# Appendix A

## *Proposed Environmental Measures*

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# APPENDIX A

# LICENSEES' PROPOSAL – ENVIRONMENTAL MEASURES

Provided below are the operations and maintenance activities within the California Department of Water Resources' (DWR) and Los Angeles Department of Water and Power's (LADWP) (Licensees) Proposal that the Licensees propose to undertake as conditions of the new license for the South SWP Hydropower, Federal Energy Regulatory Commission (FERC) Project Number 2426 (Project) for the purpose of protecting resources against impacts from continued operation and maintenance of the Project, mitigating any such impacts that would otherwise result from the Licensees' Proposal, or enhancing resources that could be affected by the Licensees' Proposal, as described in this Application for a New License Major Project – Existing Dam (Application for New License) for the Project.

For the purpose of this appendix, the Licensees have assumed that the FERC requirements regarding inspections of Project facilities (e.g., annual FERC inspections, Part 12 Dam Safety Inspections, and Environmental and Public Use Inspections) and other similar general FERC requirements (e.g., the requirement for Emergency Action Plans) will apply to the Licensees' Proposal if FERC issues a new license. The Licensees have also assumed that the specific requirements included in related approvals, such as dam certificates issued by the California Division of Safety of Dams (DSOD) for Project dams within DSOD's jurisdiction, and appropriated water rights issued by the State Water Resources Control Board for power generation, will not change under a new license. Therefore, the Licensees have not included proposed conditions related to these activities in this Application for New License. In addition, the Licensees have assumed that FERC will include in the new license FERC's *Terms and Conditions of License for Constructed Major Project Affecting Navigable Waters and Lands of the United States* (Form L-5 Standard Articles).[1] Therefore, the Licensees have not included proposed conditions that would otherwise be addressed by FERC's Form L-5 Standard Articles.

Table A-1 lists the measures included in the Licensees' Proposal.

[1] L-5: Constructed Major Project Affecting Navigable Waters and Lands of the United States, 12 Federal Power Commission (F.P.C.) 1329 (October 23, 1953), 17 F.P.C. 110 (January 13, 1957), 38 F.P.C. 203 (July 26, 1967), 54 F.P.C. 1832 (October 31, 1975)

## Table A-1. Measures Proposed by Licensees for Inclusion in a New License for the Project

| Licensees' Proposed Measures | Description |
|---|---|
| **Geology and Soils** | |
| GS1 | Implement the Erosion and Sediment Control Plan |
| **Water Resources** | |
| WR1 | Implement Pyramid Lake Water Surface Elevations |
| WR2 | Implement the Hazardous Materials Management Plan |
| **Aquatic Resources** | |
| AR1 | Implement Pyramid Reach Flow Releases |
| AR2 | Implement Pyramid Lake Fish Stocking |
| **Terrestrial Resources** | |
| TR1 | Develop and Implement an Integrated Vegetation Management Plan[1] |
| **Recreation** | |
| RR1 | Develop and Implement a Recreation Management Plan[1] |
| **Land Use** | |
| LU1 | Implement the Fire Prevention and Response Plan |
| LU2 | Develop and Implement a Project Safety Plan[2] |
| **Visual Resources** | |
| VR1 | Implement the Visual Resources Management Plan |
| **Cultural Resources** | |
| CR1 | Implement the Historic Properties Management Plan |

*Notes:*
*[1]The Licensees and the Relicensing Participants were not able to complete discussions on this plan in time for the Licensees to include the plan in their Draft License Application (DLA). The Licensees and Relicensing Participants agreed that the Licensees would include in their DLA a commitment to file a plan with FERC within the first year after license issuance. However, the Licensees and Relicensing Participants also agreed to continue collaborative discussions on the plan with the goal of replacing the proposed measure in the DLA (i.e., file a plan within a year of license issuance) with a measure to implement a final agreed-to plan that the Licensees would include in their Final License Application (FLA).*
*[2]The Licensees intend to replace this proposed measure in the DLA (i.e., file a plan within a year of license issuance) with a measure to implement a final plan that the Licensees would include in their FLA.*

The complete text for each measure as proposed by the Licensees is presented below by resource area. In addition, this section indicates if the Licensees' proposed measure is a continuation of a measure in the existing license or related condition. Collaboration with Relicensing Participants is ongoing; a map illustrating the approximate locations of the Licensees' proposed measures will be provided in the FLA.

## Geology and Soils

Measure GS1, Implement the Erosion and Sediment Control Plan

The Licensees will, within one year after license issuance, implement the Erosion and Sediment Control Plan included in this Appendix A as Attachment 1.

## Water Resources

Measure WR1, Implement Pyramid Lake Water Surface Elevations[2]

To facilitate general recreation use at Pyramid Lake, the Licensees will maintain the water surface elevation (WSE) in Pyramid Lake as follows:

- The Licensees will not lower the WSE below an elevation of 2,560 feet.
- The Licensees will not lower or raise the WSE by more than 8 feet each day (i.e., from midnight to midnight each day).
- The Licensees will not lower or raise the WSE by more than 14 feet during each 7-day period (i.e., midnight to midnight, beginning at midnight on Sunday).

During emergency conditions and the recovery therefrom, the above WSE variations or drawdown may be exceeded. Emergency conditions include, but are not limited to, the following:

- An electrical or mechanical failure, extraordinary maintenance, uncontrollable force, or other occurrence that impairs the ability of the collective facilities of the State Water Project (SWP) to deliver to, store in, or deliver scheduled quantities of water from Pyramid Lake.
- An electrical or mechanical failure, extraordinary maintenance, uncontrollable force, or other occurrence that impairs water contractors' abilities to take scheduled quantities of water from the SWP.
- Higher than scheduled water requirements from the SWP by water service contractors.
- Conditions on LADWP's power system, or the power systems with which it is interconnected, require generation at Castaic Powerplant for such an extended

[2] This measure incorporates relevant portions of the DWR/USFS 1969 Memorandum of Agreement.

period of time that greater than normal flows must be released from Pyramid Lake.

As soon as the Licensees become aware of an emergency condition, the Licensees will notify the U.S. Department of Agriculture, Forest Service (USFS) and FERC, and provide to them a revised operating schedule that will prevail during the emergency period and the recovery therefrom.

Licensees will maintain a minimum storage of no less than 27,000 acre-feet (AF) in Pyramid Lake, except in an emergency.

Measure WR2, Implement the Hazardous Materials Management Plan

The Licensees will, within one year after license issuance, implement the Hazardous Materials Management Plan included in this Appendix A as Attachment 2.

**Aquatic Resources**

Measure AR1, Implement Pyramid Reach Flow Releases[3]

The Licensees will maintain minimum flow requirements from Pyramid Lake into Pyramid reach as follows:

Stream releases from Pyramid Dam into Pyramid reach will match natural surface inflow into Pyramid Lake to the extent operationally feasible and consistent with safety requirements, as further described in the following guidelines:

- Natural inflow to Pyramid Lake will be released into Piru Creek at a rate of up to about 18,000 cubic feet per second (cfs), which is the maximum safe, designed release from Pyramid Dam. The exact maximum safe release depends on the lake surface water elevation at the time of the release.

- Storm releases from Pyramid Dam into Piru Creek may be held back at less than 18,000 cfs if higher releases are deemed by the Licensees to be a threat to life, safety, or property at Pyramid Dam, or downstream of the dam.

- The Licensees may elect to appropriate inflow to Pyramid Lake above the safe release flows under the provisions of its existing water rights.

[3] This measure is a continuation of Article 52 in the existing FERC license, with two exceptions. First, under Article 52 in the existing license, Licensees apply a 10.8 percent multiplier, as agreed to by DWR and United Water Conservation District in 1974 and provided to FERC, to calculate the ungagged daily drainage into Pyramid Lake. In the new license, the Licensees propose to use an 11.8 percent multiplier, which Licensees calculated using current standard GIS and hydrologic analysis methods, as described in Attachment 3 to this Appendix A. Second, the second bullet has been modified to clarify that the Licensees would deem when unsafe conditions occur.

- Up to 3,150 acre-feet of State Water Project water would be delivered to United Water Conservation District via middle Piru Creek (from Pyramid Dam) between November 1 and the end of February of each water year. During this period, water deliveries may be made over a period of a few days, ramping flows up and down to simulate the hydrograph of a typical storm event, or they may be released more gradually over a longer period.

- Releases from Pyramid Dam could be increased by up to 50 cfs for short periods to exercise the Pyramid Dam radial gate and stream release valves; test emergency power sources; conduct tests mandated by the Commission; or meet other short-term operational or maintenance requirements. No such testing would take place between March 15 and June 15. Testing would also be avoided to the extent possible between June 16 and July 31. Tests may be conducted at any time between August 1 and March 14, provided that flows do not increase by more than 50 cfs above current base flows during the event and that the event does not last longer than 15 minutes. Scheduled tests requiring larger releases or lasting longer than 15 minutes would require prior notification to the U.S. Fish and Wildlife Service (FWS). Unscheduled releases due to equipment failure or emergency situations must be reported to the FWS no later than three business days after the event.

- The gaging station on upper Piru Creek (located north of Pyramid Lake) provides 24 hour averages; therefore, instantaneous peak stream releases may be attenuated. Unlike the natural inflow hydrograph, which typically peaks sharply, the stream release hydrograph of middle Piru Creek may be attenuated.

- The sum of the Pyramid Lake gaged daily inflow will be multiplied by 11.8 percent to account for the ungagged portions of Pyramid Lake watershed that are not tributaries of upper Piru Creek and Cañada de los Alamos upstream of their respective gaging stations, and the product of the multiplication will be added to the sum of the daily gaged inflow data to Pyramid Lake to determine the total daily inflow into Pyramid Lake. This may result in some deviations for individual storm events due to localized variations in storm water intensity.

- Because of operational constraints, the stream release hydrograph of middle Piru Creek would typically gage measured inflow. The valves at Pyramid Dam can be adjusted for release flows of less than 3 cfs; however, the precise measurement of released flows less than 3 cfs may not be possible due to operational constraints of the dam's gaging instrumentation.

Measure AR2, Implement Pyramid Lake Fish Stocking[4]

The Licensees will, beginning in the first full calendar year after license issuance and annually thereafter during the stocking season (October 1 to May 30), stock Pyramid

[4] This measure overlaps with Article 51 in the existing FERC license.

Lake with a target of 20,000 pounds of catchable trout (i.e., approximately two fish per pound). This poundage is an average annual target that may fluctuate slightly from year to year. The average will be measured as a five-year running average to ensure consistent stocking over the term of the new license. The Licensees, after consultation with the California Department of Fish and Wildlife (CDFW), will stock the fish at appropriate times of the year, which are anticipated to typically be at least two events per month between October 1 and May 30 of each year. The fish stocking events will occur at the Emigrant Landing Boat Launch. The Licensees may contract with CDFW or one or more State-registered private fish hatcheries to raise and plant the fish.

Beginning in the first full calendar year after license issuance and once every six years thereafter, the Licensees will conduct an angler survey at Pyramid Lake. The Licensees may contract with CDFW to perform the surveys. The surveys will focus on trout, the stocked species, with an option to survey for other fish. The surveys will be performed approximately eight to ten days during each month from October 1 (or after the first stocking event, whichever is later) through May 30 (or no later than 10 days after the last seasonal stocking event), for a total of 64 to 80 survey days each year when surveys occur. The specific days to be surveyed in each month will be randomly selected by the Licensees, with five days in each month in two strata: (1) a high-use stratum (i.e., Saturday, Sunday, and federal holidays); and (2) a low-use stratum (i.e., Monday through Friday, excluding federal holidays). The time that the survey begins each day will be randomly selected between a morning start and an afternoon start by the Licensees, but all surveys will be performed during daytime hours. The daily survey locations will be the shoreline at the Emigrant Landing Boat Launch, and the shorelines at the Vaquero and Spanish Point Boat-in Picnic Areas. The duration of each survey day will be four hours.

The surveyor(s) will ask anglers a standard series of questions regarding trout. The surveyor(s) will ask the anglers questions to determine angling effort (i.e., hours fished per angler that day) and target fish (i.e., whether the anglers were fishing for trout or some other fish species). The surveyor(s) will also ask the anglers one to four standard "yes or no" questions, along with the number of trout caught, to determine their angling satisfaction for trout. The first standard question will be: "Were you satisfied with your angling experience for trout today?" The second standard question will be: "How many trout did you catch today?"

Two additional questions will be asked if the angler reports catching one or more trout: "Were you satisfied with the number of trout caught?" and "Were you satisfied with the size of trout caught?" If the anglers caught trout, the surveyor(s) will then ask questions about catch rate (i.e., the number of trout caught, including trout kept and released and why, by length of time fished), size (in inches) of trout caught, and gear used to fish. The Licensees may add other questions at their discretion (e.g., questions related to other fish species sought; where the anglers fished in the reservoir; number of anglers in their party; how often the anglers fish at Pyramid Lake; timing and duration of fishing trips; if the anglers are camping at Pyramid Lake or are just there for the day; and the distance the angler traveled to the lake).

By December 31, in the third full calendar year after license issuance and every other year thereafter (i.e., in License years 5, 7, 9, 11, etc.), the Licensees will file with FERC a report documenting Pyramid Lake trout stocking in the previous October to May stocking season, and any Licensees-conducted angler surveys in those calendar years. For each of the previous two calendar years, the report will include the following information for stocked trout: the poundage and approximate number of trout stocked; strain; size class; dates stocked; release location; method of stocking (e.g., truck); and the hatchery of origin if the fish were not obtained from CDFW. The report will also document compliance with the five-year running average stocking requirement indicated under this condition. The report will include a running summary by year of the Licensees' Pyramid Lake trout stocking (i.e., poundage of trout stocked each stocking season and the five-year running average). If the Licensees performed an angler survey in one of the two previous calendar stocking seasons, the report will include the results of the survey, including: when and where surveys were conducted; number of anglers surveyed; total hours fished; total number of trout caught and kept; total number of trout caught and released; catch rate (i.e., number of trout caught by hours fished); length-frequency of caught trout; angler satisfaction results (i.e., response to the standard questions described above); and other information, as appropriate. In addition, if an angler survey was performed in one of the two previous stocking seasons, the report will include a comparison of that season's angler survey results to previous trout angler surveys performed by the Licensees under this condition.

In years in which the report includes angler survey results for either of the previous two calendar years, prior to filing the report with FERC, the Licensees will provide a draft of the report to CDFW and consult with CDFW regarding the fish stocking program. CDFW will have 30 calendar days to provide written comments on the draft report, including recommending any changes to the fish stocking program. The Licensees will include all relevant documentation of consultation with CDFW in the final report filed with FERC. If the Licensees do not adopt a particular written recommendation by CDFW, the final report will include the Licensees' reasoning for the decision.

## Terrestrial Resources

Measure TR1, Develop and Implement an Integrated Vegetation Management Plan

The Licensees will, within one year after license issuance, develop and file with FERC for approval an Integrated Vegetation Management Plan that provides vegetation management protocols. The Licensees will implement the plan as approved by FERC.

## Recreation

Measure RR1, Develop and Implement a Recreation Management Plan[5]

[5] This measure overlaps with Articles 17 and 50 in the existing FERC license.

The Licensees will, within one year after license issuance, develop and file with FERC for approval a Recreation Management Plan that provides recreation management measures and programs for Project receation facilities. The Licensees will implement the plan as approved by FERC.

