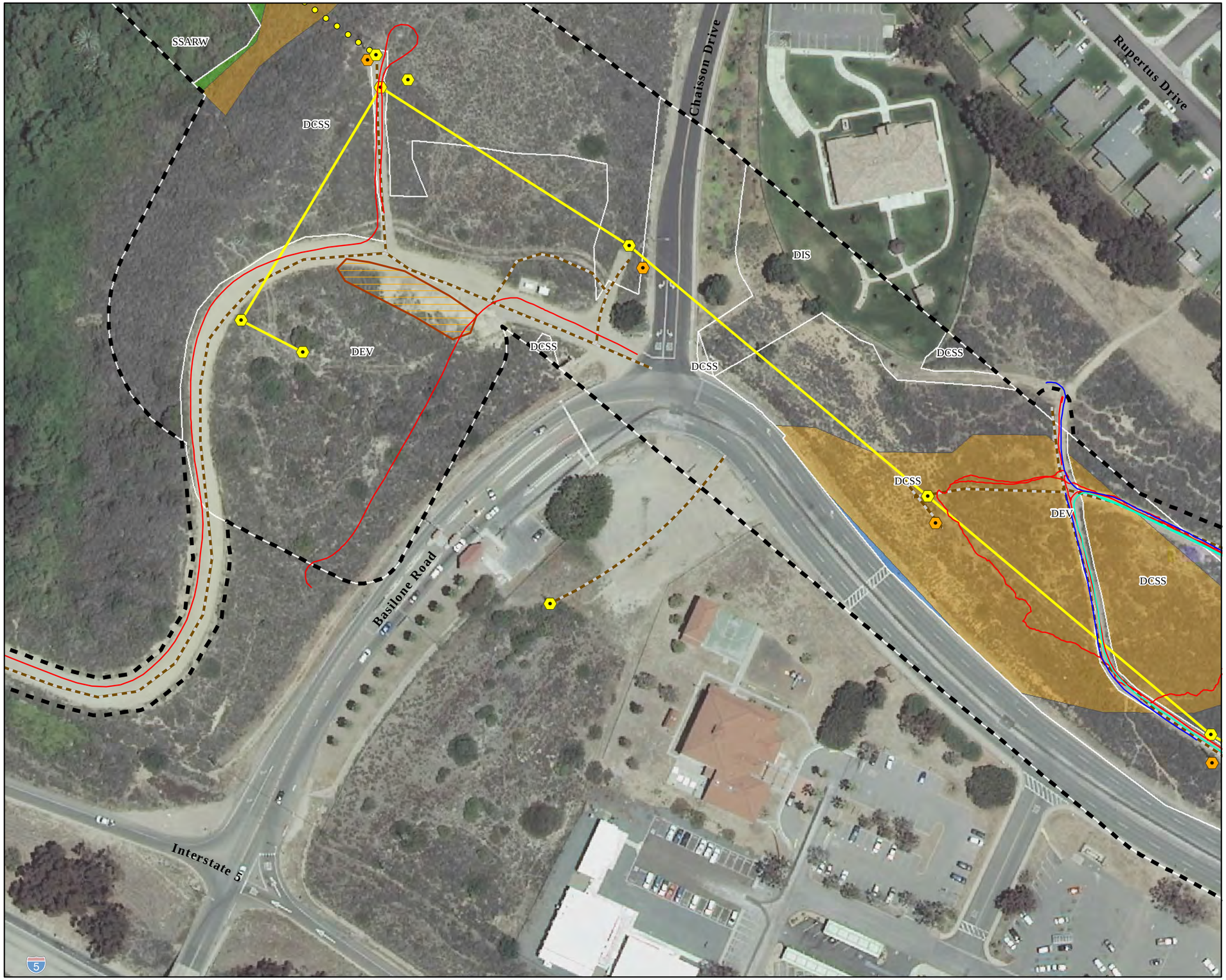


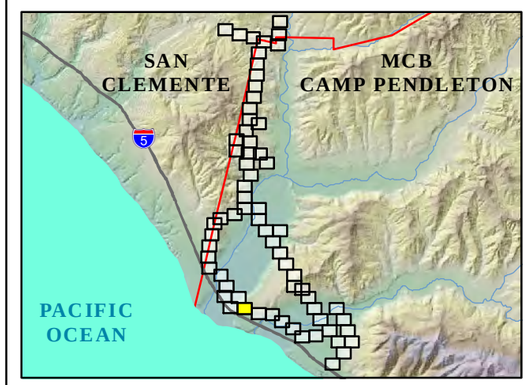
Figure B-56
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Overhead Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS
- Riparian



Meters
0 50
0 200
Feet

Source: SDG&E 2015



Figure B-57
TL695/6971 Rare Plant Survey Results

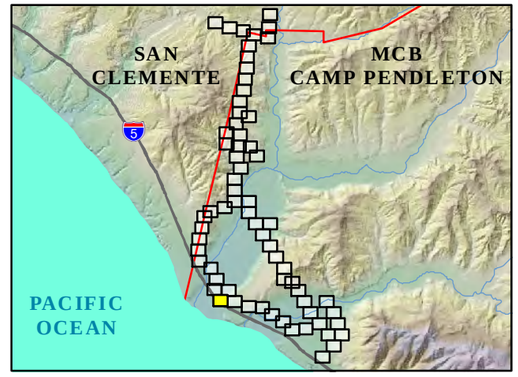
LEGEND

Project Features

- Project Survey Area
- Access Route

Rare Plant Survey Results

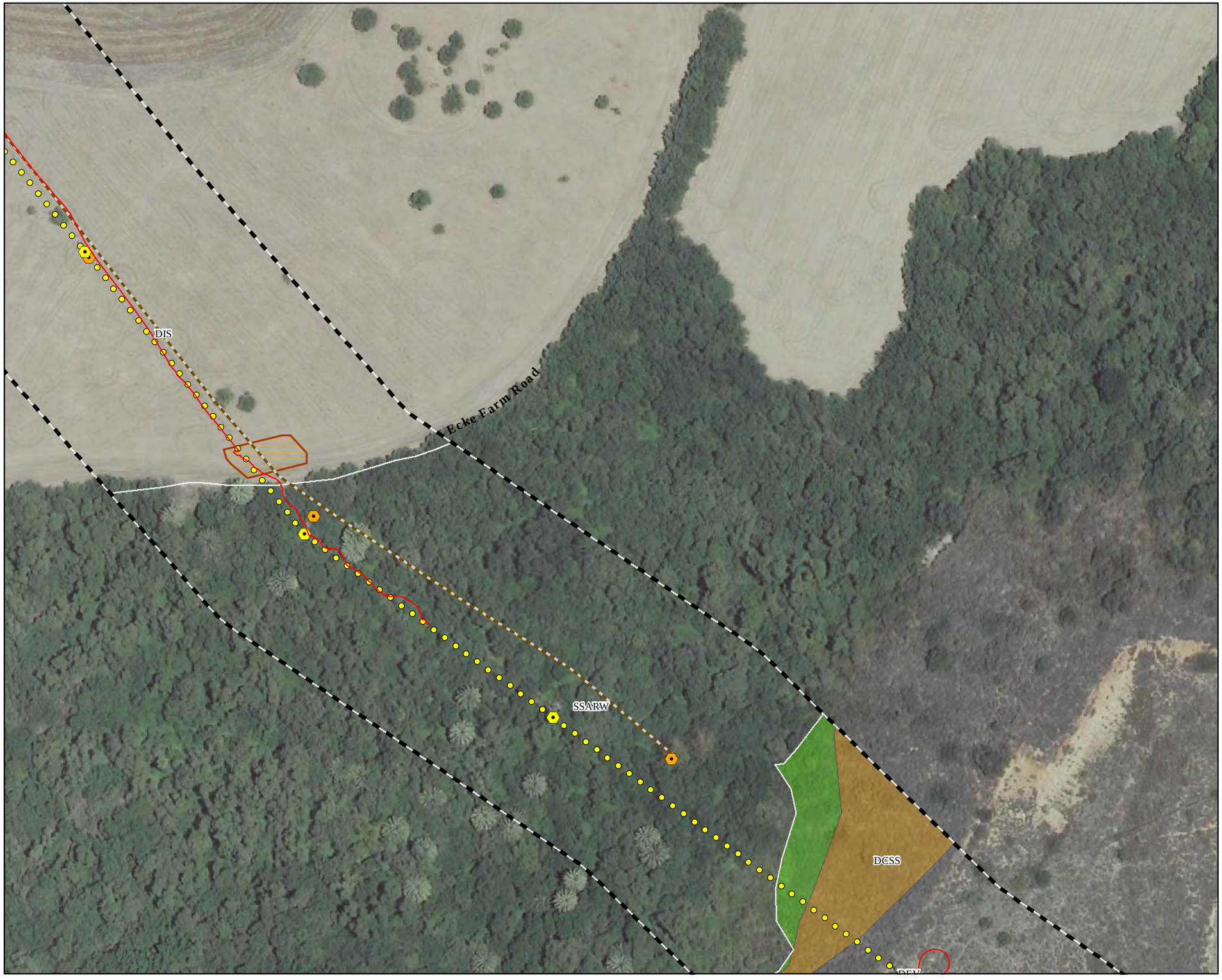
- Survey 1 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-58
TL695/6971 Rare Plant Survey Results

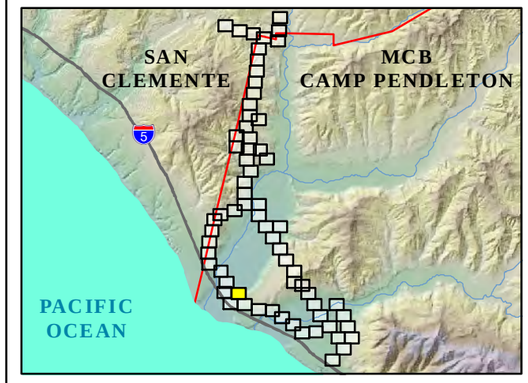


LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS
- Riparian



Meters
0 50
0 200
Feet

Source: SDG&E 2015

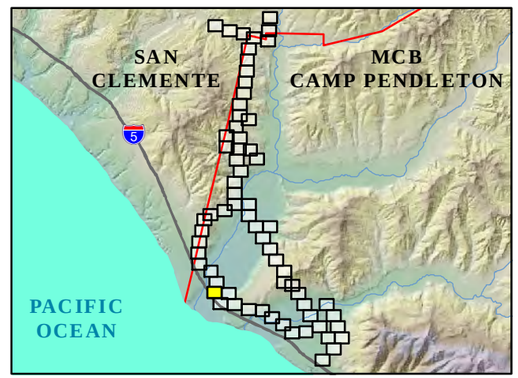


Figure B-59
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015

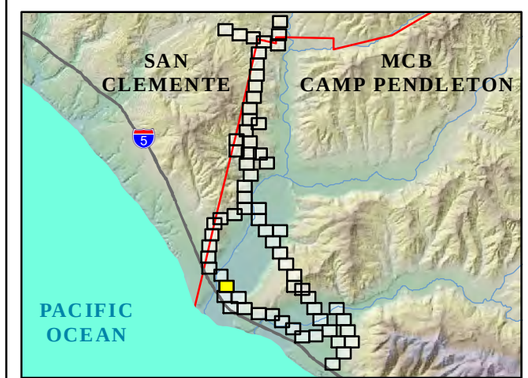


Figure B-60
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect



Meters
0 50
0 200
Feet

Source: SDG&E 2015



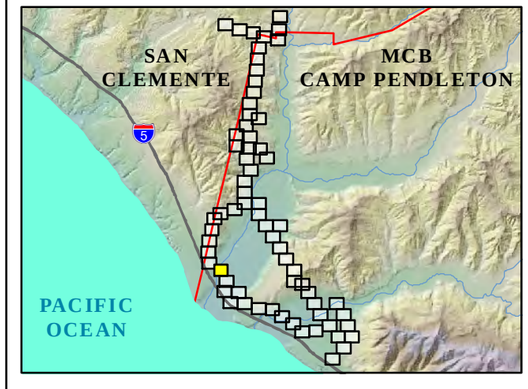
Figure B-61
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole

Rare Plant Survey Results
- Survey 1 Transect

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

Figure B-62
TL695/6971 Rare Plant Survey Results



LEGEND

Project Features

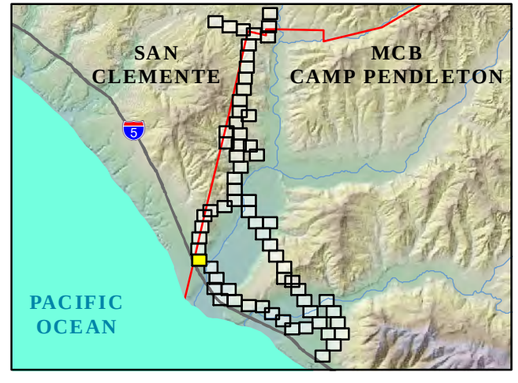
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results

- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect

Unsuitable Potential BRFI Habitat

- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015

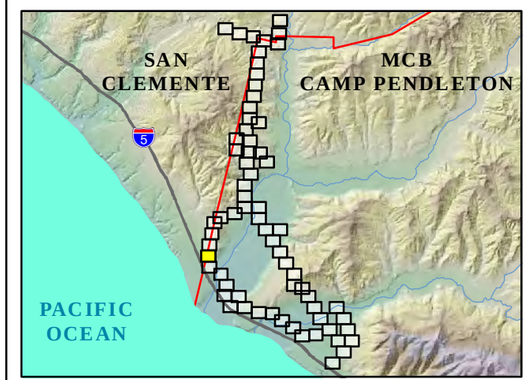


Figure B-63
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

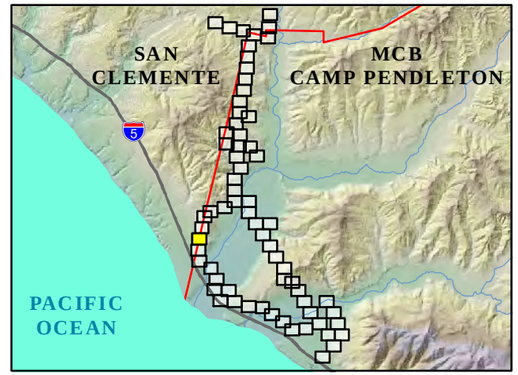


Figure B-64
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

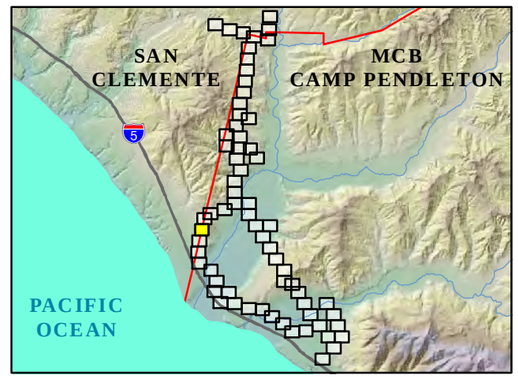


Figure B-65
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat



Meters
0 50
0 200
Feet

Source: SDG&E 2015

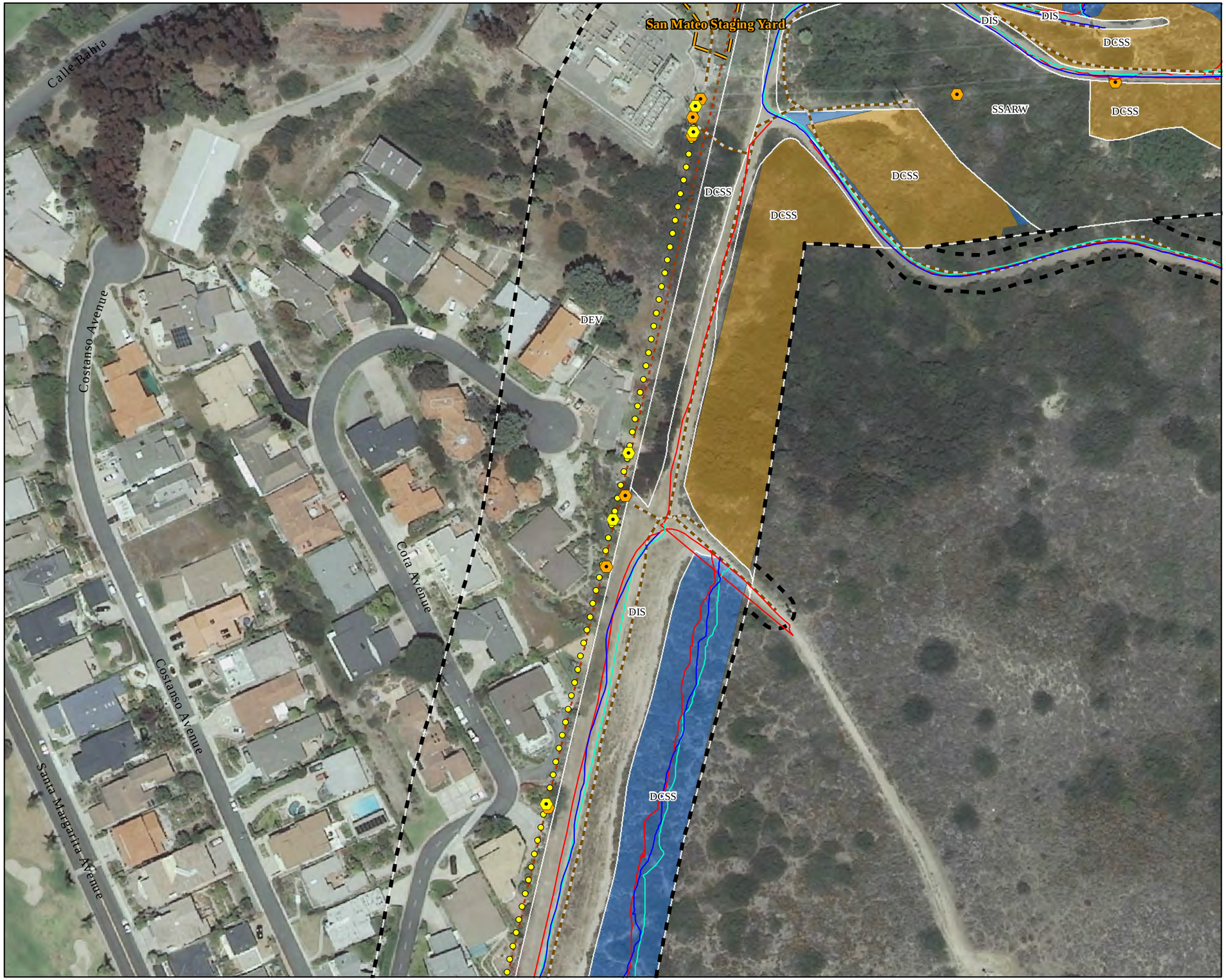


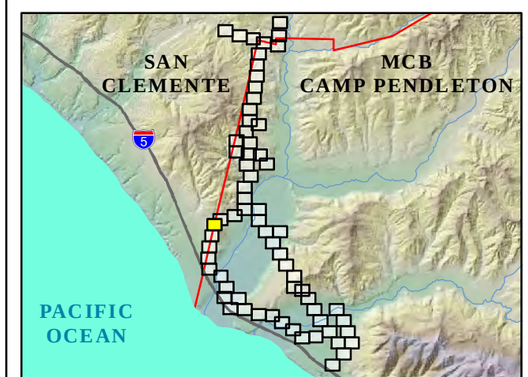
Figure B-66
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

Source: SDG&E 2015



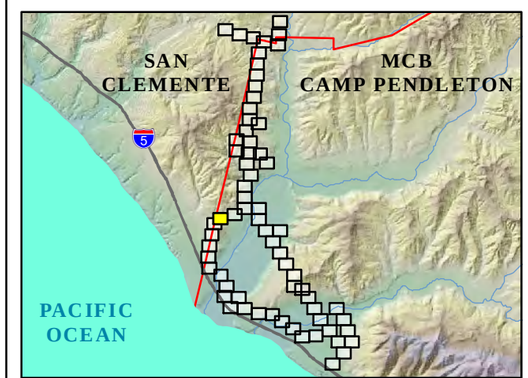
Figure B-67
TL695/6971 Rare Plant Survey Results

LEGEND

Project Features
- Project Survey Area
- Access Route
- Proposed Project Pole Topping Segment
- Proposed Utility Pole
- Staging Yard
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed

Unsuitable Potential BRFI Habitat
- Dense DCSS



Meters
0 50
0 200
Feet

N

Source: SDG&E 2015

Figure B-68
TL695/6971 Rare Plant Survey Results

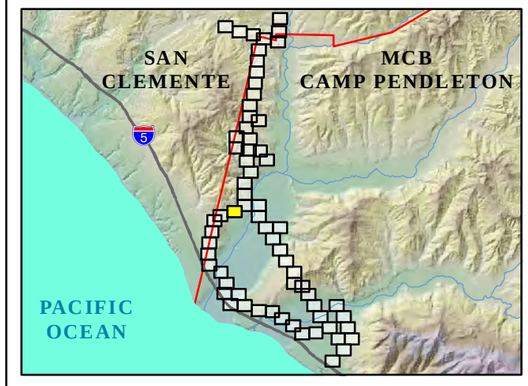


LEGEND

Project Features
- Project Survey Area
- Access Route
- Existing Wood Pole
- Work/Staging/Turnaround Area

Rare Plant Survey Results
- Survey 1 Transect
- Survey 2 Transect
- Survey 3 Transect
- Surveyed Suitable Habitat
- Paniculate Tarweed

Unsuitable Potential BRFI Habitat
- Dense NNGB
- Dense DCSS/NNGB/Recently Burned
- Dense DCSS



Meters
0 50
0 200
Feet

N

Source: SDG&E 2015

APPENDIX C

Plant Species Observed During TL 695/6971 Rare Plant Surveys

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TL 695/6971 Plant List

Family - Scientific Name	Common Name
Ferns and Fern Allies	
Equisetaceae	
Equisetum laevigatum	Smooth Horsetail
Polypodiaceae	
Polypodium californicum	Polypody Fern
Pteridaceae	
Pentagramma triangularis	Goldback Fern
Selaginellaceae	
Seliginella bigelovii	Bigelow's Spike Moss
Dicots	
Adocaceae	
Sambucus nigra ssp. *caerulea*	Blue Elderberry
Aizoaceae	
*Carpobrotus chilensis**	Sea Fig
*Carpobrotus edulis**	Hottentot Fig
*Mesembryanthemum crystallinum**	Common Ice Plant
*Tetragonia tetragonioides**	New Zealand Spinach
Amaranthaceae	
*Amaranthus albus**	Tumbleweed
Anacardiaceae	
Malosma laurina	Laurel Sumac
Rhus integrifolia	Lemonade Berry
*Schinus molle**	Peruvian Pepper
*Schinus terebinthifolius**	Brazilian Pepper
Toxicodendron diversilobum	Poison Oak
Apiaceae	
*Apium graveolens**	Celery
*Conium maculatum**	Poison Hemlock
Daucus pusillus	Rattlesnake Weed
*Foeniculum vulgare**	Fennel
Sanicula crassicaulis	Pacific Sanicle
Apocynaceae	
Asclepias fascicularis	Narrowleaf Milkweed
Asteraceae	
Acourtia microcephala	Sacapellote
Ambrosia psilostachya	Western Ragweed
Artemisia californica	California Sagebrush
Artemisia douglasiana	Mugwort
Artemisia dracunculus	Tarragon
Baccharis pilularis	Coyote Bush
Baccharis salicifolia	Mule Fat
Bebbia juncea	Sweet Bush
Brickellia californica	California Brickelbush
*Carduus pycnocephalus**	Italian Thistle
*Centaurea melitensis**	Tocalote

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Chaenactis glabriuscula var. *glabriuscula*	Yellow Pincushion
Cirsium occidentale	Cobweb Thistle
*Cirsium vulgare**	Bull Thistle
Corethrogyne filaginifolia var. *filaginifolia*	Common Sand Aster
*Cotula coronopifolia**	Brass Buttons
*Cynara cardunculus**	Artichoke Thistle
Deinandra fasciculata	Clustered Tarweed
Deinandra paniculata (CRPR 4.2)	Paniculate Tarplant
Encelia californica	California Encelia
Encelia farinosa	Brittlebush
*Erigeron bonariensis**	Flax-leaved Horseweed
Erigeron foliosus	Leafy Daisy
Eriophyllum confertiflorum	Golden Yarrow
Euthamia occidentalis	Grass-Leaf Goldenrod
*Glebionis coronaria**	Crown Daisy
Grindelia camporum	Gum Plant
*Hedypnois cretica**	Cretanweed
*Helminthotheca echioides**	Bristly Ox Tongue
Heterotheca grandiflora	Telegraph Weed
*Hypochaeris glabra**	Smooth Cat's Ear
Isocoma menziesii	Menzies' Goldenbush
Jaumea carnosa	Fleshy Jaumea
*Lactuca serriola**	Wild Lettuce
Lasthenia californica	California Goldfields
Logfia filaginoides	California Cottonrose
Logfia gallica	Dwarf Cottonrose
*Matricaria discoidea**	Pineapple Weed
Osmadenia tenella	False Rosinweed
Pseudognaphalium biolettii	Bicolor Cudweed
Pseudognaphalium californicum	California Everlasting
*Pseudognaphalium luteoalbum**	Jersey Cudweed
Pseudognaphalium stramineum	Cottonbatting Plant
Psilocarphus tenellus	Slender Woolly Marbles
Rafinesquia californica	California Chicory
*Senecio vulgaris**	Common Groundsel
*Silybum marianum**	Milk Thistle
*Sonchus asper**	Spiney-leaved Sow Thistle
*Sonchus oleraceus**	Common Sow Thistle
Stephanomeria exigua	Small Wirelettuce
Stylocline gnaphaloides	Everlasting Nest Straw
*Taraxacum officinale**	Dandelion
Uropappus lindleyi	Silver Puffs
Venegasia carpesioides	Canyon Sunflower
Xanthium strumarium	Rough Cockleburr
Boraginaceae	

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Amsinckia mensiezii var. *intermedia*	Menzie's Fiddleneck
Cryptantha clevelandii	Common Cryptantha
Cryptantha intermedia	Clearwater Cryptantha
Emmenanthe penduliflora	Whispering Bells
Eucrypta chrysanthemifolia	Spotted Eucrypta
Heliotropium curassavicum	Salt Heliotrope
Phacelia cicutaria var. *hispida*	Caterpillar Phacelia
Phacelia minor	California Bluebell
Pholistoma auritum var. *auritum*	Fiesta Flower
Plagiobothrys collinus	Cooper's Popcorn Flower
Brassicaceae	
*Brassica nigra**	Black Mustard
*Brassica rapa**	Field Mustard
Brassica tournefortii	Saharan Mustard
*Capsella bursa-pastoris**	Shepherd's Purse
Cardamine californica	Milk Maids
*Hirschfeldia incana**	Shortpod Mustard
Lepidium nitidum	Shining Pepperweed
Nasturtium officinale	White Watercress
*Raphanus sativus**	Wild Radish
*Sisymbrium altissimum**	Tumbling Mustard
Cactaceae	
Cylindropuntia prolifera	Coast Cholla
Opuntia littoralis	Coast Prickly Pear
Opuntia oricola	Chaparral Prickly Pear
Opuntia ×occidentalis	Western Prickly Pear
Caryophyllaceae	
Cardionema ramosissima	Sand Mat
*Cerastium glomeratum**	Mouse-eared Chickweed
Polycarpon tetraphyllum	Four Leaved Allseed
*Silene gallica**	Common Catchfly
*Spergularia rubra**	Red Sandspurry
*Stellaria media**	Common Chickweed
Chenopodiaceae	
Atriplex lentiformis	Big Saltbush
Atriplex prostrata	Fat-hen
*Atriplex semibaccata**	Australian Saltbush
Chenopodium californicum	California Goosefoot
Salicornia pacifica	Pickleweed
*Salsola tragus**	Russian Thistle
Cistaceae	
Helianthemum scoparium	Bisbee Peak Rushrose
Cleomaceae	
Peritoma arborea var. arborea	Bladderpod
Convolvulaceae	

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Calystegia macrostegia ssp. *arida*	Southern California Morning Glory
Cressa truxillensis	Spreading Alkali Weed
Cuscuta californica	California Dodder
Dichondra occidentalis (CRPR 4.2)	Western Pony's Foot
Crassulaceae	
Crassula aquatica	Aquatic Pygmy Weed
Crassula connata	Pygmy Weed
*Crassula ovata**	Jade Plant
Dudleya edulis	Fingertips
Dudleya lanceolata	Coastal Dudleya
Dudleya pulverulenta	Chalk Dudleya
Cucurbitaceae	
Cucurbita foetidissima	Calabazilla
Marah macrocarpa	Wild Cucumber
Datiscaceae	
Datisca glomerata	Durango Root
Euphorbiaceae	
Chamaesyce polycarpa	Small Seeded Spurge
Chamaesyce serpens	Creeping Spurge
Croton californicus	California Croton
Croton setigerus	Doveweed
*Euphorbia lathyris**	Gopher Plant
*Ricinus communis**	Castor Bean
Fabaceae	
*Acacia longifolia**	Golden Wattle
Acmispon glaber var. *glaber*	Deer Weed
Acmispon heermannii var. *heermannii*	Heermann's Lotus
Acmispon micranthus	Small Flowered Lotus
Acmispon strigosus	Hairy Lotus
Amorpha fruticosa	Desert Indigobush
Lupinus bicolor	Miniature Lupine
Lupinus succulentus	Arroyo Lupine
Lupinus truncatus	Blunt Leaved Lupine
*Medicago polymorpha**	Bur Clover
*Melilotus albus**	White Sweet Clover
*Melilotus indica**	Indian Sweet Clover
*Trifolium hirtum**	Rose Clover
Vicia sativa ssp. *nigra*	Garden Vetch
*Vicia villosa**	Winter Vetch
Fagaceae	
Quercus agrifolia	Coast Live Oak
Frankeniaceae	
Frankenia salina	Alkali Heath
Gentianaceae	
Zeltnera venusta	Charming Centaury

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Geraniaceae	
*Erodium botrys**	Long Beaked Filaree
*Erodium cicutarium**	Red Stemmed Filaree
*Erodium moschatum**	White Stemmed Filaree
Geranium carolinianum	Carolina Geranium
Grossulariaceae	
Ribes speciosum	Fuschia-flowered Gooseberry
Lamiaceae	
*Lamium amplexicaule**	Henbit Deadnettle
*Marrubium vulgare**	Horehound
Salvia apiana	White Sage
Salvia columbariae	Chia
Salvia mellifera	Black Sage
Lythraceae	
*Lythrum hyssopifolia**	Hyssop Loosestrife
Malvaceae	
Malacothamnus fasciculatus	Chaparral Mallow
*Malva parviflora**	Cheeseweed
Malvella leprosa	Alkali Mallow
Sidalcea sparsifolia	Checker Bloom
Montiaceae	
Calandrinia ciliata	Red Maids
Claytonia perfoliata	Miner's Lettuce
Myrsinaceae	
*Anagallis arvensis**	Scarlet Pimpernel
Nyctaginaceae	
Mirabilis laevis var. *crassifolia*	Wishbone Bush
Onagraceae	
Camissoniopsis bistorta	California Sun Cup
Clarkia purpurea	Purple Clarkia
Epilobium ciliatum	Fringed Willowherb
Oenothera elata	Great Marsh Evening-Primrose
Orobanchaceae	
Castilleja affinis ssp. *affinis*	Coast Indian Paintbrush
Castilleja exserta ssp. *exserta*	Purple Owl's Clover
Oxalidaceae	
*Oxalis pes-caprae**	Bermuda Buttercup
Papavaraceae	
Eschscholzia californica	California Poppy
Romneya coulteri (CRPR 4.2)	Coulter's matilija poppy
Phrymaceae	
Mimulus aurantiacus	Bush Monkey Flower
Mimulus guttatus	Common Monkey Flower
Plantaginaceae	
Antirrhinum nuttallianum ssp. *nuttallianum*	Nuttall's Snapdragon

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Keckiella cordifolia	Heart-leaved Penstemon
Nuttallanthus texanus	Blue Toadflax
*Plantago coronopus**	Cut-leaf Plantain
Plantago elongata	Coast Plantain
Plantago erecta	Dot-seed Plantain
*Plantago lanceolata**	English Plantain
*Plantago major**	Common Plantain
Platanaceae	
Platanus racemosa	California Sycamore
Polemoniaceae	
Linanthus dianthiflorus	Fringed Linanthus
Gilia angelensis	Chaparral Gilia
Polygonaceae	
Chorizanthe staticoides	Turkish Rugging
Eriogonum elongatum	Longstem Buckwheat
Eriogonum fasciculatum	California Buckwheat
Eriogonum gracile	Slender Woolly Buckwheat
Lastarriaea coriacea	Leather Spineflower
Pterostegia drymarioides	Fairy Mist
*Rumex crispus**	Curly Dock
Primulaceae	
Dodecatheon clevelandii ssp. *clevelandii*	Padre's Shooting Star
Ranunculaceae	
Clematis ligusticifolia	Western Virgin's Bower
Delphinium parryi ssp. *parryi*	Parry's Larkspur
Ranunculus californicus	California Buttercup
Rosaceae	
Adenostoma fasciculatum	Chamise
Cercocarpus minutiflorus	Smooth Mountain Mahogany
Drymocallis glandulosa	Sticky Cinquefoil
Heteromeles arbutifolia	Toyon
Rosa californica	California Rose
Rubus ursinus	California Blackberry
Rubiaceae	
Galium angustifolium ssp. *angustifolium*	Narrowleaf Bedstraw
Galium aparine	Common Bedstraw
Galium porrigens	Climbing Bedstraw
Salicaceae	
Populus fremontii	Fremont Cottonwood
Salix exigua	Sandbar Willow
Salix gooddingii	Black Willow
Salix laevigata	Red Willow
Salix lasiolepis	Arroyo Willow
Saururaceae	
Anemopsis californica	Yerba Mansa

TL 695/6971 Plant List

Family - Scientific Name	Common Name
Solanaceae	
Datura wrightii	Sacred Datura
Lycium californicum (CRPR 4.2)	California Boxthorn
*Nicotiana glauca**	Tree Tobacco
Solanum douglasii	Douglas' Nightshade
*Solanum nigrum**	Black Nightshade
Solanum parishii	Parish's Purple Nightshade
Solanum xanti	Purple Nightshade
Tamaricaceae	
*Tamarix ramosissima**	Saltcedar
Urticaceae	
Hesperocnide tenella	Western Nettle
Parietaria hespera var. *hespera*	Pellitory
Urtica dioica	Stinging Nettle
Verbenaceae	
Verbena lasiostachys	Western Verbena
Viscaceae	
Phoradendron macrophyllum	Big Leaf Mistletoe
Monocots	
Agavaceae	
Chlorogalum parviflorum	Smallflower Soap Plant
Hesperoyucca whipplei	Chaparral Yucca
Arecaceae	
*Washingtonia robusta**	Mexican Fan Palm
*Phoenix canariensis**	Canary Island Date Palm
Asphodelaceae	
*Asphodelus fistulosus**	Onion Weed
Cyperaceae	
Carex spp.	Sedge
Cyperus eragrostis	Tall Flatsedge
*Cyperus involucratus**	Umbrella Sedge
Eleocharis macrostachya	Creeping Spike Rush
Schoenoplectus acutus	Hardstem Bulrush
Schoenoplectus californicus	California Bulrush
Juncaceae	
Juncus balticus	Baltic Rush
Juncus mexicanus	Mexican Rush
Juncus rugulosus	Wrinkled Rush
Iridaceae	
Sisyrinchium bellum	Blue Eyed Grass
Liliaceae	
Calochortus splendens	Splendid Mariposa Lily
Melanthiaceae	
Toxicoscordion fremontii	Fremont's Star Lily
Poaceae	

TL 695/6971 Plant List

Family - Scientific Name	Common Name
*Arundo donax**	Giant Reed
*Avena barbata**	Slim Oat
*Avena fatua**	Common Oat
Bothriochloa barbinodis	Beard Grass
*Bromus diandrus**	Ripgut Brome
*Bromus hordeaceus**	Soft Chess Brome
*Bromus madritensis**	Red Brome
Cortaderia selloana	Pampas Grass
Distichlis spicata	Salt Grass
Elymus condensatus	Giant Ryegrass
Festuca microstachys	Small Fescue
*Festuca perennis**	Italian Ryegrass
*Hordeum murinum**	Foxtail Barley
*Lamarckia aurea**	Goldentop Grass
Leptochloa fusca ssp. *uninervia*	Mexican Sprangletop
Melica imperfecta	California Melic
*Phalaris minor**	Mediterranean Canarygrass
*Poa annua**	Annual Bluegrass
*Polypogon monspeliensis**	Rabbitsfoot Grass
*Schismus barbatus**	Mediterranean Grass
Stipa lepida	Foothill Needlegrass
Stipa pulchra	Purple Needlegrass
Themidaceae	
Bloomeria crocea	Goldenstar
Brodiaea filifolia (Federally Threatened)	Thread Leaved Brodiaea
Dichelostemma capitatum	Blue Dicks
Muilla maritima	Common Muilla
Typhaceae	
Typha spp.	Cattail

*Non-Native Species

Appendix D – Wet/Dry Season Fairy Shrimp Reports Cardno 2015

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Final

Wet Season Fairy Shrimp Technical Report for TL 695/6971 Reconductor Project

San Diego Gas & Electric Company

November 2015

Prepared for:
Pangea Biological

Prepared by:
Cardno

Acronyms and Abbreviations

kV	kilovolt	SDFS	San Diego fairy shrimp
		SDG&E	San Diego Gas & Electric Company
MCB	Marine Corps Base	SONGS	San Onofre Nuclear Generating Station
PSA	Project Survey Area	TL	Tie Line
RFS	Riverside fairy shrimp	USFWS	United States Fish and Wildlife Service

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1.0 INTRODUCTION

This Wet Season Fairy Shrimp Technical Report provides the results of United States Fish and Wildlife Service (USFWS) protocol surveys for federally listed fairy shrimp species conducted in support of a Proponent's Environmental Assessment being prepared for San Diego Gas & Electric Company's (SDG&E) Proposed Tie Line (TL) 695/6971 Reconductor[1] Project (i.e., the Proposed Project) in northern San Diego County (Figure 1). Under contract to SDG&E, and subcontracted through Pangea Biological (agreement number PBCARDNO-1001 Task Order 25240.01-001), Cardno conducted USFWS protocol surveys for federally listed fairy shrimp species in the SDG&E TL 695/6971 Reconductor project area.

In accordance with USFWS fairy shrimp presence/absence survey protocol (USFWS 1996), one full wet season (conducted from February to July 2015) presence/absence survey was conducted in the SDG&E TL 695/6971 Reconductor Project Survey Area (PSA) within all potential vernal basin habitats. Dry season tasks such as soil collection, and cyst hatching and identification, will be performed by appropriately certified permitees, and are expected to occur during the summer of 2015. A separate 90-day report will be submitted for dry season sampling activities. All wet season survey activities were completed prior to the USFWS issuance of the new protocol guidelines (USFWS 2015), and therefore conducted in accordance with the valid protocols of the time (USFWS 1996).

2.0 PROPOSED PROJECT AND PROJECT SURVEY AREA

2.1 Project Location and Description

SDG&E proposes to reconductor a 69-kilovolt (kV) power line in northern San Diego County near the border of Orange County. The power line is located primarily on federal military lands in the western portion of Marine Corps Base (MCB) Camp Pendleton (Figure 2). The proposal also includes removing wood poles, installing steel poles, and reconductoring within existing utility corridors and other areas devoted to electric utilities. The 69-kV power line will be reconductored between SDG&E's Talega, Basilone, and Japanese Mesa Substations.

While the Proposed Project components are located primarily in the westerly portion of MCB Camp Pendleton, in San Diego County, California; a portion of the power line alignment extends into the eastern area of the city of San Clemente, in Orange County, California.

As depicted in Figure 2, the northern limit of the reconductor project is located outside MCB Camp Pendleton, to the north and west of the Talega Substation. From this point, the project area runs west before turning south into MCB Camp Pendleton toward the San Mateo Junction (i.e., west of the Sierra Training Area) along the ridge tops of steep hills located to the north and west of Cristianitos Road. The hills in this area lie along the border of San Diego and Orange counties, and occur on lands that have been leased by the federal government to the California Department of Parks and Recreation. From San Mateo Junction, the Proposed Project runs in a southeasterly direction toward the northeastern corner of San Onofre Nuclear Generating Station (SONGS) Mesa. From this point, the Proposed Project extends to the northwest to the Basilone Substation, and to the southwest to the Japanese Mesa Substation. The Proposed Project includes approximately 27 miles of existing dirt roads that will be utilized to access various elements of the Proposed Project for construction activities.

[1] Reconductoring is a term used by utilities to describe the replacement of existing wires with new wires.

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Figure 1
Regional Location of MCB Camp Pendleton and the Proposed Project Area

LEGEND

- Project Area
- County Boundary
- MCB Camp Pendleton Boundary
- Cleveland National Forest Boundary
- State Route or Interstate



Kilometers
0 10
0 10
Miles

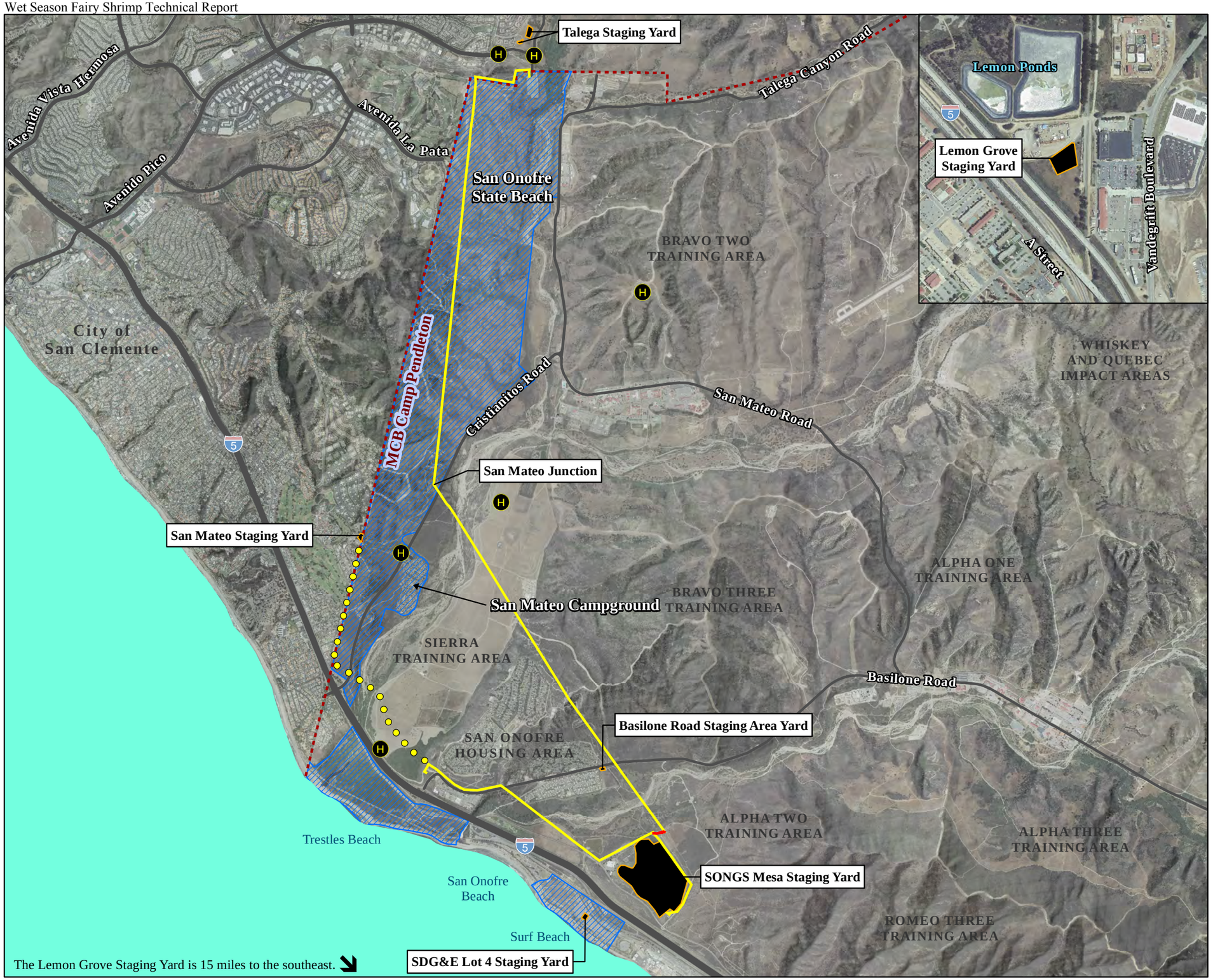


Figure 2
TL695/6971 Proposed Project Area

LEGEND

- MCB Camp Pendleton Boundary
- Proposed Project Overhead Route
- Proposed Project Underground Route
- Proposed Power Line Removal Segement
- Staging Yard
- Helicopter Incidental Landing Area
- State Parks Lease Area



Kilometers
0 2
0 1
Miles

Sources: City of San Clemente 2015, ESRI 2015

2.2 Project Survey Area

The PSA for fairy shrimp surveys consists of a 300-foot buffer that originates from the power line (150-foot buffer on each side of the power line) and a 50-foot buffer around all laydown areas, substations, and stringing sites. In addition, a 20-foot buffer was used on both sides of dirt access roads, of which 11.8 miles occur within the main 300-foot survey buffer and 15.4 miles occur outside of the 300-foot survey buffer. Table 1 details the PSA.

Table 1. TL 695/6971 Fairy Shrimp Project Survey Area

Project Component	Area
Power Line (including 300-foot survey buffer)	393.70 acres
Substations (including 50-foot survey buffer)	
Basilone Substation	1.14 acres
Japanese Mesa Substation	0.28 acres
Talega Substation	7.86 acres
Staging Yards (including 50-foot survey buffer)	
Basilone Staging Yard	1.17 acres
Talega Staging Yard 1 of 2*	3.72 acres
San Mateo Staging Yard	1.31 acres
SONGS Mesa Staging Yard	80.87 acres
SDG&E Lot 4 Staging Yard	1.88 acres
Lemon Grove Staging Yard	1.43 acres
Stringing Sites (including 50-foot buffer)	2.23 acres
TOTAL	**496.90 acres**

Note: *Talega Staging Yard 2 of 2 is a component that was added to the Proposed Project but is located outside of the PSA.

3.0 BACKGROUND

Fairy shrimp are small, translucent crustaceans that are found in ephemeral (vernal) pools and occasionally in depressions (road ruts and ditches) that support suitable ponded habitat. When water begins to pond after the commencement of the rainy season, shrimp begin to hatch from encysted embryos (cysts). Two federally listed fairy shrimp species are known to occur in San Diego County, Riverside fairy shrimp (RFS) (*Streptocephalus woottoni*) and San Diego fairy shrimp (SDFS) (*Branchinecta sandiegonensis*), both of which are described below. Threats to both species include habitat loss and degradation due to urban and agricultural development, off-road vehicle use, vehicle trampling, and flood control measures (USFWS 2008a, 2008b). Both RFS and SDFS are known to co-occur with the more common, non-listed, versatile fairy shrimp (*Branchinecta lindahli*).

3.1 Riverside Fairy Shrimp

The RFS is a medium sized fairy shrimp, typically 0.5 to 1.0 inch that is generally restricted to vernal pools and other non-vegetated ephemeral pools greater than 12 inches in depth in Riverside, Orange, and San Diego counties in southern California, and northwestern Baja California, Mexico (USFWS 2008a). The northern range of RFS is defined by Skunk Hollow and the Santa Rosa Plateau in Riverside County and coastal sites in San Diego and Orange counties. The species is documented in one vernal pool complex on Marine Corps Air Station Miramar, throughout MCB Camp Pendleton, and eight vernal pool complexes on Otay Mesa (MCB Camp Pendleton 2012). The USFWS listed the RFS as federally endangered on August 3, 1993 (USFWS 1993).

The RFS has the most limited range of any endemic California (including Baja California) fairy shrimp and is currently only known to occupy approximately 45 vernal pool complexes (approximately 200 occupied basins) (USFWS 2008a). More than half of all extant complexes known to contain RFS are in San Diego County, including eight complexes (containing at least 81 basins) on MCB Camp Pendleton (MCB Camp Pendleton 2012, USFWS 2008a).

3.2 San Diego Fairy Shrimp

The SDFS is a small fairy shrimp (growing to 0.6 inch) that is generally found in smaller, shallower (2 to 12 inches deep) vernal pools and ephemeral basins than RFS and occasionally in depressions such as ditches and road ruts (MCB Camp Pendleton 2012, USFWS 2008b). The USFWS listed the SDFS as federally endangered on February 3, 1997 (USFWS 1997).

SDFS are only known to occur in approximately 137 vernal basin complexes in San Diego, Orange, and Santa Barbara counties, and northwestern Baja California, Mexico, with the majority of occupied habitat being in San Diego County (USFWS 2008b).

4.0 METHODS

Before initiating the wet season surveys, a 15-day notice of intent (notification) letter was sent to the USFWS Carlsbad Field Office requesting permission to conduct surveys for the presence of listed fairy shrimp. The wet season sampling notification letter was submitted on February 5, 2015 and approved on March 2, 2015 (Appendix A).

Fairy shrimp surveys were conducted in accordance with the Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods (USFWS 1996)[2]. Surveys were conducted by USFWS permitted fairy shrimp and vernal pool biologists Richard Stolpe (Permit TE-25864A-0) and Clint Scheuerman (Permit TE-44855A-0).

Before beginning focused surveys, site reconnaissance surveys were conducted by Cardno, SDG&E, and Pangea Biological personnel to determine suitable vernal basin habitat. During site reconnaissance surveys, all potential vernal basins were documented and mapped in the field using a global positioning system unit with a sub-meter level accuracy receiver. The location of potential vernal basins was provided to Cardno prior to initiating fairy shrimp surveys. This information was used to prepare the 15-day wet season notice of intent that was sent to USFWS.

Per guidance from SDG&E and Pangea Biological, fairy shrimp surveys were restricted to seven previously identified basins in the survey area. However, during the course of wet season sampling, any unexpected and undocumented ponded features encountered within the PSA were also inspected for potential vernal pool characteristics or diagnostic species. If warranted, these basins were surveyed for fairy shrimp presence.

As a result of the timing of the project, wet season sampling commenced following a substantial rainfall event at the end of February 2015 and subsequent permission to proceed from the USFWS. Sampling events occurred between the dates of March 6 and July 29[3], 2015. During that time, basins identified as

[2] On May 31, 2015, new survey guidelines (the first in nearly 30 years) for conducting activities for federally listed large branchiopods were issued by USFWS (USFWS 2015). Therefore, wet season reporting for the Proposed Project follows the survey guidelines it was initiated under (USFWS 1996), which were valid at the time of the surveys.

[3] The later-than-normal end date for wet season surveys was driven by late season sufficient ponding events coupled with the finding of fairy shrimp in similar basins on coastal Camp Pendleton (for a different project) on July 28.

having potentially suitable vernal fairy shrimp habitat were mapped, photographed, and then surveyed for the duration of the wet season. Locations of all suitable vernal basins are provided on figures in Appendix B. During the wet season, each basin was surveyed approximately once every two weeks following sufficient ponding (rain) events until dry. A photographic record of surveyed basins is provided in Appendix C.

During each site visit, basin bottoms, edges, and vertical water columns were sampled using an aquarium net with mesh size no larger than 0.125 (1/8) inch (0.318 cm). Specimens collected from each basin numbered less than the maximum of 20 specimens and/or less than 10 percent of the estimated population per USFWS protocol. Only sexually mature individuals were collected. If a federally listed fairy shrimp was recovered from any of the basins during the wet season sampling, the fairy shrimp survey for that basin would have been considered complete under the protocol guidelines.

5.0 RESULTS

Results of vernal basin mapping and fairy shrimp surveys in the SDG&E TL 695/6971 Reconductor Project PSA are provided on figures in Appendix B and Table 2 below. Individual Vernal Pool Data Sheets are provided by date in Appendix D.

All surveyed basins were non-naturally occurring disturbed depressions, ruts, and/or swales. No federally listed fairy shrimp species were observed in the PSA; however, eight basins did contain the non-listed versatile fairy shrimp (*Branchinecta lindahli*). Two additional basins contained fairy shrimp that were not fully identified. The first of these basins, Basin 5-1, was observed in the field to contain fairy shrimp that were visually identifiable[4] to the *Branchinecta* genus. However, this observation was made during pre-survey reconnaissance. Additionally, this basin was initially thought to be outside of the project area. Therefore, Basin 5-1 was not sampled at that time and fairy shrimp were not observed in Basin 5-1 after that encounter. The second of these basins, Basin 33-3, contained fairy shrimp that were deceased and decaying in mud (casts), and, therefore, were unable to be sampled. Fairy shrimp were not encountered in this basin after that encounter; however, when this basin is full it appears to share hydrology with Basin 33-4, which contains the non-listed versatile fairy shrimp (*Branchinecta lindahli*). Both of the basins containing undetermined fairy shrimp likely contained *Branchinecta lindahli*, based upon the shallowness of the basins, relatively brief ponding durations, size and appearance characteristics of the shrimp, and in the case of Basin 33-3 connectivity to another basin containing *Branchinecta lindahli*. However, lab confirmation of samples would be needed to make a satisfactory determination of species.

As noted, Table 2 presents the results of the 2014-2015 wet season fairy shrimp surveys in the SDG&E TL 695/6971 Reconductor PSA.

[4] In-the-field identification made by USFWS permitted fairy shrimp biologists Richard Stolpe (TE-25864A-0).

Table 2. TL 695/6971 Basins Containing Fairy Shrimp, 2014-2015 Wet Season

Basin ID	Approximate Lat./Long.	Dates Visited (Ponding = Bold)	Observed Species	Estimated Population	Wet Season Surveyed
Basin 5-1	33°26'39.17"N, 117°34'49.54"W	**2/3**; 3/20; 4/29; 5/12; 7/29	*Branchinecta species*	100s	No[1]
Basin 7-1	33°26'17.12"N, 117°34'52.64"W	2/3; 3/20; 5/12	None	-	Yes
Basin 21-1	33°23'3.94"N, 117°34'14.56"W	2/3; **3/6, 9, 13, 20**, 26; 4/2; 5/20; **7/21, 29; 9/9**	*Branchinecta lindahli*	100s	Yes
Basin 21-2	33°23'2.88"N, 117°34'12.98"W	2/3; **3/6, 9, 13, 20**, 26; 4/2; 5/20; 7/21, 29	*Branchinecta lindahli*	1,000s	Yes
Basin 21-3	33°22'59.32"N, 117°34'7.84"W	2/3; 3/6, 9, 13, 20, 26; 4/2; 5/20; 7/21, 29	None	-	Yes
Basin 23-2	33°22'56.69"N, 117°33'20.04"W	2/3; 3/6, 9, 13, 20, 26; 4/2; 5/20; 7/21	None	-	Yes
Basin 23-4	33°22'55.79"N, 117°33'19.01"W	**2/3; 3/6, 9, 13, 20, 26; 4/2, 6**, 21; 5/20; 7/21	None	-	Yes
Basin 23-8	33°22'59.05"N, 117°33'15.99"W	**5/20**; 7/21	*Branchinecta lindahli*	10s	Yes
Basin 24-1	33°22'30.01"N, 117°32'57.59"W	2/3; **3/6, 9, 13**, 20; 4/2	*Branchinecta lindahli*	1s	Yes[2]
Basin 33-1	33°23'10.20"N, 117°33'35.19"W	2/3; **3/6, 9, 13, 20, 26**; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	10,000s	Yes
Basin 33-2	33°23'9.80"N, 117°33'39.02"W	2/3; **3/6, 9, 13**, 20, 26; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	100s	Yes
Basin 33-3	33°23'11.38"N, 117°33'38.02"W	2/3; **3/6**, 9, 13, 20, 26; 4/2; 5/20; 7/21	Undetermined[3]	10s	Yes
Basin 33-4	33°23'12.03"N, 117°33'38.01"W	2/3; **3/6, 9**, 13, 20, 26; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	10s	Yes
Basin 33-10	33°23'1.02"N, 117°33'29.47"W	2/3; **3/6, 9, 13**, 20, 26; 4/2; 5/1, **20**; 7/21	*Branchinecta lindahli*	1000's	Yes
Basin 33-11	33°23'2.83"N, 117°33'27.04"W	2/3; **3/6**, 9, 13, 20, 26; 4/2; 5/20; 7/21	None	-	Yes

Notes: [1]Visual observation determined in the field by R. Stolpe during pre-survey reconnaissance. At the time of the observation, it was assumed that this basin would not be within the project area.
[2]Only one sampling event occurred in this basin, and it has been targeted for request for future surveys.
[3]Undetermined = fairy shrimp observed in dry/drying mud, but unable to sample.

6.0 DISCUSSION

No federally listed fairy shrimp species were identified in any of the surveyed basins in the SDG&E TL 695/6971 Reconductor PSA during wet season sampling. The non-listed versatile fairy shrimp was observed in eight basins; however, this species is not afforded any protection under the federal Endangered Species Act. Two basins contained undetermined fairy shrimp; one *Branchinecta* species (but likely *Branchinecta lindahli*), and the other unknown genus but also likely *Branchinecta lindahli.* A lab confirmation of species from the basins containing undetermined fairy shrimp would be needed to make a satisfactory determination of species.

This is an interim report; a separate 90-day report will be submitted for dry season sampling activities, and both reports will be combined in a Final Fairy Shrimp Report at the conclusion of the project.

7.0 REFERENCES

MCB Camp Pendleton. 2012. Integrated Natural Resource Management Plan Marine Corps Base and Marine Corps Air Station Camp Pendleton. Assistant Chief of Staff, Environmental Security. http://www.marines.mil/unit/basecamppendleton/Pages/BaseStaffandAgencies/Environmental/NaturalResourcesManagementPlan/Home.aspx.

USFWS. 1993. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp. U.S. Fish and Wildlife Service. Federal Register 58: 41384-41392.

USFWS. 1996. Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods. 19 August.

USFWS. 1997. Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for the San Diego Fairy Shrimp. U.S. Fish and Wildlife Service. Federal Register 62: 4925-4939.

USFWS. 2008a. Riverside Fairy Shrimp (*Streptocephalus wootoni*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Carlsbad Office. Carlsbad, California. September.

USFWS. 2008b. San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Carlsbad Office. Carlsbad, California. September.

USFWS. 2015. Survey Guidelines for the Listed Large Branchiopods. Pacific Southwest Region. May 31.

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APPENDIX A

15-Day Notification for Wet Season Fairy Shrimp Surveys

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Clint Scheuerman
1941 Devaul Ranch Drive
San Luis Obispo, CA • 93405
Phone: (760) 809-4236
Email: clint.scheuerman@cardno-gs.com

February 5, 2015

Ms. Stacey Love
Recovery Permits Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA. 92008

SUBJECT: 15-day notification for 2015 wet season fairy shrimp surveys on Marine Corps Base Camp Pendleton in San Diego County, California in support of the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project

Dear Ms. Love,

I am writing to request permission for myself and/or my coworker, Mr. Richard Stolpe (please see permit information below), to conduct wet season branchiopod sampling at 7 vernal pools/ponded basins on Marine Corps Base Camp Pendleton. All of the vernal pools/ponded basins are located within the USGS SAN CLEMENTE 7.5' Quadrangle (please see Enclosure 1). The surveys would be conducted as part of the environmental analysis for the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project. The Proposed Project would replace conductor wire and poles within San Diego Gas and Electric's right-of-way along a 9-mile-long transmission corridor located in the western portion of Marine Corps Base Camp Pendleton. I realize that the surveys would be conducted after the first rains of the year, and so, I am requesting that we be able to begin the surveys as soon as possible. The vernal pool/ponded basin IDs and approximate coordinates are presented below and their locations are shown on the accompanying maps in Enclosure 1. Surveys will be conducted to collect baseline information in vernal pools that have not yet been surveyed for the presence of listed branchiopods. Based on preliminary analysis, these are the only features that need to be surveyed for listed vernal pool branchiopods are:

- Basin 1 (-117.570724, 33.384421)
- Basin 2 (-117.549498, 33.375085)
- SP_69001 (-117.579559, 33.436922)
- SP_69002 (-117.579302, 33.436169)
- SO_83001 (-117.555300, 33.382141)
- SO_83002 (-117.555526, 33.382433)
- SO_84001 (-117.557502, 33.384114)

Should, during the course of surveys, other features be located that require sampling, we will notify you at once before proceeding.

As a subcontractor to Pangea Biological for services provided to San Diego Gas and Electric Company for our employer Cardno, I, Clint Scheuerman, and/or Richard Stolpe will conduct the 2015 wet season branchiopod surveys. The branchiopod surveys will be conducted in accordance with the most recent guidelines published by the Service under Section 10(a)(1)(A) of the Endangered Species Act for wet season surveys.

Please refer to attached site maps of the areas we intend to survey. As always, please do not hesitate to contact me with any questions, or if I can provide anything further.

Very Respectfully,

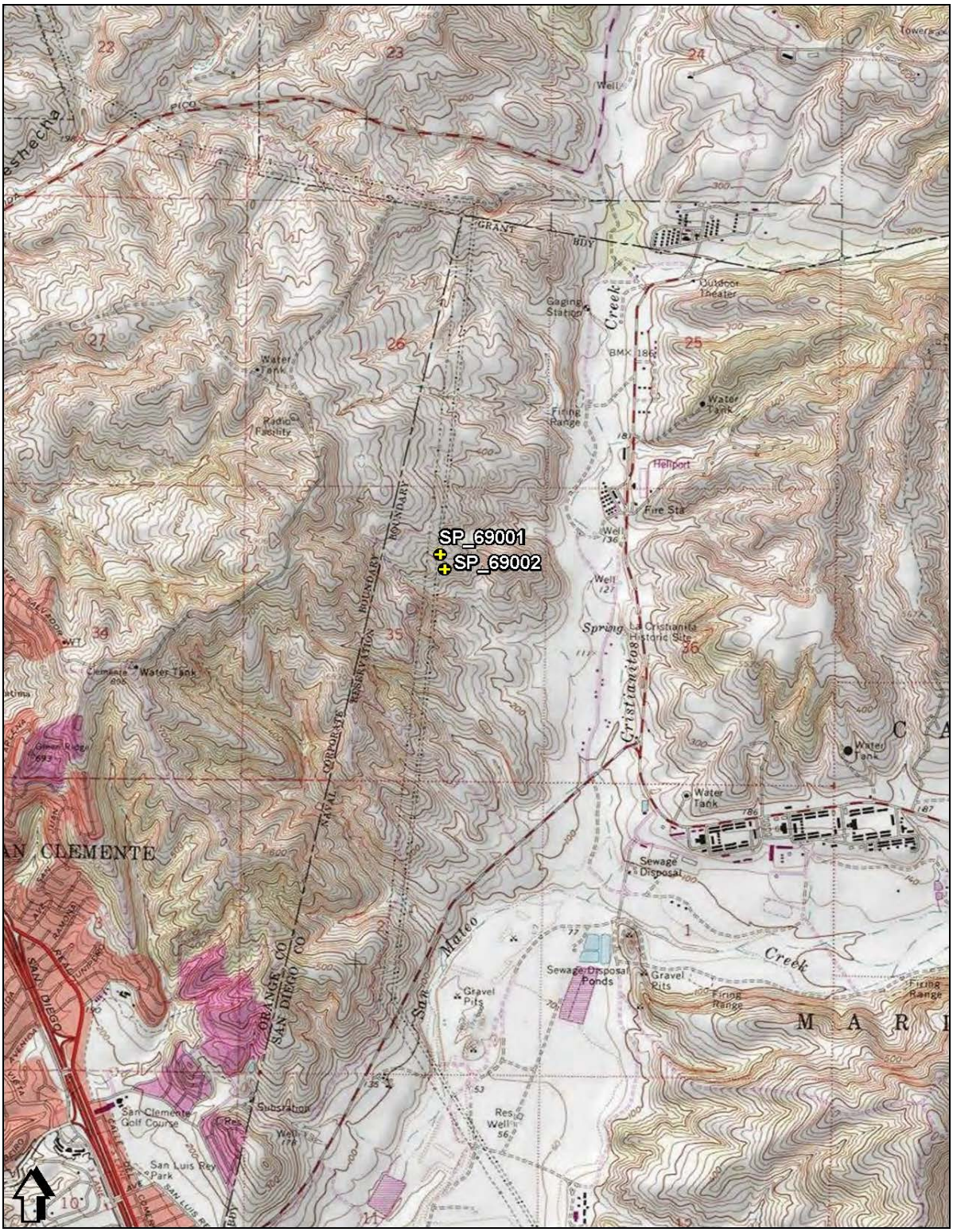


Clint Scheuerman

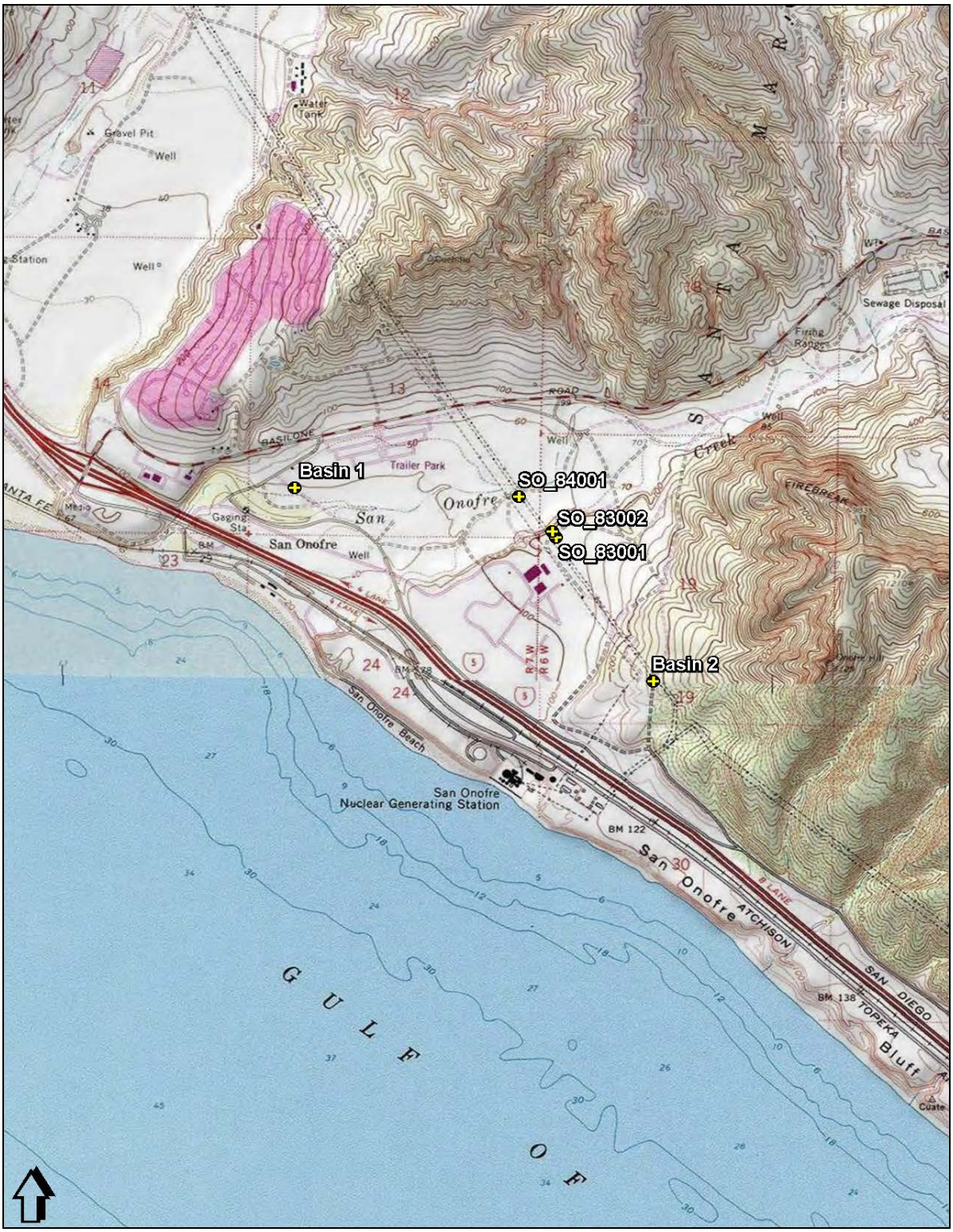
Contact Information
Clint Scheuerman, Cardno (Recovery Permit TE-44855A-1)
1941 Devaul Ranch Drive
San Luis Obispo, CA 93405
Phone: (760) 809-4236
Email: clint.scheuerman@cardno-gs.com

Richard Stolpe, Cardno (Recovery Permit TE-25864A-0)
514 Via De La Valle, Suite 308
Solana Beach, CA 92075
Phone: (858) 509-3157
Email: richard.stolpe@cardno-gs.com

Enclosure 1. Vernal Pool/Ponded Basin Locations for the TL 695 Project
in the USGS SAN CLEMENTE 7.5' Quadrangle



Enclosure 1. Vernal Pool/Ponded Basin Locations for the TL 695 Project
in the USGS SAN CLEMENTE 7.5' Quadrangle



From: Beck, Peter [mailto:peter_beck@fws.gov]
Sent: Monday, March 02, 2015 3:06 PM
To: Scheuerman, Clint
Cc: Stacey_Love@fws.gov; Barker, Scott; Stolpe, Richard; Jonathan Snyder
Subject: Re: TL 695/6971 ets 25240.01 – Wet Season Fairy Shrimp Notification

Clint,
Yes, if there is adequate ponding out there I think it makes sense to go ahead with the surveys now. Although I wouldn't normally directly approve such a request, considering our recent phone exchange, Stacey agreed I could go ahead and indicate our approval to save some time. Thanks for being patient and following up on this.
Sincerely,
Pete

****

Peter P. Beck
Fish & Wildlife Biologist
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008
Phone: (760) 431-9440 x213

On Mon, Mar 2, 2015 at 1:34 PM, Scheuerman, Clint <Clint.Scheuerman@cardno-gs.com> wrote:

Hi Stacey and Pete,

I received a voice message from Pete a couple weeks ago regarding our Notification of Intent to Conduct Wet Season Surveys at MCB Camp Pendleton. We ended up in a bit of phone-tag and never had a chance to talk, but we both agreed that at the time and with the dry weather patterns we were having, that it was too late in the season to conduct wet season surveys. However, with recent rains, it is likely that many of the vernal pools and other ponded basins in the area have ponded once again. Therefore, I am writing to check in with you and request your permission to begin wet season surveys as soon as possible. I appreciate your input and decision.

Respectfully,

Clint Scheuerman

SENIOR BIOLOGIST/WETLAND SCIENTIST
CARDNO, GOVERNMENT SERVICES DIVISION
Phone (+1) 805-755-6698 Mobile (+1) 760-809-4236
Address 1941 Devaul Ranch Drive, San Luis Obispo, CA 93405 USA

From: Scheuerman, Clint
Sent: Thursday, February 05, 2015 2:56 PM
To: Stacey_Love@fws.gov
Cc: 'teasely@semprautilities.com'; 'amy@pangeabiological.com'; 'ppotenza@pangeabiological.com'; 'msaplanning@pangeabiological.com'; Stolpe, Richard; Barker, Scott
Subject: TL 695/6971 ets 25240.01 – Wet Season Fairy Shrimp Notification

Dear Ms. Love,

Please find attached a request to conduct wet season surveys for listed vernal pool branchiopods in support of the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project. All pertinent project and survey information is presented in the request. Please feel free to contact me should you have any questions or concerns.

Very Respectfully,

Clint Scheuerman

SENIOR BIOLOGIST/WETLAND SCIENTIST
CARDNO, GOVERNMENT SERVICES DIVISION

Cardno
Shaping the Future

Phone (+1) 805-755-6698 Mobile (+1) 760-809-4236
Address 1941 Devaul Ranch Drive, San Luis Obispo, CA 93405 USA
Email clint.scheuerman@cardno-gs.com Web www.cardno.com

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APPENDIX B

TL 695/6971 2014-2015 Wet Season Fairy Shrimp Survey Results

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Unincorporated Orange County

City of
San Clemente

MCB
CAMP PENDLETON

B-1

B-2

B-3

B-4

B-5

B-6

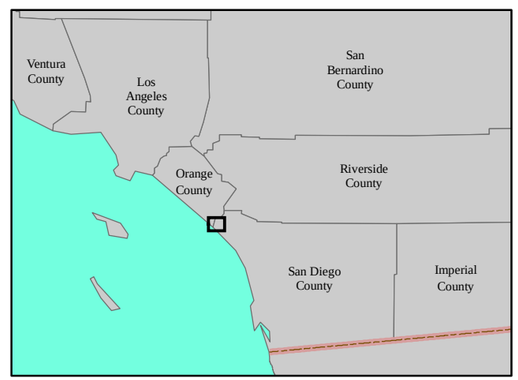
B-7

5

Figure B-1
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results Overview

LEGEND

- Appendix B Figure Extent
- Proposed Project Overhead Route
- Proposed Project Pole Topping Segment
- MCB Camp Pendleton Boundary
- State Route or Interstate



Kilometers
0 2
0 1
Miles

N



Figure B-2
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results

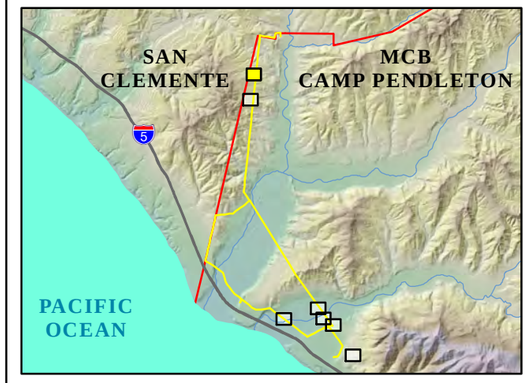
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Survey Area
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary

Wet Season Fairy Shrimp Survey Results

- Not Surveyed



Meters
0 50
0 200
Feet

N



Figure B-3
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results

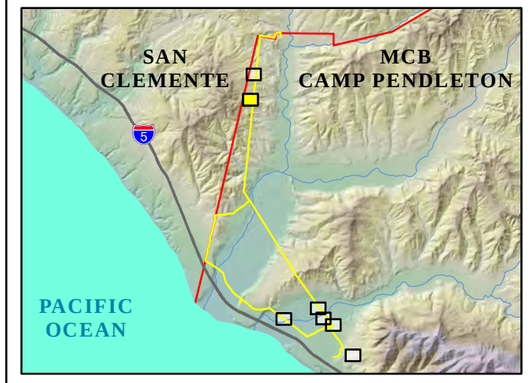
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Survey Area
- Proposed Utility Pole
- Existing Wood Pole
- MCB Camp Pendleton Boundary
- Work/Staging/Turnaround Area

Wet Season Fairy Shrimp Survey Results

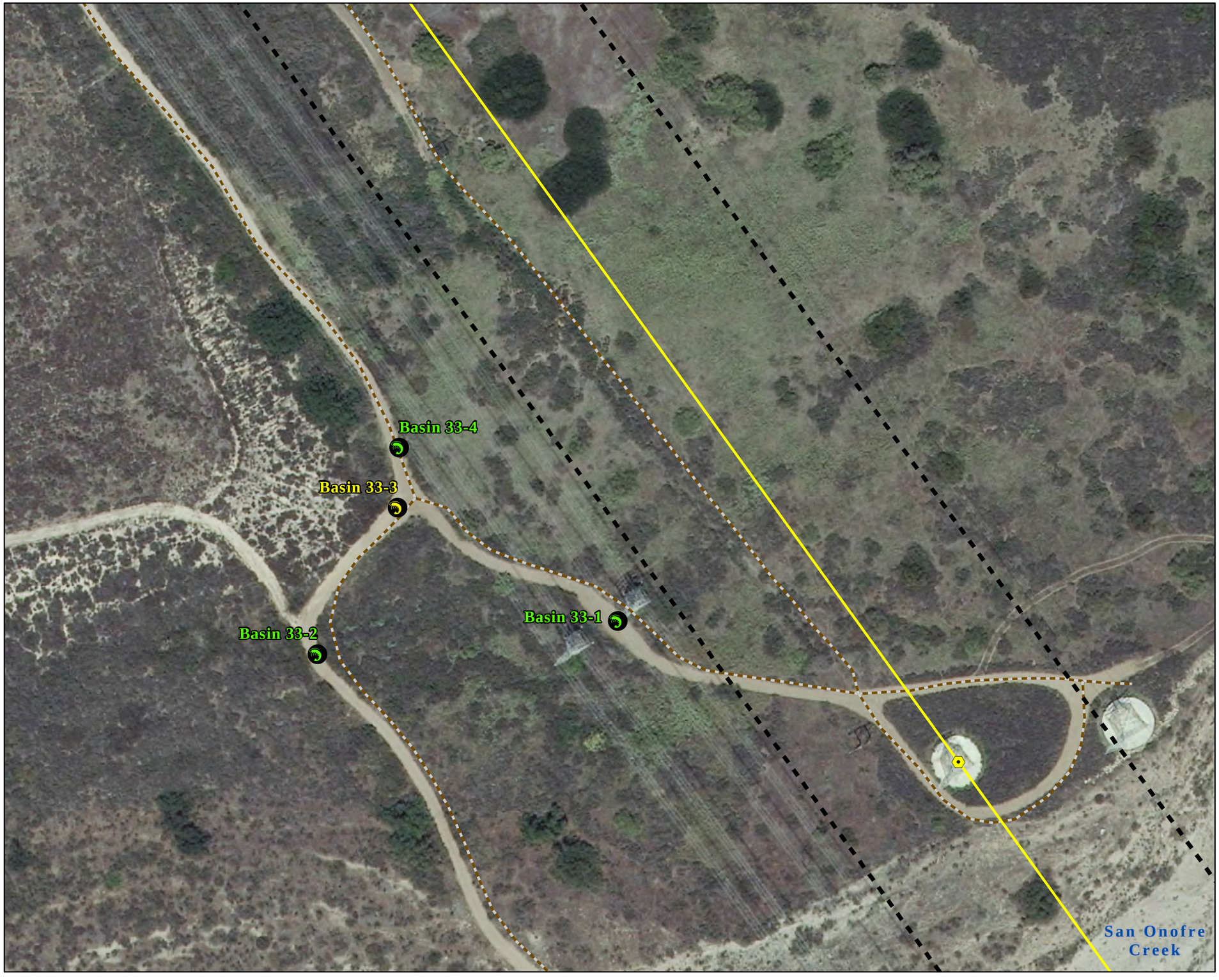
- No Fairy Shrimp Observed



Meters
0 50
0 200
Feet

N

Figure B-4
TL695/6971 2014-2015 Wet Season Fairy Shrimp Survey Results



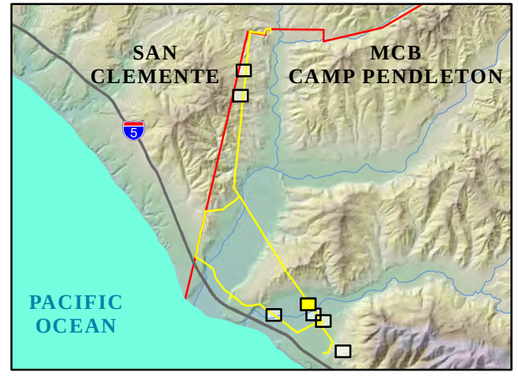
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Survey Area
- Proposed Utility Pole

Wet Season Fairy Shrimp Survey Results

- Contains Fairy Shrimp (Undetermined)
- Contains Versatile Fairy Shrimp



Meters
0 50
0 200
Feet

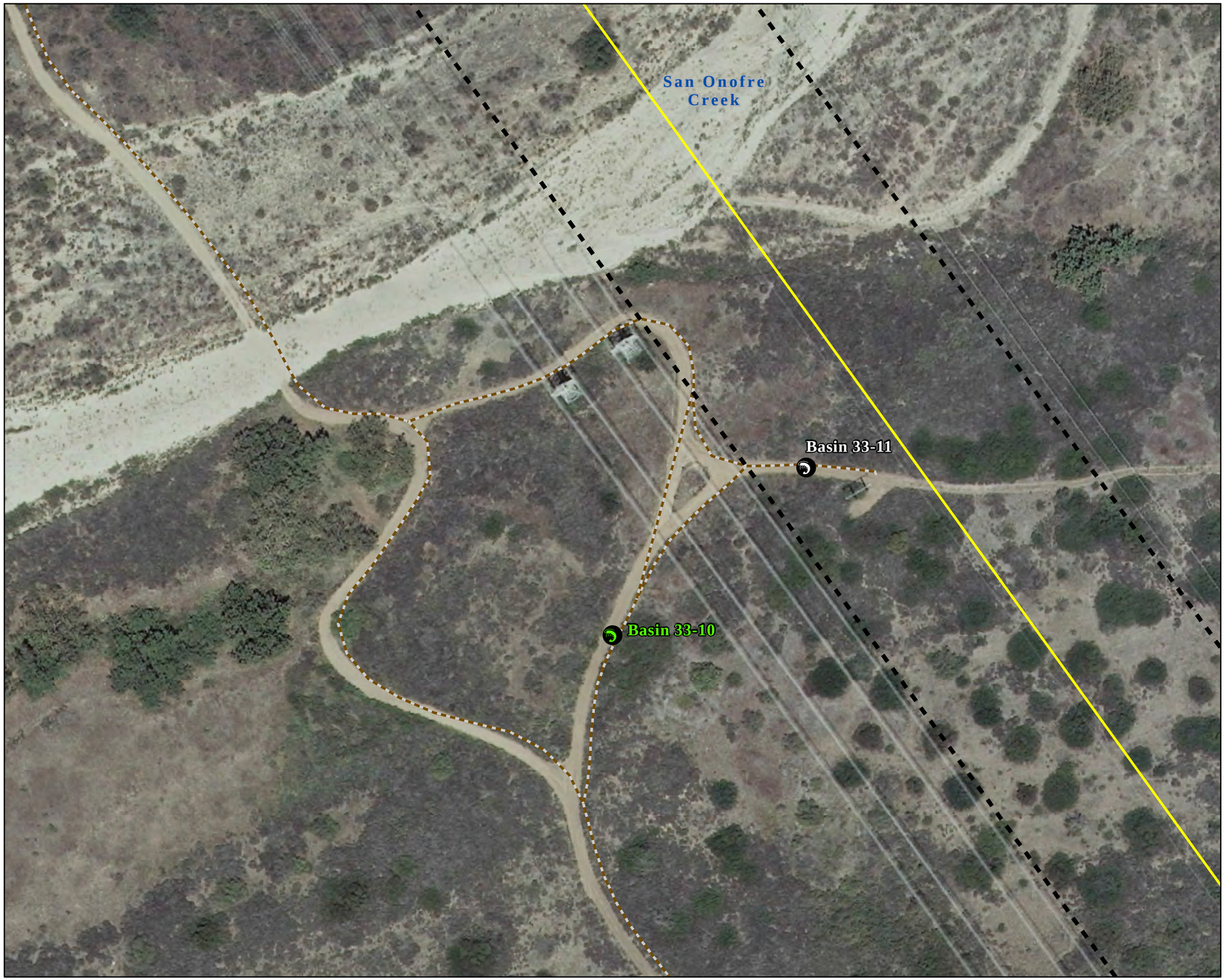


Figure B-5
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results

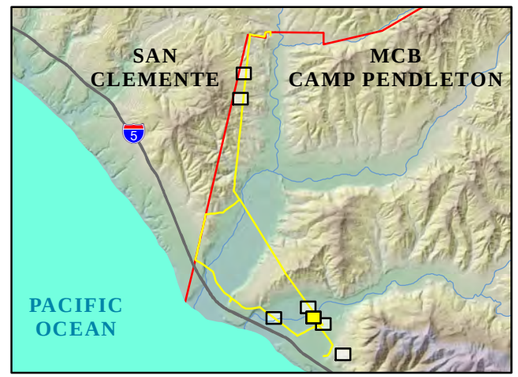
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Survey Area

Wet Season Fairy Shrimp Survey Results

- No Fairy Shrimp Observed
- Contains Versatile Fairy Shrimp



Meters
0 50
0 200
Feet

N



Figure B-6
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results

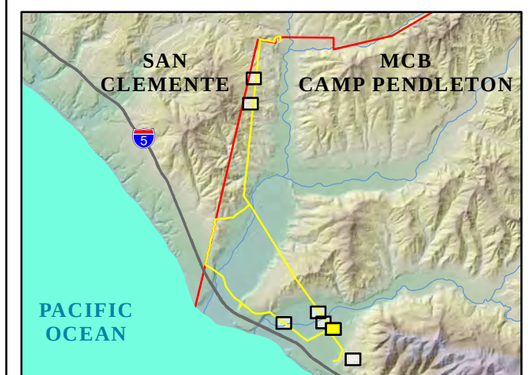
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Proposed Project Underground Route
- Survey Area
- Proposed Utility Pole
- Existing Wood Pole
- Staging Yard
- Proposed 69kV Vault

Wet Season Fairy Shrimp Survey Results

- No Fairy Shrimp Observed
- Contains Versatile Fairy Shrimp



Meters
0 50
0 200
Feet

N



Figure B-7
TL695/6971 2014-2015 Wet Season
Fairy Shrimp Survey Results

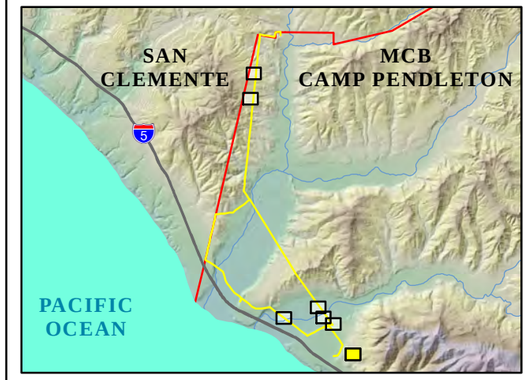
LEGEND

Project Features

Access Route

Wet Season Fairy Shrimp Survey Results

Contains Versatile Fairy Shrimp



Meters
0 50
0 200
Feet

N



Figure B-8
TL695/6971 2014-2015 Wet Season Fairy Shrimp Survey Results

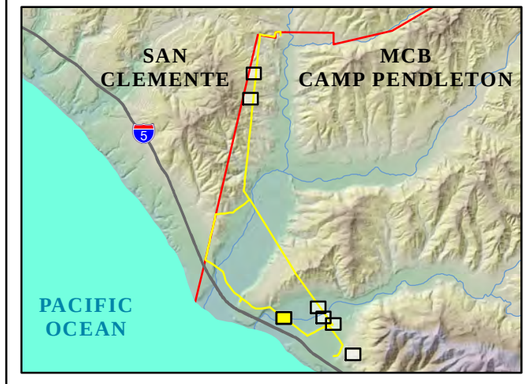
LEGEND

Project Features

- Access Route
- Proposed Project Overhead Route
- Survey Area
- Proposed Utility Pole
- Existing Wood Pole
- Work/Staging/Turnaround Area

Wet Season Fairy Shrimp Survey Results

- No Fairy Shrimp Observed
- Contains Versatile Fairy Shrimp



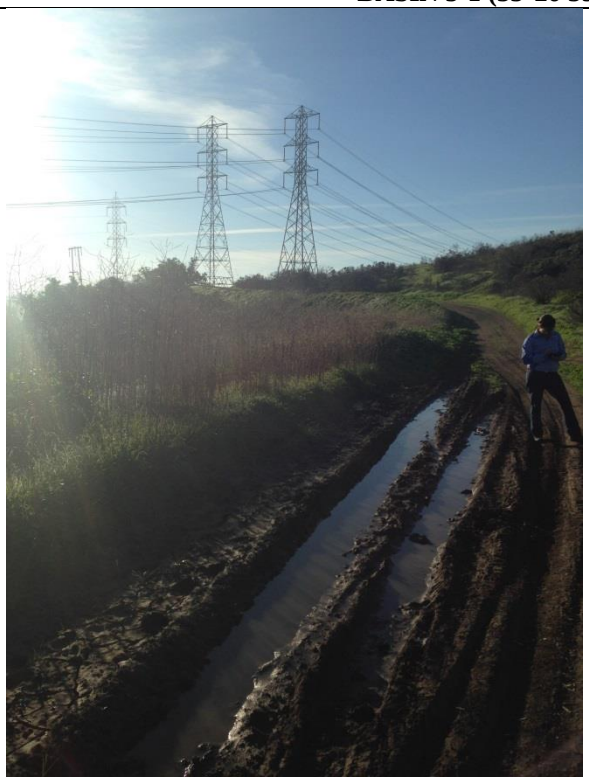
Meters
0 50
0 200
Feet

APPENDIX C

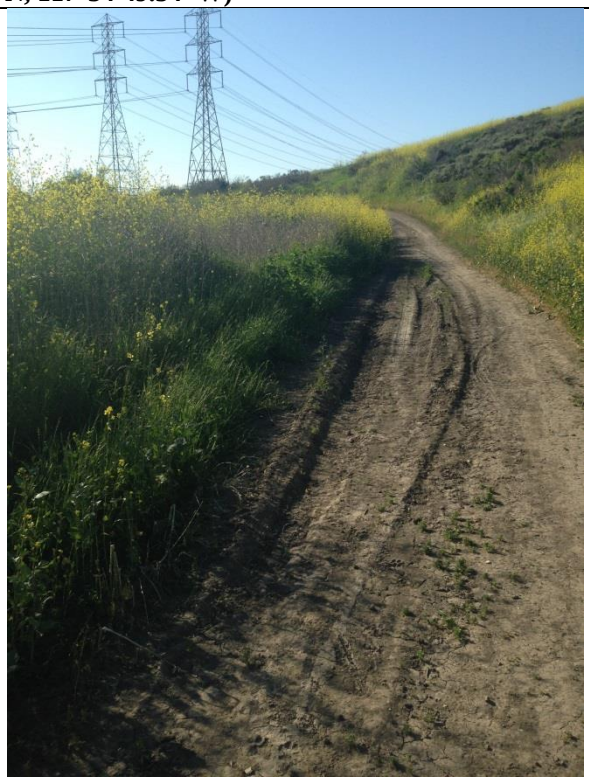
Photographic Record

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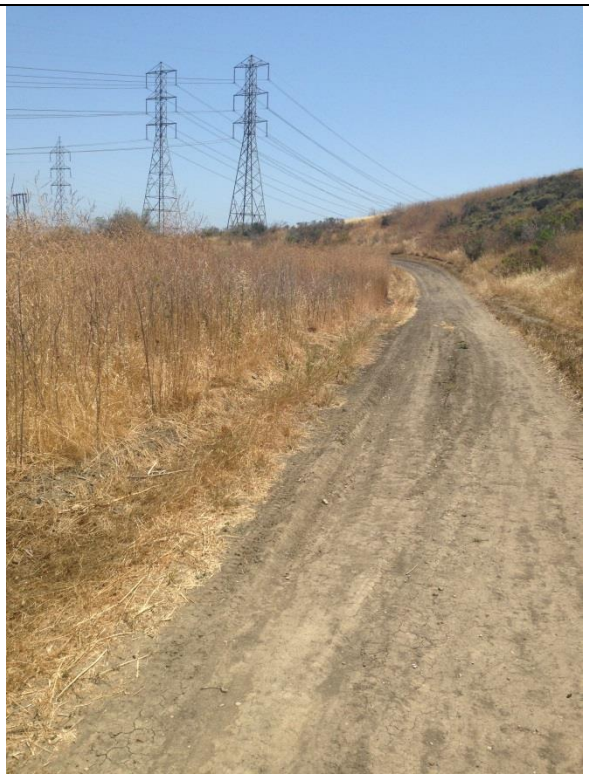
BASIN 5-1 (33°26'39.17"N, 117°34'49.54"W)



View Southeast. Photo by RCS, 3 Feb 2015.
B. species.