**Land Use**

Measure LU1, Implement the Fire Prevention and Response Plan

The Licensees will, within one year after license issuance, implement the Fire Prevention and Response Plan included in this Appendix A as Attachment 4.

Measure LU2, Develop and Implement a Project Safety Plan[6]

The Licensees will, within one year after license issuance, develop and file with FERC for approval, a Project Safety Plan that provides measures for installing and maintaining signs, lights, sirens, and other devices at Project facilities. The Licensees will implement the plan as approved by FERC.

**Visual Resources**

Measure VR1, Implement the Visual Resources Management Plan

The Licensees will, within one year after license issuance, implement the Visual Resources Management Plan included in this Appendix A as Attachment 5.

**Cultural Resources**

Measure CR1, Implement the Historic Properties Management Plan[7]

The Licensees will, within one year after license issuance, implement the Historic Properties Management Plan included in this Appendix A as Attachment 6.

**Attachments**

Attachment 1 – Erosion and Sediment Control Plan
Attachment 2 – Hazardous Materials Management Plan
Attachment 3 – Support for Calculation of Ungaged Drainage Multiplier in the Licensees'Proposed Measure AR1, Implement Pyramid Reach Flow Releases
Attachment 4 – Fire Prevention and Response Plan
Attachment 5 – Visual Resources Management Plan
Attachment 6 – Historic Properties Management Plan (Privileged)

[6] This measure overlaps with Articles 60 and 402 in the existing FERC license.

[7] This measure overlaps with Article 47 in the existing FERC license.

# Attachment 1

## *Erosion and Sediment Control Plan*

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# SOUTH SWP HYDROPOWER
# FERC PROJECT NO. 2426-227

# EROSION AND SEDIMENT CONTROL PLAN

August 2019


**State of California**
**California Natural Resources Agency**
**DEPARTMENT OF WATER RESOURCES**
**Hydropower License Planning and Compliance Office**

**Los Angeles**
**DEPARTMENT OF WATER AND POWER**

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## COMMONLY USED TERMS, ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ANF | Angeles National Forest |
| Application for New License | Application for a New License Major Project – Existing Dam for the South SWP Hydropower, FERC Project Number 2426 |
| BMP | Best Management Practice |
| CDFW | California Department of Fish and Wildlife |
| CFGC | California Fish and Game Code |
| DWR | California Department of Water Resources |
| existing Project boundary | The boundary of the Project as approved by FERC in the existing license |
| FERC | Federal Energy Regulatory Commission |
| LADWP | Los Angeles Department of Water and Power |
| Los Angeles RWQCB | Los Angeles Regional Water Quality Control Board |
| Licensees | California Department of Water Resources and Los Angeles Department of Water and Power |
| LPNF | Los Padres National Forest |
| Lahontan RWQCB | Lahontan Regional Water Quality Control Board |
| NFS | National Forest System |
| O&M | operation and maintenance |
| Plan | Erosion and Sediment Control Plan |
| PM&E measures | Protection, Mitigation, and Enhancement measures, which are operation and management activities to: (1) protect resources against impacts from continued operation and maintenance of the Project; (2) mitigate any impacts from continued operation and maintenance of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project operation and maintenance |
| Project | South SWP Hydropower, FERC Project Number 2426 |
| Project boundary | The area to which the Licensees require access for normal Project operations and maintenance |
| proposed Project boundary | The boundary of the Project as proposed by the Licensees, pending approval from FERC in the new license. Includes all existing Project facilities, but adjusts the boundary to: (1) add lands to the existing Project boundary that are |

| | |
|---|---|
| | currently utilized with a preponderance of use related to Project O&M, and (2) remove lands from the existing Project boundary that do not have Project facilities and are not used or necessary for Project O&M. |
| SCE | Southern California Edison |
| SWP | State Water Project |
| SWPPP | Stormwater Pollution Prevention Plan |
| SWRCB | California State Water Resources Control Board |
| U.S. | United States |
| USACE | U.S. Army Corps of Engineers |
| USFS | U.S. Department of Agriculture, Forest Service |
| USFWS | U.S. Department of the Interior, Fish and Wildlife Service |
| Warne Powerplant | William E. Warne Powerplant |

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# 1.0 INTRODUCTION

In XXXX 2019, the California Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) (Licensees), pursuant to Title 18 of the Code of Federal Regulations, Subchapter B (Regulation under the Federal Power Act), Part 4, Subpart F (Application for License for Major Project – Existing Dam) (Integrated Licensing Process), filed with the Federal Energy Regulatory Commission (FERC) an Application for a New License for Major Project – Existing Dam (Application for New License) for the Licensees' South SWP Hydropower, FERC Project Number 2426 (Project).

The Licensees have included this Erosion and Sediment Control Plan (Plan) in its Application for New License. All elevation data in this exhibit are in United States (U.S.) Department of Commerce, National Oceanic and Atmospheric Association, National Geodetic Survey Vertical Datum of 1929, unless otherwise stated.

## 1.1 BACKGROUND

### 1.1.1 Brief Description of the Project

The existing Project is part of a larger water storage and delivery system, the State Water Project (SWP), which is the largest state-owned and operated water supply project of its kind in the U.S. The SWP provides southern California with many benefits, including affordable water supply, reliable regional clean energy, opportunities to integrate green energy, accessible public recreation opportunities, and environmental benefits.

The Project is located in Los Angeles County in southern California, on the West Branch of the SWP. The existing Project has a FERC-authorized installed capacity of 1,349,290 kilowatts. Project facilities range in elevation from 3,325 feet to 1,130 feet, and include the Warne Power Development and Castaic Power Development. The major features of the existing Warne Power Development include: (1) Quail Lake, Quail Lake Embankment and Quail Lake Outlet; (2) Lower Quail Canal; (3) Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline; (4) Gorman Bypass Channel; (5) William E. Warne Powerplant (Warne Powerplant) and Switchyard; (6) Warne Transmission Line; (7) Primary Project Roads and Trails; (8) Quail Lake recreation facilities and (9) streamflow and reservoir staff gages. The major features of the existing Castaic Power Development include: (1) Pyramid Dam and Lake; (2) Angeles Tunnel and Surge Chamber; (3) Castaic Penstocks; (4) Castaic Powerplant and Switchyard; (5) Elderberry Forebay Dam, Forebay, and Outlet; (6) Storm Bypass Channel and Check Dams; (7) Castaic Transmission Line; (8) Primary Project Roads and Trails; and (9) Pyramid Lake recreation facilities.

The Licensees' Proposal includes the following changes to Project facilities: the addition of the existing Quail Detention Embankment to the Warne Power Development as a flood-management structure; removal of the 3-mile-long Warne Transmission Line

(owned and operated by SCE) from the Warne Power Development; addition of 99 existing road segments as Primary Project Roads associated with the Warne Power Development and the Castaic Power Development; and addition of one existing streamflow gage to the Castaic Power Development. Facilities upstream of the Angeles Tunnel Surge Chamber are operated and managed by DWR. The remainder of the downstream facilities, including the Surge Chamber, are operated and managed by LADWP.

The existing Project is operated as a power recovery project using SWP water. For that reason, Project operations do not vary based on changes in local hydrological conditions. In essence, the Project is operated in a run-of-river mode, generating power as SWP water is provided for downstream consumptive use, with the exception that Castaic Powerplant is a pumping–generating plant that reuses SWP water to generate electricity before it is delivered to downstream water users.

The Licensees propose several changes to the existing Project boundary to more accurately define lands necessary for the safe operation and maintenance (O&M) of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. The net effect of modifying the existing Project boundary is the reduction of area within the boundary from 6,928.0 acres to 4,563.8 acres, a reduction of 2,364.2 acres. This change would reduce 3,287.3 acres of federal land (47.5 percent of the total area within the existing Project boundary) to 2,007.0 acres (approximately 44.0 percent of the total area within the proposed Project boundary), resulting in 1,334.6 acres managed by the Angeles National Forest (ANF), 665.9 acres managed by the Los Padres National Forest (LPNF), and 6.5 acres managed by the U.S. Department of the Interior, Bureau of Land Management (BLM). The U.S. Department of Agriculture, Forest Service (USFS) administers the ANF and LPNF in conformance with the ANF and LPNF Land Management Plans (USFS 2005a, 2005b, 2005c, 2005d).

The Licensees propose to operate the Project as it has been operated historically, with the addition of a number of Protection, Mitigation, and Enhancement (PM&E) measures, which are operation and management activities to: (1) protect resources against potential impacts from continued O&M of the Project; (2) mitigate any impacts from continued O&M of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project O&M. This Plan is one of those PM&E measures.

Figure 1.1-1 shows the Project vicinity. Figure 1.1-2 shows the Project facilities, including land ownership. The existing Project boundary and the proposed Project boundary are shown in Figure 1.1-2 for reference purposes.

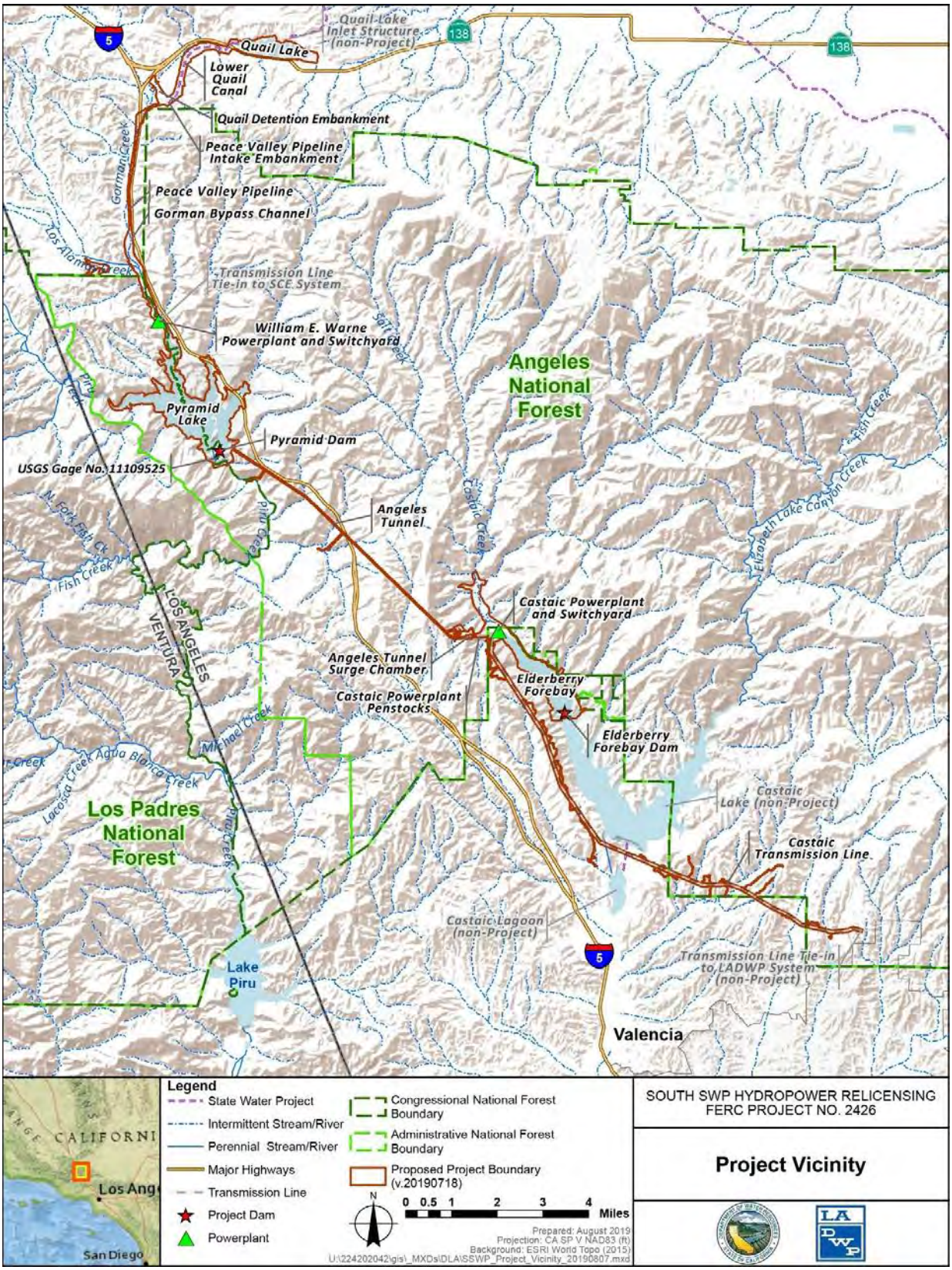


**Figure 1.1-1. South SWP Hydropower Vicinity Map**

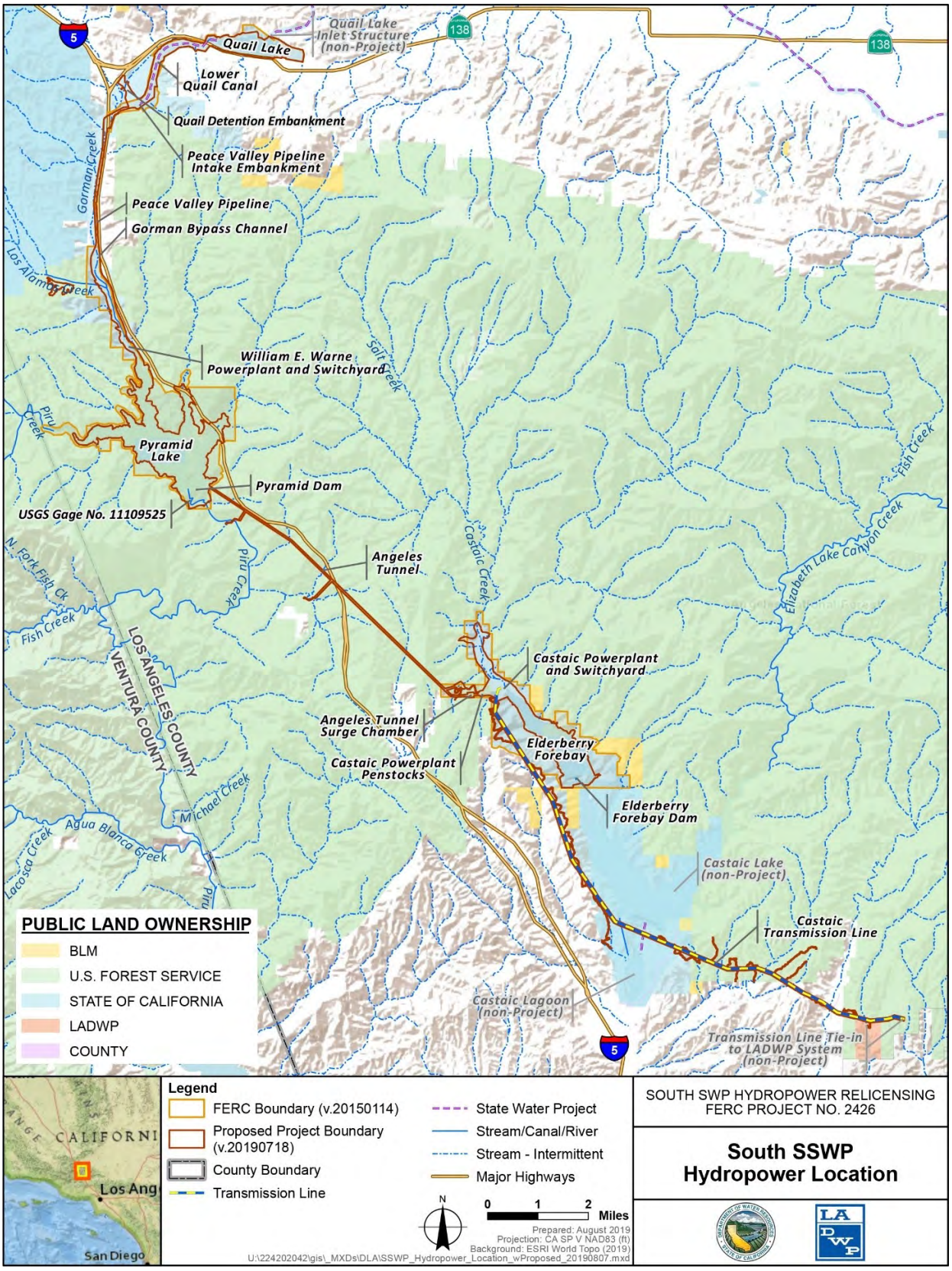


**Figure 1.1-2. South SWP Hydropower Facilities and Land Ownership**

## 1.2 PURPOSE OF THE PLAN

The purpose of this Plan is to minimize future erosion and sedimentation related to the Licensees' Proposal. This Plan covers ground-disturbing activities from routine operations, maintenance, and new construction that could produce undesirable erosion or sedimentation conditions near streams, reservoirs, or infrastructure. To the extent appropriate, the Licensees will coordinate the efforts required under this Plan with other Project resource efforts, including implementation of other resource management plans and measures included in the new license.

## 1.3 GOALS AND OBJECTIVE OF THE PLAN

The primary goals of the Plan are to describe and prescribe planned DWR, LADWP, and USFS Best Management Practices (BMP) (USFS 2012) on National Forest System (NFS) lands; and to control site-specific erosion and sedimentation impacts during routine O&M and reconstruction of Project facilities, including emergency erosion control measures for Project-related erosion during and after severe storms. The objective of the Plan is to provide current guidelines to meet Plan goals under the Licensees' Proposal.

## 1.4 CONTENTS OF THE PLAN

This Plan includes the following:

- Section 1.0. Introduction This section includes introductory information, including the purpose, goals, and objective of the Plan.

- Section 2.0. Methods for Minimizing Erosion and Sedimentation During Continued Project Operation and Maintenance. This section describes the methods for minimization of site-specific erosion and sedimentation impacts during continued O&M of the Project, new construction and/or reconstruction of Project facilities.

- Section 3.0. Plan Review, Consultation, and Revisions. This section describes Plan review and consultation between the Licensees and the ANF and LPNF, and Plan revisions.

- Section 4.0. References Cited. This section includes the resource documents cited in this Plan.

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# 2.0 METHODS FOR MINIMIZING EROSION AND SEDIMENTATION DURING CONTINUED PROJECT OPERATION AND MAINTENANCE

## 2.1 OVERALL EROSION AND SEDIMENT CONTROL PLANNING PROCESS

Figure 2.1-1 is a flowchart that generally describes the overall erosion and sediment control planning, consultation, permitting, treatment, and monitoring pathways for the Project. Normally, erosion treatment projects are either planned in advance (Box 1 in Figure 2.1-1) or arise as, or are initially implemented as, emergency actions (Box 2 in Figure 2.1-1). Prior to implementation, some permanent erosion control/stabilization activities may require consultation with the Los Angeles Regional Water Quality Control Board (Los Angeles RWQCB) or the Lahontan Regional Water Quality Control Board (Lahontan RWQCB). The Lahontan RWQCB has water quality jurisdiction only for the Quail Lake area of the Project; the remainder of the Project is under the water quality jurisdiction of the Los Angeles RWQCB (SWRCB 2018). The ANF and/or LPNF will be consulted when on or affecting NFS lands (Box 10 in Figure 2.1-1). Permanent erosion control features are defined as constructed features, such as road drainage features, rip-rap, and retaining walls.

When erosion control takes place on an emergency basis, then concurrent or after-the-fact notification to the Los Angeles RWQCB, Lahontan RWQCB, California Department of Fish and Wildlife (CDFW), USFS (when on or affecting NFS lands), and/or FERC may be necessary (Box 4 in Figure 2.1-1). If, after emergency erosion control actions are completed, but more permanent stabilization measures are required, then the Licensees will prepare a site plan with appropriate remediation and monitoring measures (Box 6 in Figure 2.1-1). If the emergency action does not require more permanent stabilization activities, then no other erosion control measures will be implemented (Box 5 in Figure 2.1-1).

Generally, planned (non-emergency) erosion control activities fall into one of two categories: (1) those associated with an erosion control element in a specific resource plan included in the new license (e.g., Recreation Management or Historic Properties Management Plans) (Box 7 in Figure 2.1-1); or (2) any Project-related erosion control not addressed by specific resource plans included in the new license (Box 8 in Figure 2.1-1).

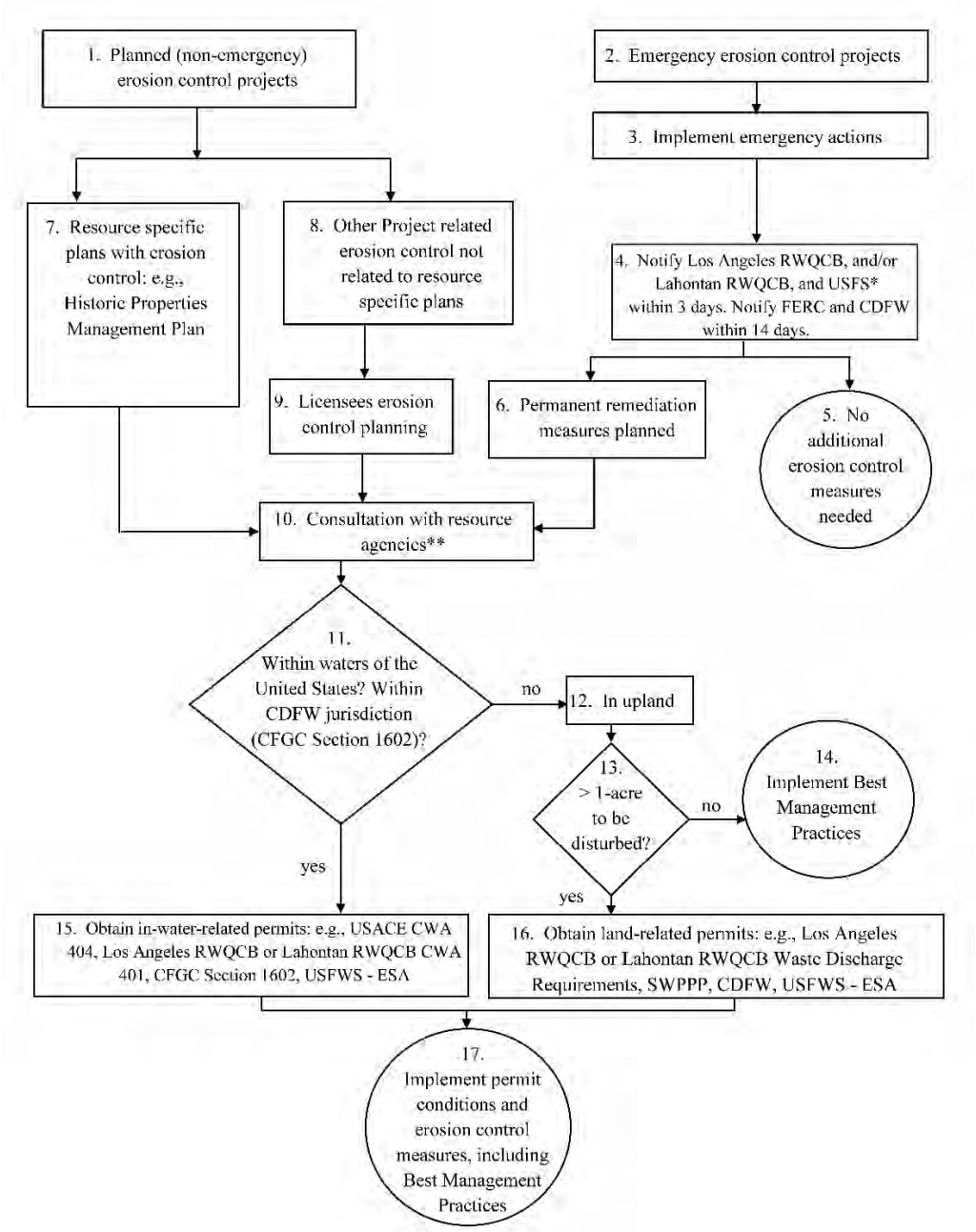
The Licensees will seek a Section 401 certification, as appropriate, if an erosion control activity would involve federal approval for a discharge into “waters of the United States.” (EPA 2018)

Erosion treatment projects that are located within designated waters of the United States may be subject to a U.S. Army Corps of Engineers (USACE) permit (Box 11 in Figure 2.1-1). This may be a Nationwide or an Individual permit, depending upon the specific circumstances.

Erosion treatment projects may also be subject to California Fish and Game Code (CFGC) Section 1602. The Licensees as a general practice will submit notification to CDFW for any non-emergency erosion control activities that may be subject to CFGC Section 1602 prior to initiating said activities (Box 11 in Figure 2.1-1).

Construction work that disturbs a land area greater than 1 acre may be subject to a Statewide General Permit for stormwater discharge associated with construction activity, which may require a Stormwater Pollution Prevention Plan (SWPPP) (Box 16 in Figure 2.1-1). If the Project is smaller than 1 acre of land disturbance, then the Statewide General Permit is not required (Box 14 in Figure 2.1-1).

After the appropriate permits are obtained, and in compliance with the requirements of such permits, the Licensees would implement the erosion treatment (Box 17 in Figure 2.1-1).




*Notes:*
**USFS consultation applies when on or affecting NFS land.*
***Resource agencies may include Los Angeles RWQCB, Lahontan RWQCB, CDFW, USFWS, USACE, and others, as appropriate.*
*Key:*
*> = greater than*
*CDFW = California Department of Fish and Wildlife*
*CFGC = California Fish and Game Code*
*CWA 401 = Clean Water Act, Section 401 Certification*
*CWA 404 = Clean Water Act, Section 404 Permit Program*
*ESA =Endangered Species Act*
*FERC = Federal Energy Regulatory Commission*
*Los Angeles RWQCB = Los Angeles Regional Water Quality Control Board*
*Lahontan RWQCB = Lahontan Regional Water Quality Control Board*
*SWPPP = Stormwater Pollution Prevention Plan*
*USACE = U.S. Army Corps of Engineers*
*USFS = U.S. Department of Agriculture, Forest Service*
*USFWS = U.S. Fish and Wildlife Service*

**Figure 2.1-1. Erosion and Sediment Control Plan Process Flow Chart**

## 2.2 MEASURES RELATED TO NEW CONSTRUCTION

Temporary erosion prevention and control measures are normally implemented during construction or reconstruction of Project facilities and infrastructure. This includes, but is not limited to, reconstruction at dam sites, road reconstruction, and recreation site development (or redevelopment), where ground disturbance and/or vegetation removal are expected. These measures are typically based on State and federal permit requirements as applicable; BMPs for NFS lands; Licensees' BMPs, including the development of a SWPPP when required; and measures included in a Section 1602 Agreement, if obtained. Table 2.2-1 provides a general list of priority BMPs for erosion control at construction sites.

Licensees, or their contractor(s), normally prepare and implement a SWPPP, if required, during development of detailed construction plans and drawings, and prior to initiating erosion control measures for each site larger than 1 acre. A copy of the SWPPP and Section 1602 Agreement, if one is obtained for the work, is usually maintained on-site while the site is under construction, commencing with the initial mobilization and ending with the completion of the job.

For construction and maintenance activities on NFS lands within the existing Project boundary, Licensees comply with the applicable BMPs adopted by USFS (USFS 2012). For construction and maintenance activities on non-NFS lands within the existing Project boundary, Licensees implement BMPs, depending on the specifics of a particular project. These BMP measures normally are site-specific for each planned construction project and might extend past the final construction inspection, if re-vegetation is included for more permanent site stabilization and erosion control.

## Table 2.2-1. General List of Best Management Practices for Erosion and Sediment Control at Construction Sites

| BMP Topic | Key Elements |
|---|---|
| Construction Scheduling | • Sequence construction activities so that the soil is not exposed for long periods of time.<br>• Schedule or limit grading to small areas.<br>• Install key sediment control practices before site grading begins.<br>• Schedule site stabilization as described below.<br>• Avoid rainy periods, if possible, when scheduling major grading activities.<br>• Incorporate time for establishment of vegetation into the conclusion of the construction schedule.<br>• Monitor rainfall and rain forecasts. |
| Preservation of Existing Vegetation | • Minimize clearing and the amount of exposed soil.<br>• Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.<br>• Protect streams, stream barriers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas. |
| Site Stabilization | • Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed, or during temporary periods of inactivity.<br>• Schedule temporary stabilization at inactive disturbed areas as soon as possible upon cessation of soil disturbing activities.<br>• Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour. |
| Silt Fencing | • Inspect and maintain silt fences after each storm event.<br>• Ensure the bottom of the silt fence is buried.<br>• Securely attach the material to the stakes.<br>• Do not place silt fences in the middle of a waterway or use them as a check dam.<br>• Install silt fence along topography contours with ends turned uphill in areas where sheet flow typically occurs. Stormwater should not flow around the silt fence.<br>• Each silt fence should drain a maximum slope length of 100 feet. |
| Storm Drain Inlet Protection | • Use rock or other appropriate material to cover the storm drain inlet to prevent trash and debris from entering the storm sewer system.<br>• Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).<br>• If using inlet filters, maintain them regularly.<br>• Storm drains should not drain an area larger than 1 acre. If they do, stormwater must be routed through additional BMPs, such as sediment basins or sediment traps. |

## Table 2.2-1. General List of BMPs for Erosion and Sediment Control at Construction Sites (continued)

| BMP Topic | Key Elements |
|---|---|
| Buffers | • Depending on-site specifics, maintain vegetative buffers or buffers by other means along water bodies to slow and filter stormwater run-off.<br>• Maintain buffers periodically to ensure their effectiveness. |
| Fugitive Dust Suppression | • Apply water on access roads.<br>• Haul materials in properly tarped or sealed containers.<br>• Restrict vehicle speeds to 15 miles per hour.<br>• Cover excavated areas and material after excavation activity ceases.<br>• Reduce the excavation size and/or number of excavations.<br>• Water down equipment and excavation faces. |
| Stabilized Construction Entrances | • Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.<br>• Maintain or repair the construction entrance so that it does not become buried in soil.<br>• Properly size entrance BMPs for all anticipated vehicles.<br>• Crushed rock and gravel pads may be used as a stabilized construction entrance.<br>• Replace gravel material when surface voids are visible.<br>• Remove all sediment deposited on roadways as soon as practical. |
| Waste Management | • Collect concrete and wash water in concrete washout facilities, especially when operations are near water resources. Containers must be adequately sized to handle solids, wash water, and possible rainfall.<br>• Choose smaller, covered containers and more frequent collection.<br>• Do not allow waste to accumulate on-site.<br>• Separate recyclable materials from waste and keep covered.<br>• Conduct visual inspections of dumpsters and recycling bins, removing containment and keeping containers covered.<br>• Ensure proper storage of stockpiled materials and material storage on-site.<br>• Stockpile processed materials on-site separately. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. |

*Key:*
*BMP = Best Management Practice*

## 2.3 MEASURES RELATED TO ROUTINE MAINTENANCE

Licensees normally adhere to USFS' National Best Management Practices for Water Quality Management on National Forest System Lands (USFS 2012) for any routine maintenance activities affecting NFS lands. These BMPs are designed to minimize soil disturbance and reduce delivery of sediment to water bodies. On non-NFS lands, the Licensees' erosion control BMPs include sediment control measures such as placement of silt fences, sandbags and straw wattles; revegetation of areas after ground-disturbing activities; re-grading of slopes to prevent concentrated runoff into water bodies; scheduling activities outside rainy periods (when possible); and installation of rock revetment structures, as described in the general list of BMPs in Table 2.2-1.