View Southeast. Photo by RCS, 20 Mar 2015.
B. species.

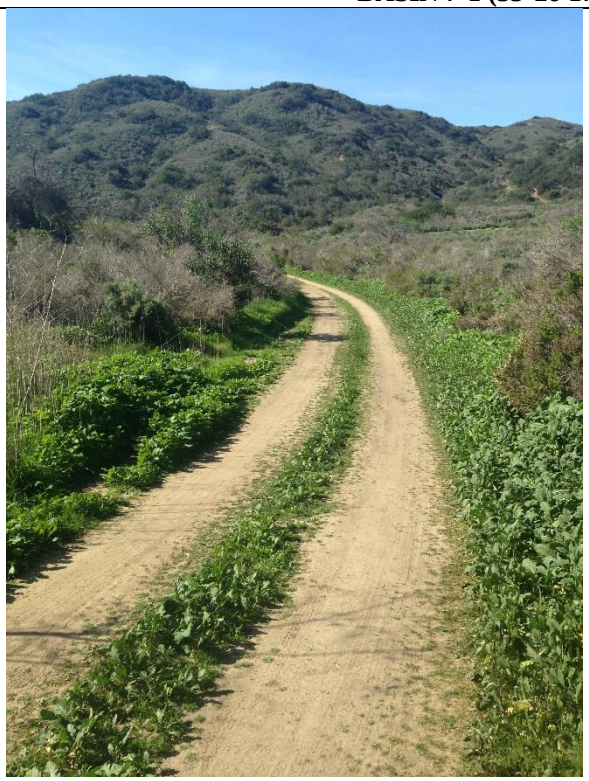


View Southeast. Photo by RCS, 12 May 2015.
B. species.

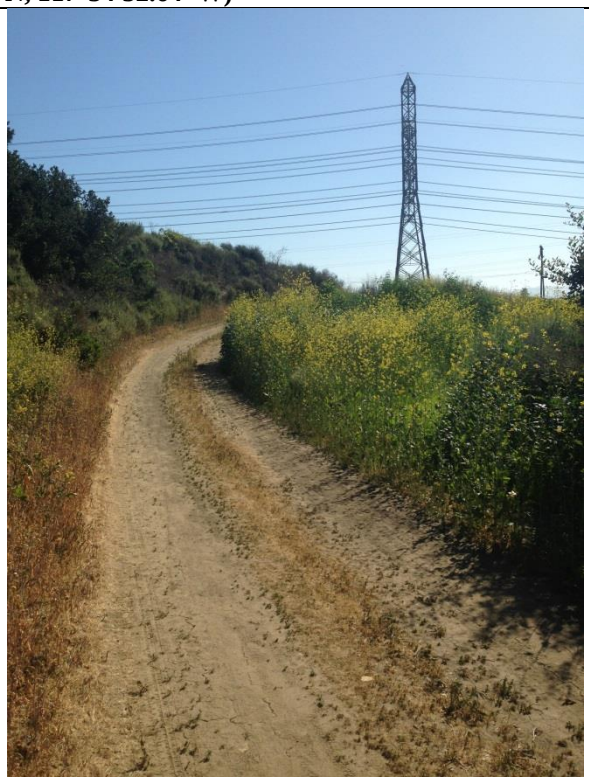


View East. Photo by RCS, 29 July 2015.
B. species.

BASIN 7-1 (33°26'17.12"N, 117°34'52.64"W)



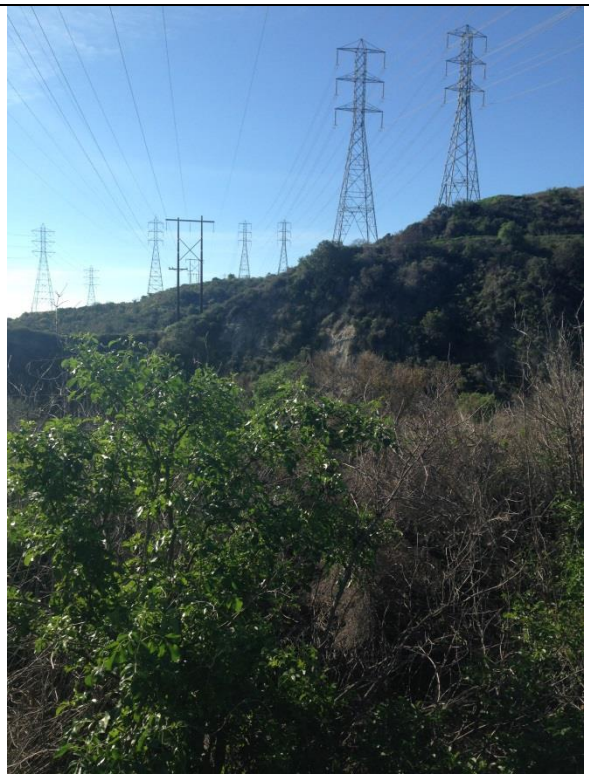
View West. Photo by RCS, 3 Feb 2015.
No shrimp.



View East. Photo by RCS, 20 Mar 2015.
No shrimp.



View East. Photo by RCS, 9 Sep 2015.
No shrimp.



View South adjacent east/downslope from Basin 7-1.
Photo by RCS, 3 Feb 2015.

BASIN 21-1 (33°23'3.94"N, 117°34'14.56"W)



View Southeast. Photo by RCS, 3 Feb 2015.
B. lindahli.



View Southeast. Photo by RCS, 9 Mar 2015.
B. lindahli.



View Southeast of area north of Basin 21-1.
Photo by CMS, 7 Apr 2015.



View Southeast. Photo by RCS, 29 Jul 2015.
B. lindahli.

BASIN 21-2 (33°23'2.88"N, 117°34'12.98"W)



View Southeast. Photo by RCS, 9 Mar 2015.
B. lindahli.



View Southeast. Photo by RCS, 13 Mar 2015.
B. lindahli.



View Northwest. Photo by RCS, 20 Mar 2015.
B. lindahli.



View Southeast. Photo by RCS, 20 May 2015.
B. lindahli.

BASIN 21-3 (33°22'2.59"N, 117°34'7.84"W)



View Northwest. Photo by RCS, 3 Feb 2015.
No shrimp.



View Northwest. Photo by RCS, 6 Mar 2015.
No shrimp.



View Down/West. Photo by RCS, 20 Mar 2015.
No shrimp.



View Southeast. Photo by RCS, 20 May 2015.
No shrimp.

BASIN 23-2 (33°22'56.69"N, 117°33'20.04"W)



View Northwest. Photo by RCS, 3 Feb 2015.
No shrimp.



View North. Photo by RCS, 6 Mar 2015.
No shrimp.

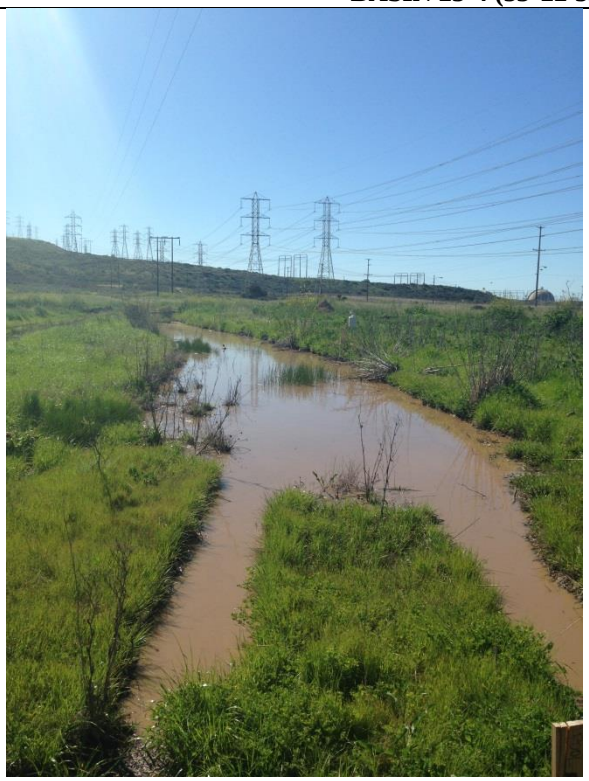


View Northwest. Photo by RCS, 20 May 2015.
No shrimp.



View Down/West. Photo by RCS, 21 Jul 2015.
No shrimp.

BASIN 23-4 (33°22'55.79"N, 117°33'19.01"W)



View Southeast. Photo by RCS, 13 Mar 2015.
No shrimp.



View Southeast. Photo by RCS, 26 Mar 2015.
No shrimp.



View Southeast. Photo by RCS, 6 Apr 2015.
No shrimp.



View Southeast. Photo by RCS, 20 May 2015.
No shrimp.

BASIN 23-8 (33°22'59.05"N, 117°33'15.99"W)



View East. Photo by RCS, 20 May 2015.
B. lindahli.



View East. Photo by RCS, 21 July 2015.
B. lindahli.



View Northeast of area southwest of Basin 23-8.
Photo by RCS, 20 May 2015.



Upland Vegetation Near Basin 23-8.
Photo by RCS, 20 Mar 2015

BASIN 24-1 (33°22'30.01"N, 117°32'57.59"W)



View Southeast. Photo by RCS, 2 Feb 2015.
B. lindahli.



View South. Photo by RCS, 6 Mar 2015.
B. lindahli.



View South. Photo by RCS, 9 Mar 2015.
B. lindahli.



View Northwest from Basin 33-3.
Photo by RCS, 2 Feb 2015.

BASIN 33-1 (33°23'10.20"N, 117°33'35.19"W)



View Southeast. Photos by RCS, 2 Feb 2015.
B. lindahli.
Desiccated tadpoles and possibly Triops (below).

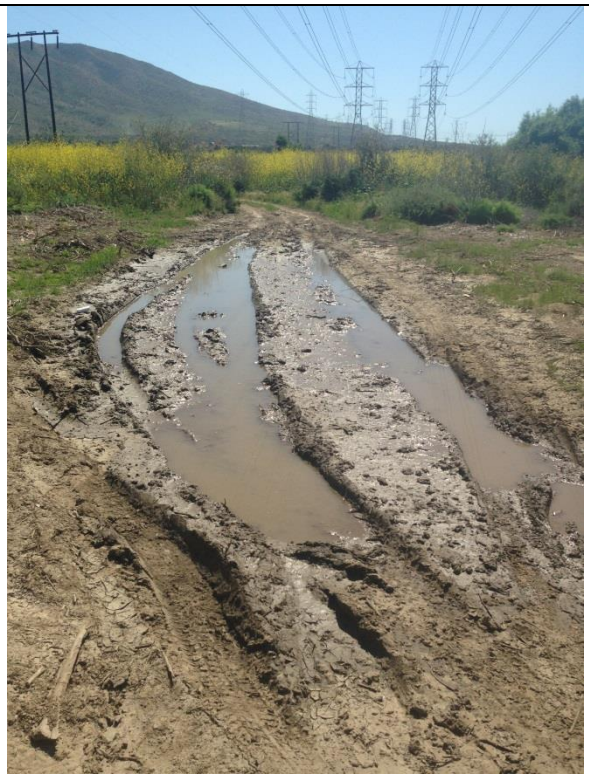




View Southeast. Photo by RCS, 9 Mar 2015.
B. lindahli.



View Southeast. Photo by RCS, 13 Mar 2015.
B. lindahli.



View Southeast. Photo by RCS, 26 Mar 2015.
B. lindahli.

BASIN 33-2 (33°23'9.80"N, 117°33'39.02"W)



View Southeast. Photo by RCS, 2 Feb 2015.
B. lindahli.



View South. Photo by RCS, 6 Mar 2015.
B. lindahli.

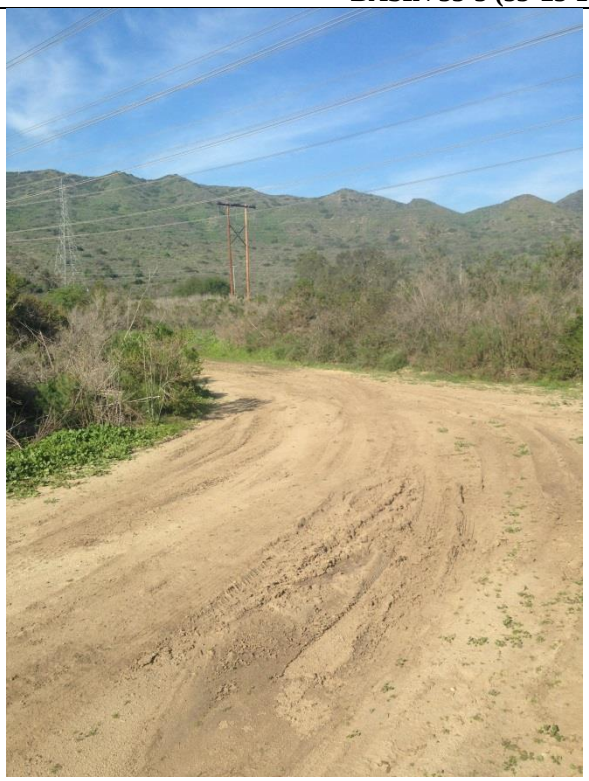


View South. Photo by RCS, 9 Mar 2015.
B. lindahli.

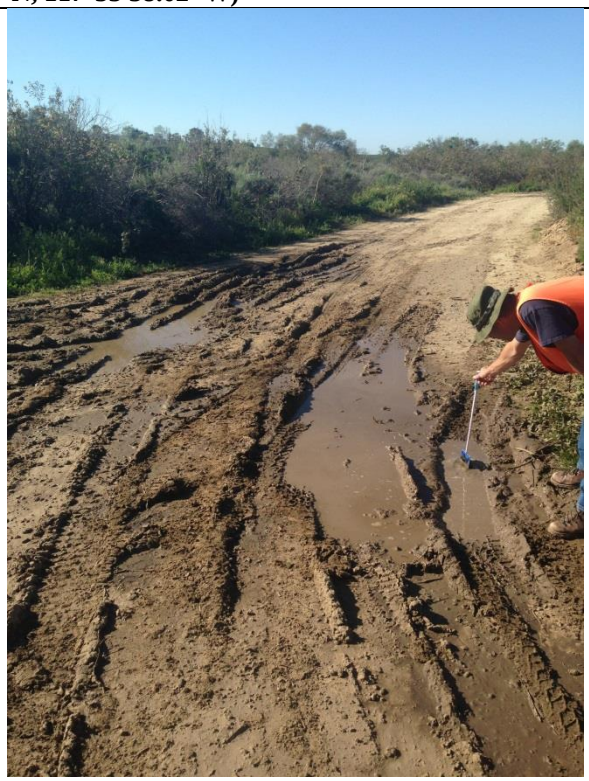


View North. Photo by RCS, 20 May 2015.
B. lindahli.

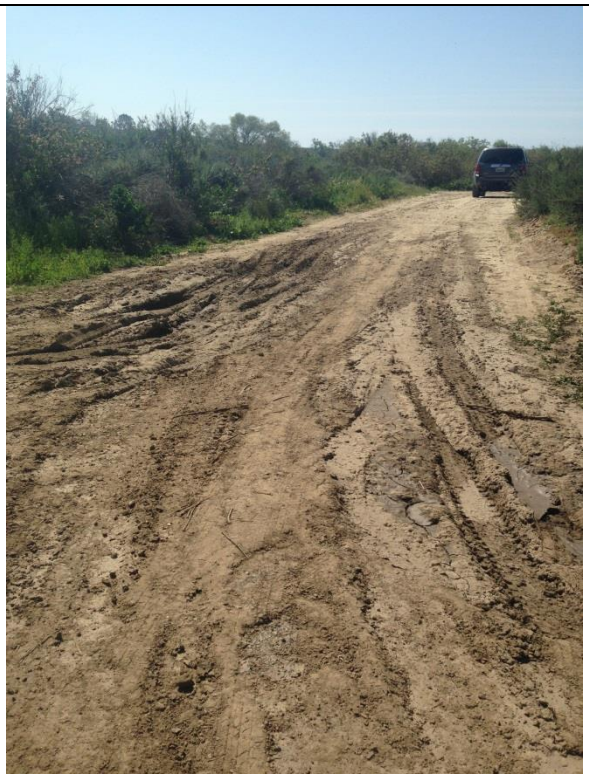
BASIN 33-3 (33°23'11.38"N, 117°33'38.02"W)



View Northeast. Photo by RCS, 2 Feb 2015.
Undetermined fairy shrimp.



View Southwest. Photo by RCS, 6 Mar 2015.
Undetermined fairy shrimp.

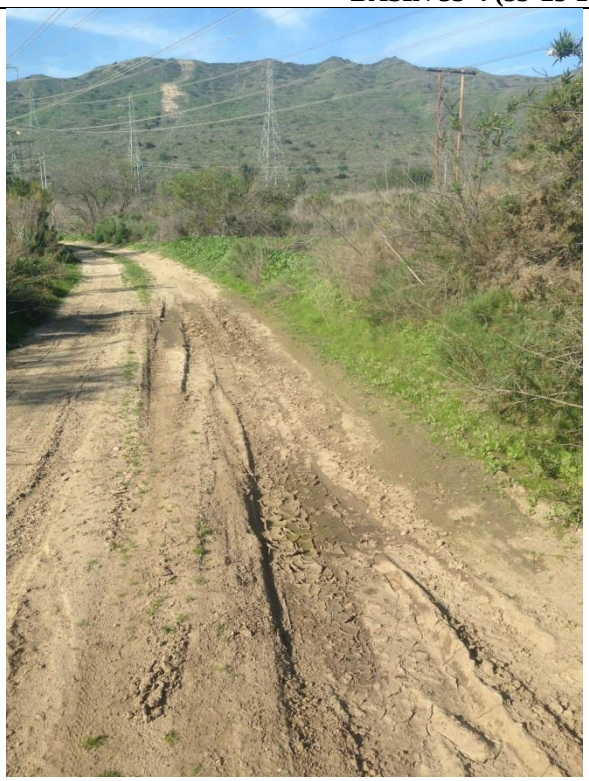


View Southwest. Photo by RCS, 9 Mar 2015.
Undetermined fairy shrimp.



View Down. Photo by RCS, 9 Mar 2015.
Undetermined fairy shrimp.

BASIN 33-4 (33°23'12.03"N, 117°33'38.01"W)



View North. Photo by RCS, 2 Feb 2015.
B. lindahli.



View South. Photo by RCS, 6 Mar 2015.
B. lindahli.

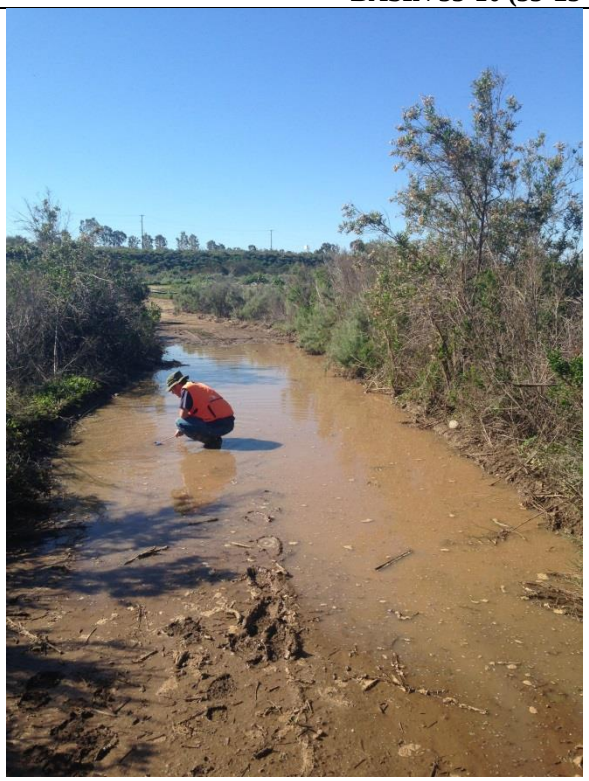


View South. Photo by RCS, 9 Mar 2015.
B. lindahli.



View South. Photo by RCS, 13 Mar 2015.
B. lindahli.

BASIN 33-10 (33°23'1.02"N, 117°33'29.47"W)



View Southwest. Photo by RCS, 6 Mar 2015.
B. lindahli.



View Southwest. Photo by RCS, 9 Mar 2015.
B. lindahli.



View Southwest. Photo by RCS, 13 Mar 2015.
B. lindahli.



View Northeast. Photo by RCS, 20 May 2015.
B. lindahli.

BASIN 33-11 (33°23'2.83"N, 117°33'27.04"W)



View East. Photo by RCS, 6 Mar 2015.
No shrimp.



View East. Photo by RCS, 9 Mar 2015.
No shrimp.



View East. Photo by RCS, 20 May 2015.
No shrimp.



View East. Photo by RCS, 21 July 2015.
No shrimp.

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APPENDIX D

Vernal Pool Data Sheets

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2/3/15

5-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 0815 County: SD Quad: SC

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: Basin 1 (5-1)

Township: N/A Range: N/A Section: N/A 33.26 lat 117.34 long.

Temperature: Water: — °C Air: 5.5 °C

Pool Depth:
at time of sampling: 10 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other___ light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):___ppm or mg/l Conductivity:___uMHO

Dissolved NH_4:___ppt or ppm Dissolved Oxygen:___ppm or mg/l

pH:___ Turbidity: (secchi disc depth)___cm or: clear to bottom ___

Salinity :___ppt or ppm Total Dissolved Solids (TDS):___ppm

Notes: Not sampled since not yet approved by USFWS. Will sample next time.

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ___			Other (specify) ___		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

5-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/20/15 Time: 0915 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: Basin 1 (5-1)

Township: N/A Range: N/A Section: N/A 33.26 lat 117.34 long.

Temperature: Water: N/A °C Air: 15.8 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/29/15

5-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 4 / 29 / 15 Time: 0951 County: SD Quad: S.C.

Collector(s): C. Scheuerman/S. Brown Permit #: TE148550

Site/Project Name: TL 695 Pool #: 5-1

Township: N/A Range: N/A Section: N/A 33.26 lat. 117.34 long.

Temperature: Water: N/A °C Air: 25.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- disturbed: (fire tracks) garbage discing/plowing
- ungrazed
- grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH3: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or: clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no			
Copepods:	yes	no	Anisoptera:	yes	no
Ostracods	yes	no	Zygoptera:	yes	no
Fish	yes	no	Hydrophilidae:	yes	no
Frogs	yes	no	Dytiscidae:	yes	no
Salamanders	yes	no	Corixidae:	yes	no
Waterfowl	yes	no	Notonectidae:	yes	no
Other (specify)			Belostomatidae:	yes	no
			Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/12/15

5-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/12/15 Time: 1335 County: SD Quad: S.C.

Collector(s): R. Stolpe/C. Scharman/S. Bowen Permit #: TE8355495 TE47855AD

Site/Project Name: TL695 Pool #: 5-1

Township: N/A Range: N/A Section: N/A 33.26 lat. 117.34 long.

Temperature: Water: N/A °C Air: 20.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm. Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

7/29/15

5-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 7/29/15 Time: 1015 County: SD Quad: S.C -

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 5-1

Township: N/A Range: N/A Section: N/A 33.26717.34 lat. long.

Temperature: Water: N/A °C Air: 23 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

2/3/15

7-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1043 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: SP_59001 (7-1)

Township: N/A Range: N/A Section: N/A 33.26 lat -117.34 long.

Temperature: Water: N/A °C Air: 18 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirtroad

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Basin location unclear; has been graded over. Dry.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/20/15

7-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/20/15 Time: 1002 County: SD Quad: S.C.

Collector(s): E. Stolpe / M. Tu Permit #: TE835545

Site/Project Name: TL695 Pool #: SP59001(7-1)

Township: N/A Range: N/A Section: N/A 32.29 lat. -117.39 long.

Temperature: Water: N/A °C Air: 18.3 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or; clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Basin location unclear; road has been grazed over (recently?).

Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/12/15

7-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 5/12/15 Time: 1342 County: SD Quad: S.C.

Collector(s): R Stolpe/C Schwartman/S. Brown Permit #: TE835495 TE-44855AD

Site/Project Name: TL695 Pool #: 7-1

Township: N/A Range: N/A Section: N/A 33.29 lat. -117.34 long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Basin location unclear. Road has been graded recently. Includes cut drainage and fiber rolls. Dry.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

2/3/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1200 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 29½ (21-1)

Township: N/A Range: N/A Section: N/A 3338 lat. 117.57 long.

Temperature: Water: N/A °C Air: 21.6 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/6/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 1130 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL 695 Pool #: 29-½(21-1)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.57 long.

Temperature: Water: — °C Air: 27.5 °C

Pool Depth:
at time of sampling: 26 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road/Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity:____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

FS collected 5M/ØF

B. lindahl:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)____		
Other (specify)____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1125 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE835595

Site/Project Name: TL 695 Pool #: 29-½(21-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: — °C Air: 17.8 °C

Pool Depth:
at time of sampling: 20 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed - disturbed: (tire tracks) (garbage) discing/plowing

- ungrazed grazed: cattle horses sheep other____
light moderate heavy

- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes: Very turbid water. Nearly 100% mortality FS
FS collected 3M/6F
B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/13/15 Time: 0923 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 29-½(21-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: ~ °C Air: 21.1 °C

Pool Depth:
at time of sampling: 10 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: ~~tire tracks~~ (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes: Turbid water; algae.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ____		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/2015 Time: 1158 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835595

Site/Project Name: TL 695 Pool #: 29-½(21-1)

Township: N/A Range: N/A Section: N/A 33 38 lat. 717.57 long.

Temperature: Water: — °C Air: 21.1 °C

Pool Depth:
at time of sampling: 1 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) — discing/plowing
- ungrazed — grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes: Bees

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) N

Notostracans:
(note reproductive status) N

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) Apoidea		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/26/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: 1043 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 29½ (21-1)

Township: N/A Range: N/A Section: N/A 3338 lat. -117:57 long.

Temperature: Water: N/A °C Air: 30.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 29-½(21-1)

Township: N/A Range: N/A Section: N/A 3338 lat 717.57 long

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO

Dissolved NH_4: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l

pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom ____

Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/20/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1220 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 21-1

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1440 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE8355495

Site/Project Name: TL695 Pool #: 21-1

Township: N/A Range: N/A Section: N/A 33.38 lat. 717.57 long.

Temperature: Water: 32.2 °C Air: 25.8 °C

Pool Depth:
at time of sampling: 22 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 3 m x 9.4 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH: 7.8 Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) Chironomidae		
Other (specify)_____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

7/29/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 7/29/15 Time: 0925 County: SD Quad: S.C.

Collector(s): R. Stolpe _____ Permit #: TE835549-5

Site/Project Name: TL695 Pool #: 21-1

Township: N/A Range: N/A Section: N/A 3338 lat. 117.57 long.

Temperature: Water: 25 °C Air: 22.5 °C

Pool Depth:
at time of sampling: 20 cm
estimated maximum. ____ cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: ____ m x ____ m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ ppm or mg/l. Conductivity:____ uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH: 9.02 Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes: Broken pipe upslope has artificially inundated this basin

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	(yes)	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	(yes)	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) Coleoptera		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

9/9/15

21-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 9/9/15 Time: 1040 County: SD Quad: S.C.

Collector(s): R. Stolpe / S. Brown Permit #: TE835495

Site/Project Name: TL 695 Pool #: 21-1

Township: N/A Range: N/A Section: N/A 33.38 lat 117.57 long.

Temperature: Water: — °C Air: 35 °C

Pool Depth:
at time of sampling: 20 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 3 m x 13.7 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other:_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Broken pipe upslope has artificially inundated this basin.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostraeans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

2/3/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1202 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835495

Site/Project Name: TC695 Pool #: 29-36(21-2)

Township: N/A Range: N/A Section: N/A 3338.717.57 lat long

Temperature: Water: N/A °C Air: 21.6 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/6/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 1140 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asamus Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 29-3 (21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: — °C Air: 28 °C

Pool Depth:
at time of sampling: 11 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi dise depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

FS collected 6 M / 1 F

B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 1000s (sub-mature)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1138 County: SD Quad: S.C.

Collector(s): R. Stalpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 1695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.57 long.

Temperature: Water: — °C Air: 17.8 °C

Pool Depth:
at time of sampling: 10 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH_4: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes: Very turbid water
FS collected 11 M/D F
B. lindahli:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/13/15 Time: 0932 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE835495

Site/Project Name: TL695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 3338 lat. 717.57 long.

Temperature: Water: — °C Air: 21.3 °C

Pool Depth:
at time of sampling: 8 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

FS collected 5M/1F

B. lindahl:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ____		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/2915 Time: 1207 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.57 long.

Temperature: Water: — °C Air: 21.1 °C

Pool Depth:
at time of sampling: 1 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostraeans:
(note reproductive status) N

Notostraeans:
(note reproductive status) N

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/26/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TC695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.57 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.57 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (fire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/20/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1225 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 21-2

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 7/21/15 Time: 1450 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asomas Permit #: TE835595

Site/Project Name: TL695 Pool #: 29-3(21-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.57 long.

Temperature: Water: N/A °C Air: 26 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

7/29/15

21-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 7/29/15 Time: 0930 County: SD Quad: S.C.

Collector(s): T. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 21-2

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: N/A °C Air: 24.4 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed
- grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

2/3/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1207 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE-835549-5

Site/Project Name: TL695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.57 long.

Temperature: Water: Ø °C Air: 21.7 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:
Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/16/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/16/15 Time: 1200 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asoms Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.57 long.

Temperature: Water: Ø °C Air: 28.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom_____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 1153 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL 1095 Pool #: 294(21-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: N/A °C Air: 18.8 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/13/15 Time: 0938 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE835495

Site/Project Name: TL 695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.57 long.

Temperature: Water: N/A °C Air: 22.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/20/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/20/15 Time: 1215 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 33.38 lat -117.57 long.

Temperature: Water: N/A °C Air: 21 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/26/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 3338 lat 11757 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 29-4(21-3)

Township: N/A Range: N/A Section: N/A 3338 lat. 117.57 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 TA.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/20/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1228 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 21-3

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: _____cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
light moderate heavy
- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostraeans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1455 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE835495

Site/Project Name: TL 1095 Pool #: 21-3

Township: N/A Range: N/A Section: N/A 33.38 lat -117.57 long.

Temperature: Water: N/A °C Air: 26.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/29/15

21-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no _✓_ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 7/29/15 Time: 0935 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 21-3

Township: N/A Range: N/A Section: N/A 3338 lat. 11757 long.

Temperature: Water: N/A °C Air: 24.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- disturbed: ~~tire tracks~~ ~~garbage~~ discing/plowing
- ungrazed
- grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

2/3/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1234 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 34-1(23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: N/A °C Air: 21.7 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing

- ungrazed grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat: Steel towers / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/6/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/6/15 Time: 1001 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL 695 Pool #: 34-1 (23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Steel tower / Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 13:41 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 34-1(23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 717.55 long.

Temperature: Water: N/A °C Air: 19.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Steel towers / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/13/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/13/15 Time: 1046 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 34-1(23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.55 long.

Temperature: Water: N/A °C Air: 28.4 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Steel tower / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/20/15 Time: 1340 County: SD Quad: S.C

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 34-1(23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: N/A °C Air: 23.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
light moderate heavy
- land use of habitat: Steel towers / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no			
Copepods:	yes	no	Anisoptera:	yes	no
Ostracods	yes	no	Zygoptera:	yes	no
Fish	yes	no	Hydrophilidae:	yes	no
Frogs	yes	no	Dytiscidae:	yes	no
Salamanders	yes	no	Corixidae:	yes	no
Waterfowl	yes	no	Notonectidae:	yes	no
Other (specify) _____			Belostomatidae:	yes	no
			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/26/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 34-1(23-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Steel tower / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL 695 Pool #: 34-1 (23-2)

Township: N/A Range: N/A Section: N/A 3338 lat. -117.55 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Steel towers / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO

Dissolved NH_4: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l

pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____

Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/20/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1311 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat. _____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing

- ungrazed grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or; clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

23-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1424 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL 695 Pool #: 23-2

Township: N/A Range: N/A Section: N/A 3338 lat. 117.55 long.

Temperature: Water: — °C Air: 25.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Steel tower / Alpine Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom_____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

2/3/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1236 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 34-2(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 21.7 °C

Pool Depth:
at time of sampling: 35 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom_____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)	Toad				

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/16/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 1006 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 34-2(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 25 °C

Pool Depth:
at time of sampling: Unk cm
estimated maximum: — cm

Surface Area:
at time of sampling: _____ m x _____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostraeans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	(yes)	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	(yes)	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	(yes)	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)	Toad		Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/9/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1342 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tn Permit #: TE8355495

Site/Project Name: TL695 Pool #: 34-2(234)

Township: N/A Range: N/A Section: N/A 33.38 at 117.55 long.

Temperature: Water: — °C Air: 19.2 °C

Pool Depth:
at time of sampling: 50 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other___
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):___ppm or mg/l. Conductivity:___uMHO

Dissolved NH_4:___ppt or ppm Dissolved Oxygen:___ppm or mg/l

pH:___ Turbidity: (secchi disc depth)___cm or: clear to bottom___

Salinity:___ppt or ppm Total Dissolved Solids (TDS):___ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	(yes)	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	(yes)	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)	Toad		Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/13/15 Time: 1040 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 34-2 (23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 28.3 °C

Pool Depth:
at time of sampling: 45 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity:____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	(yes)	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)____			Other (specify)____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/20/15 Time: 1345 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835595

Site/Project Name: TL 695 Pool #: 34-2(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 23.2 °C

Pool Depth:
at time of sampling: 40 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed - disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: Alpha Tech T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)____			Other (specify)____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/26/15

234

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/26/15 Time: 1205 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 342(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.55 long.

Temperature: Water: — °C Air: 31.6 °C

Pool Depth:
at time of sampling: 30 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other___
light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):___ppm or mg/l Conductivity:___uMHO

Dissolved NH_4:___ppt or ppm Dissolved Oxygen:___ppm or mg/l

pH:___ Turbidity: (secchi disc depth)___cm or: clear to bottom ___

Salinity :___ppt or ppm Total Dissolved Solids (TDS):___ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify) Toad					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

4/2/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 4/2/15 Time: 1409 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 34-2(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 717.55 long.

Temperature: Water: — °C Air: 21.1 °C

Pool Depth:
at time of sampling: 22 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify) Toads					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

4/6/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 4/6/15 Time: 1347 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 31-2(23-4)

Township: N/A Range: N/A Section: N/A 3338 lat. 717.55 long.

Temperature: Water: — °C Air: 18.2 °C

Pool Depth:
at time of sampling: 15 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other ___
  light moderate heavy
- land use of habitat: Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH_4: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or: clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ___		
Other (specify) ___					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

4/21/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 4/21/15 Time: 1055 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL 695 Pool #: 34-2(23-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.55 long.

Temperature: Water: N/A °C Air: 17.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	(yes) ✓dried	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

5/20/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ____ yes

Required color slides and/or photographs for the project site are included: ____ no ____ yes

Date: 5/20/15 Time: 1313 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 23-4

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

23-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1422 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 23-4

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.55 long.

Temperature: Water: — °C Air: 25.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

2/3/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1355 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 45-1(24-1)

Township: N/A Range: N/A Section: N/A 3337 lat. 717-55 long.

Temperature: Water: — °C Air: 21.1 °C

Pool Depth:
at time of sampling: 15 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	(yes)	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/6/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 1050 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-825549-5/none

Site/Project Name: TL695 Pool #: 45-1(24-1)

Township: N/A Range: N/A Section: N/A 33.37 lat. 117.55 long.

Temperature: Water: — °C Air: 26.6 °C

Pool Depth:
at time of sampling: 11 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity:____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	(yes)	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)____			Other (specify)____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/9/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 1407 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 45-1(24-1)

Township: N/A Range: N/A Section: N/A 3337 lat 717.55 long.

Temperature: Water: — °C Air: 19.3 °C

Pool Depth:
at time of sampling: 8 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify)____			Other (specify)____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/13/15 Time: 1128 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 45-1(24-1)

Township: N/A Range: N/A *Section: N/A 33.37 lat. 117.55 long.

Temperature: Water: 30 °C Air: 30.5 °C

Pool Depth:
at time of sampling: 1 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0.3 m x 0.3 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: F.S. collected 1M/1F
B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) ls

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/20/15 Time: 1415 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 45-1(24-1)

Township: N/A Range: N/A Section: N/A 33.37 lat. 117.55 long.

Temperature: Water: N/A °C Air: 23.3 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed:) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/26/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE8355495

Site/Project Name: TL695 Pool #: 45-1 (24-1)

Township: N/A Range: N/A Section: N/A 33.37 lat. 117.55 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

4/2/15

24-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no __✓__ yes

Required color slides and/or photographs for the project site are included: __✓__ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 45-1(24-1)

Township: N/A Range: N/A Section: N/A 33.37 lat -117.55 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed (disturbed) tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

2/3/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2/3/15 Time: 1430 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-3(33-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 21.1 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dried biomass of tadpoles and possibly Triops.

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify) Triops?					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/6/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/6/15 Time: 0903 County: SD Quad: S.C.

Collector(s): R. Stolpe/T. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 43-3(33-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 22-27 °C

Pool Depth:
at time of sampling: 16 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed · disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed · grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road/Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/9/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 1253 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835495

Site/Project Name: TL695 Pool #: 43-3(33-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 18.8 °C

Pool Depth:
at time of sampling: 21 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:
FS collected 2M/4F
B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10,000s (submature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ____		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/13/15 Time: 0958 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835595

Site/Project Name: TL695 Pool #: 43-3(33-1)

Township: N/A Range: N/A Section: N/A 3338.117.56 lat. long.

Temperature: Water: — °C Air: 26.1 °C

Pool Depth:
at time of sampling: 17 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- ungrazed

disturbed: (tire tracks) (garbage) discing/plowing

grazed: cattle horses sheep other___
light moderate heavy

- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH_4: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or: clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes:

FS collected 4M/3F

B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 1000s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ___			Other (specify) ___		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/20/15 Time: 1300 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 43-3 (33-1)

Township: N/A Range: N/A Section: N/A 3338 lat. 717.56 long.

Temperature: Water: — °C Air: 22.7 °C

Pool Depth:
at time of sampling: 8 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

FS collected 7M/1F
B. lindahli;

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/26/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/26/15 Time: 1145 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835546

Site/Project Name: TL695 Pool #: ~~43-3~~(33-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 31.7 °C

Pool Depth:
at time of sampling: 6 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other ___ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH_4: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or: clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes: FS collected 1M/3F
B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ___		
Other (specify) ___					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

4/2/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 4/2/15 Time: 1401 County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 43-3(33-1)

Township: N/A Range: N/A Section: N/A 32.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 21.1 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi dise depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)_____		
Other (specify)_____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/1/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/1/15 Time: 0830 County: SD Quad: S.C.

Collector(s): R. Stolpe / C. Schevermann Permit #: TE-839549-5
TE-94855AD

Site/Project Name: TL695 Pool #: 33-1

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 22.2 °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed · disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

5/20/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1439 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 33-1

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing

- ungrazed grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat:

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 7/21/15 Time: 1400 County: SD Quad: S.C.

Collector(s): R Staiger/J. Adams Permit #: TE-835849-5/none

Site/Project Name: TL695 Pool #: 33-1

Township: N/A Range: N/A Section: N/A 3336 lat 117.56 long.

Temperature: Water: N/A °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: AlphaTwo T.A./dirt road

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

2/3/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 2/3/15 Time: 1415 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-4 (33-2)

Township: N/A Range: N/A Section: N/A 33.38 lat/117.56 long.

Temperature: Water: N/A °C Air: 21.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dried small biomass, badly decayed, but likely fairy shrimp, with ostracods.

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) Possibly - dried/decayed

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	(yes)	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/6/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/6/15 Time: 0853 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Adams Permit #: TE-835549-5/none

Site/Project Name: TL 695 Pool #: 43-4 (33-2)

Township: N/A Range: N/A Section: N/A 3338 lat. 117.516 long.

Temperature: Water: — °C Air: ~~—~~ 20.5 °C

Pool Depth:
at time of sampling: 12 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road/Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

FS collected 6M/1F

B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100's (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1241 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE835548

Site/Project Name: TL695 Pool #: 43-4 (33-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 18.8 °C

Pool Depth:
at time of sampling: 10 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other ___
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ___ ppm or mg/l Conductivity: ___ uMHO

Dissolved NH_4: ___ ppt or ppm Dissolved Oxygen: ___ ppm or mg/l

pH: ___ Turbidity: (secchi disc depth) ___ cm or: clear to bottom ___

Salinity: ___ ppt or ppm Total Dissolved Solids (TDS): ___ ppm

Notes: FS collected 4M/3F
B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ___			Other (specify) ___		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/13/15 Time: 1002 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-4 (33-2)

Township: N/A Range: N/A Section: N/A 33.38° lat. 117.58° long.

Temperature: Water: — °C Air: 26.1 °C

Pool Depth:
at time of sampling: 1 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

FS collected 7M/0F
B. lindahli

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)____			Other (specify)____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/20/15 Time: 1250 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 43-4 (33-2)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.58 long.

Temperature: Water: N/A °C Air: 22.4 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: tire tracks garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/26/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 43-4(33-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 4/2/15 Time: 1400 County: SD Quad: S.C

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 43-4(33-2)

Township: N/A Range: N/A Section: N/A 33.38 lat. 717-56 long.

Temperature: Water: N/A °C Air: 21.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)_____		
Other (specify)_____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/1/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/1/15 Time: 0835 County: SD Quad: S.C.

Collector(s): R. Stolpe / C. Scheuerman Permit #: TE8355495
TE485540

Site/Project Name: TL695 Pool #: 33-2

Township: N/A Range: N/A Section: N/A 33.38 lat 117.58 long.

Temperature: Water: — °C Air: 18.3 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

5/20/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1428 County: _____ Quad: _____

Collector(s) R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 33-2

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-2

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1402 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Adams Permit #: TE-835879-5/none

Site/Project Name: TL695 Pool #: 33-2

Township: N/A Range: N/A Section: N/A 33.38 lat 117.56 long.

Temperature: Water: N/A °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry / damp

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

2/3/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 2/3/15 Time: 1424 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 3338 lat. -117.56 long.

Temperature: Water: N/A °C Air: 21.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/16/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/16/15 Time: 0850 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 20 °C

Pool Depth:
at time of sampling: 3 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____ light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ____		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/9/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1236 County: SD Quad: S.C.

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 18.8 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Fairy shrimp angels (casts) in mud. Not sampled.

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) Unknown pop. (see notes)

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify)_____			Other (speeify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/13/15 Time: 0952 County: SD Quad: S.C

Collector(s): R. Stolpe/M. Tu Permit #: TE8355495

Site/Project Name: T2695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 26.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (fire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/20/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/20/15 Time: 1248 County: SD Quad: S.C.-

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 3388 lat. -117.56 long.

Temperature: Water: N/A °C Air: 22.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/26/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835595

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 43-2(33-3)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- ungrazed

disturbed: (tire tracks) garbage discing/plowing

grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/20/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ___✓___ yes

Required color slides and/or photographs for the project site are included: ____ no ___✓___ yes

Date: 5/20/15 Time: 1431 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 33-3

Township: _____ Range: _____ Section: _____ _____lat. _____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed — disturbed: (tire tracks) garbage discing/plowing
- ungrazed — grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-3

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 7/21/15 Time: 1357 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE8355495

Site/Project Name: T2695 Pool #: 33-3

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 25.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom_____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry/damp

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)_____		
Other (specify)_____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

2/3/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 2/3/15 Time: 1426 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 43-1(33-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 21.5 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry/damp

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	(yes)	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)			Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/6/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/6/15 Time: 0827 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5 / none

Site/Project Name: TL695 Pool #: 43-1 (33-4)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.56 long.

Temperature: Water: — °C Air: 15.5 °C

Pool Depth:
at time of sampling: 5 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity:____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no			
Copepods:	yes	no	Anisoptera:	yes	no
Ostracods	yes	no	Zygoptera:	yes	no
Fish	yes	no	Hydrophilidae:	yes	no
Frogs	yes	no	Dytiscidae:	yes	no
Salamanders	yes	no	Corixidae:	yes	no
Waterfowl	yes	no	Notonectidae:	yes	no
Other (specify)			Belostomatidae:	yes	no
			Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/9/15

334

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 1222 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 43-1(334)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 18.8 °C

Pool Depth:
at time of sampling: 3 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes: FS collected 8M/4F
B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 10s (submature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) ____		
Other (specify) ____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/13/15 Time: 0948 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 43-1(33-4)

Township: N/A Range: N/A Section: N/A 3338 lat. 117.56 long.

Temperature: Water: — °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

3/20/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/2015 Time: 1242 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 43-1(33-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 22.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/26/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 43-1(33-4)

Township: N/A Range: N/A Section: N/A 33.30 lat. -117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostraeans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

4/2/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL 695 Pool #: 43-1(33-4)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: 0 cm
estimated maximum: — cm

Surface Area:
at time of sampling: 0 m x 0 m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/1/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/1/15 Time: 0830 County: SD Quad: S.C

Collector(s): R. Stolpe / C. Scheuerman Permit #: TE8355495
TE448554D

Site/Project Name: TL695 Pool #: 33-4

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 23.3 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

5/20/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1432 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: _____

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status)

Notostracans:
(note reproductive status)

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-4

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1355 County: SD Quad: S.C.

Collector(s): R. Stolpe / J. Asmus Permit #: TE-835549-5

Site/Project Name: TL695 Pool #: 33-4

Township: N/A Range: N/A Section: N/A 33.38 lat 117.56 long.

Temperature: Water: N/A °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

2/3/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 2/3/15 Time: 1328 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835495

Site/Project Name: TL695 Pool #: 44-2 (33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: N/A °C Air: 21.3 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Damp / dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify)			Other (specify)		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

3/6/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 0933 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5/none

Site/Project Name: TL 695 Pool #: 44-2 (33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat 117.56 long.

Temperature: Water: — °C Air: 23.7 °C

Pool Depth:
at time of sampling: 11 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other ____
  light moderate heavy
- land use of habitat: dirt road/Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes: FS collected 6M/1F
B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individnals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/9/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 3/9/15 Time: 1325 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 44-2 (33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 19 °C

Pool Depth:
at time of sampling: 10 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ___ m x ___ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_3:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:
FS collected 8M/0F
B. lindahli

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	(yes)	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/13/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/13/15 Time: 1026 County: SD Quad: S.C.

Collector(s): B. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 44-2 (33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 28 °C

Pool Depth:
at time of sampling: 7 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total): ____ ppm or mg/l Conductivity: ____ uMHO

Dissolved NH_4: ____ ppt or ppm Dissolved Oxygen: ____ ppm or mg/l

pH: ____ Turbidity: (secchi disc depth) ____ cm or: clear to bottom ____

Salinity: ____ ppt or ppm Total Dissolved Solids (TDS): ____ ppm

Notes:

FS collected 6M/1F

B. lindahl: 1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 100s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) ____			Other (specify) ____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

3/20/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/2015 Time: 1325 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 44-2(33-10)

Township: N/A Range: N/A Section: N/A 3338 lat. -117.56 long.

Temperature: Water: N/A °C Air: 23 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

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U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/20/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL 695 Pool #: 44-2(33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat. 717.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2-T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom_____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no			
Conchostracans:	yes	no			
Copepods:	yes	no	Anisoptera:	yes	no
Ostracods	yes	no	Zygoptera:	yes	no
Fish	yes	no	Hydrophilidae:	yes	no
Frogs	yes	no	Dytiscidae:	yes	no
Salamanders	yes	no	Corixidae:	yes	no
Waterfowl	yes	no	Notonectidae:	yes	no
Other (specify) _____			Belostomatidae:	yes	no
			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 44-2(33-10)

Township: N/A Range: N/A Section: N/A 33.38 lat 717.56 long

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

5/1/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/1/15 Time: 1026 County: SD Quad: S.C.

Collector(s): B. Stolpe / C. Schaverman Permit #: TE8355495
TE448550

Site/Project Name: TL695 Pool #: 33-10

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: — °C Air: 28 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

5/20/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1357 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL695 Pool #: 33-10

Township: _____ Range: _____ Section: _____ _____lat. _____long.

Temperature: Water: — °C Air: 20 °C

Pool Depth:
at time of sampling: 12 cm
estimated maximum: — cm

Surface Area:
at time of sampling: _____m x _____m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: FS collected 6M/8F
B. lindahli

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U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) 1000s (mature)

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-10

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____no ✓yes

Required color slides and/or photographs for the project site are included: ____ no ✓____ yes

Date: 7/21/15 Time 1409 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5

Site/Project Name: TL695 Pool #: 33-10

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: — °C Air: 25 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity:_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
		N/A	

2/3/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ✓ no ___ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 2 / 3 / 15 Time: 1325 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 44-1(33-41)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 21.3 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed
- ungrazed

disturbed: (tire tracks) (garbage) discing/plowing

grazed: cattle horses sheep other_____
light moderate heavy

- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostraceans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/6/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/6/15 Time: 0930 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5/nonc

Site/Project Name: TL695 Pool #: 44-1(33-11)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: — °C Air: 23.6 °C

Pool Depth:
at time of sampling: 1 cm
estimated maximum: — cm

Surface Area:
at time of sampling: ____ m x ____ m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed . disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other____
  light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):____ppm or mg/l Conductivity:____uMHO

Dissolved NH_4:____ppt or ppm Dissolved Oxygen:____ppm or mg/l

pH:____ Turbidity: (secchi disc depth)____cm or: clear to bottom ____

Salinity :____ppt or ppm Total Dissolved Solids (TDS):____ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/9/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 3/9/15 Time: 1320 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL 695 Pool #: 44-1 (33-11)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: 19 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes:

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/13/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/13/15 Time: 1020 County: SD Quad: S.C.

Collector(s): R. Stolpe / M. Tu Permit #: TE835549S

Site/Project Name: TL695 Pool #: 44-1(33-1)

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: — °C Air: 27.2 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify)		
Other (specify)					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

3/20/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 3/2015 Time: 1246 County: SD Quad: S.C

Collector(s): R. Stolpe / M. Tu Permit #: TE8355495

Site/Project Name: TL695 Pool #: 44-1(33+1)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: tire tracks garbage discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha Two T.A.

(Optional) Water Chemistry Data

Alkalinity (total): _____ ppm or mg/l Conductivity: _____ uMHO

Dissolved NH_4: _____ ppt or ppm Dissolved Oxygen: _____ ppm or mg/l

pH: _____ Turbidity: (secchi disc depth) _____ cm or: clear to bottom _____

Salinity: _____ ppt or ppm Total Dissolved Solids (TDS): _____ ppm

Notes:

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional):

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no	Other (specify) _____		
Other (specify) _____					

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

3/26/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ___ yes

Date: 3/26/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835549S

Site/Project Name: TL 695 Pool #: 44-1 (33-11)

Township: N/A Range: N/A Section: N/A 3338 lat. -117.56 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed - disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
	N/A		

4/2/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ✓ no ____ yes

Date: 4/2/15 Time: _____ County: SD Quad: S.C.

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 44-1 (33-11)

Township: N/A Range: N/A Section: N/A 33.38 lat. 117.58 long.

Temperature: Water: N/A °C Air: _____ °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			

5/20/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ____ no ✓ yes

Required color slides and/or photographs for the project site are included: ____ no ✓ yes

Date: 5/20/15 Time: 1416 County: _____ Quad: _____

Collector(s): R. Stolpe Permit #: TE835495

Site/Project Name: TL695 Pool #: 33-11

Township: _____ Range: _____ Section: _____ _____lat._____long.

Temperature: Water: N/A °C Air: 20 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: _____cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: _____m x _____m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (fire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____ light moderate heavy
- land use of habitat: dirt road/Alpha 2 T.A.

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom _____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

			Insects: (adult or larvae)		
Cladocerans:	yes	no	Anisoptera:	yes	no
Conchostracans:	yes	no	Zygoptera:	yes	no
Copepods:	yes	no	Hydrophilidae:	yes	no
Ostracods	yes	no	Dytiscidae:	yes	no
Fish	yes	no	Corixidae:	yes	no
Frogs	yes	no	Notonectidae:	yes	no
Salamanders	yes	no	Belostomatidae:	yes	no
Waterfowl	yes	no			
Other (specify) _____			Other (specify) _____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #

7/21/15

33-11

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

This form is being submitted to serve as part of the 90-day report: ___ no ✓ yes

Required color slides and/or photographs for the project site are included: ___ no ✓ yes

Date: 7/21/15 Time: 1408 County: SD Quad: S.C.

Collector(s): R. Stolpe/J. Asmus Permit #: TE-835549-5

Site/Project Name: TL695 Pool #: _____

Township: N/A Range: N/A Section: N/A 33.38 lat. -117.56 long.

Temperature: Water: N/A °C Air: 26.1 °C

Pool Depth:
at time of sampling: Ø cm
estimated maximum: — cm

Surface Area:
at time of sampling: Ø m x Ø m
estimated maximum: — m x — m

Habitat Condition: (circle where appropriate)

- undisturbed disturbed: (tire tracks) (garbage) discing/plowing
- ungrazed grazed: cattle horses sheep other_____
  light moderate heavy
- land use of habitat: dirt road / Alpha Two training area

(Optional) Water Chemistry Data

Alkalinity (total):_____ppm or mg/l Conductivity:_____uMHO

Dissolved NH_4:_____ppt or ppm Dissolved Oxygen:_____ppm or mg/l

pH:_____ Turbidity: (secchi disc depth)_____cm or: clear to bottom ____

Salinity :_____ppt or ppm Total Dissolved Solids (TDS):_____ppm

Notes: Dry

1

U.S. Fish and Wildlife Service Vernal Pool Data Sheet
Wet Season Survey

Note: Please fill out the required information completely for each site visit.

Species Observations: state none or estimate # of individuals present in terms of an order of magnitude (e.g., 10's, 100's, 1000's)

Anostracans:
(note reproductive status) None

Notostracans:
(note reproductive status) None

Species Observations (Optional) :

Cladocerans:	yes	no	Insects: (adult or larvae)		
Conchostracans:	yes	no	Anisoptera:	yes	no
Copepods:	yes	no	Zygoptera:	yes	no
Ostracods	yes	no	Hydrophilidae:	yes	no
Fish	yes	no	Dytiscidae:	yes	no
Frogs	yes	no	Corixidae:	yes	no
Salamanders	yes	no	Notonectidae:	yes	no
Waterfowl	yes	no	Belostomatidae:	yes	no
Other (specify)_____			Other (specify)_____		

Voucher Specimens

Specimens shall be preserved according to the standards of the institution in which they will be accessioned.

Species	# Individuals	Accession/Catalog #	Pool #
N/A			





Dry Season Fairy Shrimp Technical Report for TL 695/6971 Reconductor Project

San Diego Gas & Electric Company

November 2015

Prepared for:
United States Fish and Wildlife Service

Prepared by:
Cardno

Acronyms and Abbreviations

ERS	Ecological Restoration Service
kV	kilovolt
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
ml	milliliters
RFS	Riverside fairy shrimp
SDFS	San Diego fairy shrimp
SDG&E	San Diego Gas & Electric Company
SONGS	San Onofre Nuclear Generating Station
TL	Tie Line
USFWS	United States Fish and Wildlife Service

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1.0 INTRODUCTION

This Dry Season Fairy Shrimp Survey Report provides the results of United States Fish and Wildlife Service (USFWS) protocol surveys for federally listed fairy shrimp species conducted in support of a Proponent's Environmental Assessment being prepared for San Diego Gas & Electric Company's (SDG&E) Proposed Tie Line (TL) 695/6971 Reconductor[1] Project (i.e., the Proposed Project) in northern San Diego County (Figure 1). Under contract to SDG&E, and subcontracted through Pangea Biological (agreement number PBCARDNO-1001 Task Order 25240.01-001), Cardno conducted USFWS protocol surveys for federally listed fairy shrimp species in the SDG&E TL 695/6971 Reconductor project area. This Dry Season Report is a follow-on to an earlier Wet Season Report of the same basins. Together, the Wet and Dry Season reports form a complete cycle of annual sampling that satisfies USFWS protocols for fairy shrimp presence/absence surveys under *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996).

In accordance with the survey protocol (USFWS 1996), dry season tasks such as soil collection, and cyst hatching and identification, were performed by appropriately certified permitees in the SDG&E TL 695/6971 Reconductor Project Survey Area (PSA) within all potential vernal basin habitats. Protocol surveys were well underway prior to the USFWS issuance of the new protocol guidelines, *Survey Guidelines for the Listed Large Branchiopods* (USFWS 2015), and therefore these protocol surveys were conducted in accordance with the valid protocols in place at the time (USFWS 1996).

2.0 PROPOSED PROJECT AND PROJECT SURVEY AREA

2.1 Project Location and Description

SDG&E proposes to reconductor a 69-kilovolt (kV) power line in northern San Diego County near the border of Orange County. The power line is located primarily on federal military lands in the western portion of Marine Corps Base (MCB) Camp Pendleton (Figure 1). The proposal also includes removing wood poles, installing steel poles, and reconductoring within existing utility corridors and other areas devoted to electric utilities. The 69-kV power line will be reconductored between SDG&E's Talega, Basilone, and Japanese Mesa Substations.

The northern limit of the reconductor project is located outside MCB Camp Pendleton, into the eastern portion of the City of San Clemente, to the north and west of the Talega Substation. From this point, the project area runs west before turning south into MCB Camp Pendleton toward the San Mateo Junction (i.e., west of the Sierra Training Area) along the ridge tops of steep hills located to the north and west of Cristianitos Road. The hills in this area lie along the border of San Diego and Orange counties, and occur on lands that have been leased by the federal government to the California Department of Parks and Recreation. From San Mateo Junction, the Proposed Project runs in a southeasterly direction toward the northeastern corner of San Onofre Nuclear Generating Station (SONGS) Mesa. From this point, the Proposed Project extends to the northwest to the Basilone Substation, and to the southwest to the Japanese

[1] Reconductoring is a term used by utilities to describe the replacement of existing wires with new wires.

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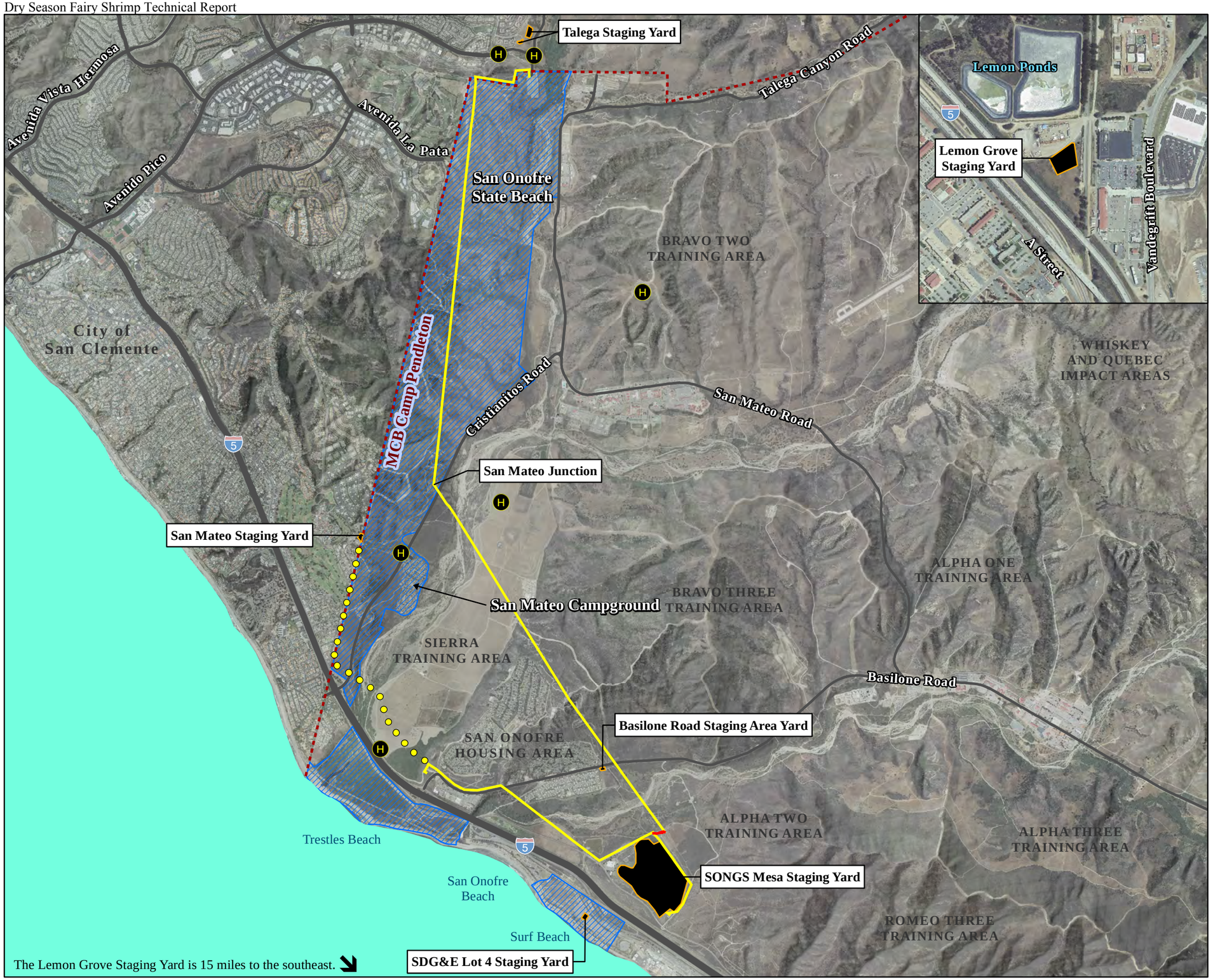


Figure 1
TL695/6971 Proposed Project Area

LEGEND

- MCB Camp Pendleton Boundary
- Proposed Project Overhead Route
- Proposed Project Underground Route
- Proposed Power Line Removal Segement
- Staging Yard
- Helicopter Incidental Landing Area
- State Parks Lease Area



Kilometers
0 2
0 1
Miles

Sources: City of San Clemente 2015, ESRI 2015

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Mesa Substation. The Proposed Project includes approximately 27 miles of existing dirt roads that will be utilized to access various elements of the Proposed Project for construction activities. Fairy shrimp protocol surveys occurred entirely within MCB Camp Pendleton-owned land.

2.2 Project Survey Area

The PSA for fairy shrimp surveys consists of a 300-foot buffer that originates from the power line (150-foot buffer on each side of the power line) and a 50-foot buffer around all laydown areas, substations, and stringing sites. In addition, a 20-foot buffer was used on both sides of dirt access roads, of which 11.8 miles occur within the main 300-foot survey buffer and 15.4 miles occur outside of the 300-foot survey buffer. Table 1 details the PSA.

Table 1. TL 695/6971 Fairy Shrimp Project Survey Area

Project Component	Area
Power Line (including 300-foot survey buffer)	393.70 acres
Substations (including 50-foot survey buffer)	
Basilone Substation	1.14 acres
Japanese Mesa Substation	0.28 acres
Talega Substation	7.86 acres
Staging Yards (including 50-foot survey buffer)	
Basilone Staging Yard	1.17 acres
Talega Staging Yard 1 of 2*	3.72 acres
San Mateo Staging Yard	1.31 acres
SONGS Mesa Staging Yard	80.87 acres
SDG&E Lot 4 Staging Yard	1.88 acres
Lemon Grove Staging Yard	1.43 acres
Stringing Sites (including 50-foot buffer)	2.23 acres
TOTAL	**496.90 acres**

Note: *Talega Staging Yard 2 of 2 is a component that was added to the Proposed Project but is located outside of the PSA.

The 15 basins located within the PSA that were surveyed in the preceding Wet Season Report, were re-examined during the Dry Season Survey. These 15 basins examined were those proposed in the 15-Day Dry Season Request to Survey (Figure 2, Figure 3, and Table 2).

Table 2. TL 695/6971 Basins Surveyed for Fairy Shrimp, 2014-2015 Wet Season

Basin ID	Approximate Lat./Long.	Dates Visited (Ponding = Bold)	Observed Species	Estimated Population	Wet Season Surveyed
Basin 5-1	33°26'39.17"N, 117°34'49.54"W	**2/3**; 3/20; 4/29; 5/12; 7/29	*Branchinecta species*	100s	No[1]
Basin 7-1	33°26'17.12"N, 117°34'52.64"W	2/3; 3/20; 5/12	None	-	Yes
Basin 21-1	33°23'3.94"N, 117°34'14.56"W	2/3; **3/6, 9, 13, 20**, 26; 4/2; 5/20; **7/21, 29; 9/9**	*Branchinecta lindahli*	100s	Yes
Basin 21-2	33°23'2.88"N, 117°34'12.98"W	2/3; **3/6, 9, 13, 20**, 26; 4/2; 5/20; 7/21, 29	*Branchinecta lindahli*	1,000s	Yes
Basin 21-3	33°22'59.32"N, 117°34'7.84"W	2/3; 3/6, 9, 13, 20, 26; 4/2; 5/20; 7/21, 29	None	-	Yes
Basin 23-2	33°22'56.69"N, 117°33'20.04"W	2/3; 3/6, 9, 13, 20, 26; 4/2; 5/20; 7/21	None	-	Yes
Basin 23-4	33°22'55.79"N, 117°33'19.01"W	**2/3; 3/6, 9, 13, 20, 26; 4/2, 6**, 21; 5/20; 7/21	None	-	Yes
Basin 23-8	33°22'59.05"N, 117°33'15.99"W	**5/20**; 7/21	*Branchinecta lindahli*	10s	Yes

Table 2. TL 695/6971 Basins Surveyed for Fairy Shrimp, 2014-2015 Wet Season

Basin ID	Approximate Lat./Long.	Dates Visited (Ponding = Bold)	Observed Species	Estimated Population	Wet Season Surveyed
Basin 24-1	33°22'30.01"N, 117°32'57.59"W	2/3; **3/6, 9, 13**, 20; 4/2	*Branchinecta lindahli*	1s	Yes[2]
Basin 33-1	33°23'10.20"N, 117°33'35.19"W	2/3; **3/6, 9, 13, 20, 26**; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	10,000s	Yes
Basin 33-2	33°23'9.80"N, 117°33'39.02"W	2/3; **3/6, 9, 13**, 20, 26; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	100s	Yes
Basin 33-3	33°23'11.38"N, 117°33'38.02"W	2/3; **3/6**, 9, 13, 20, 26; 4/2; 5/20; 7/21	Undetermined[3]	10s	Yes
Basin 33-4	33°23'12.03"N, 117°33'38.01"W	2/3; **3/6, 9**, 13, 20, 26; 4/2; 5/1, 20; 7/21	*Branchinecta lindahli*	10s	Yes
Basin 33-10	33°23'1.02"N, 117°33'29.47"W	2/3; **3/6, 9, 13**, 20, 26; 4/2; 5/1, **20**; 7/21	*Branchinecta lindahli*	1000's	Yes
Basin 33-11	33°23'2.83"N, 117°33'27.04"W	2/3; **3/6**, 9, 13, 20, 26; 4/2; 5/20; 7/21	None	-	Yes

Notes: [1]Visual observation determined in the field by R. Stolpe during pre-survey reconnaissance. At the time of the observation, it was assumed that this basin would not be within the project area.
[2]Only one sampling event occurred in this basin, and it has been targeted for request for future surveys.
[3]Undetermined = fairy shrimp observed in dry/drying mud, but unable to sample.

3.0 BACKGROUND

Fairy shrimp are small, translucent crustaceans that are found in ephemeral (vernal) pools and occasionally in depressions (road ruts and ditches) that support suitable ponded habitat. When water begins to pond after the commencement of the rainy season, shrimp begin to hatch from encysted embryos (cysts). Two federally listed fairy shrimp species are known to occur in San Diego County, Riverside fairy shrimp (RFS) (*Streptocephalus woottoni*) and San Diego fairy shrimp (SDFS) (*Branchinecta sandiegonensis*), both of which are described below. Threats to both species include habitat loss and degradation due to urban and agricultural development, off-road vehicle use, vehicle trampling, and flood control measures (USFWS 2008a, 2008b). Both RFS and SDFS are known to co-occur with the more common, non-listed, versatile fairy shrimp (*Branchinecta lindahli*).

No federally listed fairy shrimp species were identified in any of the surveyed basins in the SDG&E TL 695/6971 Reconductor PSA during Wet Season sampling. The non-listed versatile fairy shrimp was observed in eight basins; however, this species is not afforded any protection under the federal Endangered Species Act. Two basins contained undetermined fairy shrimp; one *Branchinecta* species (but likely *B. lindahli*), and the other without positive identification of genus but likely *B. lindahli* species. As part of the Dry Season sampling, lab identification from the basins containing undetermined (and determined) fairy shrimp was expected to assist with determination of species (Table 2).

3.1 Riverside Fairy Shrimp

The RFS is a medium sized fairy shrimp, typically 0.5 to 1.0 inch that is generally restricted to vernal pools and other non-vegetated ephemeral pools greater than 12 inches in depth in Riverside, Orange, and San Diego counties in southern California, and northwestern Baja California, Mexico (USFWS 2008a). The northern range of RFS is defined by Skunk Hollow and the Santa Rosa Plateau in Riverside County and coastal sites in San Diego and Orange Counties. The species is documented from one vernal pool complex on Marine Corps Air Station (MCAS) Miramar, throughout MCB Camp Pendleton, and eight vernal pool complexes on Otay Mesa (MCB Camp Pendleton 2012). The USFWS listed the RFS as federally endangered on August 3, 1993 (USFWS 1993).

Figure 2. TL 695/6971 Basins Targeted for 2015 Dry Season - North

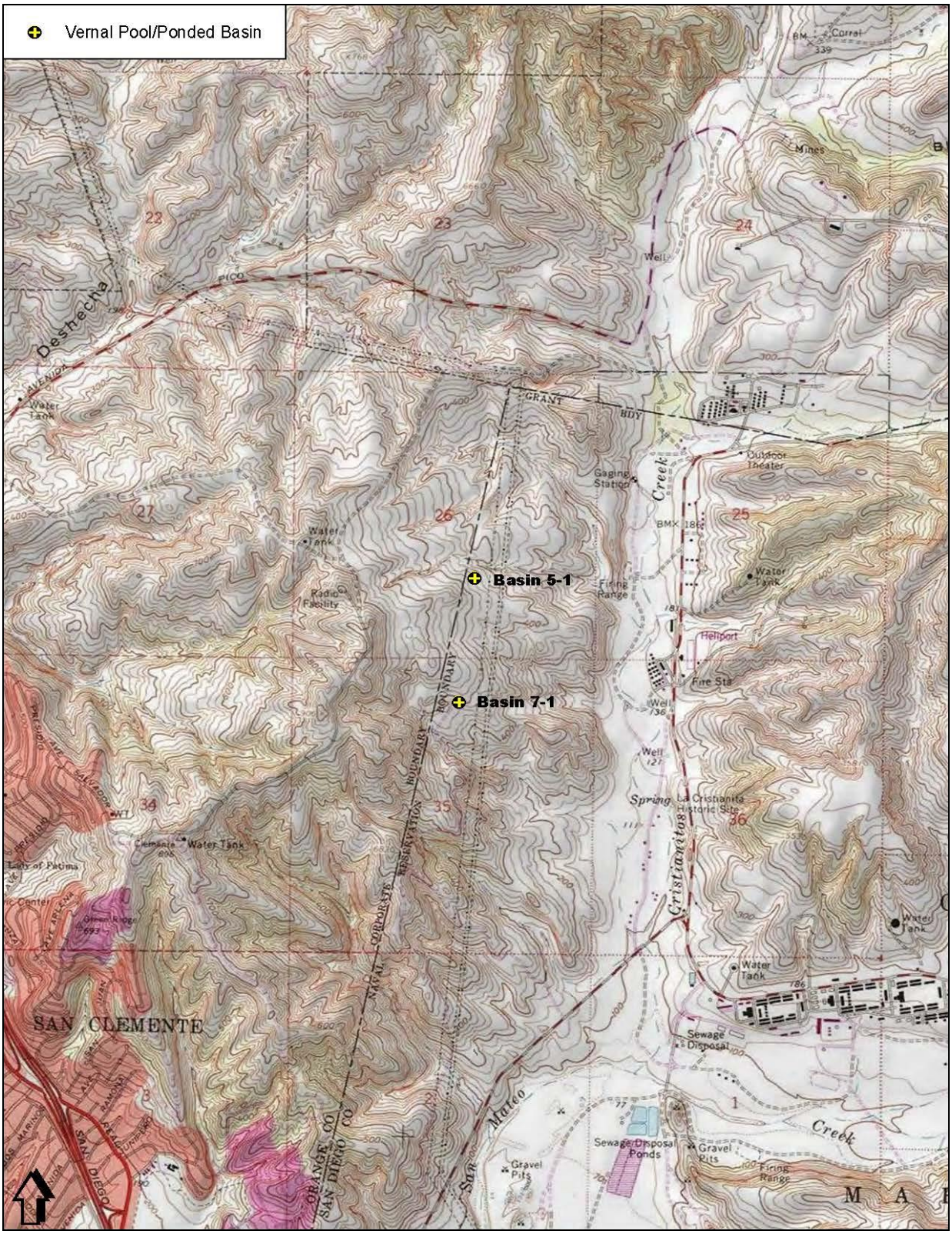
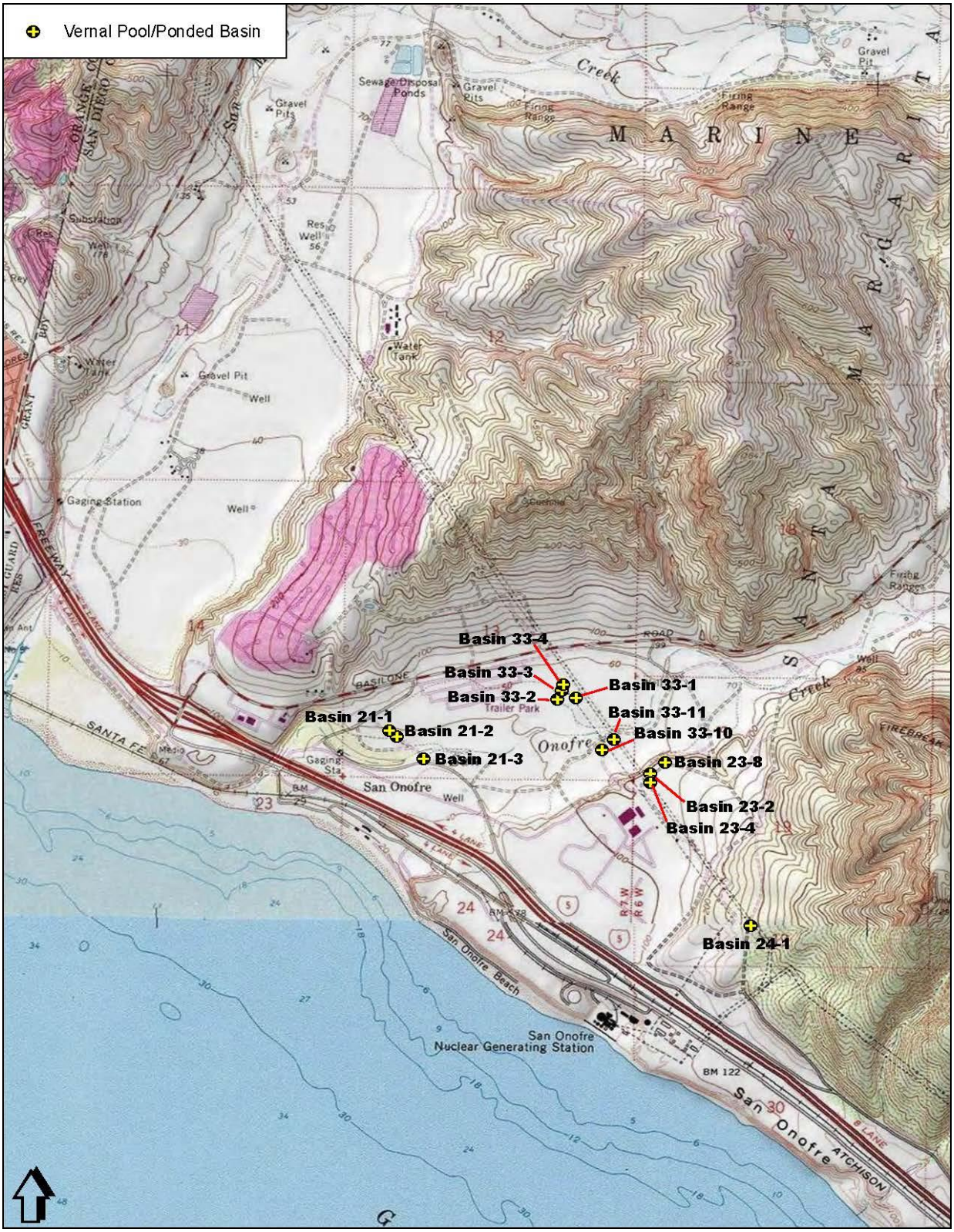


Figure 3. TL 695/6971 Basins Targeted for 2015 Dry Season - South



The RFS has the most limited range of any endemic California (including Baja California) fairy shrimp and is currently only known to occupy approximately 45 vernal pool complexes (approximately 200 occupied basins) (USFWS 2008a). More than half of all extant complexes known to contain RFS are in San Diego County, including eight complexes (containing at least 81 basins) on MCB Camp Pendleton (MCB Camp Pendleton 2012, USFWS 2008a).

3.2 San Diego Fairy Shrimp

The SDFS is a small fairy shrimp (growing to 0.6 inch) that is generally found in smaller, shallower (2 to 12 inches deep) vernal pools and ephemeral basins than RFS and occasionally in depressions such as ditches and road ruts (MCB Camp Pendleton 2012, USFWS 2008b). The USFWS listed the SDFS as federally endangered on February 3, 1997 (USFWS 1997).

SDFS are only known to occur in approximately 137 vernal basin complexes in San Diego, Orange, and Santa Barbara counties, and northwestern Baja California, Mexico, with the majority of occupied habitat being in San Diego County (USFWS 2008b).

4.0 METHODS

Before initiating the Dry Season sampling, a 15-day notice of intent (notification) letter was sent to the USFWS Carlsbad Field Office requesting permission to collect samples for the identification of fairy shrimp cysts. The Dry Season sampling notification letter was submitted on July 14, 2015 and approved on July 23, 2015 (Appendix A). Dry Season sampling for this project occurred on September 9, 2015. A photographic record of sampled basins is provided in Appendix B.

Fairy shrimp soil collection was conducted in accordance with the *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (USFWS 1996) with incorporation of the most recent guidance (USFWS 2015) wherever possible. Soil collection was conducted by USFWS permitted fairy shrimp and vernal pool biologists Richard Stolpe (Permit TE-25864A-1), with the assistance of Cardno colleagues Shannon Brown and Blake Claypool. Samples were collected in the following manner:

Soil/substrate collection - A hand spade was used to collect a maximum of one liter volume sample per basin consisting of the top 0.4 to 1.2 inches (1 to 3 cm) of basin sediment. Whenever possible, soil samples were collected in chunks and the spade was used to pry up intact chunks of sediment. Loosening the soil by raking or shoveling was avoided because of its potential to damage cysts.

Soil/substrate sample volume - At least ten soil samples were collected at each basin, but no more than 1.25 liters of total soil was taken from any basin. If a basin had had a surface area of less than 2.5 square meters, or more than 236 square meters, the number of samples and total volume of soil would have been adjusted accordingly (per Table 1 of *Survey Guidelines for the Listed Large Branchiopods* [USFWS 2015]). No more than 10% of any basin's surface area was disturbed while collecting soil/substrate. Tools and other gear used were disinfected between isolated basins after sampling.

Soil/substrate sample locations - Samples were collected from the deepest topographic area (or areas) within the basin. Interval sites between deep locations, as well as relevant sites radiating out in a transect manner from the deepest location to the basin margins were also sampled. This approach recommended by USFWS guidance (USFWS 2015) is also consistent with research findings of the author (Stolpe 2009).

Soil/substrate sample storage - Samples from the same basin were combined in the same storage container. The container was then labelled with the collection date, location of basin, and name of

permitted collector. Samples were well-ventilated and stored in a dry location out of direct sunlight to avoid excessive heating.

Only biologists who hold a valid 10(a)1(A) recovery permit for the listed large branchiopods with additional terms and conditions included in their permit specifically for conducting processing, isolating, and identifying listed large branchiopod eggs are authorized to conduct this procedure. At this time the preparation of materials to support the addition of an amendment to the permit of Mr. Stolpe is in-progress. Therefore, the services of an appropriately permitted individual, Dr. Charles Black (10[a][1][A] permit #TE835549-6[2]) were utilized for this purpose. Under Dr. Black's close supervision, Mr. Stolpe assisted with the various steps processing and identification. The results of Dr. Black's examination of soil samples are summarized in Chapter 5.0 *Results*, and the stand-alone report is included in Appendix C. The following methods were used by Dr. Black and Mr. Stolpe to isolate branchiopod eggs:

Soil/substrate sample processing for cyst presence - Approximately 1 liter bulk samples collected by Richard Stolpe from 12 different basins were delivered to Ecological Restoration Service (ERS) in September, 2015. The samples were processed per the USFWS protocol guidelines (USFWS 1996) that this project was initiated under, and modified by ERS as described below. Dr. Black of ERS is authorized by the USFWS to process dry samples for the presence of fairy shrimp cysts and to culture cysts to identify to species level as per the special conditions of his 10(a)(1)(A) permit.

The samples were hydrated for approximately 1-2 hours in tap water, and then washed through a set of sieves. Material passing through a Number 45 (.0139") USA Standard Testing Sieve, ASTM-11 specification and caught on a Number 70 (.0083") Sieve was rinsed into a container with approximately 50 milliliters (ml) of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter placed in a filter funnel, and water was removed through the filter paper by way of vacuum suction. The material left on the paper was examined under a 6.3 - 570x power Olympus SZX9 Zoom Stereo Microscope. Distinctive fairy shrimp cysts, if present, were individually counted (if less than approximately 50) or estimated (for larger numbers) by examining ¼ or ½ subsections of the filter and multiplying the subset by the appropriate factor. The presences of ostracod shells and cladoceran ephippia were also noted in samples.

Branchiopod egg specimen vouchers – As required by the conditions of the Endangered Species Act Section 10(a)(1)(A) permit for the take of large branchiopods, a representative sample of eggs from each species of branchiopod collected from a basin surveyed will be deposited at the Natural History Museum of Los Angeles County in the manner listed in the protocol guidance (USFWS 2015 [Section VIII]).

5.0 RESULTS

Results of the Dry Season fairy shrimp surveys for the SDG&E TL 695/6971 Reconductor Project survey area are provided in Table 1 of Appendix C and summarized in Table 2 below. The Dry Season Vernal Pool Data sheet entries and Voucher Specimen Data Worksheet are both included in Appendix D.

In summary, distinctive *Branchinecta* cysts were present in medium to high numbers in five basins (21-2; 23-4; 33-1; 33-2; 33-10), low numbers (less than 20 total) in samples from four basins (23-2; 33-3; 33-4; 33-11), and no cysts or other structures were found in three basins (7-1; 21-3; 24-1). No *Streptocephalus* cysts were found in any sample.