## 2.4 MEASURES RELATED TO OTHER EMERGENCY EROSION CONTROL EVENTS

The Licensees will be prepared to monitor for unexpected, emergency erosion control events within the proposed Project boundary that develop in response to significant events (e.g., storms and wildfires) and have a Project nexus. Erosion control measures typically include the protocols for documentation of specific erosion threats, appropriate agency notifications, and short/long-term actions that can be taken to stabilize each site and address public safety.

For emergency erosion control work, the Licensees will provide notification to CDFW, as appropriate, pursuant to CFGC Section 1610, which requires notification to be submitted within 14 days of beginning the emergency work in a lake or streambed. "Emergency work" as defined in CFGC Section 1610 includes: (1) immediate emergency work necessary to protect life or property, and (2) immediate emergency repairs to public service facilities necessary to maintain service as a result of a disaster in an area in which a state of emergency has been proclaimed by the governor of California.

## 2.5 MONITORING OF EROSION AND SEDIMENT CONTROL ACTIVITIES

Monitoring erosion and sediment control activities generally includes both implementation monitoring (i.e., determining whether the BMP was installed correctly) and effectiveness monitoring (e.g., evaluating whether maintenance or adaptive management is required, or whether revegetation is meeting required standards). Monitoring erosion and sediment control activities for the Project will follow the parameters of the applicable permits (e.g., Section 1602 Agreement, 404 permit and 401 certification), and/or license implementation plan for the work.

If the work is on or affects NFS lands, the monitoring will adhere, as appropriate, to USFS 2012. The implementation plans incorporate the USFS Handbook requirements so no conflict is anticipated between the implementation plans and the USFS Handbook requirements. However, if a discrepancy does occur between the specific permits and

license implementation plans, the monitoring required in the permit will take priority over the monitoring required in the implementation plan.

The USFS Pacific Southwest Region has a Management Agency Agreement with the State of California to incorporate BMPs into land and resource management activities, and to monitor their implementation and effectiveness (USFS 2012). The programmatic BMP monitoring requires USFS to annually audit BMP implementation and effectiveness on NFS lands to meet USFS policy. The USFS audit sites are annually chosen at random by USFS (USFS 2012) and may include sites related to this license. These audits would be conducted by USFS in cooperation with the Licensees.

# 3.0 PLAN REVIEW, CONSULTATION, AND REVISIONS

## 3.1 PLAN REVIEW AND CONSULTATION

The Licensees will review with the ANF and LPNF erosion and sediment control activities associated with this Plan that may affect NFS lands in the previous calendar year, as well as any Plan-related activities on NFS lands planned for the current calendar year. In addition, the Licensees will consult with the ANF and LPNF, as needed, regarding erosion and sediment control.

## 3.2 PLAN REVISIONS

The Licensees, in consultation with the ANF and LPNF, will review, update and/or revise this Plan if warranted every five years through the term of the License as it pertains to erosion and sediment control on NFS lands. The ANF and LPNF will have 60 days after receipt of the updated Plan from the Licensees to provide written comment and recommendations before the Licensees file the updated Plan with FERC for its approval. Licensees will include documentation of all relevant coordination and consultation associated with the updated Plan filed with FERC. If the Licensees do not adopt a particular recommendation by the ANF and/or LPNF, the filing will include the Licensees' reasons for not doing so. The Licensees will implement the Plan as approved by FERC. The Plan will not be considered revised until FERC issues its approval.

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# 4.0 REFERENCES CITED

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U.S. Environmental Protection Agency (EPA). 2018. 1988 Regulatory Definition of Waters of the United States: 40 Code of Federal Regulations 230.3(s). Available online: https://www.epa.gov/wotus-rule/about-waters-united-states. Last updated September 18, 2018. Accessed: June 8, 2019.

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# Attachment 2

## *Hazardous Materials Management Plan*

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# SOUTH SWP HYDROPOWER
# FERC PROJECT NO. 2426-227

# HAZARDOUS MATERIALS MANAGEMENT PLAN

August 2019


**State of California**
**California Natural Resources Agency**
**DEPARTMENT OF WATER RESOURCES**
**Hydropower License Planning and Compliance Office**

**Los Angeles**
**DEPARTMENT OF**
**WATER AND POWER**

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## APPENDICES

## COMMONLY USED TERMS, ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ANF | Angeles National Forest |
| Application for New License | Application for a New License for Major Project – Existing Dam for the South SWP Hydropower, FERC Project Number 2426 |
| BMP | Best Management Practice |
| Cal OES | California Governor's Office of Emergency Services |
| Cal OSHA | California Department of Industrial Relations, Division of Occupational Safety and Health |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| CUPA | Los Angeles County Fire Department Certified Unified Program Agency |
| DTSC | California Environmental Protection Agency, Department of Toxic Substances Control |
| DWR | California Department of Water Resources |
| existing Project boundary | The boundary of the Project as approved by FERC in the existing license |
| FERC | Federal Energy Regulatory Commission |
| hazardous material | A material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment, if released into the workplace or the environment. |
| HMBP | Hazardous Materials Business Plan |
| LADWP | Los Angeles Department of Water and Power |
| Los Angeles RWQCB | Los Angeles Regional Water Quality Control Board |
| Licensees | California Department of Water Resources and Los Angeles Department of Water and Power |
| LPNF | Los Padres National Forest |
| Lahontan RWQCB | Lahontan Regional Water Quality Control Board |
| NFS | National Forest System |
| O&M | operations and maintenance |
| Plan | Hazardous Materials Management Plan |

| | |
|---|---|
| PM&E measures | Protection, Mitigation, and Enhancement measures, which are operation and management activities to: (1) protect resources against impacts from continued operations and maintenance of the Project; (2) mitigate any impacts from continued operation and maintenance of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project operation and maintenance |
| PPE | Personal Protective Equipment |
| Project | South SWP Hydropower, FERC Project Number 2426 |
| Project boundary | The area to which the Licensees require access for normal Project operations and maintenance |
| proposed Project boundary | The boundary of the Project as proposed by the Licensees, pending approval from FERC in the new license. Includes all existing Project facilities, but adjusts the boundary to: (1) add lands to the existing Project boundary that are currently utilized with a preponderance of use related to Project O&M, and (2) remove lands from the existing Project boundary that do not have Project facilities and are not used or necessary for Project O&M. |
| SCE | Southern California Edison |
| SDS | Safety Data Sheet |
| SPCC | Spill Prevention, Control, and Countermeasure plan |
| SWP | State Water Project |
| U.S. | United States |
| USFS | U.S. Department of Agriculture, Forest Service |
| Warne Powerplant | William E. Warne Powerplant |

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# 1.0 INTRODUCTION

In XXXX 2019, the California Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) (Licensees), pursuant to Title 18 of the Code of Federal Regulations, Subchapter B (Regulation under the Federal Power Act), Part 4, Subpart F (Application for License for Major Project – Existing Dam) (Integrated Licensing Process), filed with the Federal Energy Regulatory Commission (FERC) an Application for a New License for Major Project – Existing Dam (Application for New License) for the Licensee's South SWP Hydropower, FERC Project Number 2426 (Project).

The Licensees have included this Hazardous Materials Management Plan (Plan) in its Application for New License. This Plan addresses hazardous materials, including hazardous waste, defined as "a material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment, if released into the workplace or the environment" (California Health and Safety Code, Section 25501(n)(1). Hazardous wastes are further defined by the California Department of Toxic Substances Control (DTSC) as "liquids, solids, or contained gases, and can be the by-products of manufacturing processes, used oil, discarded used materials, or discarded unused commercial products, such as cleaning fluids (solvents) or pesticides" (DTSC 2016).

All elevation data in this exhibit are in United States (U.S.) Department of Commerce, National Oceanic and Atmospheric Association, National Geodetic Survey Vertical Datum of 1929, unless otherwise stated.

## 1.1 BACKGROUND

### 1.1.1 Brief Description of the Project

The existing Project is part of a larger water storage and delivery system, the State Water Project (SWP), which is the largest state-owned and operated water supply project of its kind in the U.S. The SWP provides southern California with many benefits, including affordable water supply, reliable regional clean energy, opportunities to integrate green energy, accessible public recreation opportunities, and environmental benefits.

The Project is located in Los Angeles County in southern California, on the West Branch of the SWP. The existing Project has a FERC-authorized installed capacity of 1,349,290 kilowatts. Project facilities range in elevation from 3,325 feet to 1,130 feet, and include the Warne Power Development and the Castaic Power Development. The major features of the existing Warne Power Development include: (1) Quail Lake, Quail Lake Embankment and Quail Lake Outlet; (2) Lower Quail Canal; (3) Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline; (4) Gorman Bypass Channel; (5) William E. Warne Powerplant (Warne Powerplant) and Switchyard; (6) Warne Transmission Line; (7) Primary Project Roads and Trails; (8)

Quail Lake recreation facilities and (9) streamflow and reservoir staff gages. The major features of the existing Castaic Power Development include: (1) Pyramid Dam and Lake; (2) Angeles Tunnel and Surge Chamber; (3) Castaic Penstocks; (4) Castaic Powerplant and Switchyard; (5) Elderberry Forebay Dam, Forebay, and Outlet; (6) Storm Bypass Channel and Check Dams; (7) Castaic Transmission Line; (8) Primary Project Roads and Trails; and (9) Pyramid Lake recreation facilities.

The Licensees' Proposal includes the following changes to Project facilities: the addition of the existing Quail Detention Embankment to the Warne Power Development as a flood-management structure; removal of the 3-mile-long Warne Transmission Line (owned and operated by SCE) from the Warne Power Development; addition of 99 existing road segments as Primary Project Roads associated with the Warne Power Development and the Castaic Power Development; and addition one of existing streamflow gage to the Castaic Power Development. Facilities upstream of the Angeles Tunnel Surge Chamber are operated and managed by DWR. The remainder of the downstream facilities, including the Surge Chamber, are operated and managed by LADWP.

The existing Project is operated as a power recovery project using SWP water. For that reason, Project operations do not vary based on changes in local hydrological conditions. In essence, the Project is operated in a run-of-river mode, generating power as SWP water is provided for downstream consumptive use, with the exception that Castaic Powerplant is a pumping–generating plant that reuses SWP water to generate electricity before it is delivered to downstream water users.

The Licensees propose several changes to the existing Project boundary to more accurately define lands necessary for the safe operation and maintenance (O&M) of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. The net effect of modifying the existing Project boundary is the reduction of area within the boundary from 6,928.0 acres to 4,563.8 acres, a reduction of 2,364.2 acres. This change would reduce 3,287.3 acres of federal land (47.5 percent of the total area within the existing Project boundary) to 2,007.0 acres (approximately 44.0 percent of the total area within the proposed Project boundary), resulting in 1,334.6 acres managed by the Angeles National Forest (ANF), 665.9 acres managed by the Los Padres National Forest (LPNF), and 6.5 acres managed by the U.S. Department of the Interior, Bureau of Land Management. The U.S. Department of Agriculture, Forest Service (USFS) administers the ANF and LPNF in conformance with the ANF and LPNF Land Management Plans (USFS 2005a, 2005b, 2005c, 2005d).

The Licensees propose to operate the Project as it has been operated historically, with the addition of a number of Protection, Mitigation, and Enhancement (PM&E) measures, which are operation and management activities to: (1) protect resources against potential impacts from continued O&M of the Project; (2) mitigate any impacts from continued O&M of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project O&M. This Plan is one of those PM&E measures.

Figure 1.1-1 shows the Project vicinity. Figure 1.1-2 shows the Project facilities, including land ownership. The existing Project boundary and the proposed Project boundary are shown in Figure 1.1-2 for reference purposes.

## 1.2 PURPOSE OF THE PLAN

This Plan is intended to provide guidance for the storage, use, and transportation of hazardous materials used by the Licensees or their contractors within the proposed Project boundary. To the extent appropriate, the Licensees will coordinate the efforts required under this Plan with other Project resource efforts, including implementation of other resource management plans and measures included in the new license.

## 1.3 GOAL AND OBJECTIVE OF THE PLAN

The primary goal of the Plan is to describe the current standard practices that the Licensees follow when storing, using, transporting, and disposing of hazardous materials used for routine O&M of the Project. The objective of the Plan is to provide the guidance necessary for effective management of hazardous materials under the Licensees' Proposal.

## 1.4 CONTENTS OF THE PLAN

This Plan includes the following:

- Section 1.0. Introduction. This section includes introductory information, including the purpose, goal, and objective of the Plan.

- Section 2.0. Project-Specific Hazardous Materials Use, Transport, Storage, And Disposal. This section provides a list of hazardous materials that the Licensees currently use, transport, store, and dispose of during routine O&M of the Project. The volume and location of the materials are also described.

- Section 3.0. Hazardous Materials Management. This section lists the practices that Licensees employ to manage hazardous materials during O&M of the Project.

- Section 4.0. Consultation, Reporting, and Plan Revisions. This section describes consultation between Licensees, California Department of Fish and Wildlife (CDFW), the ANF, and the LPNF; reporting procedures; and Plan review regarding hazardous materials.

- Section 5.0. References Cited. This section includes the resource documents cited in this Plan.

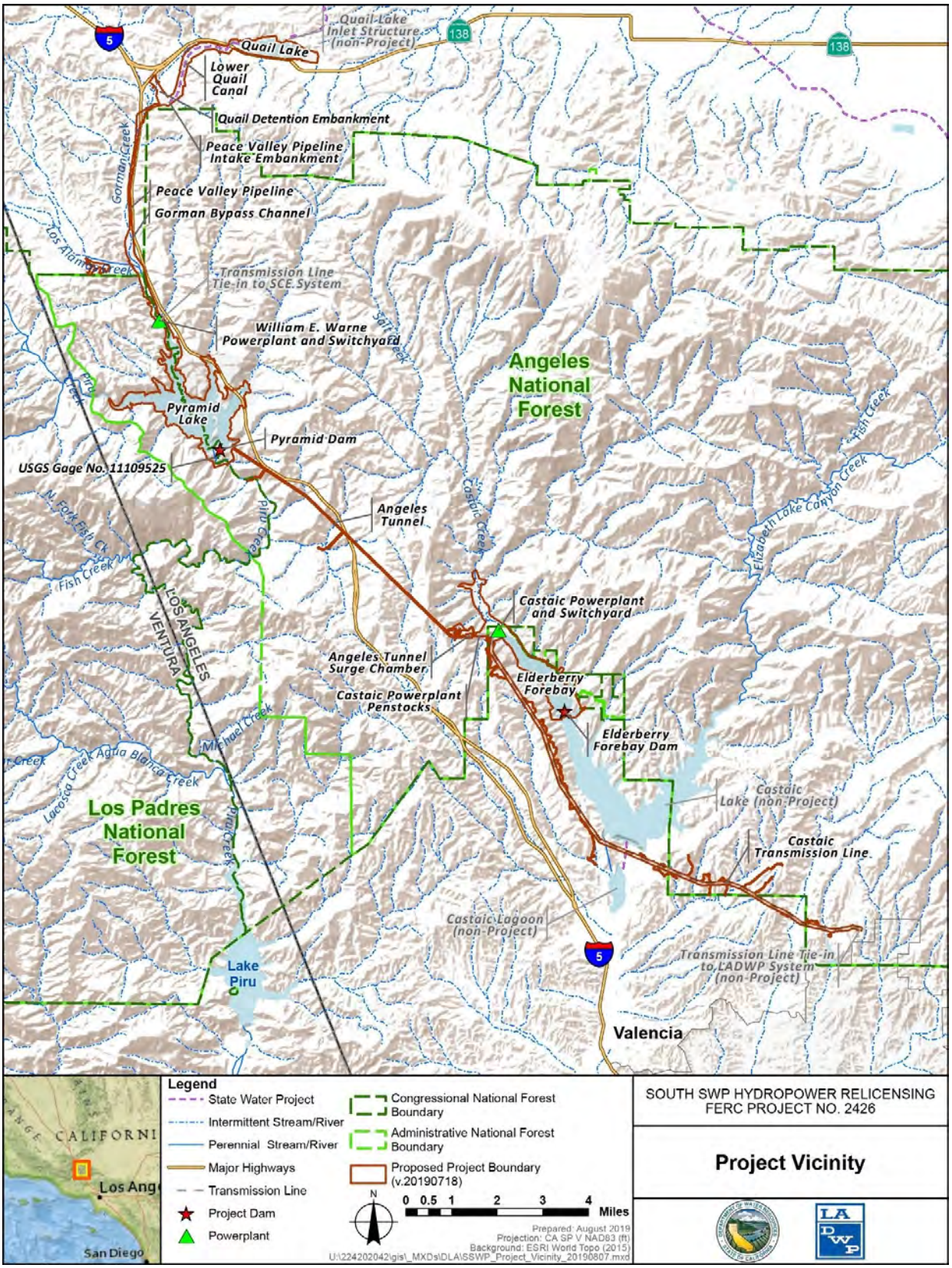


**Figure 1.1-1. South SWP Hydropower Vicinity Map**

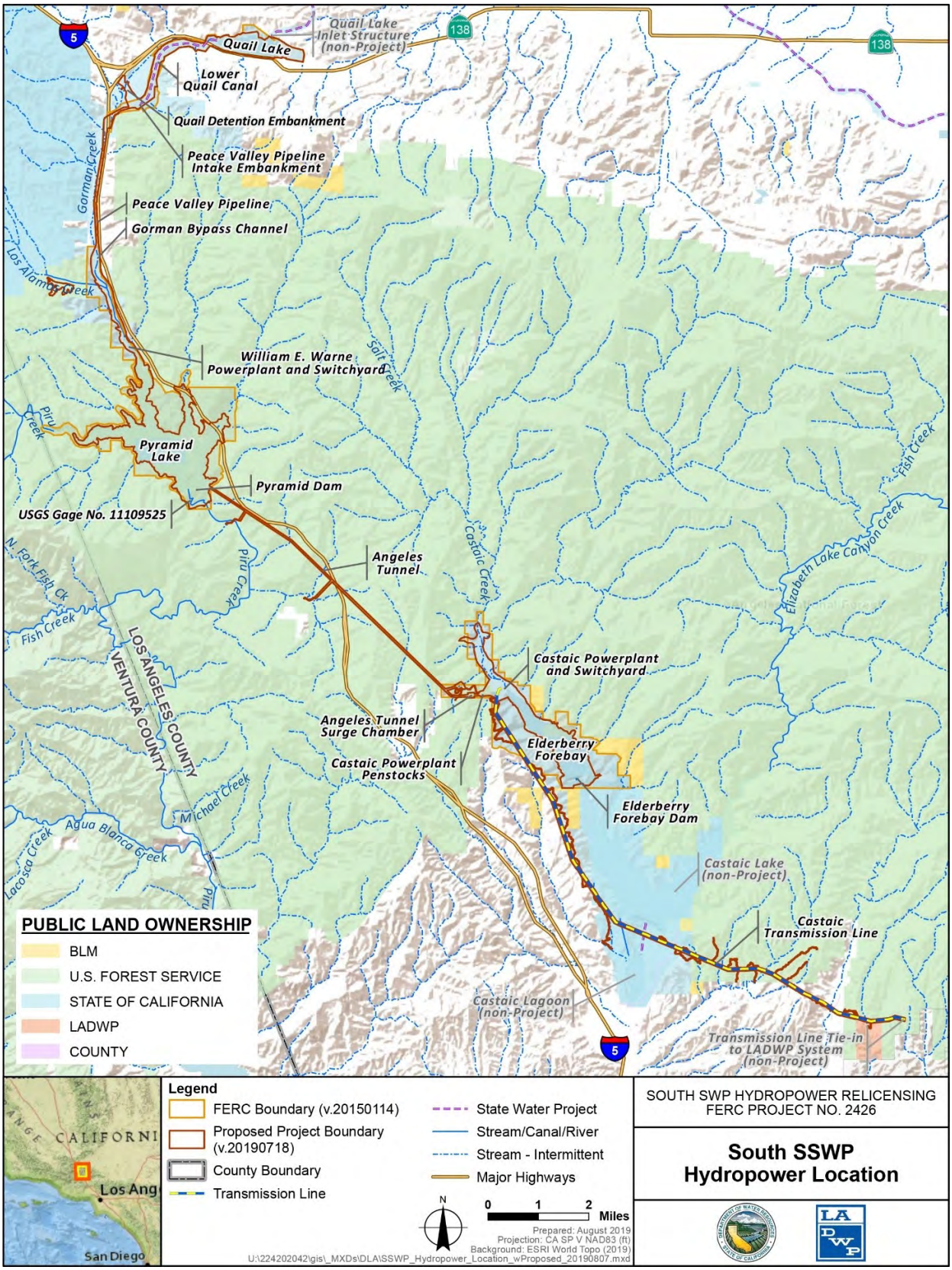


**Figure 1.1-2. South SWP Hydropower Facilities and Land Ownership**

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# 2.0 PROJECT-SPECIFIC HAZARDOUS MATERIALS USE, TRANSPORT, STORAGE, AND DISPOSAL

The Licensees use hazardous materials during routine O&M of the Project's facilities. The Licensees also transport hazardous materials to sites located within the proposed Project boundary when they are to be used for periodic maintenance work, as described below. Table 2.0-1 provides a general description, by location, of hazardous materials that may be used, stored, or transported for routine Project O&M. Refer to Section 3.2 of this Plan regarding procedures for clean-up of hazardous material spills, including during transport.

The Licensees have Hazardous Materials Business Plans (HMBP) and Spill Prevention, Control, and Countermeasure (SPCC) plans, as appropriate, for the hazardous materials stored at the Warne and Castaic Powerplants, as shown in Table 2.0-1. Warne Powerplant is the only Project facility where DWR stores hazardous materials, and Castaic Powerplant is the only Project facility where LADWP stores hazardous materials. Neither Warne nor Castaic Powerplants are located on National Forest System (NFS) lands.

## Table 2.0-1. Project Facilities and Hazardous Materials Stored, Used, or Transported for Routine Operation and Maintenance

| Hazardous Materials[1] | Location | O&M Activity | Quantity |
|---|---|---|---|
| **WARNE POWERPLANT FACILITIES (DWR)[2]** | | | |
| 76 Firebird HD motor oil, SAE 40 | Hazmat/Waste Building, South of Plant | Plant maintenance, Plant & Check Site SEG | > 40 gallons |
| 801 Industrial & marine solvent | Hazmat/Waste Building, South of Plant | Plant maintenance part cleaning (Pink Soap) | > 90 gallons |
| Chevron RPM universal gear lubricant SAE 80W-90 | Hazmat/Waste Building, South of Plant | Lubricate cranes and radial gates | > 90 gallons |
| Chevron turbine oil GST 68 | Hazmat/Waste Building, South of Plant | Lubricates generator and turbine bearings | > 1,000 gallons |
| Hydraulic oil | Hazmat/Waste Building, South of Plant | Plant maintenance, Plant Hydraulic Equipment | > 400 gallons |
| K-1 kerosene | Hazmat/Waste Building, South of Plant | Plant maintenance, Used in Steam Cleaner | > 90 gallons |
| Kano Floway - cleaner degreaser | Hazmat/Waste Building, South of Plant | Plant and equipment maintenance | > 40 gallons |
| Lubricating grease | Hazmat/Waste Building, South of Plant | Plant maintenance, Pump Grease | > 800 pounds |
| Oily rags | Hazmat/Waste Building, South of Plant | Transported offsite for recycling @ 55 gallons | > 150 pounds |
| Shell Diala Oil AX - transformer oil | Hazmat/Waste Building, South of Plant | Plant maintenance, Transformer Oil | > 220 gallons |
| Used oil / water | Hazmat/Waste Building, South of Plant | Transported offsite for recycling @ 55 gallons | > 110 gallons |
| Hydraulic oil | Hazmat/Waste Enclosure, South of Plant | Plant maintenance, Plant Hydraulic Equipment | 110 gallons |
| Used oil | Hazmat/Waste Enclosure, South of Plant | Transported offsite for recycling @ 55 gallons | > 220 gallons |
| Used oil filters | Hazmat/Waste Enclosure, South of Plant | Transported offsite for recycling @ 55 gallons | > 250 pounds |
| Chevron turbine oil GST 68 | In Plant – Elev. 2582, hydraulic control cabinet reservoir | Lubricates generator and turbine bearings | > 650 gallons |
| Oily rags | In Plant – Elev. 2582, oil purifier room | Transported offsite for recycling @ 55 gallons | > 70 pounds |
| Chevron turbine oil GST 68 | In Plant – Elev. 2582, oil room | Lubricates generator and turbine bearings | > 3,500 gallons |
| Carbon dioxide | In Plant – Elev. 2582, South Wall, $CO_2$ Fire Suppression System Cylinder Bank | Fire Suppression System | > 7,500 cubic feet |
| Nitrogen | In Plant – Elev. 2582, West Wall Cylinder Storage, West of Unit #1 | Plant maintenance, TSV System Nitrogen | > 3,500 cubic feet |
| Nitrogen | In Plant – Elev. 2582, West Wall, West of Unit #1, Fixed Hydraulic System | Plant maintenance, TSV System Nitrogen | > 8,600 cubic feet |
| Lead acid batteries | In Plant – Elev. 2598, Battery Room | Essential Buss Emergency Plant Power | 420 gallons |

## Table 2.0-1. Project Facilities and Hazardous Materials Stored, Used, or Transported for Routine Operation and Maintenance (continued)

| Hazardous Materials[1] | Location | O&M Activity | Quantity |
|---|---|---|---|
| Carbon dioxide | In Plant – Elev. 2598, East Side, $CO_2$ Fire Suppression System Banks | Fire Suppression System | > 30,000 cubic feet |
| Carbon dioxide | In Plant – Elev. 2582, North Wall, $CO_2$ Fire Suppression System Cylinders | Fire Suppression System | > 5,000 cubic feet |
| Carbon dioxide | In Plant – Elev. 2582, South Wall, Fenced Enclosure | Fire Suppression System | > 3,500 cubic feet |
| Fluorescent tubes | In Plant – Elev. 2598, Tech Shop | Plant Operations | > 75 pounds |
| Sulfur hexafluoride (SF6) | In Plant – Elev. 2614, Northwest Corner | Plant Maintenance | > 900 cubic feet |
| Acetylene | Inside Welding Shop, Portable Welding Carts | Plant Maintenance Welding | > 200 cubic feet |
| Argon compressed | Inside Welding Shop, Portable Welding Carts | Plant Maintenance Welding | > 250 cubic feet |
| Oxygen | Inside Welding Shop, Portable Welding Carts | Plant Maintenance Welding | > 500 cubic feet |
| Propane | South of Plant, Fenced Enclosures | Operation of Standby Emergency Generator | > 2,800 gallons |
| Acetylene | South Side of Welding Shop, Flammable Gas Cylinder Storage | Plant Maintenance Welding | > 1,000 cubic feet |
| 90% Argon 1-% $CO_2$ Welding Gas | South Side of Welding Shop, Non-Flammable Gas Cylinder Storage | Plant Maintenance Activity | > 900 cubic feet |
| Oxygen | South Side of Welding Shop, Non-Flammable Gas Cylinder Storage | Plant Maintenance Welding | > 500 cubic feet |
| Transformer oil | Transformer Yard, West of Plant, In Power Transformers | Plant maintenance, Electrical Plant Transformers | 9,000 gallons |
| **CASTAIC POWERPLANT FACILITIES (LADWP)[3]** | | | |
| Acetone | Hazardous Waste Storage Facility | Plant Maintenance | 55 gallons |
| Acetylene (Gas) | Auto Mechanic Shop, Building Repair Shop, Main Bldg/Level 1486, Warehouse Tank Area | Plant Maintenance, Welding | 5,997 cubic feet |
| Aerosol Cans | Auto Mechanic Shop, Main Bldg/Level 1557, Warehouse #1, Warehouse #2 | Plant Maintenance | 3,072 pounds |
| All Purpose Cleaner | Auto Mechanic Shop, Main Bldg/Level 1445, Level 1464, Level 1562 | Plant Maintenance | 55 gallons |
| Ammonium Sulfate | Warehouse #2 | Plant Maintenance | 2,960 pounds |

**Table 2.0-1. Project Facilities and Hazardous Materials Stored, Used, or Transported for Routine Operation and Maintenance (continued)**

| Hazardous Materials[1] | Location | O&M Activity | Quantity |
|---|---|---|---|
| Antifreeze (Ethylene Glycol) | Auto Mechanic Shop | Vehicle Maintenance | 60 gallons |
| Argon (Gas) | Main Bldg/Level 1486 | Plant Maintenance, Warehouse Tank Area | 6,300 cubic feet |
| Automatic Transmission Fluid | Auto Mechanic Shop | Vehicle Maintenance | 55 gallons |
| Battery Electrolyte Acid - Gel | Auto Mechanic Shop | Vehicle Maintenance | 1,500 pounds |
| Battery Electrolyte Acid - Liquid | Main Bldg/Level 1562, Unit 7 Bldg Battery Room | Plant Maintenance | 602 gallons |
| Bleach | Main Bldg/Level 1445, 1464, 1486, 1562 | Plant Maintenance | 132 gallons |
| Carbon Dioxide (Gas) | Main Bldg/Level 1464, Unit 7 Fire Protection Building, Warehouse Tank Area | Plant Maintenance | 32,057 cubic feet |
| Cement | Warehouse #2 | Plant Maintenance | 940 pounds |
| Cleaner Degreaser (Water Based) | Main Bldg/Level 1486, Warehouse #1 | Plant Maintenance | 165 gallons |
| Compressor Oil | Warehouse #1 | Plant Maintenance | 72 gallons |
| Diesel Fuel #2 | Hazardous Waste Storage Facility | Plant Maintenance | 110 gallons |
| Electrical Insulating Mineral Oil | Main Bldg/Level 1562, Main Switchrack, Outlet Tower, Spare Transformer Storage Pad, Entry Road | Plant Maintenance | 96,788 gallons |
| Ferric Chloride | Chlorine Cab/Domestic H20 Store | Plant Maintenance | 55 gallons |
| Gasoline Unleaded | Auto Mechanic Shop, Unit 7 Parking Lot | Vehicles | 2,015 gallons |
| Gear Oil | Auto Mechanic Shop | Vehicles | 55 gallons |
| Grease | Auto Mechanic Shop, Main Bldg/Level 1445, Level 1486, Outlet Tower | Plant Maintenance | 7,020 pounds |
| Helium (Gas) | Warehouse Tank Area | Plant Maintenance | 1,314 cubic feet |
| Helium-Carbon Dioxide-Argon Mixture (Gas) | Auto Mechanic Shop | Vehicle Maintenance | 244 cubic feet |