[2] Effective to 3/9/2015 (in process of renewal)

Table 3. TL 695/6971 Basins Surveyed for Fairy Shrimp, 2015 Dry Season

Basin ID	Observed Fairy Shrimp Wet Season	Observed Cysts Dry season	Cyst Abundance[1]	Ostracod Shells	Cladocera Ephippia
Basin 5-1	*Branchinecta species*	Not sampled	Not sampled	Not sampled	Not sampled
Basin 7-1	None	None	None	None	None
Basin 21-1	*Branchinecta lindahli*	Not sampled	Not sampled	Not sampled	Not sampled
Basin 21-2	*Branchinecta lindahli*	*Branchinecta species*	Medium	Yes	Yes
Basin 21-3	None	None	None	None	None
Basin 23-2	None	*Branchinecta species*	Low	Yes	None
Basin 23-4	None	*Branchinecta species*	High	Yes	Yes
Basin 23-8	*Branchinecta lindahli*	Not sampled	Not sampled	Not sampled	Not sampled
Basin 24-1	*Branchinecta lindahli*	None	None	None	None
Basin 33-1	*Branchinecta lindahli*	*Branchinecta species*	High	Yes	None
Basin 33-2	*Branchinecta lindahli*	*Branchinecta species*	Medium	Yes	None
Basin 33-3	Undetermined	*Branchinecta species*	Low	None	None
Basin 33-4	*Branchinecta lindahli*	*Branchinecta species*	Low	None	None
Basin 33-10	*Branchinecta lindahli*	*Branchinecta species*	High	Yes	None
Basin 33-11	None	*Branchinecta species*	Low	Yes	None

Notes: [1]Average number of cysts per 100 ml of soil (per sample): High = >50; Medium = 11-50; Low = 1-10 (USFWS 2015 [Section VI.d]).

Three basins were not surveyed for fairy shrimp cysts. Basin 21-1 did not dry out as expected due to a ruptured nearby irrigation pipe that repeatedly filled the basin with non-potable water. Basin 5-1 and Basin 23-8 were not sampled for fairy shrimp cysts because Wet Season sampling for those basins was insufficient.

Dry season sampling revealed Branchinecta species cysts in three basins in which fairy shrimp had not been observed during the Wet Season surveys. However, Basin 23-4 was rumored to have hosted fairy shrimp during the winter of 2014 and therefore cysts were anticipated and encountered. Dry season sampling of Basin 33-3 helped to reduce the uncertainty of findings during the Wet Season, and further the hypothesis that it may share characteristics with Basin 33-4.

Conversely, no cysts were encountered in Basin 24-1 even though on a single occasion (March 13, 2015) two mature *B. lindahli* fairy shrimp (one male and one female) were recovered from the basin. While anthropogenic translocation of the mature shrimp is possible, it is unlikely given the location of the basin and the measures taken by the surveyors to cleanse equipment between basins. It is difficult to reconcile the anomaly; however, it may suggest a very low fairy shrimp cyst population in the soil substrate.

6.0 DISCUSSION

All surveyed basins were non-naturally occurring disturbed depressions, ruts, and/or swales. No federally listed fairy shrimp species were identified in the Wet Season surveys, and no federally listed *Streptocephalus* cysts were identified during the Dry Season survey of basins for the SDG&E TL 695/6971 Reconductor Project. The *Branchinecta* species was identified in 13 of the 15 basins surveyed. The non-listed versatile fairy shrimp was observed in eight basins during the Wet Season. It is not possible at this time to distinguish between *Branchinecta* species of cysts that are or are not afforded protection under the federal Endangered Species Act without DNA-level examination.

This is an interim report, and the Dry and Wet Season reports will be combined in a Final Fairy Shrimp Report at the conclusion of the project.

7.0 REFERENCES

MCB Camp Pendleton. 2012. Integrated Natural Resource Management Plan Marine Corps Base and Marine Corps Air Station Camp Pendleton. Assistant Chief of Staff, Environmental Security. http://www.marines.mil/unit/basecamppendleton/Pages/BaseStaffandAgencies/Environmental/NaturalResourcesManagementPlan/Home.aspx.

Stolpe, R.C. 2009. Effects of Vehicular Disturbance on Physical and Biological Properties of Vernal Pools at Marine Corps Air Station, Miramar, San Diego County, CA. Published Master's Thesis. San Diego State University. Aztec Publishing.

USFWS. 1993. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for Three Vernal Pool Plants and the Riverside Fairy Shrimp. U.S. Fish and Wildlife Service. Federal Register 58: 41384-41392.

USFWS. 1996. Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods. 19 August.

USFWS. 1997. Endangered and Threatened Wildlife and Plants: Determination of Endangered Status for the San Diego Fairy Shrimp. U.S. Fish and Wildlife Service. Federal Register 62: 4925-4939.

USFWS. 2008a. Riverside Fairy Shrimp (*Streptocephalus wootoni*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Carlsbad Office. Carlsbad, California. September

USFWS. 2008b. San Diego Fairy Shrimp (*Branchinecta sandiegonensis*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service Carlsbad Office. Carlsbad, California. September

USFWS. 2015. Survey Guidelines for the Listed Large Branchiopods. Pacific Southwest Region. May 31.

APPENDIX A

15-Day Notification for Dry Season Fairy Shrimp Surveys

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From:	Love, Stacey
To:	Richard Stolpe
Subject:	Fwd: Dry Season Notification modified as requested
Date:	Tuesday, September 15, 2015 1:06:36 PM
Attachments:	USFWS Request Letter - Dry Season_modified.pdf

Hi Richard,

Thank you for the revised notification. Please consider this email our approval for you to use proposed methods and personnel described in the notification below.

Thank you,
Stacey
---------- Forwarded message ----------
From: **Richard Stolpe** <Richard.Stolpe@cardno-gs.com>
Date: Mon, Sep 14, 2015 at 10:32 AM
Subject: Dry Season Notification modified as requested
To: "Love, Stacey" <stacey_love@fws.gov>

Hi Stacey,

Just to be sure that I am satisfactorily meeting the request of your July 23rd email (refer to email chain below), I have modified the Dry Season notification as requested so that it identifies Chuck Black, 10(a)(1)(A) permit # TE-835549-5, as the individual to process the Dry Season samples and identify cysts. I only modified one other item in the letter, and that was to change the recipient from "Peter Beck" to "Stacey Love". Other than that it is the same letter that was approved back in July.

My apologies if this was unnecessary; I had not received a confirmation that the email update on September 8th was sufficient by itself.

Richard

Richard Stolpe
ENVIRONMENTAL ANALYST/PLANNER
GOVERNMENT SERVICES DIVISION, CARDNO
Fairy Shrimp Permitted Biologist
(CDFW SC-11445 / USFWS TE-25864A-0)
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From: Love, Stacey [mailto:stacey_love@fws.gov]
Sent: Thursday, July 23, 2015 12:35 PM
To: Richard Stolpe
Cc: Peter Beck
Subject: Fwd: 15-Day Dry Season Notification Letter - TL696/6971 project

Richard,

Thank you for the notification. Please consider this email our approval for you to commence dry season surveys for listed large branchiopods at this location using proposed methods described in the notification below.

As acknowledged in the notification, processing the soils and examination for listed large branchiopods can only be conducted by permittees with these authorizations per VI of the survey guidelines (please see attached list of permittees). Thus, I should receive a pre-activity notification from the permittee, or please resend this notification (once you have identified the permittee) and state their name and permit number in your email text.

Also, please be advised that hydration alone cannot determine absence per VI(f)(2) of the survey guidelines. Per number II(b) of the guidelines, a complete survey consists of one wet season survey and one dry season survey conducted within a 3-year period. Thus, the dry season survey coupled with a wet season may determine absence (assuming the wet season survey is determined to be valid by the Service). However, should *Branchinecta* sp. be detected this dry season in any pool where surveys from the 2014-2015 wet season survey found no listed shrimp, we recommend that you plan to conduct wet season surveys at these locations in 2015-2016 per IV(b)(7) of the guidelines.

I look forward to receiving your survey report.

Thank you,

Stacey

---------- Forwarded message ----------
From: **Beck, Peter** <peter_beck@fws.gov>
Date: Wed, Jul 15, 2015 at 3:17 PM
Subject: Fwd: 15-Day Dry Season Notification Letter - TL696/6971 project
To: "Stolpe, Richard" <Richard.Stolpe@cardno-gs.com>
Cc: Stacey Love <Stacey_Love@fws.gov>, Jonathan Snyder
<Jonathan_D_Snyder@fws.gov>

Richard,

Since you will be conducting surveys under your ESA 10a1A Recovery Permit, pre-activity survey notifications should always be directed to our office Permit Coordinator, Stacey Love. She typically forwards these notifications to staff biologists (like myself) for review and comment before she responds. Although she generally bases her response on our comments and recommendations, only she has the authority within our office to provide the official Service response. I will forward your notification to her, and separately provide my comments to her. She will respond to your request.

I understand that our process may be confusing at times, but I just want to make sure you are aware that all survey notifications need to go through the Permit Coordinator. You are always welcome to discuss a specific sampling strategy that will be applied to Camp Pendleton (my "turf"), as I am one of the ultimate users of the resulting survey information. Generally, sampling only needs further discussion if it varies from our established survey protocols, but there may be many case-specific situations you may wish to discuss due to the large number of vernal pools on Camp Pendleton and wealth of past survey information covering many of the pools on Camp Pendleton.

Thanks,

Pete

****

Peter P. Beck

Fish & Wildlife Biologist

U.S. Fish and Wildlife Service

2177 Salk Avenue, Suite 250

Carlsbad, CA 92008

Phone: (760) 431-9440 x213

---------- Forwarded message ----------
From: **Richard Stolpe** <Richard.Stolpe@cardno-gs.com>
Date: Tue, Jul 14, 2015 at 11:28 AM
Subject: 15-Day Dry Season Notification Letter - TL696/6971 project
To: "peter_beck@fws.gov" <peter_beck@fws.gov>
Cc: "Amy Rowland (amy@pangeabiological.com)" <amy@pangeabiological.com>, "Scott Rowland (scott@pangeabiological.com)" <scott@pangeabiological.com>, "msaplanning@pangeabiological.com" <msaplanning@pangeabiological.com>, "shruti.ramaker@cardno.com" <shruti.ramaker@cardno.com>, Scott Barker <Scott.Barker@cardno-gs.com>, Clint Scheuerman <Clint.Scheuerman@cardno-gs.com>, Lisa Woeber <Lisa.Woeber@cardno-gs.com>, Jason Strayer <Jason.Strayer@cardno-gs.com>

Dear Mr. Beck,

Please find the attached request to conduct Dry Season surveys for listed vernal pool branchiopods in support of the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project. All pertinent project and survey information is presented in the request. Please feel free to contact me should you have any questions or concerns.

Very Respectfully,

Richard Stolpe

Richard Stolpe
ENVIRONMENTAL ANALYST/PLANNER
Fairy Shrimp Permitted Biologist
(CDFW SC-11445 / USFWS TE-25864A-0)

GOVERNMENT SERVICES DIVISION
CARDNO

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Richard C. Stolpe
514 Via De La Valle, Suite 308
Solana Beach, CA • 92075
Phone: (858) 509-3157
Email: richard.stolpe@cardno-gs.com

July 14, 2015

Ms. Stacey Love
Biologist/Recovery Permits
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA. 92008

SUBJECT: 15-day notification for 2015 dry season fairy shrimp surveys on Marine Corps Base Camp Pendleton in San Diego County, California in support of the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project

Dear Ms. Love,

I am writing to request permission for myself and my coworker, Mr. Clint Scheuerman (please see permit information below), to conduct dry season branchiopod sampling at 41 potential or known basins on Marine Corps Base (MCB) Camp Pendleton. All of the basins are located within the USGS SAN CLEMENTE 7.5' Quadrangle (please see Enclosure 1). The surveys would be conducted as part of the environmental analysis for the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project, and as a follow-up to wet season surveys approved for some of those basins earlier this year (2015; refer to Enclosure 2). The Proposed Project would replace conductor wire and poles within San Diego Gas and Electric's right-of-way along an 11-mile-long transmission corridor located in the western portion of MCB Camp Pendleton. Basin IDs and approximate coordinates are presented below and their locations are shown on the accompanying maps in Enclosure 1.

For many of the 41 basins, surveys will be conducted to collect baseline information as they have not yet been surveyed for the presence of listed branchiopods. As noted above, others were wet season sampled by Cardno earlier this year, and the dry season sampling will complete their protocol surveys. For basins not sampled during the 2014-15 wet season, wet season sampling will be required during the upcoming 2015-16 wet season to complete their protocol surveys. A request for approval of 2015-16 wet season surveys will be submitted to USFWS in advance of that effort.

In February of 2015, Cardno requested permission (and was approved in March) to conduct wet season surveys on 7 known basins along the project alignment. The determination of 7 basins in the project area was based upon three sources: 1) the official MCB Camp Pendleton vernal pool database; 2) a 2014 reconnaissance survey performed by AECOM; and 3) a 2014 reconnaissance survey performed by LSA. During initial wet season survey activities, additional previously undocumented basins were observed

ponding in the project alignment, some containing fairy shrimp, and given the later start to our wet season sampling were also surveyed, although not necessarily sampled (e.g., Basin 5-1 and Basin 23-8 genus was determined visually in-the-field by a 10(a)(1)(A) fairy shrimp permitted biologist; see Table 1 below).

Since the wet season began, our survey area has expanded to include access roads approaching the project alignment. An initial survey of the access roads determined that there are another 31 potential basins which may need to be surveyed/sampled, resulting in a total of 49 basins. During both the wet season surveys/sampling and initial dry season reconnaissance survey, a total of 8 (of the 49) basins were eliminated from further consideration due to exceedingly poor basin characteristics and thus, exceedingly poor vernal pool or vernal pool flora/fauna potential. Therefore, there are 41 basins that Cardno is currently tracking; 13 that were carried over from the wet season, and 28 that will be new for this season's (2015) dry season survey/sampling event. It is the 41 basins shown both in Table 1 and on the maps in Enclosure 1, for which approval to conduct Dry Season sampling is being requested:

Table 1. Basins Identified in the Project Area

#	Feature Number	Previous Feature Numbers	Approximate Lat./Long.	Potential Species	2015 Wet Season Surveyed	2015 Observed Species
1	Basin 3-1	None	33°27'16.32"N, 117°34'22.52"W	Potentially suitable for fairy shrimp.	No	-
2	Basin 3-2	None	33°27'14.95"N, 117°34'24.63"W	Potentially suitable for fairy shrimp.	No	-
3	Basin 3-3	None	33°27'12.18"N, 117°34'32.15"W	Potentially suitable for fairy shrimp.	No	-
4	Basin 4-1	None	33°27'9.72"N, 117°34'27.81"W	Potentially suitable for fairy shrimp.	No	-
5	Basin 4-2	None	33°27'3.63"N, 117°34'43.00"W	Potentially suitable for fairy shrimp.	No	-
6	Basin 4-3	None	33°27'3.03"N, 117°34'42.46"W	Potentially suitable for fairy shrimp.	No	-
7	Basin 5-1	Basin 1 (Cardno).	33°26'39.17"N, 117°34'49.54"W	Lindahl FS known to occupy	No	*B. species*[1]
8	Basin 7-1	SP_59001 (MCBCP); 9-1 (Cardno).	33°26'17.12"N, 117°34'52.64"W	Riverside FS known to occupy	Yes	None
9	Basin 7-4	None	33°25'59.37"N, 117°34'53.04"W	Potentially suitable for fairy shrimp.	No	-
10	Basin 11-1	None	33°25'18.54"N, 117°34'51.92"W	Potentially suitable for fairy shrimp.	No	-
11	Basin 21-1	Basin 1 (AECOM); 29-1/2 (Cardno).	33°23'3.94"N, 117°34'14.56"W	Lindahl FS known to occupy	Yes	*B. lindahli*
12	Basin 21-2	29-3 (Cardno)	33°23'2.88"N, 117°34'12.98"W	Lindahl FS known to occupy	Yes	*B. lindahli*
13	Basin 21-3	29-4 (Cardno)	33°22'59.32"N, 117°34'7.84"W	Suitable for fairy shrimp	Yes	None
14	Basin 21-4	None	33°22'58.30"N, 117°34'3.38"W	Potentially suitable for fairy shrimp.	No	-
15	Basin 21-5	None	33°22'54.21"N, 117°33'56.85"W	Potentially suitable for fairy shrimp.	No	-
16	Basin 23-1	None	33°22'56.07"N, 117°33'20.62"W	Potentially suitable for fairy shrimp.	No	-

#	Feature Number	Previous Feature Numbers	Approximate Lat./Long.	Potential Species	2015 Wet Season Surveyed	2015 Observed Species
17	Basin 23-2	SO_83002 (MCBCP); 34-1 (Cardno).	33°22'56.69"N, 117°33'20.04"W	Lindahl FS known to occupy	Yes	None
18	Basin 23-3	None	33°22'56.81"N, 117°33'19.65"W	Potentially suitable for fairy shrimp.	No	-
19	Basin 23-4	SO_83001 (MCBCP); 34-2 (Cardno).	33°22'55.79"N, 117°33'19.01"W	Lindahl FS known to occupy	Yes	None
20	Basin 23-5	None	33°22'55.76"N, 117°33'21.07"W	Potentially suitable for fairy shrimp.	No	-
21	Basin 23-6	None	33°22'55.73"N, 117°33'20.67"W	Potentially suitable for fairy shrimp.	No	-
22	Basin 23-7	None	33°22'56.80"N, 117°33'18.67"W	Potentially suitable for fairy shrimp.	No	-
23	Basin 23-8	None	33°22'59.05"N, 117°33'15.99"W	Lindahl FS known to occupy	No	*B. species*[1]
24	Basin 24-1	Basin 2 (AECOM); 45-1 (Cardno).	33°22'30.01"N, 117°32'57.59"W	Lindahl FS known to occupy	Yes	*B. lindahli*
25	Basin 27-1	None	33°24'41.14"N, 117°34'47.84"W	Potentially suitable for fairy shrimp.	No	-
26	Basin 28-1	None	33°24'29.59"N, 117°34'40.05"W	Potentially suitable for fairy shrimp.	No	-
27	Basin 28-2	None	33°24'29.40"N, 117°34'38.28"W	Potentially suitable for fairy shrimp.	No	-
28	Basin 28-3	None	33°24'27.85"N, 117°34'36.17"W	Potentially suitable for fairy shrimp.	No	-
29	Basin 30-1	None	33°23'54.55"N, 117°34'10.76"W	Potentially suitable for fairy shrimp.	No	-
30	Basin 33-1	SO_74002 (MCBCP); 43-3 (Cardno).	33°23'10.20"N, 117°33'35.19"W	Lindahl FS known to occupy	Yes	*B. lindahli*
31	Basin 33-2	SO_74001 (MCBCP); 43-4 (Cardno).	33°23'9.80"N, 117°33'39.02"W	Lindahl FS known to occupy	Yes	*B. lindahli*
32	Basin 33-3	SO_74004 (MCBCP); 43-2 (Cardno).	33°23'11.38"N, 117°33'38.02"W	Lindahl FS known to occupy	Yes	Undetermined
33	Basin 33-4	SO_74003 (MCBCP); 43-1 (Cardno).	33°23'12.03"N, 117°33'38.01"W	Lindahl FS known to occupy	Yes	*B. lindahli*
34	Basin 33-5	None	33°23'11.39"N, 117°33'37.58"W	Potentially suitable for fairy shrimp.	No	-
35	Basin 33-6	None	33°23'10.94"N, 117°33'37.08"W	Potentially suitable for fairy shrimp.	No	-
36	Basin 33-7	None	33°23'10.82"N, 117°33'36.85"W	Potentially suitable for fairy shrimp.	No	-
37	Basin 33-8	None	33°23'3.89"N, 117°33'30.31"W	Potentially suitable for fairy shrimp.	No	-
38	Basin 33-9	None	33°23'0.24"N, 117°33'32.07"W	Lindahl FS known to occupy	No	Undetermined
39	Basin 33-10	SO_83003 (MCBCP); 44-2 (Cardno).	33°23'1.02"N, 117°33'29.47"W	Lindahl FS known to occupy	Yes	*B. lindahli*
40	Basin 33-11	SO_84001 (MCBCP); 44-1 (Cardno).	33°23'2.83"N, 117°33'27.04"W	Lindahl FS known to occupy	Yes	None
41	Basin 33-12	None	33°22'59.48"N, 117°33'30.26"W	Potentially suitable for fairy shrimp.	No	-

[1]Visual determination made in the field by 10(a)(1)(A) fairy shrimp permitted biologist R. Stolpe.

As a subcontractor to Pangea Biological for services provided to San Diego Gas and Electric Company for our employer Cardno, we, Richard Stolpe and/or Clint Scheuerman, will administer the 2015 dry season branchiopod surveys. The branchiopod surveys will be conducted in accordance with the most recent guidelines published by the Service under Section 10(a)(1)(A) of the Endangered Species Act for dry season surveys. Accordingly, Mr. Stolpe and/or Mr. Scheuerman will only collect soil samples, and will not process those soil samples themselves[1]. Soil samples, once collected by Mr. Stolpe and/or Mr. Scheuerman, will be processed by Dr. Chuck Black, 10(a)(1)(A) fairy shrimp permit TE-835549-5, whose permit includes the special condition that allows for the processing of dry season soil samples and identification of cysts.

Please refer to attached site maps of the areas we intend to survey. As always, please do not hesitate to contact me with any questions, or if I can provide anything further.

Very Respectfully,



Richard C. Stolpe

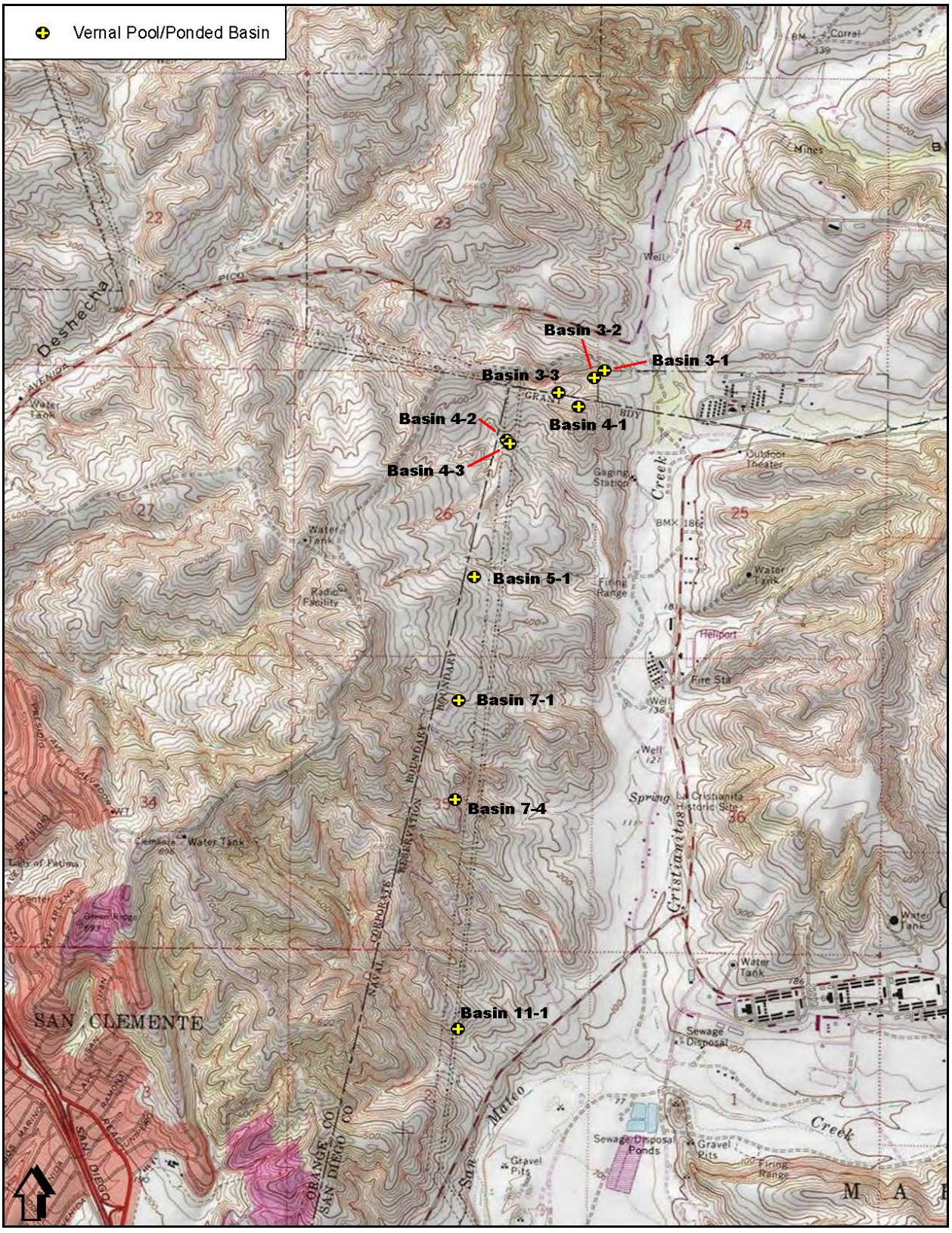
Contact Information
Richard Stolpe, Cardno (Recovery Permit TE-25864A-0)
514 Via De La Valle, Suite 308
Solana Beach, CA 92075
Phone: (858) 509-3157
Email: richard.stolpe@cardno-gs.com

Clint Scheuerman, Cardno (Recovery Permit TE-44855A-1)
1941 Devaul Ranch Drive
San Luis Obispo, CA 93405
Phone: (760) 809-4236
Email: clint.scheuerman@cardno-gs.com

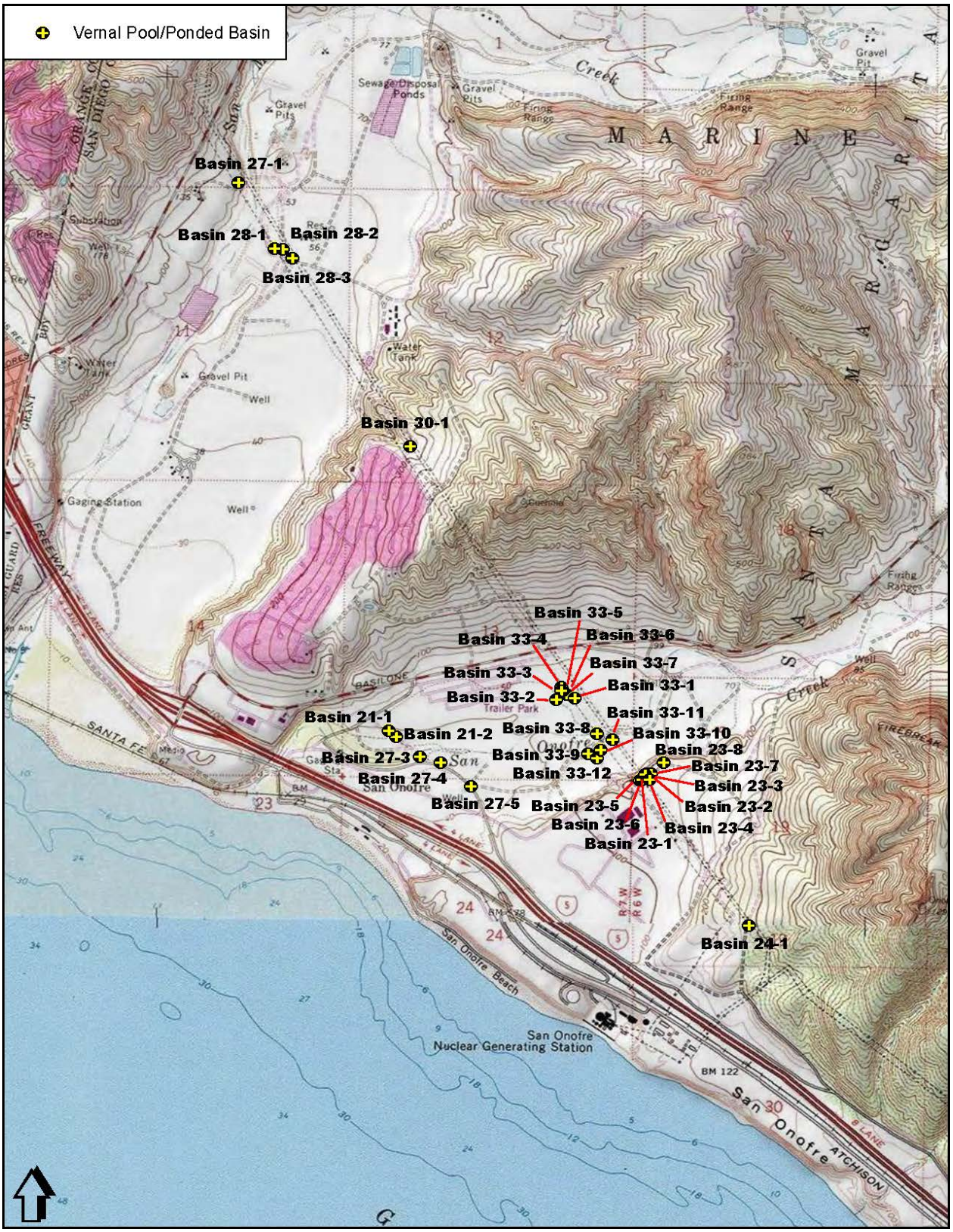
Enclosures (1) – Location of project alignment and basins listed in the table above on a USGS San Clemente 7.5' Quadrangle Map (2 pages).
(2) – Copy of the 15-Day Notification Letter for Wet Season Surveys (6 pages).

[1] Mr. Stolpe and/or Mr. Scheuerman endeavor to obtain the special condition on their permits that would allow them to process dry season samples. Until such time as this permit amendment is made and approved by USFWS however, all project dry season samples will be processed by Dr. Chuck Black, 10(a)(1)(A) fairy shrimp permit TE-835549-5.

Enclosure 1. Vernal Pool/Ponded Basin Locations for the TL 695/6971 Project
in the USGS SAN CLEMENTE 7.5' Quadrangle



Enclosure 1. Vernal Pool/Ponded Basin Locations for the TL 695/6971 Project in the USGS SAN CLEMENTE 7.5' Quadrangle



From: Beck, Peter [mailto:peter_beck@fws.gov]
Sent: Monday, March 02, 2015 3:06 PM
To: Scheuerman, Clint
Cc: Stacey_Love@fws.gov; Barker, Scott; Stolpe, Richard; Jonathan Snyder
Subject: Re: TL 695/6971 ets 25240.01 – Wet Season Fairy Shrimp Notification

Clint,
Yes, if there is adequate ponding out there I think it makes sense to go ahead with the surveys now. Although I wouldn't normally directly approve such a request, considering our recent phone exchange, Stacey agreed I could go ahead and indicate our approval to save some time. Thanks for being patient and following up on this.
Sincerely,
Pete

****

Peter P. Beck
Fish & Wildlife Biologist
U.S. Fish and Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008
Phone: (760) 431-9440 x213

On Mon, Mar 2, 2015 at 1:34 PM, Scheuerman, Clint <Clint.Scheuerman@cardno-gs.com> wrote:

Hi Stacey and Pete,

I received a voice message from Pete a couple weeks ago regarding our Notification of Intent to Conduct Wet Season Surveys at MCB Camp Pendleton. We ended up in a bit of phone-tag and never had a chance to talk, but we both agreed that at the time and with the dry weather patterns we were having, that it was too late in the season to conduct wet season surveys. However, with recent rains, it is likely that many of the vernal pools and other ponded basins in the area have ponded once again. Therefore, I am writing to check in with you and request your permission to begin wet season surveys as soon as possible. I appreciate your input and decision.

Respectfully,

Clint Scheuerman

SENIOR BIOLOGIST/WETLAND SCIENTIST
CARDNO, GOVERNMENT SERVICES DIVISION
Phone (+1) 805-755-6698 Mobile (+1) 760-809-4236
Address 1941 Devaul Ranch Drive, San Luis Obispo, CA 93405 USA

From: Scheuerman, Clint
Sent: Thursday, February 05, 2015 2:56 PM
To: Stacey_Love@fws.gov
Cc: 'teasely@semprautilities.com'; 'amy@pangeabiological.com'; 'ppotenza@pangeabiological.com'; 'msaplanning@pangeabiological.com'; Stolpe, Richard; Barker, Scott
Subject: TL 695/6971 ets 25240.01 – Wet Season Fairy Shrimp Notification

Dear Ms. Love,

Please find attached a request to conduct wet season surveys for listed vernal pool branchiopods in support of the San Diego Gas and Electric Company's TL 695/6971 Reconductor Project. All pertinent project and survey information is presented in the request. Please feel free to contact me should you have any questions or concerns.

Very Respectfully,

Clint Scheuerman

SENIOR BIOLOGIST/WETLAND SCIENTIST
CARDNO, GOVERNMENT SERVICES DIVISION

Cardno
Shaping the Future

Phone (+1) 805-755-6698 Mobile (+1) 760-809-4236
Address 1941 Devaul Ranch Drive, San Luis Obispo, CA 93405 USA
Email clint.scheuerman@cardno-gs.com Web www.cardno.com

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APPENDIX B

2015 Dry Season Photographic Record

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Photographic Record

BASIN 7-1 (33°26'17.12"N, 117°34'52.64"W)	BASIN 21-1 (33°23'3.94"N, 117°34'14.56"W)
	
View West. Photo by RCS, 9 Sep 2015. ***No cysts.***	**View Southeast. Photo by RCS, 21 Jul 2015 [9 Sep 2015 photo missing]** ***Branchinecta cysts.***
BASIN 21-3 (33°22'2.59"N, 117°34'7.84"W)	**BASIN 23-2 (33°22'56.69"N, 117°33'20.04"W)**
	
View Northwest. Photo by RCS, 9 Sep 2015. ***No cysts.***	**View Northwest. Photo by RCS, 9 Sep 2015.** ***Branchinecta cysts.***

Photographic Record

BASIN 23-4 (33°22'55.79"N, 117°33'19.01"W)	BASIN 24-1 (33°22'30.01"N, 117°32'57.59"W)
	
View Southeast. Photo by RCS, 9 Sep 2015. ***Branchinecta cysts.***	**View Southeast. Photo by RCS, 9 Sep 2015.** ***No cysts.***
BASIN 33-1 (33°23'10.20"N, 117°33'35.19"W)	**BASIN 33-2 (33°23'9.80"N, 117°33'39.02"W)**
	
View Southeast. Photo by RCS, 9 Sep 2015. ***Branchinecta cysts.***	**View South. Photo by RCS, 9 Sep 2015.** ***Branchinecta cysts.***

Photographic Record

BASIN 33-3 (33°23'11.38"N, 117°33'38.02"W)	BASIN 33-4 (33°23'12.03"N, 117°33'38.01"W)
	
View Northeast. Photo by RCS, 9 Sep 2015. ***Branchinecta cysts.***	**View North. Photo by RCS, 9 Sep 2015.** ***Branchinecta cysts.***
BASIN 33-10 (33°23'1.02"N, 117°33'29.47"W)	**BASIN 33-11 (33°23'2.83"N, 117°33'27.04"W)**
	
View South. Photo by RCS, 9 Sep 2015. ***Branchinecta cysts.***	**View East. Photo by RCS, 9 Sep 2015.** ***Branchinecta cysts.***

BASIN 21-1 (33°23'3.94"N, 117°34'14.56"W) [Unable to Sample]



View Southeast. Photo by RCS, 9 Sep 2015. Artificially flooded – Unable to Sample.



Burst irrigation pipe upslope and northwest of Basin 21-1. Photo by RCS, 9 Sep 2015.



View downslope from burst pipe. Photo by RCS, 9 Sep 2015.



View Southeast. Photo by RCS, 1 Oct 2015. Artificially flooded – Unable to Sample.

APPENDIX C

2015 Dry Season Cyst Identification Report

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Examination of Soil Samples from the Newport Banning Ranch Site for Fairy Shrimp Cysts and Fairy Shrimp Species Determination

21 September 2015

Chuck Black
Ecological Restoration Service
San Diego, CA 92103
(619) 944-1964

10(a)(1)(A) permit
TE835549-6
Effective to 3/9/2015 (in process of renewal)

Introduction

Ecological Restoration Service was contracted in September 2015 by Richard Stolpe of Cardno (514 Via De La Valle #308, Solana Beach, CA 92075) for determination of the presence of fairy shrimp cysts in dry soil samples from 12 basins collected at the San Diego Gas and Electric, Camp Pendleton Easement site.

Methods

Soil Processing for Cyst Presence

Approximately 1 liter bulk samples collected by Richard Stolpe [10(a)(1)(A) permit TE-25864A-1 (effective to 7/23/2019)] from 12 different Camp Pendleton basins were delivered to ERS in September, 2015. The samples were processed per the U.S. Fish and Wildlife Service (USFWS) April 19, 1996 Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(l)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods, modified by Ecological Restoration Service as described below. Charles Black of Ecological Restoration Service is authorized by the U.S. fish and Wildlife Service to process dry samples for the presence of fairy shrimp cysts and to culture cysts to identify to species level as per the special conditions of his 10(a)(1)(A) permit. These samples were hydrated for approximately 1-2 hours in tap water, then washed through a set of sieves. Material passing through a Number 45 (.0139") USA Standard Testing Sieve, A.S.T.M.E.-11 specification and caught on a Number 70 (.0083") Sieve was rinsed into a container with approximately 50 ml of a saturated brine solution to float organic material, including fairy shrimp cysts. The material floating on the brine was decanted onto a paper filter on a filter funnel, and water was removed through the filter paper by vacuum suction. The material left on the paper was examined under a 6.3-570x power Olympus SZX9 Zoom Stereo Microscope. Distinctive fairy shrimp cysts, if present, were individually counted (if less than approximately 50) or estimated (for larger numbers) by examining ¼ or ½ subsections of the filter and multiplying the subset by the appropriate factor. The presences of ostracod shells and cladoceran ephippia were also noted in samples.

Results

Cyst Presence

Distinctive *Branchinecta* cysts were present in small numbers (less than 20 total) in samples from four basins, moderate to high numbers in five basins, with no cysts or other structures found in three basins (Table 1). No *Streptocephalus* cysts were found in any sample.

Other Aquatic Invertebrates

Small to large numbers of ostracod shells and cladoceran ephippia were also found in several samples, with highest numbers generally correlating to basins where high numbers of *Branchinecta* cysts were found (Table 1).

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

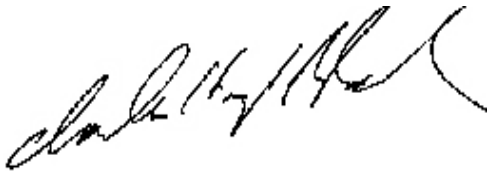


Table 1 - Numbers of Branchinecta cysts, ostrocod shells, and cladoceran ephippia found in each of ten 100 ml soil samples for each basin (values left blank when no structures were found).

Pool	Branchinecta cysts	Ostrocod shells	Cladoceran ephippia	Pool	Branchinecta cysts	Ostrocod shells	Cladoceran ephippia	Pool	Branchinecta cysts	Ostrocod shells	Cladoceran ephippia
33-2	16			23-2	1			33-3			
	23										
	43					2					
	23								1		
	24	1									
	9				1	2			3		
	26										
	21					2					
	11	2							1		
	11								1		
33-4	2			33-11	2	2		21-2	85	20	
	1					1			52	8	
	2				2				64	8	
	3				1				64	2	
					1				41	12	
									44	9	
	1								28	400	
					1				32	128	
	3				1				24	16	
	2								15	2	1
33-1	260	65		33-10	21	1					
	84	50			100	4					
	20	24			108						
	96	28			14						
	28	5			29						
	151	7			165						
	120				78						
	96	4			64						
	184	4			210						
	25	4			95						
23-4	145	125		24-1	no cysts						
	60	30	20								
	145	65	60								
	150	70	30								
	80	70	40								
	28	10	50								
	20	15	30								
	85	20	75								
	48	10	49								
	102	10	120								
7-1	no cysts			21-3	no cysts						

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APPENDIX D

2015 Dry Season Sampling Data and Voucher Specimen Data Worksheets

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Appendix 2. U.S. Fish and Wildlife Service – Data Sheet for Dry Season Sample Analysis for Listed Large Branchiopods

Project Information

Project Name: TL695/6971 SDG&E
USFWS Project Number:
County: San Diego
Lat: (See reports)
Long:
Quad: San Clemente
Township: —
Range: —
Section: —

Biologist Information

Name of Person(2) Who Conducted the Following Tasks and Permit Number(s):

Soil Collection: Richard C. Stolpe TE-25864A-1
Soil Processing: Chuck Black TE-835549-6 with R.C.S. TE25864A-1
Soil Analysis/Cysts ID: (same as above)
Soil Collection Date: 9 September 2015

Pool/ Habitat/ Basin No.	Invertebrates Present (X)															Comments
	Insect Exo-Skeletons	Micro-Turbellaria Cysts	Cladocera Ephippia	Ostracods Live/Cysts/ Carapaces	Copepods Live/Cysts	Number of Large Branchiopod Cysts: *Branchinecta* sp.	*Lepidurus packardi*	*Streptocephalus wootoni*	*Linderiella occidentalis*	*Lynceus brachyurus*	*Cyzicus californicus*	Hydracarina Live	Nematoda	Collembola	Other Species	
7-1			—	—		—	—	—	—	—	—					—
21-2			Y	Y		Y	—	—	—	—	—					To Be Accessioned (TBA)
21-3			—	—		—	—	—	—	—	—					—
23-2			—	Y		Y	—	—	—	—	—					TBA
23-4			Y	Y		Y	—	—	—	—	—					TBA
24-1			—	—		—	—	—	—	—	—					—
33-1			—	Y		Y	—	—	—	—	—					TBA
33-2			—	Y		Y	—	—	—	—	—					TBA
33-3			—	—		Y	—	—	—	—	—					TBA
33-4			—	—		Y	—	—	—	—	—					TBA
33-10			—	Y		Y	—	—	—	—	—					TBA
33-11			—	Y		Y	—	—	—	—	—					TBA

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Appendix E – Southwestern Willow Flycatcher, Least Bell's Vireo, and Arroyo Toad Survey Report Bloom 2015

July 17, 2015

Ms. Stacey Love
U.S. Fish & Wildlife Service
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

[via email]

SUBJECT: Results of protocol surveys for Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Least Bell's Vireo (*Vireo bellii pusillus*), and Arroyo Toad (*Anaxyrus californicus*) for the San Diego Gas & Electric TL 695/6971 Reconductor Project in Orange and San Diego Counties, California.

Dear Ms. Love:

Bloom Biological, Incorporated (BBI) was retained by Pangea Biological (Pangea) for the San Diego Gas & Electric Company (SDG&E) to conduct protocol surveys for Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Least Bell's Vireo (*Vireo bellii pusillus*), and Arroyo Toad (Anaxyrus *californicus*) within the TL 695/6971 Reconductor Project (Project), situated in the northwestern corner of Marine Corps Base Camp Pendleton (MCBCP), and in portions of both Orange and San Diego Counties, California. BBI conducted surveys within the study area from 24 March to 2 July, 2015 following the current survey protocols established by the U.S. Fish and Wildlife Service (USFWS). The following letter report documents the methods, results and conclusions of BBI's surveys.

SURVEY AREA DESCRIPTION

The Survey Area for this report is comprised of approximately 58.9 acres of riparian and adjacent scrub habitats in the lower portions of the San Onofre Creek and San Mateo Creek drainages. The Survey Area includes all potential habitat for Southwestern Willow Flycatcher, Least Bell's Vireo and Arroyo Toad within 150 feet of Project components. Although portions of the Project are in Orange County, the Survey Area falls entirely within San Diego County due to the lack of potential habitat for the three species in the Orange County portions of the Project. The entirety of the Survey Area is located in the U.S. Geological Survey (USGS) 7.5-minute *San Clemente* quadrangle. Elevations in the Survey Area range from 30 to 120 feet (10 To 40 meters) above mean sea level (amsl). The Survey Area boundaries are depicted on USGS topographical map on the attached Exhibit.

Potential Least Bell's Vireo habitat within the survey area consists primarily of southern willow scrub, mulefat scrub, and sycamore alder riparian woodland within and adjacent to riparian corridors and streambeds. Arroyo Toad breeding and aestivation habitat is present in many of the same areas as potential LBVI habitat, whereas potential Southwestern Willow Flycatcher habitat exists primarily within the main stream channels, or seasonally wet areas where dense vegetation is present.

SURVEY METHODS

Arroyo Toad

Following the protocol recommended by the USFWS (1999), Peter H. Bloom, Ph.D. (USFWS Permit # TE 787376) conducted six (6) Arroyo Toad surveys between 24 March and 14 June, 2015 intended to provide an accurate assessment of the presence or absence of the species in the Survey Area (Table 1). As described by the USFWS in the protocol, the following components of an Arroyo Toad protocol survey were followed by Dr. Bloom during surveys:

- Daytime surveys - "conducted while walking slowly along stream margins and in adjacent riparian habitat, visually searching for (but not disturbing) eggs, larvae and juveniles. If necessary, surveyors may walk within the stream, taking care not to disturb or create silt deposits within breeding pools. If stream crossings are necessary, these should be on the downstream ends of potential breeding pools or in fast-flowing channels to minimize the likelihood of stirring up silt deposits."

- Nighttime surveys - "conducted by walking slowly and carefully on stream banks. Surveyors should stop periodically and remain still and silent for approximately 15 minutes at appropriate sites to wait for Arroyo Toads to begin calling." Nighttime surveys are to be conducted between one hour after dusk and midnight under the following conditions:

    - Temperatures of 55 degrees Fahrenheit or greater;
    - Absence of a full or near-full moon;
    - Absence of adverse weather conditions such as rain, high winds or flood flows.

- At least six (6) surveys are to be conducted during the breeding season, which is generally considered to last from March 15 through July 1. At least one survey should be conducted each month in April, May, and June with at least seven (7) days between surveys.

Least Bell's Vireo

A total of eight presence/absence Least Bell's Vireo surveys were conducted by Dr. Bloom between 10 April and 21 June, 2015 (Table 1) in accordance with Service protocol (USFWS 2001). All potential Least Bell's Vireo habitat and riparian areas within the Survey Area were surveyed eight times during the breeding season (April 10 to July 31) with a minimum of ten days between survey visits. The surveys were conducted during the morning hours prior to 1000h and when the temperature exceeded 41° F (5° C). Dr. Bloom listened for Least Bell's Vireo songs, whisper songs, calls, and scolds and looked for adult and juvenile Least Bell's Vireos in all areas of potential suitable breeding habitat. Some Least Bell's Vireo surveys were conducted in the same Survey Areas simultaneously with Southwestern Willow Flycatcher surveys, as noted in Table 1.

Southwestern Willow Flycatcher

Five surveys were conducted by Dr. Bloom between 21 May and 2 July, 2015 (Table 1) according to the revised protocol for project-related surveys for Southwestern Willow Flycatcher (Sogge et al. 2010). All potential habitat was surveyed once during Period 1 (May 15 to May 31), two times during Period 2 (June 1 to June 24), and twice during Period 3 (June 25 to July 17). Surveys were conducted at least five days apart and were conducted during morning hours (prior to 1030h). If a singing Southwestern Willow Flycatcher

was not heard in an area after one to two minutes, Dr. Bloom played a taped vocalization for approximately 30 seconds and observed the area for responding flycatchers. This was repeated approximately every 100 ft (30 m). If a willow flycatcher would have been detected, tape playing would be immediately discontinued according to protocol guidelines. Some Southwestern Willow Flycatcher surveys were conducted in the same Survey Areas simultaneously with Least Bell's Vireo Surveys, as noted in Table 1.

Table 1. Survey dates, times and weather conditions

Date	Species	Time (h)	Temp (F°)	Cloud (%)	Wind (m.p.h)	Precip.	Biologist
24-Mar-15	ARTO	1000-1300	63-67	0-0	0-0	None	Pete Bloom (Permitted); Hiram Herrera
24-Mar-15	ARTO	1900-2330	60-60	0-0	0-0	None	Pete Bloom (Permitted); Hiram Herrera
6-Apr-15	ARTO	1300-1600	65-66	0-0	0-0	None	Pete Bloom (Permitted); Hiram Herrera
6-Apr-15	ARTO	1900-2145	55-55	0-0	0-0	None	Pete Bloom (Permitted); Hiram Herrera
10-Apr-15	LBVI	0601-1100	55-64	0-0	0-0	None	Pete Bloom (Permitted)
19-Apr-15	ARTO	1200-1600	67-68	0-0	0-0	None	Pete Bloom (Permitted)
19-Apr-15	ARTO	1900-2300	65-65	0-0	0-0	None	Pete Bloom (Permitted)
20-Apr-15	LBVI	0500-1100	60-65	100-100	0-0	None	Pete Bloom (Permitted)
26-Apr-15	ARTO	1200-1630	66-67	30-40	2-5	None	Pete Bloom (Permitted)
26-Apr-15	ARTO	1900-2300	65-65	10-10	3-3	None	Pete Bloom (Permitted)
30-Apr-15	LBVI	0500-1100	52-65	10-10	0-0	None	Pete Bloom (Permitted)
10-May-15	ARTO	1400-1730	62-64	100-100	0-0	None	Pete Bloom
10-May-15	ARTO	2000-0000	60-60	100-100	0-0	None	Pete Bloom
11-May-15	LBVI	0500-1100	56-64	100-100	0-0	None	Pete Bloom
21-May-15	LBVI/SWFL	0500-1100	60-65	100-100	0-0	None	Pete Bloom
1-Jun-15	LBVI/SWFL	0430-1100	56-62	100-100	0-0	None	Pete Bloom
11-Jun-15	LBVI	0430-1100	56-66	75-80	0-0	None	Pete Bloom
14-Jun-15	ARTO	2100-2300	60-60	100-100	0-0	None	Pete Bloom (Permitted)
21-Jun-15	LBVI/SWFL	0500-1100	59-66	100-100	0-0	None	Pete Bloom (Permitted)
26-Jun-15	SWFL	0500-1000	60-66	70-70	0-0	None	Pete Bloom (Permitted)
2-Jul-15	SWFL	0500-1000	58-64	60-60	0-0	None	Pete Bloom (Permitted)

RESULTS & DISCUSSION

Least Bell's Vireos were detected regularly throughout most of the Survey Area and Arroyo Toads were detected four times during nocturnal surveys at three locations. No Willow Flycatchers were detected during any survey. The dates and coordinates for all Least Bell's Vireo and Arroyo Toad observations are shown below in Table 2 and displayed in the attached Exhibit.

Table 2. Species detection information

Date	Species	Quantity	Latitude	Longitude	Comments
24-Mar-15	Arroyo Toad	1	33.41065	-117.57890	San Mateo East
24-Mar-15	Arroyo Toad	1	33.38538	-117.55780	San Onofre East
6-Apr-15	Arroyo Toad	1	33.38529	-117.55790	San Onofre East
6-Apr-15	Arroyo Toad	1	33.38342	-117.56924	San Onofre West
10-Apr-15	Least Bell's Vireo	1	33.41142	-117.58332	Singing male, San Mateo East
10-Apr-15	Least Bell's Vireo	1	33.41067	-117.57948	Singing male, San Mateo East
10-Apr-15	Least Bell's Vireo	1	33.40912	-117.57773	Singing male, San Mateo East
10-Apr-15	Least Bell's Vireo	1	33.39628	-117.58998	Singing male, San Mateo West
10-Apr-15	Least Bell's Vireo	1	33.39581	-117.58995	Singing male, San Mateo West
10-Apr-15	Least Bell's Vireo	1	33.39503	-117.58868	Singing male, San Mateo West
10-Apr-15	Least Bell's Vireo	1	33.38926	-117.58360	Singing male, San Mateo West
10-Apr-15	Least Bell's Vireo	1	33.38839	-117.56232	Singing male, San Onofre East
10-Apr-15	Least Bell's Vireo	1	33.38595	-117.55893	Singing male, San Onofre East
10-Apr-15	Least Bell's Vireo	1	33.38372	-117.56929	Singing male, San Onofre West
10-Apr-15	Least Bell's Vireo	1	33.38337	-117.56965	Singing male, San Onofre West
10-Apr-15	Least Bell's Vireo	1	33.38303	-117.55612	Singing male, San Onofre East
10-Apr-15	Least Bell's Vireo	1	33.38167	-117.56543	Singing male, San Onofre West
10-Apr-15	Least Bell's Vireo	1	33.38152	-117.56751	Singing male, San Onofre West
20-Apr-15	Least Bell's Vireo	1	33.40881	-117.57787	Singing male, San Mateo East
20-Apr-15	Least Bell's Vireo	1	33.38930	-117.58364	Singing male, San Mateo West
20-Apr-15	Least Bell's Vireo	1	33.38593	-117.55890	Singing male, San Onofre East
20-Apr-15	Least Bell's Vireo	1	33.38504	-117.57207	Singing male, San Onofre West
20-Apr-15	Least Bell's Vireo	1	33.38370	-117.56882	Singing male, San Onofre West
20-Apr-15	Least Bell's Vireo	1	33.38340	-117.56968	Singing male, San Onofre West
30-Apr-15	Least Bell's Vireo	1	33.41120	-117.58284	Singing male, San Mateo East
30-Apr-15	Least Bell's Vireo	1	33.38920	-117.58353	Singing male, San Mateo West
30-Apr-15	Least Bell's Vireo	1	33.38603	-117.55938	Singing male, San Onofre East
30-Apr-15	Least Bell's Vireo	1	33.38565	-117.55848	Singing male, San Onofre East
30-Apr-15	Least Bell's Vireo	1	33.38414	-117.57037	Singing male, San Onofre West
30-Apr-15	Least Bell's Vireo	1	33.38334	-117.56979	Singing male, San Onofre West
30-Apr-15	Least Bell's Vireo	1	33.38259	-117.56670	Singing male, San Onofre West
30-Apr-15	Least Bell's Vireo	1	33.38168	-117.56526	Singing male, San Onofre West
30-Apr-15	Least Bell's Vireo	1	33.38168	-117.56335	Singing male, San Onofre West
11-May-15	Least Bell's Vireo	1	33.41158	-117.57918	Singing male, San Mateo East
11-May-15	Least Bell's Vireo	1	33.41154	-117.58168	Singing male, San Mateo East
11-May-15	Least Bell's Vireo	1	33.41139	-117.58330	Singing male, San Mateo East
11-May-15	Least Bell's Vireo	1	33.38304	-117.56386	Singing male, San Onofre West
21-May-15	Least Bell's Vireo	1	33.41143	-117.58235	Singing male, San Mateo East
21-May-15	Least Bell's Vireo	1	33.41142	-117.58228	Singing male, San Mateo East
21-May-15	Least Bell's Vireo	1	33.39604	-117.59013	Singing male, San Mateo West
21-May-15	Least Bell's Vireo	1	33.39600	-117.59017	Singing male, San Mateo West

Date	Species	Quantity	Latitude	Longitude	Comments
21-May-15	Least Bell's Vireo	1	33.38598	-117.55885	Singing male, San Onofre East
21-May-15	Least Bell's Vireo	1	33.38379	-117.56941	Singing male, San Onofre West
21-May-15	Least Bell's Vireo	1	33.38368	-117.56935	Singing male, San Onofre West
21-May-15	Least Bell's Vireo	1	33.38167	-117.56557	Singing male, San Onofre West
21-May-15	Least Bell's Vireo	1	33.38165	-117.56564	Singing male, San Onofre West
11-Jun-15	Least Bell's Vireo	1	33.41145	-117.58224	Singing male, San Mateo East
11-Jun-15	Least Bell's Vireo	1	33.39600	-117.59014	Singing male, San Mateo West
11-Jun-15	Least Bell's Vireo	1	33.38737	-117.55977	Singing male, San Onofre East
11-Jun-15	Least Bell's Vireo	1	33.38317	-117.56901	Singing male, San Onofre West
11-Jun-15	Least Bell's Vireo	1	33.38295	-117.56800	Singing male, San Onofre West
21-Jun-15	Least Bell's Vireo	1	33.41145	-117.58228	Singing male, San Mateo East
21-Jun-15	Least Bell's Vireo	1	33.39605	-117.59010	Singing male, San Mateo West
21-Jun-15	Least Bell's Vireo	1	33.38737	-117.55987	Singing male, San Onofre East
21-Jun-15	Least Bell's Vireo	1	33.38323	-117.56904	Singing male, San Onofre West
21-Jun-15	Least Bell's Vireo	1	33.38301	-117.56798	Singing male, San Onofre West

No flowing water was present in the streambeds at any point during surveys, but they may contain water in years with greater precipitation. Based on the lack of surface water, breeding habitat for Southwestern Willow Flycatchers within the Survey area is marginal, but migrant Willow Flycatchers may utilize the drainages.

Some areas where we did not find Arroyo Toads may yet yield toads in a future wet year as the sandy portion within this section of western San Mateo Creek wash soil lends itself to being a good aestivation site and is only 0.25 miles downstream of occupied breeding habitat.

A list of all wildlife species detected during the survey is provided as Attachment A.

If you have any questions or comments regarding this letter please feel free to call us at 949-272-0905.

Sincerely,

BLOOM BIOLOGICAL, INC.



Peter H. Bloom
Zoologist/President



Michael Kuehn
Senior Biologist/Statistical Analyst

Cc: Ms. Amy Rowland
Managing Partner
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Encinitas, California 92024

LITERATURE CITED

Sogge, M.K., Ahlers, Darrell, and Sferra, S.J. 2010. A natural history summary and survey protocol for the southwestern willow flycatcher: U.S. Geological Survey Techniques and Methods 2A-10, 38 pages.

U.S. Fish and Wildlife Service (USFWS). 1999. Survey protocol for the Arroyo Toad. May 19, 1999.

U.S. Fish and Wildlife Service (USFWS). 2001. Least Bell's Vireo survey guidelines protocol (as amended 19 January 2001).

CERTIFICATION

I certify that the information in this survey report and attached exhibits fully and accurately represents my work. If you have any questions or require additional information please feel free to contact me at (949) 272-0905 or petebloom@bloombiological.com.

_____

Peter H. Bloom, Ph.D.
TE-787376-8

APPENDIX A. FAUNAL COMPENDIUM

The following 22 bird, one mammal, and two reptile species were detected in Survey Area during surveys conducted by BBI biologist Peter Bloom, Ph.D. from 24 March to 2 July, 2015.

Birds

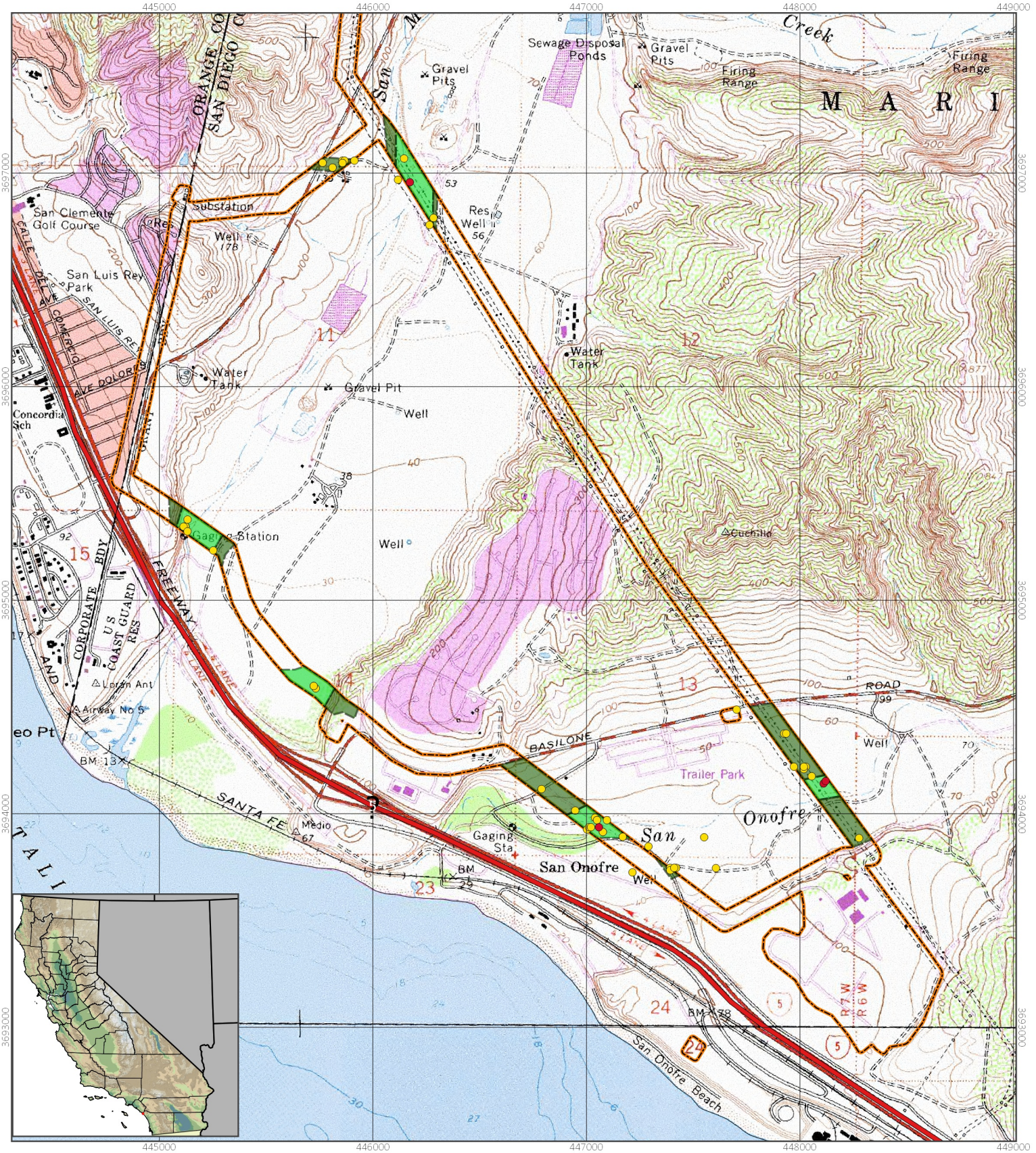
Common Name	Scientific Name	FE	FT	CE	CT	CFP	CP	SSC
California Quail	Callipepla californica							
Red-shouldered Hawk	Buteo lineatus							
Red-tailed Hawk	Buteo jamaicensis							
Mourning Dove	Zenaida macroura							
Greater Roadrunner	Geococcyx californianus							
Anna's Hummingbird	Calypte anna							
Nuttall's Woodpecker	Picoides nuttallii							
Pacific-slope Flycatcher	Empidonax difficilis							
Black Phoebe	Sayornis nigricans							
Say's Phoebe	Sayornis saya							
Least Bell's Vireo	Vireo bellii pusillus	X						
Western Scrub-Jay	Aphelocoma californica							
Common Raven	Corvus corax							
Cliff Swallow	Petrochelidon pyrrhonota							
California Thrasher	Toxostoma redivivum							
European Starling	Sturnus vulgaris							
Common Yellowthroat	Geothlypis trichas							
Yellow-breasted Chat	Icteria virens							
California Towhee	Melozone crissalis							
Song Sparrow	Melospiza melodia							
House Finch	Haemorhous mexicanus							
Lesser Goldfinch	Spinus psaltria							

Mammals

Common Name	Scientific Name	FE	FT	CE	CT	SSC
California Ground Squirrel	Spermophilus beecheyi					

Reptiles

Common Name	Scientific Name	FE	FT	CE	CT	SSC
Western Fence Lizard	Sceloporus occidentalis					
Western Whiptail	Cnimidophorus tigris					



Survey Areas

- *LBVI & ARTO*
- *LBVI, ARTO & SWFL*

TL695 150-meter Buffer

Species Observations

- *Arroyo Toad*
- *Least Bell's Vireo*

250 0 250 500 750 1000 m

1:24,000

Coordinate Grid: UTM NAD 83 Zone 11
Background: US Geological Survey 24k Topo Series
San Clemente quadrangle
Map Date: July 16, 2015
Author: Michael J. Kuehn

Exhibit 1. Protocol Survey Results

SDG&E TL 695/6971 Reconductor Project | San Diego County, California

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research | consulting | conservation

Appendix F – Nonbreeding Season Western Burrowing Owl Survey Report AECOM 2015

NONBREEDING SEASON WESTERN BURROWING OWL SURVEY REPORT FOR TRANSMISSION LINE 695 WOOD TO STEEL POLE REPLACEMENT PROJECT, MARINE CORPS BASE CAMP PENDLETON, SAN DIEGO COUNTY, CALIFORNIA

Prepared for:

Todd Easley
San Diego Gas and Electric Environmental Programs
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Escondido, California 92029

Prepared by:

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San Diego, California 92101
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Contact: Andrew Fisher

February 2015

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LIST OF ACRONYMS

BSA	Biological Study Area
CDFW	California Department of Fish and Wildlife
INRMP	Integrated Natural Resources Management Plan
MCBCP	Marine Corps Base Camp Pendleton
Navy	U.S. Department of the Navy
NCCP	Natural Community Conservation Plan
SDG&E	San Diego Gas and Electric
SONGS	San Onofre Nuclear Generating Station
TL	Transmission Line
WBO	western burrowing owl

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CHAPTER 1
INTRODUCTION

1.1 PURPOSE AND PROJECT DESCRIPTION

Focused western burrowing owl (*Athene cunicularia hypugaea;* WBO) surveys were conducted by AECOM on behalf of San Diego Gas and Electric (SDG&E) on Marine Corps Base Camp Pendleton (MCBCP), San Diego County, California. This report discusses the findings of surveys conducted between December 18, 2014 and January 23, 2015. AECOM complied with the guiding principles in the California Department of Fish and Wildlife (CDFW; formerly California Department of Fish and Game [CDFG]) protocol, as stated in Staff Report on Burrowing Owl Mitigation (CDFG 2012).

The Transmission Line (TL) 695 Wood to Steel Pole Replacement Project (the "project") would involve the replacement of existing wooden structures with steel poles. Some wooden poles and associated anchors would be completely removed and not replaced due to the longer span between steel poles. The project would be covered by the SDG&E Natural Community Conservation Plan (NCCP) and includes the transmission line, several stringing sites, and a staging area. The project is located along the northern boundary of MCBCP (or Base), with the northern end at the Talega Substation and the southern end near the San Onofre Nuclear Generating Station (SONGS).

1.2 DESCRIPTION OF SURVEY AREA

MCBCP is a 200-square-mile military training facility located along the Pacific coast in northwestern San Diego County, 40 miles north of downtown San Diego. Orange County is contiguous with the northwest boundary of MCBCP, and Riverside County is northeast of, but not adjacent to, the boundary of MCBCP. The city of San Clemente and Cleveland National Forest border MCBCP to the northwest and north, respectively. The city of Oceanside is to the south. The San Diego County community of Fallbrook is to the east.

MCBCP occupies approximately 125,000 acres of largely undeveloped land, with more than 17 miles of coastline in northwestern San Diego County in Southern California. It is the U.S. Marine Corps' premier amphibious training base, and the U.S. Marine Corps' only west coast amphibious training base, promoting the combat readiness of operating forces by providing facilities, services, and support responsive to the needs of marines, sailors, and their families.

The project is located in the coastal province in northern San Diego County on MCBCP (Figure 1). This region is characterized by warm, dry summers and mild winters, with mean temperatures ranging from 75 to 78 degrees Fahrenheit. Although close enough to the coast to benefit from maritime clouds and fog, MCBCP is relatively dry. Elevation within the project area ranges from approximately 30 to 570 feet above mean sea level.

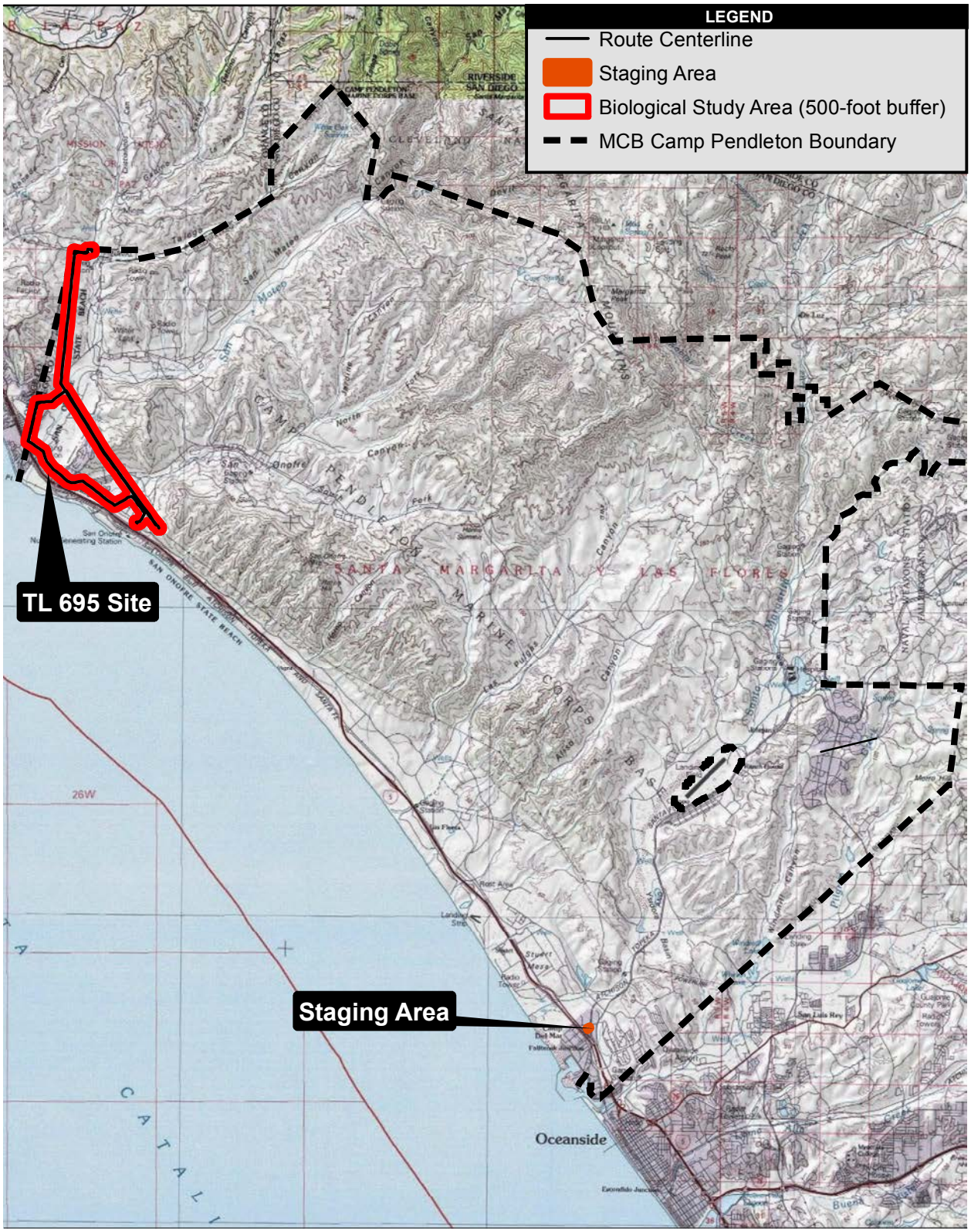
The project is located in the far northern boundary of MCBCP and extends from the Talega Substation, and then heads west toward the Pacific Ocean along the ridgetops of steep hills along the north side of Cristianitos Road. These hills are along the border of San Diego and Orange Counties, and occur on lands that are under lease by California State Parks. As the project heads west, it splits and crosses San Mateo Creek heading south at two points. The two separate lines head south through MCBCP, with one line roughly paralleling Interstate 5, and the other line going up and over a steep hill on the east side of the San Onofre Housing Area. The two lines join again after they cross San Onofre Creek, and then terminate opposite and east of SONGS. The staging area for the project is located at the south end of MCBCP and consists of a developed gravel lot (Figure 1).

The Biological Study Area (BSA) is defined as the transmission line centerline plus an adjacent 500-foot buffer. Specifically, the BSA for WBO surveys includes only the habitat that has a potential to support wintering WBO, which is defined below in the Survey Methodology Section (Figure 2). The vegetation within and around the BSA was historically agricultural lands that have now converted to nonnative grasslands and ruderal habitat. The potentially suitable WBO habitat within the BSA is located in two active military training areas (Sierra 1 and Alpha 2). There are scattered shrubs around the BSA with open, low-growing vegetation between them. Representative site photographs of the BSA are provided in Appendix A.

1.3 STATUS OF WESTERN BURROWING OWL AT MARINE CORPS BASE CAMP PENDLETON

The WBO is a California Species of Special Concern and considered by the U.S. Fish and Wildlife Service to be a Bird of Conservation Concern (CDFW 2014) at the national level that is declining throughout its range, especially California's coastal populations (Klute et al. 2003). WBO are year-round residents of Southern California. Throughout their range, they are threatened by habitat loss, predation, vehicle impacts, and control programs for ground squirrels. The WBO's population has been declining especially in Southern California (Unitt 2004).

WBO breed in grassland and open scrub using the burrows of small mammals or man-made substitutes such as pipes or culverts. Within Southern California, the most commonly used burrows are those created by California ground squirrels (*Otospermophilus beecheyi*).



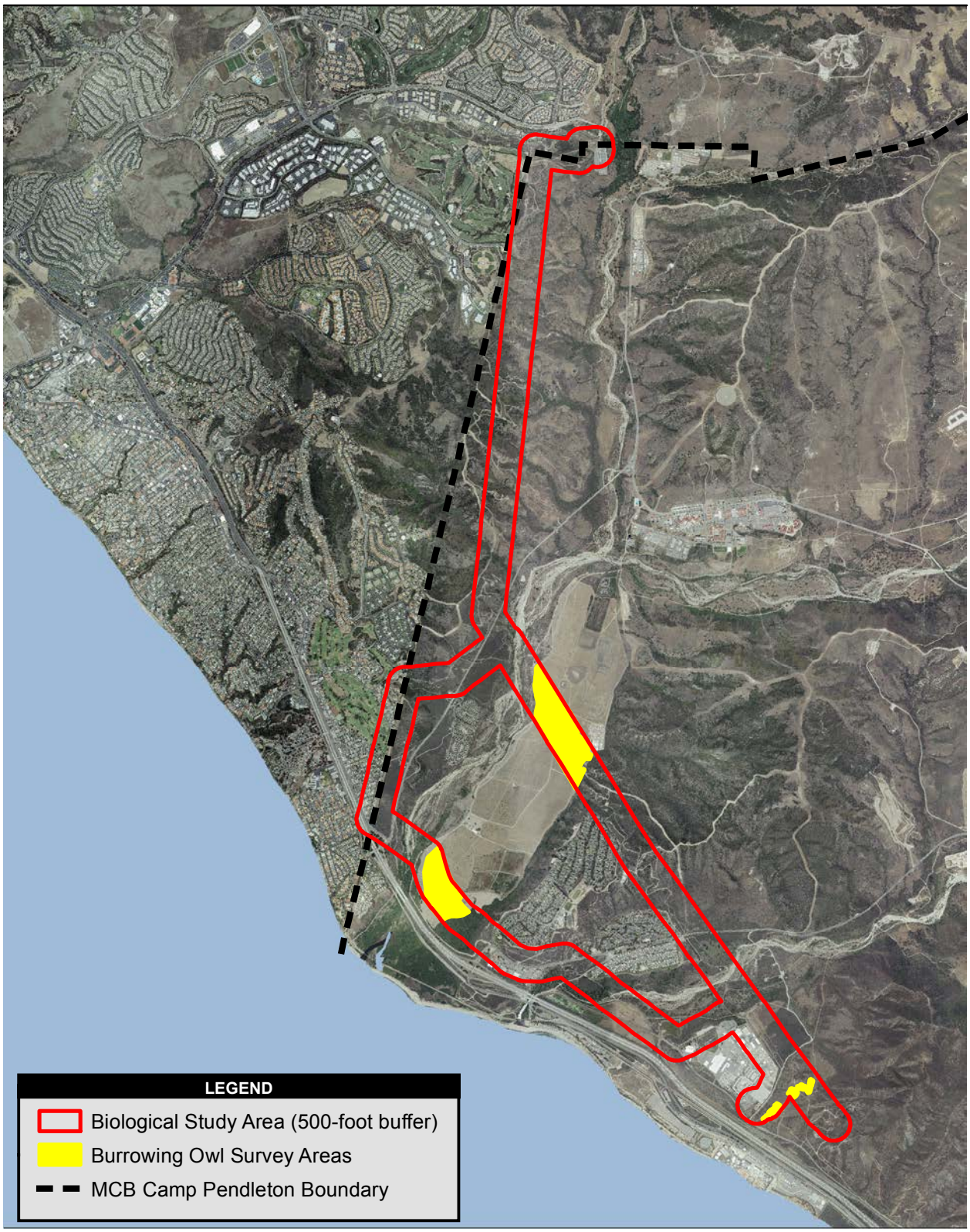
Copyright:© 2013 National Geographic Society, i-cubed

3 1.5 0 3 Miles

Scale: 1:190,080; 1 inch = 3 miles

Figure 1
Vicinity Map

Path: \\ussdg1fp001.na.aecomnet.com\data\projects\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Owl_SurveyRPT\Fig_1_Vicinity.mxd, 1/26/2015, SorensenJ



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

4,500 2,250 0 4,500 Feet

Scale: 1:54,000; 1 inch = 4,500 feet

Figure 2
Western Burrowing Owl Survey Areas

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Owl_SurveyRPT\Fig_2_BUOW_SurveyAReas.mxd, 1/22/2015, sorensenj

Consequently, WBO are vulnerable to predation by a wide variety of terrestrial predators such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), and red fox (*Vulpes vulpes*). WBO feed primarily on invertebrates but also forage on rodents, reptiles, amphibians, and small birds. WBO can form loose colonies made up of both year-round resident owls and winter migratory owls. During the breeding season, eggs are produced from late March to mid-June (Unitt 2004), and fledglings are active through August. Within Southern California, during the winter months or nonbreeding season generally September 1 through January 31, there is an influx of migratory WBO.

For historical context, within San Diego County in 2003, there were approximately 25–30 resident pairs of WBO (Lincer and Bloom 2007). In 2007, approximately 41–46 pairs were breeding within San Diego County. In 2007, approximately 148–168 resident WBO (including breeding pairs and their offspring) were estimated as wintering within San Diego County. These resident WBO are joined by migrant and wintering WBO during the nonbreeding season. During 2007, it was estimated that 50 to 100 migrant WBO winter in, or migrate through MCBCP and adjacent military lands. In total, for all of San Diego County in 2007, there was estimated to be approximately 300-370 wintering WBO (Lincer and Bloom 2007).

The status of WBO on MCBCP is one that has gone from breeding resident to occasional winter resident. In the 1970s approximately 15 pairs of WBO were documented as breeding on MCBCP (Lincer and Bloom 2007). This number dropped to two pairs in the 1980s and the last pair of breeding WBO was documented in 1994. By 1995, WBO were no longer documented as breeding on MCBCP (Lincer and Bloom 2007). Currently, on MCBCP the WBO is a winter resident only. The extirpation of WBO as a breeding resident on MCBCP may have been caused by a variety of factors. These include land use changes from agriculture and cattle grazing to heavy tank training and off-road maneuvers that crush ground squirrel burrows and compact the soil. Cattle were historically grazed on MCBCP; once the military eliminated cattle, the vegetation changed to permit tall nonnative grasses and sweet fennel (*Foeniculum vulgare*) to flourish (Lincer and Bloom 2007). Increased military training activities coupled with vegetation changes led to increased fire activity. Occasional fires are useful in WBO habitat and potentially positive as they open up the habitat, but increased fire frequency can lead to a decrease in essential WBO prey items, such as arthropods, herpetofauna, and small mammals (Lincer and Bloom 2007). Consequently, the habitat on MCBCP has become less conducive to breeding WBO, and now only wintering WBO are found on MCBCP.

Currently, there are scattered records of wintering WBO along the coastal plain of MCBCP. Based on a review of the historical WBO occurrences on MCBCP, there are no WBO locations within or adjacent to the BSA within the last several decades. The closest WBO location recorded in recent history is 7 miles south of the BSA from 2010 (U.S. Navy 2015). An

additional winter WBO location found during the course of biological surveys for another project in 2013 was 8 miles south of the BSA (AECOM 2013). Based on historical data and recent WBO observations only during the winter, nonbreeding season WBO surveys were conducted for the project.

CHAPTER 2
METHODOLOGY

2.1 SURVEY METHOD

Prior to conducting WBO surveys, the California Natural Diversity Database was reviewed for a 1-mile radius buffer around the BSA to determine if any WBO were historically known from the area. Additionally, a records search of historical data from MCBCP was conducted to determine if any historical WBO locations were known from the BSA and vicinity (U.S. Navy 2015). After historical data were reviewed, a detailed habitat assessment was conducted. The initial habitat assessment for the entire TL 695 Project was conducted on July 30, 31, and August 4, 2014. A follow-up focused WBO habitat assessment was conducted on November 25, 2014. A total of 109.5 acres of potentially suitable WBO was identified within the BSA. Habitat that was considered not suitable for WBO included dense Diegan coastal sage scrub, chaparral, riparian vegetation types, developed areas, dense ruderal or weedy vegetation on steep slopes, firebreaks, dirt access roads, other areas with no burrows, dense vegetation, and steep slopes. Potentially suitable WBO habitat contained elements such as the following:

1. The presence of potentially suitable burrows. These may include plastic pipes sticking out of the ground, rock piles or riprap, culverts, and burrows created by fossorial mammals such as the California ground squirrel.
2. Short, sparse vegetation with gentle topography and well-drained soils (CDFG 2012). This may include ruderal grassy fields, agricultural areas, vacant lots, pastures, and similar habitats that are open and have low vegetative cover.
3. The presence of nearby foraging habitat. This is defined as habitat within the estimated home range of an occupied burrow that supports a suitable prey base and allows for effective foraging (CDFG 2012).

Following the habitat assessment, potential WBO habitat was mapped within the BSA in three main areas. The first two main areas were located within a historically agricultural area within the Sierra Training Area, which is currently used as a training area for heavy tank maneuvers (Figure 2). These areas are located along the south side of the San Mateo River floodplain and have flat topography. At the time of the habitat assessment, the vegetation within these two areas was short ruderal and weedy vegetation. There were scattered Mexican elderberry (*Sambucus mexicana*) and coyote brush (*Baccharis pilularis*) shrubs with nonnative vegetation growing between them. The military routinely mows the vegetation to keep it short. This area also had many California ground squirrel burrows. The third area with potentially suitable WBO habitat

was located south of the two main areas and was located along gently sloping hills above SONGS within the Alpha 2 Training Area (Figure 2). This area consisted of low-growing and open native grassland intermixed with Diegan coastal sage scrub, but no California ground squirrel burrows were observed in this area.

Since WBO are currently winter residents only on MCBCP, four nonbreeding WBO season (September 1 through January 31) surveys were conducted according to the Staff Report on Burrowing Owl Mitigation (CDFG 2012). This report reflects the most recent regulatory agency/industry standard protocols for WBO surveys. Nonbreeding WBO surveys generally occurred over a 1- or 2-day period per survey. There were three main areas surveyed for WBO. The two areas located within the Sierra Training Area were surveyed during the morning, and the third area within Alpha 2 Training Area was surveyed in the evening. The first nonbreeding WBO survey was conducted on December 18 and 19, 2014; the second survey on December 29, 2014; the third survey on January 8 and 9, 2015; and the fourth survey on January 22 and 23, 2015 as noted in Table 1. Surveys were conducted approximately 10 days to 2 weeks apart when possible.

Table 1
Survey Dates, Personnel, and Weather Conditions

Survey Number	Date	Survey Personnel	Time	Weather Conditions
1	12/18/2014	Andrew Fisher, Donna Germann	1535–1611	Start: 64°F, wind 2 mph, 90% cover End: 62°F, wind 1 mph, 80% cover
1	12/19/2014	Donna Germann	0644–1000	Start: 49°F, wind 4 mph, 15% cover End: 68°F, wind 0 mph, 0% cover
1	12/19/2014	Brennan Mulrooney	0645–1000	Start: 49°F, wind 4 mph, 15% cover End: 68°F, wind 0 mph, 0% cover
1	12/19/2014	James McMorran	0646–1000	Start: 49°F, wind 4 mph, 15% cover End: 62°F, wind 3 mph, 10% cover
1	12/19/2014	Andrew Fisher	0647–1000	Start: 49°F, wind 4 mph, 15% cover End: 68°F, wind 0 mph, 0% cover
2	12/29/2014	Brennan Mulrooney	0640–1000	Start: 40°F, wind 2 mph, 15% cover End: 63°F, wind 3 mph, 5% cover
2	12/29/2014	Matthew Kedziora	0641–1000	Start: 40°F, wind 2 mph, 15% cover End: 63°F, wind 3 mph, 2% cover
2	12/29/2014	James McMorran	0645–1000	Start: 40°F, wind 2 mph, 20% cover End: 63°F, wind 3 mph, 5% cover
2	12/29/2014	Andrew Fisher	0645–1000	Start: 40°F, wind 2 mph, 35% cover End: 63°F, wind 3 mph, 5% cover
2	12/29/2014	Andrew Fisher	1557–1637	Start: 59°F, wind 2 mph, 0% cover End: 56°F, wind 0 mph, 0% cover
3	1/8/2015	Andrew Fisher	1514–1626	Start: 65°F, wind 1 mph, 5% cover End: 61°F, wind 1 mph, 20% cover
3	1/9/2015	Brynne Mulrooney	0644–1000	Start: 51°F, wind 0 mph, 100% cover End: 62°F, wind 1 mph, 100% cover
3	1/9/2015	Andrew Fisher	0649–1000	Start: 53°F, wind 0 mph, 100% cover End: 62°F, wind 1 mph, 100% cover

Survey Number	Date	Survey Personnel	Time	Weather Conditions
3	1/9/2015	Brennan Mulrooney	0649–1000	Start: 51°F, wind 0 mph, 100% cover End: 69°F, wind 0 mph, 100% cover
3	1/9/2015	James McMorran	0649–1000	Start: 53°F, wind 0 mph, 100% cover End: 62°F, wind 1 mph, 100% cover
4	1/22/2015	Andrew Fisher	1432–1627	Start: 65°F, wind 0 mph, 90% cover End: 60°F, wind 0 mph, 95% cover
4	1/23/2015	Donna Germann	0622–1000	Start: 47°F, wind 4 mph, 0% cover End: 68°F, wind 3 mph, 0% cover
4	1/23/2015	Keoni Calantas	0644–1000	Start: 47°F, wind 4 mph, 0% cover End: 68°F, wind 3 mph, 0% cover
4	1/23/2015	Andrew Fisher	0655–1000	Start: 47°F, wind 4 mph, 0% cover End: 68°F, wind 3 mph, 0% cover

°F = degrees Fahrenheit; mph = miles per hour

The four WBO surveys were conducted during the nonbreeding season (September 1 through January 31). Surveys were conducted by walking generally straight-line transects through all suitable habitat within the BSA using 100 percent visual coverage, focusing on visual signs of WBO (e.g., burrows, pellets, feathers, white wash). Distance between transects was no greater than 65 feet during each survey. While walking transects, biologists scanned the BSA to search for WBO and suitable WBO burrows. Any individual WBO detections, including foraging observations and suitable WBO burrow locations, were mapped using Global Positioning System equipment. Suitable WBO burrows were defined as burrows greater than approximately 4 inches in diameter (height and width) and greater than approximately 60 inches in depth (CDFG 2012). A burrow was considered suitable if it had an adequate diameter and the end could not be seen. At each suitable burrow, presence of any WBO sign (e.g., pellets, prey remains, whitewash, decorations, tracks) and number of WBO present at that burrow were recorded during each survey visit. Each suitable burrow was classified as follows:

- Occupied – at least one WBO individual observed to be present at the burrow
- Active – a burrow with fresh WBO sign, but no WBO individual present at the time of the survey
- Inactive – suitable for WBO but no WBO or fresh sign observed
- No longer suitable – burrow either destroyed or physical characteristics have changed in such a manner that it is no longer suitable habitat for WBO

After a burrow was marked, it was revisited during each subsequent survey and biologists continued to survey for new potentially suitable burrows during each subsequent survey. After each survey was completed, the cumulative burrow status for all burrows detected during that

survey was determined. Cumulative burrow status includes burrows that were occupied by WBO, active, suitable but inactive, and no longer suitable.

To ensure the greatest detection probability, surveys were conducted at times of high WBO activity: between morning civil twilight and 10:00 AM, and 2 hours before sunset until evening civil twilight. Surveys were not conducted when wind speeds exceeded 12.4 miles per hour or when it was raining or during the presence of dense fog.