**Table 2.0-1. Project Facilities and Hazardous Materials Stored, Used, or Transported for Routine Operation and Maintenance (continued)**

| Hazardous Materials[1] | Location | O&M Activity | Quantity |
|---|---|---|---|
| Hs 1000 | Main Bldg/Level 1486, Warehouse #1 | Plant Maintenance | 146 gallons |
| Hydraulic Fluid | Auto Mechanic Shop | Plant Maintenance | 190 gallons |
| Inergen Fire Extinguishing Agent (Gas) | Unit 7 Fire Protection Building | Fire Protection | 6,960 cubic feet |
| Kerosene | Hazardous Waste Storage Facility | Plant Maintenance | 55 gallons |
| Machine or Cutting Oil | Main Bldg/Level 1417, Warehouse #1 | Plant Maintenance | 171 gallons |
| Motor Oil | Auto Mechanic Shop | Vehicle Maintenance | 165 gallons |
| Nitrogen (Gas) | Main Bldg/Level 1464, Level 1486, Unit 7 Bldg/1st Level, Unit 7 Fire Protection Building | Plant Maintenance | 13,600 cubic feet |
| Oxygen (Gas) | Auto Mechanic Shop, Main Bldg/Level 1486, Warehouse Tank Area | Plant Maintenance | 6,994 cubic feet |
| Paint (Water Base) | Warehouse Container D, Warehouse Tank Area | Plant Maintenance | 265 gallons |
| Paint Thinner | Hazardous Waste Storage Facility | Plant Maintenance | 55 gallons |
| Polymer | Chlorine Cab/Domestic H20 Store | Plant Maintenance | 55 gallons |
| Propane (Gas) | Warehouse #1, Warehouse Tank Area | Plant Maintenance | 966 pounds |
| Sand Blast Grit | Warehouse #2 | Plant Maintenance | 650 pounds |
| Silica Sand | Warehouse #2 | Plant Maintenance | 10,000 pounds |
| Sodium Hypochlorite (12.5%) | Chlorine Cab/Domestic H20 Store | Plant Maintenance | 55 gallons |
| Stoddard Solvent | Hazardous Waste Storage Facility | Plant Maintenance | 55 gallons |
| Sulfur Hexaflouride (Gas) | Main Switchrack, Unit 7 Switchrack | Plant Maintenance | 10,232 cubic feet |
| Turbine Oil | Compressor House, Main Bldg/Level 1417, Level 1445, South Portal | Plant Maintenance | 66,829 gallons |
| Victor Plastic Cement for Portland Cement | Warehouse #2 | Plant Maintenance | 1,650 pounds |

## Table 2.0-1. Project Facilities and Hazardous Materials Stored, Used, or Transported for Routine Operation and Maintenance (continued)

| Hazardous Materials[1] | Location | O&M Activity | Quantity |
|---|---|---|---|
| Waste Antifreeze Ethylene Glycol | Warehouse #2 | Recycling | 55 gallons |
| Waste Oil | Auto Mechanic Shop, Hazardous Waste Storage Facility, Main Bldg/Level 1417, Level 1445 | Recycling | 2,025 gallons |
| Wheelabrator Steel Shot/Steeletts | Warehouse #2 | Plant Maintenance | 1,000 pounds |

*Notes:*
*[1]This list represents the products used or on-site during the writing of this Plan. It is not intended to limit the type, volume, or storage location of products used or held during the term of the license.*
*[2]DWR maintains a Hazardous Materials Business Plan for this facility.*
*[3]LADWP maintains a Hazardous Materials Business Plan for this facility.*
*Key:*
*> = greater than*
*% = percent*
*@ = at*
*Bldg = building*
*$CO_2$ = carbon dioxide*
*O&M = operations and maintenance*
*SEG = Standby emergency generator*
*TSV = Turbine shut-off valve*

# 3.0 HAZARDOUS MATERIALS MANAGEMENT

## 3.1 ROUTINE O&M

Prior to conducting any O&M task, Licensees' staff normally develop solutions that will eliminate, nullify, or prevent hazards that may be encountered during task implementation, including hazards associated with hazardous materials handling.

### 3.1.1 Training

Using best practices and good judgment, and as required by regulations, Licensees' staff who handle hazardous materials during routine O&M are trained in the following:

- Safe handling of hazardous materials, including appropriate protocols with respect to storage, labeling, and Safety Data Sheets (SDS)
- Location and use of appropriate equipment and materials for containing or cleaning up any hazardous materials spill
- Procedures for cleaning up spills
- Use of spill control equipment and personal protective equipment (PPE)

Licensees formally document all training.

### 3.1.2 Notification Procedures

Licensees' staff who handle hazardous materials are familiar with notification and reporting procedures in case of a hazardous materials spill or incident during routine O&M activities. These notification and reporting procedures may include the following:

- As soon as possible, after the event of a reportable-quantity hazardous materials spill or accident, the Licensees inform the appropriate federal, State, and county agencies; and the Licensees initially notify the California Governor's Office of Emergency Services (Cal OES) at 800-852-7550 or 916-262-1621.
- If the spill occurs on or affects resources on NFS lands, the Licensees contact the ANF and/or LPNF to report the spill and discuss corrective actions. The contact information for the ANF Emergency Command Center dispatch to initiate the ANF's Emergency Response Plan is 661-723-3620; or 626-574-1613 (for office, general questions). The contact information for the LPNF Emergency Command Center dispatch to initiate the LPNF's Emergency Response Plan is 805-938-9142; or 805-968-6640 (for office, general questions).
- Depending on the type of spill or incident, the Licensees may contact CDFW, Office of Spill Prevention and Response at 800-852-7550 or 916-845-0045,

and/or the U.S. Department of the Interior, Fish and Wildlife Service at 760-431-9440 (extension 271) or 760-431-9440 (extension 291).

- Reporting includes the following details regarding the spill: product, magnitude, nature, time, date, location, and actions taken. Reports can be made by the appropriate Licensees' representative.

- Depending on the nature of the release, the Licensees may notify FERC of the event. The notification may include the agencies notified by the Licensees, pertinent details regarding the event, and any corrective actions or requirements of the responsible agencies.

In the rare event during which spill prevention activities fail, clean-up material inventories at the Warne and Castaic Powerplants are used to supply Project tasks managed by the Licensees.

At Licensee-maintained facilities within the proposed Project boundary, the clean-up response supply inventory is specific to the products in use. Those clean-up supplies may include, but are not limited to:

- Emergency Spill Kit
    - Absorbent socks
    - Disposal bags and ties
    - Safety glasses
    - Rubber gloves
    - Absorbent drip pillow
    - Absorbent skimmers
    - Emergency response guide book
    - Absorbent spill pillows, 24 inches by 18 inches
    - Hazardous Waste labels
    - LITE-DRI® Absorbent (or equal) – Fast-wicking recycled granular cellulose spill control material that absorbs and retains oils, coolants, solvents, and water
    - Flat-bladed shovel and broom

  - Waste material containment drums for collection of spilled materials, including disposable spill kit items used in the spill response (e.g., absorbent socks and pillows, rubber gloves, etc.) for disposal in accordance with federal, State, and local regulations.

- Absorbent Pads – Each pad (18 inches by 18 inches) is polypropylene fabric that absorbs 11 times its weight in liquids. Pads absorb 10 gallons of liquid per bale of 100 pads. Each clean-up crew normally has 100 absorbent pads.

- Absorbent Skimmers and Booms – Skimmers float indefinitely before or after saturation with oils. Skimmers are made of meltdown polypropylene fill that repels water. They absorb 10 times their weight in oil and can be used in lakes, streams, or on the ground. Each skimmer normally has a harness kit attached that is made of yellow polypropylene rope with grommets that are used to connect skimmers. Each boom is usually 5 inches by 10 feet. Absorbent skimmer booms are useful when work is performed near water. Licensees maintain spill response plans as part of their SPCC plans and Storm Water Pollution Prevention Plans (SWPPP).

- Clean Drum – A clean 55-gallon drum, lined with polypropylene material (overpack), can be used to store spill response materials until needed. When a spill occurs, soiled pads, pillows, skimmers and contaminated soil will be placed in the drum for disposal after the cleanup is completed.

## 3.2 SPILL RESPONSE

In the remote event that the Licensees' prevention practices are not successful, the Licensees generally follow the procedures outlined below when responding to, and reporting on, a spill of hazardous materials. Spill responses will be in accordance with facility-specific health and safety procedures, including spill response plans incorporated into the Licensees' SPCC plans and SWPPPs. In addition, Licensees maintain contingency/emergency response plans, and have emergency response contractors on standby as needed for spill response.

### 3.2.1 Spill Response – Guidelines for Immediate Actions

- Evaluate the Area. Identify the most immediate hazard. Identify if anyone is in immediate danger. After donning appropriate PPE, respond safely to control or stop the spill by closing an upstream valve or diking the leak with absorbent materials. Staff will avoid contact with the spilled product.

- Notify Your Supervisor. Notify your supervisor and warn affected personnel in accordance with internal emergency response system procedures. If possible, do not leave the spill unattended when reporting to your supervisor; instead recruit other staff to monitor the spill and to enforce safety/security measures, and keep the scene safe. Inform your supervisor of the situation. The supervisor assures

that the Incident Commander for the facility assumes incident command for directing a coordinated response and ensuring the required external reporting notifications.

- Secure the Work Area. Clear the immediate area. Block off the spill site and areas where there is a potential for exposure. Keep all sources of ignition away from the area. Staff will secure the scene and divert people and vehicles around the spill area. Shut down machinery that could ignite the spill. If machinery cannot be removed from the path of the spill, surround equipment with absorbent materials. Be aware of the potential for electric shock.

- Personal Protective Equipment. In accordance with the training of the responding personnel, don appropriate PPE before beginning any cleanup or containment operation. The type of PPE needed will vary according to the type and degree of hazard. The SDS will be referred to for the type of PPE needed for the spilled material.

- Control the Spill. Prior to taking measures to control any spill, personal and scene safety will be assessed. Personal safety considerations may include prevention of heat and cold illnesses, presence of fire extinguisher(s), and having first-aid supplies readily available. Plan your emergency escape route. Follow the path of the spill back to its origin and stop the flow: a ruptured pipeline can be turned off by shutting down the closest valve upstream; an overturned container can be placed upright and secured; and a damaged container can be rolled on its side so the damaged area is on top. Try to keep the spill from entering a floor drain.

- Contain the Spill. Try to contain the spill to a small area. If you are dealing with a liquid, it is best to dike or block the spill by using absorbent materials. If the spill is outdoors, you may dig a trench around the spill to help contain it. For outdoor spills, the main concern is to prevent runoff into storm sewers and nearby bodies of water. Deploy floating absorbent booms to contain water already contaminated or threatened by contamination.

- Clean Up the Spill. After immediate threats are stabilized, clean the spill by absorbing it, neutralizing the chemical, or by recovering it. It is required to have adequate information and proper training to perform this work safely (consult the SDS). Clean-up methods should be appropriate for the chemical.

    - Absorb. Absorb the spill with a commercial spill absorbent, or a non-reactive absorbent such as vermiculite. Clean up absorbent and place it in sealed and labeled containers. If the spill contains a hazardous substance, a hazardous waste label is required.

    - Neutralize. Neutralize where appropriate and in accordance with the directions in the SDS and training of responding personnel. Neutralization is

the process of applying either acids or bases to the spill to form a neutral salt. Neutralization reduces the toxicity of the spill and allows for additional means of disposal. Do not neutralize a spilled liquid unless you know that the resulting reaction will not release a hazardous gas or cause an explosion or other hazardous reaction.

- Recover. Recover using equipment compatible with the spilled material (e.g., rubber squeegee, flat-bladed shovel, etc.). An industrial wet-vac may be used for certain, non-volatile oils if there is no risk of ignition. Place recovered product in a new container appropriate for the product, seal properly, and label for disposal.

- Decontaminate. All decontamination will be performed in accordance with the standards and methods of Cal-OSHA, Title 8, CCR 5192. General methods include: (1) decontaminate employees and their equipment, (2) set up a decontamination area away from the spill, (3) ensure all equipment, material, and personnel are properly decontaminated, (4) decontaminate PPE before it is removed, if appropriate, then remove the PPE so that outside surfaces do not touch the wearer.

- Dispose. Immediately after a release, the appropriate Licensees' representative will provide for storing and/or disposing of all recovered product, contaminated soil, contaminated water, and/or contaminated spill response media. The appropriate Licensees' representative will oversee the disposal process with contracted waste handlers. All containers used for disposal will be labeled in accordance with hazardous materials standards. Chain of custody forms will be used where applicable.

### 3.2.2 Spill Reporting

#### *3.2.2.1 Immediate Reporting*

- The appropriate Licensees' representative will contact Los Angeles County Fire Department Certified Unified Program Agency (CUPA) at 323-890-4317, or Cal OES at 800-852-7550 or 916-262-1621 for any of the following conditions:
  - Any significant spill/release of petroleum
  - Discharges of any hazardous materials, oil, or petroleum products into State waters
  - Discharges that may threaten or impact water quality
- If it is determined that emergency response assistance is required, the appropriate Licensees' representative may notify the following agencies, depending on the nature of the release:

  - Local Emergency Response Agency (9-1-1)
  - Los Angeles County Fire – Health Hazardous Materials Division at 323-881-2455
  - Los Angeles Regional Water Quality Control Board (Los Angeles RWQCB) at 213-576-6660 (for all areas of the Project, except the Quail Lake area)
  - Lahontan Regional Water Quality Control Board (Lahontan RWQCB) at 760-241-6583 or 530-542-5400 (for the Quail Lake area only)
  - CDFW Office of Spill Prevention and Response at 800-852-7550 or at 916-445-0045.

- The appropriate Licensees' representative contacts the U.S. Coast Guard National Response Center at 800-424-8802 if any of the following conditions are met:
  - The spill/release of hazardous materials will reach a navigable body of water or an adjoining shoreline
  - Water quality standards could be violated
  - The spill/release could cause a film, sheen, or discoloration
  - The spill/release could cause a sludge or emulsion
  - The spill/release exceeds Federal Reportable Quantities (Comprehensive Environmental Response, Compensation, and Liability Act)
- For serious injuries or harmful exposures to workers, the appropriate Licensees' representative contacts the California Department of Industrial Relations/Division of Occupational Safety and Health District Office in Van Nuys at 818-901-5403 within eight hours.
- For hazardous waste tank system releases or secondary containment releases, the appropriate Licensees' representative contacts the California Environmental Protection Agency, DTSC at 916-255-3545.

To the maximum extent known, the appropriate Licensees' representative provides the following information to the federal, State, and local reporting agencies during the initial telephone notifications:

- Identity of caller and telephone number at which he/she can be reached
- Location, date, and time of the spill/release incident, or threatened spill/release incident

- Substance and quantity involved
- A description of what happened
- Medium or media impacted by the spill/release (water or land)
- Time and duration of the spill/release
- Proper precautions to take
- Danger or threat posed by the spill/release
- Number and types of injuries (if any)
- Weather conditions at the incident location
- Any other information that may help emergency personnel responding to the incident

#### *3.2.2.2 Follow-Up Reporting*

- As soon as practical, but no later than 30 days after the release of hazardous materials, the appropriate Licensees' representative normally files a Section 304: Emergency Release Follow-Up Notice Reporting Form with Cal OES. (A blank Section 304: Emergency Release Follow-Up Notice Reporting Form is provided in Appendix A).
- If the release of hazardous materials is greater than the reportable quantity, the appropriate Licensees' representative prepares a written report of the incident. The report will be submitted to the appropriate agencies within the appropriate timeframe. The written report will include the following.
    - Name of the facility
    - Appropriate Licensees' representatives name
    - Location of the facility
    - Maximum storage or handling capacity of the facility and normal daily throughput
    - Corrective action and countermeasures taken, including a description of the equipment repairs and replacements
    - A description of the facility, including maps, flow diagrams, and topographical maps, as necessary

- The cause of the discharge, including failure analysis of the system or subsystem in which the failure occurred
- Additional preventative measures taken or contemplated to minimize the possibility of recurrence
- Other information the Regional Administrator may reasonably require pertinent to the SPCC plan or discharge incident(s)

### 3.2.3 Best Management Practices

On NFS lands, BMP [Best Management Practice] FAC-6 Hazardous Materials (USFS 2012) will be used. The BMPs will be adhered to on non-NFS lands:

- Vehicles and equipment will not be maintained or refueled in areas where hazardous materials may enter a stream or lake.
- Any debris, soil, silt, sand, rubbish, construction waste, cement or concrete or washings thereof, asphalt, paint, oil or other petroleum products, or any other materials which could be hazardous to aquatic life, will be stored or otherwise placed in an area that is secured or controlled by the use of Best Management Practices in order to prevent entry into a stream or lake.

## 3.3 NEW CONSTRUCTION

In addition to their own standard practices, when Licensees hire a contractor to perform any maintenance work or new construction within the proposed Project boundary, prior to the work, each contractor will have a work-specific SPCC and/or BMP plan in place if one is required for the work. The Licensees will notify the ANF and/or LPNF of any new construction for the Project if the new construction is on NFS lands. The work-specific SPCC and/or BMP plan will normally include:

- Designating a supervisor to oversee and enforce proper spill prevention measures
- Providing spill response and prevention education for employees and subcontractors
- Stocking appropriate clean-up materials onsite near material storage, unloading, and use areas
- Designating hazardous waste storage areas away from storm drains or watercourses
- Minimizing production or generation of hazardous materials on-site or substitute materials used on-site with less hazardous materials, if feasible

# 4.0 CONSULTATION, REPORTING, AND PLAN REVISIONS

## 4.1 CONSULTATION AND REPORTING

For activities subject to this plan on NFS lands, the Licensees will meet annually with the ANF and LPNF to review activities involving hazardous materials during the previous calendar year, as well as any Plan activities for the current calendar year. In addition, the Licensees will consult with the ANF and/or LPNF, as needed, regarding hazardous materials. The Licensees will follow ANF and LPNF reporting requirements for the release of hazardous materials. For activities not on NFS lands, the Licensees will follow all applicable hazardous materials laws and regulations for consultation and reporting.

## 4.2 PLAN REVISIONS

The Licensees, in consultation with the ANF and LPNF, will review, update and/or revise this Plan as it pertains to use of hazardous materials on NFS lands. For activities not on NFS lands, the Licensees will consult with applicable federal and State agencies regarding any updates or revisions to this plan. Any updates to the Plan will be prepared in coordination and consultation with the ANF, LPNF, and appropriate federal and State agencies. The ANF, LPNF, and appropriate federal and State agencies will have 60 days after receipt of the updated Plan from the Licensees to provide written comment and recommendations before the Licensees file the updated Plan with FERC for approval. The updated Plan will include documentation of all relevant coordination and consultation. If the Licensees do not adopt a particular recommendation by the ANF or LPNF, and appropriate federal and State agencies, the filing will include the Licensees' reasons for not doing so. The Licensees will implement the Plan as approved by FERC. The Plan will not be considered revised until FERC issues its approval.

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# 5.0 REFERENCES CITED

California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 2016. Defining Hazardous Waste. Last updated 3/22/2016. Available online: https://www.dtsc.ca.gov/HazardousWaste/upload/HWMP_DefiningHW111.pdf

U.S. Department of Agriculture, Forest Service (USFS). 2012. FS 990a – National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide. 177 pp. Available online: https://www.fs.fed.us/naturalresources/watershed/pubs/FS_National_Core_BMPs_April2012.pdf.

_____. 2005a. Land Management Plan Part 1, Southern California National Forests Vision. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-075. September 2005.

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_____. 2005c. Land Management Plan Part 2, LPNF Strategy. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-078. September 2005.

_____. 2005d. Land Management Plan Part 3, Design Criteria for the Southern California National Forests Vision. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-080. September 2005.

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# Appendix A

## *Section 304: Emergency Release Follow-Up Notice Reporting Form*

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# Written Reporting of Emergency Releases

The requirements for written reports can be found in the California Code of Regulations - Title 19, Division 2, Chapter 4, Article 2, Section 2705, which states:

(a) If required to submit a written emergency release follow-up notice pursuant to 42 U.S.C. section 11004(c) (1989), or as that section may be subsequently amended, a business shall prepare the written emergency release follow-up notice using the form specified in subsection (c) of this section.

(b) A written emergency release follow-up notice prepared pursuant to subsection (a) shall be sent to the Chemical Emergency Planning and Response Commission (CEPRC) at 3650 Schriever Avenue, Mather, CA 95655. This written report shall be sent as soon as practicable following a release, but no later than 7 days from the date of the release.

(c) The following reporting form (with instructions), the `Emergency Release Follow-up Notice Reporting Form,' shall be used for filing the written emergency release follow-up notice required by subsection (a) of this section.

# EMERGENCY RELEASE FOLLOW - UP NOTICE REPORTING FORM

**A**

BUSINESS NAME

FACILITY EMERGENCY CONTACT & PHONE NUMBER
( ) -

**B**

INCIDENT DATE MO DAY YR

TIME OES NOTIFIED (use 24 hr time)

OES CONTROL NO.

**C**

INCIDENT ADDRESS LOCATION

CITY / COMMUNITY

COUNTY ZIP

**D**

CHEMICAL OR TRADE NAME (print or type)

CAS Number

CHECK IF CHEMICAL IS LISTED IN 40 CFR 355, APPENDIX A ☐

CHECK IF RELEASE REQUIRES NOTIFI - CATION UNDER 42 U.S.C. Section 9603 (a) ☐

PHYSICAL STATE CONTAINED ☐ SOLID ☐ LIQUID ☐ GAS

PHYSICAL STATE RELEASED ☐ SOLID ☐ LIQUID ☐ GAS

QUANTITY RELEASED

ENVIRONMENTAL CONTAMINATION ☐ AIR ☐ WATER ☐ GROUND ☐ OTHER

TIME OF RELEASE

DURATION OF RELEASE
___DAYS ___HOURS ___MINUTES

**E**

ACTIONS TAKEN

**F**

KNOWN OR ANTICIPATED HEALTH EFFECTS (Use the comments section for addition information)

☐ ACUTE OR IMMEDIATE (explain) _____

☐ CHRONIC OR DELAYED (explain) _____

☐ NOT KNOWN (explain)

**G**

ADVICE REGARDING MEDICAL ATTENTION NECESSARY FOR EXPOSED INDIVIDUALS

**H**

COMMENTS (INDICATE SECTION (A - G) AND ITEM WITH COMMENTS OR ADDITIONAL INFORMATION)

**I**

CERTIFICATION: I certify under penalty of law that I have personally examined and I am familiar with the information submitted and believe the submitted information is true, accurate, and complete.

REPORTING FACILITY REPRESENTATIVE (print or type) _____

SIGNATURE OF REPORTING FACILITY REPRESENTATIVE _____ DATE: _____

**EMERGENCY RELEASE FOLLOW-UP NOTICE**
**REPORTING FORM INSTRUCTIONS**
(This form may be reproduced, as needed)

**GENERAL INFORMATION:**
Chapter 6.95 of Division 20 of the California Health and Safety Code requires that written emergency release follow-up notices prepared pursuant to 42 U.S.C. § 11004, be submitted using this reporting form. Non-permitted releases of reportable quantities of Extremely Hazardous Substances (listed in 40 CFR 355, appendix A) or of chemicals that require release reporting under section 103(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 [42 U.S.C. § 9603(a)] must be reported on the form, as soon as practicable, but no later than 7 days, following a release. The written follow-up report is required in addition to the verbal notification.

**BASIC INSTRUCTIONS:**
- The form, when filled out, reports follow-up information required by 42 U.S.C § 11004. Ensure that all information requested by the form is provided as completely as possible.
- If the incident involves reportable releases of more than one chemical, prepare one report form for each chemical released.
- If the incident involves a series of separate releases of chemical(s) at different times, the releases should be reported on separate reporting forms.

**SPECIFIC INSTRUCTIONS:**
Block A: Enter the name of the business and the name and phone number of a contact person who can provide detailed facility information concerning the release.

Block B: Enter the date of the incident and the time that verbal notification was made to OES. The OES control number is provided to the caller by OES at the time verbal notification is made. Enter this control number in the space provided.

Block C: Provide information pertaining to the location where the release occurred. Include the street address, the city or community, the county and the zip code.

Block D: Provide information concerning the specific chemical that was released. Include the chemical or trade name and the Chemical Abstract Service (CAS) number. Check all categories that apply. Provide best available information on quantity, time and duration of the release.

Block E: Indicate all actions taken to respond to and contain the release as specified in 42 U.S.C. § 11004(c).

Block F: Check the categories that apply to the health effects that occurred or could result from the release. Provide an explanation or description of the effects in the space provided. Use Block H for additional comments/information if necessary to meet requirements specified in 42 U.S.C. § 11004(c).

Block G: Include information on the type of medical attention required for exposure to the chemical released. Indicate when and how this information was made available to individuals exposed and to medical personnel, if appropriate for the incident, as specified in 42 U.S.C. § 11004(c).

Block H: List any additional pertinent information.

Block I: Print or type the name of the facility representative submitting the report. Include the official signature and the date that the form was prepared.

**MAIL THE COMPLETED REPORT TO:**

**Chemical Emergency Planning and Response Commission (CEPRC) /**
**Local Emergency Planning Committee (LEPC)**
**Attn: Section 304 Reports**
**3650 Schriever Avenue,**
**Mather, CA 95655**

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# Attachment 3

## *Support for Calculation of Ungaged Drainage Multiplier in the Licensees'Proposed Measure AR1, Implement Pyramid Reach Flow Releases*

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# 1.0 INTRODUCTION

This attachment provides support for the California Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) proposal to use an 11.8 percent multiplier to estimate the ungagged daily runoff into Pyramid Lake in the Licensees' Proposed Measure AR1, Implement Pyramid Reach Flow Releases.

# 2.0 GAGED NATURAL INFLOW INTO PYRAMID LAKE

Two U.S. Geological Survey (USGS) streamflow gages measure natural runoff into Pyramid Lake. These two gages are described below.

## 2.1 USGS Gage 11109375, Piru Creek below Buck Creek near Pyramid Lake, CA

According to the USGS, its Gage 11109375 measures natural runoff from 198 square miles of Piru Creek upstream from Pyramid Lake. The gage is a water stage recorder with a concrete control weir, located on the left bank of Piru Creek, 300 feet downstream from the confluence of Piru and Buck Creeks, 2 miles upstream from Pyramid Lake. There are no water storage or diversion projects in the drainage upstream of the gage.

## 2.2 USGS Gage 11109395, Canada de Los Alamos above Pyramid Lake, CA

The second USGS gage that measures natural runoff into Pyramid Lake is USGS Gage 11109395. According to USGS, this gage measures runoff form a drainage area of 61.8 miles. The gage is a water stage recorder with a concrete control weir, located on the right bank of Canada de Los Alamos, 0.1 miles upstream from Pyramid Lake. There are no water storage or diversion facilities in the drainage upstream of the gage.

# 3.0 UNGAGED NATURAL INFLOW IN PYRAMID LAKE

The Licensees used the steps described below to calculate the proportion of the Pyramid Lake drainage area for which runoff is not gaged.

1. The Licensees developed a Geographic Information System (GIS) map layer of the Pyramid Lake drainage upstream of Pyramid Dam by delineating the drainage basins by following the ridgelines from the gageing station location pour point. Based on its GIS map layer, the total drainage area into Pyramid Lake is 295.3 square miles, which is similar to USGS's estimate of 295 square miles for the drainage area upstream of its Gage 11109525, Piru Creek below Pyramid Lake, near Gorman CA, that is located downstream of the base of Pyramid Dam.

2. Next, the Licensees divided its GIS map layer of the Pyramid Lake drainage area into three areas: (1) the drainage area upstream of USGS Gage 11109375; (2) the drainage area upstream of USGS Gage 11109395; and (3) the remaining drainage area, which represents the ungagged portion of the drainage (Figure 1). Based on its GIS map layer, the total drainage areas upstream of USGS Gages

11109375 and 11109395 are 197.9 and 62.4 square miles, respectively, which are similar to USGS's estimates of 198 square miles and 61.8 square miles, respectively, for the drainage area upstream of each of these gages.

3. Based on its analysis, the Licensees calculated that the Pyramid Lake ungagged drainage area is 35.0 square miles, which represents 11.8 percent of the total Pyramid Lake drainage area.

## 4.0 DEVELOPMENT OF THE MULTIPLIER

To translate drainage area into flow, the Licensees assumed that daily runoff in the ungagged portion of the Pyramid Lake drainage would generally be similar to daily runoff in the gaged portions of the Pyramid Lake drainage. The Licensees recognize that this assumption may result in some deviations for individual storm events due to localized variations in storm water intensity and ground cover, but given the total area and use the data, the differences are expected to be de minimis. Further, this is a common assumption in hydrologic analysis for watersheds with generally similar areas, land use, soil type, and experiencing similar precipitation patterns. When these conditions are met, the relative response to a particular precipitation event would be expected to be the same across multiple watersheds. In this particular case, the conditions between the three watersheds are similar enough that the watersheds would experience very close to the same precipitation and runoff, and would be expected to respond similarly.

Based on the above analysis and assumption, the Licensees used in its proposed Measure AR1 an 11.8 percent multiplier to account for ungagged runoff into Pyramid Lake. Specifically, the gaged daily inflow would be multiplied by 11.8 percent to account for the ungagged portions of Pyramid Lake watershed that are not tributaries of upper Piru Creek and Cañada de los Alamos upstream of their respective gaging stations, and the product of the multiplication would be added to the sum of the daily gaged inflow data to Pyramid Lake to determine the total daily natural inflow into Pyramid Lake.

The Licensees note that the 11.8 percent multiplier is similar to the 10.8 percent multiplier used since 1974 to calculate daily ungaged runoff into Pyramid Lake and for implementation of Article 52 in the existing license.