During the WBO surveys, all wildlife species detected were recorded and are listed in a table included in Appendix B of this document.

CHAPTER 3
RESULTS AND DISCUSSION

3.1 RESULTS

No WBO or their sign (e.g., pellets, prey remains, whitewash, decorations, tracks) were observed within the BSA during nonbreeding season surveys. Hundreds of potentially suitable burrows created by California ground squirrels as well as rock piles and pipes were documented within the BSA. A summary of burrows recorded and their status is provided in Table 2 below and the locations of all potentially suitable burrows are provided in Figure 3.

Table 2
Progression of Cumulative Burrow Status by Survey Number within the BSA

	Number of Burrows by Survey Number			
Cumulative Burrow Status	**1**	**2**	**3**	**4**
Occupied	0	0	0	0
Active	0	0	0	0
Inactive	220	284	306	302
No longer suitable	0	0	3	7
Total	**220**	**284**	**309**	**309**

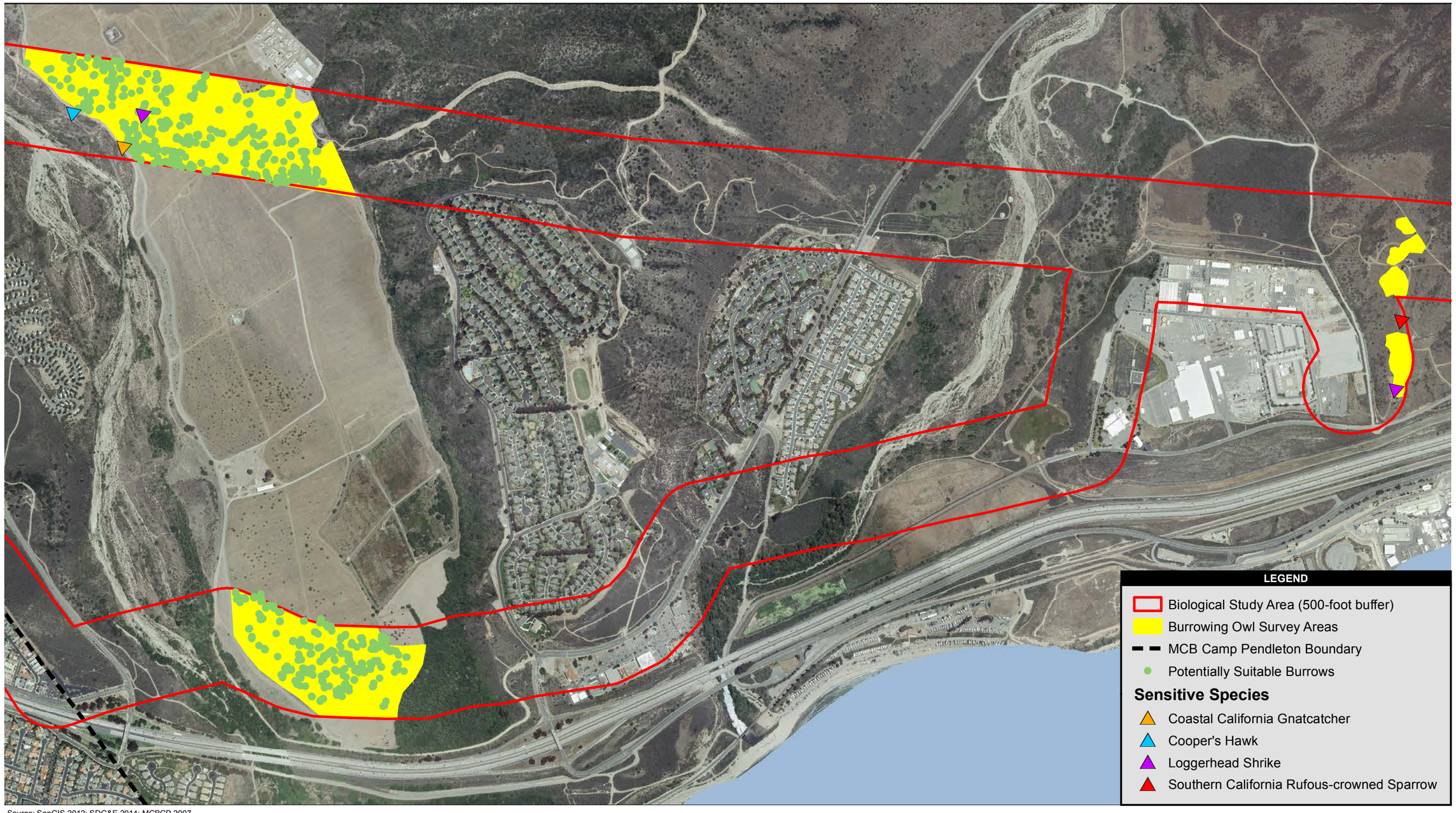
All suitable burrows found within the BSA were either inactive or became no longer suitable during surveys. No WBO sign was found at any burrow and no WBO were encountered during the surveys. Three burrows were considered destroyed or no longer suitable during Survey 3 and seven burrows were no longer suitable during Survey 4. This is likely due to rain events filling in the burrows (with mud or other debris), or ground squirrels modifying the burrows. Additionally, during the course of surveys, the vegetation surrounding several burrows grew and covered the entrances to the burrows, rendering them no longer suitable.

Five special-status species were detected during WBO surveys. These are Cooper's hawk (*Accipiter cooperii*; NCCP covered), Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*; NCCP covered), loggerhead shrike (*Lanius ludovicianus*; CDFW Species of Special Concern), coastal California gnatcatcher (*Polioptila californica californica*; federally threatened, NCCP covered), and mule deer (*Odocoileus hemionus*; NCCP covered). The locations of the special-status avian species are included in Figure 3. A full list of wildlife species detected during WBO surveys is included in Appendix B, and the raw field data in Excel tabular format are located in Appendix C.

3.2 DISCUSSION

Due to the extirpation of WBO as a breeding resident on MCBCP, and current state as a winter resident only, nonbreeding season WBO surveys were conducted within the BSA. Protocol nonbreeding season WBO surveys were conducted and no WBO or WBO sign were detected. There were hundreds of potentially suitable burrows created by California ground squirrels plus a few small culverts, pipes, and rock piles that could be used by WBO. The vegetation within and around the BSA is open nonnative ruderal habitat that is considered suitable for WBO. The BSA is located within an active military training area that includes off-road tank maneuvers. Many tank tracks crisscross the BSA and, where recent tank training activity was observed, there were few to almost no California ground squirrel burrows. Generally, areas with low levels of tank training or no tank training (as evidenced by tank tracks on the ground) had higher numbers of California ground squirrel burrows. Areas with many tank tracks had fewer California ground squirrel burrows.

Throughout the course of surveys, the ruderal and weedy vegetation within the BSA grew many inches to several feet in height in a few areas. At the beginning of surveys, the vegetation was low growing and the ground cover was a few inches high. By the end of surveys, the ground cover was several feet high in some locations. Most of the ground cover is weedy ruderal vegetation that proliferates in disturbed habitats. It tends to grow very quickly and, by the end of WBO surveys, several large patches of formerly suitable habitat had become too tall and dense to be considered suitable for WBO. Since WBO prefer low-growing vegetation that permits them to easily see prey and predators when standing on the ground, tall vegetation can inhibit WBO from occurring in certain areas. Several potentially suitable burrows that were recorded during the first survey could no longer be located by the last survey due to dense vegetative growth. MCBCP periodically mows the vegetation within most of the BSA, which makes it suitable again for WBO. Despite the high number of potentially suitable burrows, generally open low-growing vegetation (until the last survey), and nearby foraging habitat, no wintering WBO were detected.



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

1,050 525 0 1,050 Feet

Scale: 1:12,600; 1 inch = 1,050 feet

Figure 3
Potentially Suitable Burrows and Sensitive Species Detected

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Owl_SurveyRPT\Fig_3_BUOW_Burrows_SSpecies.mxd, 1/29/2015, SorensenJ

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CHAPTER 4
LITERATURE CITED

AECOM

2013 *2012/2013 Marine Corps Forces Special Operations Command Expansion Project, Listed Branchiopod Species 90-Day Report of Protocol Wet Season Surveys, Marine Corps Base Camp Pendleton, California*. July 25.

California Department of Fish and Game (CDFG)

2012 Staff Report on Burrowing Owl Mitigation (Dept. of Fish and Game, March 7, 2012). Available at http://www.dfg.ca.gov/wildlife/nongame/survey_ monitor. html.

California Department of Fish and Wildlife (CDFW)

2014 California Natural Diversity Database. Special Animals List. September.

Klute, D. S., L. W. Ayers, J. A. Shaffer, M. T. Green, W. H. Howe, S. L. Jones, S. R. Sheffield, and T. S. Zimmerman

2003 *Status Assessment and Conservation Plan for the Western Burrowing owl in the United States.* U.S. Fish and Wildlife Service Biological Technical Publication, BTP-R6001-2003

Lincer, J. L., and P. H. Bloom

2007 The Status of the Burrowing Owl in San Diego County, California. *Proceedings of the California Burrowing Owl Symposium 90-102*. The Institute for Bird Populations.

Unitt, P.

2004 *San Diego County Bird Atlas*. Proc. San Diego Soc. Nat. Hist. 39.

United States Navy (U.S. Navy)

2015 Marine Corps Base Camp Pendleton Basewide Survey. Data for Western Burrowing Owl.

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APPENDIX A

REPRESENTATIVE SITE PHOTOGRAPHS

Appendix A – Representative Site Photographs



Photo 1. View north of California ground squirrel burrows that could serve as potentially suitable western burrowing owl burrow in foreground and TL 695 power lines in the background.



Photo 2. View north of California ground squirrel complex that could serve as potentially suitable western burrowing owl burrows.

APPENDIX B

WILDLIFE SPECIES DETECTED DURING NONBREEDING SEASON WESTERN BURROWING OWL SURVEYS

Appendix B. Wildlife Species Detected during Nonbreeding Season Western Burrowing Owl Surveys

Common Name	Scientific Name	Order	Family	Federal and California Status (Endangered/Threatened/Species of Special Concern)[1]	SDG&E NCCP Status
Invertebrates					
pygmy blue	*Brephidium exilis*	Lepidoptera	Lycaenidae	none	none
painted lady	*Vanessa cardui*	Lepidoptera	Nymphalidae	none	none
Reptiles & Amphibians					
Baja California treefrog	*Pseudacris hypochondriaca*	Anura	Hylidae	none	none
Avian					
Cooper's hawk	*Accipiter cooperii*	Accipitriformes	Accipitridae	none	covered
red-tailed hawk	*Buteo jamaicensis*	Accipitriformes	Accipitridae	none	none
white-throated swift	*Aeronautes saxatalis*	Apodiformes	Apodidae	none	none
Anna's hummingbird	*Calypte anna*	Apodiformes	Trochilidae	none	none
killdeer	*Charadrius vociferus*	Charadriiformes	Charadriidae	none	none
black-bellied plover	*Pluvialis squatarola*	Charadriiformes	Charadriidae	none	none
horned lark	*Eremophila alpestris*	Passeriformes	Alaudidae	none	none
American crow	*Corvus brachyrhynchos*	Passeriformes	Corvidae	none	none
common raven	*Corvus corax*	Passeriformes	Corvidae	none	none
southern California rufous-crowned	*Aimophila ruficeps canescens*	Passeriformes	Emberizidae	none	covered

Common Name	Scientific Name	Order	Family	Federal and California Status (Endangered/Threatened/Species of Special Concern)[1]	SDG&E NCCP Status
sparrow					
Lincoln's sparrow	*Melospiza lincolnii*	Passeriformes	Emberizidae	none	none
song sparrow	*Melospiza melodia*	Passeriformes	Emberizidae	none	none
California towhee	*Melozone crissalis*	Passeriformes	Emberizidae	none	none
savannah sparrow	*Passerculus sandwichensis*	Passeriformes	Emberizidae	none	none
spotted towhee	*Pipilo maculatus*	Passeriformes	Emberizidae	none	none
white-crowned sparrow	*Zonotrichia leucophrys*	Passeriformes	Emberizidae	none	none
American goldfinch	*Spinus tristis*	Passeriformes	Fringillidae	none	none
western meadowlark	*Sturnella neglecta*	Passeriformes	Icteridae	none	none
loggerhead shrike	*Lanius ludovicianus*	Passeriformes	Laniidae	species of special concern	covered
American pipit	*Anthus rubrescens*	Passeriformes	Motacillidae	none	none
yellow-rumped warbler	*Setophaga coronata*	Passeriformes	Parulidae	none	none
blue-gray gnatcatcher	*Polioptila caerulea*	Passeriformes	Polioptilidae	none	none
coastal California gnatcatcher	*Polioptila californica californica*	Passeriformes	Polioptilidae	threatened	covered
European	*Sturnus vulgaris*	Passeriformes	Sturnidae	none	none

Common Name	Scientific Name	Order	Family	Federal and California Status (Endangered/Threatened/Species of Special Concern)[1]	SDG&E NCCP Status
starling					
wrentit	*Chamaea fasciata*	Passeriformes	Sylviidae	none	none
Bewick's Wren	*Thryomanes bewickii*	Passeriformes	Troglodytidae	none	none
house wren	*Troglodytes aedon*	Passeriformes	Troglodytidae	none	none
hermit thrush	*Catharus guttatus*	Passeriformes	Turdidae	none	none
Say's phoebe	*Sayornis saya*	Passeriformes	Tyrannidae	none	none
Hutton's vireo	*Vireo huttoni*	Passeriformes	Vireonidae	none	none
northern flicker	*Colaptes auratus*	Piciformes	Picidae	none	none
Nuttall's woodpecker	*Picoides nuttallii*	Piciformes	Picidae	none	none
downy woodpecker	*Picoides pubescens*	Piciformes	Picidae	none	none
Mammals					
mule deer	*Odocoileus hemionus*	Artiodactyla	Cervidae	none	covered
coyote	*Canis latrans*	Carnivora	Canidae	none	none
California ground squirrel	*Spermophilus beecheyi*	Rodentia	Sciuridae	none	none

[1] Species sensitivity status taken from CDFW Special Animals List September (CDFW 2014).

APPENDIX C

RAW FIELD DATA IN EXCEL TABULAR FORMAT

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	1	12/19/2014	6:57:23 AM	Inactive	Inactive	1	none	Grnd squirrel burrow	33 24.5888 N 117 34.5751 W::12/19/14 at 14:54:39 (UTC)	117.576252 W	33.409813 N	11S	3696868.65	446417.38
Brennan Mulrooney	2	12/29/2014	7:00:34 AM	Inactive	Inactive	1	none		33 24.5887 N 117 34.5770 W::12/29/14 at 14:57:49 (UTC)	117.576283 W	33.409812 N	11S	3696868.65	446417.38
Brennan Mulrooney	3	1/9/2015	6:50:25 AM	Inactive	Inactive	1	none		33 24.5906 N 117 34.5771 W::1/9/15 at 14:57:34 (UTC)	117.576285 W	33.409843 N	11S	3696871.45	446416
Andrew Fisher	4	1/22/2015	3:06:13 PM	Inactive	Inactive	1	none		33 24.5899 N 117 34.5768 W::1/22/15 at 23:00:12 (UTC)	117.576280 W	33.409832 N	11S	3696871.45	446416
Andrew Fisher	1	12/19/2014	7:16:59 AM	Inactive	Inactive	10	none	multiple burrow entrances	33 24.3860 N 117 34.4245 W::12/19/14 at 15:13:57 (UTC)	117.573742 W	33.406433 N	11S	3696494.3	446647.08
Brennan Mulrooney	2	12/29/2014	7:19:51 AM	Inactive	Inactive	10	none		33 24.3878 N 117 34.4283 W::12/29/14 at 15:16:17 (UTC)	117.573808 W	33.406462 N	11S	3696494.3	446647.08
Brennan Mulrooney	3	1/9/2015	7:16:05 AM	Inactive	Inactive	10	none		33 24.3853 N 117 34.4248 W::1/9/15 at 15:11:16 (UTC)	117.573747 W	33.406422 N	11S	3696490.7	446648.365
Andrew Fisher	4	1/22/2015	3:28:28 PM	Inactive	Inactive	10	none		33 24.3845 N 117 34.4265 W::1/22/15 at 23:22:47 (UTC)	117.573775 W	33.406408 N	11S	3696490.7	446648.365
Brennan Mulrooney	1	12/19/2014	7:35:17 AM	Inactive	Inactive	100	none	multiple burrow entrances	33 24.2658 N 117 34.4406 W::12/19/14 at 15:32:21 (UTC)	117.573967 W	33.404453 N	11S	3696275.35	446627.975
Andrew Fisher	2	12/29/2014	7:44:57 AM	Inactive	Inactive	100	none	multiple burrow entrances	33 24.2694 N 117 34.4381 W::12/29/14 at 15:40:53 (UTC)	117.573968 W	33.404490 N	11S	3696275.35	446627.975
Andrew Fisher	3	1/9/2015	7:32:22 AM	Inactive	Inactive	100	none	multiple burrow entrances	33 24.2696 N 117 34.4389 W::1/9/15 at 15:27:27 (UTC)	117.573982 W	33.404493 N	11S	3696277	446626.17
Donna Germann	4	1/23/2015	7:22:28 AM	Inactive	Inactive	100	none		33 24.2688 N 117 34.4395 W::1/23/15 at 15:19:29 (UTC)	117.573992 W	33.404480 N	11S	3696277	446626.17
Brennan Mulrooney	1	12/19/2014	7:39:28 AM	Inactive	Inactive	101	none	multiple burrow entrances	33 24.3585 N 117 34.5070 W::12/19/14 at 15:36:39 (UTC)	117.575117 W	33.405975 N	11S	3696443	446521.96
Andrew Fisher	2	12/29/2014	8:16:17 AM	Inactive	Inactive	101	none	multiple burrow entrances	33 24.3589 N 117 34.5071 W::12/29/14 at 16:12:11 (UTC)	117.575118 W	33.405982 N	11S	3696443	446521.96
Andrew Fisher	3	1/9/2015	8:04:59 AM	Inactive	Inactive	101	none	multiple burrow entrances	33 24.3583 N 117 34.5077 W::1/9/15 at 16:00:07 (UTC)	117.575128 W	33.405972 N	11S	3696443.55	446519.965
Keoni Calantas	4	1/23/2015	7:25:40 AM	Inactive	Inactive	101	none		33 24.3597 N 117 34.5090 W::1/23/15 at 15:24:32 (UTC)	117.575150 W	33.405995 N	11S	3696443.55	446519.965
Brennan Mulrooney	1	12/19/2014	7:44:29 AM	Inactive	Inactive	102	none		33 24.4375 N 117 34.5636 W::12/19/14 at 15:41:27 (UTC)	117.576060 W	33.407292 N	11S	3696589.45	446436.15
Andrew Fisher	2	12/29/2014	7:53:56 AM	Inactive	Inactive	102	none	multiple burrow entrances	33 24.4378 N 117 34.5622 W::12/29/14 at 15:49:55 (UTC)	117.576038 W	33.407298 N	11S	3696589.45	446436.15
Andrew Fisher	3	1/9/2015	7:41:02 AM	Inactive	Inactive	102	none	occupied by ground squirrel	33 24.4368 N 117 34.5633 W::1/9/15 at 15:36:06 (UTC)	117.576055 W	33.407280 N	11S	3696589	446435.915
Donna Germann	4	1/23/2015	7:33:44 AM	Inactive	Inactive	102	none		33 24.4381 N 117 34.5629 W::1/23/15 at 15:30:46 (UTC)	117.576048 W	33.407302 N	11S	3696589	446435.915
Brennan Mulrooney	1	12/19/2014	7:47:31 AM	Inactive	Inactive	103	none	multiple burrow entrances	33 24.4925 N 117 34.6129 W::12/19/14 at 15:44:38 (UTC)	117.576888 W	33.408217 N	11S	3696691.6	446361.535
Andrew Fisher	2	12/29/2014	8:06:51 AM	Inactive	Inactive	103	none	multiple burrow entrances	33 24.4925 N 117 34.6096 W::12/29/14 at 16:02:52 (UTC)	117.576827 W	33.408208 N	11S	3696691.6	446361.535
Andrew Fisher	3	1/9/2015	7:56:31 AM	Inactive	Inactive	103	none	multiple burrow entrances	33 24.4922 N 117 34.6089 W::1/9/15 at 15:51:36 (UTC)	117.576815 W	33.408203 N	11S	3696691.65	446360.975
Keoni Calantas	4	1/23/2015	8:34:16 AM	Inactive	Inactive	103	none		33 24.4934 N 117 34.6147 W::1/23/15 at 16:33:16 (UTC)	117.576912 W	33.408223 N	11S	3696691.65	446360.975
Brennan Mulrooney	1	12/19/2014	7:48:49 AM	Inactive	Inactive	104	none	multiple burrow entrances	33 24.5248 N 117 34.6099 W::12/19/14 at 15:45:55 (UTC)	117.576832 W	33.408747 N	11S	3696747.5	446363.05
Brennan Mulrooney	2	12/29/2014	7:58:10 AM	Inactive	Inactive	104	none		33 24.5212 N 117 34.6114 W::12/29/14 at 15:54:18 (UTC)	117.576857 W	33.408687 N	11S	3696747.5	446363.05
Brennan Mulrooney	3	1/9/2015	7:48:51 AM	Inactive	Inactive	104	none		33 24.5206 N 117 34.6102 W::1/9/15 at 15:44:01 (UTC)	117.576837 W	33.408677 N	11S	3696749.15	446365.48
Donna Germann	4	1/23/2015	6:58:43 AM	Inactive	Inactive	104	none		33 24.5272 N 117 34.6080 W::1/23/15 at 14:55:38 (UTC)	117.576800 W	33.408787 N	11S	3696749.15	446365.48
Brennan Mulrooney	1	12/19/2014	7:57:43 AM	Inactive	Inactive	105	none		33 24.4382 N 117 34.6088 W::12/19/14 at 15:54:48 (UTC)	117.576813 W	33.407303 N	11S	3696591.75	446366.65
Matthew Kedziora	2	12/29/2014	8:05:24 AM	Inactive	Inactive	105	none		33 24.4393 N 117 34.6068 W::12/29/14 at 16:04:34 (UTC)	117.576780 W	33.407322 N	11S	3696591.75	446366.65
Brynne Mulrooney	3	1/9/2015	7:52:52 AM	Inactive	Inactive	105	none		33 24.4362 N 117 34.6069 W::1/9/15 at 15:53:30 (UTC)	117.576782 W	33.407270 N	11S	3696592.3	446367.265
Andrew Fisher	4	1/23/2015	7:42:25 AM	Inactive	Inactive	105	none		33 24.4419 N 117 34.6079 W::1/23/15 at 15:36:36 (UTC)	117.576798 W	33.407365 N	11S	3696592.3	446367.265
Brennan Mulrooney	1	12/19/2014	7:58:53 AM	Inactive	Inactive	106	none	multiple burrow entrances	33 24.4337 N 117 34.6072 W::12/19/14 at 15:56:04 (UTC)	117.576787 W	33.407228 N	11S	3696575.3	446366.145
Matthew Kedziora	2	12/29/2014	8:06:40 AM	Inactive	Inactive	106	none		33 24.4260 N 117 34.6089 W::12/29/14 at 16:05:37 (UTC)	117.576815 W	33.407100 N	11S	3696575.3	446366.145
James McMorran	3	1/9/2015	7:58:39 AM	Inactive	Inactive	106	none		33 24.4263 N 117 34.6019 W::1/9/15 at 15:53:45 (UTC)	117.576698 W	33.407105 N	11S	3696571.65	446375.38
Andrew Fisher	4	1/23/2015	7:44:06 AM	Inactive	Inactive	106	none		33 24.4295 N 117 34.6023 W::1/23/15 at 15:38:07 (UTC)	117.576705 W	33.407158 N	11S	3696571.65	446375.38
Brennan Mulrooney	1	12/19/2014	7:59:47 AM	Inactive	Inactive	107	none	multiple burrow entrances	33 24.4214 N 117 34.5960 W::12/19/14 at 15:56:47 (UTC)	117.576602 W	33.407022 N	11S	3696562.8	446381.555
Matthew Kedziora	2	12/29/2014	8:08:51 AM	Inactive	Inactive	107	none		33 24.4249 N 117 34.6000 W::12/29/14 at 16:07:55 (UTC)	117.576667 W	33.407082 N	11S	3696562.8	446381.555
Brynne Mulrooney	3	1/9/2015	7:54:52 AM	Inactive	Inactive	107	none		33 24.4238 N 117 34.5941 W::1/9/15 at 15:55:28 (UTC)	117.576568 W	33.407063 N	11S	3696565.65	446386.97
Andrew Fisher	4	1/23/2015	7:45:31 AM	Inactive	Inactive	107	none		33 24.4256 N 117 34.5951 W::1/23/15 at 15:39:36 (UTC)	117.576585 W	33.407093 N	11S	3696565.65	446386.97
Brennan Mulrooney	1	12/19/2014	8:00:50 AM	Inactive	Inactive	108	none	multiple burrow entrances	33 24.4065 N 117 34.5845 W::12/19/14 at 15:57:57 (UTC)	117.576387 W	33.406760 N	11S	3696528.5	446407.635
Matthew Kedziora	2	12/29/2014	8:10:08 AM	Inactive	Inactive	108	none		33 24.4024 N 117 34.5778 W::12/29/14 at 16:09:10 (UTC)	117.576317 W	33.406728 N	11S	3696528.5	446407.635
Brynne Mulrooney	3	1/9/2015	7:56:14 AM	Inactive	Inactive	108	none		33 24.4065 N 117 34.5819 W::1/9/15 at 15:56:26 (UTC)	117.576365 W	33.406775 N	11S	3696531.95	446408.31
Andrew Fisher	4	1/23/2015	7:47:27 AM	Inactive	Inactive	108	none		33 24.4065 N 117 34.5795 W::1/23/15 at 15:41:53 (UTC)	117.576325 W	33.406775 N	11S	3696531.95	446408.31
Brennan Mulrooney	1	12/19/2014	8:05:33 AM	Inactive	Inactive	109	none		33 24.3564 N 117 34.5488 W::12/19/14 at 16:02:42 (UTC)	117.575813 W	33.405940 N	11S	3696435.35	446456.31
James McMorran	2	12/29/2014	8:14:24 AM	Inactive	Inactive	109	none		33 24.3523 N 117 34.5500 W::12/29/14 at 16:10:30 (UTC)	117.575833 W	33.405872 N	11S	3696435.35	446456.31
James McMorran	3	1/9/2015	8:03:44 AM	Inactive	Inactive	109	none		33 24.3541 N 117 34.5526 W::1/9/15 at 15:58:30 (UTC)	117.575877 W	33.405902 N	11S	3696437.3	446453.025
Keoni Calantas	4	1/23/2015	7:45:54 AM	Inactive	Inactive	109	none		33 24.3567 N 117 34.5504 W::1/23/15 at 15:44:47 (UTC)	117.575840 W	33.405945 N	11S	3696437.3	446453.025
Andrew Fisher	1	12/19/2014	7:18:38 AM	Inactive	Inactive	11	none	multiple burrow entrances	33 24.3908 N 117 34.4116 W::12/19/14 at 15:15:35 (UTC)	117.573523 W	33.406507 N	11S	3696499.15	446672.865
Andrew Fisher	2	12/29/2014	7:20:29 AM	Inactive	Inactive	11	none	multiple burrow entrances	33 24.3887 N 117 34.4084 W::12/29/14 at 15:16:35 (UTC)	117.573473 W	33.406478 N	11S	3696499.15	446672.865
Andrew Fisher	3	1/9/2015	7:16:15 AM	Inactive	Inactive	11	none	occupied by ground squirrel	33 24.3889 N 117 34.4098 W::1/9/15 at 15:11:40 (UTC)	117.573497 W	33.406482 N	11S	3696498.9	446671.56
Andrew Fisher	4	1/22/2015	3:16:28 PM	Inactive	Inactive	11	none		33 24.3899 N 117 34.4116 W::1/22/15 at 23:10:27 (UTC)	117.573527 W	33.406498 N	11S	3696498.9	446671.56
Brennan Mulrooney	1	12/19/2014	8:06:44 AM	Inactive	Inactive	110	none	multiple burrow entrances	33 24.3387 N 117 34.5333 W::12/19/14 at 16:03:47 (UTC)	117.575555 W	33.405645 N	11S	3696406.8	446482.935
Matthew Kedziora	2	12/29/2014	8:13:45 AM	Inactive	Inactive	110	none		33 24.3393 N 117 34.5309 W::12/29/14 at 16:12:49 (UTC)	117.575515 W	33.405655 N	11S	3696406.8	446482.935

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Brynne Mulrooney	3	1/9/2015	7:59:49 AM	Inactive	Inactive	110	none		33 24.3410 N 117 34.5337 W::1/9/15 at 15:59:59 (UTC)	117.575562 W	33.405683 N	11S	3696410.45	446479.985
Andrew Fisher	4	1/23/2015	7:50:54 AM	Inactive	Inactive	110	none		33 24.3409 N 117 34.5343 W::1/23/15 at 15:44:55 (UTC)	117.575572 W	33.405682 N	11S	3696410.45	446479.985
Brennan Mulrooney	1	12/19/2014	8:11:27 AM	Inactive	Inactive	111	none		33 24.2753 N 117 34.4801 W::12/19/14 at 16:08:31 (UTC)	117.574668 W	33.404588 N	11S	3696285.2	446566.145
Matthew Kedziora	2	12/29/2014	8:18:53 AM	Inactive	Inactive	111	none		33 24.2722 N 117 34.4765 W::12/29/14 at 16:17:54 (UTC)	117.574598 W	33.404527 N	11S	3696285.2	446566.145
Brynne Mulrooney	3	1/9/2015	8:04:14 AM	Inactive	Inactive	111	none		33 24.2742 N 117 34.4808 W::1/9/15 at 16:04:21 (UTC)	117.574680 W	33.404570 N	11S	3696286.9	446561.78
Andrew Fisher	4	1/23/2015	7:56:34 AM	Inactive	Inactive	111	none		33 24.2747 N 117 34.4808 W::1/23/15 at 15:50:49 (UTC)	117.574680 W	33.404575 N	11S	3696286.9	446561.78
Brennan Mulrooney	1	12/19/2014	8:17:57 AM	Inactive	Inactive	112	none		33 24.1672 N 117 34.3941 W::12/19/14 at 16:14:54 (UTC)	117.573233 W	33.402782 N	11S	3696084	446697.685
Matthew Kedziora	2	12/29/2014	8:25:36 AM	Inactive	Inactive	112	none		33 24.1630 N 117 34.3908 W::12/29/14 at 16:24:59 (UTC)	117.573180 W	33.402717 N	11S	3696084	446697.685
Brynne Mulrooney	3	1/9/2015	8:10:53 AM	Inactive	Inactive	112	none		33 24.1649 N 117 34.3921 W::1/9/15 at 16:11:09 (UTC)	117.573202 W	33.402748 N	11S	3696083	446698.33
Andrew Fisher	4	1/23/2015	8:05:53 AM	Inactive	Inactive	112	none		33 24.1639 N 117 34.3918 W::1/23/15 at 15:59:54 (UTC)	117.573197 W	33.402732 N	11S	3696083	446698.33
Brennan Mulrooney	1	12/19/2014	8:23:12 AM	Inactive	Inactive	113	none		33 24.1056 N 117 34.4154 W::12/19/14 at 16:20:15 (UTC)	117.573590 W	33.401760 N	11S	3695973.4	446660.855
Brennan Mulrooney	2	12/29/2014	8:35:10 AM	Inactive	Inactive	113	none		33 24.1044 N 117 34.4161 W::12/29/14 at 16:31:22 (UTC)	117.573602 W	33.401740 N	11S	3695973.4	446660.855
Brennan Mulrooney	3	1/9/2015	8:23:14 AM	Inactive	Inactive	113	none		33 24.1198 N 117 34.4151 W::1/9/15 at 16:18:32 (UTC)	117.573585 W	33.401997 N	11S	3695997.25	446661.87
Keoni Calantas	4	1/23/2015	8:07:03 AM	Inactive	Inactive	113	none		33 24.1160 N 117 34.4153 W::1/23/15 at 16:06:00 (UTC)	117.573588 W	33.401933 N	11S	3695997.25	446661.87
Brennan Mulrooney	1	12/19/2014	8:24:15 AM	Inactive	Inactive	114	none		33 24.1187 N 117 34.4216 W::12/19/14 at 16:21:20 (UTC)	117.573732 W	33.401988 N	11S	3696001.75	446647.2
Brennan Mulrooney	2	12/29/2014	8:36:00 AM	Inactive	Inactive	114	none		33 24.1213 N 117 34.4254 W::12/29/14 at 16:32:04 (UTC)	117.573757 W	33.402022 N	11S	3696001.75	446647.2
Brennan Mulrooney	3	1/9/2015	8:23:53 AM	Inactive	Inactive	114	none		33 24.1206 N 117 34.4257 W::1/9/15 at 16:19:06 (UTC)	117.573760 W	33.402010 N	11S	3696012.15	446641.54
Keoni Calantas	4	1/23/2015	8:08:42 AM	Inactive	Inactive	114	none		33 24.1312 N 117 34.4311 W::1/23/15 at 16:07:38 (UTC)	117.573852 W	33.402187 N	11S	3696012.15	446641.54
Brennan Mulrooney	1	12/19/2014	8:26:11 AM	Inactive	Inactive	115	none		33 24.1419 N 117 34.4391 W::12/19/14 at 16:23:16 (UTC)	117.573997 W	33.402375 N	11S	3696042.25	446623.9
Brennan Mulrooney	2	12/29/2014	8:37:40 AM	Inactive	Inactive	115	none		33 24.1418 N 117 34.4399 W::12/29/14 at 16:33:45 (UTC)	117.573998 W	33.402363 N	11S	3696042.25	446623.9
Brennan Mulrooney	3	1/9/2015	8:24:57 AM	Inactive	Inactive	115	none		33 24.1430 N 117 34.4373 W::1/9/15 at 16:20:28 (UTC)	117.573955 W	33.402383 N	11S	3696058.9	446621.11
Keoni Calantas	4	1/23/2015	8:09:41 AM	Inactive	Inactive	115	none		33 24.1593 N 117 34.4461 W::1/23/15 at 16:11:05 (UTC)	117.574102 W	33.402655 N	11S	3696058.9	446621.11
Brennan Mulrooney	1	12/19/2014	8:27:42 AM	Inactive	Inactive	116	none		33 24.1579 N 117 34.4469 W::12/19/14 at 16:24:39 (UTC)	117.574113 W	33.402633 N	11S	3696071.3	446613.55
Brennan Mulrooney	2	12/29/2014	8:38:56 AM	Inactive	Inactive	116	none		33 24.1577 N 117 34.4465 W::12/29/14 at 16:35:05 (UTC)	117.574108 W	33.402628 N	11S	3696071.3	446613.55
Brennan Mulrooney	3	1/9/2015	8:26:37 AM	Inactive	Inactive	116	none		33 24.1583 N 117 34.4452 W::1/9/15 at 16:21:49 (UTC)	117.574087 W	33.402638 N	11S	3696073.15	446614.445
Keoni Calantas	4	1/23/2015	8:12:38 AM	Inactive	Inactive	116	none		33 24.1594 N 117 34.4469 W::1/23/15 at 16:11:36 (UTC)	117.574115 W	33.402657 N	11S	3696073.15	446614.445
Brennan Mulrooney	1	12/19/2014	8:28:59 AM	Inactive	Inactive	117	none		33 24.1657 N 117 34.4608 W::12/19/14 at 16:26:05 (UTC)	117.574347 W	33.402762 N	11S	3696094	446595.635
Brennan Mulrooney	2	12/29/2014	8:40:55 AM	Inactive	Inactive	117	none		33 24.1744 N 117 34.4557 W::12/29/14 at 16:37:01 (UTC)	117.574262 W	33.402907 N	11S	3696094	446595.635
Brynne Mulrooney	3	1/9/2015	8:22:43 AM	Inactive	Inactive	117	none		33 24.1737 N 117 34.4542 W::1/9/15 at 16:22:57 (UTC)	117.574237 W	33.402895 N	11S	3696099.4	446601.48
Donna Germann	4	1/23/2015	8:13:56 AM	Inactive	Inactive	117	none		33 24.1723 N 117 34.4548 W::1/23/15 at 16:10:47 (UTC)	117.574247 W	33.402872 N	11S	3696099.4	446601.48
Brennan Mulrooney	1	12/19/2014	8:32:23 AM	Inactive	Inactive	118	none		33 24.2011 N 117 34.4985 W::12/19/14 at 16:29:32 (UTC)	117.574975 W	33.403352 N	11S	3696153.8	446533.52
Andrew Fisher	2	12/29/2014	8:44:24 AM	Inactive	Inactive	118	none	multiple burrow entrances	33 24.2034 N 117 34.4986 W::12/29/14 at 16:40:20 (UTC)	117.574977 W	33.403390 N	11S	3696153.8	446533.52
Andrew Fisher	3	1/9/2015	8:30:40 AM	Inactive	Inactive	118	none	occupied by ground squirrel	33 24.2015 N 117 34.4992 W::1/9/15 at 16:25:44 (UTC)	117.574987 W	33.403358 N	11S	3696153.35	446532.45
Andrew Fisher	4	1/23/2015	8:20:43 AM	Inactive	Inactive	118	none		33 24.2025 N 117 34.4993 W::1/23/15 at 16:14:40 (UTC)	117.574988 W	33.403375 N	11S	3696153.35	446532.45
Brennan Mulrooney	1	12/19/2014	8:33:36 AM	Inactive	Inactive	119	none		33 24.2220 N 117 34.5107 W::12/19/14 at 16:30:31 (UTC)	117.575178 W	33.403700 N	11S	3696190.95	446516.245
Andrew Fisher	2	12/29/2014	8:45:50 AM	Inactive	Inactive	119	none	occupied by ground squirrel	33 24.2226 N 117 34.5090 W::12/29/14 at 16:41:51 (UTC)	117.575150 W	33.403710 N	11S	3696190.95	446516.245
Andrew Fisher	3	1/9/2015	8:31:50 AM	Inactive	Inactive	119	none	occupied by ground squirrel	33 24.2219 N 117 34.5097 W::1/9/15 at 16:26:58 (UTC)	117.575162 W	33.403698 N	11S	3696190.6	446516.845
Keoni Calantas	4	1/23/2015	8:17:23 AM	Inactive	Inactive	119	none		33 24.2223 N 117 34.5092 W::1/23/15 at 16:16:15 (UTC)	117.575153 W	33.403705 N	11S	3696190.6	446516.845
Andrew Fisher	1	12/19/2014	7:36:39 AM	Inactive	Inactive	12	none	multiple burrow entrances	33 24.1916 N 117 34.3904 W::12/19/14 at 15:33:32 (UTC)	117.573173 W	33.403193 N	11S	3696132.9	446702.745
Andrew Fisher	2	12/29/2014	8:26:47 AM	Inactive	Inactive	12	none	multiple burrow entrances	33 24.1913 N 117 34.3882 W::12/29/14 at 16:22:48 (UTC)	117.573137 W	33.403188 N	11S	3696132.9	446702.745
Andrew Fisher	3	1/9/2015	8:17:15 AM	Inactive	Inactive	12	none	multiple burrow entrances	33 24.1902 N 117 34.3887 W::1/9/15 at 16:12:21 (UTC)	117.573145 W	33.403170 N	11S	3696130.9	446701.43
Keoni Calantas	4	1/23/2015	7:14:28 AM	Inactive	Inactive	12	none		33 24.1905 N 117 34.3916 W::1/23/15 at 15:13:29 (UTC)	117.573193 W	33.403175 N	11S	3696130.9	446701.43
Brennan Mulrooney	1	12/19/2014	8:38:31 AM	Inactive	Inactive	120	none		33 24.3025 N 117 34.5759 W::12/19/14 at 16:35:39 (UTC)	117.576265 W	33.405042 N	11S	3696341.5	446416.18
Andrew Fisher	2	12/29/2014	8:52:41 AM	Inactive	Inactive	120	none	multiple burrow entrances	33 24.3044 N 117 34.5739 W::12/29/14 at 16:48:49 (UTC)	117.576233 W	33.405073 N	11S	3696341.5	446416.18
Andrew Fisher	3	1/9/2015	8:37:16 AM	Inactive	Inactive	120	none	multiple burrow entrances	33 24.3040 N 117 34.5749 W::1/9/15 at 16:32:19 (UTC)	117.576250 W	33.405067 N	11S	3696342.95	446415.955
Andrew Fisher	4	1/23/2015	8:26:48 AM	Inactive	Inactive	120	none		33 24.3045 N 117 34.5752 W::1/23/15 at 16:20:45 (UTC)	117.576253 W	33.405075 N	11S	3696342.95	446415.955
Brennan Mulrooney	1	12/19/2014	8:39:52 AM	Inactive	Inactive	121	none		33 24.3211 N 117 34.5897 W::12/19/14 at 16:37:02 (UTC)	117.576495 W	33.405352 N	11S	3696374.3	446391.065
Andrew Fisher	2	12/29/2014	8:54:14 AM	Inactive	Inactive	121	none	multiple burrow entrances	33 24.3211 N 117 34.5928 W::12/29/14 at 16:50:12 (UTC)	117.576547 W	33.405352 N	11S	3696374.3	446391.065
Andrew Fisher	3	1/9/2015	8:38:23 AM	Inactive	Inactive	121	none	occupied by ground squirrel	33 24.3218 N 117 34.5935 W::1/9/15 at 16:33:30 (UTC)	117.576558 W	33.405363 N	11S	3696374.9	446387.305
Andrew Fisher	4	1/23/2015	8:28:37 AM	Inactive	Inactive	121	none		33 24.3211 N 117 34.5939 W::1/23/15 at 16:22:33 (UTC)	117.576565 W	33.405352 N	11S	3696374.9	446387.305
Brennan Mulrooney	1	12/19/2014	8:40:40 AM	Inactive	Inactive	122	none	multiple burrow entrances	33 24.3331 N 117 34.6010 W::12/19/14 at 16:37:46 (UTC)	117.576683 W	33.405552 N	11S	3696397.1	446376.645
Andrew Fisher	2	12/29/2014	8:55:22 AM	Inactive	Inactive	122	none	multiple burrow entrances	33 24.3338 N 117 34.6003 W::12/29/14 at 16:51:17 (UTC)	117.576672 W	33.405563 N	11S	3696397.1	446376.645
Andrew Fisher	3	1/9/2015	8:39:30 AM	Inactive	Inactive	122	none	multiple burrow entrances	33 24.3347 N 117 34.6011 W::1/9/15 at 16:34:41 (UTC)	117.576685 W	33.405578 N	11S	3696403	446376.35
Andrew Fisher	4	1/23/2015	8:31:09 AM	Inactive	Inactive	122	none		33 24.3386 N 117 34.6006 W::1/23/15 at 16:25:07 (UTC)	117.576677 W	33.405643 N	11S	3696403	446376.35

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Brennan Mulrooney	1	12/19/2014	8:41:29 AM	Inactive	Inactive	123	none	multiple burrow entrances	33 24.3382 N 117 34.6027 W::12/19/14 at 16:38:34 (UTC)	117.576712 W	33.405637 N	11S	3696408.65	446372.75
Andrew Fisher	2	12/29/2014	8:55:52 AM	Inactive	Inactive	123	none	multiple burrow entrances	33 24.3411 N 117 34.6037 W::12/29/14 at 16:51:53 (UTC)	117.576728 W	33.405685 N	11S	3696408.65	446372.75
Andrew Fisher	3	1/9/2015	8:40:11 AM	Inactive	Inactive	123	none	occupied by ground squirrel	33 24.3425 N 117 34.6056 W::1/9/15 at 16:35:14 (UTC)	117.576760 W	33.405708 N	11S	3696413.45	446367.2
Andrew Fisher	4	1/23/2015	8:31:34 AM	Inactive	Inactive	123	none		33 24.3420 N 117 34.6080 W::1/23/15 at 16:25:29 (UTC)	117.576800 W	33.405700 N	11S	3696413.45	446367.2
Brennan Mulrooney	1	12/19/2014	8:43:59 AM	Inactive	Inactive	124	none		33 24.3905 N 117 34.6305 W::12/19/14 at 16:41:01 (UTC)	117.577175 W	33.406508 N	11S	3696502.45	446334.12
Brennan Mulrooney	2	12/29/2014	8:58:03 AM	Inactive	Inactive	124	none		33 24.3901 N 117 34.6264 W::12/29/14 at 16:54:08 (UTC)	117.577107 W	33.406502 N	11S	3696502.45	446334.12
Brennan Mulrooney	3	1/9/2015	8:42:27 AM	Inactive	Inactive	124	none		33 24.3896 N 117 34.6270 W::1/9/15 at 16:37:35 (UTC)	117.577117 W	33.406493 N	11S	3696502.15	446335.655
Keoni Calantas	4	1/23/2015	8:26:51 AM	Inactive	Inactive	124	none		33 24.3907 N 117 34.6279 W::1/23/15 at 16:25:44 (UTC)	117.577132 W	33.406512 N	11S	3696502.15	446335.655
Brennan Mulrooney	1	12/19/2014	8:44:49 AM	Inactive	Inactive	125	none		33 24.3993 N 117 34.6338 W::12/19/14 at 16:41:48 (UTC)	117.577225 W	33.406650 N	11S	3696526.4	446324.955
Brennan Mulrooney	2	12/29/2014	8:59:18 AM	Inactive	Inactive	125	none		33 24.4075 N 117 34.6354 W::12/29/14 at 16:55:34 (UTC)	117.577257 W	33.406792 N	11S	3696526.4	446324.955
Brennan Mulrooney	3	1/9/2015	8:43:34 AM	Inactive	Inactive	125	none		33 24.3969 N 117 34.6346 W::1/9/15 at 16:39:27 (UTC)	117.577243 W	33.406615 N	11S	3696519.8	446324.085
Keoni Calantas	4	1/23/2015	8:27:49 AM	Inactive	Inactive	125	none		33 24.4024 N 117 34.6354 W::1/23/15 at 16:27:09 (UTC)	117.577257 W	33.406707 N	11S	3696519.8	446324.085
Brennan Mulrooney	1	12/19/2014	9:11:42 AM	Inactive	Inactive	126	none	multiple burrow entrances	33 23.6794 N 117 35.1835 W::12/19/14 at 17:08:45 (UTC)	117.586392 W	33.394657 N	11S	3695193.95	445466.225
Brennan Mulrooney	2	12/29/2014	9:27:29 AM	Inactive	Inactive	126	none		33 23.6798 N 117 35.1839 W::12/29/14 at 17:23:49 (UTC)	117.586398 W	33.394663 N	11S	3695193.95	445466.225
Andrew Fisher	3	1/9/2015	9:55:39 AM	Inactive	Inactive	126	none		33 23.6798 N 117 35.1839 W::12/29/14 at 17:23:49 (UTC)	117.586398 W	33.394663 N	11S	3695195.1	445464.835
Andrew Fisher	4	1/23/2015	8:59:35 AM	Inactive	Inactive	126	none		33 23.6806 N 117 35.1853 W::1/23/15 at 16:53:33 (UTC)	117.586422 W	33.394677 N	11S	3695195.1	445464.835
Brennan Mulrooney	1	12/19/2014	9:18:37 AM	Inactive	Inactive	127	none	multiple burrow entrances	33 23.5783 N 117 35.1526 W::12/19/14 at 17:15:46 (UTC)	117.585877 W	33.392972 N	11S	3695011.55	445512.67
Brennan Mulrooney	2	12/29/2014	9:33:51 AM	Inactive	Inactive	127	none		33 23.5837 N 117 35.1535 W::12/29/14 at 17:29:58 (UTC)	117.585892 W	33.393062 N	11S	3695011.55	445512.67
James McMorran	3	1/9/2015	9:12:14 AM	Inactive	Inactive	127	none		33 23.5850 N 117 35.1549 W::1/9/15 at 17:07:00 (UTC)	117.585915 W	33.393083 N	11S	3695019.65	445515.325
Keoni Calantas	4	1/23/2015	8:57:57 AM	Inactive	Inactive	127	none		33 23.5858 N 117 35.1479 W::1/23/15 at 16:56:51 (UTC)	117.585798 W	33.393097 N	11S	3695019.65	445515.325
Brennan Mulrooney	1	12/19/2014	9:23:34 AM	Inactive	Inactive	128	none		33 23.5229 N 117 35.1180 W::12/19/14 at 17:20:37 (UTC)	117.585315 W	33.392038 N	11S	3694899.9	445562.92
Matthew Kedziora	2	12/29/2014	9:37:39 AM	Inactive	Inactive	128	none		33 23.5192 N 117 35.1216 W::12/29/14 at 17:36:42 (UTC)	117.585360 W	33.391987 N	11S	3694899.9	445562.92
Brynne Mulrooney	3	1/9/2015	9:09:56 AM	Inactive	Inactive	128	none		33 23.5208 N 117 35.1236 W::1/9/15 at 17:10:13 (UTC)	117.585393 W	33.392013 N	11S	3694900	445558.04
Donna Germann	4	1/23/2015	9:03:17 AM	Inactive	Inactive	128	none		33 23.5208 N 117 35.1232 W::1/23/15 at 17:00:10 (UTC)	117.585387 W	33.392013 N	11S	3694900	445558.04
Brennan Mulrooney	1	12/19/2014	9:24:40 AM	Inactive	Inactive	129	none	multiple burrow entrances	33 23.5066 N 117 35.1057 W::12/19/14 at 17:21:44 (UTC)	117.585095 W	33.391777 N	11S	3694876.5	445588.135
Matthew Kedziora	2	12/29/2014	9:39:01 AM	Inactive	Inactive	129	none		33 23.5097 N 117 35.1021 W::12/29/14 at 17:38:06 (UTC)	117.585035 W	33.391828 N	11S	3694876.5	445588.135
Brynne Mulrooney	3	1/9/2015	9:11:30 AM	Inactive	Inactive	129	none		33 23.5048 N 117 35.1066 W::1/9/15 at 17:11:37 (UTC)	117.585110 W	33.391747 N	11S	3694870.5	445583.075
Donna Germann	4	1/23/2015	9:04:30 AM	Inactive	Inactive	129	none		33 23.5050 N 117 35.1078 W::1/23/15 at 17:01:27 (UTC)	117.585128 W	33.391750 N	11S	3694870.5	445583.075
Andrew Fisher	1	12/19/2014	7:37:41 AM	Inactive	Inactive	13	none	multiple burrow entrances	33 24.2102 N 117 34.4075 W::12/19/14 at 15:34:31 (UTC)	117.573458 W	33.403503 N	11S	3696164.5	446674.325
Brennan Mulrooney	2	12/29/2014	8:26:05 AM	Inactive	Inactive	13	none		33 24.2067 N 117 34.4080 W::12/29/14 at 16:22:09 (UTC)	117.573467 W	33.403445 N	11S	3696164.5	446674.325
Andrew Fisher	3	1/9/2015	8:15:49 AM	Inactive	Inactive	13	none	occupied by ground squirrel	33 24.2092 N 117 34.4084 W::1/9/15 at 16:10:56 (UTC)	117.573473 W	33.403487 N	11S	3696165.95	446673.59
Keoni Calantas	4	1/23/2015	7:16:13 AM	Inactive	Inactive	13	none		33 24.2093 N 117 34.4081 W::1/23/15 at 15:15:07 (UTC)	117.573468 W	33.403488 N	11S	3696165.95	446673.59
Brennan Mulrooney	1	12/19/2014	9:27:06 AM	Inactive	Inactive	130	none	multiple burrow entrances	33 23.4674 N 117 35.0809 W::12/19/14 at 17:24:11 (UTC)	117.584687 W	33.391118 N	11S	3694793.7	445623.75
James McMorran	2	12/29/2014	9:45:09 AM	Inactive	Inactive	130	none		33 23.4598 N 117 35.0800 W::12/29/14 at 17:41:14 (UTC)	117.584667 W	33.390997 N	11S	3694793.7	445623.75
Brynne Mulrooney	3	1/9/2015	9:18:24 AM	Inactive	Inactive	130	none		33 23.4649 N 117 35.0812 W::1/9/15 at 17:18:39 (UTC)	117.584687 W	33.391082 N	11S	3694797	445623.495
Donna Germann	4	1/23/2015	9:09:25 AM	Inactive	Inactive	130	none		33 23.4656 N 117 35.0804 W::1/23/15 at 17:06:35 (UTC)	117.584673 W	33.391093 N	11S	3694797	445623.495
Brennan Mulrooney	1	12/19/2014	9:28:40 AM	Inactive	Inactive	131	none		33 23.4760 N 117 35.0779 W::12/19/14 at 17:25:41 (UTC)	117.584638 W	33.391153 N	11S	3694803.4	445625.945
Andrew Fisher	2	12/29/2014	9:45:36 AM	Inactive	Inactive	131	none	occupied by ground squirrel	33 23.4683 N 117 35.0802 W::12/29/14 at 17:41:33 (UTC)	117.584670 W	33.391138 N	11S	3694803.4	445625.945
Brennan Mulrooney	3	1/9/2015	9:20:34 AM	Inactive	Inactive	131	none		33 23.4687 N 117 35.0794 W::1/9/15 at 17:17:18 (UTC)	117.584657 W	33.391145 N	11S	3694804.35	445628.555
Donna Germann	4	1/23/2015	9:14:44 AM	Inactive	Inactive	131	none		33 23.4700 N 117 35.0757 W::1/23/15 at 17:11:33 (UTC)	117.584595 W	33.391163 N	11S	3694804.35	445628.555
Brennan Mulrooney	1	12/19/2014	9:30:35 AM	Inactive	Inactive	132	none		33 23.4524 N 117 35.0710 W::12/19/14 at 17:27:38 (UTC)	117.584517 W	33.390873 N	11S	3694767.4	445635.2
James McMorran	2	12/29/2014	9:46:44 AM	Inactive	Inactive	132	none		33 23.4446 N 117 35.0738 W::12/29/14 at 17:42:55 (UTC)	117.584563 W	33.390743 N	11S	3694767.4	445635.2
Brennan Mulrooney	3	1/9/2015	9:23:42 AM	Inactive	Inactive	132	none		33 23.4515 N 117 35.0712 W::1/9/15 at 17:18:50 (UTC)	117.584520 W	33.390858 N	11S	3694770.2	445638.69
Donna Germann	4	1/23/2015	9:13:15 AM	Inactive	Inactive	132	none		33 23.4501 N 117 35.0706 W::1/23/15 at 17:10:09 (UTC)	117.584510 W	33.390835 N	11S	3694770.2	445638.69
Brennan Mulrooney	1	12/19/2014	9:36:30 AM	Inactive	Inactive	133	none		33 23.4348 N 117 35.0942 W::12/19/14 at 17:33:30 (UTC)	117.584903 W	33.390580 N	11S	3694740	445606.665
Brennan Mulrooney	2	12/29/2014	9:52:16 AM	Inactive	Inactive	133	none		33 23.4339 N 117 35.0888 W::12/29/14 at 17:48:36 (UTC)	117.584812 W	33.390565 N	11S	3694740	445606.665
James McMorran	3	1/9/2015	9:30:23 AM	Inactive	Inactive	133	none		33 23.4345 N 117 35.0896 W::1/9/15 at 17:25:22 (UTC)	117.584827 W	33.390575 N	11S	3694738.7	445611.445
Andrew Fisher	4	1/23/2015	9:16:43 AM	Inactive	Inactive	133	none		33 23.4328 N 117 35.0871 W::1/23/15 at 17:10:48 (UTC)	117.584785 W	33.390547 N	11S	3694738.7	445611.445
Brennan Mulrooney	1	12/19/2014	9:39:11 AM	Inactive	Inactive	134	none	multiple burrow entrances	33 23.4701 N 117 35.1169 W::12/19/14 at 17:36:14 (UTC)	117.585285 W	33.391167 N	11S	3694801.25	445570.36
Matthew Kedziora	2	12/29/2014	9:51:57 AM	Inactive	Inactive	134	none		33 23.4648 N 117 35.1131 W::12/29/14 at 17:50:57 (UTC)	117.585218 W	33.391080 N	11S	3694801.25	445570.36
Brynne Mulrooney	3	1/9/2015	9:26:57 AM	Inactive	Inactive	134	none		33 23.4660 N 117 35.1118 W::1/9/15 at 17:27:15 (UTC)	117.585197 W	33.391100 N	11S	3694800.75	445575.15
Andrew Fisher	4	1/23/2015	9:18:03 AM	Inactive	Inactive	134	none		33 23.4682 N 117 35.1122 W::1/23/15 at 17:12:04 (UTC)	117.585203 W	33.391137 N	11S	3694800.75	445575.15
Brennan Mulrooney	1	12/19/2014	9:41:25 AM	Inactive	Inactive	135	none		33 23.5056 N 117 35.1540 W::12/19/14 at 17:38:30 (UTC)	117.585895 W	33.391775 N	11S	3694873.85	445514.875
Matthew Kedziora	2	12/29/2014	9:55:19 AM	Inactive	Inactive	135	none	Caution bees nest!	33 23.5065 N 117 35.1486 W::12/29/14 at 17:54:48 (UTC)	117.585810 W	33.391775 N	11S	3694873.85	445514.875

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Brynne Mulrooney	3	1/9/2015	9:30:01 AM	Inactive	Inactive	135	none	Bees in burrow	33 23.5077 N 117 35.1489 W::1/9/15 at 17:30:36 (UTC)	117.585815 W	33.391795 N	11S	3694875.65	445518
Andrew Fisher	4	1/23/2015	9:20:33 AM	Inactive	Inactive	135	none		33 23.5073 N 117 35.1494 W::1/23/15 at 17:14:41 (UTC)	117.585823 W	33.391788 N	11S	3694875.65	445518
Brennan Mulrooney	1	12/19/2014	9:43:14 AM	Inactive	Inactive	136	none		33 23.5247 N 117 35.1707 W::12/19/14 at 17:40:16 (UTC)	117.586187 W	33.392097 N	11S	3694908.5	445483.73
Brennan Mulrooney	2	12/29/2014	10:00:16 AM	Inactive	Inactive	136	none		33 23.5245 N 117 35.1715 W::12/29/14 at 17:56:33 (UTC)	117.586192 W	33.392075 N	11S	3694908.5	445483.73
Brynne Mulrooney	3	1/9/2015	9:31:59 AM	Inactive	Inactive	136	none		33 23.5268 N 117 35.1701 W::1/9/15 at 17:32:09 (UTC)	117.586168 W	33.392113 N	11S	3694910.6	445485.505
Andrew Fisher	4	1/23/2015	9:21:52 AM	Inactive	Inactive	136	none		33 23.5258 N 117 35.1703 W::1/23/15 at 17:15:51 (UTC)	117.586173 W	33.392097 N	11S	3694910.6	445485.505
Brennan Mulrooney	1	12/19/2014	9:44:12 AM	Inactive	Inactive	137	none		33 23.5411 N 117 35.1858 W::12/19/14 at 17:41:16 (UTC)	117.586430 W	33.392352 N	11S	3694941.4	445466.055
Matthew Kedziora	2	12/29/2014	9:59:45 AM	Inactive	Inactive	137	none		33 23.5447 N 117 35.1800 W::12/29/14 at 17:58:49 (UTC)	117.586333 W	33.392412 N	11S	3694941.4	445466.055
Brynne Mulrooney	3	1/9/2015	9:33:03 AM	Inactive	Inactive	137	none		33 23.5429 N 117 35.1832 W::1/9/15 at 17:33:07 (UTC)	117.586387 W	33.392382 N	11S	3694937.8	445465.615
Andrew Fisher	4	1/23/2015	9:22:52 AM	Inactive	Inactive	137	none		33 23.5387 N 117 35.1831 W::1/23/15 at 17:16:46 (UTC)	117.586385 W	33.392317 N	11S	3694937.8	445465.615
Brennan Mulrooney	1	12/19/2014	9:45:44 AM	Inactive	Inactive	138	none	multiple burrow entrances	33 23.5648 N 117 35.1965 W::12/19/14 at 17:43:02 (UTC)	117.586610 W	33.392747 N	11S	3694981.7	445446.655
Matthew Kedziora	2	12/29/2014	10:00:58 AM	Inactive	Inactive	138	none		33 23.5645 N 117 35.1945 W::12/29/14 at 18:00:13 (UTC)	117.586575 W	33.392742 N	11S	3694981.7	445446.655
Brynne Mulrooney	3	1/9/2015	9:34:12 AM	Inactive	Inactive	138	none		33 23.5643 N 117 35.1936 W::1/9/15 at 17:34:22 (UTC)	117.586562 W	33.392738 N	11S	3694979.15	445447.805
Andrew Fisher	4	1/23/2015	9:24:30 AM	Inactive	Inactive	138	none		33 23.5624 N 117 35.1959 W::1/23/15 at 17:18:29 (UTC)	117.586598 W	33.392705 N	11S	3694979.15	445447.805
Brennan Mulrooney	1	12/19/2014	9:56:39 AM	Inactive	Inactive	139	none		33 23.5491 N 117 35.2494 W::12/19/14 at 17:53:42 (UTC)	117.587490 W	33.392485 N	11S	3694956.55	445366.765
Brennan Mulrooney	2	12/29/2014	10:19:15 AM	Inactive	Inactive	139	none		33 23.5525 N 117 35.2446 W::12/29/14 at 18:15:19 (UTC)	117.587410 W	33.392542 N	11S	3694956.55	445366.765
James McMorran	3	1/9/2015	9:50:36 AM	Inactive	Inactive	139	none		33 23.5556 N 117 35.2450 W::1/9/15 at 17:45:17 (UTC)	117.587417 W	33.392593 N	11S	3694959.45	445368.405
Donna Germann	4	1/23/2015	10:01:11 AM	Inactive	Inactive	139	none		33 23.5492 N 117 35.2469 W::1/23/15 at 17:58:01 (UTC)	117.587448 W	33.392487 N	11S	3694959.45	445368.405
Andrew Fisher	1	12/19/2014	7:38:47 AM	Inactive	Inactive	14	none	multiple burrow entrances	33 24.2462 N 117 34.4322 W::12/19/14 at 15:35:31 (UTC)	117.573870 W	33.404102 N	11S	3696234.75	446638.115
Andrew Fisher	2	12/29/2014	8:22:50 AM	Inactive	Inactive	14	none	multiple burrow entrances	33 24.2466 N 117 34.4305 W::12/29/14 at 16:18:46 (UTC)	117.573842 W	33.404110 N	11S	3696234.75	446638.115
Andrew Fisher	3	1/9/2015	8:13:03 AM	Inactive	Inactive	14	none	multiple burrow entrances	33 24.2457 N 117 34.4313 W::1/9/15 at 16:08:08 (UTC)	117.573855 W	33.404095 N	11S	3696233.9	446637.745
Keoni Calantas	4	1/23/2015	7:19:23 AM	Inactive	Inactive	14	none		33 24.2461 N 117 34.4319 W::1/23/15 at 15:18:15 (UTC)	117.573865 W	33.404102 N	11S	3696233.9	446637.745
Brennan Mulrooney	1	12/19/2014	9:59:22 AM	Inactive	Inactive	140	none		33 23.5172 N 117 35.2239 W::12/19/14 at 17:56:24 (UTC)	117.587065 W	33.391953 N	11S	3694892	445402.765
Brennan Mulrooney	2	12/29/2014	10:20:54 AM	Inactive	Inactive	140	none		33 23.5148 N 117 35.2233 W::12/29/14 at 18:17:00 (UTC)	117.587053 W	33.391913 N	11S	3694892	445402.765
James McMorran	3	1/9/2015	9:52:49 AM	Inactive	Inactive	140	none		33 23.5158 N 117 35.2243 W::1/9/15 at 17:47:19 (UTC)	117.587072 W	33.391930 N	11S	3694888.35	445401.255
Donna Germann	4	1/23/2015	9:59:35 AM	Inactive	Inactive	140	none		33 23.5122 N 117 35.2247 W::1/23/15 at 17:56:26 (UTC)	117.587078 W	33.391870 N	11S	3694888.35	445401.255
Brennan Mulrooney	1	12/19/2014	10:01:28 AM	Inactive	Inactive	141	none		33 23.4820 N 117 35.1968 W::12/19/14 at 17:58:50 (UTC)	117.586613 W	33.391367 N	11S	3694828.6	445445.285
Brennan Mulrooney	2	12/29/2014	10:22:27 AM	Inactive	Inactive	141	none		33 23.4816 N 117 35.1950 W::12/29/14 at 18:18:33 (UTC)	117.586583 W	33.391360 N	11S	3694828.6	445445.285
James McMorran	3	1/9/2015	9:55:51 AM	Inactive	Inactive	141	none		33 23.4824 N 117 35.1966 W::1/9/15 at 17:50:21 (UTC)	117.586610 W	33.391373 N	11S	3694827.4	445446.575
Donna Germann	4	1/23/2015	9:56:43 AM	Inactive	Inactive	141	none		33 23.4799 N 117 35.1935 W::1/23/15 at 17:53:33 (UTC)	117.586558 W	33.391332 N	11S	3694827.4	445446.575
Brennan Mulrooney	1	12/19/2014	10:05:04 AM	Inactive	Inactive	142	none		33 23.4409 N 117 35.1602 W::12/19/14 at 18:02:22 (UTC)	117.586003 W	33.390682 N	11S	3694753.7	445498.855
Brennan Mulrooney	2	12/29/2014	10:25:45 AM	Inactive	Inactive	142	none		33 23.4420 N 117 35.1619 W::12/29/14 at 18:21:49 (UTC)	117.586032 W	33.390700 N	11S	3694753.7	445498.855
James McMorran	3	1/9/2015	9:58:56 AM	Inactive	Inactive	142	none		33 23.4441 N 117 35.1543 W::1/9/15 at 17:53:25 (UTC)	117.585905 W	33.390735 N	11S	3694755	445507.555
Donna Germann	4	1/23/2015	9:53:14 AM	No Longer Suitable	No Longer Suitable	142	none	Overgrown with vegetation	33 23.4402 N 117 35.1566 W::1/23/15 at 17:50:17 (UTC)	117.585943 W	33.390670 N	11S	3694755	445507.555
Brennan Mulrooney	1	12/19/2014	10:06:27 AM	Inactive	Inactive	143	none		33 23.4033 N 117 35.1757 W::12/19/14 at 18:06:17 (UTC)	117.586262 W	33.390055 N	11S	3694684.6	445473.26
Brennan Mulrooney	2	12/29/2014	10:29:27 AM	Inactive	Inactive	143	none		33 23.4046 N 117 35.1789 W::12/29/14 at 18:25:30 (UTC)	117.586315 W	33.390077 N	11S	3694684.6	445473.26
James McMorran	3	1/9/2015	10:01:30 AM	Inactive	Inactive	143	none		33 23.4062 N 117 35.1670 W::1/9/15 at 17:55:59 (UTC)	117.586117 W	33.390103 N	11S	3694682.65	445484.08
Andrew Fisher	4	1/23/2015	9:56:03 AM	No Longer Suitable	No Longer Suitable	143	none	Overgrown with weeds	33 23.3997 N 117 35.1736 W::1/23/15 at 17:50:15 (UTC)	117.586227 W	33.389995 N	11S	3694682.65	445484.08
Donna Germann	1	12/19/2014	6:59:08 AM	Inactive	Inactive	144	none	TWO BURROW	33 24.5406 N 117 34.5674 W::12/19/14 at 14:59:08 (UTC)	117.576125 W	33.409012 N	11S	3696779.8	446430.14
James McMorran	2	12/29/2014	7:01:50 AM	Inactive	Inactive	144	none		33 24.5406 N 117 34.5674 W::12/19/14 at 14:59:08 (UTC)	117.576125 W	33.409012 N	11S	3696779.8	446430.14
James McMorran	3	1/9/2015	7:03:50 AM	Inactive	Inactive	144	none		33 24.5411 N 117 34.5645 W::1/9/15 at 14:58:45 (UTC)	117.576075 W	33.409018 N	11S	3696779.8	446431.3
Andrew Fisher	4	1/22/2015	3:48:27 PM	Inactive	Inactive	144	none		33 24.5403 N 117 34.5690 W::1/22/15 at 23:42:25 (UTC)	117.576150 W	33.409005 N	11S	3696779.8	446431.3
Donna Germann	1	12/19/2014	7:02:20 AM	Inactive	Inactive	145	none		33 24.5163 N 117 34.5556 W::12/19/14 at 15:02:10 (UTC)	117.575927 W	33.408605 N	11S	3696734.6	446448.3
James McMorran	2	12/29/2014	7:03:56 AM	Inactive	Inactive	145	none		33 24.5163 N 117 34.5556 W::12/19/14 at 15:02:10 (UTC)	117.575927 W	33.408605 N	11S	3696734.6	446448.3
James McMorran	3	1/9/2015	7:05:30 AM	Inactive	Inactive	145	none		33 24.5163 N 117 34.5416 W::1/9/15 at 15:00:12 (UTC)	117.575693 W	33.408605 N	11S	3696734.1	446458.34
Andrew Fisher	4	1/22/2015	4:25:14 PM	Inactive	Inactive	145	none		33 24.5158 N 117 34.5567 W::1/23/15 at 00:19:17 (UTC)	117.575945 W	33.408597 N	11S	3696734.1	446458.34
Donna Germann	1	12/19/2014	7:03:45 AM	Inactive	Inactive	146	none	multiple burrow entrances	33 24.5096 N 117 34.5502 W::12/19/14 at 15:04:04 (UTC)	117.575837 W	33.408493 N	11S	3696724.1	446459.63
James McMorran	2	12/29/2014	7:04:41 AM	Inactive	Inactive	146	none		33 24.5117 N 117 34.5463 W::12/29/14 at 15:00:37 (UTC)	117.575772 W	33.408528 N	11S	3696724.1	446459.63
James McMorran	3	1/9/2015	7:06:26 AM	Inactive	Inactive	146	none		33 24.5089 N 117 34.5463 W::1/9/15 at 15:01:15 (UTC)	117.575772 W	33.408482 N	11S	3696722.05	446457.485
Andrew Fisher	4	1/22/2015	4:24:45 PM	Inactive	Inactive	146	none		33 24.5101 N 117 34.5530 W::1/23/15 at 00:18:50 (UTC)	117.575883 W	33.408502 N	11S	3696722.05	446457.485
Donna Germann	1	12/19/2014	7:05:12 AM	Inactive	Inactive	147	none	multiple burrow entrances	33 24.5003 N 117 34.5346 W::12/19/14 at 15:05:05 (UTC)	117.575577 W	33.408338 N	11S	3696705.1	446480.68
Matthew Kedziora	2	12/29/2014	7:10:09 AM	Inactive	Inactive	147	none		33 24.5006 N 117 34.5346 W::12/29/14 at 15:09:04 (UTC)	117.575577 W	33.408343 N	11S	3696705.1	446480.68
Brynne Mulrooney	3	1/9/2015	7:04:08 AM	Inactive	Inactive	147	none	Mammal tracks	33 24.5014 N 117 34.5352 W::1/9/15 at 15:04:27 (UTC)	117.575587 W	33.408357 N	11S	3696706.45	446478.315
Andrew Fisher	4	1/22/2015	3:50:04 PM	Inactive	Inactive	147	none		33 24.5009 N 117 34.5371 W::1/22/15 at 23:44:13 (UTC)	117.575618 W	33.408348 N	11S	3696706.45	446478.315

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Donna Germann	1	12/19/2014	7:12:04 AM	Inactive	Inactive	148	none	Vegetation in entrance	33 24.4201 N 117 34.4818 W::12/19/14 at 15:12:27 (UTC)	117.574702 W	33.407003 N	11S	3696558.45	446562.72
James McMorran	2	12/29/2014	7:16:47 AM	Inactive	Inactive	148	none		33 24.4224 N 117 34.4802 W::12/29/14 at 15:12:42 (UTC)	117.574670 W	33.407040 N	11S	3696558.45	446562.72
James McMorran	3	1/9/2015	7:14:05 AM	Inactive	Inactive	148	none		33 24.4266 N 117 34.4864 W::1/9/15 at 15:08:36 (UTC)	117.574773 W	33.407110 N	11S	3696567.85	446552.13
Andrew Fisher	4	1/22/2015	4:20:06 PM	Inactive	Inactive	148	none		33 24.4261 N 117 34.4897 W::1/23/15 at 00:14:10 (UTC)	117.574828 W	33.407102 N	11S	3696567.85	446552.13
Donna Germann	1	12/19/2014	7:14:30 AM	Inactive	Inactive	149	none	multiple burrow entrances	33 24.3795 N 117 34.4631 W::12/19/14 at 15:14:16 (UTC)	117.574385 W	33.406325 N	11S	3696482.65	446592.25
James McMorran	2	12/29/2014	7:18:47 AM	Inactive	Inactive	149	none		33 24.3813 N 117 34.4606 W::12/29/14 at 15:14:53 (UTC)	117.574343 W	33.406355 N	11S	3696482.65	446592.25
James McMorran	3	1/9/2015	7:16:00 AM	Inactive	Inactive	149	none		33 24.3857 N 117 34.4639 W::1/9/15 at 15:10:45 (UTC)	117.574398 W	33.406428 N	11S	3696488.45	446588.79
Andrew Fisher	4	1/22/2015	4:15:25 PM	Inactive	Inactive	149	none		33 24.3813 N 117 34.4643 W::1/23/15 at 00:09:28 (UTC)	117.574405 W	33.406355 N	11S	3696488.45	446588.79
Andrew Fisher	1	12/19/2014	7:39:23 AM	Inactive	Inactive	15	none		33 24.2540 N 117 34.4373 W::12/19/14 at 15:36:05 (UTC)	117.573955 W	33.404233 N	11S	3696249.15	446629.13
Andrew Fisher	2	12/29/2014	8:22:17 AM	Inactive	Inactive	15	none	occupied by ground squirrel	33 24.2543 N 117 34.4371 W::12/29/14 at 16:18:12 (UTC)	117.573952 W	33.404238 N	11S	3696249.15	446629.13
Andrew Fisher	3	1/9/2015	8:12:34 AM	Inactive	Inactive	15	none	occupied by ground squirrel	33 24.2548 N 117 34.4372 W::1/9/15 at 16:07:38 (UTC)	117.573953 W	33.404247 N	11S	3696249.6	446628.3
Keoni Calantas	4	1/23/2015	7:20:03 AM	Inactive	Inactive	15	none		33 24.2539 N 117 34.4383 W::1/23/15 at 15:18:55 (UTC)	117.573972 W	33.404232 N	11S	3696249.6	446628.3
Donna Germann	1	12/19/2014	7:29:13 AM	Inactive	Inactive	150	none		33 24.2102 N 117 34.3766 W::12/19/14 at 15:29:03 (UTC)	117.572943 W	33.403503 N	11S	3696166.4	446721.295
Brennan Mulrooney	2	12/29/2014	7:39:58 AM	Inactive	Inactive	150	none		33 24.2091 N 117 34.3783 W::12/29/14 at 15:36:19 (UTC)	117.572972 W	33.403485 N	11S	3696166.4	446721.295
Andrew Fisher	3	1/9/2015	7:28:05 AM	Inactive	Inactive	150	none	occupied by ground squirrel	33 24.2083 N 117 34.3744 W::1/9/15 at 15:23:21 (UTC)	117.572907 W	33.403472 N	11S	3696164.9	446723.985
Donna Germann	4	1/23/2015	7:16:55 AM	Inactive	Inactive	150	none		33 24.2093 N 117 34.3770 W::1/23/15 at 15:13:51 (UTC)	117.572950 W	33.403488 N	11S	3696164.9	446723.985
Donna Germann	1	12/19/2014	7:43:40 AM	Inactive	Inactive	151	none	multiple burrow entrances	33 24.4893 N 117 34.5767 W::12/19/14 at 15:43:33 (UTC)	117.576278 W	33.408155 N	11S	3696687.3	446414
Matthew Kedziora	2	12/29/2014	7:53:12 AM	Inactive	Inactive	151	none		33 24.4899 N 117 34.5786 W::12/29/14 at 15:52:13 (UTC)	117.576308 W	33.408198 N	11S	3696687.3	446414
Brennan Mulrooney	3	1/9/2015	7:44:48 AM	Inactive	Inactive	151	none		33 24.4880 N 117 34.5778 W::1/9/15 at 15:40:03 (UTC)	117.576297 W	33.408133 N	11S	3696687.45	446410.56
Donna Germann	4	1/23/2015	7:00:06 AM	Inactive	Inactive	151	none		33 24.4933 N 117 34.5818 W::1/23/15 at 14:57:01 (UTC)	117.576363 W	33.408222 N	11S	3696687.45	446410.56
Donna Germann	1	12/19/2014	7:47:04 AM	Inactive	Inactive	152	none		33 24.5380 N 117 34.6106 W::12/19/14 at 15:46:53 (UTC)	117.576843 W	33.408967 N	11S	3696772.85	446367.89
Matthew Kedziora	2	12/29/2014	7:56:16 AM	Inactive	Inactive	152	none		33 24.5348 N 117 34.6045 W::12/29/14 at 15:55:18 (UTC)	117.576745 W	33.408925 N	11S	3696772.85	446367.89
Brynne Mulrooney	3	1/9/2015	7:44:16 AM	Inactive	Inactive	152	none		33 24.5379 N 117 34.6127 W::1/9/15 at 15:44:22 (UTC)	117.576878 W	33.408965 N	11S	3696775	446363.855
Donna Germann	4	1/23/2015	6:56:15 AM	Inactive	Inactive	152	none		33 24.5379 N 117 34.6078 W::1/23/15 at 14:53:30 (UTC)	117.576797 W	33.408965 N	11S	3696775	446363.855
Donna Germann	1	12/19/2014	7:48:28 AM	Inactive	Inactive	153	none	multiple burrow entrances	33 24.5572 N 117 34.6178 W::12/19/14 at 15:48:39 (UTC)	117.576963 W	33.409287 N	11S	3696810.55	446351.505
James McMorran	2	12/29/2014	7:57:23 AM	Inactive	Inactive	153	none		33 24.5570 N 117 34.6189 W::12/29/14 at 15:53:30 (UTC)	117.576982 W	33.409283 N	11S	3696810.55	446351.505
Brynne Mulrooney	3	1/9/2015	7:45:03 AM	Inactive	Inactive	153	none		33 24.5555 N 117 34.6199 W::1/9/15 at 15:45:07 (UTC)	117.576998 W	33.409258 N	11S	3696807.3	446354.595
Keoni Calantas	4	1/23/2015	6:53:12 AM	Inactive	Inactive	153	none		33 24.5552 N 117 34.6128 W::1/23/15 at 14:52:12 (UTC)	117.576880 W	33.409253 N	11S	3696807.3	446354.595
Donna Germann	1	12/19/2014	7:57:43 AM	Inactive	Inactive	154	none		33 24.4170 N 117 34.6331 W::12/19/14 at 15:57:34 (UTC)	117.577218 W	33.406950 N	11S	3696546.4	446329.58
Matthew Kedziora	2	12/29/2014	8:58:21 AM	Inactive	Inactive	154	none		33 24.4112 N 117 34.6300 W::12/29/14 at 16:57:13 (UTC)	117.577167 W	33.406853 N	11S	3696546.4	446329.58
James McMorran	3	1/9/2015	8:44:13 AM	Inactive	Inactive	154	none		33 24.4116 N 117 34.6350 W::1/9/15 at 16:38:42 (UTC)	117.577250 W	33.406860 N	11S	3696542.55	446325.745
Donna Germann	4	1/23/2015	8:31:56 AM	Inactive	Inactive	154	none		33 24.4124 N 117 34.6330 W::1/23/15 at 16:28:54 (UTC)	117.577217 W	33.406873 N	11S	3696542.55	446325.745
Donna Germann	1	12/19/2014	7:58:38 AM	Inactive	Inactive	155	none	multiple burrow entrances	33 24.4074 N 117 34.6230 W::12/19/14 at 15:58:37 (UTC)	117.577050 W	33.406790 N	11S	3696534.45	446342.67
Matthew Kedziora	2	12/29/2014	8:57:45 AM	Inactive	Inactive	155	none		33 24.4079 N 117 34.6230 W::12/29/14 at 16:56:39 (UTC)	117.577052 W	33.406798 N	11S	3696534.45	446342.67
Brynne Mulrooney	3	1/9/2015	8:39:20 AM	Inactive	Inactive	155	none		33 24.4097 N 117 34.6262 W::1/9/15 at 16:39:30 (UTC)	117.577103 W	33.406828 N	11S	3696537.35	446340.225
Donna Germann	4	1/23/2015	8:30:42 AM	Inactive	Inactive	155	none		33 24.4088 N 117 34.6231 W::1/23/15 at 16:27:35 (UTC)	117.577052 W	33.406813 N	11S	3696537.35	446340.225
Donna Germann	1	12/19/2014	8:00:45 AM	Inactive	Inactive	156	none		33 24.3884 N 117 34.6064 W::12/19/14 at 16:00:38 (UTC)	117.576773 W	33.406473 N	11S	3696501.75	446368.615
James McMorran	2	12/29/2014	8:57:36 AM	Inactive	Inactive	156	none		33 24.3917 N 117 34.6060 W::12/29/14 at 16:53:29 (UTC)	117.576767 W	33.406528 N	11S	3696501.75	446368.615
James McMorran	3	1/9/2015	8:38:43 AM	Inactive	Inactive	156	none		33 24.3892 N 117 34.6096 W::1/9/15 at 16:33:25 (UTC)	117.576827 W	33.406487 N	11S	3696504.2	446363.425
Donna Germann	4	1/23/2015	8:28:59 AM	Inactive	Inactive	156	none		33 24.3935 N 117 34.6095 W::1/23/15 at 16:25:51 (UTC)	117.576825 W	33.406558 N	11S	3696504.2	446363.425
Donna Germann	1	12/19/2014	8:01:40 AM	Inactive	Inactive	157	none	multiple burrow entrances	33 24.3814 N 117 34.6019 W::12/19/14 at 16:01:30 (UTC)	117.576700 W	33.406357 N	11S	3696474.95	446379.395
James McMorran	2	12/29/2014	8:54:53 AM	Inactive	Inactive	157	none		33 24.3697 N 117 34.5963 W::12/29/14 at 16:50:49 (UTC)	117.576605 W	33.406162 N	11S	3696474.95	446379.395
Brynne Mulrooney	3	1/9/2015	8:35:21 AM	Inactive	Inactive	157	none		33 24.3789 N 117 34.6030 W::1/9/15 at 16:35:23 (UTC)	117.576717 W	33.406315 N	11S	3696483.25	446372.605
Donna Germann	4	1/23/2015	8:27:38 AM	Inactive	Inactive	157	none		33 24.3812 N 117 34.6041 W::1/23/15 at 16:24:31 (UTC)	117.576735 W	33.406353 N	11S	3696483.25	446372.605
Donna Germann	1	12/19/2014	8:02:26 AM	Inactive	Inactive	158	none	TWO BURROW	33 24.3757 N 117 34.5964 W::12/19/14 at 16:02:33 (UTC)	117.576607 W	33.406262 N	11S	3696469.65	446383.69
James McMorran	2	12/29/2014	8:54:11 AM	Inactive	Inactive	158	none		33 24.3697 N 117 34.5963 W::12/29/14 at 16:50:10 (UTC)	117.576605 W	33.406162 N	11S	3696469.65	446383.69
Brynne Mulrooney	3	1/9/2015	8:34:38 AM	Inactive	Inactive	158	none		33 24.3730 N 117 34.6032 W::1/9/15 at 16:34:46 (UTC)	117.576720 W	33.406217 N	11S	3696472.75	446375.105
Donna Germann	4	1/23/2015	8:26:57 AM	Inactive	Inactive	158	none		33 24.3757 N 117 34.6006 W::1/23/15 at 16:23:53 (UTC)	117.576677 W	33.406262 N	11S	3696472.75	446375.105
Donna Germann	1	12/19/2014	8:21:49 AM	Inactive	Inactive	159	none	TWO POSSIBLE BURROWS	33 24.1244 N 117 34.4076 W::12/19/14 at 16:21:53 (UTC)	117.573462 W	33.402073 N	11S	3696012.2	446674.225
James McMorran	2	12/29/2014	8:35:10 AM	Inactive	Inactive	159	none		33 24.1277 N 117 34.4068 W::12/29/14 at 16:31:17 (UTC)	117.573447 W	33.402128 N	11S	3696012.2	446674.225
James McMorran	3	1/9/2015	8:23:01 AM	Inactive	Inactive	159	none		33 24.1283 N 117 34.4058 W::1/9/15 at 16:17:41 (UTC)	117.573430 W	33.402138 N	11S	3696012.45	446674.415
Donna Germann	4	1/23/2015	8:05:27 AM	Inactive	Inactive	159	none		33 24.1241 N 117 34.4085 W::1/23/15 at 16:02:21 (UTC)	117.573475 W	33.402068 N	11S	3696012.45	446674.415
Andrew Fisher	1	12/19/2014	7:39:58 AM	Inactive	Inactive	16	none	multiple burrow entrances	33 24.2685 N 117 34.4484 W::12/19/14 at 15:36:40 (UTC)	117.574140 W	33.404475 N	11S	3696275.7	446612.495
Andrew Fisher	2	12/29/2014	8:21:06 AM	Inactive	Inactive	16	none	multiple burrow entrances	33 24.2684 N 117 34.4477 W::12/29/14 at 16:17:02 (UTC)	117.574128 W	33.404473 N	11S	3696275.7	446612.495

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	3	1/9/2015	8:09:27 AM	Inactive	Inactive	16	none	occupied by ground squirrel	33 24.2684 N 117 34.4483 W::1/9/15 at 16:04:40 (UTC)	117.574138 W	33.404473 N	11S	3696276.65	446612.405
Keoni Calantas	4	1/23/2015	7:21:08 AM	Inactive	Inactive	16	none		33 24.2695 N 117 34.4479 W::1/23/15 at 15:19:59 (UTC)	117.574132 W	33.404492 N	11S	3696276.65	446612.405
Donna Germann	1	12/19/2014	8:23:49 AM	Inactive	Inactive	160	none	TWO BURROW IN DEAD THISTLE	33 24.1384 N 117 34.4033 W::12/19/14 at 16:23:34 (UTC)	117.573630 W	33.402333 N	11S	3696038.75	446658.055
James McMorran	2	12/29/2014	8:36:27 AM	Inactive	Inactive	160	none		33 24.1407 N 117 34.4178 W::12/29/14 at 16:32:45 (UTC)	117.573630 W	33.402345 N	11S	3696038.75	446658.055
James McMorran	3	1/9/2015	8:23:50 AM	Inactive	Inactive	160	none		33 24.1446 N 117 34.4160 W::1/9/15 at 16:18:23 (UTC)	117.573600 W	33.402410 N	11S	3696051.55	446663.8
Donna Germann	4	1/23/2015	8:03:27 AM	Inactive	Inactive	160	none		33 24.1500 N 117 34.4123 W::1/23/15 at 16:01:15 (UTC)	117.573538 W	33.402500 N	11S	3696051.55	446663.8
Donna Germann	1	12/19/2014	8:33:10 AM	Inactive	Inactive	161	none		33 24.2690 N 117 34.5209 W::12/19/14 at 16:32:58 (UTC)	117.575348 W	33.404483 N	11S	3696281.7	446501.54
Matthew Kedziora	2	12/29/2014	8:46:17 AM	Inactive	Inactive	161	none		33 24.2737 N 117 34.5184 W::12/29/14 at 16:45:22 (UTC)	117.575307 W	33.404562 N	11S	3696281.7	446501.54
Brynne Mulrooney	3	1/9/2015	8:28:24 AM	Inactive	Inactive	161	none		33 24.2715 N 117 34.5201 W::1/9/15 at 16:28:27 (UTC)	117.575335 W	33.404525 N	11S	3696279.4	446499.76
Donna Germann	4	1/23/2015	8:20:44 AM	Inactive	Inactive	161	none		33 24.2687 N 117 34.5216 W::1/23/15 at 16:17:43 (UTC)	117.575358 W	33.404478 N	11S	3696279.4	446499.76
Donna Germann	1	12/19/2014	8:36:03 AM	Inactive	Inactive	162	none		33 24.3204 N 117 34.5700 W::12/19/14 at 16:35:56 (UTC)	117.576167 W	33.405340 N	11S	3696381.65	446425.61
Matthew Kedziora	2	12/29/2014	8:49:05 AM	Inactive	Inactive	162	none		33 24.3300 N 117 34.5680 W::12/29/14 at 16:48:09 (UTC)	117.576133 W	33.405500 N	11S	3696381.65	446425.61
Brynne Mulrooney	3	1/9/2015	8:31:11 AM	Inactive	Inactive	162	none		33 24.3346 N 117 34.5695 W::1/9/15 at 16:31:26 (UTC)	117.576158 W	33.405577 N	11S	3695997.6	446105.1633
Donna Germann	4	1/23/2015	8:23:25 AM	Inactive	Inactive	162	none		33 24.3310 N 117 34.5717 W::1/23/15 at 16:20:19 (UTC)	117.576195 W	33.405517 N	11S	3695997.6	446105.1633
Donna Germann	1	12/19/2014	8:39:12 AM	Inactive	Inactive	163	none	multiple burrow entrances	33 24.3530 N 117 34.5848 W::12/19/14 at 16:39:06 (UTC)	117.576413 W	33.405883 N	11S	3696436.45	446398.945
Matthew Kedziora	2	12/29/2014	8:52:16 AM	Inactive	Inactive	163	none		33 24.3566 N 117 34.5880 W::12/29/14 at 16:51:23 (UTC)	117.576467 W	33.405943 N	11S	3696436.45	446398.945
Brynne Mulrooney	3	1/9/2015	8:33:11 AM	Inactive	Inactive	163	none		33 24.3545 N 117 34.5907 W::1/9/15 at 16:33:16 (UTC)	117.576512 W	33.405908 N	11S	3696435.85	446393.04
Donna Germann	4	1/23/2015	8:25:12 AM	No Longer Suitable	No Longer Suitable	163	none		33 24.3544 N 117 34.5897 W::1/23/15 at 16:22:09 (UTC)	117.576495 W	33.405907 N	11S	3696435.85	446393.04
Donna Germann	1	12/19/2014	8:40:43 AM	Inactive	Inactive	164	none	multiple burrow entrances	33 24.3661 N 117 34.5813 W::12/19/14 at 16:40:33 (UTC)	117.576568 W	33.406178 N	11S	3696465	446385.475
James McMorran	2	12/29/2014	8:53:17 AM	Inactive	Inactive	164	none		33 24.3697 N 117 34.5963 W::12/29/14 at 16:49:31 (UTC)	117.576605 W	33.406162 N	11S	3696465	446385.475
Brynne Mulrooney	3	1/9/2015	8:34:08 AM	Inactive	Inactive	164	none		33 24.3663 N 117 34.5970 W::1/9/15 at 16:34:10 (UTC)	117.576617 W	33.406105 N	11S	3696462.9	446386.535
Donna Germann	4	1/23/2015	8:26:17 AM	Inactive	Inactive	164	none		33 24.3718 N 117 34.5920 W::1/23/15 at 16:23:13 (UTC)	117.576533 W	33.406197 N	11S	3696462.9	446386.535
Donna Germann	1	12/19/2014	8:41:38 AM	Inactive	Inactive	165	none	multiple burrow entrances	33 24.3836 N 117 34.6091 W::12/19/14 at 16:41:28 (UTC)	117.576818 W	33.406393 N	11S	3696486.3	446364.35
Matthew Kedziora	2	12/29/2014	8:55:06 AM	Inactive	Inactive	165	none		33 24.3798 N 117 34.6087 W::12/29/14 at 16:54:05 (UTC)	117.576812 W	33.406330 N	11S	3696486.3	446364.35
Brynne Mulrooney	3	1/9/2015	8:36:12 AM	Inactive	Inactive	165	none		33 24.3804 N 117 34.6119 W::1/9/15 at 16:36:18 (UTC)	117.576865 W	33.406340 N	11S	3696485.65	446360.16
Donna Germann	4	1/23/2015	8:28:19 AM	Inactive	Inactive	165	none		33 24.3822 N 117 34.6113 W::1/23/15 at 16:25:10 (UTC)	117.576855 W	33.406370 N	11S	3696485.65	446360.16
Donna Germann	1	12/19/2014	8:42:58 AM	Inactive	Inactive	166	none	TWO BURROWS	33 24.4070 N 117 34.6152 W::12/19/14 at 16:42:51 (UTC)	117.576920 W	33.406783 N	11S	3696533.1	446354.84
Matthew Kedziora	2	12/29/2014	10:28:32 AM	Inactive	Inactive	166	none		33 24.4070 N 117 34.6152 W::12/19/14 at 16:42:51 (UTC)	117.576920 W	33.406783 N	11S	3696533.1	446354.84
James McMorran	3	1/9/2015	8:41:57 AM	Inactive	Inactive	166	none		33 24.4086 N 117 34.6191 W::1/9/15 at 16:36:42 (UTC)	117.576985 W	33.406810 N	11S	3696538.65	446349.625
Donna Germann	4	1/23/2015	7:43:21 AM	Inactive	Inactive	166	none		33 24.4113 N 117 34.6181 W::1/23/15 at 15:40:27 (UTC)	117.576968 W	33.406855 N	11S	3696538.65	446349.625
Donna Germann	1	12/19/2014	9:06:09 AM	Inactive	Inactive	167	none		33 23.7210 N 117 35.2118 W::12/19/14 at 17:06:11 (UTC)	117.586863 W	33.395350 N	11S	3695270.7	445423.13
Brennan Mulrooney	2	12/29/2014	10:29:27 AM	Inactive	Inactive	167	none		33 23.7210 N 117 35.2118 W::12/19/14 at 17:06:11 (UTC)	117.586863 W	33.395350 N	11S	3695270.7	445423.13
James McMorran	3	1/9/2015	9:06:04 AM	Inactive	Inactive	167	none		33 23.7222 N 117 35.2115 W::1/9/15 at 17:00:34 (UTC)	117.586858 W	33.395370 N	11S	3695272.8	445425.28
Keoni Calantas	4	1/23/2015	8:52:33 AM	Inactive	Inactive	167	none		33 23.7221 N 117 35.2093 W::1/23/15 at 16:51:23 (UTC)	117.586822 W	33.395368 N	11S	3695272.8	445425.28
Donna Germann	1	12/19/2014	9:08:00 AM	Inactive	Inactive	168	none	multiple burrow entrances	33 23.6932 N 117 35.1813 W::12/19/14 at 17:07:50 (UTC)	117.586355 W	33.394888 N	11S	3695217.95	445471.47
Brennan Mulrooney	2	12/29/2014	9:26:01 AM	Inactive	Inactive	168	none		33 23.6919 N 117 35.1795 W::12/29/14 at 17:22:07 (UTC)	117.586325 W	33.394865 N	11S	3695217.95	445471.47
Andrew Fisher	3	1/9/2015	9:07:29 AM	Inactive	Inactive	168	none	multiple burrow entrances	33 23.6931 N 117 35.1809 W::1/9/15 at 17:02:46 (UTC)	117.586350 W	33.394888 N	11S	3695217.3	445470.215
Andrew Fisher	4	1/23/2015	8:59:02 AM	Inactive	Inactive	168	none		33 23.6912 N 117 35.1814 W::1/23/15 at 16:52:58 (UTC)	117.586357 W	33.394853 N	11S	3695217.3	445470.215
Donna Germann	1	12/19/2014	9:11:49 AM	Inactive	Inactive	169	none	multiple burrow entrances	33 23.6440 N 117 35.1857 W::12/19/14 at 17:11:38 (UTC)	117.586428 W	33.394067 N	11S	3695128.95	445462.925
Brennan Mulrooney	2	12/29/2014	9:29:20 AM	Inactive	Inactive	169	none		33 23.6448 N 117 35.1855 W::12/29/14 at 17:25:40 (UTC)	117.586425 W	33.394080 N	11S	3695128.95	445462.925
Brynne Mulrooney	3	1/9/2015	9:03:54 AM	Inactive	Inactive	169	none		33 23.6447 N 117 35.1874 W::1/9/15 at 17:04:07 (UTC)	117.586457 W	33.394078 N	11S	3695128.2	445465.385
Keoni Calantas	4	1/23/2015	8:55:02 AM	Inactive	Inactive	169	none		33 23.6433 N 117 35.1806 W::1/23/15 at 16:54:02 (UTC)	117.586343 W	33.394055 N	11S	3695128.2	445465.385
Andrew Fisher	1	12/19/2014	7:41:58 AM	Inactive	Inactive	17	none	multiple burrow entrances	33 24.3194 N 117 34.4891 W::12/19/14 at 15:38:42 (UTC)	117.574818 W	33.405323 N	11S	3696369.6	446549.685
Andrew Fisher	2	12/29/2014	8:17:55 AM	Inactive	Inactive	17	none	multiple burrow entrances	33 24.3187 N 117 34.4887 W::12/29/14 at 16:13:54 (UTC)	117.574812 W	33.405312 N	11S	3696369.6	446549.685
Andrew Fisher	3	1/9/2015	8:06:50 AM	Inactive	Inactive	17	none	occupied by ground squirrel	33 24.3188 N 117 34.4893 W::1/9/15 at 16:01:53 (UTC)	117.574820 W	33.405313 N	11S	3696373.25	446548.405
Keoni Calantas	4	1/23/2015	7:23:51 AM	Inactive	Inactive	17	none		33 24.3272 N 117 34.4919 W::1/23/15 at 15:22:50 (UTC)	117.574838 W	33.405388 N	11S	3696373.25	446548.405
Donna Germann	1	12/19/2014	9:19:44 AM	Inactive	Inactive	170	none	multiple burrow entrances	33 23.5414 N 117 35.1270 W::12/19/14 at 17:19:33 (UTC)	117.585452 W	33.392357 N	11S	3694939.85	445552.96
Brennan Mulrooney	2	12/29/2014	9:37:51 AM	Inactive	Inactive	170	none		33 23.5432 N 117 35.1265 W::12/29/14 at 17:34:07 (UTC)	117.585442 W	33.392387 N	11S	3694939.85	445552.96
Brynne Mulrooney	3	1/9/2015	9:08:27 AM	Inactive	Inactive	170	none		33 23.5415 N 117 35.1291 W::1/9/15 at 17:08:43 (UTC)	117.585485 W	33.392358 N	11S	3694938.25	445550.58
Donna Germann	4	1/23/2015	9:02:03 AM	Inactive	Inactive	170	none		33 23.5414 N 117 35.1276 W::1/23/15 at 16:59:00 (UTC)	117.585460 W	33.392357 N	11S	3694938.25	445550.58
Donna Germann	1	12/19/2014	9:21:24 AM	Inactive	Inactive	171	none	multiple burrow entrances	33 23.5143 N 117 35.0978 W::12/19/14 at 17:21:20 (UTC)	117.584963 W	33.391905 N	11S	3694887.25	445597.91
Brennan Mulrooney	2	12/29/2014	9:41:26 AM	Inactive	Inactive	171	none		33 23.5137 N 117 35.0975 W::12/29/14 at 17:37:35 (UTC)	117.584958 W	33.391895 N	11S	3694887.25	445597.91
James McMorran	3	1/9/2015	9:16:46 AM	Inactive	Inactive	171	none		33 23.5157 N 117 35.0995 W::1/9/15 at 17:11:37 (UTC)	117.584992 W	33.391928 N	11S	3694896.8	445595.5
Keoni Calantas	4	1/23/2015	9:02:01 AM	Inactive	Inactive	171	none		33 23.5227 N 117 35.0989 W::1/23/15 at 17:00:55 (UTC)	117.584982 W	33.392045 N	11S	3694896.8	445595.5

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Donna Germann	1	12/19/2014	9:23:36 AM	Inactive	Inactive	172	none	multiple burrow entrances	33 23.4782 N 117 35.0800 W::12/19/14 at 17:23:25 (UTC)	117.584667 W	33.391303 N	11S	3694818.9	445626.41
Matthew Kedziora	2	12/29/2014	9:42:02 AM	Inactive	Inactive	172	none		33 23.4760 N 117 35.0780 W::12/29/14 at 17:41:10 (UTC)	117.584633 W	33.391267 N	11S	3694818.9	445626.41
Brynne Mulrooney	3	1/9/2015	9:15:34 AM	Inactive	Inactive	172	none		33 23.4778 N 117 35.0803 W::1/9/15 at 17:15:47 (UTC)	117.584672 W	33.391297 N	11S	3694815.5	445594.9533
Donna Germann	4	1/23/2015	9:07:15 AM	Inactive	Inactive	172	none		33 23.4787 N 117 35.0827 W::1/23/15 at 17:04:44 (UTC)	117.584712 W	33.391312 N	11S	3694815.5	445594.9533
Donna Germann	1	12/19/2014	9:24:36 AM	Inactive	Inactive	173	none	multiple burrow entrances	33 23.4722 N 117 35.0751 W::12/19/14 at 17:24:23 (UTC)	117.584585 W	33.391205 N	11S	3694811	445631.85
Brennan Mulrooney	2	12/29/2014	9:44:05 AM	Inactive	Inactive	173	none		33 23.4734 N 117 35.0758 W::12/29/14 at 17:40:11 (UTC)	117.584597 W	33.391223 N	11S	3694811	445631.85
James McMorran	3	1/9/2015	9:20:50 AM	Inactive	Inactive	173	none		33 23.4818 N 117 35.0794 W::1/9/15 at 17:15:34 (UTC)	117.584662 W	33.391353 N	11S	3694822.8	445625.73
Donna Germann	4	1/23/2015	9:08:35 AM	Inactive	Inactive	173	none		33 23.4773 N 117 35.0792 W::1/23/15 at 17:05:30 (UTC)	117.584653 W	33.391288 N	11S	3694822.8	445625.73
Donna Germann	1	12/19/2014	9:34:23 AM	Inactive	Inactive	174	none	multiple burrow entrances	33 23.4530 N 117 35.1175 W::12/19/14 at 17:34:08 (UTC)	117.585292 W	33.390883 N	11S	3694775.55	445566.92
Brennan Mulrooney	2	12/29/2014	9:53:57 AM	Inactive	Inactive	174	none		33 23.4540 N 117 35.1169 W::12/29/14 at 17:50:05 (UTC)	117.585282 W	33.390900 N	11S	3694775.55	445566.92
James McMorran	3	1/9/2015	9:32:13 AM	Inactive	Inactive	174	none		33 23.4546 N 117 35.1171 W::1/9/15 at 17:26:56 (UTC)	117.585285 W	33.390910 N	11S	3694776.9	445566.41
Andrew Fisher	4	1/23/2015	9:49:11 AM	Inactive	Inactive	174	none		33 23.4538 N 117 35.1180 W::1/23/15 at 17:43:09 (UTC)	117.585300 W	33.390897 N	11S	3694776.9	445566.41
Donna Germann	1	12/19/2014	9:36:31 AM	Inactive	Inactive	175	none		33 23.4693 N 117 35.1291 W::12/19/14 at 17:36:14 (UTC)	117.585485 W	33.391155 N	11S	3694804.9	445549.69
Brennan Mulrooney	2	12/29/2014	9:55:05 AM	Inactive	Inactive	175	none		33 23.4693 N 117 35.1278 W::12/29/14 at 17:51:28 (UTC)	117.585463 W	33.391155 N	11S	3694804.9	445549.69
James McMorran	3	1/9/2015	9:33:13 AM	Inactive	Inactive	175	none		33 23.4728 N 117 35.1267 W::1/9/15 at 17:27:43 (UTC)	117.585445 W	33.391213 N	11S	3694808.5	445549.385
Andrew Fisher	4	1/23/2015	9:47:40 AM	Inactive	Inactive	175	none		33 23.4697 N 117 35.1306 W::1/23/15 at 17:41:39 (UTC)	117.585510 W	33.391162 N	11S	3694808.5	445549.385
Donna Germann	1	12/19/2014	9:38:12 AM	Inactive	Inactive	176	none		33 23.4826 N 117 35.1385 W::12/19/14 at 17:37:58 (UTC)	117.585642 W	33.391377 N	11S	3694829.6	445534.2
Andrew Fisher	2	12/29/2014	10:29:32 AM	Inactive	Inactive	176	none		33 23.4826 N 117 35.1385 W::12/19/14 at 17:37:58 (UTC)	117.585642 W	33.391377 N	11S	3694829.6	445534.2
Brynne Mulrooney	3	1/9/2015	9:28:45 AM	Inactive	Inactive	176	none		33 23.4849 N 117 35.1393 W::1/9/15 at 17:28:49 (UTC)	117.585655 W	33.391413 N	11S	3694833	445532.69
Andrew Fisher	4	1/23/2015	9:19:39 AM	Inactive	Inactive	176	none		33 23.4841 N 117 35.1397 W::1/23/15 at 17:13:34 (UTC)	117.585662 W	33.391402 N	11S	3694833	445532.69
Donna Germann	1	12/19/2014	9:39:11 AM	Inactive	Inactive	177	none		33 23.4965 N 117 35.1548 W::12/19/14 at 17:38:54 (UTC)	117.585913 W	33.391608 N	11S	3694857.45	445507.57
Brennan Mulrooney	2	12/29/2014	9:58:05 AM	Inactive	Inactive	177	none		33 23.4987 N 117 35.1568 W::12/29/14 at 17:54:23 (UTC)	117.585947 W	33.391645 N	11S	3694857.45	445507.57
James McMorran	3	1/9/2015	9:35:34 AM	Inactive	Inactive	177	none		33 23.4986 N 117 35.1535 W::1/9/15 at 17:30:18 (UTC)	117.585892 W	33.391643 N	11S	3694858.8	445508.325
Andrew Fisher	4	1/23/2015	9:44:58 AM	Inactive	Inactive	177	none		33 23.4981 N 117 35.1571 W::1/23/15 at 17:38:56 (UTC)	117.585952 W	33.391635 N	11S	3694858.8	445508.325
Donna Germann	1	12/19/2014	9:41:14 AM	Inactive	Inactive	178	none	multiple burrow entrances	33 23.5422 N 117 35.1944 W::12/19/14 at 17:41:00 (UTC)	117.586573 W	33.392370 N	11S	3694940.85	445447.915
Brennan Mulrooney	2	12/29/2014	10:01:39 AM	Inactive	Inactive	178	none		33 23.5429 N 117 35.1948 W::12/29/14 at 17:58:48 (UTC)	117.586580 W	33.392382 N	11S	3694940.85	445447.915
James McMorran	3	1/9/2015	9:38:46 AM	Inactive	Inactive	178	none		33 23.5431 N 117 35.1938 W::1/9/15 at 17:33:30 (UTC)	117.586563 W	33.392385 N	11S	3694939.75	445450.33
Andrew Fisher	4	1/23/2015	9:23:19 AM	Inactive	Inactive	178	none		33 23.5409 N 117 35.1923 W::1/23/15 at 17:17:25 (UTC)	117.586538 W	33.392348 N	11S	3694939.75	445450.33
Donna Germann	1	12/19/2014	9:43:45 AM	Inactive	Inactive	179	none	TWO BURROWUNDER TREE	33 23.5705 N 117 35.2177 W::12/19/14 at 17:43:48 (UTC)	117.586962 W	33.392842 N	11S	3694993.8	445411.06
Brennan Mulrooney	2	12/29/2014	10:03:01 AM	Inactive	Inactive	179	none		33 23.5717 N 117 35.2194 W::12/29/14 at 18:02:13 (UTC)	117.586990 W	33.392862 N	11S	3694993.8	445411.06
James McMorran	3	1/9/2015	9:40:22 AM	Inactive	Inactive	179	none		33 23.5741 N 117 35.2229 W::1/9/15 at 17:35:05 (UTC)	117.587048 W	33.392902 N	11S	3694997.2	445405.31
Andrew Fisher	4	1/23/2015	9:38:51 AM	Inactive	Inactive	179	none		33 23.5717 N 117 35.2217 W::1/23/15 at 17:32:46 (UTC)	117.587028 W	33.392862 N	11S	3694997.2	445405.31
Andrew Fisher	1	12/19/2014	7:43:28 AM	Inactive	Inactive	18	none	multiple burrow entrances	33 24.3637 N 117 34.5243 W::12/19/14 at 15:40:13 (UTC)	117.575405 W	33.406062 N	11S	3696453.15	446494.82
Andrew Fisher	2	12/29/2014	8:15:20 AM	Inactive	Inactive	18	none	multiple burrow entrances	33 24.3645 N 117 34.5249 W::12/29/14 at 16:11:16 (UTC)	117.575415 W	33.406075 N	11S	3696453.15	446494.82
Andrew Fisher	3	1/9/2015	8:04:11 AM	Inactive	Inactive	18	none	occupied by ground squirrel	33 24.3645 N 117 34.5268 W::1/9/15 at 15:59:17 (UTC)	117.575447 W	33.406075 N	11S	3696451.65	446493.925
Andrew Fisher	4	1/23/2015	7:31:17 AM	Inactive	Inactive	18	none		33 24.3630 N 117 34.5227 W::1/23/15 at 15:25:25 (UTC)	117.575392 W	33.406035 N	11S	3696451.65	446493.925
Donna Germann	1	12/19/2014	9:47:39 AM	Inactive	Inactive	180	none	multiple burrow entrances	33 23.6628 N 117 35.2538 W::12/19/14 at 17:47:23 (UTC)	117.587563 W	33.394380 N	11S	3695164.2	445358.96
Brennan Mulrooney	2	12/29/2014	10:09:25 AM	Inactive	Inactive	180	none		33 23.6635 N 117 35.2518 W::12/29/14 at 18:05:51 (UTC)	117.587530 W	33.394392 N	11S	3695164.2	445358.96
James McMorran	3	1/9/2015	9:44:51 AM	Inactive	Inactive	180	none		33 23.6644 N 117 35.2509 W::1/9/15 at 17:39:32 (UTC)	117.587515 W	33.394407 N	11S	3695170.95	445357.835
Andrew Fisher	4	1/23/2015	9:34:19 AM	Inactive	Inactive	180	none		33 23.6692 N 117 35.2562 W::1/23/15 at 17:28:33 (UTC)	117.587603 W	33.394487 N	11S	3695170.95	445357.835
Donna Germann	1	12/19/2014	9:56:06 AM	Inactive	Inactive	181	none		33 23.5361 N 117 35.2265 W::12/19/14 at 17:55:49 (UTC)	117.587108 W	33.392268 N	11S	3694936.6	445396.835
James McMorran	2	12/29/2014	10:19:44 AM	Inactive	Inactive	181	none		33 23.5441 N 117 35.2286 W::12/29/14 at 18:15:40 (UTC)	117.587143 W	33.392402 N	11S	3694936.6	445396.835
Andrew Fisher	3	1/9/2015	9:52:51 AM	Inactive	Inactive	181	none	occupied by ground squirrel	33 23.5391 N 117 35.2269 W::1/9/15 at 17:48:36 (UTC)	117.587115 W	33.392318 N	11S	3695589.933	445715.85
Andrew Fisher	4	1/22/2015	3:45:53 PM	Inactive	Inactive	181	none		33 24.6075 N 117 34.6187 W::1/22/15 at 23:39:56 (UTC)	117.576978 W	33.410125 N	11S	3695589.933	445715.85
Donna Germann	1	12/19/2014	9:57:19 AM	Inactive	Inactive	182	none	multiple burrow entrances	33 23.5212 N 117 35.2163 W::12/19/14 at 17:57:03 (UTC)	117.586938 W	33.392020 N	11S	3694901.4	445415.375
James McMorran	2	12/29/2014	10:20:38 AM	Inactive	Inactive	182	none		33 23.5210 N 117 35.2146 W::12/29/14 at 18:16:44 (UTC)	117.586910 W	33.392017 N	11S	3694901.4	445415.375
Andrew Fisher	3	1/9/2015	9:54:08 AM	Inactive	Inactive	182	none	multiple burrow entrances	33 23.5237 N 117 35.2166 W::1/9/15 at 17:49:19 (UTC)	117.586943 W	33.392057 N	11S	3694904	445413.855
Donna Germann	4	1/23/2015	9:38:16 AM	Inactive	Inactive	182	none		33 23.5216 N 117 35.2163 W::1/23/15 at 17:35:08 (UTC)	117.586938 W	33.392027 N	11S	3694904	445413.855
James McMorran	1	12/19/2014	6:55:07 AM	Inactive	Inactive	183	none	2 BURROWS 5 METERS APART	33 24.6070 N 117 34.6160 W::12/19/14 at 14:53:59 (UTC)	117.576933 W	33.410117 N	11S	3696906.3	446350.725
Matthew Kedziora	2	12/29/2014	6:56:02 AM	Inactive	Inactive	183	none		33 24.6108 N 117 34.6224 W::12/29/14 at 14:55:00 (UTC)	117.577040 W	33.410180 N	11S	3696906.3	446350.725
Brynne Mulrooney	3	1/9/2015	6:54:30 AM	Inactive	Inactive	183	none		33 24.6103 N 117 34.6219 W::1/9/15 at 14:55:09 (UTC)	117.577032 W	33.410172 N	11S	1848454.45	223173.255
Keoni Calantas	4	1/26/2015	2:34:57 PM	Inactive	Inactive	183	none		33 24.6103 N 117 34.6219 W::1/9/15 at 14:55:09 (UTC)	117.577032 W	33.410172 N	11S	1848454.45	223173.255
James McMorran	1	12/19/2014	7:00:09 AM	Inactive	Inactive	184	none	MULTIPLE BURROWS	33 24.5632 N 117 34.5653 W::12/19/14 at 14:58:07 (UTC)	117.576088 W	33.409387 N	11S	3696821.85	446433.395
Brennan Mulrooney	2	12/29/2014	7:03:51 AM	Inactive	Inactive	184	none		33 24.5638 N 117 34.5658 W::12/29/14 at 14:59:57 (UTC)	117.576097 W	33.409395 N	11S	3696821.85	446433.395

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Brennan Mulrooney	3	1/9/2015	7:04:39 AM	Inactive	Inactive	184	none		33 24.5651 N 117 34.5661 W::1/9/15 at 14:59:49 (UTC)	117.576102 W	33.409418 N	11S	3696824.4	446432.705
Andrew Fisher	4	1/22/2015	3:39:14 PM	Inactive	Inactive	184	none		33 24.5646 N 117 34.5659 W::1/22/15 at 23:33:16 (UTC)	117.576098 W	33.409410 N	11S	3696824.4	446432.705
James McMorran	1	12/19/2014	7:09:31 AM	Inactive	Inactive	185	none		33 24.4688 N 117 34.5089 W::12/19/14 at 15:06:57 (UTC)	117.575135 W	33.407810 N	11S	3696648.85	446521.33
Matthew Kedziora	2	12/29/2014	7:11:32 AM	Inactive	Inactive	185	none		33 24.4723 N 117 34.5085 W::12/29/14 at 15:10:34 (UTC)	117.575138 W	33.407860 N	11S	3696648.85	446521.33
Brynne Mulrooney	3	1/9/2015	7:06:27 AM	Inactive	Inactive	185	none		33 24.4695 N 117 34.5089 W::1/9/15 at 15:06:36 (UTC)	117.575148 W	33.407825 N	11S	3696647.55	446518.675
Andrew Fisher	4	1/22/2015	3:51:33 PM	Inactive	Inactive	185	none		33 24.4693 N 117 34.5109 W::1/22/15 at 23:45:43 (UTC)	117.575182 W	33.407822 N	11S	3696647.55	446518.675
James McMorran	1	12/19/2014	7:13:14 AM	Inactive	Inactive	186	none	multiple burrow entrances	33 24.4249 N 117 34.4893 W::12/19/14 at 15:10:47 (UTC)	117.574822 W	33.407082 N	11S	3696563.3	446548.475
James McMorran	2	12/29/2014	7:15:56 AM	Inactive	Inactive	186	none		33 24.4229 N 117 34.4914 W::12/29/14 at 15:12:01 (UTC)	117.574857 W	33.407048 N	11S	3696563.3	446548.475
James McMorran	3	1/9/2015	7:13:06 AM	Inactive	Inactive	186	none		33 24.4262 N 117 34.4920 W::1/9/15 at 15:07:53 (UTC)	117.574867 W	33.407103 N	11S	3696565.3	446547.555
Andrew Fisher	4	1/22/2015	4:17:47 PM	Inactive	Inactive	186	none		33 24.4238 N 117 34.4899 W::1/23/15 at 00:11:50 (UTC)	117.574832 W	33.407063 N	11S	3696565.3	446547.555
James McMorran	1	12/19/2014	7:48:22 AM	Inactive	Inactive	187	none	multiple burrow entrances	33 24.4365 N 117 34.5452 W::12/19/14 at 15:45:41 (UTC)	117.575753 W	33.407275 N	11S	3696588.6	446466.225
Brennan Mulrooney	2	12/29/2014	7:52:42 AM	Inactive	Inactive	187	none		33 24.4382 N 117 34.5419 W::12/29/14 at 15:48:53 (UTC)	117.575698 W	33.407303 N	11S	3696588.6	446466.225
Brennan Mulrooney	3	1/9/2015	7:40:40 AM	Inactive	Inactive	187	none		33 24.4377 N 117 34.5399 W::1/9/15 at 15:36:00 (UTC)	117.575657 W	33.407305 N	11S	3696591.3	446470.755
Donna Germann	4	1/23/2015	7:04:12 AM	Inactive	Inactive	187	none		33 24.4393 N 117 34.5419 W::1/23/15 at 15:01:05 (UTC)	117.575697 W	33.407322 N	11S	3696591.3	446470.755
James McMorran	1	12/19/2014	7:58:42 AM	Inactive	Inactive	188	none	multiple burrow entrances	33 24.4130 N 117 34.6221 W::12/19/14 at 15:56:05 (UTC)	117.577035 W	33.406883 N	11S	3696543.8	446347.555
James McMorran	2	12/29/2014	8:58:47 AM	Inactive	Inactive	188	none		33 24.4122 N 117 34.6179 W::12/29/14 at 16:54:52 (UTC)	117.576963 W	33.406875 N	11S	3696543.8	446347.555
James McMorran	3	1/9/2015	8:43:14 AM	Inactive	Inactive	188	none		33 24.4198 N 117 34.6198 W::1/9/15 at 16:37:44 (UTC)	117.576997 W	33.406997 N	11S	3696555.25	446346.04
Donna Germann	4	1/23/2015	7:42:54 AM	Inactive	Inactive	188	none		33 24.4180 N 117 34.6221 W::1/23/15 at 15:39:48 (UTC)	117.577035 W	33.406967 N	11S	3696555.25	446346.04
James McMorran	1	12/19/2014	7:59:46 AM	Inactive	Inactive	189	none	multiple burrow entrances	33 24.4265 N 117 34.6104 W::12/19/14 at 15:57:02 (UTC)	117.576840 W	33.407108 N	11S	3696569.9	446362.115
James McMorran	2	12/29/2014	8:07:46 AM	Inactive	Inactive	189	none		33 24.4273 N 117 34.6109 W::12/29/14 at 16:03:53 (UTC)	117.576848 W	33.407122 N	11S	3696569.9	446362.115
James McMorran	3	1/9/2015	7:59:54 AM	Inactive	Inactive	189	none		33 24.4263 N 117 34.6019 W::1/9/15 at 15:54:28 (UTC)	117.576698 W	33.407105 N	11S	3696573.6	446370.505
Keoni Calantas	4	1/23/2015	7:39:11 AM	Inactive	Inactive	189	none		33 24.4320 N 117 34.6088 W::1/23/15 at 15:38:12 (UTC)	117.576810 W	33.407193 N	11S	3696573.6	446370.505
Andrew Fisher	1	12/19/2014	7:44:23 AM	Inactive	Inactive	19	none	multiple burrow entrances	33 24.3821 N 117 34.5386 W::12/19/14 at 15:41:08 (UTC)	117.575645 W	33.406368 N	11S	3696486.15	446473.935
Andrew Fisher	2	12/29/2014	8:14:00 AM	Inactive	Inactive	19	none	multiple burrow entrances	33 24.3817 N 117 34.5377 W::12/29/14 at 16:09:56 (UTC)	117.575628 W	33.406362 N	11S	3696486.15	446473.935
Andrew Fisher	3	1/9/2015	8:03:04 AM	Inactive	Inactive	19	none	occupied by ground squirrel	33 24.3848 N 117 34.5402 W::1/9/15 at 15:58:07 (UTC)	117.575670 W	33.406413 N	11S	3696491.15	446471.175
Keoni Calantas	4	1/23/2015	7:27:14 AM	Inactive	Inactive	19	none		33 24.3844 N 117 34.5398 W::1/23/15 at 15:26:04 (UTC)	117.575663 W	33.406407 N	11S	3696491.15	446471.175
James McMorran	1	12/19/2014	8:00:25 AM	Inactive	Inactive	190	none	multiple burrow entrances	33 24.4086 N 117 34.6027 W::12/19/14 at 15:57:47 (UTC)	117.576712 W	33.406810 N	11S	3696537.75	446375.79
James McMorran	2	12/29/2014	8:09:11 AM	Inactive	Inactive	190	none		33 24.4105 N 117 34.6007 W::12/29/14 at 16:05:21 (UTC)	117.576678 W	33.406842 N	11S	3696537.75	446375.79
James McMorran	3	1/9/2015	8:00:36 AM	Inactive	Inactive	190	none		33 24.4115 N 117 34.6024 W::1/9/15 at 15:55:06 (UTC)	117.576707 W	33.406858 N	11S	3696540.75	446375.395
Keoni Calantas	4	1/23/2015	7:41:04 AM	Inactive	Inactive	190	none		33 24.4109 N 117 34.6015 W::1/23/15 at 15:40:00 (UTC)	117.576692 W	33.406848 N	11S	3696540.75	446375.395
James McMorran	1	12/19/2014	8:05:25 AM	Inactive	Inactive	191	none	2 BURROWS	33 24.3436 N 117 34.5485 W::12/19/14 at 16:02:55 (UTC)	117.575808 W	33.405727 N	11S	3696420.5	446457.44
James McMorran	2	12/29/2014	8:15:30 AM	Inactive	Inactive	191	none		33 24.3490 N 117 34.5487 W::12/29/14 at 16:11:40 (UTC)	117.575812 W	33.405817 N	11S	3696420.5	446457.44
James McMorran	3	1/9/2015	8:04:44 AM	Inactive	Inactive	191	none		33 24.3387 N 117 34.5478 W::1/9/15 at 15:59:30 (UTC)	117.575797 W	33.405645 N	11S	3696412.85	446459.77
Keoni Calantas	4	1/23/2015	7:46:35 AM	Inactive	Inactive	191	none		33 24.3457 N 117 34.5463 W::1/23/15 at 15:45:29 (UTC)	117.575772 W	33.405762 N	11S	3696412.85	446459.77
James McMorran	1	12/19/2014	8:06:24 AM	Inactive	Inactive	192	none	multiple burrow entrances	33 24.3317 N 117 34.5433 W::12/19/14 at 16:03:40 (UTC)	117.575722 W	33.405528 N	11S	3696399.45	446462.575
James McMorran	2	12/29/2014	8:16:29 AM	Inactive	Inactive	192	none		33 24.3382 N 117 34.5471 W::12/29/14 at 16:12:38 (UTC)	117.575785 W	33.405637 N	11S	3696399.45	446462.575
James McMorran	3	1/9/2015	8:05:27 AM	Inactive	Inactive	192	none		33 24.3306 N 117 34.5438 W::1/9/15 at 15:59:59 (UTC)	117.575730 W	33.405510 N	11S	3696394.45	446465.575
Keoni Calantas	4	1/23/2015	7:48:39 AM	Inactive	Inactive	192	none		33 24.3339 N 117 34.5427 W::1/23/15 at 15:47:31 (UTC)	117.575712 W	33.405565 N	11S	3696394.45	446465.575
James McMorran	1	12/19/2014	8:07:35 AM	Inactive	Inactive	193	none	multiple burrow entrances	33 24.3231 N 117 34.5311 W::12/19/14 at 16:04:58 (UTC)	117.575518 W	33.405385 N	11S	3696385.35	446480.91
James McMorran	2	12/29/2014	8:17:29 AM	Inactive	Inactive	193	none		33 24.3317 N 117 34.5356 W::12/29/14 at 16:13:35 (UTC)	117.575593 W	33.405528 N	11S	3696385.35	446480.91
James McMorran	3	1/9/2015	8:07:57 AM	No Longer Suitable	No Longer Suitable	193	none	has gotten too small to be suitable	33 24.3256 N 117 34.5326 W::1/9/15 at 16:02:59 (UTC)	117.575543 W	33.405427 N	11S	3696384.85	446483.14
Keoni Calantas	4	1/23/2015	7:49:54 AM	Inactive	Inactive	193	none		33 24.3286 N 117 34.5312 W::1/23/15 at 15:48:45 (UTC)	117.575520 W	33.405477 N	11S	3696384.85	446483.14
James McMorran	1	12/19/2014	8:08:35 AM	Inactive	Inactive	194	none		33 24.3072 N 117 34.5193 W::12/19/14 at 16:05:56 (UTC)	117.575322 W	33.405120 N	11S	3696348.3	446501.21
James McMorran	2	12/29/2014	8:18:38 AM	Inactive	Inactive	194	none		33 24.3076 N 117 34.5209 W::12/29/14 at 16:14:44 (UTC)	117.575348 W	33.405127 N	11S	3696348.3	446501.21
James McMorran	3	1/9/2015	8:09:28 AM	Inactive	Inactive	194	none		33 24.3101 N 117 34.5234 W::1/9/15 at 16:03:58 (UTC)	117.575390 W	33.405168 N	11S	3696352.65	446497.605
Keoni Calantas	4	1/23/2015	7:51:09 AM	Inactive	Inactive	194	none		33 24.3094 N 117 34.5215 W::1/23/15 at 15:50:00 (UTC)	117.575358 W	33.405157 N	11S	3696352.65	446497.605
James McMorran	1	12/19/2014	8:12:46 AM	Inactive	Inactive	195	none	multiple burrow entrances	33 24.2350 N 117 34.4513 W::12/19/14 at 16:10:09 (UTC)	117.574188 W	33.403917 N	11S	3696223.7	446607.65
Matthew Kedziora	2	12/29/2014	8:20:33 AM	Inactive	Inactive	195	none		33 24.2468 N 117 34.4504 W::12/29/14 at 16:19:36 (UTC)	117.574178 W	33.404092 N	11S	3696223.7	446607.65
Brynne Mulrooney	3	1/9/2015	8:06:24 AM	Inactive	Inactive	195	none		33 24.2353 N 117 34.4514 W::1/9/15 at 16:06:32 (UTC)	117.574190 W	33.403922 N	11S	3696214.1	446608.9
Andrew Fisher	4	1/23/2015	8:00:09 AM	Inactive	Inactive	195	none		33 24.2349 N 117 34.4487 W::1/23/15 at 15:54:22 (UTC)	117.574148 W	33.403915 N	11S	3696214.1	446608.9
James McMorran	1	12/19/2014	8:15:26 AM	Inactive	Inactive	196	none	multiple burrow entrances	33 24.1778 N 117 34.4201 W::12/19/14 at 16:12:44 (UTC)	117.573668 W	33.402963 N	11S	3696110.6	446656.545
James McMorran	2	12/29/2014	8:24:57 AM	Inactive	Inactive	196	none		33 24.1804 N 117 34.4201 W::12/29/14 at 16:21:01 (UTC)	117.573633 W	33.403012 N	11S	3696110.6	446656.545
James McMorran	3	1/9/2015	8:14:16 AM	Inactive	Inactive	196	none		33 24.1794 N 117 34.4199 W::1/9/15 at 16:09:03 (UTC)	117.573665 W	33.402990 N	11S	3696110.75	446656.965
Keoni Calantas	4	1/23/2015	7:59:01 AM	Inactive	Inactive	196	none		33 24.1792 N 117 34.4176 W::1/23/15 at 15:57:54 (UTC)	117.573627 W	33.402987 N	11S	3696110.75	446656.965

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
James McMorran	1	12/19/2014	8:17:21 AM	Inactive	Inactive	197	none		33 24.1516 N 117 34.4066 W::12/19/14 at 16:15:27 (UTC)	117.573443 W	33.402527 N	11S	3696076.5	446682.765
James McMorran	2	12/29/2014	8:26:33 AM	Inactive	Inactive	197	none		33 24.1701 N 117 34.3974 W::12/29/14 at 16:22:43 (UTC)	117.573290 W	33.402835 N	11S	3696076.5	446682.765
James McMorran	3	1/9/2015	8:16:04 AM	Inactive	Inactive	197	none		33 24.1586 N 117 34.4034 W::1/9/15 at 16:10:34 (UTC)	117.573390 W	33.402643 N	11S	3696075.85	446680.255
Keoni Calantas	4	1/23/2015	8:01:05 AM	Inactive	Inactive	197	none		33 24.1624 N 117 34.4038 W::1/23/15 at 16:00:01 (UTC)	117.573397 W	33.402707 N	11S	3696075.85	446680.255
James McMorran	1	12/19/2014	8:23:06 AM	Inactive	Inactive	198	none	multiple burrow entrances	33 24.1200 N 117 34.4164 W::12/19/14 at 16:20:33 (UTC)	117.573607 W	33.402000 N	11S	3696004.25	446662.89
Matthew Kedziora	2	12/29/2014	8:32:20 AM	Inactive	Inactive	198	none		33 24.1234 N 117 34.4127 W::12/29/14 at 16:31:25 (UTC)	117.573545 W	33.402057 N	11S	3696004.25	446662.89
Brynne Mulrooney	3	1/9/2015	8:18:11 AM	Inactive	Inactive	198	none		33 24.1220 N 117 34.4165 W::1/9/15 at 16:18:32 (UTC)	117.573608 W	33.402033 N	11S	3696007.25	446659.46
Donna Germann	4	1/23/2015	8:08:51 AM	Inactive	Inactive	198	none		33 24.1247 N 117 34.4171 W::1/23/15 at 16:05:48 (UTC)	117.573618 W	33.402077 N	11S	3696007.25	446659.46
James McMorran	1	12/19/2014	8:24:56 AM	Inactive	Inactive	199	none	multiple burrow entrances	33 24.1344 N 117 34.4249 W::12/19/14 at 16:22:18 (UTC)	117.573748 W	33.402240 N	11S	3696028	446643.905
Matthew Kedziora	2	12/29/2014	8:33:42 AM	Inactive	Inactive	199	none		33 24.1346 N 117 34.4289 W::12/29/14 at 16:32:48 (UTC)	117.573815 W	33.402243 N	11S	3696028	446643.905
Brynne Mulrooney	3	1/9/2015	8:19:30 AM	Inactive	Inactive	199	none		33 24.1384 N 117 34.4274 W::1/9/15 at 16:19:37 (UTC)	117.573790 W	33.402307 N	11S	3696031.65	446644.07
Donna Germann	4	1/23/2015	8:10:09 AM	Inactive	Inactive	199	none		33 24.1346 N 117 34.4262 W::1/23/15 at 16:07:04 (UTC)	117.573770 W	33.402242 N	11S	3696031.65	446644.07
Andrew Fisher	1	12/19/2014	6:59:39 AM	Inactive	Inactive	2	none	4 burrows in area	33 24.5907 N 117 34.5663 W::12/19/14 at 14:56:31 (UTC)	117.576098 W	33.409837 N	11S	3696871.85	446433.76
Andrew Fisher	2	12/29/2014	6:58:48 AM	Inactive	Inactive	2	none	multiple burrow entrances	33 24.5906 N 117 34.5652 W::12/29/14 at 14:54:46 (UTC)	117.576085 W	33.409847 N	11S	3696871.85	446433.76
Andrew Fisher	3	1/9/2015	7:01:50 AM	Inactive	Inactive	2	none	occupied by ground squirrel	33 24.5909 N 117 34.5659 W::1/9/15 at 14:57:03 (UTC)	117.576098 W	33.409848 N	11S	3696873.2	446430.745
Andrew Fisher	4	1/22/2015	3:06:55 PM	Inactive	Inactive	2	none		33 24.5916 N 117 34.5690 W::1/22/15 at 23:00:56 (UTC)	117.576150 W	33.409860 N	11S	3696873.2	446430.745
Andrew Fisher	1	12/19/2014	7:44:57 AM	Inactive	Inactive	20	none	multiple burrow entrances	33 24.3894 N 117 34.5377 W::12/19/14 at 15:41:44 (UTC)	117.575628 W	33.406490 N	11S	3696500	446475.78
Andrew Fisher	2	12/29/2014	8:13:13 AM	Inactive	Inactive	20	none	occupied by ground squirrel	33 24.3894 N 117 34.5364 W::12/29/14 at 16:09:08 (UTC)	117.575607 W	33.406490 N	11S	3696500	446475.78
Andrew Fisher	3	1/9/2015	8:02:19 AM	Inactive	Inactive	20	none	multiple burrow entrances	33 24.3884 N 117 34.5378 W::1/9/15 at 15:57:31 (UTC)	117.575630 W	33.406475 N	11S	3696504.15	446473.62
Keoni Calantas	4	1/23/2015	7:28:04 AM	Inactive	Inactive	20	none		33 24.3948 N 117 34.5391 W::1/23/15 at 15:27:18 (UTC)	117.575652 W	33.406580 N	11S	3696504.15	446473.62
James McMorran	1	12/19/2014	8:25:57 AM	Inactive	Inactive	200	none	multiple burrow entrances	33 24.1443 N 117 34.4294 W::12/19/14 at 16:23:19 (UTC)	117.573823 W	33.402405 N	11S	3696053.2	446635.305
Matthew Kedziora	2	12/29/2014	8:34:56 AM	Inactive	Inactive	200	none		33 24.1520 N 117 34.4355 W::12/29/14 at 16:34:07 (UTC)	117.573928 W	33.402532 N	11S	3696053.2	446635.305
Brynne Mulrooney	3	1/9/2015	8:20:27 AM	Inactive	Inactive	200	none		33 24.1540 N 117 34.4360 W::1/9/15 at 16:20:30 (UTC)	117.573933 W	33.402567 N	11S	3696061.75	446630.75
Donna Germann	4	1/23/2015	8:12:16 AM	Inactive	Inactive	200	none		33 24.1514 N 117 34.4350 W::1/23/15 at 16:09:11 (UTC)	117.573917 W	33.402523 N	11S	3696061.75	446630.75
James McMorran	1	12/19/2014	8:29:32 AM	Inactive	Inactive	201	none	multiple burrow entrances	33 24.1708 N 117 34.4733 W::12/19/14 at 16:26:57 (UTC)	117.574555 W	33.402847 N	11S	3696096.7	446571.89
Andrew Fisher	2	12/29/2014	8:41:42 AM	Inactive	Inactive	201	none	occupied by ground squirrel	33 24.1721 N 117 34.4739 W::12/29/14 at 16:37:44 (UTC)	117.574565 W	33.402868 N	11S	3696096.7	446571.89
Andrew Fisher	3	1/9/2015	8:29:00 AM	Inactive	Inactive	201	none	occupied by ground squirrel	33 24.1707 N 117 34.4742 W::1/9/15 at 16:24:10 (UTC)	117.574570 W	33.402845 N	11S	3696094.75	446571.505
Andrew Fisher	4	1/23/2015	8:18:34 AM	Inactive	Inactive	201	none		33 24.1699 N 117 34.4734 W::1/23/15 at 16:12:32 (UTC)	117.574558 W	33.402835 N	11S	3696094.75	446571.505
James McMorran	1	12/19/2014	8:30:57 AM	Inactive	Inactive	202	none	multiple burrow entrances	33 24.1938 N 117 34.4799 W::12/19/14 at 16:28:20 (UTC)	117.574665 W	33.403230 N	11S	3696133.9	446558.7
Brennan Mulrooney	2	12/29/2014	8:43:34 AM	Inactive	Inactive	202	none		33 24.1893 N 117 34.4846 W::12/29/14 at 16:39:45 (UTC)	117.574743 W	33.403155 N	11S	3696133.9	446558.7
Brennan Mulrooney	3	1/9/2015	8:29:31 AM	Inactive	Inactive	202	none		33 24.1884 N 117 34.4844 W::1/9/15 at 16:24:45 (UTC)	117.574740 W	33.403140 N	11S	3696129.5	446557.655
Keoni Calantas	4	1/23/2015	8:15:23 AM	Inactive	Inactive	202	none		33 24.1899 N 117 34.4814 W::1/23/15 at 16:14:21 (UTC)	117.574690 W	33.403165 N	11S	3696129.5	446557.655
James McMorran	1	12/19/2014	8:34:35 AM	Inactive	Inactive	203	none	multiple burrow entrances	33 24.2641 N 117 34.5210 W::12/19/14 at 16:31:59 (UTC)	117.575350 W	33.404402 N	11S	3696267.8	446499.695
Matthew Kedziora	2	12/29/2014	8:45:32 AM	Inactive	Inactive	203	none		33 24.2636 N 117 34.5206 W::12/29/14 at 16:44:32 (UTC)	117.575343 W	33.404393 N	11S	3696267.8	446499.695
Brynne Mulrooney	3	1/9/2015	8:27:33 AM	Inactive	Inactive	203	none		33 24.2639 N 117 34.5185 W::1/9/15 at 16:27:46 (UTC)	117.575307 W	33.404398 N	11S	3696265.05	446500.985
Donna Germann	4	1/23/2015	8:20:04 AM	Inactive	Inactive	203	none		33 24.2608 N 117 34.5215 W::1/23/15 at 16:17:00 (UTC)	117.575358 W	33.404347 N	11S	3696265.05	446500.985
James McMorran	1	12/19/2014	8:39:09 AM	Inactive	Inactive	204	none	multiple burrow entrances	33 24.3271 N 117 34.5857 W::12/19/14 at 16:36:32 (UTC)	117.576428 W	33.405452 N	11S	3696390.55	446402.875
Brennan Mulrooney	2	12/29/2014	8:52:11 AM	Inactive	Inactive	204	none		33 24.3328 N 117 34.5817 W::12/29/14 at 16:48:16 (UTC)	117.576362 W	33.405547 N	11S	3696390.55	446402.875
Brennan Mulrooney	3	1/9/2015	8:38:25 AM	Inactive	Inactive	204	none		33 24.3254 N 117 34.5854 W::1/9/15 at 16:33:46 (UTC)	117.576420 W	33.405420 N	11S	3696390.65	446402.64
Keoni Calantas	4	1/23/2015	8:22:11 AM	Inactive	Inactive	204	none		33 24.3348 N 117 34.5825 W::1/23/15 at 16:21:04 (UTC)	117.576375 W	33.405580 N	11S	3696390.65	446402.64
James McMorran	1	12/19/2014	8:40:52 AM	Inactive	Inactive	205	none	multiple burrow entrances	33 24.3343 N 117 34.5914 W::12/19/14 at 16:38:10 (UTC)	117.576523 W	33.405572 N	11S	3696400.95	446393.59
Brennan Mulrooney	2	12/29/2014	8:54:45 AM	Inactive	Inactive	205	none		33 24.3368 N 117 34.5881 W::12/29/14 at 16:50:50 (UTC)	117.576468 W	33.405613 N	11S	3696400.95	446393.59
Brennan Mulrooney	3	1/9/2015	8:39:35 AM	Inactive	Inactive	205	none		33 24.3381 N 117 34.5879 W::1/9/15 at 16:34:43 (UTC)	117.576467 W	33.405635 N	11S	3696405.5	446396.26
Keoni Calantas	4	1/23/2015	8:22:43 AM	Inactive	Inactive	205	none		33 24.3380 N 117 34.5880 W::1/23/15 at 16:21:35 (UTC)	117.576467 W	33.405633 N	11S	3696405.5	446396.26
James McMorran	1	12/19/2014	8:43:35 AM	Inactive	Inactive	206	none	multiple burrow entrances	33 24.3876 N 117 34.6169 W::12/19/14 at 16:40:50 (UTC)	117.576948 W	33.406460 N	11S	3696497.75	446352.555
Matthew Kedziora	2	12/29/2014	8:56:08 AM	Inactive	Inactive	206	none		33 24.3881 N 117 34.6162 W::12/29/14 at 16:55:11 (UTC)	117.576937 W	33.406468 N	11S	3696497.75	446352.555
Brynne Mulrooney	3	1/9/2015	8:37:16 AM	Inactive	Inactive	206	none		33 24.3921 N 117 34.6225 W::1/9/15 at 16:37:19 (UTC)	117.577042 W	33.406535 N	11S	3696508	446345.78
Keoni Calantas	4	1/23/2015	8:26:09 AM	Inactive	Inactive	206	none		33 24.3946 N 117 34.6194 W::1/23/15 at 16:25:00 (UTC)	117.576990 W	33.406577 N	11S	3696508	446345.78
James McMorran	1	12/19/2014	8:44:27 AM	Inactive	Inactive	207	none	multiple burrow entrances	33 24.3985 N 117 34.6203 W::12/19/14 at 16:42:02 (UTC)	117.577005 W	33.406642 N	11S	3696523.35	446347.675
Matthew Kedziora	2	12/29/2014	8:57:06 AM	Inactive	Inactive	207	none		33 24.4048 N 117 34.6193 W::12/29/14 at 16:56:11 (UTC)	117.576988 W	33.406747 N	11S	3696523.35	446347.675
Brynne Mulrooney	3	1/9/2015	8:38:39 AM	Inactive	Inactive	207	none		33 24.4038 N 117 34.6183 W::1/9/15 at 16:38:45 (UTC)	117.576972 W	33.406732 N	11S	3696527.55	446349.84
Donna Germann	4	1/23/2015	8:29:59 AM	Inactive	Inactive	207	none		33 24.4040 N 117 34.6185 W::1/23/15 at 16:26:53 (UTC)	117.576975 W	33.406733 N	11S	3696527.55	446349.84
James McMorran	1	12/19/2014	9:12:53 AM	Inactive	Inactive	208	none	multiple burrow entrances	33 23.6715 N 117 35.2056 W::12/19/14 at 17:10:16 (UTC)	117.586760 W	33.394525 N	11S	3695188.75	445433.78
Matthew Kedziora	2	12/29/2014	9:23:37 AM	Inactive	Inactive	208	none		33 23.6818 N 117 35.2036 W::12/29/14 at 17:22:38 (UTC)	117.586727 W	33.394697 N	11S	3695188.75	445433.78

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Brynne Mulrooney	3	1/9/2015	9:01:36 AM	Inactive	Inactive	208	none		33 23.6787 N 117 35.2051 W::1/9/15 at 17:01:50 (UTC)	117.586752 W	33.394645 N	11S	3695192.05	445433.1
Donna Germann	4	1/23/2015	8:54:48 AM	Inactive	Inactive	208	none		33 23.6782 N 117 35.2050 W::1/23/15 at 16:51:57 (UTC)	117.586750 W	33.394637 N	11S	3695192.05	445433.1
James McMorran	1	12/19/2014	9:25:20 AM	Inactive	Inactive	209	none	multiple burrow entrances	33 23.4882 N 117 35.0991 W::12/19/14 at 17:22:50 (UTC)	117.584985 W	33.391470 N	11S	3694838.5	445593.265
Andrew Fisher	2	12/29/2014	9:42:20 AM	Inactive	Inactive	209	none	multiple burrow entrances	33 23.4870 N 117 35.1018 W::12/29/14 at 17:38:22 (UTC)	117.585030 W	33.391450 N	11S	3694838.5	445593.265
Brennan Mulrooney	3	1/9/2015	9:17:09 AM	Inactive	Inactive	209	none		33 23.4887 N 117 35.1024 W::1/9/15 at 17:12:22 (UTC)	117.585040 W	33.391478 N	11S	3694838.5	445590.8
Donna Germann	4	1/23/2015	9:17:01 AM	Inactive	Inactive	209	none		33 23.4865 N 117 35.1017 W::1/23/15 at 17:13:54 (UTC)	117.585028 W	33.391442 N	11S	3694838.5	445590.8
Andrew Fisher	1	12/19/2014	7:45:34 AM	Inactive	Inactive	21	none	multiple burrow entrances	33 24.3960 N 117 34.5476 W::12/19/14 at 15:42:15 (UTC)	117.575793 W	33.406600 N	11S	3696511.9	446459.76
Andrew Fisher	2	12/29/2014	8:12:31 AM	Inactive	Inactive	21	none	multiple burrow entrances	33 24.3956 N 117 34.5473 W::12/29/14 at 16:08:24 (UTC)	117.575788 W	33.406593 N	11S	3696511.9	446459.76
Andrew Fisher	3	1/9/2015	8:01:38 AM	Inactive	Inactive	21	none	multiple burrow entrances	33 24.3951 N 117 34.5475 W::1/9/15 at 15:56:40 (UTC)	117.575792 W	33.406585 N	11S	3696511.8	446458.92
Keoni Calantas	4	1/23/2015	7:29:13 AM	Inactive	Inactive	21	none		33 24.3964 N 117 34.5484 W::1/23/15 at 15:28:03 (UTC)	117.575807 W	33.406607 N	11S	3696511.8	446458.92
James McMorran	1	12/19/2014	9:26:52 AM	Inactive	Inactive	210	none	multiple burrow entrances	33 23.4840 N 117 35.0945 W::12/19/14 at 17:24:14 (UTC)	117.584908 W	33.391400 N	11S	3694830.85	445600.85
Andrew Fisher	2	12/29/2014	9:43:16 AM	Inactive	Inactive	210	none	multiple burrow entrances	33 23.4830 N 117 35.0966 W::12/29/14 at 17:39:12 (UTC)	117.584943 W	33.391383 N	11S	3694830.85	445600.85
Brennan Mulrooney	3	1/9/2015	9:19:03 AM	Inactive	Inactive	210	none		33 23.4838 N 117 35.0987 W::1/9/15 at 17:14:14 (UTC)	117.584978 W	33.391398 N	11S	3694831.6	445595.55
Donna Germann	4	1/23/2015	9:16:40 AM	Inactive	Inactive	210	none		33 23.4839 N 117 35.0992 W::1/23/15 at 17:13:31 (UTC)	117.584987 W	33.391398 N	11S	3694831.6	445595.55
James McMorran	1	12/19/2014	9:41:29 AM	Inactive	Inactive	211	none	multiple burrow entrances	33 23.5133 N 117 35.1457 W::12/19/14 at 17:38:54 (UTC)	117.585762 W	33.391888 N	11S	3694885.15	445525.54
Andrew Fisher	2	12/29/2014	9:57:21 AM	Inactive	Inactive	211	none	multiple burrow entrances	33 23.5120 N 117 35.1429 W::12/29/14 at 17:53:29 (UTC)	117.585715 W	33.391867 N	11S	3694885.15	445525.54
Brennan Mulrooney	3	1/9/2015	9:35:07 AM	Inactive	Inactive	211	none		33 23.5131 N 117 35.1445 W::1/9/15 at 17:30:15 (UTC)	117.585742 W	33.391885 N	11S	3694886.7	445526.85
Keoni Calantas	4	1/23/2015	9:15:13 AM	Inactive	Inactive	211	none		33 23.5139 N 117 35.1424 W::1/23/15 at 17:14:21 (UTC)	117.585707 W	33.391898 N	11S	3694886.7	445526.85
James McMorran	1	12/19/2014	9:43:05 AM	Inactive	Inactive	212	none	multiple burrow entrances	33 23.5237 N 117 35.1514 W::12/19/14 at 17:40:26 (UTC)	117.585857 W	33.392062 N	11S	3694900.1	445518.42
Andrew Fisher	2	12/29/2014	9:59:25 AM	Inactive	Inactive	212	none	multiple burrow entrances	33 23.5177 N 117 35.1466 W::12/29/14 at 17:55:20 (UTC)	117.585775 W	33.391962 N	11S	3694900.1	445518.42
Andrew Fisher	3	1/9/2015	9:55:39 AM	Inactive	Inactive	212	none	multiple burrow entrances	33 23.5177 N 117 35.1466 W::12/29/14 at 17:55:20 (UTC)	117.585775 W	33.391962 N	11S	3694897.3	445520.68
Keoni Calantas	4	1/23/2015	9:16:25 AM	Inactive	Inactive	212	none		33 23.5207 N 117 35.1485 W::1/23/15 at 17:15:15 (UTC)	117.585808 W	33.392012 N	11S	3694897.3	445520.68
James McMorran	1	12/19/2014	9:44:15 AM	Inactive	Inactive	213	none		33 23.5380 N 117 35.1681 W::12/19/14 at 17:41:35 (UTC)	117.586128 W	33.392347 N	11S	3694937.7	445488.03
Matthew Kedziora	2	12/29/2014	9:58:27 AM	Inactive	Inactive	213	none		33 23.5423 N 117 35.1714 W::12/29/14 at 17:57:28 (UTC)	117.586162 W	33.392352 N	11S	3694937.7	445488.03
Brennan Mulrooney	3	1/9/2015	9:38:01 AM	Inactive	Inactive	213	none		33 23.5411 N 117 35.1740 W::1/9/15 at 17:33:09 (UTC)	117.586233 W	33.392353 N	11S	3694938.05	445481.71
Keoni Calantas	4	1/23/2015	9:19:03 AM	Inactive	Inactive	213	none		33 23.5411 N 117 35.1717 W::1/23/15 at 17:17:52 (UTC)	117.586193 W	33.392352 N	11S	3694938.05	445481.71
James McMorran	1	12/19/2014	9:45:07 AM	Inactive	Inactive	214	none	multiple burrow entrances	33 23.5615 N 117 35.1757 W::12/19/14 at 17:42:28 (UTC)	117.586262 W	33.392692 N	11S	3694974	445481.305
Andrew Fisher	2	12/29/2014	9:37:35 AM	Inactive	Inactive	214	none	multiple burrow entrances	33 23.5597 N 117 35.1706 W::12/29/14 at 17:33:33 (UTC)	117.586177 W	33.392662 N	11S	3694974	445481.305
Brennan Mulrooney	3	1/9/2015	9:12:15 AM	Inactive	Inactive	214	none		33 23.5598 N 117 35.1711 W::1/9/15 at 17:07:27 (UTC)	117.586185 W	33.392663 N	11S	3694971.3	445484.965
Donna Germann	4	1/23/2015	9:20:46 AM	Inactive	Inactive	214	none		33 23.5585 N 117 35.1705 W::1/23/15 at 17:17:35 (UTC)	117.586175 W	33.392642 N	11S	3694971.3	445484.965
James McMorran	1	12/19/2014	9:46:39 AM	Inactive	Inactive	215	none	multiple burrow entrances	33 23.5805 N 117 35.1886 W::12/19/14 at 17:43:52 (UTC)	117.586477 W	33.393008 N	11S	3695019.65	445450.495
Andrew Fisher	2	12/29/2014	9:35:22 AM	Inactive	Inactive	215	none	multiple burrow entrances	33 23.5899 N 117 35.1978 W::12/29/14 at 17:31:27 (UTC)	117.586630 W	33.393165 N	11S	3695019.65	445450.495
Brennan Mulrooney	3	1/9/2015	9:40:55 AM	Inactive	Inactive	215	none		33 23.5907 N 117 35.1971 W::1/9/15 at 17:36:13 (UTC)	117.586622 W	33.393182 N	11S	3695030.55	445442.89
Keoni Calantas	4	1/23/2015	9:21:53 AM	Inactive	Inactive	215	none		33 23.5913 N 117 35.1990 W::1/23/15 at 17:20:51 (UTC)	117.586650 W	33.393188 N	11S	3695030.55	445442.89
James McMorran	1	12/19/2014	9:47:17 AM	Inactive	Inactive	216	none	multiple burrow entrances	33 23.6042 N 117 35.1989 W::12/19/14 at 17:44:34 (UTC)	117.586648 W	33.393403 N	11S	3695053.35	445442.6
Andrew Fisher	2	12/29/2014	9:31:43 AM	Inactive	Inactive	216	none	multiple burrow entrances	33 23.6027 N 117 35.1980 W::12/29/14 at 17:27:51 (UTC)	117.586633 W	33.393378 N	11S	3695053.35	445442.6
Brennan Mulrooney	3	1/9/2015	9:41:55 AM	Inactive	Inactive	216	none		33 23.6034 N 117 35.2009 W::1/9/15 at 17:37:04 (UTC)	117.586682 W	33.393390 N	11S	3695054.7	445437.77
Keoni Calantas	4	1/23/2015	9:22:56 AM	Inactive	Inactive	216	none		33 23.6049 N 117 35.2022 W::1/23/15 at 17:21:56 (UTC)	117.586703 W	33.393415 N	11S	3695054.7	445437.77
James McMorran	1	12/19/2014	9:56:02 AM	Inactive	Inactive	217	none	multiple burrow entrances	33 23.5744 N 117 35.2741 W::12/19/14 at 17:53:34 (UTC)	117.587902 W	33.392907 N	11S	3695005.15	445327.555
Matthew Kedziora	2	12/29/2014	10:15:03 AM	Inactive	Inactive	217	none		33 23.5796 N 117 35.2708 W::12/29/14 at 18:14:06 (UTC)	117.587847 W	33.392993 N	11S	3695005.15	445327.555
Brynne Mulrooney	3	1/9/2015	9:44:55 AM	Inactive	Inactive	217	none		33 23.5776 N 117 35.2673 W::1/9/15 at 17:45:08 (UTC)	117.587783 W	33.392967 N	11S	3695002.55	445334.89
Donna Germann	4	1/23/2015	10:03:01 AM	Inactive	Inactive	217	none		33 23.5732 N 117 35.2685 W::1/23/15 at 17:59:51 (UTC)	117.587808 W	33.392887 N	11S	3695002.55	445334.89
James McMorran	1	12/19/2014	9:59:31 AM	Inactive	Inactive	218	none	multiple burrow entrances	33 23.5007 N 117 35.2219 W::12/19/14 at 17:56:57 (UTC)	117.587032 W	33.391678 N	11S	3694868.65	445398.17
Matthew Kedziora	2	12/29/2014	10:18:48 AM	Inactive	Inactive	218	none		33 23.5060 N 117 35.2309 W::12/29/14 at 18:17:53 (UTC)	117.587182 W	33.391767 N	11S	3694868.65	445398.17
James McMorran	3	1/9/2015	9:53:23 AM	Inactive	Inactive	218	none		33 23.5075 N 117 35.2291 W::1/9/15 at 17:47:55 (UTC)	117.587152 W	33.391792 N	11S	3694870.533	445393.87
Donna Germann	4	1/23/2015	9:58:41 AM	Inactive	Inactive	218	none		33 23.4994 N 117 35.2268 W::1/23/15 at 17:55:31 (UTC)	117.587113 W	33.391657 N	11S	3694870.533	445393.87
James McMorran	1	12/19/2014	10:00:53 AM	Inactive	Inactive	219	none		33 23.4784 N 117 35.2100 W::12/19/14 at 17:58:15 (UTC)	117.586833 W	33.391307 N	11S	3694829.8	445416.225
Matthew Kedziora	2	12/29/2014	10:20:37 AM	Inactive	Inactive	219	none		33 23.4863 N 117 35.2193 W::12/29/14 at 18:19:39 (UTC)	117.586988 W	33.391438 N	11S	3694829.8	445416.225
Brynne Mulrooney	3	1/9/2015	9:51:12 AM	Inactive	Inactive	219	none		33 23.4845 N 117 35.2118 W::1/9/15 at 17:51:18 (UTC)	117.586863 W	33.391408 N	11S	3694833.65	445420.205
Keoni Calantas	4	1/23/2015	9:56:37 AM	Inactive	Inactive	219	none		33 23.4844 N 117 35.2124 W::1/23/15 at 17:55:42 (UTC)	117.586873 W	33.391407 N	11S	3694833.65	445420.205
Andrew Fisher	1	12/19/2014	7:46:24 AM	Inactive	Inactive	22	none	multiple burrow entrances	33 24.4224 N 117 34.5627 W::12/19/14 at 15:43:09 (UTC)	117.576045 W	33.407040 N	11S	3696559.9	446436.735
Andrew Fisher	2	12/29/2014	8:09:48 AM	Inactive	Inactive	22	none	multiple burrow entrances	33 24.4210 N 117 34.5622 W::12/29/14 at 16:05:42 (UTC)	117.576037 W	33.407017 N	11S	3696559.9	446436.735
Andrew Fisher	3	1/9/2015	7:59:48 AM	Inactive	Inactive	22	none	multiple burrow entrances	33 24.4229 N 117 34.5628 W::1/9/15 at 15:54:57 (UTC)	117.576047 W	33.407048 N	11S	3696559.85	446438.215
Keoni Calantas	4	1/23/2015	7:30:28 AM	Inactive	Inactive	22	none		33 24.4205 N 117 34.5602 W::1/23/15 at 15:29:21 (UTC)	117.576003 W	33.407008 N	11S	3696559.85	446438.215

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
James McMorran	1	12/19/2014	10:02:30 AM	Inactive	Inactive	220	none	multiple burrow entrances	33 23.4727 N 117 35.1962 W::12/19/14 at 17:59:53 (UTC)	117.586603 W	33.391212 N	11S	3694813.8	445441.06
Matthew Kedziora	2	12/29/2014	10:21:38 AM	Inactive	Inactive	220	none		33 23.4749 N 117 35.2009 W::12/29/14 at 18:20:45 (UTC)	117.586682 W	33.391248 N	11S	3694813.8	445441.06
Brynne Mulrooney	3	1/9/2015	9:52:43 AM	Inactive	Inactive	220	none		33 23.4742 N 117 35.1998 W::1/9/15 at 17:52:47 (UTC)	117.586663 W	33.391237 N	11S	3694810.3	445441.97
Keoni Calantas	4	1/23/2015	9:52:23 AM	Inactive	Inactive	220	none		33 23.4696 N 117 35.1961 W::1/23/15 at 17:51:26 (UTC)	117.586602 W	33.391160 N	11S	3694810.3	445441.97
Andrew Fisher	1	12/19/2014	7:49:14 AM	Inactive	Inactive	23	none	multiple burrow entrances	33 24.5076 N 117 34.6247 W::12/19/14 at 15:45:59 (UTC)	117.577078 W	33.408460 N	11S	3696717.85	446336.76
Andrew Fisher	2	12/29/2014	8:05:55 AM	Inactive	Inactive	23	none	multiple burrow entrances	33 24.5062 N 117 34.6304 W::12/29/14 at 16:01:49 (UTC)	117.577173 W	33.408437 N	11S	3696717.85	446336.76
Andrew Fisher	3	1/9/2015	7:55:39 AM	Inactive	Inactive	23	none	occupied by ground squirrel	33 24.5061 N 117 34.6305 W::1/9/15 at 15:50:43 (UTC)	117.577175 W	33.408435 N	11S	3696718.05	446332.53
Keoni Calantas	4	1/23/2015	8:35:50 AM	Inactive	Inactive	23	none		33 24.5079 N 117 34.6300 W::1/23/15 at 16:34:48 (UTC)	117.577167 W	33.408465 N	11S	3696718.05	446332.53
Andrew Fisher	1	12/19/2014	7:50:05 AM	Inactive	Inactive	24	none		33 24.5237 N 117 34.6417 W::12/19/14 at 15:46:57 (UTC)	117.577362 W	33.408728 N	11S	3696744.9	446319.66
Andrew Fisher	2	12/29/2014	8:03:48 AM	Inactive	Inactive	24	none	multiple burrow entrances	33 24.5193 N 117 34.6356 W::12/29/14 at 16:00:03 (UTC)	117.577260 W	33.408655 N	11S	3696744.9	446319.66
Andrew Fisher	3	1/9/2015	7:54:58 AM	Inactive	Inactive	24	none	occupied by ground squirrel	33 24.5167 N 117 34.6357 W::1/9/15 at 15:50:07 (UTC)	117.577262 W	33.408612 N	11S	3696738.75	446323.81
Keoni Calantas	4	1/23/2015	8:36:53 AM	Inactive	Inactive	24	none		33 24.5196 N 117 34.6362 W::1/23/15 at 16:35:50 (UTC)	117.577270 W	33.408660 N	11S	3696738.75	446323.81
Andrew Fisher	1	12/19/2014	7:58:09 AM	Inactive	Inactive	25	none	multiple burrow entrances	33 24.4409 N 117 34.5997 W::12/19/14 at 15:54:55 (UTC)	117.576663 W	33.407358 N	11S	3696599.2	446377.53
Brennan Mulrooney	2	12/29/2014	8:08:46 AM	Inactive	Inactive	25	none		33 24.4442 N 117 34.6018 W::12/29/14 at 16:04:54 (UTC)	117.576697 W	33.407403 N	11S	3696599.2	446377.53
Brennan Mulrooney	3	1/9/2015	7:57:40 AM	Inactive	Inactive	25	none		33 24.4424 N 117 34.6020 W::1/9/15 at 15:53:01 (UTC)	117.576695 W	33.407435 N	11S	3696604.45	446374.91
Andrew Fisher	4	1/23/2015	7:39:02 AM	Inactive	Inactive	25	none		33 24.4452 N 117 34.6033 W::1/23/15 at 15:33:14 (UTC)	117.576722 W	33.407420 N	11S	3696604.45	446374.91
Andrew Fisher	1	12/19/2014	8:00:07 AM	Inactive	Inactive	26	none		33 24.4180 N 117 34.5657 W::12/19/14 at 15:56:51 (UTC)	117.576095 W	33.406967 N	11S	3696552.55	446431.995
Andrew Fisher	2	12/29/2014	8:10:18 AM	Inactive	Inactive	26	none	multiple burrow entrances	33 24.4174 N 117 34.5653 W::12/29/14 at 16:06:27 (UTC)	117.576088 W	33.406957 N	11S	3696552.55	446431.995
Andrew Fisher	3	1/9/2015	8:00:17 AM	Inactive	Inactive	26	none	multiple burrow entrances	33 24.4180 N 117 34.5664 W::1/9/15 at 15:55:22 (UTC)	117.576107 W	33.406967 N	11S	3696552.7	446431.95
Andrew Fisher	4	1/23/2015	7:35:30 AM	Inactive	Inactive	26	none		33 24.4176 N 117 34.5646 W::1/23/15 at 15:29:36 (UTC)	117.576077 W	33.406960 N	11S	3696552.7	446431.95
Andrew Fisher	1	12/19/2014	8:01:12 AM	Inactive	Inactive	27	none	multiple burrow entrances	33 24.4141 N 117 34.5767 W::12/19/14 at 15:57:55 (UTC)	117.576278 W	33.406902 N	11S	3696545.05	446414.84
Brennan Mulrooney	2	12/29/2014	8:11:05 AM	Inactive	Inactive	27	none		33 24.4131 N 117 34.5768 W::12/29/14 at 16:07:23 (UTC)	117.576273 W	33.406885 N	11S	3696545.05	446414.84
Brennan Mulrooney	3	1/9/2015	8:01:21 AM	Inactive	Inactive	27	none		33 24.4147 N 117 34.5773 W::1/9/15 at 15:56:30 (UTC)	117.576288 W	33.406912 N	11S	3696546.25	446413.36
Andrew Fisher	4	1/23/2015	7:36:34 AM	Inactive	Inactive	27	none		33 24.4138 N 117 34.5777 W::1/23/15 at 15:30:34 (UTC)	117.576295 W	33.406897 N	11S	3696546.25	446413.36
Andrew Fisher	1	12/19/2014	8:02:07 AM	Inactive	Inactive	28	none	multiple burrow entrances	33 24.3968 N 117 34.5727 W::12/19/14 at 15:58:58 (UTC)	117.576212 W	33.406613 N	11S	3696514.45	446422.67
Matthew Kedziora	2	12/29/2014	8:11:05 AM	Inactive	Inactive	28	none		33 24.3974 N 117 34.5700 W::12/29/14 at 16:10:04 (UTC)	117.576167 W	33.406623 N	11S	3696514.45	446422.67
Brynne Mulrooney	3	1/9/2015	7:57:13 AM	Inactive	Inactive	28	none		33 24.3991 N 117 34.5713 W::1/9/15 at 15:57:17 (UTC)	117.576188 W	33.406650 N	11S	3696518.45	446422.18
Andrew Fisher	4	1/23/2015	7:48:29 AM	Inactive	Inactive	28	none		33 24.3997 N 117 34.5718 W::1/23/15 at 15:42:28 (UTC)	117.576202 W	33.406658 N	11S	3696518.45	446422.18
Andrew Fisher	1	12/19/2014	8:03:18 AM	Inactive	Inactive	29	none	multiple burrow entrances	33 24.3861 N 117 34.5557 W::12/19/14 at 16:00:07 (UTC)	117.575928 W	33.406435 N	11S	3696494.2	446446.685
Brennan Mulrooney	2	12/29/2014	8:12:33 AM	Inactive	Inactive	29	none		33 24.3863 N 117 34.5559 W::12/29/14 at 16:08:38 (UTC)	117.575932 W	33.406438 N	11S	3696494.2	446446.685
Brynne Mulrooney	3	1/9/2015	7:58:09 AM	Inactive	Inactive	29	none		33 24.3860 N 117 34.5561 W::1/9/15 at 15:58:21 (UTC)	117.575935 W	33.406433 N	11S	3696494.05	446445.665
Andrew Fisher	4	1/23/2015	7:33:53 AM	Inactive	Inactive	29	none		33 24.3862 N 117 34.5568 W::1/23/15 at 15:27:57 (UTC)	117.575947 W	33.406437 N	11S	3696494.05	446445.665
Andrew Fisher	1	12/19/2014	7:01:19 AM	Inactive	Inactive	3	none	1 burrow	33 24.5708 N 117 34.5460 W::12/19/14 at 14:58:06 (UTC)	117.575767 W	33.409513 N	11S	3696834.95	446463.59
Andrew Fisher	2	12/29/2014	7:00:55 AM	Inactive	Inactive	3	none	occupied by ground squirrel	33 24.5705 N 117 34.5462 W::12/29/14 at 14:56:52 (UTC)	117.575770 W	33.409508 N	11S	3696834.95	446463.59
Andrew Fisher	3	1/9/2015	7:03:07 AM	Inactive	Inactive	3	none	occupied by ground squirrel	33 24.5701 N 117 34.5471 W::1/9/15 at 14:58:18 (UTC)	117.575785 W	33.409502 N	11S	3696835.65	446460.76
Andrew Fisher	4	1/22/2015	3:08:26 PM	Inactive	Inactive	3	none		33 24.5719 N 117 34.5488 W::1/22/15 at 23:02:29 (UTC)	117.575813 W	33.409532 N	11S	3696835.65	446460.76
Andrew Fisher	1	12/19/2014	8:03:57 AM	Inactive	Inactive	30	none	multiple burrow entrances	33 24.3833 N 117 34.5526 W::12/19/14 at 16:00:44 (UTC)	117.575877 W	33.406388 N	11S	3696487.8	446453.21
Brennan Mulrooney	2	12/29/2014	8:13:26 AM	Inactive	Inactive	30	none		33 24.3822 N 117 34.5505 W::12/29/14 at 16:09:30 (UTC)	117.575842 W	33.406370 N	11S	3696487.8	446453.21
Brennan Mulrooney	3	1/9/2015	8:03:24 AM	Inactive	Inactive	30	none		33 24.3829 N 117 34.5513 W::1/9/15 at 15:58:35 (UTC)	117.575855 W	33.406382 N	11S	3696487.9	446455.115
Andrew Fisher	4	1/23/2015	7:32:41 AM	Inactive	Inactive	30	none		33 24.3827 N 117 34.5494 W::1/23/15 at 15:27:06 (UTC)	117.575823 W	33.406378 N	11S	3696487.9	446455.115
Andrew Fisher	2	12/29/2014	6:56:21 AM	Inactive	Inactive	300	none	occupied by ground squirrel	33 24.6007 N 117 34.5771 W::12/29/14 at 14:53:14 (UTC)	117.576285 W	33.410012 N	11S	3696890.8	446415.87
Andrew Fisher	3	1/9/2015	6:59:17 AM	Inactive	Inactive	300	none	occupied by ground squirrel	33 24.6014 N 117 34.5800 W::1/9/15 at 14:54:52 (UTC)	117.576333 W	33.410023 N	11S	3696892.25	446407.84
Andrew Fisher	4	1/22/2015	3:03:41 PM	Inactive	Inactive	300	none		33 24.6016 N 117 34.5846 W::1/22/15 at 22:59:35 (UTC)	117.576410 W	33.410027 N	11S	3696892.25	446407.84
Andrew Fisher	2	12/29/2014	7:57:19 AM	Inactive	Inactive	301	none	multiple burrow entrances	33 24.5164 N 117 34.6142 W::12/29/14 at 15:53:36 (UTC)	117.576903 W	33.408605 N	11S	3696735.1	446357.55
Andrew Fisher	3	1/9/2015	7:44:32 AM	Inactive	Inactive	301	none	occupied by ground squirrel	33 24.5149 N 117 34.6136 W::1/9/15 at 15:39:36 (UTC)	117.576893 W	33.408582 N	11S	3696733.45	446358.93
Andrew Fisher	4	1/23/2015	8:39:50 AM	Inactive	Inactive	301	none		33 24.5159 N 117 34.6130 W::1/23/15 at 16:33:48 (UTC)	117.576883 W	33.408598 N	11S	3696733.45	446358.93
Andrew Fisher	2	12/29/2014	7:58:40 AM	Inactive	Inactive	302	none	multiple burrow entrances	33 24.5216 N 117 34.6254 W::12/29/14 at 15:54:45 (UTC)	117.577090 W	33.408693 N	11S	3696745	446340.21
Andrew Fisher	3	1/9/2015	7:45:34 AM	Inactive	Inactive	302	none	occupied by ground squirrel	33 24.5194 N 117 34.6250 W::1/9/15 at 15:40:40 (UTC)	117.577085 W	33.408657 N	11S	3696743.65	446340.665
Andrew Fisher	4	1/23/2015	8:41:18 AM	Inactive	Inactive	302	none		33 24.5223 N 117 34.6251 W::1/23/15 at 16:35:15 (UTC)	117.577085 W	33.408705 N	11S	3696743.65	446340.665
Andrew Fisher	2	12/29/2014	8:23:38 AM	Inactive	Inactive	303	none	multiple burrow entrances	33 24.2443 N 117 34.4199 W::12/29/14 at 16:19:39 (UTC)	117.573665 W	33.404072 N	11S	3696230.9	446655.86
Andrew Fisher	3	1/9/2015	8:13:33 AM	Inactive	Inactive	303	none	multiple burrow entrances	33 24.2439 N 117 34.4204 W::1/9/15 at 16:08:42 (UTC)	117.573673 W	33.404065 N	11S	3696229.95	446654.18
Keoni Calantas	4	1/23/2015	7:18:41 AM	Inactive	Inactive	303	none		33 24.2438 N 117 34.4216 W::1/23/15 at 15:17:33 (UTC)	117.573693 W	33.404062 N	11S	3696229.95	446654.18
Andrew Fisher	2	12/29/2014	8:25:14 AM	Inactive	Inactive	304	none	multiple burrow entrances	33 24.2141 N 117 34.4016 W::12/29/14 at 16:21:19 (UTC)	117.573360 W	33.403568 N	11S	3696174.8	446683.91
Andrew Fisher	3	1/9/2015	8:14:57 AM	Inactive	Inactive	304	none	occupied by ground squirrel	33 24.2181 N 117 34.4033 W::1/9/15 at 16:10:08 (UTC)	117.573388 W	33.403633 N	11S	3696184.55	446682.805

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Keoni Calantas	4	1/23/2015	7:17:03 AM	Inactive	Inactive	304	none		33 24.2207 N 117 34.4014 W::1/23/15 at 15:16:08 (UTC)	117.573357 W	33.403678 N	11S	3696184.55	446682.805
Andrew Fisher	2	12/29/2014	9:25:25 AM	Inactive	Inactive	305	none	multiple burrow entrances	33 23.6713 N 117 35.2091 W::12/29/14 at 17:22:07 (UTC)	117.586818 W	33.394522 N	11S	3695178.9	445426.8
Brennan Mulrooney	3	1/9/2015	9:07:03 AM	Inactive	Inactive	305	none		33 23.6736 N 117 35.2107 W::1/9/15 at 17:02:18 (UTC)	117.586845 W	33.394560 N	11S	3695182.7	445424.91
Donna Germann	4	1/23/2015	8:55:46 AM	Inactive	Inactive	305	none		33 23.6732 N 117 35.2099 W::1/23/15 at 16:52:50 (UTC)	117.586832 W	33.394553 N	11S	3695182.7	445424.91
Andrew Fisher	2	12/29/2014	8:44:56 AM	Inactive	Inactive	306	none	occupied by ground squirrel	33 24.2097 N 117 34.5036 W::12/29/14 at 16:40:58 (UTC)	117.575062 W	33.403497 N	11S	3696167.9	446525.6
Andrew Fisher	3	1/9/2015	8:31:08 AM	Inactive	Inactive	306	none	occupied by ground squirrel	33 24.2082 N 117 34.5045 W::1/9/15 at 16:26:17 (UTC)	117.575075 W	33.403470 N	11S	3696165.45	446524.61
Andrew Fisher	4	1/23/2015	8:21:31 AM	Inactive	Inactive	306	none		33 24.2088 N 117 34.5042 W::1/23/15 at 16:15:35 (UTC)	117.575070 W	33.403480 N	11S	3696165.45	446524.61
Andrew Fisher	2	12/29/2014	9:33:02 AM	Inactive	Inactive	307	none	multiple burrow entrances	33 23.5930 N 117 35.1872 W::12/29/14 at 17:29:12 (UTC)	117.586453 W	33.393217 N	11S	3695034	445459.93
Brennan Mulrooney	3	1/9/2015	9:10:51 AM	Inactive	Inactive	307	none		33 23.5946 N 117 35.1860 W::1/9/15 at 17:06:01 (UTC)	117.586433 W	33.393243 N	11S	3695035.8	445460.91
Donna Germann	4	1/23/2015	9:24:26 AM	Inactive	Inactive	307	none		33 23.5934 N 117 35.1871 W::1/23/15 at 17:21:19 (UTC)	117.586452 W	33.393223 N	11S	3695035.8	445460.91
Andrew Fisher	2	12/29/2014	9:39:13 AM	Inactive	Inactive	308	none	multiple burrow entrances	33 23.5321 N 117 35.1427 W::12/29/14 at 17:35:20 (UTC)	117.585712 W	33.392202 N	11S	3694921.1	445528.21
Brennan Mulrooney	3	1/9/2015	9:13:44 AM	Inactive	Inactive	308	none		33 23.5352 N 117 35.1417 W::1/9/15 at 17:08:55 (UTC)	117.585695 W	33.392253 N	11S	3694924.5	445530.275
Donna Germann	4	1/23/2015	9:19:08 AM	Inactive	Inactive	308	none		33 23.5328 N 117 35.1411 W::1/23/15 at 17:16:00 (UTC)	117.585685 W	33.392213 N	11S	3694924.5	445530.275
Andrew Fisher	2	12/29/2014	9:44:12 AM	Inactive	Inactive	309	none	multiple burrow entrances	33 23.4796 N 117 35.0886 W::12/29/14 at 17:40:15 (UTC)	117.584812 W	33.391327 N	11S	3694823.6	445611.36
Brennan Mulrooney	3	1/9/2015	9:19:36 AM	Inactive	Inactive	309	none		33 23.4800 N 117 35.0881 W::1/9/15 at 17:14:46 (UTC)	117.584803 W	33.391335 N	11S	3694823.4	445612.2
Donna Germann	4	1/23/2015	9:15:34 AM	Inactive	Inactive	309	none		33 23.4789 N 117 35.0882 W::1/23/15 at 17:12:26 (UTC)	117.584803 W	33.391315 N	11S	3694823.4	445612.2
Andrew Fisher	1	12/19/2014	8:07:58 AM	Inactive	Inactive	31	none	multiple burrow entrances	33 24.3281 N 117 34.5164 W::12/19/14 at 16:04:56 (UTC)	117.575273 W	33.405468 N	11S	3696390.933	446507.4633
Matthew Kedziora	2	12/29/2014	8:15:53 AM	Inactive	Inactive	31	none		33 24.3296 N 117 34.5152 W::12/29/14 at 16:14:54 (UTC)	117.575243 W	33.405498 N	11S	3696390.933	446507.4633
Brynne Mulrooney	3	1/9/2015	8:01:13 AM	Inactive	Inactive	31	none		33 24.3318 N 117 34.5178 W::1/9/15 at 16:01:16 (UTC)	117.575297 W	33.405530 N	11S	3696392.3	446505.17
Andrew Fisher	4	1/23/2015	7:51:56 AM	Inactive	Inactive	31	none		33 24.3306 N 117 34.5176 W::1/23/15 at 15:46:03 (UTC)	117.575293 W	33.405510 N	11S	3696392.3	446505.17
Andrew Fisher	2	12/29/2014	9:46:38 AM	Inactive	Inactive	310	none	multiple burrow entrances	33 23.4599 N 117 35.0768 W::12/29/14 at 17:42:41 (UTC)	117.584613 W	33.390998 N	11S	3694787	445629.67
Andrew Fisher	3	1/9/2015	9:23:25 AM	Inactive	Inactive	310	none	occupied by ground squirrel	33 23.4588 N 117 35.0753 W::1/9/15 at 17:18:34 (UTC)	117.584588 W	33.390980 N	11S	3694784.55	445631.885
Donna Germann	4	1/23/2015	9:13:56 AM	Inactive	Inactive	310	none		33 23.4583 N 117 35.0754 W::1/23/15 at 17:10:49 (UTC)	117.584590 W	33.390972 N	11S	3694784.55	445631.885
Andrew Fisher	2	12/29/2014	7:07:20 AM	Inactive	Inactive	311	none	multiple burrow entrances	33 24.5282 N 117 34.5126 W::12/29/14 at 15:03:23 (UTC)	117.575210 W	33.408803 N	11S	3696756.2	446515.09
Andrew Fisher	3	1/9/2015	7:07:03 AM	Inactive	Inactive	311	none	multiple burrow entrances	33 24.5301 N 117 34.5140 W::1/9/15 at 15:02:07 (UTC)	117.575233 W	33.408835 N	11S	3696758.85	446513.195
Andrew Fisher	4	1/22/2015	3:11:41 PM	Inactive	Inactive	311	none		33 24.5291 N 117 34.5137 W::1/22/15 at 23:05:43 (UTC)	117.575228 W	33.408818 N	11S	3696758.85	446513.195
Andrew Fisher	2	12/29/2014	10:00:39 AM	Inactive	Inactive	312	none	multiple burrow entrances	33 23.5360 N 117 35.1591 W::12/29/14 at 17:56:48 (UTC)	117.585985 W	33.392267 N	11S	3694928.5	445502.86
Brennan Mulrooney	3	1/9/2015	9:37:10 AM	Inactive	Inactive	312	none		33 23.5403 N 117 35.1608 W::1/9/15 at 17:32:28 (UTC)	117.586013 W	33.392338 N	11S	3694933.65	445500.565
Keoni Calantas	4	1/23/2015	9:17:56 AM	Inactive	Inactive	312	none		33 23.5374 N 117 35.1605 W::1/23/15 at 17:17:09 (UTC)	117.586007 W	33.392290 N	11S	3694933.65	445500.565
Andrew Fisher	2	12/29/2014	10:03:05 AM	Inactive	Inactive	313	none	occupied by ground squirrel	33 23.5736 N 117 35.1843 W::12/29/14 at 17:59:10 (UTC)	117.586405 W	33.392893 N	11S	3694998.1	445464.19
Brennan Mulrooney	3	1/9/2015	9:39:44 AM	Inactive	Inactive	313	none		33 23.5751 N 117 35.1863 W::1/9/15 at 17:34:53 (UTC)	117.586438 W	33.392918 N	11S	3694999.6	445461.41
Keoni Calantas	4	1/23/2015	9:20:34 AM	Inactive	Inactive	313	none		33 23.5737 N 117 35.1859 W::1/23/15 at 17:19:30 (UTC)	117.586432 W	33.392895 N	11S	3694999.6	445461.41
Andrew Fisher	2	12/29/2014	10:09:22 AM	Inactive	Inactive	314	none	multiple burrow entrances	33 23.6772 N 117 35.2413 W::12/29/14 at 18:05:26 (UTC)	117.587355 W	33.394620 N	11S	3695190	445376.92
Brynne Mulrooney	3	1/9/2015	9:39:52 AM	Inactive	Inactive	314	none		33 23.6775 N 117 35.2430 W::1/9/15 at 17:40:02 (UTC)	117.587378 W	33.394628 N	11S	3695190.6	445373.29
Andrew Fisher	4	1/23/2015	9:29:31 AM	Inactive	Inactive	314	none		33 23.6773 N 117 35.2446 W::1/23/15 at 17:23:31 (UTC)	117.587410 W	33.394622 N	11S	3695190.6	445373.29
Andrew Fisher	2	12/29/2014	10:18:35 AM	Inactive	Inactive	315	none	multiple burrow entrances	33 23.5413 N 117 35.2613 W::12/29/14 at 18:14:46 (UTC)	117.587688 W	33.392355 N	11S	3694939.1	445344.53
Brennan Mulrooney	3	1/9/2015	9:51:57 AM	Inactive	Inactive	315	none		33 23.5477 N 117 35.2648 W::1/9/15 at 17:47:55 (UTC)	117.587745 W	33.392463 N	11S	3694951.4	445339.67
Keoni Calantas	4	1/23/2015	10:00:07 AM	Inactive	Inactive	315	none		33 23.5481 N 117 35.2642 W::1/23/15 at 17:59:00 (UTC)	117.587737 W	33.392468 N	11S	3694951.4	445339.67
Andrew Fisher	2	12/29/2014	10:19:39 AM	Inactive	Inactive	316	none	multiple burrow entrances	33 23.5337 N 117 35.2549 W::12/29/14 at 18:15:44 (UTC)	117.587582 W	33.392228 N	11S	3694925	445354.31
Brynne Mulrooney	3	1/9/2015	9:48:05 AM	Inactive	Inactive	316	none		33 23.5339 N 117 35.2563 W::1/9/15 at 17:48:09 (UTC)	117.587605 W	33.392232 N	11S	3694923.65	445353.325
Keoni Calantas	4	1/23/2015	9:59:09 AM	Inactive	Inactive	316	none		33 23.5320 N 117 35.2548 W::1/23/15 at 17:58:06 (UTC)	117.587580 W	33.392200 N	11S	3694923.65	445353.325
Andrew Fisher	2	12/29/2014	10:25:41 AM	Inactive	Inactive	317	none	multiple burrow entrances	33 23.4692 N 117 35.2021 W::12/29/14 at 18:22:09 (UTC)	117.586702 W	33.391153 N	11S	3694805.3	445435.48
Brynne Mulrooney	3	1/9/2015	9:53:49 AM	Inactive	Inactive	317	none		33 23.4689 N 117 35.2011 W::1/9/15 at 17:53:53 (UTC)	117.586685 W	33.391148 N	11S	3694805	445436.455
Andrew Fisher	4	1/23/2015	9:59:41 AM	Inactive	Inactive	317	none		33 23.4691 N 117 35.2019 W::1/23/15 at 17:53:51 (UTC)	117.586698 W	33.391152 N	11S	3694805	445436.455
Andrew Fisher	2	12/29/2014	10:29:32 AM	Inactive	Inactive	318	none	multiple burrow entrances	33 23.4962 N 117 35.2590 W::12/29/14 at 18:25:40 (UTC)	117.587650 W	33.391603 N	11S	3694855.7	445347.59
Brennan Mulrooney	3	1/9/2015	10:02:34 AM	Inactive	Inactive	318	none		33 23.4964 N 117 35.2587 W::1/9/15 at 17:57:43 (UTC)	117.587645 W	33.391607 N	11S	3694855.2	445347.915
Andrew Fisher	4	1/23/2015	10:04:03 AM	Inactive	Inactive	318	none		33 23.4954 N 117 35.2589 W::1/23/15 at 17:57:58 (UTC)	117.587648 W	33.391590 N	11S	3694855.2	445347.915
Andrew Fisher	2	12/29/2014	7:27:45 AM	Inactive	Inactive	319	none	multiple burrow entrances	33 24.2914 N 117 34.3588 W::12/29/14 at 15:23:48 (UTC)	117.572647 W	33.404857 N	11S	3696317.4	446751
Brennan Mulrooney	3	1/9/2015	7:21:26 AM	Inactive	Inactive	319	none		33 24.2870 N 117 34.3563 W::1/9/15 at 15:16:49 (UTC)	117.572605 W	33.404783 N	11S	3696311.4	446754.035
Andrew Fisher	4	1/22/2015	3:21:41 PM	Inactive	Inactive	319	none		33 24.2894 N 117 34.3574 W::1/22/15 at 23:15:49 (UTC)	117.572623 W	33.404823 N	11S	3696311.4	446754.035
Andrew Fisher	1	12/19/2014	8:09:56 AM	Inactive	Inactive	32	none	multiple burrow entrances	33 24.3049 N 117 34.4852 W::12/19/14 at 16:06:39 (UTC)	117.574753 W	33.405082 N	11S	3696343.7	446554.745
Brennan Mulrooney	2	12/29/2014	8:18:59 AM	Inactive	Inactive	32	none		33 24.3052 N 117 34.4859 W::12/29/14 at 16:15:03 (UTC)	117.574765 W	33.405087 N	11S	3696343.7	446554.745
Brennan Mulrooney	3	1/9/2015	8:07:59 AM	Inactive	Inactive	32	none		33 24.3095 N 117 34.4852 W::1/9/15 at 16:03:21 (UTC)	117.574753 W	33.405158 N	11S	3696347.5	446554.305
Andrew Fisher	4	1/23/2015	7:27:49 AM	Inactive	Inactive	32	none		33 24.3048 N 117 34.4865 W::1/23/15 at 15:21:58 (UTC)	117.574775 W	33.405080 N	11S	3696347.5	446554.305

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	2	12/29/2014	7:29:51 AM	Inactive	Inactive	320	none	occupied by ground squirrel	33 24.2594 N 117 34.3162 W::12/29/14 at 15:25:50 (UTC)	117.571937 W	33.404323 N	11S	3696257.8	446816.7
Andrew Fisher	3	1/9/2015	7:21:54 AM	Inactive	Inactive	320	none	occupied by ground squirrel	33 24.2603 N 117 34.3154 W::1/9/15 at 15:17:13 (UTC)	117.571923 W	33.404338 N	11S	3696260.3	446816.06
Andrew Fisher	4	1/22/2015	3:23:23 PM	Inactive	Inactive	320	none		33 24.2611 N 117 34.3179 W::1/22/15 at 23:17:31 (UTC)	117.571965 W	33.404352 N	11S	3696260.3	446816.06
Andrew Fisher	2	12/29/2014	7:42:35 AM	Inactive	Inactive	321	none	multiple burrow entrances	33 24.2635 N 117 34.4249 W::12/29/14 at 15:38:43 (UTC)	117.573748 W	33.404392 N	11S	3696266.4	446648.34
Andrew Fisher	3	1/9/2015	7:30:30 AM	Inactive	Inactive	321	none	multiple burrow entrances	33 24.2627 N 117 34.4251 W::1/9/15 at 15:25:34 (UTC)	117.573752 W	33.404378 N	11S	3696265.7	446648.845
Donna Germann	4	1/23/2015	7:20:15 AM	Inactive	Inactive	321	none		33 24.2636 N 117 34.4240 W::1/23/15 at 15:17:10 (UTC)	117.573733 W	33.404393 N	11S	3696265.7	446648.845
Andrew Fisher	2	12/29/2014	7:48:02 AM	Inactive	Inactive	322	none	multiple burrow entrances	33 24.3627 N 117 34.4983 W::12/29/14 at 15:44:14 (UTC)	117.574972 W	33.406045 N	11S	3696450.3	446535.53
Andrew Fisher	3	1/9/2015	7:35:40 AM	Inactive	Inactive	322	none	multiple burrow entrances	33 24.3643 N 117 34.4989 W::1/9/15 at 15:30:53 (UTC)	117.574985 W	33.406072 N	11S	3696451.7	446533.54
Donna Germann	4	1/23/2015	7:28:36 AM	Inactive	Inactive	322	none		33 24.3626 N 117 34.5001 W::1/23/15 at 15:25:34 (UTC)	117.575002 W	33.406043 N	11S	3696451.7	446533.54
Andrew Fisher	2	12/29/2014	7:43:24 AM	Inactive	Inactive	323	none	multiple burrow entrances	33 24.2644 N 117 34.4299 W::12/29/14 at 15:39:29 (UTC)	117.573832 W	33.404407 N	11S	3696268.1	446640.53
Andrew Fisher	3	1/9/2015	7:31:14 AM	Inactive	Inactive	323	none	multiple burrow entrances	33 24.2645 N 117 34.4303 W::1/9/15 at 15:26:17 (UTC)	117.573838 W	33.404408 N	11S	3696269.15	446641.195
Donna Germann	4	1/23/2015	7:20:53 AM	Inactive	Inactive	323	none		33 24.2655 N 117 34.4287 W::1/23/15 at 15:17:51 (UTC)	117.573812 W	33.404425 N	11S	3696269.15	446641.195
Andrew Fisher	2	12/29/2014	7:49:17 AM	Inactive	Inactive	324	none	occupied by ground squirrel	33 24.3706 N 117 34.5087 W::12/29/14 at 15:45:24 (UTC)	117.575145 W	33.406177 N	11S	3696465	446519.52
Andrew Fisher	3	1/9/2015	7:36:31 AM	Inactive	Inactive	324	none	occupied by ground squirrel	33 24.3705 N 117 34.5099 W::1/9/15 at 15:31:36 (UTC)	117.575165 W	33.406175 N	11S	3696465.8	446518.365
Donna Germann	4	1/23/2015	7:29:24 AM	Inactive	Inactive	324	none		33 24.3715 N 117 34.5091 W::1/23/15 at 15:26:18 (UTC)	117.575150 W	33.406193 N	11S	3696465.8	446518.365
Andrew Fisher	2	12/29/2014	7:51:15 AM	Inactive	Inactive	325	none	multiple burrow entrances	33 24.4124 N 117 34.5351 W::12/29/14 at 15:47:16 (UTC)	117.575585 W	33.406873 N	11S	3696542.4	446479.04
Andrew Fisher	3	1/9/2015	7:38:58 AM	Inactive	Inactive	325	none	multiple burrow entrances	33 24.4136 N 117 34.5363 W::1/9/15 at 15:34:09 (UTC)	117.575607 W	33.406892 N	11S	3696543.45	446476.065
Donna Germann	4	1/23/2015	7:31:39 AM	Inactive	Inactive	325	none		33 24.4124 N 117 34.5376 W::1/23/15 at 15:28:42 (UTC)	117.575627 W	33.406873 N	11S	3696543.45	446476.065
Andrew Fisher	2	12/29/2014	7:53:06 AM	Inactive	Inactive	326	none	multiple burrow entrances	33 24.4344 N 117 34.5543 W::12/29/14 at 15:49:10 (UTC)	117.575905 W	33.407240 N	11S	3696583.3	446449.51
Andrew Fisher	3	1/9/2015	7:40:36 AM	Inactive	Inactive	326	none	occupied by ground squirrel	33 24.4341 N 117 34.5548 W::1/9/15 at 15:35:38 (UTC)	117.575913 W	33.407235 N	11S	3696583.25	446448.345
Donna Germann	4	1/23/2015	7:33:08 AM	Inactive	Inactive	326	none		33 24.4347 N 117 34.5553 W::1/23/15 at 15:30:00 (UTC)	117.575922 W	33.407245 N	11S	3696583.25	446448.345
Andrew Fisher	2	12/29/2014	7:52:00 AM	Inactive	Inactive	327	none	multiple burrow entrances	33 24.4184 N 117 34.5403 W::12/29/14 at 15:48:02 (UTC)	117.575672 W	33.406973 N	11S	3696553.5	446471.01
Andrew Fisher	3	1/9/2015	7:39:35 AM	Inactive	Inactive	327	none	multiple burrow entrances	33 24.4186 N 117 34.5409 W::1/9/15 at 15:34:37 (UTC)	117.575682 W	33.406977 N	11S	3696558.2	446468.245
Donna Germann	4	1/23/2015	7:32:30 AM	Inactive	Inactive	327	none		33 24.4232 N 117 34.5433 W::1/23/15 at 15:29:25 (UTC)	117.575722 W	33.407053 N	11S	3696558.2	446468.245
Brennan Mulrooney	2	12/29/2014	7:26:53 AM	Inactive	Inactive	328	none		33 24.2791 N 117 34.3455 W::12/29/14 at 15:23:14 (UTC)	117.572425 W	33.404652 N	11S	3696294.6	446771.52
Brennan Mulrooney	3	1/9/2015	7:22:39 AM	Inactive	Inactive	328	none		33 24.2820 N 117 34.3482 W::1/9/15 at 15:17:51 (UTC)	117.572470 W	33.404700 N	11S	3696300	446766.665
Andrew Fisher	4	1/22/2015	3:22:23 PM	Inactive	Inactive	328	none		33 24.2821 N 117 34.3492 W::1/22/15 at 23:16:28 (UTC)	117.572485 W	33.404702 N	11S	3696300	446766.665
Brennan Mulrooney	2	12/29/2014	8:10:16 AM	Inactive	Inactive	329	none		33 24.4277 N 117 34.5869 W::12/29/14 at 16:06:23 (UTC)	117.576448 W	33.407128 N	11S	3696571.1	446398.95
Brennan Mulrooney	3	1/9/2015	8:00:25 AM	Inactive	Inactive	329	none		33 24.4272 N 117 34.5877 W::1/9/15 at 15:55:36 (UTC)	117.576462 W	33.407120 N	11S	3696570	446398.895
Andrew Fisher	4	1/23/2015	7:37:24 AM	Inactive	Inactive	329	none		33 24.4269 N 117 34.5860 W::1/23/15 at 15:31:56 (UTC)	117.576435 W	33.407115 N	11S	3696570	446398.895
Andrew Fisher	1	12/19/2014	8:10:29 AM	Inactive	Inactive	33	none	multiple burrow entrances	33 24.2984 N 117 34.4794 W::12/19/14 at 16:07:13 (UTC)	117.574657 W	33.404973 N	11S	3696331.8	446563.8
Brennan Mulrooney	2	12/29/2014	8:19:28 AM	Inactive	Inactive	33	none		33 24.2989 N 117 34.4799 W::12/29/14 at 16:15:31 (UTC)	117.574665 W	33.404982 N	11S	3696331.8	446563.8
Brennan Mulrooney	3	1/9/2015	8:08:45 AM	Inactive	Inactive	33	none		33 24.2974 N 117 34.4794 W::1/9/15 at 16:03:53 (UTC)	117.574657 W	33.404957 N	11S	3696332.75	446561.245
Andrew Fisher	4	1/23/2015	7:26:48 AM	Inactive	Inactive	33	none		33 24.3009 N 117 34.4832 W::1/23/15 at 15:21:03 (UTC)	117.574720 W	33.405015 N	11S	3696332.75	446561.245
Brennan Mulrooney	2	12/29/2014	8:49:33 AM	Inactive	Inactive	330	none		33 24.2918 N 117 34.5561 W::12/29/14 at 16:45:49 (UTC)	117.575935 W	33.404863 N	11S	3696319.7	446445.26
Brennan Mulrooney	3	1/9/2015	8:34:26 AM	Inactive	Inactive	330	none		33 24.2922 N 117 34.5567 W::1/9/15 at 16:29:47 (UTC)	117.575945 W	33.404870 N	11S	3696345.55	446447.025
Keoni Calantas	4	1/23/2015	8:20:10 AM	Inactive	Inactive	330	none		33 24.3193 N 117 34.5534 W::1/23/15 at 16:19:07 (UTC)	117.575890 W	33.405322 N	11S	3696345.55	446447.025
Brennan Mulrooney	2	12/29/2014	10:17:25 AM	Inactive	Inactive	331	none		33 23.5721 N 117 35.2494 W::12/29/14 at 18:14:31 (UTC)	117.587490 W	33.392868 N	11S	3694995.9	445363.27
Andrew Fisher	3	1/9/2015	9:50:29 AM	Inactive	Inactive	331	none	multiple burrow entrances	33 23.5726 N 117 35.2486 W::1/9/15 at 17:45:38 (UTC)	117.587477 W	33.392877 N	11S	3694996.75	445364.435
Donna Germann	4	1/23/2015	9:34:44 AM	Inactive	Inactive	331	none		33 23.5725 N 117 35.2487 W::1/23/15 at 17:31:35 (UTC)	117.587478 W	33.392875 N	11S	3694996.75	445364.435
Matthew Kedziora	2	12/29/2014	6:58:41 AM	Inactive	Inactive	332	none		33 24.5778 N 117 34.5864 W::12/29/14 at 14:57:58 (UTC)	117.576443 W	33.409632 N	11S	3696848.7	446400.95
Brynne Mulrooney	3	1/9/2015	6:57:00 AM	Inactive	Inactive	332	none	Mammal tracks	33 24.5788 N 117 34.5900 W::1/9/15 at 14:57:36 (UTC)	117.576500 W	33.409647 N	11S	3696849.65	446396.025
Andrew Fisher	4	1/22/2015	3:47:09 PM	Inactive	Inactive	332	none		33 24.5780 N 117 34.5895 W::1/22/15 at 23:41:12 (UTC)	117.576492 W	33.409633 N	11S	3696849.65	446396.025
Matthew Kedziora	2	12/29/2014	7:04:56 AM	Inactive	Inactive	333	none		33 24.5173 N 117 34.5354 W::12/29/14 at 15:04:17 (UTC)	117.575590 W	33.408622 N	11S	3696736.3	446479.64
Brynne Mulrooney	3	1/9/2015	7:02:22 AM	Inactive	Inactive	333	none		33 24.5176 N 117 34.5372 W::1/9/15 at 15:02:36 (UTC)	117.575620 W	33.408627 N	11S	3696732.9	446476.605
Andrew Fisher	4	1/22/2015	3:49:34 PM	Inactive	Inactive	333	none		33 24.5133 N 117 34.5375 W::1/22/15 at 23:43:34 (UTC)	117.575625 W	33.408555 N	11S	3696732.9	446476.605
Matthew Kedziora	2	12/29/2014	7:17:11 AM	Inactive	Inactive	334	none		33 24.3871 N 117 34.4422 W::12/29/14 at 15:16:13 (UTC)	117.574037 W	33.406452 N	11S	3696494.9	446622.72
Brynne Mulrooney	3	1/9/2015	7:10:55 AM	Inactive	Inactive	334	none		33 24.3886 N 117 34.4443 W::1/9/15 at 15:11:09 (UTC)	117.574072 W	33.406477 N	11S	3696497.05	446619.48
Andrew Fisher	4	1/22/2015	4:00:08 PM	Inactive	Inactive	334	none		33 24.3879 N 117 34.4443 W::1/22/15 at 23:54:08 (UTC)	117.574072 W	33.406465 N	11S	3696497.05	446619.48
Matthew Kedziora	2	12/29/2014	7:37:57 AM	Inactive	Inactive	335	none		33 24.2237 N 117 34.3700 W::12/29/14 at 15:36:58 (UTC)	117.572830 W	33.403690 N	11S	3696188.1	446733.27
Brennan Mulrooney	3	1/9/2015	7:28:07 AM	Inactive	Inactive	335	none		33 24.2150 N 117 34.3734 W::1/9/15 at 15:23:30 (UTC)	117.572890 W	33.403583 N	11S	3696179.15	446731.27
Donna Germann	4	1/23/2015	7:12:41 AM	Inactive	Inactive	335	none		33 24.2181 N 117 34.3687 W::1/23/15 at 15:09:35 (UTC)	117.572812 W	33.403635 N	11S	3696179.15	446731.27
Matthew Kedziora	2	12/29/2014	7:42:46 AM	Inactive	Inactive	336	none		33 24.3299 N 117 34.4458 W::12/29/14 at 15:41:44 (UTC)	117.574097 W	33.405498 N	11S	3696389.2	446616.56
Brynne Mulrooney	3	1/9/2015	7:30:22 AM	Inactive	Inactive	336	none		33 24.3307 N 117 34.4461 W::1/9/15 at 15:30:36 (UTC)	117.574102 W	33.405512 N	11S	3696389.85	446616.05

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Keoni Calantas	4	1/23/2015	7:06:40 AM	Inactive	Inactive	336	none		33 24.3297 N 117 34.4462 W::1/23/15 at 15:05:32 (UTC)	117.574103 W	33.405495 N	11S	3696389.85	446616.05
Matthew Kedziora	2	12/29/2014	7:47:07 AM	Inactive	Inactive	337	none		33 24.4102 N 117 34.5081 W::12/29/14 at 15:46:09 (UTC)	117.575135 W	33.406837 N	11S	3696538.2	446520.86
Brynne Mulrooney	3	1/9/2015	7:34:07 AM	Inactive	Inactive	337	none		33 24.4146 N 117 34.5072 W::1/9/15 at 15:34:20 (UTC)	117.575102 W	33.406890 N	11S	3696541.8	446514.6
Keoni Calantas	4	1/23/2015	7:02:50 AM	Inactive	Inactive	337	none		33 24.4109 N 117 34.5182 W::1/23/15 at 15:01:47 (UTC)	117.575303 W	33.406848 N	11S	3696541.8	446514.6
Matthew Kedziora	2	12/29/2014	7:51:35 AM	Inactive	Inactive	338	none		33 24.4772 N 117 34.5600 W::12/29/14 at 15:50:34 (UTC)	117.576000 W	33.407953 N	11S	3696662.4	446441.11
Brynne Mulrooney	3	1/9/2015	7:37:54 AM	Inactive	Inactive	338	none		33 24.4760 N 117 34.5569 W::1/9/15 at 15:38:10 (UTC)	117.575948 W	33.407933 N	11S	3696661.6	446446.17
Keoni Calantas	4	1/23/2015	6:59:23 AM	Inactive	Inactive	338	none		33 24.4776 N 117 34.5566 W::1/23/15 at 14:58:15 (UTC)	117.575943 W	33.407960 N	11S	3696661.6	446446.17
Matthew Kedziora	2	12/29/2014	7:54:39 AM	Inactive	Inactive	339	none		33 24.5214 N 117 34.5953 W::12/29/14 at 15:53:42 (UTC)	117.576588 W	33.408690 N	11S	3696744.4	446386.89
Brynne Mulrooney	3	1/9/2015	7:43:01 AM	Inactive	Inactive	339	none		33 24.5185 N 117 34.5920 W::1/9/15 at 15:43:06 (UTC)	117.576533 W	33.408642 N	11S	3696739.55	446392.81
Keoni Calantas	4	1/23/2015	6:55:14 AM	Inactive	Inactive	339	none		33 24.5191 N 117 34.5909 W::1/23/15 at 14:54:09 (UTC)	117.576515 W	33.408652 N	11S	3696739.55	446392.81
Andrew Fisher	1	12/19/2014	8:12:01 AM	Inactive	Inactive	34	none	multiple burrow entrances	33 24.2701 N 117 34.4622 W::12/19/14 at 16:08:44 (UTC)	117.574370 W	33.404502 N	11S	3696278.8	446592.05
Brennan Mulrooney	2	12/29/2014	8:20:52 AM	Inactive	Inactive	34	none		33 24.2700 N 117 34.4604 W::12/29/14 at 16:16:59 (UTC)	117.574338 W	33.404500 N	11S	3696278.8	446592.05
Brennan Mulrooney	3	1/9/2015	8:10:11 AM	Inactive	Inactive	34	none		33 24.2693 N 117 34.4581 W::1/9/15 at 16:05:32 (UTC)	117.574302 W	33.404488 N	11S	3696277.6	446595.72
Andrew Fisher	4	1/23/2015	7:24:27 AM	Inactive	Inactive	34	none		33 24.2697 N 117 34.4597 W::1/23/15 at 15:18:38 (UTC)	117.574327 W	33.404493 N	11S	3696277.6	446595.72
Matthew Kedziora	2	12/29/2014	8:17:18 AM	Inactive	Inactive	340	none		33 24.3073 N 117 34.5031 W::12/29/14 at 16:16:20 (UTC)	117.575052 W	33.405122 N	11S	3696348	446527.53
Brynne Mulrooney	3	1/9/2015	8:02:18 AM	Inactive	Inactive	340	none		33 24.3103 N 117 34.5024 W::1/9/15 at 16:02:26 (UTC)	117.575040 W	33.405172 N	11S	3696354.5	446528.35
Andrew Fisher	4	1/23/2015	7:53:31 AM	Inactive	Inactive	340	none		33 24.3113 N 117 34.5027 W::1/23/15 at 15:47:33 (UTC)	117.575047 W	33.405190 N	11S	3696354.5	446528.35
Matthew Kedziora	2	12/29/2014	8:22:02 AM	Inactive	Inactive	341	none		33 24.2280 N 117 34.4381 W::12/29/14 at 16:21:03 (UTC)	117.573968 W	33.403800 N	11S	3696200.9	446627.52
Brynne Mulrooney	3	1/9/2015	8:07:35 AM	Inactive	Inactive	341	none		33 24.2297 N 117 34.4416 W::1/9/15 at 16:07:39 (UTC)	117.574027 W	33.403828 N	11S	3696202.45	446622.275
Andrew Fisher	4	1/23/2015	8:01:16 AM	Inactive	Inactive	341	none		33 24.2280 N 117 34.4413 W::1/23/15 at 15:55:27 (UTC)	117.574022 W	33.403800 N	11S	3696202.45	446622.275
Matthew Kedziora	2	12/29/2014	8:41:33 AM	Inactive	Inactive	342	none		33 24.2074 N 117 34.4768 W::12/29/14 at 16:40:37 (UTC)	117.574597 W	33.403477 N	11S	3696165.4	446568.83
Brynne Mulrooney	3	1/9/2015	8:24:32 AM	Inactive	Inactive	342	none		33 24.2107 N 117 34.4749 W::1/9/15 at 16:24:44 (UTC)	117.574573 W	33.403523 N	11S	3696168.1	446571.82
Donna Germann	4	1/23/2015	8:16:29 AM	Inactive	Inactive	342	none		33 24.2088 N 117 34.4734 W::1/23/15 at 16:13:25 (UTC)	117.574557 W	33.403480 N	11S	3696168.1	446571.82
Matthew Kedziora	2	12/29/2014	8:43:15 AM	Inactive	Inactive	343	none		33 24.2347 N 117 34.4967 W::12/29/14 at 16:42:20 (UTC)	117.574945 W	33.403912 N	11S	3696213.8	446536.73
Brynne Mulrooney	3	1/9/2015	8:25:53 AM	Inactive	Inactive	343	none		33 24.2305 N 117 34.4962 W::1/9/15 at 16:26:02 (UTC)	117.574937 W	33.403842 N	11S	3696204.65	446536.455
Donna Germann	4	1/23/2015	8:18:03 AM	Inactive	Inactive	343	none		33 24.2290 N 117 34.4975 W::1/23/15 at 16:15:21 (UTC)	117.574958 W	33.403817 N	11S	3696204.65	446536.455
Matthew Kedziora	2	12/29/2014	8:50:54 AM	Inactive	Inactive	344	none		33 24.3427 N 117 34.5762 W::12/29/14 at 16:50:00 (UTC)	117.576270 W	33.405712 N	11S	3696414	446414.63
Brynne Mulrooney	3	1/9/2015	8:32:19 AM	Inactive	Inactive	344	none		33 24.3474 N 117 34.5808 W::1/9/15 at 16:32:27 (UTC)	117.576348 W	33.405790 N	11S	3696422.55	446407.465
Donna Germann	4	1/23/2015	8:24:27 AM	Inactive	Inactive	344	none		33 24.3472 N 117 34.5808 W::1/23/15 at 16:21:20 (UTC)	117.576347 W	33.405787 N	11S	3696422.55	446407.465
Matthew Kedziora	2	12/29/2014	9:40:25 AM	Inactive	Inactive	345	none		33 23.4918 N 117 35.0894 W::12/29/14 at 17:39:32 (UTC)	117.584823 W	33.391530 N	11S	3694846.1	445610.47
Brynne Mulrooney	3	1/9/2015	9:12:47 AM	Inactive	Inactive	345	none		33 23.4935 N 117 35.0905 W::1/9/15 at 17:12:51 (UTC)	117.584842 W	33.391558 N	11S	3694850.45	445609.98
Donna Germann	4	1/23/2015	9:05:53 AM	No Longer Suitable	No Longer Suitable	345	none	Knee high grass. Couldnt find.	33 23.4947 N 117 35.0889 W::1/23/15 at 17:03:12 (UTC)	117.584815 W	33.391580 N	11S	3694850.45	445609.98
Matthew Kedziora	2	12/29/2014	9:49:11 AM	Inactive	Inactive	346	none		33 23.4301 N 117 35.0659 W::12/29/14 at 17:48:15 (UTC)	117.584432 W	33.390502 N	11S	3694732	445646.19
Brynne Mulrooney	3	1/9/2015	9:23:41 AM	No Longer Suitable	No Longer Suitable	346	none	Could not find burrow. No sign	33 23.4313 N 117 35.0671 W::1/9/15 at 17:24:28 (UTC)	117.584452 W	33.390522 N	11S	3694734.9	445645.84
Keoni Calantas	4	1/23/2015	9:10:51 AM	Inactive	Inactive	346	none		33 23.4320 N 117 35.0647 W::1/23/15 at 17:09:46 (UTC)	117.584420 W	33.390535 N	11S	3694734.9	445645.84
Matthew Kedziora	2	12/29/2014	10:04:05 AM	Inactive	Inactive	347	none		33 23.5780 N 117 35.2150 W::12/29/14 at 18:03:16 (UTC)	117.586917 W	33.392967 N	11S	3695006.5	445416.62
Brynne Mulrooney	3	1/9/2015	9:35:30 AM	Inactive	Inactive	347	none		33 23.5805 N 117 35.2136 W::1/9/15 at 17:35:32 (UTC)	117.586893 W	33.393008 N	11S	3695009.1	445418.4
Andrew Fisher	4	1/23/2015	9:25:40 AM	Inactive	Inactive	347	none		33 23.5783 N 117 35.2143 W::1/23/15 at 17:19:38 (UTC)	117.586903 W	33.392972 N	11S	3695009.1	445418.4
Matthew Kedziora	2	12/29/2014	10:16:27 AM	Inactive	Inactive	348	none		33 23.5537 N 117 35.2619 W::12/29/14 at 18:15:36 (UTC)	117.587698 W	33.392562 N	11S	3694962.1	445343.73
Brynne Mulrooney	3	1/9/2015	9:46:27 AM	Inactive	Inactive	348	none		33 23.5527 N 117 35.2613 W::1/9/15 at 17:46:38 (UTC)	117.587688 W	33.392545 N	11S	3694959.25	445344.46
Keoni Calantas	4	1/23/2015	10:01:16 AM	Inactive	Inactive	348	none		33 23.5517 N 117 35.2615 W::1/23/15 at 18:00:10 (UTC)	117.587692 W	33.392528 N	11S	3694959.25	445344.46
Matthew Kedziora	2	12/29/2014	10:25:46 AM	Inactive	Inactive	349	none		33 23.4958 N 117 35.2511 W::12/29/14 at 18:24:52 (UTC)	117.587518 W	33.391597 N	11S	3694855	445359.87
Brennan Mulrooney	3	1/9/2015	10:01:58 AM	Inactive	Inactive	349	none		33 23.4943 N 117 35.2507 W::1/9/15 at 17:57:07 (UTC)	117.587512 W	33.391572 N	11S	3694850.6	445361.515
Andrew Fisher	4	1/23/2015	10:03:32 AM	Inactive	Inactive	349	none		33 23.4926 N 117 35.2493 W::1/23/15 at 17:57:29 (UTC)	117.587488 W	33.391543 N	11S	3694850.6	445361.515
Andrew Fisher	1	12/19/2014	8:14:52 AM	Inactive	Inactive	35	none	multiple burrow entrances	33 24.2130 N 117 34.4153 W::12/19/14 at 16:11:47 (UTC)	117.573588 W	33.403550 N	11S	3696173.7	446660.285
Brennan Mulrooney	2	12/29/2014	8:24:18 AM	Inactive	Inactive	35	none		33 24.2138 N 117 34.4184 W::12/29/14 at 16:20:23 (UTC)	117.573640 W	33.403563 N	11S	3696173.7	446660.285
Brennan Mulrooney	3	1/9/2015	8:15:52 AM	Inactive	Inactive	35	none		33 24.2129 N 117 34.4173 W::1/9/15 at 16:11:07 (UTC)	117.573622 W	33.403548 N	11S	3696172.6	446659.26
Andrew Fisher	4	1/23/2015	7:21:42 AM	Inactive	Inactive	35	none		33 24.2127 N 117 34.4177 W::1/23/15 at 15:15:54 (UTC)	117.573628 W	33.403545 N	11S	3696172.6	446659.26
Matthew Kedziora	2	12/29/2014	10:28:32 AM	Inactive	Inactive	350	none		33 23.5122 N 117 35.2628 W::12/29/14 at 18:27:36 (UTC)	117.587713 W	33.391870 N	11S	3694885.3	445341.9
Brennan Mulrooney	3	1/9/2015	10:03:25 AM	Inactive	Inactive	350	none		33 23.5135 N 117 35.2628 W::1/9/15 at 17:58:34 (UTC)	117.587713 W	33.391892 N	11S	3694884.8	445342.645
Andrew Fisher	4	1/23/2015	10:05:12 AM	No Longer Suitable	No Longer Suitable	350	none	Weedy	33 23.5103 N 117 35.2618 W::1/23/15 at 17:59:14 (UTC)	117.587697 W	33.391838 N	11S	3694884.8	445342.645
James McMorran	2	12/29/2014	7:53:18 AM	Inactive	Inactive	351	none		33 24.4690 N 117 34.5426 W::12/29/14 at 15:49:28 (UTC)	117.575710 W	33.407817 N	11S	3696647.1	446467.99
James McMorran	3	1/9/2015	7:41:48 AM	Inactive	Inactive	351	none		33 24.4602 N 117 34.5271 W::1/9/15 at 15:36:18 (UTC)	117.575452 W	33.407670 N	11S	3696637.8	446484.49
Andrew Fisher	4	1/23/2015	7:05:02 AM	Inactive	Inactive	351	none		33 24.4670 N 117 34.5368 W::1/23/15 at 14:59:12 (UTC)	117.575612 W	33.407797 N	11S	3696637.8	446484.49

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
James McMorran	2	12/29/2014	8:45:08 AM	Inactive	Inactive	352	none		33 24.2374 N 117 34.4844 W::12/29/14 at 16:41:20 (UTC)	117.574740 W	33.403957 N	11S	3696218.7	446555.82
James McMorran	3	1/9/2015	8:30:57 AM	Inactive	Inactive	352	none		33 24.2423 N 117 34.4790 W::1/9/15 at 16:25:26 (UTC)	117.574650 W	33.404038 N	11S	3696227.35	446561.82
Donna Germann	4	1/23/2015	7:57:14 AM	Inactive	Inactive	352	none		33 24.2420 N 117 34.4821 W::1/23/15 at 15:54:12 (UTC)	117.574702 W	33.404033 N	11S	3696227.35	446561.82
James McMorran	2	12/29/2014	10:18:43 AM	Inactive	Inactive	353	none	multiple burrow entrances	33 23.5500 N 117 35.2336 W::12/29/14 at 18:14:49 (UTC)	117.587227 W	33.392500 N	11S	3694954.9	445387.5
Andrew Fisher	3	1/9/2015	9:51:29 AM	Inactive	Inactive	353	none	multiple burrow entrances	33 23.5524 N 117 35.2373 W::1/9/15 at 17:46:32 (UTC)	117.587288 W	33.392540 N	11S	3694959.95	445384.64
Donna Germann	4	1/23/2015	9:36:29 AM	Inactive	Inactive	353	none		33 23.5530 N 117 35.2337 W::1/23/15 at 17:33:22 (UTC)	117.587228 W	33.392550 N	11S	3694959.95	445384.64
James McMorran	2	12/29/2014	8:40:32 AM	Inactive	Inactive	354	none	multiple burrow entrances	33 24.1961 N 117 34.4481 W::12/29/14 at 16:36:41 (UTC)	117.574135 W	33.403268 N	11S	3696142	446611.66
James McMorran	3	1/9/2015	8:28:30 AM	Inactive	Inactive	354	none		33 24.1966 N 117 34.4496 W::1/9/15 at 16:23:01 (UTC)	117.574160 W	33.403277 N	11S	3696145.5	446609.125
Donna Germann	4	1/23/2015	8:00:59 AM	Inactive	Inactive	354	none		33 24.1993 N 117 34.4499 W::1/23/15 at 15:58:00 (UTC)	117.574165 W	33.403322 N	11S	3696145.5	446609.125
James McMorran	2	12/29/2014	8:38:26 AM	Inactive	Inactive	355	none	multiple burrow entrances	33 24.1564 N 117 34.4320 W::12/29/14 at 16:34:36 (UTC)	117.573867 W	33.402607 N	11S	3696068.6	446636.18
James McMorran	3	1/9/2015	8:26:17 AM	Inactive	Inactive	355	none		33 24.1616 N 117 34.4327 W::1/9/15 at 16:21:04 (UTC)	117.573878 W	33.402693 N	11S	3696077.3	446633.625
Donna Germann	4	1/23/2015	8:13:01 AM	Inactive	Inactive	355	none		33 24.1607 N 117 34.4347 W::1/23/15 at 16:09:53 (UTC)	117.573912 W	33.402678 N	11S	3696077.3	446633.625
James McMorran	2	12/29/2014	8:41:57 AM	Inactive	Inactive	356	none	multiple burrow entrances	33 24.2107 N 117 34.4603 W::12/29/14 at 16:38:02 (UTC)	117.574338 W	33.403512 N	11S	3696169.1	446592.93
James McMorran	3	1/9/2015	8:29:20 AM	Inactive	Inactive	356	none		33 24.2142 N 117 34.4592 W::1/9/15 at 16:24:08 (UTC)	117.574320 W	33.403570 N	11S	3696174.45	446598.26
Donna Germann	4	1/23/2015	7:59:14 AM	Inactive	Inactive	356	none		33 24.2130 N 117 34.4545 W::1/23/15 at 15:56:07 (UTC)	117.574242 W	33.403550 N	11S	3696174.45	446598.26
James McMorran	2	12/29/2014	8:11:55 AM	Inactive	Inactive	357	none		33 24.3938 N 117 34.5798 W::12/29/14 at 16:08:00 (UTC)	117.576350 W	33.406560 N	11S	3696508.1	446407.71
James McMorran	3	1/9/2015	8:01:42 AM	Inactive	Inactive	357	none		33 24.3988 N 117 34.5828 W::1/9/15 at 15:56:27 (UTC)	117.576380 W	33.406647 N	11S	3696517.15	446403.805
Keoni Calantas	4	1/23/2015	7:43:11 AM	Inactive	Inactive	357	none		33 24.3981 N 117 34.5843 W::1/23/15 at 15:42:12 (UTC)	117.576405 W	33.406635 N	11S	3696517.15	446403.805
James McMorran	2	12/29/2014	10:22:54 AM	Inactive	Inactive	358	none	multiple burrow entrances	33 23.4749 N 117 35.1755 W::12/29/14 at 18:18:59 (UTC)	117.586258 W	33.391248 N	11S	3694815.6	445476.83
Andrew Fisher	3	1/9/2015	9:57:35 AM	Inactive	Inactive	358	none	occupied by ground squirrel	33 23.4745 N 117 35.1767 W::1/9/15 at 17:52:42 (UTC)	117.586278 W	33.391242 N	11S	3694813.633	445479.7067
Donna Germann	4	1/23/2015	9:42:40 AM	Inactive	Inactive	358	none		33 23.4742 N 117 35.1672 W::1/23/15 at 17:39:34 (UTC)	117.586120 W	33.391237 N	11S	3694813.633	445479.7067
James McMorran	2	12/29/2014	7:54:53 AM	Inactive	Inactive	359	none		33 24.5018 N 117 34.5578 W::12/29/14 at 15:51:01 (UTC)	117.575963 W	33.408363 N	11S	3696707.8	446444.8
James McMorran	3	1/9/2015	7:43:19 AM	Inactive	Inactive	359	none		33 24.5009 N 117 34.5564 W::1/9/15 at 15:37:50 (UTC)	117.575940 W	33.408348 N	11S	3696705.55	446444.465
Andrew Fisher	4	1/23/2015	7:01:57 AM	Inactive	Inactive	359	none		33 24.5003 N 117 34.5596 W::1/23/15 at 14:56:06 (UTC)	117.575993 W	33.408338 N	11S	3696705.55	446444.465
Andrew Fisher	1	12/19/2014	8:16:18 AM	Inactive	Inactive	36	none	multiple burrow entrances	33 24.1930 N 117 34.3971 W::12/19/14 at 16:13:05 (UTC)	117.573285 W	33.403217 N	11S	3696135.8	446690.58
Brennan Mulrooney	2	12/29/2014	8:26:46 AM	Inactive	Inactive	36	none		33 24.1929 N 117 34.3972 W::12/29/14 at 16:22:54 (UTC)	117.573287 W	33.403215 N	11S	3696135.8	446690.58
Brennan Mulrooney	3	1/9/2015	8:17:06 AM	Inactive	Inactive	36	none		33 24.1922 N 117 34.3994 W::1/9/15 at 16:12:21 (UTC)	117.573323 W	33.403203 N	11S	3696134.75	446688.06
Andrew Fisher	4	1/23/2015	7:20:18 AM	Inactive	Inactive	36	none		33 24.1926 N 117 34.3982 W::1/23/15 at 15:14:28 (UTC)	117.573303 W	33.403210 N	11S	3696134.75	446688.06
James McMorran	2	12/29/2014	7:59:51 AM	Inactive	Inactive	360	none		33 24.5718 N 117 34.6110 W::12/29/14 at 15:55:58 (UTC)	117.576850 W	33.409530 N	11S	3696837.6	446363.04
James McMorran	3	1/9/2015	7:46:31 AM	Inactive	Inactive	360	none		33 24.5723 N 117 34.6085 W::1/9/15 at 15:41:03 (UTC)	117.576808 W	33.409538 N	11S	3696836.25	446363.5
Andrew Fisher	4	1/23/2015	6:57:29 AM	Inactive	Inactive	360	none		33 24.5698 N 117 34.6129 W::1/23/15 at 14:51:31 (UTC)	117.576882 W	33.409497 N	11S	3696836.25	446363.5
James McMorran	2	12/29/2014	8:23:04 AM	Inactive	Inactive	361	none	multiple burrow entrances	33 24.2128 N 117 34.4464 W::12/29/14 at 16:19:05 (UTC)	117.574107 W	33.403547 N	11S	3696172.9	446614.44
James McMorran	3	1/9/2015	8:12:31 AM	Inactive	Inactive	361	none		33 24.2122 N 117 34.4514 W::1/9/15 at 16:07:15 (UTC)	117.574190 W	33.403537 N	11S	3696174.35	446610.585
Keoni Calantas	4	1/23/2015	7:56:44 AM	Inactive	Inactive	361	none		33 24.2152 N 117 34.4452 W::1/23/15 at 15:55:42 (UTC)	117.574107 W	33.403583 N	11S	3696174.35	446610.585
James McMorran	2	12/29/2014	9:22:18 AM	Inactive	Inactive	362	none		33 23.7375 N 117 35.2039 W::12/29/14 at 17:18:22 (UTC)	117.586732 W	33.395625 N	11S	3695301.1	445435.48
Andrew Fisher	3	1/9/2015	9:03:49 AM	Inactive	Inactive	362	none	occupied by ground squirrel	33 23.7396 N 117 35.2013 W::1/9/15 at 16:59:06 (UTC)	117.586688 W	33.395660 N	11S	3695306.8	445438.445
Andrew Fisher	4	1/23/2015	8:55:46 AM	Inactive	Inactive	362	none		33 23.7414 N 117 35.2028 W::1/23/15 at 16:49:46 (UTC)	117.586713 W	33.395692 N	11S	3695306.8	445438.445
James McMorran	2	12/29/2014	8:01:03 AM	Inactive	Inactive	363	none	multiple burrow entrances	33 24.5893 N 117 34.6302 W::12/29/14 at 15:57:13 (UTC)	117.577170 W	33.409822 N	11S	3696870.2	446333.47
James McMorran	3	1/9/2015	7:48:24 AM	Inactive	Inactive	363	none		33 24.5940 N 117 34.6327 W::1/9/15 at 15:43:07 (UTC)	117.577212 W	33.409900 N	11S	3696877.75	446329.605
Andrew Fisher	4	1/23/2015	6:56:12 AM	Inactive	Inactive	363	none		33 24.5928 N 117 34.6327 W::1/23/15 at 14:50:12 (UTC)	117.577212 W	33.409880 N	11S	3696877.75	446329.605
Andrew Fisher	1	12/19/2014	8:19:27 AM	Inactive	Inactive	37	none	multiple burrow entrances	33 24.1489 N 117 34.3739 W::12/19/14 at 16:16:27 (UTC)	117.572905 W	33.402478 N	11S	3696055.15	446724.775
Andrew Fisher	2	12/29/2014	8:28:46 AM	Inactive	Inactive	37	none	multiple burrow entrances	33 24.1502 N 117 34.3753 W::12/29/14 at 16:24:41 (UTC)	117.572922 W	33.402503 N	11S	3696055.15	446724.775
Brynne Mulrooney	3	1/9/2015	8:12:36 AM	Inactive	Inactive	37	none		33 24.1502 N 117 34.3764 W::1/9/15 at 16:12:54 (UTC)	117.572940 W	33.402503 N	11S	3696055.75	446722.08
Andrew Fisher	4	1/23/2015	7:18:25 AM	Inactive	Inactive	37	none		33 24.1493 N 117 34.3767 W::1/23/15 at 15:12:36 (UTC)	117.572945 W	33.402488 N	11S	3696055.75	446722.08
Andrew Fisher	1	12/19/2014	8:24:24 AM	Inactive	Inactive	38	none	ground squirrel sign	33 24.1189 N 117 34.4338 W::12/19/14 at 16:21:20 (UTC)	117.573897 W	33.401982 N	11S	3695993.8	446636.885
Andrew Fisher	2	12/29/2014	8:36:12 AM	Inactive	Inactive	38	none	occupied by ground squirrel	33 24.1119 N 117 34.4287 W::12/29/14 at 16:32:17 (UTC)	117.573813 W	33.401883 N	11S	3695993.8	446636.885
Andrew Fisher	3	1/9/2015	8:23:53 AM	Inactive	Inactive	38	none	occupied by ground squirrel	33 24.1168 N 117 34.4326 W::1/9/15 at 16:19:10 (UTC)	117.573877 W	33.401947 N	11S	3695995.45	446633.92
Andrew Fisher	4	1/23/2015	8:12:01 AM	Inactive	Inactive	38	none		33 24.1169 N 117 34.4338 W::1/23/15 at 16:06:11 (UTC)	117.573897 W	33.401948 N	11S	3695995.45	446633.92
Andrew Fisher	1	12/19/2014	8:25:35 AM	Inactive	Inactive	39	none	multiple burrow entrances	33 24.1266 N 117 34.4365 W::12/19/14 at 16:22:26 (UTC)	117.573942 W	33.402112 N	11S	3696014.25	446629.135
Brennan Mulrooney	2	12/29/2014	8:36:57 AM	Inactive	Inactive	39	none		33 24.1273 N 117 34.4362 W::12/29/14 at 16:33:01 (UTC)	117.573937 W	33.402122 N	11S	3696014.25	446629.135
Andrew Fisher	3	1/9/2015	8:24:42 AM	Inactive	Inactive	39	none	occupied by ground squirrel	33 24.1270 N 117 34.4396 W::1/9/15 at 16:19:54 (UTC)	117.573995 W	33.402115 N	11S	3696015.3	446627.47
Andrew Fisher	4	1/23/2015	8:13:21 AM	Inactive	Inactive	39	none		33 24.1282 N 117 34.4352 W::1/23/15 at 16:07:23 (UTC)	117.573920 W	33.402137 N	11S	3696015.3	446627.47
Andrew Fisher	1	12/19/2014	7:02:39 AM	Inactive	Inactive	4	none	3 burrows	33 24.5545 N 117 34.5350 W::12/19/14 at 14:59:26 (UTC)	117.575583 W	33.409242 N	11S	3696804.95	446481.28
Andrew Fisher	2	12/29/2014	7:02:05 AM	Inactive	Inactive	4	none	occupied by ground squirrel	33 24.5544 N 117 34.5342 W::12/29/14 at 14:58:02 (UTC)	117.575570 W	33.409240 N	11S	3696804.95	446481.28

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	3	1/9/2015	7:04:08 AM	Inactive	Inactive	4	none	occupied by ground squirrel	33 24.5560 N 117 34.5360 W::1/9/15 at 14:59:13 (UTC)	117.575600 W	33.409267 N	11S	3696810.1	446477.17
Andrew Fisher	4	1/22/2015	3:09:12 PM	Inactive	Inactive	4	none		33 24.5585 N 117 34.5385 W::1/22/15 at 23:03:14 (UTC)	117.575642 W	33.409308 N	11S	3696810.1	446477.17
Andrew Fisher	1	12/19/2014	8:26:15 AM	Inactive	Inactive	40	none	multiple burrow entrances	33 24.1337 N 117 34.4447 W::12/19/14 at 16:23:00 (UTC)	117.574078 W	33.402228 N	11S	3696026.9	446618.235
Andrew Fisher	2	12/29/2014	8:37:23 AM	Inactive	Inactive	40	none	occupied by ground squirrel	33 24.1339 N 117 34.4422 W::12/29/14 at 16:33:31 (UTC)	117.574037 W	33.402232 N	11S	3696026.9	446618.235
Andrew Fisher	3	1/9/2015	8:25:21 AM	Inactive	Inactive	40	none	occupied by ground squirrel	33 24.1328 N 117 34.4440 W::1/9/15 at 16:20:29 (UTC)	117.574067 W	33.402213 N	11S	3696024.55	446618.92
Andrew Fisher	4	1/23/2015	8:14:12 AM	Inactive	Inactive	40	none		33 24.1323 N 117 34.4420 W::1/23/15 at 16:08:19 (UTC)	117.574033 W	33.402205 N	11S	3696024.55	446618.92
Brennan Mulrooney	3	1/9/2015	8:40:43 AM	Inactive	Inactive	400	none		33 24.3575 N 117 34.6088 W::1/9/15 at 16:35:54 (UTC)	117.576813 W	33.405957 N	11S	3696442.3	446366.665
Keoni Calantas	4	1/23/2015	8:23:54 AM	Inactive	Inactive	400	none		33 24.3583 N 117 34.6057 W::1/23/15 at 16:22:49 (UTC)	117.576762 W	33.405972 N	11S	3696442.3	446366.665
Brynne Mulrooney	3	1/9/2015	7:26:14 AM	Inactive	Inactive	401	none		33 24.2835 N 117 34.4102 W::1/9/15 at 15:27:10 (UTC)	117.573503 W	33.404725 N	11S	3696303.3	446670.995
Keoni Calantas	4	1/23/2015	7:08:37 AM	Inactive	Inactive	401	none		33 24.2836 N 117 34.4106 W::1/23/15 at 15:07:28 (UTC)	117.573510 W	33.404727 N	11S	3696303.3	446670.995
Andrew Fisher	3	1/9/2015	7:42:53 AM	Inactive	Inactive	402	none	occupied by ground squirrel	33 24.4802 N 117 34.5901 W::1/9/15 at 15:38:05 (UTC)	117.576502 W	33.408003 N	11S	3696668.95	446393.49
Donna Germann	4	1/23/2015	8:36:30 AM	Inactive	Inactive	402	none		33 24.4810 N 117 34.5914 W::1/23/15 at 16:33:22 (UTC)	117.576523 W	33.408017 N	11S	3696668.95	446393.49
Brennan Mulrooney	3	1/9/2015	8:41:28 AM	Inactive	Inactive	403	none		33 24.3695 N 117 34.6102 W::1/9/15 at 16:36:38 (UTC)	117.576837 W	33.406158 N	11S	3696465.45	446360.19
Keoni Calantas	4	1/23/2015	8:24:44 AM	Inactive	Inactive	403	none		33 24.3713 N 117 34.6128 W::1/23/15 at 16:23:34 (UTC)	117.576880 W	33.406188 N	11S	3696465.45	446360.19
Brennan Mulrooney	3	1/9/2015	9:09:00 AM	Inactive	Inactive	404	none		33 23.6354 N 117 35.2118 W::1/9/15 at 17:04:20 (UTC)	117.586863 W	33.393923 N	11S	3695108.25	445426.445
Donna Germann	4	1/23/2015	9:26:27 AM	Inactive	Inactive	404	none		33 23.6308 N 117 35.2063 W::1/23/15 at 17:23:19 (UTC)	117.586772 W	33.393847 N	11S	3695108.25	445426.445
Brennan Mulrooney	3	1/9/2015	9:15:52 AM	Inactive	Inactive	405	none		33 23.5103 N 117 35.1193 W::1/9/15 at 17:11:03 (UTC)	117.585322 W	33.391838 N	11S	3694880.5	445562.39
Donna Germann	4	1/23/2015	9:18:06 AM	Inactive	Inactive	405	none		33 23.5102 N 117 35.1217 W::1/23/15 at 17:14:56 (UTC)	117.585362 W	33.391837 N	11S	3694880.5	445562.39
Brynne Mulrooney	3	1/9/2015	7:08:16 AM	Inactive	Inactive	406	none		33 24.4516 N 117 34.4884 W::1/9/15 at 15:08:24 (UTC)	117.574805 W	33.407527 N	11S	3696613.75	446551.125
Andrew Fisher	4	1/22/2015	3:55:22 PM	Inactive	Inactive	406	none		33 24.4508 N 117 34.4894 W::1/22/15 at 23:49:27 (UTC)	117.574823 W	33.407513 N	11S	3696613.75	446551.125
Brynne Mulrooney	3	1/9/2015	7:46:33 AM	Inactive	Inactive	407	none		33 24.5750 N 117 34.6307 W::1/9/15 at 15:46:54 (UTC)	117.577178 W	33.409583 N	11S	3696850	446333.82
Keoni Calantas	4	1/23/2015	6:46:27 AM	Inactive	Inactive	407	none		33 24.5818 N 117 34.6291 W::1/23/15 at 14:50:35 (UTC)	117.577152 W	33.409697 N	11S	3696850	446333.82
Brynne Mulrooney	3	1/9/2015	7:41:31 AM	Inactive	Inactive	408	none		33 24.4971 N 117 34.5682 W::1/9/15 at 15:42:01 (UTC)	117.576137 W	33.408285 N	11S	3696699.1	446428.295
Keoni Calantas	4	1/23/2015	6:57:29 AM	Inactive	Inactive	408	none		33 24.4970 N 117 34.5686 W::1/23/15 at 14:56:20 (UTC)	117.576143 W	33.408283 N	11S	3696699.1	446428.295
James McMorran	3	1/9/2015	7:28:02 AM	Inactive	Inactive	409	none		33 24.2179 N 117 34.3438 W::1/9/15 at 15:22:41 (UTC)	117.572397 W	33.403632 N	11S	3696174.8	446774.815
Andrew Fisher	4	1/23/2015	7:16:17 AM	Inactive	Inactive	409	none		33 24.2107 N 117 34.3421 W::1/23/15 at 15:10:24 (UTC)	117.572368 W	33.403512 N	11S	3696174.8	446774.815
Andrew Fisher	1	12/19/2014	8:27:24 AM	Inactive	Inactive	41	none	ground squirrel sign	33 24.1445 N 117 34.4512 W::12/19/14 at 16:24:17 (UTC)	117.574187 W	33.402408 N	11S	3696047.05	446608.35
Andrew Fisher	2	12/29/2014	8:38:33 AM	Inactive	Inactive	41	none	occupied by ground squirrel	33 24.1449 N 117 34.4485 W::12/29/14 at 16:34:26 (UTC)	117.574143 W	33.402415 N	11S	3696047.05	446608.35
Andrew Fisher	3	1/9/2015	8:26:06 AM	Inactive	Inactive	41	none	occupied by ground squirrel	33 24.1435 N 117 34.4511 W::1/9/15 at 16:21:10 (UTC)	117.574185 W	33.402392 N	11S	3696045.05	446607.5
Andrew Fisher	4	1/23/2015	8:15:12 AM	Inactive	Inactive	41	none		33 24.1438 N 117 34.4499 W::1/23/15 at 16:09:08 (UTC)	117.574163 W	33.402395 N	11S	3696045.05	446607.5
James McMorran	3	1/9/2015	7:39:46 AM	Inactive	Inactive	410	none		33 24.4247 N 117 34.5048 W::1/9/15 at 15:34:32 (UTC)	117.575080 W	33.407078 N	11S	3696568.6	446525.77
Andrew Fisher	4	1/23/2015	7:07:11 AM	Inactive	Inactive	410	none		33 24.4287 N 117 34.5053 W::1/23/15 at 15:01:18 (UTC)	117.575088 W	33.407145 N	11S	3696568.6	446525.77
James McMorran	3	1/9/2015	7:42:28 AM	Inactive	Inactive	411	none	multiple burrow entrances	33 24.4841 N 117 34.5453 W::1/9/15 at 15:37:03 (UTC)	117.575755 W	33.408068 N	11S	3696672.9	446461.855
Andrew Fisher	4	1/23/2015	7:03:03 AM	Inactive	Inactive	411	none		33 24.4818 N 117 34.5480 W::1/23/15 at 14:57:10 (UTC)	117.575800 W	33.408030 N	11S	3696672.9	446461.855
James McMorran	3	1/9/2015	7:16:51 AM	Inactive	Inactive	412	none		33 24.3825 N 117 34.4554 W::1/9/15 at 15:11:33 (UTC)	117.574257 W	33.406375 N	11S	3696481.8	446601.215
Andrew Fisher	4	1/22/2015	4:14:53 PM	Inactive	Inactive	412	none		33 24.3775 N 117 34.4565 W::1/23/15 at 00:08:52 (UTC)	117.574278 W	33.406290 N	11S	3696481.8	446601.215
Andrew Fisher	3	1/9/2015	9:34:10 AM	Inactive	Inactive	413	none	multiple burrow entrances	33 23.4771 N 117 35.1593 W::1/9/15 at 17:29:15 (UTC)	117.585988 W	33.391285 N	11S	3694820	445500.855
Keoni Calantas	4	1/23/2015	9:41:22 AM	No Longer Suitable	No Longer Suitable	413	none		33 23.4775 N 117 35.1607 W::1/23/15 at 17:40:13 (UTC)	117.586012 W	33.391292 N	11S	3694820	445500.855
Andrew Fisher	3	1/9/2015	9:35:56 AM	Inactive	Inactive	414	none	occupied by ground squirrel	33 23.5010 N 117 35.1723 W::1/9/15 at 17:31:01 (UTC)	117.586205 W	33.391683 N	11S	3694864.2	445480.545
Andrew Fisher	4	1/23/2015	9:41:57 AM	Inactive	Inactive	414	none		33 23.5014 N 117 35.1742 W::1/23/15 at 17:36:05 (UTC)	117.586237 W	33.391690 N	11S	3694864.2	445480.545
Andrew Fisher	3	1/9/2015	9:59:28 AM	Inactive	Inactive	415	none	WHITE PIPES	33 23.4423 N 117 35.1383 W::1/9/15 at 17:54:45 (UTC)	117.585638 W	33.390705 N	11S	3694755.35	445533.975
Donna Germann	4	1/23/2015	9:44:44 AM	Inactive	Inactive	415	none		33 23.4426 N 117 35.1385 W::1/23/15 at 17:41:51 (UTC)	117.585642 W	33.390710 N	11S	3694755.35	445533.975
Andrew Fisher	3	1/9/2015	9:36:31 AM	Inactive	Inactive	416	none	multiple burrow entrances	33 23.5030 N 117 35.1805 W::1/9/15 at 17:31:35 (UTC)	117.586342 W	33.391715 N	11S	3694868.8	445469.505
Keoni Calantas	4	1/23/2015	9:39:40 AM	Inactive	Inactive	416	none		33 23.5044 N 117 35.1803 W::1/23/15 at 17:38:30 (UTC)	117.586338 W	33.391740 N	11S	3694868.8	445469.505
James McMorran	3	1/9/2015	8:27:34 AM	Inactive	Inactive	417	none	multiple burrow entrances	33 24.1818 N 117 34.4382 W::1/9/15 at 16:22:13 (UTC)	117.573970 W	33.403030 N	11S	3696118.85	446623.25
Donna Germann	4	1/23/2015	8:01:49 AM	Inactive	Inactive	417	none		33 24.1854 N 117 34.4429 W::1/23/15 at 15:58:43 (UTC)	117.574048 W	33.403090 N	11S	3696118.85	446623.25
James McMorran	3	1/9/2015	8:37:11 AM	Inactive	Inactive	418	none	multiple burrow entrances	33 24.3805 N 117 34.5870 W::1/9/15 at 16:32:03 (UTC)	117.576450 W	33.406342 N	11S	3696486.2	446397.825
Donna Germann	4	1/23/2015	7:46:06 AM	Inactive	Inactive	418	none		33 24.3829 N 117 34.5876 W::1/23/15 at 15:43:00 (UTC)	117.576460 W	33.406382 N	11S	3696486.2	446397.825
Andrew Fisher	3	1/9/2015	9:09:59 AM	Inactive	Inactive	419	none	multiple burrow entrances	33 23.6545 N 117 35.1706 W::1/9/15 at 17:05:07 (UTC)	117.586177 W	33.394242 N	11S	3695147.85	445485.495
Andrew Fisher	4	1/23/2015	9:01:07 AM	Inactive	Inactive	419	none		33 23.6549 N 117 35.1716 W::1/23/15 at 16:55:07 (UTC)	117.586193 W	33.394248 N	11S	3695147.85	445485.495
Andrew Fisher	1	12/19/2014	8:28:06 AM	Inactive	Inactive	42	none	ground squirrel sign	33 24.1488 N 117 34.4555 W::12/19/14 at 16:25:10 (UTC)	117.574258 W	33.402480 N	11S	3696054.95	446600.02
Andrew Fisher	2	12/29/2014	8:39:02 AM	Inactive	Inactive	42	none	occupied by ground squirrel	33 24.1491 N 117 34.4551 W::12/29/14 at 16:34:56 (UTC)	117.574252 W	33.402485 N	11S	3696054.95	446600.02
Andrew Fisher	3	1/9/2015	8:26:32 AM	Inactive	Inactive	42	none	occupied by ground squirrel	33 24.1482 N 117 34.4565 W::1/9/15 at 16:21:43 (UTC)	117.574275 W	33.402470 N	11S	3696051.8	446599.31
Andrew Fisher	4	1/23/2015	8:15:44 AM	Inactive	Inactive	42	none		33 24.1463 N 117 34.4550 W::1/23/15 at 16:09:46 (UTC)	117.574250 W	33.402438 N	11S	3696051.8	446599.31

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	3	1/9/2015	7:23:05 AM	Inactive	Inactive	420	none	occupied by ground squirrel	33 24.2552 N 117 34.3261 W::1/9/15 at 15:18:20 (UTC)	117.572102 W	33.404253 N	11S	3696249.55	446803.355
Andrew Fisher	4	1/22/2015	3:24:32 PM	Inactive	Inactive	420	none		33 24.2546 N 117 34.3234 W::1/22/15 at 23:18:30 (UTC)	117.572058 W	33.404242 N	11S	3696249.55	446803.355
James McMorran	3	1/9/2015	7:11:27 AM	Inactive	Inactive	421	none	multiple burrow entrances	33 24.4402 N 117 34.5002 W::1/9/15 at 15:06:25 (UTC)	117.575003 W	33.407337 N	11S	3696593.3	446530
Andrew Fisher	4	1/22/2015	4:20:58 PM	Inactive	Inactive	421	none		33 24.4399 N 117 34.5046 W::1/23/15 at 00:15:00 (UTC)	117.575077 W	33.407332 N	11S	3696593.3	446530
Andrew Fisher	3	1/9/2015	9:43:13 AM	Inactive	Inactive	422	none	multiple burrow entrances	33 23.6061 N 117 35.2462 W::1/9/15 at 17:38:18 (UTC)	117.587437 W	33.393435 N	11S	3695063.3	445371.6
Keoni Calantas	4	1/23/2015	9:31:37 AM	Inactive	Inactive	422	none		33 23.6157 N 117 35.2422 W::1/23/15 at 17:30:37 (UTC)	117.587372 W	33.393518 N	11S	3695063.3	445371.6
Andrew Fisher	3	1/9/2015	9:49:55 AM	Inactive	Inactive	423	none	multiple burrow entrances	33 23.5758 N 117 35.2545 W::1/9/15 at 17:45:08 (UTC)	117.587575 W	33.392930 N	11S	3695003.8	445355.035
Donna Germann	4	1/23/2015	9:35:10 AM	Inactive	Inactive	423	none		33 23.5769 N 117 35.2550 W::1/23/15 at 17:32:05 (UTC)	117.587583 W	33.392948 N	11S	3695003.8	445355.035
James McMorran	3	1/9/2015	6:56:28 AM	Inactive	Inactive	424	none		33 24.6429 N 117 34.6407 W::1/9/15 at 14:51:17 (UTC)	117.577352 W	33.410757 N	11S	3696971.75	446315.34
Andrew Fisher	4	1/22/2015	3:43:49 PM	Inactive	Inactive	424	none	Plastic culvert opening	33 24.6431 N 117 34.6434 W::1/22/15 at 23:38:07 (UTC)	117.577390 W	33.410718 N	11S	3696971.75	446315.34
James McMorran	3	1/9/2015	7:07:46 AM	Inactive	Inactive	425	none		33 24.5018 N 117 34.5509 W::1/9/15 at 15:02:26 (UTC)	117.575848 W	33.408363 N	11S	3696702.85	446455.05
Andrew Fisher	4	1/22/2015	4:23:55 PM	Inactive	Inactive	425	none		33 24.4964 N 117 34.5514 W::1/23/15 at 00:18:09 (UTC)	117.575857 W	33.408275 N	11S	3696702.85	446455.05
Andrew Fisher	1	12/19/2014	8:29:10 AM	Inactive	Inactive	43	none	ground squirrel sign	33 24.1538 N 117 34.4686 W::12/19/14 at 16:25:56 (UTC)	117.574477 W	33.402565 N	11S	3696064.3	446581.01
Andrew Fisher	2	12/29/2014	8:39:36 AM	Inactive	Inactive	43	none	occupied by ground squirrel	33 24.1540 N 117 34.4666 W::12/29/14 at 16:35:31 (UTC)	117.574443 W	33.402567 N	11S	3696064.3	446581.01
Andrew Fisher	3	1/9/2015	8:27:15 AM	Inactive	Inactive	43	none	occupied by ground squirrel	33 24.1532 N 117 34.4676 W::1/9/15 at 16:22:28 (UTC)	117.574460 W	33.402553 N	11S	3696063.65	446580.865
Andrew Fisher	4	1/23/2015	8:16:29 AM	Inactive	Inactive	43	none		33 24.1540 N 117 34.4678 W::1/23/15 at 16:10:27 (UTC)	117.574463 W	33.402567 N	11S	3696063.65	446580.865
Andrew Fisher	1	12/19/2014	8:29:54 AM	Inactive	Inactive	44	none	multiple burrow entrances	33 24.1613 N 117 34.4739 W::12/19/14 at 16:26:37 (UTC)	117.574565 W	33.402688 N	11S	3696077.45	446572.945
Andrew Fisher	2	12/29/2014	8:40:11 AM	Inactive	Inactive	44	none	multiple burrow entrances	33 24.1608 N 117 34.4718 W::12/29/14 at 16:36:05 (UTC)	117.574530 W	33.402680 N	11S	3696077.45	446572.945
Andrew Fisher	3	1/9/2015	8:27:54 AM	Inactive	Inactive	44	none	occupied by ground squirrel	33 24.1590 N 117 34.4720 W::1/9/15 at 16:22:55 (UTC)	117.574533 W	33.402652 N	11S	3696073.95	446573.855
Andrew Fisher	4	1/23/2015	8:17:02 AM	Inactive	Inactive	44	none		33 24.1592 N 117 34.4725 W::1/23/15 at 16:11:02 (UTC)	117.574542 W	33.402653 N	11S	3696073.95	446573.855
Andrew Fisher	1	12/19/2014	8:30:33 AM	Inactive	Inactive	45	none	multiple burrow entrances	33 24.1675 N 117 34.4833 W::12/19/14 at 16:27:15 (UTC)	117.574722 W	33.402792 N	11S	3696089.3	446557.435
Andrew Fisher	2	12/29/2014	8:41:03 AM	Inactive	Inactive	45	none	occupied by ground squirrel	33 24.1673 N 117 34.4825 W::12/29/14 at 16:37:04 (UTC)	117.574708 W	33.402788 N	11S	3696089.3	446557.435
Andrew Fisher	3	1/9/2015	8:28:29 AM	Inactive	Inactive	45	none	occupied by ground squirrel	33 24.1658 N 117 34.4834 W::1/9/15 at 16:23:34 (UTC)	117.574723 W	33.402762 N	11S	3696087.2	446556.725
Andrew Fisher	4	1/23/2015	8:18:03 AM	Inactive	Inactive	45	none		33 24.1668 N 117 34.4833 W::1/23/15 at 16:11:58 (UTC)	117.574722 W	33.402780 N	11S	3696087.2	446556.725
Andrew Fisher	1	12/19/2014	8:31:24 AM	Inactive	Inactive	46	none	ground squirrel sign	33 24.1815 N 117 34.4882 W::12/19/14 at 16:28:09 (UTC)	117.574803 W	33.403025 N	11S	3696115.85	446549.305
Andrew Fisher	2	12/29/2014	8:42:53 AM	Inactive	Inactive	46	none	occupied by ground squirrel	33 24.1820 N 117 34.4883 W::12/29/14 at 16:38:55 (UTC)	117.574805 W	33.403033 N	11S	3696115.85	446549.305
Andrew Fisher	3	1/9/2015	8:29:45 AM	Inactive	Inactive	46	none	multiple burrow entrances	33 24.1808 N 117 34.4889 W::1/9/15 at 16:24:48 (UTC)	117.574815 W	33.403013 N	11S	3696115.6	446547.955
Andrew Fisher	4	1/23/2015	8:19:42 AM	Inactive	Inactive	46	none		33 24.1824 N 117 34.4893 W::1/23/15 at 16:13:41 (UTC)	117.574822 W	33.403040 N	11S	3696115.6	446547.955
Andrew Fisher	1	12/19/2014	8:35:57 AM	Inactive	Inactive	47	none	ground squirrel sign	33 24.2656 N 117 34.5478 W::12/19/14 at 16:32:44 (UTC)	117.575797 W	33.404427 N	11S	3696270.75	446460.095
Andrew Fisher	2	12/29/2014	8:47:55 AM	Inactive	Inactive	47	none	occupied by ground squirrel	33 24.2650 N 117 34.5449 W::12/29/14 at 16:43:50 (UTC)	117.575748 W	33.404417 N	11S	3696270.75	446460.095
Andrew Fisher	3	1/9/2015	8:33:28 AM	Inactive	Inactive	47	none	occupied by ground squirrel	33 24.2644 N 117 34.5456 W::1/9/15 at 16:28:34 (UTC)	117.575760 W	33.404408 N	11S	3696270.55	446461.165
Andrew Fisher	4	1/23/2015	8:23:39 AM	Inactive	Inactive	47	none		33 24.2659 N 117 34.5457 W::1/23/15 at 16:17:42 (UTC)	117.575762 W	33.404432 N	11S	3696270.55	446461.165
Andrew Fisher	1	12/19/2014	8:36:47 AM	Inactive	Inactive	48	none	multiple burrow entrances	33 24.2728 N 117 34.5624 W::12/19/14 at 16:33:39 (UTC)	117.576040 W	33.404547 N	11S	3696284.3	446436.6
Andrew Fisher	2	12/29/2014	8:48:39 AM	Inactive	Inactive	48	none	multiple burrow entrances	33 24.2723 N 117 34.5607 W::12/29/14 at 16:44:34 (UTC)	117.576012 W	33.404538 N	11S	3696284.3	446436.6
Andrew Fisher	3	1/9/2015	8:34:12 AM	Inactive	Inactive	48	none	occupied by ground squirrel	33 24.2723 N 117 34.5600 W::1/9/15 at 16:29:19 (UTC)	117.576000 W	33.404538 N	11S	3696283.65	446437.945
Andrew Fisher	4	1/23/2015	8:24:29 AM	Inactive	Inactive	48	none		33 24.2722 N 117 34.5614 W::1/23/15 at 16:18:30 (UTC)	117.576023 W	33.404537 N	11S	3696283.65	446437.945
Andrew Fisher	1	12/19/2014	8:37:29 AM	Inactive	Inactive	49	none	multiple burrow entrances	33 24.2779 N 117 34.5644 W::12/19/14 at 16:34:12 (UTC)	117.576073 W	33.404632 N	11S	3696294.75	446433.68
Andrew Fisher	2	12/29/2014	8:49:58 AM	Inactive	Inactive	49	none	multiple burrow entrances	33 24.2785 N 117 34.5626 W::12/29/14 at 16:45:57 (UTC)	117.576043 W	33.404642 N	11S	3696294.75	446433.68
Andrew Fisher	3	1/9/2015	8:34:49 AM	Inactive	Inactive	49	none	occupied by ground squirrel	33 24.2780 N 117 34.5631 W::1/9/15 at 16:29:53 (UTC)	117.576052 W	33.404633 N	11S	3696295.25	446433.545
Andrew Fisher	4	1/23/2015	8:25:13 AM	Inactive	Inactive	49	none		33 24.2790 N 117 34.5640 W::1/23/15 at 16:19:09 (UTC)	117.576067 W	33.404650 N	11S	3696295.25	446433.545
Andrew Fisher	1	12/19/2014	7:03:38 AM	Inactive	Inactive	5	none	2 burrows	33 24.5415 N 117 34.5339 W::12/19/14 at 15:00:27 (UTC)	117.575565 W	33.409025 N	11S	3696781.4	446482.92
Andrew Fisher	2	12/29/2014	7:05:08 AM	Inactive	Inactive	5	none	occupied by ground squirrel	33 24.5419 N 117 34.5330 W::12/29/14 at 15:01:03 (UTC)	117.575550 W	33.409032 N	11S	3696781.4	446482.92
Andrew Fisher	3	1/9/2015	7:05:01 AM	Inactive	Inactive	5	none	multiple burrow entrances	33 24.5445 N 117 34.5358 W::1/9/15 at 15:00:02 (UTC)	117.575597 W	33.409073 N	11S	3696788.5	446478.91
Andrew Fisher	4	1/22/2015	3:09:46 PM	Inactive	Inactive	5	none		33 24.5467 N 117 34.5363 W::1/22/15 at 23:03:45 (UTC)	117.575605 W	33.409112 N	11S	3696788.5	446478.91
Andrew Fisher	1	12/19/2014	8:38:28 AM	Inactive	Inactive	50	none	multiple burrow entrances	33 24.2972 N 117 34.5764 W::12/19/14 at 16:35:14 (UTC)	117.576273 W	33.404953 N	11S	3696331.95	446415.425
Andrew Fisher	2	12/29/2014	8:51:06 AM	Inactive	Inactive	50	none	multiple burrow entrances	33 24.2994 N 117 34.5744 W::12/29/14 at 16:47:11 (UTC)	117.576240 W	33.404990 N	11S	3696331.95	446415.425
Andrew Fisher	3	1/9/2015	8:35:53 AM	Inactive	Inactive	50	none	occupied by ground squirrel	33 24.2984 N 117 34.5738 W::1/9/15 at 16:31:02 (UTC)	117.576230 W	33.404973 N	11S	3696333.75	446416.04
Andrew Fisher	4	1/23/2015	8:26:07 AM	Inactive	Inactive	50	none		33 24.3002 N 117 34.5762 W::1/23/15 at 16:20:01 (UTC)	117.576270 W	33.405003 N	11S	3696333.75	446416.04
Andrew Fisher	1	12/19/2014	8:39:05 AM	Inactive	Inactive	51	none	multiple burrow entrances	33 24.3010 N 117 34.5807 W::12/19/14 at 16:35:53 (UTC)	117.576345 W	33.405017 N	11S	3696338.3	446407.005
Andrew Fisher	2	12/29/2014	8:52:09 AM	Inactive	Inactive	51	none	multiple burrow entrances	33 24.3024 N 117 34.5810 W::12/29/14 at 16:48:04 (UTC)	117.576350 W	33.405040 N	11S	3696338.3	446407.005
Andrew Fisher	3	1/9/2015	8:36:44 AM	Inactive	Inactive	51	none	multiple burrow entrances	33 24.3032 N 117 34.5822 W::1/9/15 at 16:31:46 (UTC)	117.576368 W	33.405053 N	11S	3696340.3	446405.015
Andrew Fisher	4	1/23/2015	8:27:18 AM	Inactive	Inactive	51	none		33 24.3024 N 117 34.5822 W::1/23/15 at 16:21:14 (UTC)	117.576370 W	33.405040 N	11S	3696340.3	446405.015
Andrew Fisher	1	12/19/2014	8:39:56 AM	Inactive	Inactive	52	none	multiple burrow entrances	33 24.3140 N 117 34.5911 W::12/19/14 at 16:36:50 (UTC)	117.576518 W	33.405233 N	11S	3696360.75	446391.5
Andrew Fisher	2	12/29/2014	8:53:37 AM	Inactive	Inactive	52	none	multiple burrow entrances	33 24.3136 N 117 34.5908 W::12/29/14 at 16:49:31 (UTC)	117.576513 W	33.405227 N	11S	3696360.75	446391.5

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	3	1/9/2015	8:37:53 AM	Inactive	Inactive	52	none	multiple burrow entrances	33 24.3140 N 117 34.5910 W::1/9/15 at 16:32:55 (UTC)	117.576517 W	33.405233 N	11S	3696361.5	446390.905
Andrew Fisher	4	1/23/2015	8:27:55 AM	Inactive	Inactive	52	none		33 24.3144 N 117 34.5916 W::1/23/15 at 16:21:51 (UTC)	117.576527 W	33.405240 N	11S	3696361.5	446390.905
Andrew Fisher	1	12/19/2014	8:40:45 AM	Inactive	Inactive	53	none	multiple burrow entrances	33 24.3244 N 117 34.5978 W::12/19/14 at 16:37:30 (UTC)	117.576630 W	33.405407 N	11S	3696384	446381.36
Andrew Fisher	2	12/29/2014	8:54:55 AM	Inactive	Inactive	53	none	multiple burrow entrances	33 24.3283 N 117 34.5973 W::12/29/14 at 16:50:50 (UTC)	117.576622 W	33.405472 N	11S	3696384	446381.36
Andrew Fisher	3	1/9/2015	8:39:06 AM	Inactive	Inactive	53	none	multiple burrow entrances	33 24.3282 N 117 34.5975 W::1/9/15 at 16:34:08 (UTC)	117.576625 W	33.405468 N	11S	3696388.8	446383.245
Andrew Fisher	4	1/23/2015	8:29:14 AM	Inactive	Inactive	53	none		33 24.3298 N 117 34.5952 W::1/23/15 at 16:23:10 (UTC)	117.576587 W	33.405497 N	11S	3696388.8	446383.245
Andrew Fisher	1	12/19/2014	8:41:48 AM	Inactive	Inactive	54	none	multiple burrow entrances	33 24.3481 N 117 34.6130 W::12/19/14 at 16:39:09 (UTC)	117.576883 W	33.405802 N	11S	3696423.8	446358.19
Andrew Fisher	2	12/29/2014	8:56:36 AM	Inactive	Inactive	54	none	multiple burrow entrances	33 24.3476 N 117 34.6123 W::12/29/14 at 16:52:31 (UTC)	117.576872 W	33.405793 N	11S	3696423.8	446358.19
Andrew Fisher	3	1/9/2015	8:40:43 AM	Inactive	Inactive	54	none	multiple burrow entrances	33 24.3492 N 117 34.6136 W::1/9/15 at 16:35:49 (UTC)	117.576893 W	33.405820 N	11S	3696427.15	446357.14
Andrew Fisher	4	1/23/2015	8:32:04 AM	Inactive	Inactive	54	none		33 24.3501 N 117 34.6131 W::1/23/15 at 16:25:59 (UTC)	117.576885 W	33.405835 N	11S	3696427.15	446357.14
Andrew Fisher	1	12/19/2014	8:43:02 AM	Inactive	Inactive	55	none	multiple burrow entrances	33 24.3554 N 117 34.6236 W::12/19/14 at 16:39:48 (UTC)	117.577062 W	33.405923 N	11S	3696437.45	446341.435
Andrew Fisher	2	12/29/2014	8:57:17 AM	Inactive	Inactive	55	none	multiple burrow entrances	33 24.3549 N 117 34.6233 W::12/29/14 at 16:53:12 (UTC)	117.577055 W	33.405915 N	11S	3696437.45	446341.435
Andrew Fisher	3	1/9/2015	8:41:20 AM	Inactive	Inactive	55	none	multiple burrow entrances	33 24.3557 N 117 34.6232 W::1/9/15 at 16:36:26 (UTC)	117.577053 W	33.405928 N	11S	3696440.25	446343.82
Andrew Fisher	4	1/23/2015	8:33:08 AM	Inactive	Inactive	55	none		33 24.3577 N 117 34.6208 W::1/23/15 at 16:27:02 (UTC)	117.577013 W	33.405962 N	11S	3696440.25	446343.82
Andrew Fisher	1	12/19/2014	8:44:21 AM	Inactive	Inactive	56	none	multiple burrow entrances	33 24.3772 N 117 34.6379 W::12/19/14 at 16:41:06 (UTC)	117.577298 W	33.406287 N	11S	3696478.1	446319.205
Andrew Fisher	2	12/29/2014	8:58:15 AM	Inactive	Inactive	56	none	multiple burrow entrances	33 24.3770 N 117 34.6381 W::12/29/14 at 16:54:18 (UTC)	117.577302 W	33.406283 N	11S	3696478.1	446319.205
Andrew Fisher	3	1/9/2015	8:42:04 AM	Inactive	Inactive	56	none	multiple burrow entrances	33 24.3776 N 117 34.6367 W::1/9/15 at 16:37:20 (UTC)	117.577278 W	33.406293 N	11S	3696480.6	446321.725
Andrew Fisher	4	1/23/2015	8:34:33 AM	Inactive	Inactive	56	none		33 24.3793 N 117 34.6361 W::1/23/15 at 16:28:28 (UTC)	117.577268 W	33.406322 N	11S	3696480.6	446321.725
Andrew Fisher	1	12/19/2014	8:45:17 AM	Inactive	Inactive	57	none	multiple burrow entrances	33 24.3878 N 117 34.6387 W::12/19/14 at 16:42:10 (UTC)	117.577312 W	33.406463 N	11S	3696497.3	446318.1967
Andrew Fisher	2	12/29/2014	8:59:11 AM	Inactive	Inactive	57	none	multiple burrow entrances	33 24.3870 N 117 34.6387 W::12/29/14 at 16:55:17 (UTC)	117.577312 W	33.406450 N	11S	3696497.3	446318.1967
Andrew Fisher	3	1/9/2015	8:42:50 AM	Inactive	Inactive	57	none	multiple burrow entrances	33 24.3875 N 117 34.6393 W::1/9/15 at 16:37:59 (UTC)	117.577322 W	33.406458 N	11S	3696501.6	446315.985
Andrew Fisher	4	1/23/2015	8:35:33 AM	Inactive	Inactive	57	none		33 24.3921 N 117 34.6410 W::1/23/15 at 16:29:27 (UTC)	117.577350 W	33.406535 N	11S	3696501.6	446315.985
Andrew Fisher	1	12/19/2014	9:08:47 AM	Inactive	Inactive	58	none	multiple burrow entrances	33 23.7292 N 117 35.2056 W::12/19/14 at 17:05:38 (UTC)	117.586760 W	33.395487 N	11S	3695283.65	445432.08
Brennan Mulrooney	2	12/29/2014	9:22:44 AM	Inactive	Inactive	58	none		33 23.7268 N 117 35.2065 W::12/29/14 at 17:18:49 (UTC)	117.586775 W	33.395447 N	11S	3695283.65	445432.08
James McMorran	3	1/9/2015	9:05:18 AM	Inactive	Inactive	58	none		33 23.7295 N 117 35.2118 W::1/9/15 at 17:00:06 (UTC)	117.586863 W	33.395492 N	11S	3695287	445427.685
Keoni Calantas	4	1/23/2015	8:51:58 AM	Inactive	Inactive	58	none		33 23.7301 N 117 35.2060 W::1/23/15 at 16:50:52 (UTC)	117.586767 W	33.395502 N	11S	3695287	445427.685
Andrew Fisher	1	12/19/2014	9:09:37 AM	Inactive	Inactive	59	none	multiple burrow entrances	33 23.7201 N 117 35.1984 W::12/19/14 at 17:06:33 (UTC)	117.586640 W	33.395335 N	11S	3695270.6	445446.5633
Brennan Mulrooney	2	12/29/2014	9:23:41 AM	Inactive	Inactive	59	none		33 23.7180 N 117 35.1983 W::12/29/14 at 17:19:46 (UTC)	117.586638 W	33.395300 N	11S	3695270.6	445446.5633
Andrew Fisher	3	1/9/2015	9:05:21 AM	Inactive	Inactive	59	none	multiple burrow entrances	33 23.7203 N 117 35.1988 W::1/9/15 at 17:00:26 (UTC)	117.586647 W	33.395338 N	11S	3695269.1	445444.79
Andrew Fisher	4	1/23/2015	8:56:38 AM	Inactive	Inactive	59	none		33 23.7201 N 117 35.1968 W::1/23/15 at 16:50:36 (UTC)	117.586613 W	33.395335 N	11S	3695269.1	445444.79
Andrew Fisher	1	12/19/2014	7:04:15 AM	Inactive	Inactive	6	none	multiple burrow entrances	33 24.5359 N 117 34.5340 W::12/19/14 at 15:01:17 (UTC)	117.575567 W	33.408932 N	11S	3696770.95	446482.625
Brennan Mulrooney	2	12/29/2014	7:05:35 AM	Inactive	Inactive	6	none		33 24.5362 N 117 34.5332 W::12/29/14 at 15:01:43 (UTC)	117.575553 W	33.408937 N	11S	3696770.95	446482.625
Andrew Fisher	3	1/9/2015	7:05:39 AM	Inactive	Inactive	6	none	multiple burrow entrances	33 24.5363 N 117 34.5352 W::1/9/15 at 15:00:41 (UTC)	117.575587 W	33.408938 N	11S	3696772.9	446479.385
Andrew Fisher	4	1/22/2015	3:10:23 PM	Inactive	Inactive	6	none		33 24.5379 N 117 34.5362 W::1/22/15 at 23:04:23 (UTC)	117.575603 W	33.408965 N	11S	3696772.9	446479.385
Andrew Fisher	1	12/19/2014	9:11:18 AM	Inactive	Inactive	60	none	multiple burrow entrances	33 23.7082 N 117 35.1836 W::12/19/14 at 17:08:04 (UTC)	117.586393 W	33.395137 N	11S	3695247.3	445466.85
Brennan Mulrooney	2	12/29/2014	9:24:34 AM	Inactive	Inactive	60	none		33 23.7087 N 117 35.1834 W::12/29/14 at 17:20:43 (UTC)	117.586390 W	33.395145 N	11S	3695247.3	445466.85
Andrew Fisher	3	1/9/2015	9:06:08 AM	Inactive	Inactive	60	none	occupied by ground squirrel	33 23.7077 N 117 35.1846 W::1/9/15 at 17:01:15 (UTC)	117.586412 W	33.395128 N	11S	3695246.7	445465.725
Andrew Fisher	4	1/23/2015	8:57:27 AM	Inactive	Inactive	60	none		33 23.7086 N 117 35.1837 W::1/23/15 at 16:51:28 (UTC)	117.586395 W	33.395143 N	11S	3695246.7	445465.725
Andrew Fisher	1	12/19/2014	9:12:10 AM	Inactive	Inactive	61	none		33 23.6955 N 117 35.1765 W::12/19/14 at 17:08:55 (UTC)	117.586275 W	33.394925 N	11S	3695229.75	445483.725
James McMorran	2	12/29/2014	9:26:06 AM	Inactive	Inactive	61	none		33 23.7025 N 117 35.1686 W::12/29/14 at 17:22:31 (UTC)	117.586143 W	33.395042 N	11S	3695229.75	445483.725
Andrew Fisher	3	1/9/2015	9:07:05 AM	Inactive	Inactive	61	none	multiple burrow entrances	33 23.7008 N 117 35.1773 W::1/9/15 at 17:02:09 (UTC)	117.586288 W	33.395013 N	11S	3695234.4	445476.68
Andrew Fisher	4	1/23/2015	8:58:01 AM	Inactive	Inactive	61	none		33 23.7022 N 117 35.1769 W::1/23/15 at 16:52:01 (UTC)	117.586282 W	33.395037 N	11S	3695234.4	445476.68
Andrew Fisher	1	12/19/2014	9:13:12 AM	Inactive	Inactive	62	none	multiple burrow entrances	33 23.6776 N 117 35.1757 W::12/19/14 at 17:09:59 (UTC)	117.586262 W	33.394627 N	11S	3695190.4	445478.29
James McMorran	2	12/29/2014	9:27:45 AM	Inactive	Inactive	62	none		33 23.6778 N 117 35.1761 W::12/29/14 at 17:23:52 (UTC)	117.586268 W	33.394630 N	11S	3695190.4	445478.29
Andrew Fisher	3	1/9/2015	9:08:24 AM	Inactive	Inactive	62	none	multiple burrow entrances	33 23.6787 N 117 35.1785 W::1/9/15 at 17:03:26 (UTC)	117.586308 W	33.394645 N	11S	3695191.85	445474.995
Andrew Fisher	4	1/23/2015	9:00:01 AM	Inactive	Inactive	62	none		33 23.6782 N 117 35.1776 W::1/23/15 at 16:53:55 (UTC)	117.586293 W	33.394637 N	11S	3695191.85	445474.995
Andrew Fisher	1	12/19/2014	9:14:31 AM	Inactive	Inactive	63	none	multiple burrow entrances	33 23.6561 N 117 35.1735 W::12/19/14 at 17:11:19 (UTC)	117.586225 W	33.394268 N	11S	3695164.1	445483.96
James McMorran	2	12/29/2014	9:28:54 AM	Inactive	Inactive	63	none		33 23.6709 N 117 35.1708 W::12/29/14 at 17:24:59 (UTC)	117.586180 W	33.394515 N	11S	3695164.1	445483.96
Andrew Fisher	3	1/9/2015	9:08:56 AM	Inactive	Inactive	63	none	multiple burrow entrances	33 23.6678 N 117 35.1747 W::1/9/15 at 17:04:08 (UTC)	117.586245 W	33.394463 N	11S	3695171.8	445480.605
Andrew Fisher	4	1/23/2015	9:00:32 AM	Inactive	Inactive	63	none		33 23.6675 N 117 35.1740 W::1/23/15 at 16:54:31 (UTC)	117.586233 W	33.394458 N	11S	3695171.8	445480.605
Andrew Fisher	1	12/19/2014	9:17:04 AM	Inactive	Inactive	64	none	multiple burrow entrances	33 23.6117 N 117 35.1517 W::12/19/14 at 17:13:59 (UTC)	117.585862 W	33.393528 N	11S	3695072.033	445517.2133
Brennan Mulrooney	2	12/29/2014	9:32:11 AM	Inactive	Inactive	64	none		33 23.6127 N 117 35.1524 W::12/29/14 at 17:28:23 (UTC)	117.585873 W	33.393545 N	11S	3695072.033	445517.2133
Andrew Fisher	3	1/9/2015	9:11:17 AM	Inactive	Inactive	64	none	multiple burrow entrances	33 23.6122 N 117 35.1529 W::1/9/15 at 17:06:26 (UTC)	117.585882 W	33.393538 N	11S	3695069.15	445513.185
Andrew Fisher	4	1/23/2015	9:02:37 AM	Inactive	Inactive	64	none		33 23.6121 N 117 35.1530 W::1/23/15 at 16:56:34 (UTC)	117.585883 W	33.393535 N	11S	3695069.15	445513.185

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	1	12/19/2014	9:18:54 AM	Inactive	Inactive	65	none	multiple burrow entrances	33 23.5885 N 117 35.1325 W::12/19/14 at 17:15:43 (UTC)	117.585542 W	33.393142 N	11S	3695028	445550.755
James McMorran	2	12/29/2014	9:33:53 AM	Inactive	Inactive	65	none		33 23.5916 N 117 35.1246 W::12/29/14 at 17:29:52 (UTC)	117.585410 W	33.393193 N	11S	3695028	445550.755
Andrew Fisher	3	1/9/2015	9:13:15 AM	Inactive	Inactive	65	none	multiple burrow entrances	33 23.5882 N 117 35.1333 W::1/9/15 at 17:08:16 (UTC)	117.585555 W	33.393137 N	11S	3695025.85	445545.725
Andrew Fisher	4	1/23/2015	9:03:47 AM	Inactive	Inactive	65	none		33 23.5895 N 117 35.1303 W::1/23/15 at 16:57:46 (UTC)	117.585505 W	33.393158 N	11S	3695025.85	445545.725
Andrew Fisher	1	12/19/2014	9:19:49 AM	Inactive	Inactive	66	none	multiple burrow entrances	33 23.5734 N 117 35.1289 W::12/19/14 at 17:16:38 (UTC)	117.585482 W	33.392890 N	11S	3695001.9	445550.985
James McMorran	2	12/29/2014	9:35:05 AM	Inactive	Inactive	66	none		33 23.5784 N 117 35.1277 W::12/29/14 at 17:31:13 (UTC)	117.585462 W	33.392973 N	11S	3695001.9	445550.985
Andrew Fisher	3	1/9/2015	9:13:53 AM	Inactive	Inactive	66	none	multiple burrow entrances	33 23.5747 N 117 35.1280 W::1/9/15 at 17:08:54 (UTC)	117.585467 W	33.392912 N	11S	3694999.75	445550.74
Andrew Fisher	4	1/23/2015	9:04:33 AM	Inactive	Inactive	66	none		33 23.5748 N 117 35.1289 W::1/23/15 at 16:58:26 (UTC)	117.585482 W	33.392913 N	11S	3694999.75	445550.74
Andrew Fisher	1	12/19/2014	9:20:28 AM	Inactive	Inactive	67	none	multiple burrow entrances	33 23.5633 N 117 35.1291 W::12/19/14 at 17:17:19 (UTC)	117.585485 W	33.392722 N	11S	3694984.3	445554.79
James McMorran	2	12/29/2014	9:36:02 AM	Inactive	Inactive	67	none		33 23.5695 N 117 35.1225 W::12/29/14 at 17:32:06 (UTC)	117.585375 W	33.392825 N	11S	3694984.3	445554.79
Andrew Fisher	3	1/9/2015	9:14:18 AM	Inactive	Inactive	67	none	multiple burrow entrances	33 23.5669 N 117 35.1254 W::1/9/15 at 17:09:24 (UTC)	117.585423 W	33.392782 N	11S	3694984.6	445555.445
Andrew Fisher	4	1/23/2015	9:04:59 AM	Inactive	Inactive	67	none		33 23.5662 N 117 35.1254 W::1/23/15 at 16:58:59 (UTC)	117.585423 W	33.392770 N	11S	3694984.6	445555.445
Andrew Fisher	1	12/19/2014	9:22:15 AM	Inactive	Inactive	68	none	multiple burrow entrances	33 23.5403 N 117 35.1176 W::12/19/14 at 17:19:13 (UTC)	117.585290 W	33.392340 N	11S	3694936.3	445569.26
Brennan Mulrooney	2	12/29/2014	9:38:35 AM	Inactive	Inactive	68	none		33 23.5405 N 117 35.1152 W::12/29/14 at 17:34:41 (UTC)	117.585253 W	33.392342 N	11S	3694936.3	445569.26
James McMorran	3	1/9/2015	9:14:29 AM	Inactive	Inactive	68	none		33 23.5391 N 117 35.1187 W::1/9/15 at 17:10:00 (UTC)	117.585312 W	33.392318 N	11S	3694939.2	445560.86
Keoni Calantas	4	1/23/2015	9:00:30 AM	Inactive	Inactive	68	none		33 23.5449 N 117 35.1247 W::1/23/15 at 16:59:31 (UTC)	117.585412 W	33.392415 N	11S	3694939.2	445560.86
Andrew Fisher	1	12/19/2014	9:25:53 AM	Inactive	Inactive	69	none	multiple burrow entrances	33 23.4834 N 117 35.0724 W::12/19/14 at 17:22:41 (UTC)	117.584532 W	33.391432 N	11S	3694835.25	445638.865
Brennan Mulrooney	2	12/29/2014	9:43:10 AM	Inactive	Inactive	69	none		33 23.4861 N 117 35.0702 W::12/29/14 at 17:39:17 (UTC)	117.584502 W	33.391435 N	11S	3694835.25	445638.865
James McMorran	3	1/9/2015	9:18:28 AM	Inactive	Inactive	69	none		33 23.4899 N 117 35.0674 W::1/9/15 at 17:13:17 (UTC)	117.584457 W	33.391498 N	11S	3694841.85	445645.65
Keoni Calantas	4	1/23/2015	9:04:02 AM	Inactive	Inactive	69	none		33 23.4893 N 117 35.0659 W::1/23/15 at 17:02:53 (UTC)	117.584432 W	33.391488 N	11S	3694841.85	445645.65
Andrew Fisher	1	12/19/2014	7:05:09 AM	Inactive	Inactive	7	none	multiple burrow entrances	33 24.5316 N 117 34.5269 W::12/19/14 at 15:01:57 (UTC)	117.575447 W	33.408862 N	11S	3696763.35	446493.09
Andrew Fisher	2	12/29/2014	7:06:01 AM	Inactive	Inactive	7	none	multiple burrow entrances	33 24.5322 N 117 34.5268 W::12/29/14 at 15:01:59 (UTC)	117.575447 W	33.408870 N	11S	3696763.35	446493.09
Andrew Fisher	3	1/9/2015	7:06:13 AM	Inactive	Inactive	7	none	multiple burrow entrances	33 24.5315 N 117 34.5277 W::1/9/15 at 15:01:18 (UTC)	117.575462 W	33.408858 N	11S	3696764.85	446492.26
Andrew Fisher	4	1/22/2015	3:11:04 PM	Inactive	Inactive	7	none		33 24.5341 N 117 34.5270 W::1/22/15 at 23:05:03 (UTC)	117.575450 W	33.408902 N	11S	3696764.85	446492.26
Andrew Fisher	1	12/19/2014	9:26:44 AM	Inactive	Inactive	70	none	multiple burrow entrances	33 23.4781 N 117 35.0670 W::12/19/14 at 17:23:39 (UTC)	117.584450 W	33.391302 N	11S	3694826.65	445645.425
James McMorran	2	12/29/2014	9:43:32 AM	Inactive	Inactive	70	none		33 23.4846 N 117 35.0665 W::12/29/14 at 17:39:37 (UTC)	117.584442 W	33.391410 N	11S	3694826.65	445645.425
Andrew Fisher	3	1/9/2015	9:18:39 AM	Inactive	Inactive	70	none	multiple burrow entrances	33 23.4811 N 117 35.0654 W::1/9/15 at 17:13:48 (UTC)	117.584423 W	33.391352 N	11S	3694825.4	445646.53
Keoni Calantas	4	1/23/2015	9:04:40 AM	Inactive	Inactive	70	none		33 23.4803 N 117 35.0667 W::1/23/15 at 17:03:34 (UTC)	117.584445 W	33.391338 N	11S	3694825.4	445646.53
Andrew Fisher	1	12/19/2014	9:35:49 AM	Inactive	Inactive	71	none	multiple burrow entrances	33 23.4295 N 117 35.1079 W::12/19/14 at 17:32:45 (UTC)	117.585132 W	33.390492 N	11S	3694720.6	445593.065
James McMorran	2	12/29/2014	9:52:22 AM	Inactive	Inactive	71	none		33 23.4181 N 117 35.0924 W::12/29/14 at 17:48:29 (UTC)	117.584873 W	33.390302 N	11S	3694720.6	445593.065
Andrew Fisher	3	1/9/2015	9:29:40 AM	Inactive	Inactive	71	none	occupied by ground squirrel	33 23.4272 N 117 35.0985 W::1/9/15 at 17:25:09 (UTC)	117.584975 W	33.390453 N	11S	3694725.95	445595.285
Keoni Calantas	4	1/23/2015	9:43:55 AM	No Longer Suitable	No Longer Suitable	71	none		33 23.4263 N 117 35.0990 W::1/23/15 at 17:44:22 (UTC)	117.584983 W	33.390438 N	11S	3694725.95	445595.285
Andrew Fisher	1	12/19/2014	9:38:14 AM	Inactive	Inactive	72	none	multiple burrow entrances	33 23.4649 N 117 35.1364 W::12/19/14 at 17:35:02 (UTC)	117.585607 W	33.391082 N	11S	3694798.35	445537
James McMorran	2	12/29/2014	9:54:53 AM	Inactive	Inactive	72	none		33 23.4665 N 117 35.1368 W::12/29/14 at 17:50:57 (UTC)	117.585613 W	33.391108 N	11S	3694798.35	445537
Andrew Fisher	4	1/23/2015	9:48:11 AM	Inactive	Inactive	72	none		33 23.4662 N 117 35.1368 W::1/23/15 at 17:42:14 (UTC)	117.585613 W	33.391103 N	11S	1847399.6	222768.365
Keoni Calantas	4	1/26/2015	2:35:23 PM	Inactive	Inactive	72	none		33 23.4662 N 117 35.1368 W::1/23/15 at 17:42:14 (UTC)	117.585613 W	33.391103 N	11S	1847399.6	222768.365
Andrew Fisher	1	12/19/2014	9:39:16 AM	Inactive	Inactive	73	none	multiple burrow entrances	33 23.4754 N 117 35.1485 W::12/19/14 at 17:36:01 (UTC)	117.585808 W	33.391257 N	11S	3694813.65	445519.885
James McMorran	2	12/29/2014	9:56:01 AM	Inactive	Inactive	73	none		33 23.4725 N 117 35.1469 W::12/29/14 at 17:52:12 (UTC)	117.585782 W	33.391208 N	11S	3694813.65	445519.885
Andrew Fisher	3	1/9/2015	9:33:22 AM	Inactive	Inactive	73	none	occupied by ground squirrel	33 23.4756 N 117 35.1487 W::1/9/15 at 17:28:27 (UTC)	117.585812 W	33.391260 N	11S	3694818.65	445515.635
Andrew Fisher	4	1/23/2015	9:46:44 AM	Inactive	Inactive	73	none		33 23.4777 N 117 35.1522 W::1/23/15 at 17:40:40 (UTC)	117.585870 W	33.391295 N	11S	3694818.65	445515.635
Andrew Fisher	1	12/19/2014	9:39:45 AM	Inactive	Inactive	74	none	multiple burrow entrances	33 23.4803 N 117 35.1454 W::12/19/14 at 17:36:34 (UTC)	117.585757 W	33.391338 N	11S	3694826.25	445522.325
Brennan Mulrooney	2	12/29/2014	9:56:51 AM	Inactive	Inactive	74	none		33 23.4813 N 117 35.1469 W::12/29/14 at 17:53:08 (UTC)	117.585782 W	33.391355 N	11S	3694826.25	445522.325
James McMorran	3	1/9/2015	9:34:30 AM	Inactive	Inactive	74	none		33 23.4816 N 117 35.1447 W::1/9/15 at 17:29:05 (UTC)	117.585745 W	33.391360 N	11S	3694830	445520.765
Andrew Fisher	4	1/23/2015	9:45:49 AM	Inactive	Inactive	74	none		33 23.4840 N 117 35.1497 W::1/23/15 at 17:39:46 (UTC)	117.585828 W	33.391400 N	11S	3694830	445520.765
Andrew Fisher	1	12/19/2014	9:40:25 AM	Inactive	Inactive	75	none	multiple burrow entrances	33 23.4840 N 117 35.1544 W::12/19/14 at 17:37:10 (UTC)	117.585907 W	33.391400 N	11S	3694833.25	445504.695
James McMorran	2	12/29/2014	9:57:42 AM	Inactive	Inactive	75	none		33 23.4850 N 117 35.1607 W::12/29/14 at 17:53:34 (UTC)	117.586012 W	33.391417 N	11S	3694833.25	445504.695
Andrew Fisher	3	1/9/2015	9:34:46 AM	Inactive	Inactive	75	none	occupied by ground squirrel	33 23.4854 N 117 35.1586 W::1/9/15 at 17:29:51 (UTC)	117.585977 W	33.391422 N	11S	3694835.4	445501.78
Keoni Calantas	4	1/23/2015	9:40:45 AM	Inactive	Inactive	75	none		33 23.4860 N 117 35.1603 W::1/23/15 at 17:39:38 (UTC)	117.586005 W	33.391433 N	11S	3694835.4	445501.78
Andrew Fisher	1	12/19/2014	9:42:12 AM	Inactive	Inactive	76	none	ground squirrel sign	33 23.5106 N 117 35.1873 W::12/19/14 at 17:39:19 (UTC)	117.586455 W	33.391843 N	11S	3694884	445458.8
James McMorran	2	12/29/2014	10:00:02 AM	Inactive	Inactive	76	none		33 23.5131 N 117 35.1874 W::12/29/14 at 17:56:09 (UTC)	117.586457 W	33.391885 N	11S	3694884	445458.8
Andrew Fisher	3	1/9/2015	9:37:01 AM	Inactive	Inactive	76	none	multiple burrow entrances	33 23.5090 N 117 35.1874 W::1/9/15 at 17:32:06 (UTC)	117.586457 W	33.391817 N	11S	3694881	445458.555
Keoni Calantas	4	1/23/2015	9:38:56 AM	Inactive	Inactive	76	none		33 23.5114 N 117 35.1876 W::1/23/15 at 17:37:54 (UTC)	117.586460 W	33.391857 N	11S	3694881	445458.555
Andrew Fisher	1	12/19/2014	9:48:57 AM	Inactive	Inactive	77	none	multiple burrow entrances	33 23.6333 N 117 35.2519 W::12/19/14 at 17:45:41 (UTC)	117.587532 W	33.393888 N	11S	3695107.45	445359.06
James McMorran	2	12/29/2014	10:07:47 AM	Inactive	Inactive	77	none		33 23.6316 N 117 35.2531 W::12/29/14 at 18:03:41 (UTC)	117.587552 W	33.393860 N	11S	3695107.45	445359.06

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
James McMorran	3	1/9/2015	9:43:07 AM	Inactive	Inactive	77	none		33 23.6316 N 117 35.2531 W::12/29/14 at 18:03:41 (UTC)	117.587552 W	33.393860 N	11S	3695077.65	445369.585
Keoni Calantas	4	1/23/2015	9:33:02 AM	Inactive	Inactive	77	none		33 23.6011 N 117 35.2381 W::1/23/15 at 17:31:54 (UTC)	117.587302 W	33.393352 N	11S	3695077.65	445369.585
Andrew Fisher	1	12/19/2014	9:49:36 AM	Inactive	Inactive	78	none	multiple burrow entrances	33 23.6439 N 117 35.2550 W::12/19/14 at 17:46:20 (UTC)	117.587583 W	33.394065 N	11S	3695117.25	445356.745
James McMorran	2	12/29/2014	10:08:18 AM	Inactive	Inactive	78	none		33 23.6316 N 117 35.2531 W::12/29/14 at 18:04:21 (UTC)	117.587552 W	33.393860 N	11S	3695117.25	445356.745
James McMorran	3	1/9/2015	9:43:36 AM	Inactive	Inactive	78	none		33 23.6316 N 117 35.2531 W::12/29/14 at 18:04:21 (UTC)	117.587552 W	33.393860 N	11S	3695082.8	445370.315
Andrew Fisher	4	1/23/2015	9:36:43 AM	Inactive	Inactive	78	none		33 23.6067 N 117 35.2372 W::1/23/15 at 17:30:45 (UTC)	117.587287 W	33.393445 N	11S	3695082.8	445370.315
Andrew Fisher	1	12/19/2014	9:54:46 AM	Inactive	Inactive	79	none	multiple burrow entrances	33 23.5819 N 117 35.2486 W::12/19/14 at 17:51:44 (UTC)	117.587477 W	33.393032 N	11S	3695012.3	445357.22
James McMorran	2	12/29/2014	10:16:59 AM	Inactive	Inactive	79	none		33 23.5800 N 117 35.2581 W::12/29/14 at 18:13:10 (UTC)	117.587635 W	33.393000 N	11S	3695012.3	445357.22
Andrew Fisher	3	1/9/2015	9:48:59 AM	Inactive	Inactive	79	none	multiple burrow entrances	33 23.5811 N 117 35.2552 W::1/9/15 at 17:44:17 (UTC)	117.587595 W	33.393042 N	11S	3695015.45	445357.47
Donna Germann	4	1/23/2015	9:34:08 AM	Inactive	Inactive	79	none		33 23.5828 N 117 35.2507 W::1/23/15 at 17:31:00 (UTC)	117.587512 W	33.393047 N	11S	3695015.45	445357.47
Andrew Fisher	1	12/19/2014	7:07:38 AM	Inactive	Inactive	8	none	multiple burrow entrances	33 24.5198 N 117 34.5063 W::12/19/14 at 15:04:21 (UTC)	117.575105 W	33.408663 N	11S	3696741.25	446526.03
Andrew Fisher	2	12/29/2014	7:08:28 AM	Inactive	Inactive	8	none	occupied by ground squirrel	33 24.5205 N 117 34.5047 W::12/29/14 at 15:04:23 (UTC)	117.575078 W	33.408675 N	11S	3696741.25	446526.03
Andrew Fisher	3	1/9/2015	7:07:41 AM	Inactive	Inactive	8	none	occupied by ground squirrel	33 24.5209 N 117 34.5048 W::1/9/15 at 15:02:46 (UTC)	117.575080 W	33.408682 N	11S	3696743.05	446524.545
Andrew Fisher	4	1/22/2015	3:12:10 PM	Inactive	Inactive	8	none		33 24.5213 N 117 34.5081 W::1/22/15 at 23:06:09 (UTC)	117.575135 W	33.408688 N	11S	3696743.05	446524.545
Andrew Fisher	1	12/19/2014	9:56:32 AM	Inactive	Inactive	80	none	multiple burrow entrances	33 23.5581 N 117 35.2300 W::12/19/14 at 17:53:21 (UTC)	117.587167 W	33.392635 N	11S	3694968.25	445392.64
James McMorran	2	12/29/2014	10:04:53 AM	Inactive	Inactive	80	none		33 23.5563 N 117 35.2307 W::12/29/14 at 18:00:48 (UTC)	117.587178 W	33.392605 N	11S	3694968.25	445392.64
Andrew Fisher	3	1/9/2015	9:40:42 AM	Inactive	Inactive	80	none	multiple burrow entrances	33 23.5574 N 117 35.2292 W::1/9/15 at 17:35:46 (UTC)	117.587153 W	33.392623 N	11S	3694970	445395.765
Keoni Calantas	4	1/23/2015	9:34:54 AM	Inactive	Inactive	80	none		33 23.5590 N 117 35.2275 W::1/23/15 at 17:33:43 (UTC)	117.587125 W	33.392650 N	11S	3694970	445395.765
Andrew Fisher	1	12/19/2014	9:57:33 AM	Inactive	Inactive	81	none	multiple burrow entrances	33 23.5523 N 117 35.2274 W::12/19/14 at 17:54:20 (UTC)	117.587123 W	33.392538 N	11S	3694962.85	445394.655
James McMorran	2	12/29/2014	10:03:49 AM	Inactive	Inactive	81	none		33 23.5563 N 117 35.2307 W::12/29/14 at 17:59:58 (UTC)	117.587178 W	33.392605 N	11S	3694962.85	445394.655
Andrew Fisher	3	1/9/2015	9:41:34 AM	Inactive	Inactive	81	none	occupied by ground squirrel	33 23.5546 N 117 35.2317 W::1/9/15 at 17:36:37 (UTC)	117.587195 W	33.392577 N	11S	3694962.15	445394.37
Keoni Calantas	4	1/23/2015	9:35:22 AM	Inactive	Inactive	81	none		33 23.5532 N 117 35.2267 W::1/23/15 at 17:34:13 (UTC)	117.587112 W	33.392553 N	11S	3694962.15	445394.37
Andrew Fisher	1	12/19/2014	9:58:32 AM	Inactive	Inactive	82	none	multiple burrow entrances	33 23.5457 N 117 35.2196 W::12/19/14 at 17:55:17 (UTC)	117.586993 W	33.392428 N	11S	3694946.9	445411.21
James McMorran	2	12/29/2014	10:02:37 AM	Inactive	Inactive	82	none		33 23.5458 N 117 35.2170 W::12/29/14 at 17:58:45 (UTC)	117.586950 W	33.392430 N	11S	3694946.9	445411.21
Andrew Fisher	3	1/9/2015	9:38:59 AM	Inactive	Inactive	82	none	multiple burrow entrances	33 23.5452 N 117 35.2181 W::1/9/15 at 17:34:01 (UTC)	117.586968 W	33.392420 N	11S	3694947.3	445410.75
Keoni Calantas	4	1/23/2015	9:36:13 AM	Inactive	Inactive	82	none		33 23.5467 N 117 35.2191 W::1/23/15 at 17:35:13 (UTC)	117.586985 W	33.392445 N	11S	3694947.3	445410.75
Andrew Fisher	1	12/19/2014	9:59:50 AM	Inactive	Inactive	83	none	multiple burrow entrances	33 23.5199 N 117 35.2073 W::12/19/14 at 17:56:43 (UTC)	117.586788 W	33.391998 N	11S	3694899.5	445429.455
James McMorran	2	12/29/2014	10:01:16 AM	Inactive	Inactive	83	none		33 23.5204 N 117 35.2054 W::12/29/14 at 17:57:20 (UTC)	117.586757 W	33.392007 N	11S	3694899.5	445429.455
Andrew Fisher	3	1/9/2015	9:38:00 AM	Inactive	Inactive	83	none	occupied by ground squirrel	33 23.5206 N 117 35.2069 W::1/9/15 at 17:33:05 (UTC)	117.586782 W	33.392010 N	11S	3694901.05	445429.835
Keoni Calantas	4	1/23/2015	9:37:40 AM	Inactive	Inactive	83	none		33 23.5213 N 117 35.2053 W::1/23/15 at 17:36:38 (UTC)	117.586755 W	33.392022 N	11S	3694901.05	445429.835
Andrew Fisher	1	12/19/2014	10:01:22 AM	Inactive	Inactive	84	none	multiple burrow entrances	33 23.4944 N 117 35.1843 W::12/19/14 at 17:58:10 (UTC)	117.586405 W	33.391573 N	11S	3694846.85	445464.36
James McMorran	2	12/29/2014	9:58:48 AM	Inactive	Inactive	84	none		33 23.4891 N 117 35.1830 W::12/29/14 at 17:54:54 (UTC)	117.586383 W	33.391485 N	11S	3694846.85	445464.36
Andrew Fisher	3	1/9/2015	9:55:39 AM	Inactive	Inactive	84	none	multiple burrow entrances	33 23.4944 N 117 35.1846 W::1/9/15 at 17:50:46 (UTC)	117.586410 W	33.391573 N	11S	3694852.25	445462.53
Donna Germann	4	1/23/2015	9:41:07 AM	Inactive	Inactive	84	none		33 23.4950 N 117 35.1851 W::1/23/15 at 17:38:00 (UTC)	117.586418 W	33.391583 N	11S	3694852.25	445462.53
Andrew Fisher	1	12/19/2014	10:03:59 AM	Inactive	Inactive	85	none	multiple burrow entrances	33 23.4695 N 117 35.1518 W::12/19/14 at 18:00:52 (UTC)	117.585858 W	33.391157 N	11S	3694808.1	445517.53
James McMorran	2	12/29/2014	9:56:42 AM	Inactive	Inactive	85	none		33 23.4725 N 117 35.1469 W::12/29/14 at 17:52:41 (UTC)	117.585782 W	33.391208 N	11S	3694808.1	445517.53
Andrew Fisher	3	1/9/2015	9:32:29 AM	Inactive	Inactive	85	none	multiple burrow entrances	33 23.4704 N 117 35.1495 W::1/9/15 at 17:27:33 (UTC)	117.585825 W	33.391173 N	11S	3694809	445521.58
Keoni Calantas	4	1/23/2015	9:42:12 AM	Inactive	Inactive	85	none		33 23.4725 N 117 35.1437 W::1/23/15 at 17:41:19 (UTC)	117.585728 W	33.391208 N	11S	3694809	445521.58
Andrew Fisher	1	12/19/2014	10:14:30 AM	Inactive	Inactive	86	none	multiple burrow entrances	33 23.4732 N 117 35.2210 W::12/19/14 at 18:11:16 (UTC)	117.587017 W	33.391220 N	11S	3694819.4	445402.035
Andrew Fisher	2	12/29/2014	10:23:25 AM	Inactive	Inactive	86	none	occupied by ground squirrel	33 23.4798 N 117 35.2263 W::12/29/14 at 18:19:31 (UTC)	117.587108 W	33.391337 N	11S	3694819.4	445402.035
Brennan Mulrooney	3	1/9/2015	9:56:05 AM	Inactive	Inactive	86	none		33 23.4718 N 117 35.2191 W::1/9/15 at 17:51:18 (UTC)	117.586985 W	33.391197 N	11S	3694809.65	445408.625
Andrew Fisher	4	1/23/2015	10:01:49 AM	Inactive	Inactive	86	none		33 23.4711 N 117 35.2198 W::1/23/15 at 17:55:46 (UTC)	117.586997 W	33.391185 N	11S	3694809.65	445408.625
Brennan Mulrooney	1	12/19/2014	6:59:50 AM	Inactive	Inactive	87	none	multiple burrow entrances	33 24.5733 N 117 34.5653 W::12/19/14 at 14:58:04 (UTC)	117.576088 W	33.409555 N	11S	3696840	446435.21
Brennan Mulrooney	2	12/29/2014	7:02:36 AM	Inactive	Inactive	87	none		33 24.5733 N 117 34.5635 W::12/29/14 at 14:58:55 (UTC)	117.576060 W	33.409555 N	11S	3696840	446435.21
Brennan Mulrooney	3	1/9/2015	7:03:29 AM	Inactive	Inactive	87	none		33 24.5754 N 117 34.5651 W::1/9/15 at 14:58:44 (UTC)	117.576085 W	33.409590 N	11S	3696843.55	446431.65
Andrew Fisher	4	1/22/2015	3:07:41 PM	Inactive	Inactive	87	none		33 24.5750 N 117 34.5683 W::1/22/15 at 23:01:41 (UTC)	117.576140 W	33.409583 N	11S	3696843.55	446431.65
Brennan Mulrooney	1	12/19/2014	7:02:22 AM	Inactive	Inactive	88	none		33 24.5496 N 117 34.5464 W::12/19/14 at 14:59:32 (UTC)	117.575773 W	33.409160 N	11S	3696796.5	446463.8
Brennan Mulrooney	2	12/29/2014	7:04:42 AM	Inactive	Inactive	88	none		33 24.5501 N 117 34.5453 W::12/29/14 at 15:00:46 (UTC)	117.575755 W	33.409168 N	11S	3696796.5	446463.8
Brennan Mulrooney	3	1/9/2015	7:05:35 AM	Inactive	Inactive	88	none		33 24.5509 N 117 34.5464 W::1/9/15 at 15:00:46 (UTC)	117.575773 W	33.409182 N	11S	3696798.1	446462.785
Andrew Fisher	4	1/22/2015	3:38:16 PM	Inactive	Inactive	88	none		33 24.5505 N 117 34.5466 W::1/22/15 at 23:32:18 (UTC)	117.575777 W	33.409175 N	11S	3696798.1	446462.785
Brennan Mulrooney	1	12/19/2014	7:03:43 AM	Inactive	Inactive	89	none	multiple burrow entrances	33 24.5331 N 117 34.5442 W::12/19/14 at 15:00:50 (UTC)	117.575737 W	33.408885 N	11S	3696766.25	446464.935
Matthew Kedziora	2	12/29/2014	7:03:16 AM	Inactive	Inactive	89	none		33 24.5338 N 117 34.5458 W::12/29/14 at 15:02:14 (UTC)	117.575763 W	33.408897 N	11S	3696766.25	446464.935
Brynne Mulrooney	3	1/9/2015	7:00:39 AM	Inactive	Inactive	89	none	Mammal tracks	33 24.5356 N 117 34.5449 W::1/9/15 at 15:01:12 (UTC)	117.575748 W	33.408927 N	11S	3696771.4	446463.75
Andrew Fisher	4	1/22/2015	3:36:30 PM	Inactive	Inactive	89	none		33 24.5369 N 117 34.5467 W::1/22/15 at 23:30:56 (UTC)	117.575778 W	33.408948 N	11S	3696771.4	446463.75

Appendix C – Raw Field Data

Primary_Bio	Survey Number	Date	Time	Cumulative_ Burrow_ Status	Field_ Burrow_ Status	Burrow ID	Sign	Notes	GPSLocation	Longitude	Latitude	Zone	Avg_ Northing_ Final	Avg_ Easting_ Final
Andrew Fisher	1	12/19/2014	7:10:35 AM	Inactive	Inactive	9	none	1 burrow	33 24.4578 N 117 34.4759 W::12/19/14 at 15:07:25 (UTC)	117.574600 W	33.407630 N	11S	3696626.25	446571.7
Brennan Mulrooney	2	12/29/2014	7:14:56 AM	Inactive	Inactive	9	none		33 24.4583 N 117 34.4752 W::12/29/14 at 15:11:12 (UTC)	117.574587 W	33.407638 N	11S	3696626.25	446571.7
Brennan Mulrooney	3	1/9/2015	7:12:30 AM	Inactive	Inactive	9	none		33 24.4574 N 117 34.4767 W::1/9/15 at 15:07:42 (UTC)	117.574612 W	33.407623 N	11S	3696626.4	446570.63
Andrew Fisher	4	1/22/2015	3:31:09 PM	Inactive	Inactive	9	none		33 24.4588 N 117 34.4759 W::1/22/15 at 23:25:10 (UTC)	117.574598 W	33.407647 N	11S	3696626.4	446570.63
Brennan Mulrooney	1	12/19/2014	7:05:00 AM	Inactive	Inactive	90	none	multiple burrow entrances	33 24.5256 N 117 34.5314 W::12/19/14 at 15:02:10 (UTC)	117.575523 W	33.408760 N	11S	3696751.3	446486.655
Brennan Mulrooney	2	12/29/2014	7:06:48 AM	Inactive	Inactive	90	none		33 24.5254 N 117 34.5307 W::12/29/14 at 15:02:57 (UTC)	117.575508 W	33.408755 N	11S	3696751.3	446486.655
Brennan Mulrooney	3	1/9/2015	7:07:37 AM	Inactive	Inactive	90	none		33 24.5248 N 117 34.5316 W::1/9/15 at 15:02:45 (UTC)	117.575527 W	33.408747 N	11S	3696750.9	446485.445
Andrew Fisher	4	1/22/2015	3:35:22 PM	Inactive	Inactive	90	none		33 24.5256 N 117 34.5318 W::1/22/15 at 23:29:26 (UTC)	117.575530 W	33.408760 N	11S	3696750.9	446485.445
Brennan Mulrooney	1	12/19/2014	7:07:39 AM	Inactive	Inactive	91	none		33 24.5160 N 117 34.5165 W::12/19/14 at 15:04:38 (UTC)	117.575283 W	33.408593 N	11S	3696731.45	446507.835
Brennan Mulrooney	2	12/29/2014	7:10:12 AM	Inactive	Inactive	91	none		33 24.5139 N 117 34.5174 W::12/29/14 at 15:06:30 (UTC)	117.575290 W	33.408565 N	11S	3696731.45	446507.835
Brennan Mulrooney	3	1/9/2015	7:08:43 AM	Inactive	Inactive	91	none		33 24.5138 N 117 34.5186 W::1/9/15 at 15:03:52 (UTC)	117.575310 W	33.408563 N	11S	3696730.4	446506.67
Andrew Fisher	4	1/22/2015	3:34:31 PM	Inactive	Inactive	91	none		33 24.5146 N 117 34.5173 W::1/22/15 at 23:28:31 (UTC)	117.575288 W	33.408577 N	11S	3696730.4	446506.67
Brennan Mulrooney	1	12/19/2014	7:08:26 AM	Inactive	Inactive	92	none	multiple burrow entrances	33 24.4992 N 117 34.5160 W::12/19/14 at 15:06:23 (UTC)	117.575267 W	33.408320 N	11S	3696704.15	446512.055
Brennan Mulrooney	2	12/29/2014	7:11:31 AM	Inactive	Inactive	92	none		33 24.5008 N 117 34.5127 W::12/29/14 at 15:07:35 (UTC)	117.575212 W	33.408347 N	11S	3696704.15	446512.055
Brennan Mulrooney	3	1/9/2015	7:09:26 AM	Inactive	Inactive	92	none		33 24.5014 N 117 34.5145 W::1/9/15 at 15:04:37 (UTC)	117.575242 W	33.408357 N	11S	3696707.5	446509.15
Andrew Fisher	4	1/22/2015	3:33:28 PM	Inactive	Inactive	92	none		33 24.5022 N 117 34.5180 W::1/22/15 at 23:27:59 (UTC)	117.575300 W	33.408370 N	11S	3696707.5	446509.15
Brennan Mulrooney	1	12/19/2014	7:10:58 AM	Inactive	Inactive	93	none		33 24.4730 N 117 34.4902 W::12/19/14 at 15:08:06 (UTC)	117.574827 W	33.407858 N	11S	3696650.1	446551.51
Brennan Mulrooney	2	12/29/2014	7:13:15 AM	Inactive	Inactive	93	none		33 24.4702 N 117 34.4878 W::12/29/14 at 15:09:52 (UTC)	117.574797 W	33.407838 N	11S	3696650.1	446551.51
Brennan Mulrooney	3	1/9/2015	7:11:35 AM	Inactive	Inactive	93	none		33 24.4701 N 117 34.4890 W::1/9/15 at 15:06:44 (UTC)	117.574817 W	33.407835 N	11S	3696647.95	446550.43
Andrew Fisher	4	1/22/2015	3:31:55 PM	Inactive	Inactive	93	none		33 24.4693 N 117 34.4898 W::1/22/15 at 23:25:57 (UTC)	117.574830 W	33.407822 N	11S	3696647.95	446550.43
Brennan Mulrooney	1	12/19/2014	7:12:13 AM	Inactive	Inactive	94	none		33 24.4496 N 117 34.4824 W::12/19/14 at 15:09:24 (UTC)	117.574707 W	33.407493 N	11S	3696612.6	446557.535
Matthew Kedziora	2	12/29/2014	7:13:26 AM	Inactive	Inactive	94	none		33 24.4516 N 117 34.4870 W::12/29/14 at 15:12:28 (UTC)	117.574783 W	33.407527 N	11S	3696612.6	446557.535
Andrew Fisher	3	1/9/2015	9:55:39 AM	Inactive	Inactive	94	none		33 24.4516 N 117 34.4870 W::12/29/14 at 15:12:28 (UTC)	117.574783 W	33.407527 N	11S	3696610.5	446556.13
Andrew Fisher	4	1/22/2015	3:54:13 PM	Inactive	Inactive	94	none		33 24.4473 N 117 34.4842 W::1/22/15 at 23:48:23 (UTC)	117.574737 W	33.407455 N	11S	3696610.5	446556.13
Brennan Mulrooney	1	12/19/2014	7:17:22 AM	Inactive	Inactive	95	none		33 24.3780 N 117 34.4316 W::12/19/14 at 15:14:31 (UTC)	117.573860 W	33.406300 N	11S	3696477.45	446636.435
Matthew Kedziora	2	12/29/2014	7:18:12 AM	Inactive	Inactive	95	none		33 24.3774 N 117 34.4350 W::12/29/14 at 15:17:12 (UTC)	117.573917 W	33.406290 N	11S	3696477.45	446636.435
Brynne Mulrooney	3	1/9/2015	7:12:19 AM	Inactive	Inactive	95	none		33 24.3771 N 117 34.4330 W::1/9/15 at 15:12:29 (UTC)	117.573883 W	33.406285 N	11S	3696475.95	446637.68
Andrew Fisher	4	1/22/2015	4:00:58 PM	Inactive	Inactive	95	none		33 24.3766 N 117 34.4320 W::1/22/15 at 23:55:02 (UTC)	117.573867 W	33.406277 N	11S	3696475.95	446637.68
Brennan Mulrooney	1	12/19/2014	7:21:17 AM	Inactive	Inactive	96	none		33 24.3226 N 117 34.4075 W::12/19/14 at 15:18:18 (UTC)	117.573428 W	33.405322 N	11S	3696371.1	446684.945
James McMorran	2	12/29/2014	7:24:09 AM	Inactive	Inactive	96	none		33 24.3213 N 117 34.3976 W::12/29/14 at 15:20:10 (UTC)	117.573293 W	33.405355 N	11S	3696371.1	446684.945
James McMorran	3	1/9/2015	7:20:18 AM	Inactive	Inactive	96	none		33 24.3193 N 117 34.4021 W::1/9/15 at 15:15:03 (UTC)	117.573368 W	33.405322 N	11S	3696367.4	446684.46
Andrew Fisher	4	1/22/2015	4:03:51 PM	Inactive	Inactive	96	none		33 24.3173 N 117 34.4018 W::1/22/15 at 23:57:50 (UTC)	117.573363 W	33.405288 N	11S	3696367.4	446684.46
Brennan Mulrooney	1	12/19/2014	7:22:23 AM	Inactive	Inactive	97	none		33 24.2987 N 117 34.3955 W::12/19/14 at 15:19:21 (UTC)	117.573258 W	33.404978 N	11S	3696331.6	446699.425
James McMorran	2	12/29/2014	7:25:31 AM	Inactive	Inactive	97	none		33 24.2992 N 117 34.3888 W::12/29/14 at 15:21:38 (UTC)	117.573147 W	33.404987 N	11S	3696331.6	446699.425
James McMorran	3	1/9/2015	7:21:18 AM	Inactive	Inactive	97	none		33 24.3008 N 117 34.3950 W::1/9/15 at 15:16:00 (UTC)	117.573265 W	33.405032 N	11S	3696334.95	446693.77
Andrew Fisher	4	1/22/2015	4:10:40 PM	Inactive	Inactive	97	none		33 24.2996 N 117 34.3957 W::1/23/15 at 00:04:56 (UTC)	117.573262 W	33.404993 N	11S	3696334.95	446693.77
Brennan Mulrooney	1	12/19/2014	7:24:27 AM	Inactive	Inactive	98	none		33 24.2564 N 117 34.3489 W::12/19/14 at 15:21:36 (UTC)	117.572480 W	33.404272 N	11S	3696250.85	446769.325
Matthew Kedziora	2	12/29/2014	7:25:35 AM	Inactive	Inactive	98	none		33 24.2546 N 117 34.3447 W::12/29/14 at 15:24:37 (UTC)	117.572412 W	33.404243 N	11S	3696250.85	446769.325
Brynne Mulrooney	3	1/9/2015	7:18:12 AM	No Longer Suitable	No Longer Suitable	98	none		33 24.2552 N 117 34.3479 W::1/9/15 at 15:18:30 (UTC)	117.572465 W	33.404253 N	11S	3696245.75	446765.675
Andrew Fisher	4	1/22/2015	4:06:38 PM	Inactive	Inactive	98	none		33 24.2502 N 117 34.3503 W::1/23/15 at 00:00:55 (UTC)	117.572505 W	33.404170 N	11S	3696245.75	446765.675
Brennan Mulrooney	1	12/19/2014	7:34:21 AM	Inactive	Inactive	99	none	multiple burrow entrances	33 24.2656 N 117 34.4337 W::12/19/14 at 15:31:31 (UTC)	117.573895 W	33.404427 N	11S	3696270.3	446633.665
Andrew Fisher	2	12/29/2014	7:44:17 AM	Inactive	Inactive	99	none	multiple burrow entrances	33 24.2655 N 117 34.4350 W::12/29/14 at 15:40:19 (UTC)	117.573917 W	33.404425 N	11S	3696270.3	446633.665
Andrew Fisher	3	1/9/2015	7:31:52 AM	Inactive	Inactive	99	none	occupied by ground squirrel	33 24.2651 N 117 34.4359 W::1/9/15 at 15:26:53 (UTC)	117.573932 W	33.404418 N	11S	3696271.6	446631.72
Donna Germann	4	1/23/2015	7:22:00 AM	Inactive	Inactive	99	none		33 24.2675 N 117 34.4353 W::1/23/15 at 15:18:53 (UTC)	117.573922 W	33.404458 N	11S	3696271.6	446631.72

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Appendix G – Coastal Cactus Wren Breeding Survey Report Bloom 2015

THIS APPENDIX HAS BEEN OMITTED – IT HAS BEEN SUBMITTED UNDER CONFIDENTIAL COVER

Appendix H – Coastal California Gnatcatcher Survey Report AECOM 2014

AECOM
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October 6, 2014

Stacey Love
Recovery Permit Coordinator
Carlsbad Fish and Wildlife Office
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

RE: 2014 Transmission Line 695 Wood to Steel Replacement Project, Coastal California Gnatcatcher 45-Day Summary Report, Orange and San Diego Counties, California

Dear Ms. Love:

In compliance with the Special Terms and Conditions for Endangered Species Permit TE-820658-6, AECOM biologists conducted focused surveys in August 2014 to determine the presence or absence of the federally threatened coastal California gnatcatcher (*Polioptila californica californica*) (CAGN) within the proposed Transmission Line (TL) 695 Wood to Steel Replacement Project (the "project") in both Orange and San Diego Counties, California (Figure 1). As an environmental consultant, AECOM is contracted by San Diego Gas & Electric (SDG&E) to conduct protocol CAGN surveys within potentially suitable habitat proposed for the project and an adjacent 150-foot buffer (Figure 2).

Project Description

The project would involve the replacement of existing wooden structures with steel poles. Some wooden poles and associated anchors would be completely removed and not replaced due to the longer span between steel poles. The project would be covered by the SDG&E Natural Community Conservation Plan (NCCP), and would include a 150-foot survey buffer around the tie-line centerline, for a total width of 300 feet. Several stringing sites located throughout the project area also included a 150-foot buffer. The staging area is located in a developed area, so no buffer was placed around the staging area. The project is located along the northern boundary of Marine Corps Base Camp Pendleton (MCBCP or Base), with the northern end in Orange County and the southern end near the San Onofre Nuclear Generating Station (SONGS).

Site Description

MCBCP is a 200-square-mile military training facility located along the Pacific coast in northwestern San Diego County, 40 miles north of downtown San Diego. Orange County is contiguous with the northwest boundary of MCBCP, and Riverside County is northeast of, but not adjacent to, the boundary of MCBCP. The city of San Clemente and Cleveland National Forest border MCBCP to the northwest and north, respectively. The city of Oceanside is to the south. The San Diego County community of Fallbrook is to the east.

MCBCP occupies approximately 125,000 acres of largely undeveloped land, with more than 17 miles of coastline in northwestern San Diego County of Southern California. It is the

U.S. Marine Corp's premier amphibious training base, and the U.S. Marine Corps' only west coast amphibious training base, promoting the combat readiness of operating forces by providing facilities, services, and support responsive to the needs of Marines, sailors, and their families.

The project is located in the coastal province in northern San Diego County on MCBCP (Figure 1). This region is characterized by warm, dry summers and mild winters, with mean temperatures ranging from 75 to 78 degrees Fahrenheit (°F). Although close enough to the coast to benefit from maritime clouds and fog, MCBCP is relatively dry. Elevation within the project area ranges from approximately 30 to 570 feet above mean sea level.

The project area is located in the far northern boundary of MCBCP and extends into Orange County. The project area extends from a small substation in Orange County, and then heads west toward the Pacific Ocean along the ridgetops of steep hills along the north side of Christianitos Road. These hills are along the border of San Diego and Orange Counties, and occur on lands that are under lease from California State Parks. As the project area heads west, it splits and crosses San Mateo Creek heading south at two points. The two separate lines head south through MCBCP, with one line roughly paralleling Interstate 5, and the other line going up and over a steep hill on the east side of the San Onofre Housing Area. The two lines join again after they cross San Onofre Creek, and then terminate opposite and east of SONGS.

Background Information

CAGN, a subspecies of California gnatcatcher (*Polioptila californica*), is federally listed as threatened by the U.S. Fish and Wildlife Service (USFWS) (1993) and considered a species of special concern by the California Department of Fish and Wildlife (CDFW) (State of California 2011). No recovery plan has been drafted for CAGN. CAGN is an uncommon year-round resident of Southern California. This species is declining proportionately with the continued loss of coastal sage scrub habitat in the six Southern California counties (San Bernardino, Ventura, Los Angeles, Orange, San Diego, and Riverside) located within the coastal plain.

The primary cause of the decline of CAGN is the cumulative loss of coastal sage scrub vegetation to urban and agricultural development. Studies suggest that CAGN may be highly sensitive to the effects of habitat fragmentation and development activity (Atwood 1990; ERCE 1990). USFWS has estimated that coastal sage scrub habitat has been reduced by 70 to 90% of its historical extent (USFWS 1991), and little of what remains is protected in natural open space.

CAGN generally inhabits Diegan coastal sage scrub and Riversidian coastal sage scrub dominated by California sagebrush (*Artemesia californica*) and flat-topped buckwheat (*Eriogonum fasciculatum*), usually at lower than 1,500 feet in elevation along the coastal slope. When nesting, CAGN typically avoids slopes greater than 25% that have tall, dense vegetation. CAGN pairs will attempt several nests each year, each placed in a different

location inside of their breeding territory, but most nest attempts are unsuccessful due to depredation by a variety of species (Atwood and Bontrager 2001). Clutch size ranges from one to five eggs, with three or four eggs most common. CAGN typically experiences a high rate of nest failure, with an annual mean number of four nest attempts per pair in San Diego County (Grishaver et al. 1998). CAGN tends to have slightly smaller clutches in years with poor rainfall, and will experience a higher rate of mortality during cold winters (Atwood and Bontrager 2001; Grishaver et al. 1998). CAGN will remain paired through the nonbreeding season, and will generally expand their home range when not breeding.

CAGN is particularly vulnerable to habitat destruction and fragmentation because of poor dispersal, reliance on a specific habitat type, and difficulty in successful breeding. On average, juvenile CAGN disperse less than 1.2 miles from their natal territories, making colonization of distant habitat patches difficult. CAGN is closely tied to coastal sage scrub, and has been described as “obligate residents of coastal sage scrub” (Atwood and Bontrager 2001).

Critical habitat was originally designated for CAGN by USFWS in 2000, but this was revised, and a final rule was published in 2007 (USFWS 2007). No critical habitat for CAGN occurs on MCBCP (MCBCP 2007) or adjacent to the project area. MCBCP supports one of the core populations of CAGN within San Diego County due to the extensive amount of intact coastal sage scrub occurring on the Base (Unitt 2004).

Survey Methodology

The CAGN survey area includes the proposed project tie-line centerline and stringing sites plus an adjacent 150-foot-radius survey buffer around the project area. Before surveys, AECOM biologists conducted a habitat assessment and vegetation mapping within the survey area on July 30 and 31, and August 4, 2014, to outline potentially suitable CAGN habitat and to delineate the vegetation community boundaries. Potentially suitable CAGN habitat was then digitized onto maps to establish a CAGN survey area of approximately 405 acres (Figure 2). The vegetation as mapped by AECOM botanists in summer 2014 was used to delineate the CAGN survey area. Potentially suitable CAGN habitat includes Diegan coastal sage scrub, disturbed Diegan coastal sage scrub interspersed with grassland, and mulefat and coyote bush scrub interspersed with Diegan coastal sage scrub.

CAGN surveys were completed during the 2014 breeding season per USFWS guidelines (USFWS 1997). Since the CAGN survey area is included within SDG&E’s NCCP area, the protocol requires three surveys to be conducted during the breeding season (February 15 through August 30). Surveys were conducted within the survey area in suitable CAGN habitat. All surveys followed the current USFWS protocol for the species, dated February 28, 1997 (and as amended July 28, 1997) (USFWS 1997). AECOM biologists Andrew Fisher, Bonnie Hendricks, James McMorran, and Brennan Mulrooney conducted the surveys under Endangered Species Permit TE-820658-6. CAGN surveys were conducted during morning hours when conditions were suitable to detect CAGN and continued to no later than noon when bird activity decreased. The three protocol surveys were separated by a minimum of 7

days, and were conducted from August 11 through August 27, 2014. Approximately 405 acres of potentially suitable CAGN habitat spread across the project area were surveyed per the protocol during each survey (Figure 2).

Each survey consisted of walking meandering transects through potential CAGN habitat, including all scrub associations, uplands, and canyons. The biologist conducted passive surveillance (i.e., listening and looking for the species) in all habitats with potential to support CAGN. If an observation was not made after approximately 5 to 10 minutes of passive survey activity, a recorded vocalization of CAGN was played for approximately 5 to 10 seconds (i.e., active survey activity), followed by another period of passive observation. If CAGN was detected, its location, sex, and behavior were recorded with a Global Positioning System (GPS) unit within an HP Travel Companion. Each CAGN was observed for a few minutes to determine if it was single, a pair, nesting, feeding young, exhibiting territoriality, or other behavior. When a CAGN was detected during a survey, it was observed for several minutes, and different GPS points were taken each time the CAGN moved to record the area being used by the CAGN at the time of the survey. In this way, the CAGN "use area" at the time of the survey was determined and is depicted on the figures (Figures 3c and 3d). Sometimes a CAGN was only heard once or only briefly seen and, therefore, no "use area" could be determined.

Surveys were not conducted during periods of inclement weather such as extreme wind or during a rain event. As allowed under AECOM's endangered species permit, the survey activity "takes" CAGN through harassment with playback of taped CAGN vocalizations. No individual CAGNs were captured.

Results

Survey results for the project are depicted in Figures 3a through 3j. Prior to the start of CAGN surveys, several CAGNs were detected during habitat assessments. These CAGNs consisted of one pair, one family group of four birds, and two individual juveniles. The locations of these CAGNs are depicted in Figures 3e and 3g.

A summary of survey dates, permitted biologists, times, and weather conditions are presented in Table 1. During surveys, temperature ranged from 63 to 88°F, and wind speed ranged 0 to 8 miles per hour (mph).

Table 1
Survey Dates, Permitted Biologist, and Weather Conditions

Survey Number	Date	Permitted Biologist	Time	Weather Conditions
1	8/11/2014	Andrew Fisher	0610–1155	Start: 63°F, wind 0 mph, 100% cover End: 76°F, wind 3 mph, 15% cover
1	8/12/2014	Andrew Fisher	0608–1152	Start: 59°F, wind 0 mph, 100% cover End: 76°F, wind 4 mph, 0% cover
1	8/13/2014	Brennan Mulrooney	0643–1200	Start: 69°F, wind 1 mph, 100% cover End: 79°F, wind 7 mph, 10% cover
1	8/13/2014	Andrew Fisher	0648–1200	Start: 69°F, wind 2 mph, 100% cover End: 80°F, wind 4 mph, 5% cover
2	8/19/2014	James McMorran	0631–1150	Start: 69°F, wind 3 mph, 100% cover End: 84°F, wind 6 mph, 0% cover
2	8/19/2014	Brennan Mulrooney	0634–1157	Start: 64°F, wind 1 mph, 100% cover End: 84°F, wind 8 mph, 10% cover
2	8/20/2014	Andrew Fisher	0651–1055	Start: 65°F, wind 0 mph, 35% cover End: 75°F, wind 0 mph, 80% cover
2	8/20/2014	Brennan Mulrooney	0656–1126	Start: 66°F, wind 0 mph, 30% cover End: 73°F, wind 6 mph, 50% cover
2	8/20/2014	James McMorran	0659–1135	Start: 62°F, wind 3 mph, 50% cover End: 74°F, wind 4 mph, 50% cover
3	8/26/2014	Bonnie Hendricks	0624–1200	Start: 66°F, wind 3 mph, 5% cover End: 79°F, wind 8 mph, 5% cover
3	8/26/2014	Brennan Mulrooney	0657–1200	Start: 66°F, wind 3 mph, 10% cover End: 79°F, wind 8 mph, 5% cover
3	8/27/2014	Bonnie Hendricks	0656–1200	Start: 65°F, wind 0 mph, 0% cover End: 88°F, wind 3 mph, 0% cover
3	8/27/2014	Brennan Mulrooney	0657–1200	Start: 65°F, wind 3 mph, 0% cover End: 85°F, wind 7 mph, 0% cover

The CAGN survey area consisted of approximately 405 acres of Diegan coastal sage scrub and various scrub associations that constitute potential CAGN habitat. Potentially suitable habitat included the slopes of several large drainages, mesa tops, hillsides, alluvial floodplain areas, and other areas with Diegan coastal sage scrub within the project area. In many areas, the Diegan coastal sage scrub was mature enough to support breeding CAGN and did not appear to have burned for many years. Table 2 details the CAGN observations within the project area. All survey results for the project are depicted in Figures 3a through 3j.

Table 2
Coastal California Gnatcatcher Detections

Survey Number	Date	Survey Personnel	CAGN Detections*
1	8/11/2014	Andrew Fisher	1 pair and 1 unknown individual
1	8/12/2014	Andrew Fisher	4 individual males, 4 individual females, 1 male plus an unknown bird, 2 females plus an unknown bird and 1 juvenile, 1 juvenile, and 1 unknown individual
1	8/13/2014	Brennan Mulrooney	1 male, 1 male plus and unknown bird, and 4 unknown individuals
1	8/13/2014	Andrew Fisher	5 pairs, 1 individual male, 1 male plus an unknown individual, 1 family group of 3 birds, 1 family group of 4 birds, 3 juvenile birds, and 1 unknown individual
2	8/19/2014	James McMorran	6 unknown individuals
2	8/19/2014	Brennan Mulrooney	1 unknown individual
2	8/20/2014	Andrew Fisher	1 pair, 2 individual males, 5 juvenile birds, and 2 unknown individuals
2	8/20/2014	Brennan Mulrooney	1 pair, 1 family group of three birds, and 4 unknown individuals
2	8/20/2014	James McMorran	1 pair, 1 male plus an unknown individual, and 9 unknown individuals
3	8/26/2014	Bonnie Hendricks	1 pair and 3 unknown individuals
3	8/26/2014	Brennan Mulrooney	1 female and 3 unknown individuals
3	8/27/2014	Bonnie Hendricks	3 unknown individuals
3	8/27/2014	Brennan Mulrooney	1 pair and 5 unknown individuals

* Unknown birds were detected aurally, but never seen and, therefore, their age or sex could not be determined.

CAGNs were detected during all surveys between August 11 and August 27, 2014. In some cases CAGN were detected slightly outside the project area but were still recorded because they were detected during a survey, and could move into or use the project area. Surveys were conducted near the end of the breeding season, and, therefore, CAGNs were beginning to molt (males lose their distinguishing black cap), juveniles were dispersing, and many females and juveniles could not be differentiated. Additionally, many birds were beginning to leave their primary nesting areas and beginning to expand their territories for the nonbreeding season. Since surveys were conducted at the end of the breeding season, many CAGN were less responsive to a taped playback compared to the beginning of the breeding season. Therefore, it was difficult to elicit a behavioral response (birds may fly toward the taped playback or tend to “pop-up” out of the shrubs to get a visual on the

intruding bird), and surveyors were less likely to get a visual on CAGN in the area. Due to the time of year, many birds were unresponsive and simply gave a short "mew" call and were never seen. Several male birds were detected with a second unknown bird that could possibly represent a pair, as the second bird was likely an unresponsive female. In addition, 2014 was an exceptionally dry year, and instead of having an extended breeding season, the vegetation was extremely dry and no evidence of nesting was observed during surveys.

Table 3 summarizes the CAGN detections within the project area based on the type of CAGN detection (pair, family group, etc.) and the number of detections.

Table 3
Summary of Coastal California Gnatcatcher Detections

Type of CAGN Detection	Number of Detections
Pair	11
Individual Male	7
Individual Female	5
Family Group	3 (3 to 4 birds per group)
Male with Unknown Bird (potential pair)	4
Female with Unknown Bird	2
Juvenile	9
Unknown Individual	43
Total CAGN Detections	**108**

There were 108 CAGN detections during protocol surveys. This number does not necessarily represent the total number of individual CAGNs detected, but simply the number of birds detected across all three surveys. Most likely, several of the same pairs, family groups, juveniles, and unknown individuals were detected in the same general area across the three surveys.

One federally listed endangered species, least Bell's vireo (*Vireo bellii pusillus*), and three special-status wildlife species (CDFW species of special concern) were detected during focused CAGN surveys within the project area: coastal cactus wren (*Campylorhynchus brunneicapillus sandiegensis*), yellow-breasted chat (*Icteria virens*), and yellow warbler (*Setophaga petechia brewsteri*) (State of California 2011). Locations of these species are depicted in Figure 4. Field data collected during 2014 CAGN surveys are presented in Appendix A and a list of all wildlife species detected is presented in Appendix B.

Discussion

Across all three protocol surveys in August 2014, there were 108 CAGN detections. These detections most likely include CAGNs that were detected on multiple surveys in the same general area. Multiple pairs, males, females, family groups, juveniles, and unknown birds were detected throughout the length of the project. Generally, CAGNs were more numerous closer to the coast and became less abundant farther east. The far northeast corner of the

project area did not have any CAGN detections. In that area, the Diegan coastal sage scrub was beginning to transition into chaparral-type vegetation, and contained more large shrubs with nearby trees. Generally, mature Diegan coastal sage scrub along southwest-facing slopes, shallow drainages, valleys, and gradually sloping areas at the base of hills tended to have the most CAGN.

Throughout fall 2013 and spring 2014, rainfall was very low. Rainfall was approximately 68% below the average between October 2013 and May 2014 (NOAA 2014). Rainfall can be both positive and negative for CAGN. With low winter rainfall (such as during winter 2013), there tends to be lower adult mortality during the nonbreeding season, and more adult CAGN survive the winter to breed the following spring. However, low rainfall (in both winter and spring months) also leads to lower reproductive success and a shorter nesting season. Since no active nests were detected within the project area, it is not possible to confirm nesting, but the presence of several family groups and juveniles may indicate successful nesting earlier in the season. Since surveys were conducted at the end of the breeding season, several adult CAGN males were molting into nonbreeding plumage, and birds appeared less interested in the taped playback. Many juvenile birds were dispersing, and pairs were no longer actively defending their territories. Despite dry conditions, many CAGN were detected during surveys.

If you have any questions or require additional information, contact me at (619) 233-1454.

Andrew Fisher
Wildlife Biologist

cc: Todd Easley, SDG&E
Karen Click, SDG&E
Brynne Mulrooney, AECOM
Cecilia Meyer Lovell, AECOM

Attachments: Figure 1 – Vicinity Map
Figure 2 – Coastal California Gnatcatcher Survey Areas
Figure 3a–3j – Coastal California Gnatcatcher Observations
Figure 4 – Other Sensitive Species Observations
Appendix A – Field Data Collected during 2014 CAGN Surveys
Appendix B – Wildlife Species Detected during 2014 CAGN Surveys

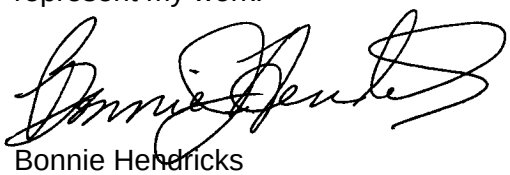
Certification Statement

"I certify that the information in this survey report and attached exhibits fully and accurately represent my work."



Andrew Fisher
Wildlife Biologist
TE-820658-6

"I certify that the information in this survey report and attached exhibits fully and accurately represent my work."



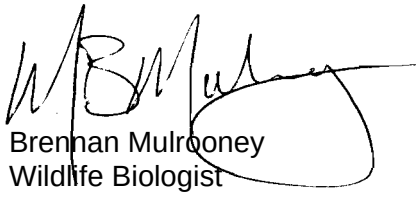
Bonnie Hendricks
Wildlife Biologist
TE-820658-6

"I certify that the information in this survey report and attached exhibits fully and accurately represent my work."



James McMorran
Wildlife Biologist
TE-820658-6

"I certify that the information in this survey report and attached exhibits fully and accurately represent my work."



Brennan Mulrooney
Wildlife Biologist
TE-820658-6

Literature Cited

Atwood, J. L.
1990 *Status Review of the California Gnatcatcher (Polioptila californica*). Manomet Bird Observatory, Manomet, Massachusetts. 79 pp.

Atwood, J. L., and D. R. Bontrager
2001 California Gnatcatcher (*Polioptila californica)*. In *The Birds of North America*, No. 574. 32 pp.

Environmental and Energy Services Company (ERCE)
1990 *Phase 1 Report Amber Ridge California Gnatcatcher Study*. Prepared for Weingarten, Siegel, Fletcher Group. April. 30 pp.

Grishaver, M. A., P. J. Mock, and K. L. Preston
1998 Breeding Behavior of the California Gnatcatcher in Southwestern San Diego County, California. *West. Birds* 29:299–322.

Marine Corps Base Camp Pendleton (MCBCP)
2007 *Integrated Natural Resources Management Plan*.

National Oceanic and Atmospheric Administration (NOAA)
2014 Available at http://www.nws.noaa.gov/climate/index.php?wfo=sgx. Accessed July 8, 2014.

State of California
2011 Department of Fish and Game. Biogeographic Data Branch. California Natural Diversity Database. Special Animals (898 taxa). January.

Unitt, Philip
2004 *San Diego County Bird Atlas*. San Diego Natural History Museum, San Diego, California.

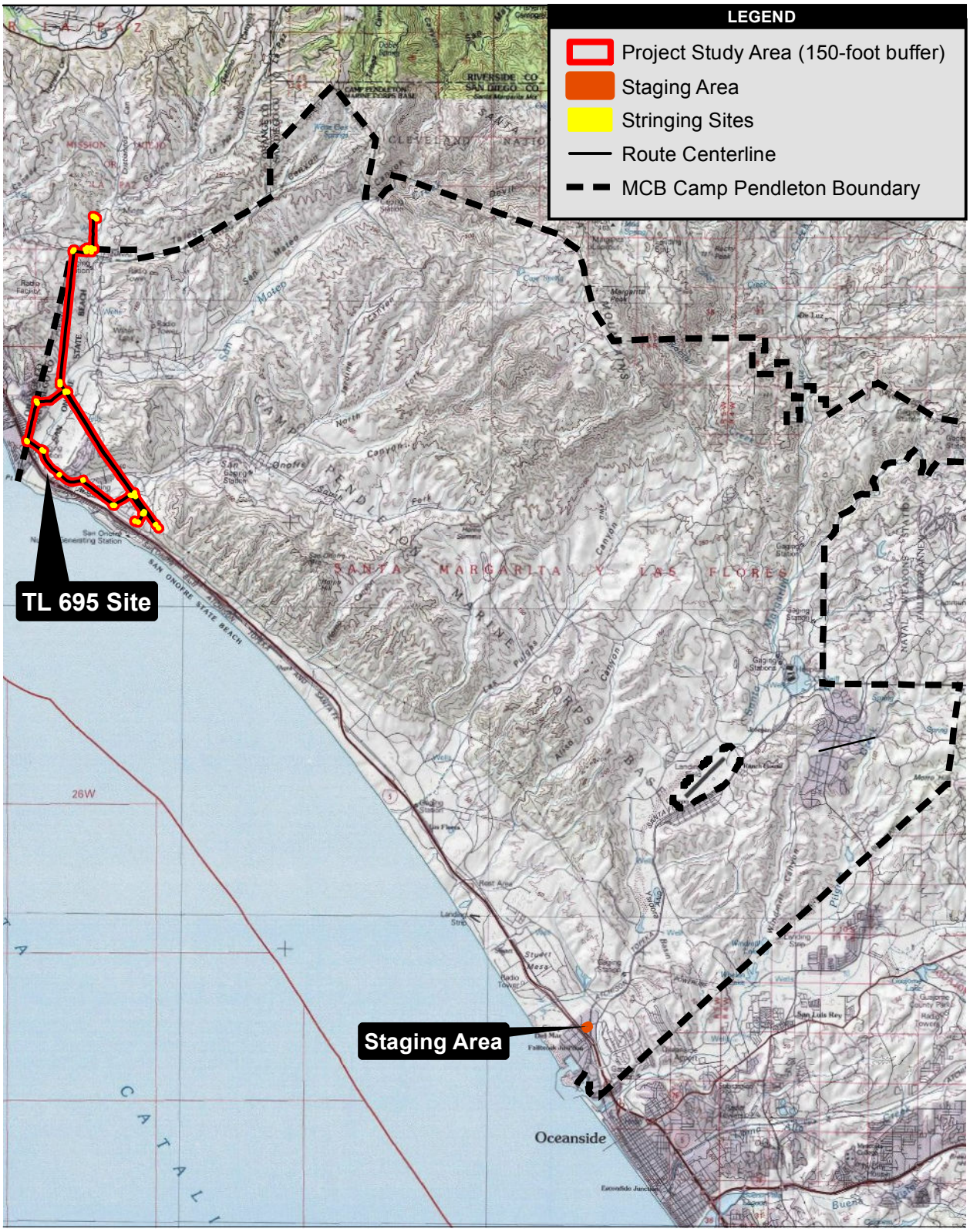
U.S. Fish and Wildlife Service (USFWS)
1991 *Summary of the Proposed Rule to List the Coastal California Gnatcatcher (Polioptila californica) as Endangered in California and Baja, Mexico*. September. 114 pp.

1993 Endangered and Threatened Wildlife and Plants: Special Rule Concerning Take of the Threatened Coastal California Gnatcatcher. Final Rule. *Federal Register* 58:65088–65096.

1997 Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Guidelines February 28, 1997. Available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/cagn/coastal-gnatcatcher_survey-guidelines.pdf.

2007 Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*); Final Rule. *Federal Register* 72:72009–72213.

FIGURES



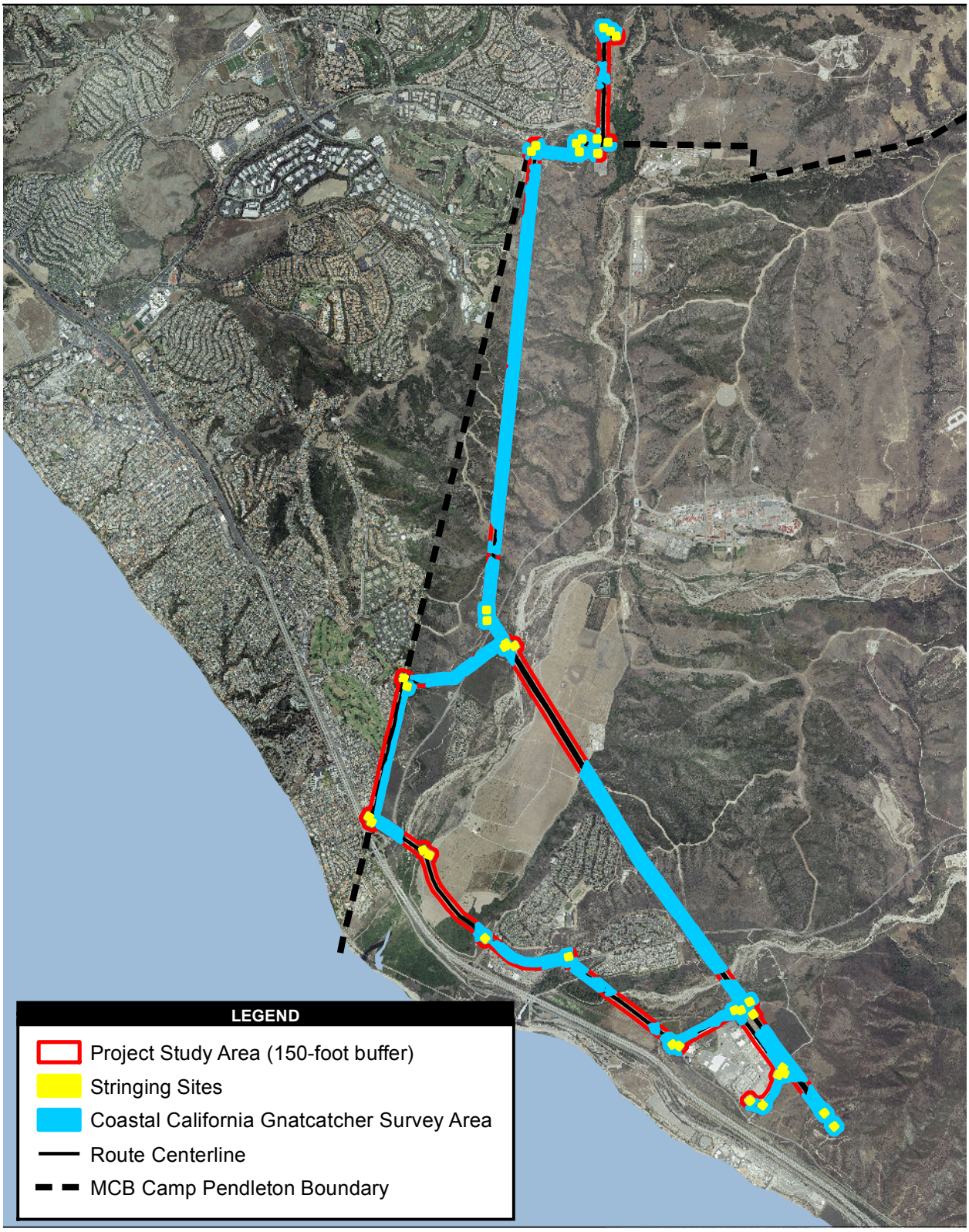
Copyright:© 2013 National Geographic Society, i-cubed

3 1.5 0 3 Miles

Scale: 1:190,080; 1 inch = 3 miles

Figure 1
Vicinity Map

Path: \\ussdg1fp001.na.aecomnet.com\data\projects\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\Results_Ltr\Fig_1_8x11P.mxd, 10/1/2014, janssenn



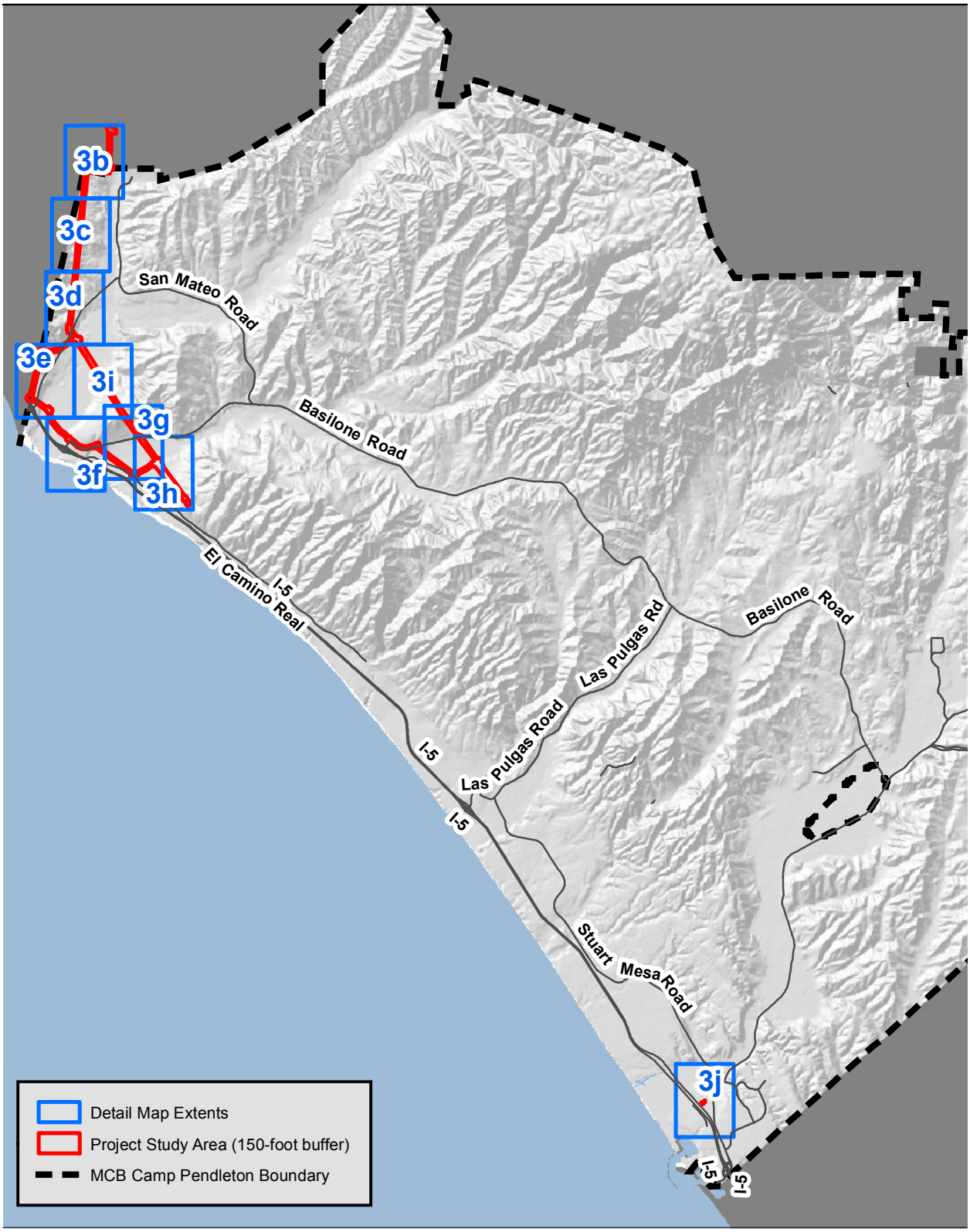
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

4,500 2,250 0 4,500 Feet

Scale: 1:54,000; 1 inch = 4,500 feet

Figure 2
Coastal California Gnatcatcher Survey Areas

Path: \\ussdg1fp001.na.aecomnet.com\data\projects\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\Fig_2.mxd, 9/30/2014, janssenn



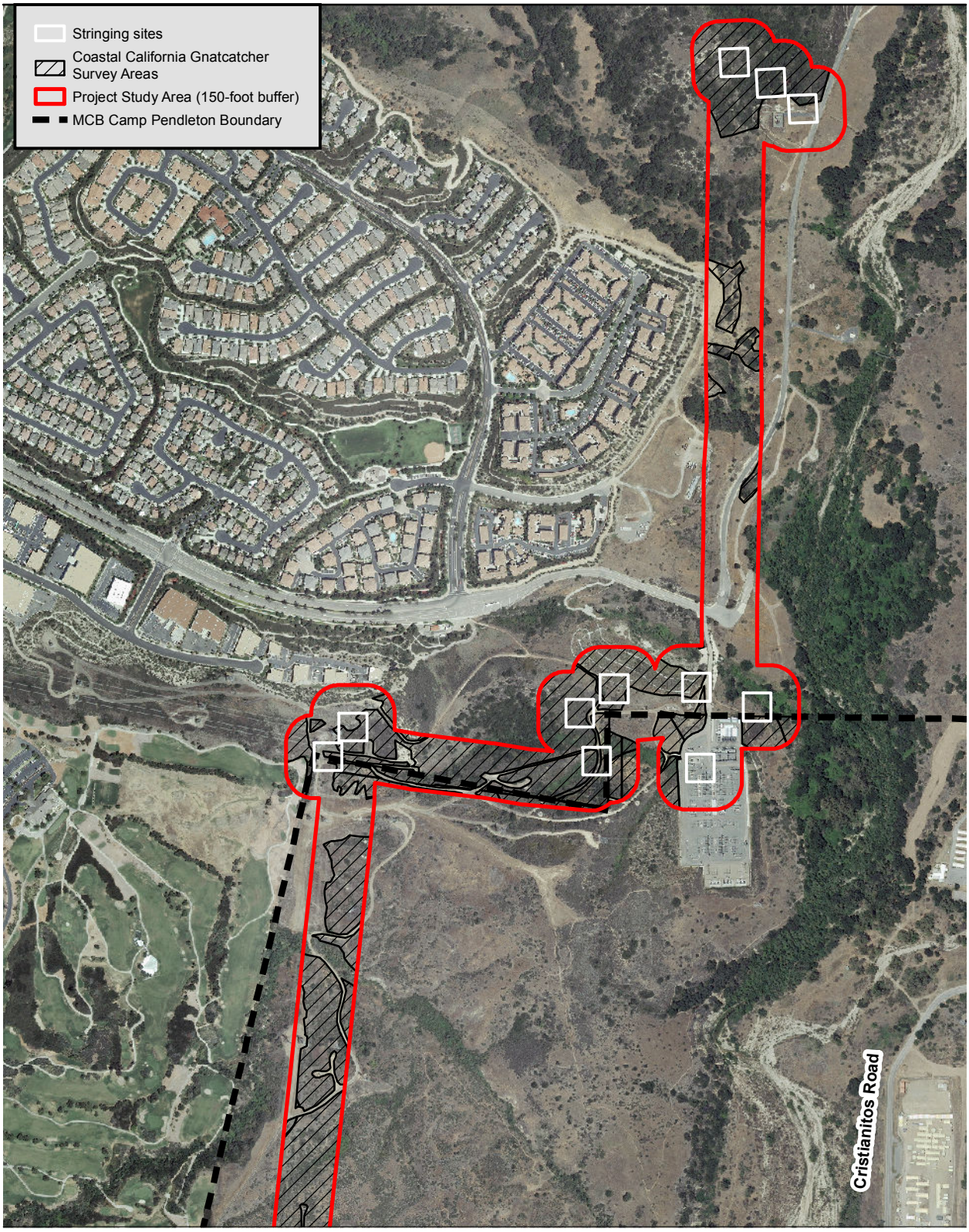
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

2.5 1.25 0 2.5 Miles

Scale: 1:158,400; 1 inch = 2.5 miles

Figure 3a
Coastal California Gnatcatcher Observations - Overview Map

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\Fig_3_Ovrvw.mxd, 9/30/2014, janssenn



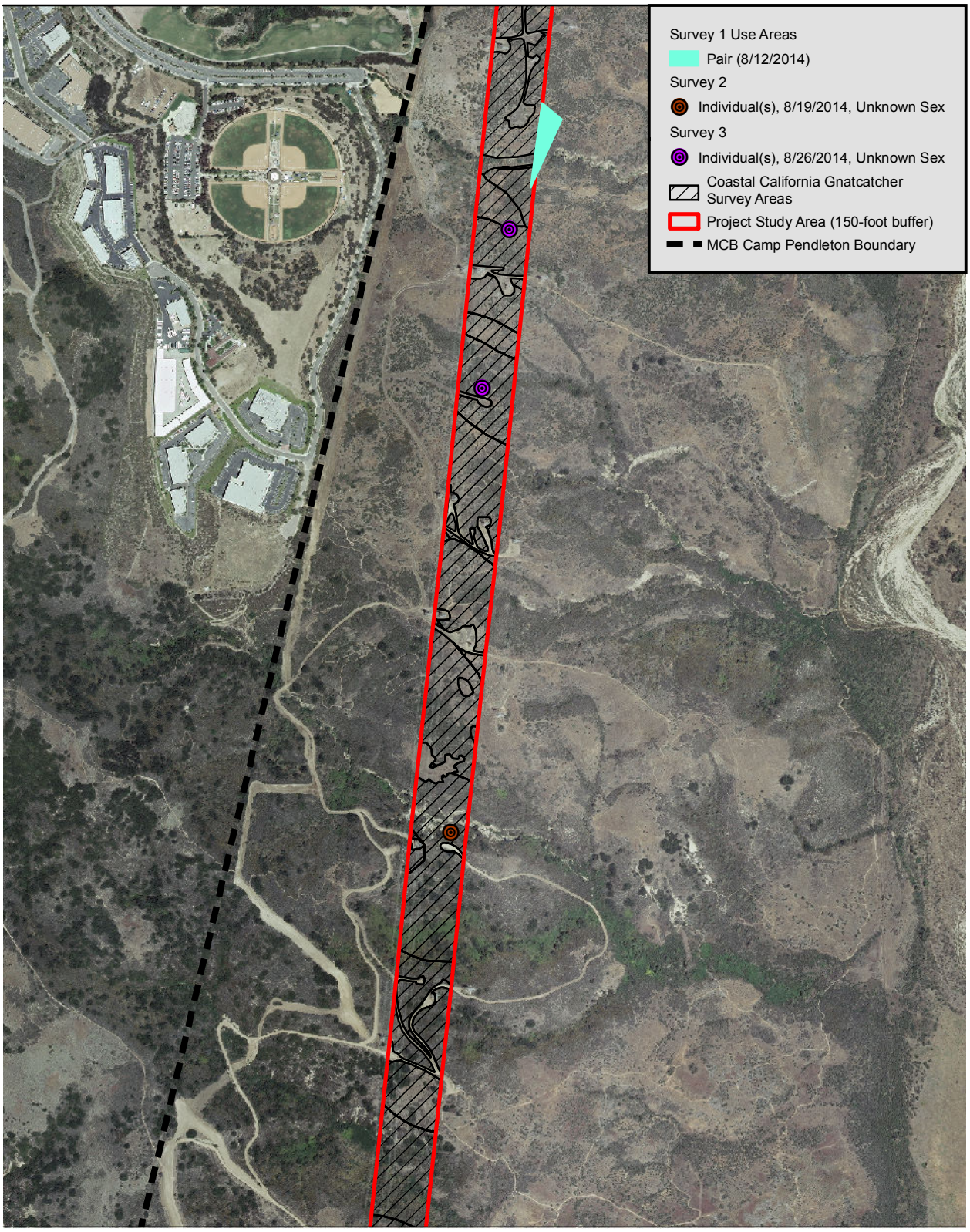
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3b
Coastal California Gnatcatcher Observations - Detail Map 1 of 9

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\ObsSeries.mxd, 10/6/2014, janssenn



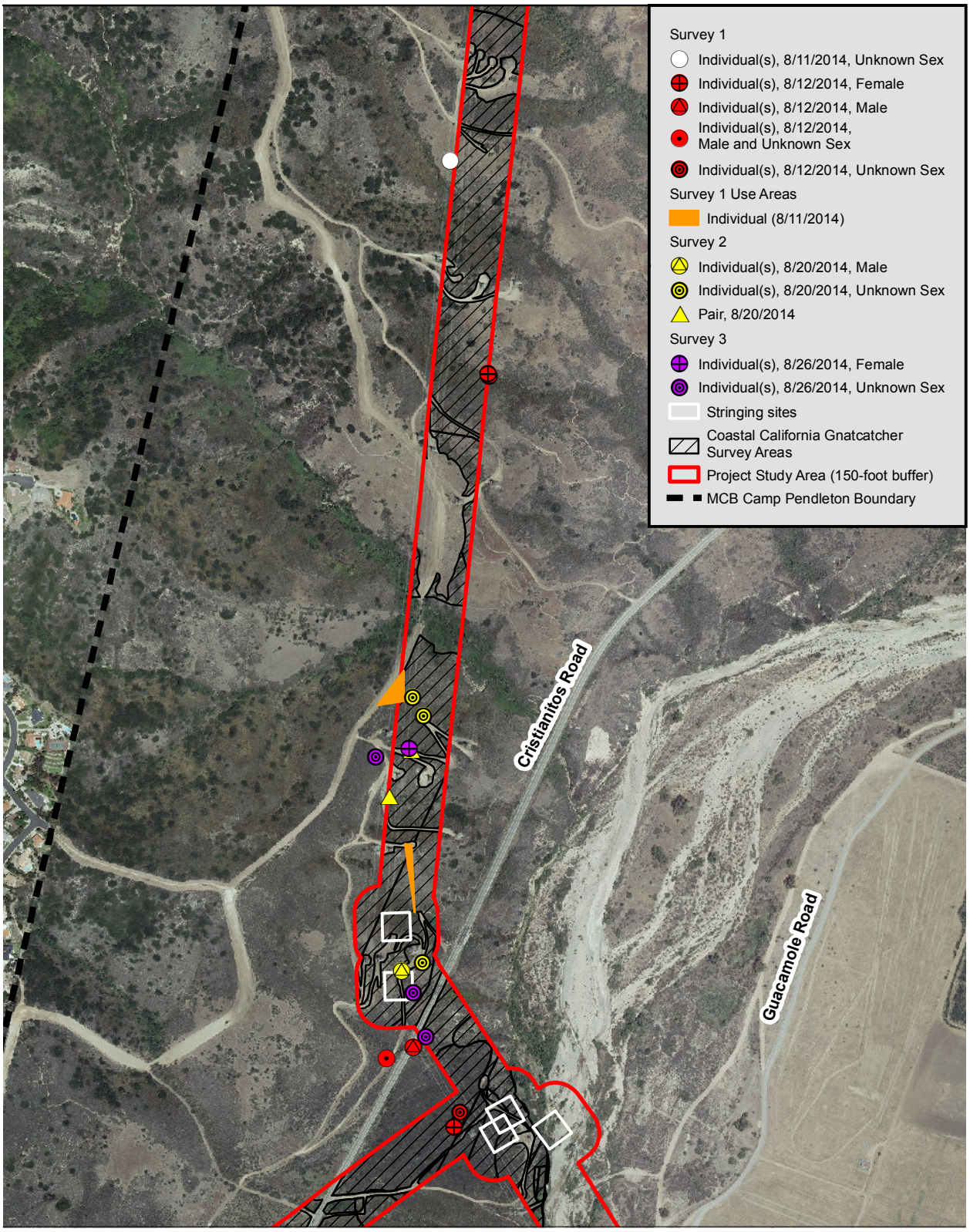
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3c
Coastal California Gnatcatcher Observations - Detail Map 2 of 9

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3d
Coastal California Gnatcatcher Observations - Detail Map 3 of 9

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\ObsSeries.mxd, 10/6/2014, janssenn



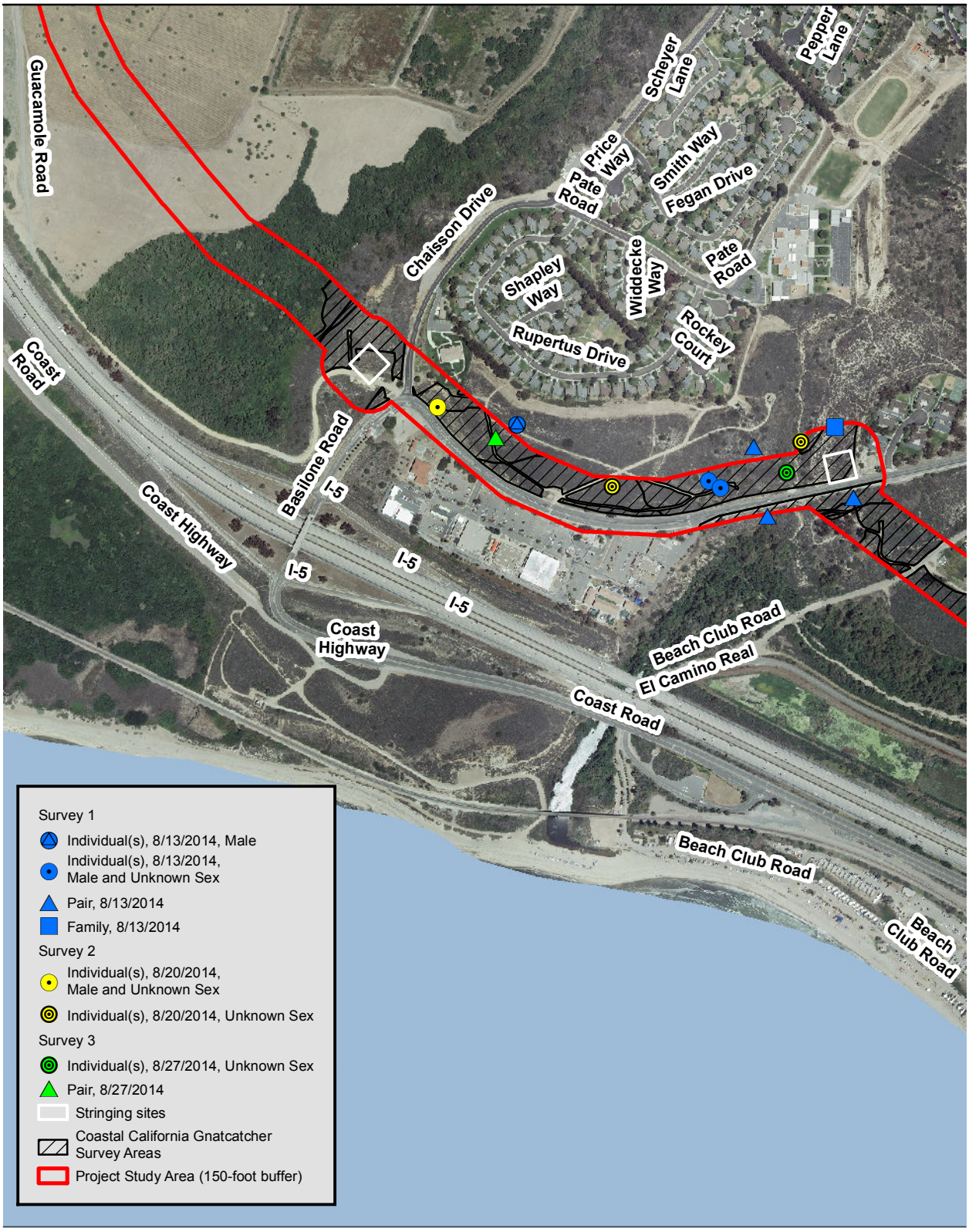
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3e
Coastal California Gnatcatcher Observations - Detail Map 4 of 9

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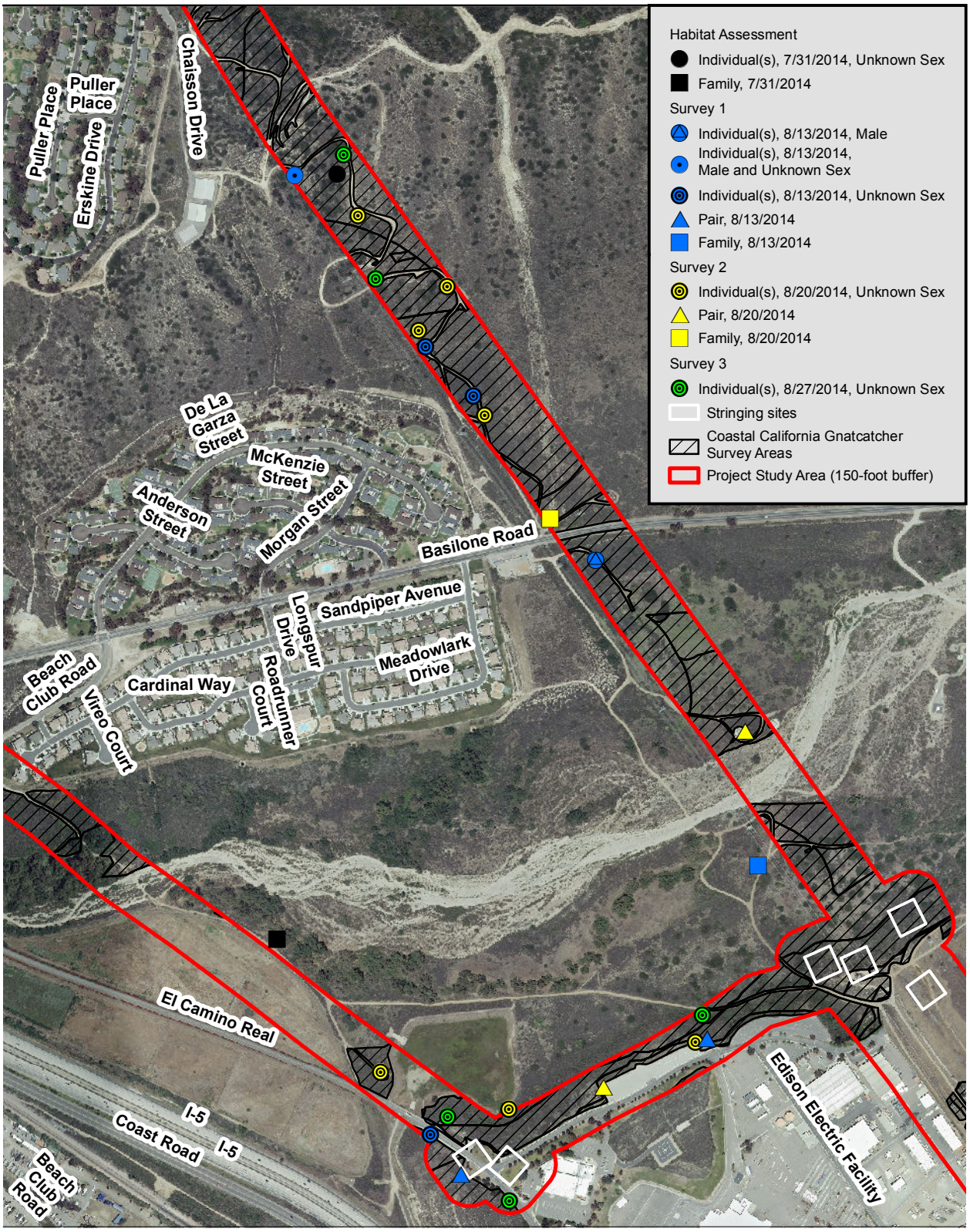
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3f
Coastal California Gnatcatcher Observations - Detail Map 5 of 9

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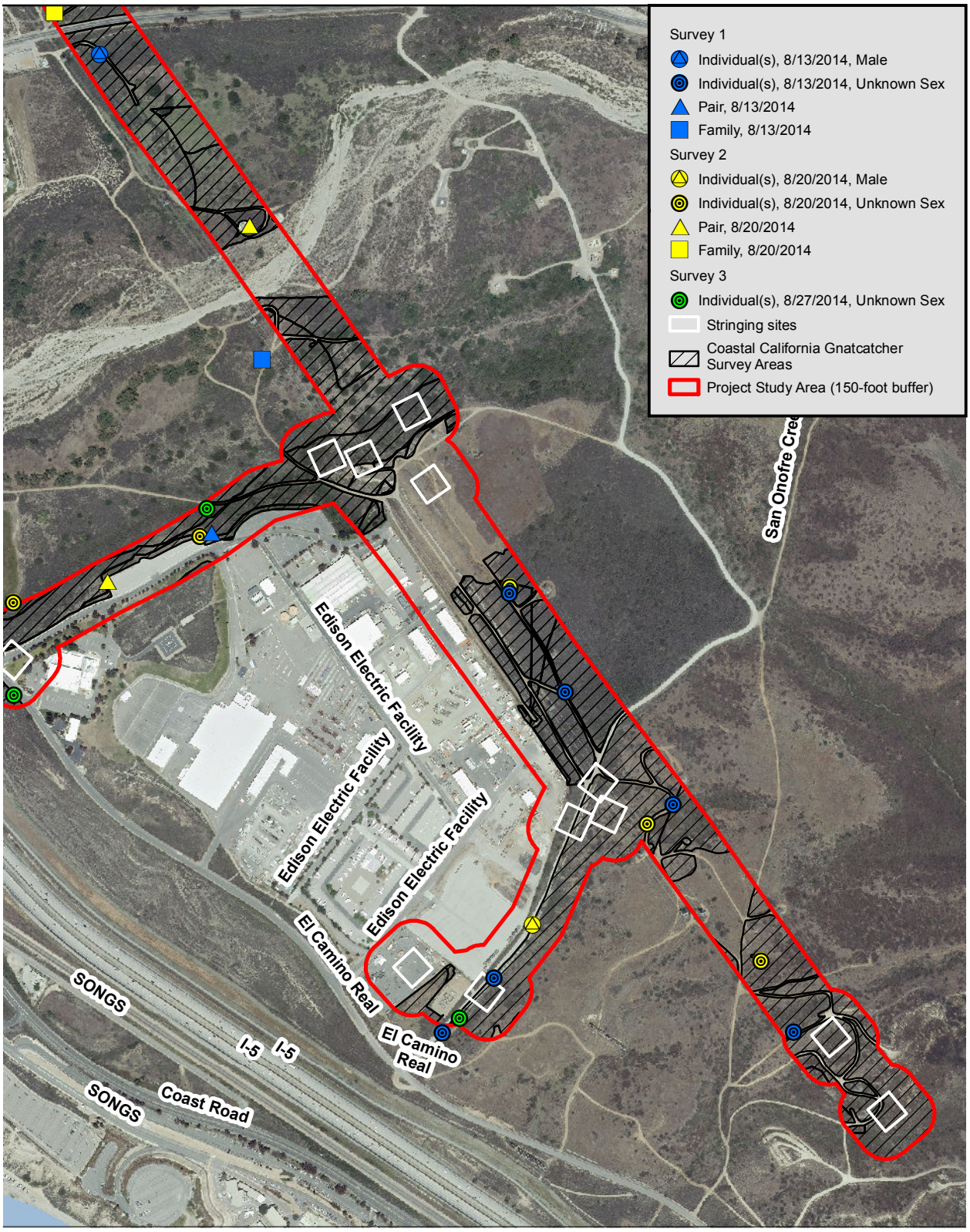
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3g
Coastal California Gnatcatcher Observations - Detail Map 6 of 9

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\ObsSeries.mxd, 10/6/2014, janssenn



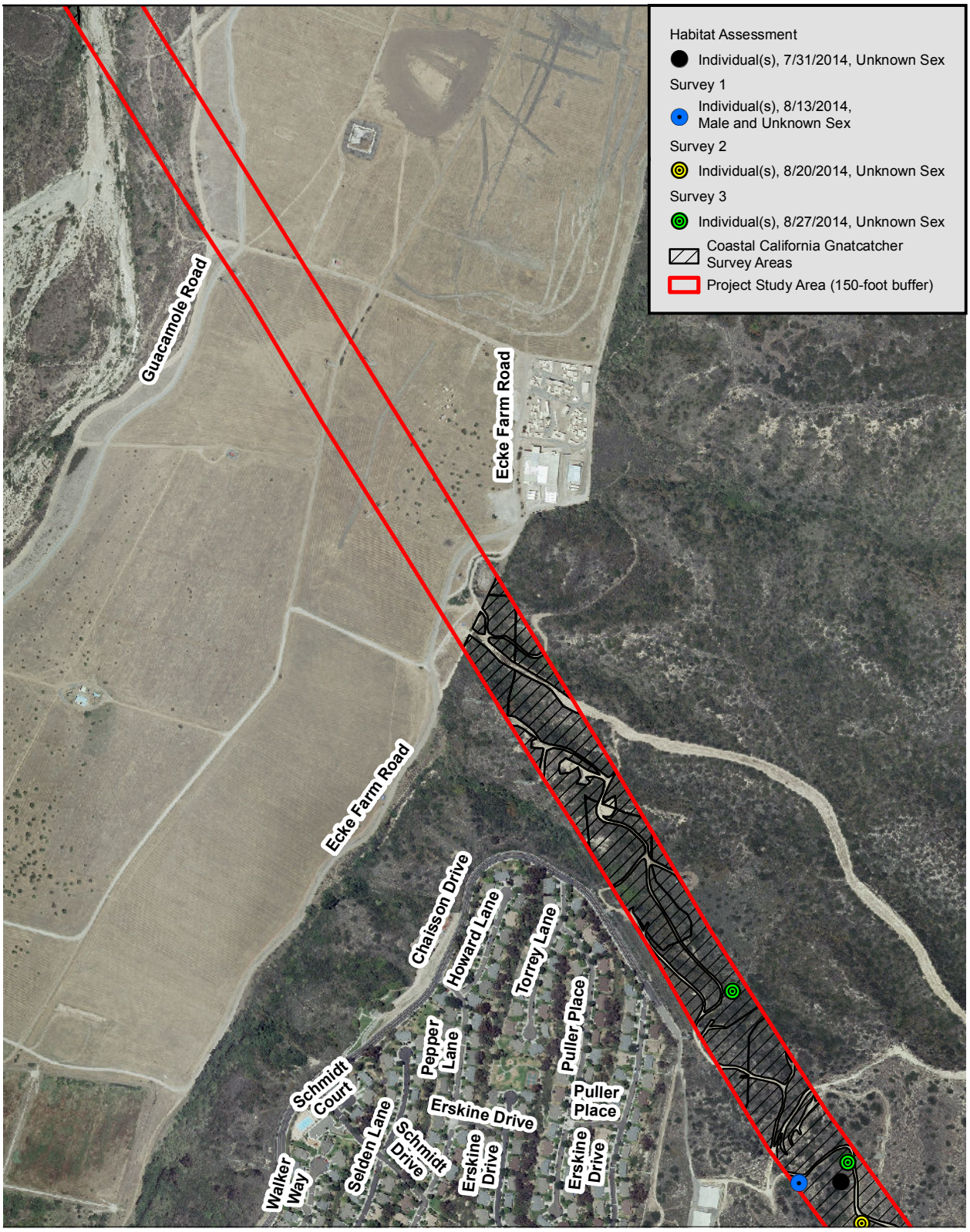
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3h
Coastal California Gnatcatcher Observations - Detail Map 7 of 9

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\ObsSeries.mxd, 10/6/2014, janssenn



Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3i
Coastal California Gnatcatcher Observations - Detail Map 8 of 9

Path: P:\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\ObsSeries.mxd, 10/6/2014, janssenn



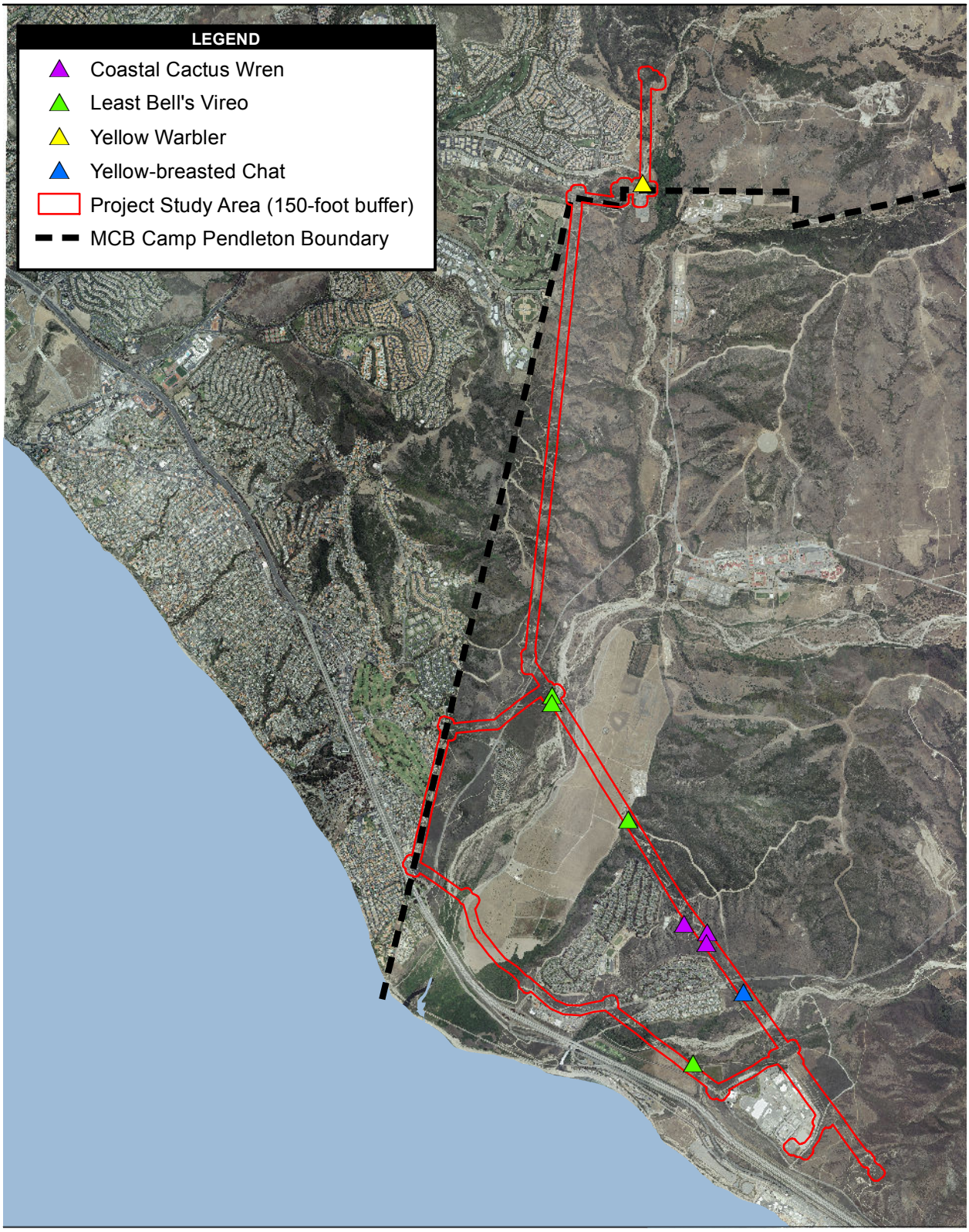
Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

800 400 0 800 Feet

Scale: 1:9,600; 1 inch = 800 feet

Figure 3j
Coastal California Gnatcatcher Observations - Detail Map 9 of 9

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Source: SanGIS 2012; SDG&E 2014; MCBCP 2007

4,500 2,250 0 4,500 Feet

Scale: 1:54,000; 1 inch = 4,500 feet

Figure 4
Other Sensitive Species Observations

2014 TL 695 Wood to Steel Pole Replacement Project Coastal California Gnatcatcher 45-day Survey Report

Path: \\ussdg1fp001.na.aecomnet.com\data\projects\2014\60329186_TM_Easley\900-CAD-GIS\920 GIS\922_Maps\CAGN 45-day Rpt\Fig_4.mxd, 9/30/2014, janssenn

APPENDIX A

FIELD DATA COLLECTED
DURING 2014 CAGN SURVEYS

Appendix A
Field Data Collected during 2014 CAGN Surveys

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
Andrew Fisher	1	8/11/2014	9:26:23 AM	AFI01	Individual(s)	Adult	Female	1	Calling sporadically	33 26.7364 N 117 34.6997 W::8/11/14 at 16:20:47 (UTC)	33.445607 N	117.578328 W	11S	3700838.3	446247.85
Andrew Fisher	1	8/11/2014	9:27:47 AM	AFI01	Individual(s)	Adult	Female and unknown	2	Calling sporadically and a second bird only heard once, could not see the second bird	33 26.7224 N 117 34.6782 W::8/11/14 at 16:23:30 (UTC)	33.445373 N	117.577970 W	11S	3700812.1	446280.98
Andrew Fisher	1	8/11/2014	9:43:28 AM	AFI01	Pair	Adult	Male and Female	2	Calling, black cap almost totally gone, small spot of black on rear right side of head.	33 26.6611 N 117 34.7103 W::8/11/14 at 16:38:40 (UTC)	33.444352 N	117.578505 W	11S	3700699.2	446230.63
Andrew Fisher	1	8/11/2014	9:45:58 AM	AFI01	Pair	Adult	Male and Female	2	Calling, black cap almost totally gone, small spot of black on rear right side of head.	33 26.6611 N 117 34.7103 W::8/11/14 at 16:40:26 (UTC)	33.444352 N	117.578505 W	11S	3700699.2	446230.63
Andrew Fisher	1	8/11/2014	11:48:21 AM	AFI02	Individual(s)	Unknown	Unknown	1	One faint mew call heard across canyon.	33 25.5889 N 117 34.8721 W::8/11/14 at 18:42:12 (UTC)	33.426482 N	117.581202 W	11S	3698758.371	445946.38
Andrew Fisher	1	8/12/2014	6:45:15 AM	AFI03	Individual(s)	Unknown	Unknown	1	One heard give a brief mew call.	33 24.1769 N 117 35.4780 W::8/12/14 at 13:39:09 (UTC)	33.402948 N	117.591300 W	11S	3696115.4	445015.28
Andrew Fisher	1	8/12/2014	6:47:09 AM	AFI03	Individual(s)	Adult	Male	1	One heard give a brief mew call, black cap gone, faded dark head.	33 24.1769 N 117 35.4780 W::8/12/14 at 13:40:43 (UTC)	33.402948 N	117.591300 W	11S	3696115.4	445015.28
Andrew Fisher	0	7/31/2014	7:30:18 AM	AFI04	Pair	Adult	Male and Female	2	Pair detected during habitat assessment.	33 23.8255 N 117 35.4871 W::7/31/14 at 14:24:10 (UTC)	33.397092 N	117.591452 W	11S	3695466.3	444997.46
Andrew Fisher	1	8/12/2014	7:38:41 AM	AFI05	Individual(s)	Adult and Juvenile	Female	2	1 female and a juvenile observed giving short mew and contact calls.	33 23.7740 N 117 35.4768 W::8/12/14 at 14:32:45 (UTC)	33.396233 N	117.591280 W	11S	3695370.9	445012.91
Andrew Fisher	1	8/12/2014	7:43:52 AM	AFI06	Individual(s)	Adult	Male	1	Popped up in veg in front of me totally silently, still retaining most of its black cap.	33 23.8051 N 117 35.4471 W::8/12/14 at 14:38:17 (UTC)	33.396752 N	117.590785 W	11S	3695428.2	445059.27
Andrew Fisher	1	8/12/2014	7:48:32 AM	AFI06	Individual(s)	Adult	Male	1	Popped up in veg in front of me totally silently, still retaining most of its black cap.	33 23.8187 N 117 35.4476 W::8/12/14 at 14:42:20 (UTC)	33.396978 N	117.590793 W	11S	3695453.3	445058.67
Andrew Fisher	1	8/12/2014	8:08:28 AM	AFI07	Individual(s)	Unknown	Unknown	1	Heard a brief mew, no bird seen.	33 24.6492 N 117 35.0520 W::8/12/14 at 15:02:17 (UTC)	33.410820 N	117.584200 W	11S	3696984.5	445680.41
Andrew Fisher	1	8/12/2014	8:21:37 AM	AFI08	Individual(s)	Adult	Female	1	Observed moving through Baccharis scrub giving brief mew calls, overall very silent. May be the same bird as AFI07.	33 24.6063 N 117 35.1334 W::8/12/14 at 15:15:49 (UTC)	33.410105 N	117.585557 W	11S	3696905.9	445553.79
Andrew Fisher	1	8/12/2014	9:10:08 AM	AFI09	Individual(s)	Adult	Female	1	Female flew in silently to taped callback and then disappeared.	33 24.7469 N 117 34.8736 W::8/12/14 at 16:03:53 (UTC)	33.412448 N	117.581227 W	11S	3697163.4	445957.86
Andrew Fisher	1	8/12/2014	9:13:56 AM	AFI09	Individual(s)	Adult	Female	1	Female flew in silently to taped callback and then disappeared.	33 24.7508 N 117 34.8653 W::8/12/14 at 16:07:07 (UTC)	33.412513 N	117.581088 W	11S	3697170.6	445970.82
Andrew Fisher	1	8/12/2014	9:31:50 AM	AFI10	Individual(s)	Juvenile	Unknown	1	A juvenile-looking bird calling infrequently and moving through sage scrub.	33 24.7619 N 117 34.8631 W::8/12/14 at 16:25:43 (UTC)	33.412698 N	117.581052 W	11S	3697191.1	445974.29

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
Andrew Fisher	1	8/12/2014	9:51:32 AM	AFI11	Individual(s)	Adult	Male, and unknown	2	Male with almost no black in cap that gave very few faint mew calls. A second bird heard calling nearby but never seen.	33 24.8020 N 117 34.9464 W::8/12/14 at 16:45:19 (UTC)	33.413367 N	117.582440 W	11S	3697265.9	445845.64
Andrew Fisher	1	8/12/2014	9:55:23 AM	AFI11	Individual(s)	Adult	Male, and unknown	2	Male with almost no black in cap that gave very few faint mew calls. A second bird heard calling nearby but never seen.	33 24.8161 N 117 34.9351 W::8/12/14 at 16:49:05 (UTC)	33.413602 N	117.582252 W	11S	3697291.9	445863.27
Andrew Fisher	1	8/12/2014	10:05:03 AM	AFI12	Individual(s)	Adult	Male	1	Observed calling from sage scrub, brief mew calls, lots of black remaining on head.	33 24.8194 N 117 34.9137 W::8/12/14 at 16:59:12 (UTC)	33.413657 N	117.581895 W	11S	3697297.8	445896.5
Andrew Fisher	1	8/12/2014	10:30:38 AM	AFI13	Individual(s)	Adult	Male	1	Vocal male that is molting and black cap is almost entirely gone.	33 24.9996 N 117 34.9183 W::8/12/14 at 17:24:49 (UTC)	33.416660 N	117.581972 W	11S	3697630.8	445891.2
Andrew Fisher	1	8/12/2014	10:31:51 AM	AFI13	Individual(s)	Adult	Male	1	Vocal male that is molting and black cap is almost entirely gone.	33 25.0005 N 117 34.9256 W::8/12/14 at 17:25:37 (UTC)	33.416675 N	117.582093 W	11S	3697632.5	445879.96
Andrew Fisher	1	8/12/2014	10:44:47 AM	AFI13	Individual(s)	Adult	Male	1	Vocal male that is molting and black cap is almost entirely gone.	33 24.9396 N 117 34.9142 W::8/12/14 at 17:37:58 (UTC)	33.415660 N	117.581903 W	11S	3697519.9	445897
Andrew Fisher	1	8/12/2014	11:17:53 AM	AFI14	Individual(s)	Adult	Female	1	One faint mew call heard across canyon. Then bird flew in.	33 25.3897 N 117 34.8763 W::8/12/14 at 18:11:50 (UTC)	33.423162 N	117.581272 W	11S	3698404.333	446013.343
Andrew Fisher	1	8/12/2014	11:22:06 AM	AFI14	Individual(s)	Adult	Female	1	One faint mew call heard across canyon. Then bird flew in.	33 25.3916 N 117 34.8776 W::8/12/14 at 18:15:23 (UTC)	33.423193 N	117.581293 W	11S	3698407.833	446011.413
Andrew Fisher	1	8/12/2014	11:34:21 AM	AFI15	Individual(s)	Adult	Female	1	Female-type bird flew in to playback, very responsive.	33 25.1547 N 117 34.9289 W::8/12/14 at 18:28:33 (UTC)	33.419245 N	117.582148 W	11S	3697867.5	445876.44
Andrew Fisher	1	8/12/2014	11:35:41 AM	AFI15	Individual(s)	Adult	Female	1	Female-type bird flew in to playback, very responsive.	33 25.1547 N 117 34.9289 W::8/12/14 at 18:30:05 (UTC)	33.419245 N	117.582148 W	11S	3697917.5	445876.44
Andrew Fisher	1	8/12/2014	11:42:10 AM	AFI15	Individual(s)	Adult	Female, and unknown	2	Female-type bird flew in to playback, very responsive, then heard a second bird, but could not get a visual.	33 25.1238 N 117 34.9564 W::8/12/14 at 18:36:12 (UTC)	33.418730 N	117.582607 W	11S	3697860.6	445833.45
Andrew Fisher	1	8/13/2014	7:54:25 AM	AFI16	Individual(s)	Adult	Male	1	Mewed a few times but overall nonresponsive, some black in cap.	33 23.2288 N 117 34.7615 W::8/13/14 at 14:48:31 (UTC)	33.387147 N	117.579358 W	11S	3694357.4	446116.03
Andrew Fisher	1	8/13/2014	7:55:37 AM	AFI16	Individual(s)	Adult	Male	1	Mewed a few times but overall nonresponsive, some black in cap.	33 23.2288 N 117 34.7615 W::8/13/14 at 14:49:11 (UTC)	33.387147 N	117.579358 W	11S	3694357.4	446116.03
Andrew Fisher	1	8/13/2014	8:10:06 AM	AFI17	Individual(s)	Adult	Male, and unknown	2	Most of the black is gone, dark patch above eyes. Second bird only heard and not seen.	33 23.1812 N 117 34.5571 W::8/13/14 at 15:08:59 (UTC)	33.386353 N	117.575952 W	11S	3694267.6	446432.32
Andrew Fisher	1	8/13/2014	8:16:10 AM	AFI17	Individual(s)	Adult	Male, and unknown	2	Most of the black is gone, dark patch above eyes. Second bird only heard and not seen.	33 23.1750 N 117 34.5448 W::8/13/14 at 15:09:49 (UTC)	33.386250 N	117.575747 W	11S	3694256	446451.33
Andrew Fisher	1	8/13/2014	8:24:47 AM	AFI18	Pair	Adult	Male and Female	2	Different birds than AFI17, male has very little black left.	33 23.2118 N 117 34.5101 W::8/13/14 at 15:19:12 (UTC)	33.386863 N	117.575168 W	11S	3694323.7	446505.55
Andrew Fisher	1	8/13/2014	8:35:11 AM	AFI19	Family	Adult and Fledgling	Male and Female	3	Group of three moving around together in short scrub.	33 23.2300 N 117 34.4240 W::8/13/14 at 15:29:12 (UTC)	33.387167 N	117.573733 W	11S	3694356.7	446639.21

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
Andrew Fisher	1	8/13/2014	8:45:10 AM	AFI20	Pair	Adult	Male and Female	2	One faint mew call heard, pair finally seen.	33 23.1788 N 117 34.4037 W::8/13/14 at 15:38:55 (UTC)	33.386313 N	117.573395 W	11S	3694241.8	446670.12
Andrew Fisher	1	8/13/2014	8:57:46 AM	AFI21	Pair	Adult	Male and Female	2	Pair foraging along slope.	33 23.1503 N 117 34.4944 W::8/13/14 at 15:52:16 (UTC)	33.385838 N	117.574907 W	11S	3694209.9	446529.2
Andrew Fisher	1	8/13/2014	9:49:00 AM	AFI22	Individual(s)	Unknown	Unknown	1	Bird only gave a brief mew once, never seen.	33 22.7826 N 117 33.8357 W::8/13/14 at 16:42:58 (UTC)	33.379710 N	117.563928 W	11S	3693524.9	447546.67
Andrew Fisher	1	8/13/2014	9:53:15 AM	AFI23	Pair	Adult	Male and Female	2	Pair foraging together.	33 22.7477 N 117 33.8028 W::8/13/14 at 16:46:52 (UTC)	33.379128 N	117.563380 W	11S	3693460.1	447597.29
Andrew Fisher	1	8/13/2014	10:16:05 AM	AFI24	Pair	Adult	Male and Female	2	Most of the black cap is gone.	33 22.8711 N 117 33.5432 W::8/13/14 at 17:09:38 (UTC)	33.381185 N	117.559053 W	11S	3693686	448000.99
Andrew Fisher	1	8/13/2014	10:57:15 AM	AFI25	Individual(s)	Juvenile	Unknown	2	Two female-type birds, probably juveniles.	33 22.4775 N 117 33.2375 W::8/13/14 at 17:50:47 (UTC)	33.374625 N	117.553958 W	11S	3692956.2	448471.03
Andrew Fisher	1	8/13/2014	11:02:47 AM	AFI25	Individual(s)	Juvenile	Unknown	2	Two female-type birds, probably juveniles.	33 22.4281 N 117 33.2915 W::8/13/14 at 17:56:01 (UTC)	33.373802 N	117.554858 W	11S	3692865.4	448386.83
Andrew Fisher	1	8/13/2014	11:34:33 AM	AFI26	Individual(s)	Juvenile	Unknown	1	One juvenile, probably dispersing.	33 22.7334 N 117 33.1654 W::8/13/14 at 18:28:20 (UTC)	33.378890 N	117.552757 W	11S	3693428.5	448585.26
Andrew Fisher	1	8/13/2014	11:40:26 AM	AFI26	Individual(s)	Juvenile	Unknown	1	One juvenile, probably dispersing.	33 22.8207 N 117 33.2262 W::8/13/14 at 18:33:42 (UTC)	33.380345 N	117.553770 W	11S	3693590.3	448491.89
Andrew Fisher	1	8/13/2014	12:00:59 PM	AFI27	Family	Adult and Fledgling	Male and Female	4	Pair with two juveniles.	33 23.0260 N 117 33.4917 W::8/13/14 at 19:07:30 (UTC)	33.383767 N	117.558195 W	11S	3693971.9	448082.34
Brennan Mulrooney	1	8/13/2014	8:45:36 AM	Bmu01	Individual(s)	Adult and Unknown	Male and Unknown	2	Foraging together. Adult male and bird of unk age/sex.	33 23.6361 N 117 33.9862 W::8/13/14 at 15:45:10 (UTC)	33.393935 N	117.566437 W	11S	3695103.3	447311.87
Brennan Mulrooney	1	8/13/2014	9:33:05 AM	Bmu02	Individual(s)	Unknown	Unknown	1	Calling	33 23.4843 N 117 33.8519 W::8/13/14 at 16:31:43 (UTC)	33.391405 N	117.564198 W	11S	3694821.7	447528.58
Brennan Mulrooney	1	8/13/2014	9:40:02 AM	Bmu03	Individual(s)	Unknown	Unknown	1	Calling	33 23.4415 N 117 33.8000 W::8/13/14 at 16:39:39 (UTC)	33.390692 N	117.563333 W	11S	3694742.2	447608.6
Brennan Mulrooney	1	8/13/2014	10:08:34 AM	Bmu04	Individual(s)	Adult	Male	1	Foraging	33 23.2973 N 117 33.6681 W::8/13/14 at 17:07:11 (UTC)	33.388273 N	117.561135 W	11S	3694472.9	447811.57
Brennan Mulrooney	1	8/13/2014	11:41:28 AM	Bmu05	Individual(s)	Unknown	Unknown	1	Calling	33 22.4328 N 117 32.9187 W::8/13/14 at 18:40:21 (UTC)	33.373880 N	117.548645 W	11S	3692871	448964.82
Brennan Mulrooney	1	8/13/2014	12:00:23 PM	Bmu06	Individual(s)	Unknown	Unknown	1	Calling	33 22.6341 N 117 33.0495 W::8/13/14 at 19:07:25 (UTC)	33.377235 N	117.550825 W	11S	3693244	448764
Brennan Mulrooney	2	8/19/2014	9:34:56 AM	Bmu01	Individual(s)	Unknown	Unknown	1	Calling	33 26.0750 N 117 34.7887 W::8/19/14 at 16:36:46 (UTC)	33.434583 N	117.579812 W	11S	3699636.496	446106.583
James McMorran	2	8/19/2014	7:10:23 AM	CAGN1	Individual(s)	Unknown	Unknown	1	Calling	33 23.9262 N 117 35.5729 W::8/19/14 at 14:10:10 (UTC)	33.398767 N	117.592883 W	11S	3695642.7	444882.7505
James McMorran	2	8/19/2014	7:16:01 AM	CAGN2	Individual(s)	Unknown	Unknown	1	Calling	33 23.9885 N 117 35.5536 W::8/19/14 at 14:15:59 (UTC)	33.399808 N	117.592560 W	11S	3695758	444913.4505
James McMorran	2	8/19/2014	7:35:49 AM	CAGN 3	Individual(s)	Unknown	Unknown	1	Calling	33 24.1483 N 117 35.5150 W::8/19/14 at 14:35:45 (UTC)	33.402473 N	117.591915 W	11S	3696057.891	444987.3342
James McMorran	2	8/19/2014	9:11:49 AM	CAGN 4	Individual(s)	Unknown	Unknown	2	Calling	33 24.5828 N 117 35.1897 W::8/19/14 at 16:13:54 (UTC)	33.409713 N	117.586495 W	11S	3696877.9	445466.33

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
James McMorran	2	8/19/2014	9:14:50 AM	CAGN 5	Individual(s)	Unknown	Unknown	1	Calling	33 24.5827 N 117 35.1880 W::8/19/14 at 16:14:34 (UTC)	33.409712 N	117.586467 W	11S	3696844.006	445462.0896
Andrew Fisher	2	8/20/2014	7:00:08 AM	AFI01	Individual(s)	Juvenile	Unknown	1	One juvenile in fresh plumage.	33 25.1150 N 117 34.9075 W::8/20/14 at 13:53:36 (UTC)	33.418583 N	117.581792 W	11S	3697843.9	445909.13
Andrew Fisher	2	8/20/2014	7:01:13 AM	AFI01	Individual(s)	Juvenile	Unknown	1	One juvenile in fresh plumage.	33 25.1150 N 117 34.9075 W::8/20/14 at 13:53:47 (UTC)	33.418583 N	117.581792 W	11S	3697874.211	445891.63
Andrew Fisher	2	8/20/2014	7:07:19 AM	AFI02	Pair	Adult	Male and Female	2	Calling and foraging around.	33 25.0843 N 117 34.9192 W::8/20/14 at 14:00:41 (UTC)	33.418072 N	117.581987 W	11S	3697787.4	445890.68
Andrew Fisher	2	8/20/2014	7:17:54 AM	AFI02	Pair	Adult	Male and Female	2	Calling and foraging around.	33 25.0426 N 117 34.9422 W::8/20/14 at 14:10:54 (UTC)	33.417377 N	117.582370 W	11S	3697710.5	445854.64
Andrew Fisher	2	8/20/2014	7:53:47 AM	AFI03	Individual(s)	Juvenile	Unknown	1	One juvenile in fresh plumage calling occassionally.	33 24.8950 N 117 34.9051 W::8/20/14 at 14:49:00 (UTC)	33.414917 N	117.581752 W	11S	3697437.4	445910.57
Andrew Fisher	2	8/20/2014	7:58:17 AM	AFI04	Individual(s)	Adult	Male	1	Retaining most of his black cap.	33 24.8869 N 117 34.9267 W::8/20/14 at 14:51:43 (UTC)	33.414782 N	117.582112 W	11S	3697422.7	445877.02
Andrew Fisher	2	8/20/2014	8:56:34 AM	AFI05	Individual(s)	Juvenile	Unknown	2	Two juvenile birds moving around scrub.	33 22.4960 N 117 32.9538 W::8/20/14 at 15:49:41 (UTC)	33.374933 N	117.549230 W	11S	3692988	448911.01
Andrew Fisher	2	8/20/2014	9:23:40 AM	AFI06	Individual(s)	Juvenile	Unknown	1	Dispersing juvenile.	33 22.6163 N 117 33.0767 W::8/20/14 at 16:16:43 (UTC)	33.376938 N	117.551278 W	11S	3693211.3	448721.68
Andrew Fisher	2	8/20/2014	9:42:13 AM	AFI07	Individual(s)	Adult	Male	1	A single male observed along powerline.	33 22.5255 N 117 33.1972 W::8/20/14 at 16:35:28 (UTC)	33.375425 N	117.553287 W	11S	3693044.6	448533.92
Andrew Fisher	2	8/20/2014	10:23:59 AM	AFI09	Individual(s)	Unknown	Unknown	1	Heard briefly and then observed flying away from surveyor.	33 22.8265 N 117 33.2256 W::8/20/14 at 17:17:31 (UTC)	33.380442 N	117.553760 W	11S	3693601	448492.88
Andrew Fisher	2	8/20/2014	10:25:09 AM	AFI09	Individual(s)	Unknown	Unknown	1	Heard briefly and then observed flying away from surveyor.	33 22.8265 N 117 33.2256 W::8/20/14 at 17:18:05 (UTC)	33.380442 N	117.553760 W	11S	3693601	448492.88
Brennan Mulrooney	2	8/20/2014	8:55:33 AM	Bmu01	Individual(s)	Unknown	Unknown	1	Calling	33 23.6005 N 117 33.9125 W::8/20/14 at 15:53:35 (UTC)	33.393342 N	117.565208 W	11S	3695037	447415.81
Brennan Mulrooney	2	8/20/2014	9:24:49 AM	Bmu02	Individual(s)	Unknown	Unknown	1	Calling	33 23.5387 N 117 33.8262 W::8/20/14 at 16:22:48 (UTC)	33.392312 N	117.563770 W	11S	3694922	447563.93
Brennan Mulrooney	2	8/20/2014	9:30:46 AM	Bmu03	Individual(s)	Unknown	Unknown	1	Calling	33 23.4989 N 117 33.8398 W::8/20/14 at 16:28:48 (UTC)	33.391648 N	117.563997 W	11S	3694848.5	447517.42
Brennan Mulrooney	2	8/20/2014	9:37:40 AM	Bmu04	Individual(s)	Unknown	Unknown	1	Calling	33 23.4402 N 117 33.7847 W::8/20/14 at 16:35:42 (UTC)	33.390670 N	117.563078 W	11S	3694710.056	447627.0906
Brennan Mulrooney	2	8/20/2014	9:47:27 AM	Bmu05	Family	Adult and Juvenile	Unknown	3	Foraging	33 23.3329 N 117 33.7169 W::8/20/14 at 16:45:32 (UTC)	33.388882 N	117.561948 W	11S	3694540.8	447736.33
Brennan Mulrooney	2	8/20/2014	10:24:01 AM	Bmu06	Pair	Adult	Male and Female	2	Foraging	33 23.1454 N 117 33.5086 W::8/20/14 at 17:22:15 (UTC)	33.385757 N	117.558477 W	11S	3694192.6	448060.29
James McMorran	2	8/20/2014	7:29:35 AM	CAGN 1	Individual(s)	Unknown	Unknown	1	Calling	33 23.1861 N 117 34.6596 W::8/20/14 at 14:29:32 (UTC)	33.386435 N	117.577660 W	11S	3694257.5	446273.51
James McMorran	2	8/20/2014	7:58:16 AM	CAGN 2	Individual(s)	Adult and unknown	Male and Unknown	2	Calling, two birds, one adule male, the other either adult female, or juvenile bird.	33 23.2382 N 117 34.8470 W::8/20/14 at 14:59:02 (UTC)	33.387303 N	117.580783 W	11S	3694385.248	445985.3265
James McMorran	2	8/20/2014	8:16:50 AM	CAGN 3	Individual(s)	Unknown	Unknown	2	Calling, individuals heard only.	33 23.2030 N 117 34.4499 W::8/20/14 at 15:17:24 (UTC)	33.386717 N	117.574167 W	11S	3694332.981	446583.56

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
James McMorran	2	8/20/2014	9:17:36 AM	CAGN 5	Individual(s)	Unknown	Unknown	2	Calling	33 22.8381 N 117 33.8897 W::8/20/14 at 16:18:02 (UTC)	33.380635 N	117.564828 W	11S	3693627.9	447463.51
James McMorran	2	8/20/2014	9:28:35 AM	CAGN 6	Individual(s)	Unknown	Unknown	2	Carrying food	33 22.8103 N 117 33.7784 W::8/20/14 at 16:28:11 (UTC)	33.380172 N	117.562973 W	11S	3693568.754	447675.1623
James McMorran	2	8/20/2014	9:34:00 AM	CAGN 7	Pair	Adult	Male and Female	2	Calling	33 22.8267 N 117 33.6527 W::8/20/14 at 17:09:55 (UTC)	33.380445 N	117.560878 W	11S	3693604.9	447830.8
James McMorran	2	8/20/2014	10:16:11 AM	CAGN 8	Individual(s)	Unknown	Unknown	2	Calling	33 22.8680 N 117 33.5556 W::8/20/14 at 17:16:02 (UTC)	33.381133 N	117.559260 W	11S	3693680.4	447981.71
Bonnie Hendricks	3	8/26/2014	7:32:07 AM	Bhe01	Individual(s)	Unknown	Unknown	1	Called a few times from artemesia at this location then moved NW. Only saw and heard one but could have been pair.	33 24.5882 N 117 35.2017 W::8/26/14 at 14:35:44 (UTC)	33.409803 N	117.586695 W	11S	3696873	445447.79
Bonnie Hendricks	3	8/26/2014	7:38:22 AM	Bhe01	Individual(s)	Unknown	Unknown	1	Called a few times from artemesia at this location then moved NW. Only saw and heard one but could have been pair.	33 24.5668 N 117 35.2361 W::8/26/14 at 14:42:21 (UTC)	33.409447 N	117.587268 W	11S	3696833.9	445394.28
Bonnie Hendricks	3	8/26/2014	8:07:37 AM	Bhe02	Pair	Adult	Male and Female	2	Calling and foraging in artemisia.	33 24.5703 N 117 35.2760 W::8/26/14 at 15:07:38 (UTC)	33.409505 N	117.587933 W	11S	3696840.6	445332.49
Bonnie Hendricks	3	8/26/2014	11:07:46 AM	Bhe03	Individual(s)	Unknown	Unknown	2	Moving around habitat area calling from elderberry bush and heard calling from both sides of Christianitos road.	33 24.8288 N 117 34.9003 W::8/26/14 at 18:11:41 (UTC)	33.413813 N	117.581672 W	11S	3697315	445917.33
Bonnie Hendricks	3	8/26/2014	11:20:44 AM	Bhe03	Individual(s)	Unknown	Unknown	1	Same bird new location other side of road.	33 24.8680 N 117 34.9148 W::8/26/14 at 18:20:43 (UTC)	33.414467 N	117.581913 W	11S	3697387.6	445895.33
Brennan Mulrooney	3	8/26/2014	8:59:30 AM	Bmu01	Individual(s)	Unknown	Unknown	1	Calling	33 26.6159 N 117 34.7415 W::8/26/14 at 15:56:58 (UTC)	33.443598 N	117.579025 W	11S	3700630.042	446195.9721
Brennan Mulrooney	3	8/26/2014	9:13:46 AM	Bmu02	Individual(s)	Unknown	Unknown	1	Calling	33 26.4823 N 117 34.7591 W::8/26/14 at 16:11:40 (UTC)	33.441372 N	117.579320 W	11S	3700369.2	446153.04
Brennan Mulrooney	3	8/26/2014	11:56:41 AM	Bmu03	Individual(s)	Unknown	Unknown	1	Calling	33 25.0816 N 117 34.9534 W::8/26/14 at 18:55:12 (UTC)	33.418027 N	117.582557 W	11S	3697775.04	445831.2321
Brennan Mulrooney	3	8/26/2014	12:00:17 PM	Bmu04	Individual(s)	Adult	Female	1	Calling	33 25.0853 N 117 34.9219 W::8/26/14 at 18:58:39 (UTC)	33.418088 N	117.582032 W	11S	3697789.2	445886.51
Bonnie Hendricks	3	8/27/2014	8:32:40 AM	Bhe04	Individual(s)	Unknown	Unknown	1	Heard call and did not see, in California sagebrush patch.	33 23.8063 N 117 34.0662 W::8/27/14 at 15:32:42 (UTC)	33.396772 N	117.567770 W	11S	3695418.5	447199.62
Bonnie Hendricks	3	8/27/2014	9:35:52 AM	Bhe05	Individual(s)	Unknown	Unknown	1	Came to recording, perched on rhus integrifolia.	33 23.6552 N 117 33.9410 W::8/27/14 at 16:38:02 (UTC)	33.394253 N	117.565683 W	11S	3695138.2	447392.18
Bonnie Hendricks	3	8/27/2014	10:10:03 AM	Bhe06	Individual(s)	Unknown	Unknown	1	Responded to playback. Ing	33 23.5453 N 117 33.8994 W::8/27/14 at 17:09:53 (UTC)	33.392422 N	117.564990 W	11S	3694933.064	447445.6819
Brennan Mulrooney	3	8/27/2014	7:26:40 AM	Bmu01	Pair	Adult	Male and Female	2	Calling	33 23.2176 N 117 34.7839 W::8/27/14 at 14:25:28 (UTC)	33.386960 N	117.579733 W	11S	3694336.8	446081.03
Brennan Mulrooney	3	8/27/2014	8:10:23 AM	Bmu02	Individual(s)	Unknown	Unknown	1	Calling	33 23.1893 N 117 34.4747 W::8/27/14 at 15:08:00 (UTC)	33.386488 N	117.574578 W	11S	3694281.8	446560.2
Brennan Mulrooney	3	8/27/2014	10:19:51 AM	Bmu03	Individual(s)	Unknown	Unknown	1	Calling	33 22.4521 N 117 33.2736 W::8/27/14 at 17:17:24 (UTC)	33.374202 N	117.554560 W	11S	3692889.6	448414.78

Primary_ Bio	Survey #	Date	Time	Territory ID	Obs Type	Age	Sex	Count	Behavior Notes	GPS Location	Latitude	Longitude	Zone	Northing_ Final	Easting_ Final
Brennan Mulrooney	3	8/27/2014	11:08:12 AM	Bmu04	Individual(s)	Unknown	Unknown	1	Calling	33 22.8977 N 117 33.5474 W::8/27/14 at 18:06:13 (UTC)	33.381628 N	117.559123 W	11S	3693725.352	447993.0135
Brennan Mulrooney	3	8/27/2014	11:33:48 AM	Bmu05	Individual(s)	Unknown	Unknown	1	Calling	33 22.7986 N 117 33.8178 W::8/27/14 at 18:31:17 (UTC)	33.379977 N	117.563630 W	11S	3693554.4	447574.55
Brennan Mulrooney	3	8/27/2014	11:58:06 AM	Bmu06	Individual(s)	Unknown	Unknown	1	Calling	33 22.7193 N 117 33.7500 W::8/27/14 at 18:55:36 (UTC)	33.378760 N	117.562360 W	11S	3693416.195	447677.1779

APPENDIX B

WILDLIFE SPECIES DETECTED DURING 2014 CAGN SURVEYS

Appendix B
Wildlife Species Detected during 2014 CAGN Surveys

Common Name	Scientific Name	Order	Family	Federal Status (Endangered/ Threatened)	California Status (Endangered/ Threatened/Species of Special Concern)	NCCP Covered Species (NC) or NCCP Narrow Endemic (NE)
Invertebrates						
Gray hairstreak	*Strymon melinus*	Lepidoptera	Lycaenidae	None	None	None
Western tiger swallowtail	*Papilio rutulus*	Lepidoptera	Papilionidae	None	None	None
Anise swallowtail	*Papilio zelicaon*	Lepidoptera	Papilionidae	None	None	None
Checkered white	*Pontia protodice*	Lepidoptera	Pieridae	None	None	None
Behr's metalmark	*Apodemia mormo virgulti*	Lepidoptera	Riodinidae	None	None	None
Avian						
Cooper's hawk	*Accipiter cooperii*	Accipitriformes	Accipitridae	None	None	NC
Red-tailed hawk	*Buteo jamaicensis*	Accipitriformes	Accipitridae	None	None	None
Turkey vulture	*Cathartes aura*	Accipitriformes	Cathartidae	None	None	None
Anna's hummingbird	*Calypte anna*	Apodiformes	Trochilidae	None	None	None
Rufous hummingbird	*Selasphorus rufus/sasin*	Apodiformes	Trochilidae	None	None	None
Allen's hummingbird	*Selasphorus sasin*	Apodiformes	Trochilidae	None	None	None
Lesser nighthawk	*Chordeiles acutipennis*	Caprimulgiformes	Caprimulgidae	None	None	None
Killdeer	*Charadrius vociferus*	Charadriiformes	Charadriidae	None	None	None
Greater yellowlegs	*Tringa melanoleuca*	Charadriiformes	Scolopacidae	None	None	None
Eurasian collared-dove	*Streptopelia decaocto*	Columbiformes	Columbidae	None	None	None
Mourning dove	*Zenaida macroura*	Columbiformes	Columbidae	None	None	None
Greater roadrunner	*Geococcyx californianus*	Cuculiformes	Cuculidae	None	None	None
American kestrel	*Falco sparverius*	Falconiformes	Falconidae	None	None	None
California quail	*Callipepla californica*	Galliformes	Odontophoridae	None	None	None
Bushtit	*Psaltriparus minimus*	Passeriformes	Aegithalidae	None	None	None
Lazuli bunting	*Passerina amoena*	Passeriformes	Cardinalidae	None	None	None
Blue grosbeak	*Passerina caerulea*	Passeriformes	Cardinalidae	None	None	None
Black-headed grosbeak	*Pheucticus melanocephalus*	Passeriformes	Cardinalidae	None	None	None
Western tanager	*Piranga ludoviciana*	Passeriformes	Cardinalidae	None	None	None
Western scrub-jay	*Aphelocoma californica*	Passeriformes	Corvidae	None	None	None
American crow	*Corvus brachyrhynchos*	Passeriformes	Corvidae	None	None	None
Common raven	*Corvus corax*	Passeriformes	Corvidae	None	None	None
Southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	Passeriformes	Emberizidae	None	None	NC
Song sparrow	*Melospiza melodia*	Passeriformes	Emberizidae	None	None	None
California towhee	*Melozone crissalis*	Passeriformes	Emberizidae	None	None	None
Spotted towhee	*Pipilo maculatus*	Passeriformes	Emberizidae	None	None	None
Scaly-breasted munia	*Lonchura punctulata*	Passeriformes	Estrildidae	None	None	None
House finch	*Haemorhous mexicanus*	Passeriformes	Fringillidae	None	None	None
Lesser goldfinch	*Spinus psaltria*	Passeriformes	Fringillidae	None	None	None
Cliff swallow	*Petrochelidon pyrrhonota*	Passeriformes	Hirundinidae	None	None	None

Common Name	Scientific Name	Order	Family	Federal Status (Endangered/ Threatened)	California Status (Endangered/ Threatened/Species of Special Concern)	NCCP Covered Species (NC) or NCCP Narrow Endemic (NE)
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Passeriformes	Hirundinidae	None	None	None
Bullock's oriole	*Icterus bullockii*	Passeriformes	Icteridae	None	None	None
Brown-headed cowbird	*Molothrus ater*	Passeriformes	Icteridae	None	None	None
Northern mockingbird	*Mimus polyglottos*	Passeriformes	Mimidae	None	None	None
California thrasher	*Toxostoma redivivum*	Passeriformes	Mimidae	None	None	None
Oak titmouse	*Baeolophus inornatus*	Passeriformes	Paridae	None	None	None
Wilson's warbler	*Cardellina pusilla*	Passeriformes	Parulidae	None	None	None
Common yellowthroat	*Geothlypis trichas*	Passeriformes	Parulidae	None	None	None
Yellow-breasted chat	*Icteria virens*	Passeriformes	Parulidae	None	Species of Special Concern	None
Orange-crowned warbler	*Oreothlypis celata*	Passeriformes	Parulidae	None	None	None
Yellow warbler	*Setophaga petechia brewsteri*	Passeriformes	Parulidae	None	Species of Special Concern	None
Blue-gray gnatcatcher	*Polioptila caerulea*	Passeriformes	Polioptilidae	None	None	None
Coastal California gnatcatcher	*Polioptila californica californica*	Passeriformes	Polioptilidae	Threatened	Species of Special Concern	NC
Phainopepla	*Phainopepla nitens*	Passeriformes	Ptilogonatidae	None	None	None
Wrentit	*Chamaea fasciata*	Passeriformes	Sylviidae	None	None	None
Coastal cactus wren	*Campylorhynchus brunneicapillus sandiegensis*	Passeriformes	Troglodytidae	None	Species of Special Concern	NE
Bewick's wren	*Thryomanes bewickii*	Passeriformes	Troglodytidae	None	None	None
House wren	*Troglodytes aedon*	Passeriformes	Troglodytidae	None	None	None
Western bluebird	*Sialia mexicana*	Passeriformes	Turdidae	None	None	NC
Ash-throated flycatcher	*Myiarchus cinerascens*	Passeriformes	Tyrannidae	None	None	None
Black phoebe	*Sayornis nigricans*	Passeriformes	Tyrannidae	None	None	None
Western kingbird	*Tyrannus verticalis*	Passeriformes	Tyrannidae	None	None	None
Cassin's kingbird	*Tyrannus vociferans*	Passeriformes	Tyrannidae	None	None	None
Least Bell's vireo	*Vireo bellii pusillus*	Passeriformes	Vireonidae	Endangered	Endangered	NC
Northern flicker	*Colaptes auratus*	Piciformes	Picidae	None	None	None
Acorn woodpecker	*Melanerpes formicivorus*	Piciformes	Picidae	None	None	None
Nuttall's woodpecker	*Picoides nuttallii*	Piciformes	Picidae	None	None	None
Downy woodpecker	*Picoides pubescens*	Piciformes	Picidae	None	None	None
Mammals						
Southern mule deer	*Odocoileus hemionus fuliginatus*	Artiodactyla	Cervidae	None	None	NC
Coyote	*Canis latrans*	Carnivora	Canidae	None	None	None
Bobcat	*Lynx rufus*	Carnivora	Felidae	None	None	None
Desert cottontail	*Sylvilagus audubonii*	Lagomorpha	Leporidae	None	None	None
Botta's pocket gopher	*Thomomys bottae*	Rodentia	Geomyidae	None	None	None
Dusky-footed woodrat	*Neotoma fuscipes*	Rodentia	Muridae	None	None	None
California ground squirrel	*Spermophilus beecheyi*	Rodentia	Sciuridae	None	None	None

*Species sensitivity status taken from State of California 2011.

Appendix I – Pacific Pocket Mouse Focused Survey Reports Tremor 2013

THIS APPENDIX HAS BEEN OMITTED – IT HAS BEEN SUBMITTED UNDER CONFIDENTIAL COVER

Appendix J – Jurisdictional Delineation Report
Pangea Biological and Borcher Environmental Management 2015

(Refer to Appendix 4.9-A of the PEA for the Jurisdictional Delineation Report)

Appendix K – Plant and Wildlife Species Lists

General Plant Species Observed	
Common Name	**Scientific Name**
Equisetaceae	
Smooth Horsetail	*Equisetum laevigatum*
Polypodiaceae	
Polypody Fern	*Polypodium californicum*
Pteridaceae	
Goldback Fern	*Pentagramma triangularis*
Selaginellaceae	
Bigelow's Spike Moss	*Seliginella bigelovii*
Dicots	
Adocaceae	
Blue Elderberry	*Sambucus nigra* ssp. *caerulea*
Aizoaceae	
Sea Fig	*Carpobrotus chilensis**
Hottentot Fig	*Carpobrotus edulis**
Common Ice Plant	*Mesembryanthemum crystallinum**
New Zealand Spinach	*Tetragonia tetragonioides**
Amaranthaceae	
Tumbleweed	*Amaranthus albus**
Anacardiaceae	
Laurel Sumac	*Malosma laurina*
Lemonade Berry	*Rhus integrifolia*
Peruvian Pepper	*Schinus molle**
Brazilian Pepper	*Schinus terebinthifolius**
Poison Oak	*Toxicodendron diversilobum*
Apiaceae	
Celery	*Apium graveolens**
Poison Hemlock	*Conium maculatum**
Rattlesnake Weed	*Daucus pusillus*
Fennel	*Foeniculum vulgare**
Pacific Sanicle	*Sanicula crassicaulis*
Apocynaceae	
Narrowleaf Milkweed	*Asclepias fascicularis*
Asteraceae	
Sacapellote	*Acourtia microcephala*
Western Ragweed	*Ambrosia psilostachya*
California Sagebrush	*Artemisia californica*
Mugwort	*Artemisia douglasiana*
Tarragon	*Artemisia dracunculus*
Coyote Bush	*Baccharis pilularis*
Mule Fat	*Baccharis salicifolia*
Sweet Bush	*Bebbia juncea*
California Brickelbush	*Brickellia californica*
Italian Thistle	*Carduus pycnocephalus**
Tocalote	*Centaurea melitensis**
Common Name	**Family - Scientific Name**

General Plant Species Observed	
Common Name	**Scientific Name**
Yellow Pincushion	*Chaenactis glabriuscula* var. *glabriuscula*
Cobweb Thistle	*Cirsium occidentale*
Bull Thistle	*Cirsium vulgare**
Common Sand Aster	*Corethrogyne filaginifolia* var. *filaginifolia*
Brass Buttons	*Cotula coronopifolia**
Artichoke Thistle	*Cynara cardunculus**
Clustered Tarweed	*Deinandra fasciculata*
Paniculate Tarplant	*Deinandra paniculata*
California Encelia	*Encelia californica*
Brittlebush	*Encelia farinosa*
Flax-leaved Horseweed	*Erigeron bonariensis**
Leafy Daisy	*Erigeron foliosus*
Golden Yarrow	*Eriophyllum confertiflorum*
Grass-Leaf Goldenrod	*Euthamia occidentalis*
Crown Daisy	*Glebionis coronaria**
Gum Plant	*Grindelia camporum*
Cretanweed	*Hedypnois cretica**
Bristly Ox Tongue	*Helminthotheca echioides**
Telegraph Weed	*Heterotheca grandiflora*
Smooth Cat's Ear	*Hypochaeris glabra**
Menzies' Goldenbush	*Isocoma menziesii*
Fleshy Jaumea	*Jaumea carnosa*
Wild Lettuce	*Lactuca serriola**
California Goldfields	*Lasthenia californica*
California Cottonrose	*Logfia filaginoides*
Dwarf Cottonrose	*Logfia gallica*
Pineapple Weed	*Matricaria discoidea**
False Rosinweed	*Osmadenia tenella*
Bicolor Cudweed	*Pseudognaphalium biolettii*
California Everlasting	*Pseudognaphalium californicum*
Jersey Cudweed	*Pseudognaphalium luteoalbum**
Cottonbatting Plant	*Pseudognaphalium stramineum*
Slender Woolly Marbles	*Psilocarphus tenellus*
California Chicory	*Rafinesquia californica*
Common Groundsel	*Senecio vulgaris**
Milk Thistle	*Silybum marianum**
Spiney-leaved Sow Thistle	*Sonchus asper**
Common Sow Thistle	*Sonchus oleraceus**
Small Wirelettuce	*Stephanomeria exigua*
Everlasting Nest Straw	*Stylocline gnaphaloides*
Dandelion	*Taraxacum officinale**
Silver Puffs	*Uropappus lindleyi*
Canyon Sunflower	*Venegasia carpesioides*
Rough Cockleburr	*Xanthium strumarium*
Boraginaceae	

General Plant Species Observed	
Common Name	**Scientific Name**
Menzie's Fiddleneck	*Amsinckia mensiezii* var. *intermedia*
Common Cryptantha	*Cryptantha clevelandii*
Clearwater Cryptantha	*Cryptantha intermedia*
Whispering Bells	*Emmenanthe penduliflora*
Spotted Eucrypta	*Eucrypta chrysanthemifolia*
Salt Heliotrope	*Heliotropium curassavicum*
Caterpillar Phacelia	*Phacelia cicutaria* var. *hispida*
California Bluebell	*Phacelia minor*
Fiesta Flower	*Pholistoma auritum* var. *auritum*
Cooper's Popcorn Flower	*Plagiobothrys collinus*
Brassicaceae	
Black Mustard	*Brassica nigra**
Field Mustard	*Brassica rapa**
Saharan Mustard	*Brassica tournefortii*
Shepherd's Purse	*Capsella bursa-pastoris**
Milk Maids	*Cardamine californica*
Shortpod Mustard	*Hirschfeldia incana**
Shining Pepperweed	*Lepidium nitidum*
White Watercress	*Nasturtium officinale*
Wild Radish	*Raphanus sativus**
Tumbling Mustard	*Sisymbrium altissimum**
Cactaceae	
Coast Cholla	*Cylindropuntia prolifera*
Coast Prickly Pear	*Opuntia littoralis*
Chaparral Prickly Pear	*Opuntia oricola*
Western Prickly Pear	*Opuntia ×occidentalis*
Caryophyllaceae	
Sand Mat	*Cardionema ramosissima*
Mouse-eared Chickweed	*Cerastium glomeratum**
Four Leaved Allseed	*Polycarpon tetraphyllum*
Common Catchfly	*Silene gallica**
Red Sandspurry	*Spergularia rubra**
Common Chickweed	*Stellaria media**
Chenopodiaceae	
Big Saltbush	*Atriplex lentiformis*
Fat-hen	*Atriplex prostrata*
Australian Saltbush	*Atriplex semibaccata**
California Goosefoot	*Chenopodium californicum*
Pickleweed	*Salicornia pacifica*
Russian Thistle	*Salsola tragus**
Cistaceae	
Bisbee Peak Rushrose	*Helianthemum scoparium*
Cleomaceae	
Bladderpod	*Peritoma arborea var. arborea*
Convolvulaceae	

General Plant Species Observed	
Common Name	**Scientific Name**
Southern California Morning Glory	*Calystegia macrostegia* ssp. *arida*
Spreading Alkali Weed	*Cressa truxillensis*
California Dodder	*Cuscuta californica*
Western Pony's Foot	*Dichondra occidentalis*
Crassulaceae	
Aquatic Pygmy Weed	*Crassula aquatica*
Pygmy Weed	*Crassula connata*
Jade Plant	*Crassula ovata**
Fingertips	*Dudleya edulis*
Coastal Dudleya	*Dudleya lanceolata*
Chalk Dudleya	*Dudleya pulverulenta*
Cucurbitaceae	
Calabazilla	*Cucurbita foetidissima*
Wild Cucumber	*Marah macrocarpa*
Datiscaceae	
Durango Root	*Datisca glomerata*
Euphorbiaceae	
Small Seeded Spurge	*Chamaesyce polycarpa*
Creeping Spurge	*Chamaesyce serpens*
California Croton	*Croton californicus*
Doveweed	*Croton setigerus*
Gopher Plant	*Euphorbia lathyris**
Castor Bean	*Ricinus communis**
Fabaceae	
Golden Wattle	*Acacia longifolia**
Deer Weed	*Acmispon glaber* var. *glaber*
Heermann's Lotus	*Acmispon heermannii* var. *heermannii*
Small Flowered Lotus	*Acmispon micranthus*
Hairy Lotus	*Acmispon strigosus*
Desert Indigobush	*Amorpha fruticosa*
Miniature Lupine	*Lupinus bicolor*
Arroyo Lupine	*Lupinus succulentus*
Blunt Leaved Lupine	*Lupinus truncatus*
Bur Clover	*Medicago polymorpha**
White Sweet Clover	*Melilotus albus**
Indian Sweet Clover	*Melilotus indica**
Rose Clover	*Trifolium hirtum**
Garden Vetch	*Vicia sativa* ssp. *nigra*
Winter Vetch	*Vicia villosa**
Fagaceae	
Coast Live Oak	*Quercus agrifolia*
Frankeniaceae	
Alkali Heath	*Frankenia salina*
Gentianaceae	
Charming Centaury	*Zeltnera venusta*

General Plant Species Observed	
Common Name	**Scientific Name**
Geraniaceae	
Long Beaked Filaree	*Erodium botrys**
Red Stemmed Filaree	*Erodium cicutarium**
White Stemmed Filaree	*Erodium moschatum**
Carolina Geranium	*Geranium carolinianum*
Grossulariaceae	
Fuschia-flowered Gooseberry	*Ribes speciosum*
Lamiaceae	
Henbit Deadnettle	*Lamium amplexicaule**
Horehound	*Marrubium vulgare**
White Sage	*Salvia apiana*
Chia	*Salvia columbariae*
Black Sage	*Salvia mellifera*
Lythraceae	
Hyssop Loosestrife	*Lythrum hyssopifolia**
Malvaceae	
Chaparral Mallow	*Malacothamnus fasciculatus*
Cheeseweed	*Malva parviflora**
Alkali Mallow	*Malvella leprosa*
Checker Bloom	*Sidalcea sparsifolia*
Montiaceae	
Red Maids	*Calandrinia ciliata*
Miner's Lettuce	*Claytonia perfoliata*
Myrsinaceae	
Scarlet Pimpernel	*Anagallis arvensis**
Nyctaginaceae	
Wishbone Bush	*Mirabilis laevis* var. *crassifolia*
Onagraceae	
California Sun Cup	*Camissoniopsis bistorta*
Purple Clarkia	*Clarkia purpurea*
Fringed Willowherb	*Epilobium ciliatum*
Great Marsh Evening-Primrose	*Oenothera elata*
Orobanchaceae	
Coast Indian Paintbrush	*Castilleja affinis* ssp. *affinis*
Purple Owl's Clover	*Castilleja exserta* ssp. *exserta*
Oxalidaceae	
Bermuda Buttercup	*Oxalis pes-caprae**
Papavaraceae	
California Poppy	*Eschscholzia californica*
Coulter's matilija poppy	*Romneya coulteri*
Phrymaceae	
Bush Monkey Flower	*Mimulus aurantiacus*
Common Monkey Flower	*Mimulus guttatus*
Plantaginaceae	
Nuttall's Snapdragon	*Antirrhinum nuttallianum* ssp. *nuttallianum*

General Plant Species Observed	
Common Name	**Scientific Name**
Heart-leaved Penstemon	*Keckiella cordifolia*
Blue Toadflax	*Nuttallanthus texanus*
Cut-leaf Plantain	*Plantago coronopus**
Coast Plantain	*Plantago elongata*
Dot-seed Plantain	*Plantago erecta*
English Plantain	*Plantago lanceolata**
Common Plantain	*Plantago major**
Platanaceae	
California Sycamore	*Platanus racemosa*
Polemoniaceae	
Fringed Linanthus	*Linanthus dianthiflorus*
Chaparral Gilia	*Gilia angelensis*
Polygonaceae	
Turkish Rugging	*Chorizanthe staticoides*
Longstem Buckwheat	*Eriogonum elongatum*
California Buckwheat	*Eriogonum fasciculatum*
Slender Woolly Buckwheat	*Eriogonum gracile*
Leather Spineflower	*Lastarriaea coriacea*
Fairy Mist	*Pterostegia drymarioides*
Curly Dock	*Rumex crispus**
Primulaceae	
Padre's Shooting Star	*Dodecatheon clevelandii* ssp. *clevelandii*
Ranunculaceae	
Western Virgin's Bower	*Clematis ligusticifolia*
Parry's Larkspur	*Delphinium parryi* ssp. *parryi*
California Buttercup	*Ranunculus californicus*
Rosaceae	
Chamise	*Adenostoma fasciculatum*
Smooth Mountain Mahogany	*Cercocarpus minutiflorus*
Sticky Cinquefoil	*Drymocallis glandulosa*
Toyon	*Heteromeles arbutifolia*
California Rose	*Rosa californica*
California Blackberry	*Rubus ursinus*
Rubiaceae	
Narrowleaf Bedstraw	*Galium angustifolium* ssp. *angustifolium*
Common Bedstraw	*Galium aparine*
Climbing Bedstraw	*Galium porrigens*
Salicaceae	
Fremont Cottonwood	*Populus fremontii*
Sandbar Willow	*Salix exigua*
Black Willow	*Salix gooddingii*
Red Willow	*Salix laevigata*
Arroyo Willow	*Salix lasiolepis*
Saururaceae	
Yerba Mansa	*Anemopsis californica*

General Plant Species Observed	
Common Name	**Scientific Name**
Solanaceae	
Sacred Datura	*Datura wrightii*
California Boxthorn	*Lycium californicum*
Tree Tobacco	*Nicotiana glauca**
Douglas' Nightshade	*Solanum douglasii*
Black Nightshade	*Solanum nigrum**
Parish's Purple Nightshade	*Solanum parishii*
Purple Nightshade	*Solanum xanti*
Tamaricaceae	
Saltcedar	*Tamarix ramosissima**
Urticaceae	
Western Nettle	*Hesperocnide tenella*
Pellitory	*Parietaria hespera* var. *hespera*
Stinging Nettle	*Urtica dioica*
Verbenaceae	
Western Verbena	*Verbena lasiostachys*
Viscaceae	
Big Leaf Mistletoe	*Phoradendron macrophyllum*
Monocots	
Agavaceae	
Smallflower Soap Plant	*Chlorogalum parviflorum*
Chaparral Yucca	*Hesperoyucca whipplei*
Arecaceae	
Mexican Fan Palm	*Washingtonia robusta**
Canary Island Date Palm	*Phoenix canariensis**
Asphodelaceae	
Onion Weed	*Asphodelus fistulosus**
Cyperaceae	
Sedge	*Carex* spp.
Tall Flatsedge	*Cyperus eragrostis*
Umbrella Sedge	*Cyperus involucratus**
Creeping Spike Rush	*Eleocharis macrostachya*
Hardstem Bulrush	*Schoenoplectus acutus*
California Bulrush	*Schoenoplectus californicus*
Juncaceae	
Baltic Rush	*Juncus balticus*
Mexican Rush	*Juncus mexicanus*
Wrinkled Rush	*Juncus rugulosus*
Iridaceae	
Blue Eyed Grass	*Sisyrinchium bellum*
Liliaceae	
Splendid Mariposa Lily	*Calochortus splendens*
Melanthiaceae	
Fremont's Star Lily	*Toxicoscordion fremontii*
Poaceae	

General Plant Species Observed	
Common Name	**Scientific Name**
Giant Reed	*Arundo donax**
Slim Oat	*Avena barbata**
Common Oat	*Avena fatua**
Beard Grass	*Bothriochloa barbinodis*
Ripgut Brome	*Bromus diandrus**
Soft Chess Brome	*Bromus hordeaceus**
Red Brome	*Bromus madritensis**
Pampas Grass	*Cortaderia selloana*
Salt Grass	*Distichlis spicata*
Giant Ryegrass	*Elymus condensatus*
Small Fescue	*Festuca microstachys*
Italian Ryegrass	*Festuca perennis**
Foxtail Barley	*Hordeum murinum**
Goldentop Grass	*Lamarckia aurea**
Mexican Sprangletop	*Leptochloa fusca* ssp. *uninervia*
California Melic	*Melica imperfecta*
Mediterranean Canarygrass	*Phalaris minor**
Annual Bluegrass	*Poa annua**
Rabbitsfoot Grass	*Polypogon monspeliensis**
Mediterranean Grass	*Schismus barbatus**
Foothill Needlegrass	*Stipa lepida*
Purple Needlegrass	*Stipa pulchra*
Themidaceae	
Goldenstar	*Bloomeria crocea*
Thread Leaved Brodiaea	*Brodiaea filifolia*
Blue Dicks	*Dichelostemma capitatum*
Common Muilla	*Muilla maritima*
Typhaceae	
Cattail	*Typha* spp.

*Denotes nonnative species

General Wildlife Species Observed	
Common Name	**Scientific Name**
Invertebrates	
Anise Swallowtail	*Papilio zelicaon*
Behr's metalmark	*Apodemia mormo virqulti*
Checkered White	*Pontia protodice*
Gray Hairstreak	*Strymon melinus*
Painted Lady	*Vanessa cardui*
Pygmy Blue	*Brephidium exilis*
Versatile Fairy Shrimp	*Branchinecta lindahli*
Western Tiger Swallowtail	*Papilio rutulus*
Amphibians	
Baja California treefrog	*Pseudacris hypochondriaca*
Reptiles	
Western fence lizard	*Sceloporus occidentalis*
Western Whiptail	*Cnimidophorus tigris*
Birds	
Acorn Woodpecker	Melanerpes formicivorus
Allen's Hummingbird	*Selasphorus sasin*
American Crow	*Corvus brachyrhychos*
American Goldfinch	*Spinus tristis*
American Kestrel	*Falco sparverius*
American Pipit	*Anthus rubrescens*
Anna's Hummingbird	*Calypte anna*
Ash-throated flycatcher	Myiarchus cinerascens
Bewick's Wren	*Thryomanes bewickii*
Black Phoebe	*Sayornis nigricans*
Black-bellied Plover	*Pluvialis squatarola*
Black-headed Grosbeak	*Pheuticus melanocephalus*
Blue Grosbeak	*Passerina caerulea*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Brown-headed Cowbird	*Molothrus ater*
Bullock's Oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
Caifornia Towhee	*Melospiza crissalis*
California quail	*Callipepta californica*
California Thrasher	*Toxostoma redivivum*
Cassin's Kingbird	*Tyrannus vociferans*
Cliff Swallow	*Petrochelidon pyrrhonota*
Coastal Cactus Wren	*Campylorhynchus brunneicapillus*
Coastal California Gnatcatcher	*Polioptila californica californica*
Common Quail	*Callipepla californica*
Common Raven	*Corvus corax*
Common Yellowthroat	*Geothylpis trichas*
Cooper's Hawk	*Accipiter cooperii*
Downy Woodpecker	*Picoides pubescens*
Eurasian Collared-dove	*Streptopelia decaocto*

General Wildlife Species Observed	
Common Name	**Scientific Name**
European Starling	*Sturnus vulgaris*
Greater Roadrunner	*Geococcyx californianus*
Greater Yellowlegs	*Tringa melanolecua*
Hermit Thrush	*Catharus guttatus*
Horned Lark	*Eremophila alpestris*
House Finch	*Haemorhous mexicanus*
House Wren	*Troglodytes aedon*
Hutton's Vireo	*Vireo huttoni*
Killdeer	*Charadrius vociferus*
Lazuli bunting	*Passerina amoena*
Least Bell's Vireo	*Vireo bellii pusillis*
Lesser Goldfinch	*Spinus psaltria*
Lesser Nighthawk	*Chordeiles acutipennis*
Lincoln's Sparrow	*Melospiza lincolnii*
Loggerhead Shrike	*Lanius ludovicianus*
Mourning Dove	*Zenaida macroura*
Northern Flicker	*Colaptes auratus*
Northern Mockingbird	*Mimus polyglottos*
Northern Rough-winged swallow	*Stelqidopteryx serripennis*
Nuttall's Woodpecker	*Picoides nuttallii*
Oak titmouse	*Baeolophus inornatus*
Orange-crowned Warbler	*Oreothylpis trichas*
Pacific-slope Flycatcher	*Empidonax difficilis*
Phainopepla	Phainopepla nitens
Red-shouldered Hawk	*Buteo lineatus*
Red-tailed Hawk	*Buteo jamaicensis*
Rufous Hummingbird	*Selasphorus rufus/sasin*
Savannah Sparrow	*Passerculus sandwichensis*
Say's Phoebe	*Sayornis saya*
Scaly-breasted Munia	*Lonchura punctulata*
Song Sparrow	*Melospiza melodia*
Southern California Rufous-Crowned Sparrow	*Aimophila ruficeps canescens*
Spotted Towhee	*Pipilo maculatus*
Turkey Vulture	*Cathartes aura*
Western Bluebird	*Sialia mexicana*
Western Kingbird	Tyrannus verticalis
Western Meadowlark	*Sturnella neglecta*
Western Scrub-Jay	*Aphelocoma californica*
Western Tanager	*Piranga ludoviciana*
White-crowned Sparrow	*Zonotrichia leucophrys*
White-throated Swift	*Aeronautes saxatalis*
Wilson's Warbler	*Cardellina pusilla*
Wrentit	*Chamaea fasciata*
Yellow Warbler	*Setophaga petechia brewsteri*
Yellow-breasted Chat	*Icteria virens*

General Wildlife Species Observed	
Common Name	**Scientific Name**
Yellow-rumped Warbler	*Setophaga coronata*
Mammals	
Bobcat	*Lynx rufus*
Botta's Pocket Gopher	*Thomoys bottae*
Brush mouse	*Peromyscus boylii*
Bryant's woodrat	*Neotoma bryanti*
California Ground Squirrel	*Spermophilus beecheyi*
California mouse	*Peromyscus californicus*
Coyote	*Canis latrans*
Deer mouse	*Peromyscus maniculatus gambellii*
Desert Cottontail	*Sylvilagus audubonii*
Dulzura pocket mouse	*Chaetodipus californicus femoralis*
Dusky-footed Woodrat	*Neotoma fuscipes*
Mule Deer	*Odocoileus hemionus*
Northern Baja deer mouse	*Peromyscus fraterculus*
Western harvest mouse	*Reithrodontomys megalotis*