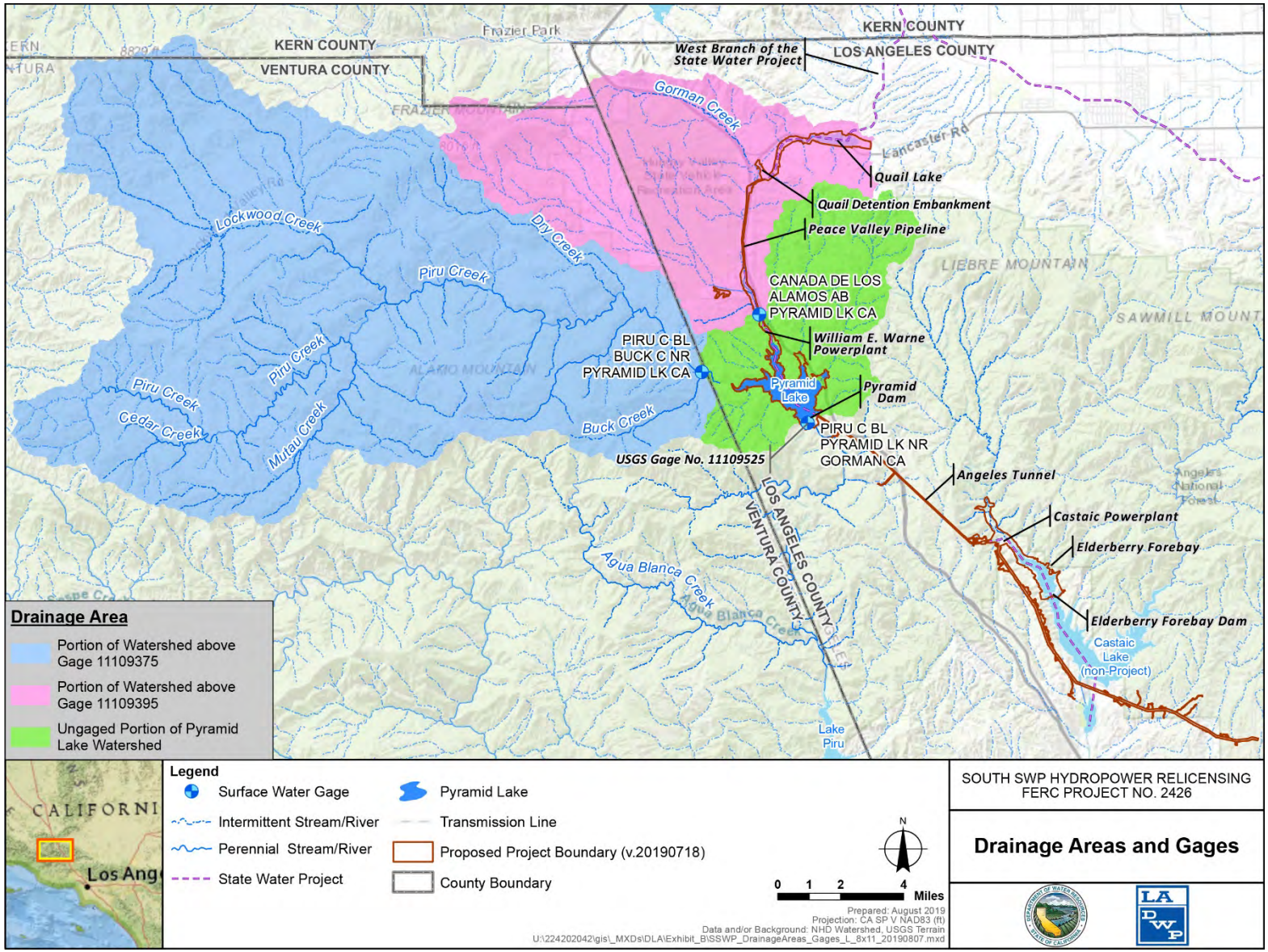


**Figure 1. Pyramid Lake Drainage Area by Gaged and Ungaged Areas**

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# Attachment 4

## *Fire Prevention and Response Plan*

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# SOUTH SWP HYDROPOWER
# FERC PROJECT NO. 2426-227

# FIRE PREVENTION AND RESPONSE PLAN

August 2019


**State of California**
**California Natural Resources Agency**
**DEPARTMENT OF WATER RESOURCES**
**Hydropower License Planning and Compliance Office**

**Los Angeles**
**DEPARTMENT OF**
**WATER AND POWER**

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## LIST OF FIGURES



## APPENDICES

## COMMONLY USED TERMS, ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACC | Area Control Center |
| ANF | Angeles National Forest |
| Application for New License | Application for a New License for Major Project – Existing Dam for the South SWP Hydropower, FERC Project Number 2426 |
| BLM | U.S. Department of the Interior, Bureau of Land Management |
| CAL FIRE | California Natural Resources Agency, Department of Forestry and Fire Protection |
| CPRC | California Public Resource Code |
| DWR | California Department of Water Resources |
| Existing Project boundary | The boundary of the Project as approved by FERC in the existing license |
| FERC | Federal Energy Regulatory Commission |
| fire prevention and protection | Activities directed at reducing the number of person-caused fires, including public education, law enforcement, dissemination of information, and the reduction of hazards |
| LACFD | Los Angeles County Fire Department |
| LADWP | Los Angeles Department of Water and Power |
| Licensees | California Department of Water Resources and Los Angeles Department of Water and Power |
| LPNF | Los Padres National Forest |
| NFS | National Forest System |
| O&M | operation and maintenance |
| PAL | Project Activity Level |
| Plan | Fire Prevention and Response Plan |
| PM&E measures | Protection, Mitigation, and Enhancement measures, which are operation and management activities to: (1) protect resources against impacts from continued operation and maintenance of the Project; (2) mitigate any impacts from continued operation and maintenance of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project operation and maintenance |
| Project | South SWP Hydropower, FERC Project Number 2426 |

| | |
|---|---|
| Project area | The area within the existing Project boundary and the area immediately surrounding the existing Project boundary |
| Project boundary | The area to which the Licensees require access for normal Project operations and maintenance |
| Project vicinity | The area within the existing Project boundary and the area surrounding the Project on the order of a USGS 1:24,000 quadrangle |
| Proposed Project boundary | The boundary of the Project as proposed by the Licensees, pending approval from FERC in the new license. Includes all existing Project facilities, but adjusts the boundary to: (1) add lands to the existing Project boundary that are currently utilized with a preponderance of use related to Project O&M, and (2) remove lands from the existing Project boundary that do not have Project facilities and are not used or necessary for Project O&M |
| SCE | Southern California Edison |
| State | State of California |
| suppression | All the work of extinguishing or containing a fire, beginning with its discovery |
| SWP | State Water Project |
| U.S. | United States |
| USFS | United States Department of Agriculture, Forest Service |
| Warne Powerplant | William E. Warne Powerplant |
| wildfire | An unplanned and unwanted wildland fire, including unauthorized human-caused fires, escaped wildland fire use events, escaped prescribed fire projects, and all other wildland fires where the objective is to put the fire out |

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# 1.0 INTRODUCTION

In XXXX 2019, the California Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) (Licensees), pursuant to Title 18 of the Code of Federal Regulations, Subchapter B (Regulation under the Federal Power Act), Part 4, Subpart F (Application for License for Major Project – Existing Dam) (Integrated Licensing Process), filed with the Federal Energy Regulatory Commission (FERC) an Application for a New License for Major Project – Existing Dam (Application for New License) for Licensees' South SWP Hydropower, FERC Project Number 2426 (Project).

The Licensees have included this Fire Prevention and Response Plan (Plan) in its Application for New License. This Plan addresses fire prevention procedures, reporting, and safe fire practices for the Licensees' personnel and contractors responsible for operating and maintaining the Project.

All elevation data in this exhibit are in United States (U.S.) Department of Commerce, National Oceanic and Atmospheric Association, National Geodetic Survey Vertical Datum of 1929, unless otherwise stated.

## 1.1 BACKGROUND

### 1.1.1 Brief Description of the Project

The existing Project is part of a larger water storage and delivery system, the State Water Project (SWP), which is the largest state-owned and operated water supply project of its kind in the U.S. The SWP provides southern California with many benefits, including affordable water supply, reliable regional clean energy, opportunities to integrate green energy, accessible public recreation opportunities, and environmental benefits.

The Project is located in Los Angeles County in southern California, on the West Branch of the SWP. The existing Project has a FERC-authorized installed capacity of 1,349,290 kilowatts. Project facilities range in elevation from 3,325 feet to 1,130 feet, and include the Warne Power Development and Castaic Power Development. The major features of the existing Warne Power Development include: (1) Quail Lake, Quail Lake Embankment and Quail Lake Outlet; (2) Lower Quail Canal; (3) Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline; (4) Gorman Bypass Channel; (5) William E. Warne Powerplant (Warne Powerplant) and Switchyard; (6) Warne Transmission Line; (7) Primary Project Roads and Trails; (8) Quail Lake recreation facilities and (9) streamflow and reservoir staff gages. The major features of the existing Castaic Power Development include: (1) Pyramid Dam and Lake; (2) Angeles Tunnel and Surge Chamber; (3) Castaic Penstocks; (4) Castaic Powerplant and Switchyard; (5) Elderberry Forebay Dam, Forebay, and Outlet; (6) Storm Bypass Channel and Check Dams; (7) Castaic Transmission Line; (8) Primary Project Roads and Trails; and (9) Pyramid Lake recreation facilities.

The Licensees' Proposal includes the following changes to Project facilities: addition of the existing Quail Detention Embankment to the Warne Power Development as a flood-management structure; removal of the 3-mile-long Warne Transmission Line (owned and operated by SCE) from the Warne Power Development; addition of 99 existing road segments as Primary Project Roads associated with the Warne Power Development and the Castaic Power Development; and addition of one existing streamflow gage to the Castaic Power Development. Facilities upstream of the Angeles Tunnel Surge Chamber are operated and managed by DWR. The remainder of the downstream facilities, including the Surge Chamber, are operated and managed by LADWP.

The existing Project is operated as a power recovery project using SWP water. For that reason, Project operations do not vary based on changes in local hydrological conditions. In essence, the Project is operated in a run-of-river mode, generating power as SWP water is provided for downstream consumptive use, with the exception that Castaic Powerplant is a pumping–generating plant that reuses SWP water to generate electricity before it is delivered to downstream water users.

The Licensees propose several changes to the existing Project boundary to more accurately define lands necessary for the safe operation and maintenance (O&M) of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. The net effect of modifying the existing Project boundary is the reduction of area within the boundary from 6,928.0 acres to 4,563.8 acres, a reduction of 2,364.2 acres. This change would reduce 3,287.3 acres of federal land (47.5 percent of the total area within the existing Project boundary) to 2,007.0 acres (approximately 44.0 percent of the total area within the proposed Project boundary), resulting in 1,334.6 acres managed by the Angeles National Forest (ANF), 665.9 acres managed by the Los Padres National Forest (LPNF), and 6.5 acres managed by the U.S. Department of the Interior, Bureau of Land Management (BLM). The U.S. Department of Agriculture, Forest Service (USFS) administers the ANF and LPNF in conformance with the ANF and LPNF Land Management Plans (USFS 2005a, 2005b, 2005c, 2005d).

The Licensees propose to operate the Project as it has been operated historically, with the addition of a number of Protection, Mitigation, and Enhancement (PM&E) measures, which are operation and management activities to: (1) protect resources against potential impacts from continued O&M of the Project; (2) mitigate any impacts from continued O&M of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project O&M. This Plan is one of those PM&E measures.

Figure 1.1-1 shows the Project vicinity. Figure 1.1-2 shows the Project facilities, including land ownership. The existing Project boundary and the proposed Project boundary are shown in Figure 1.1-2 for reference purposes.

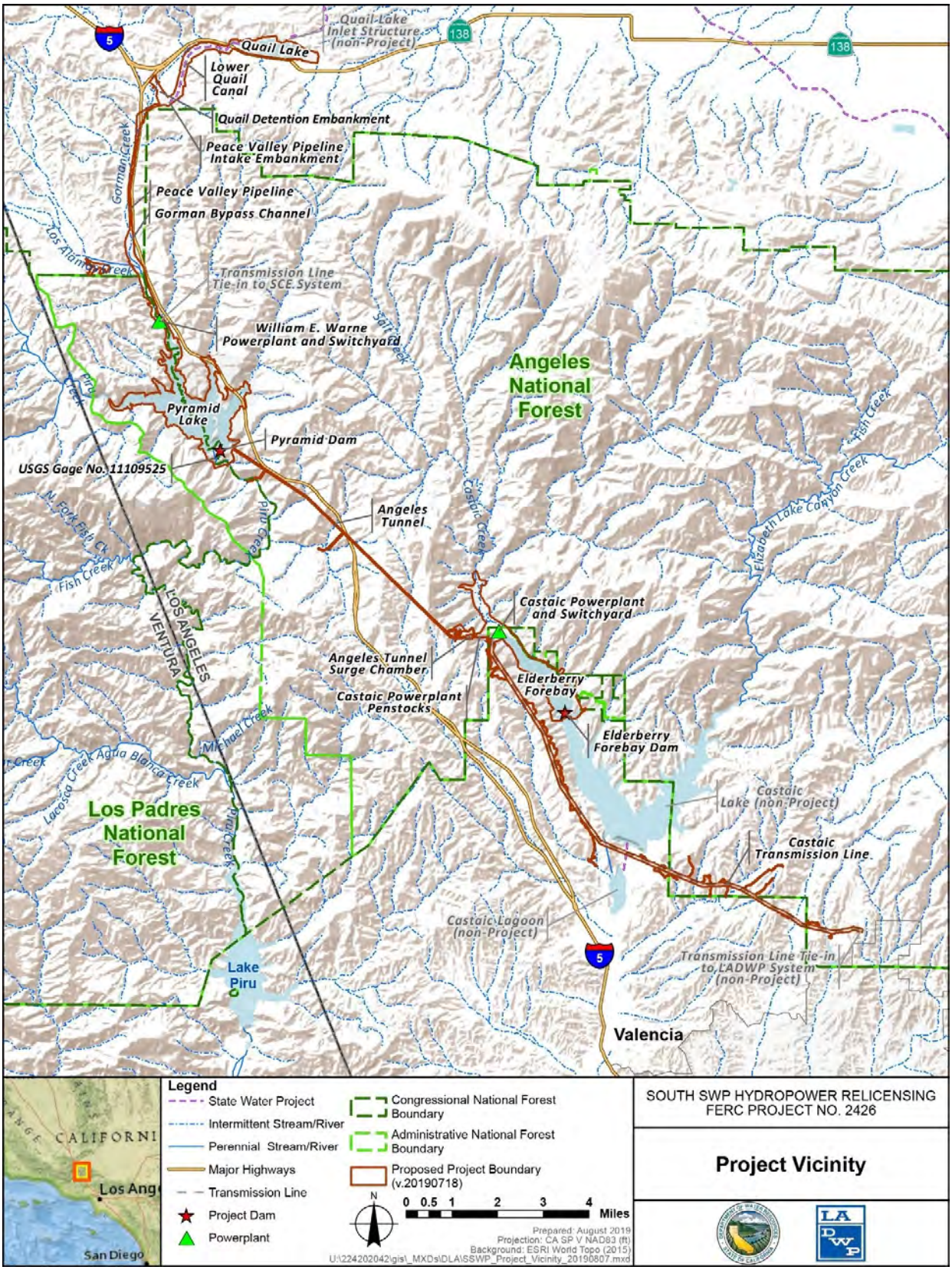


**Figure 1.1-1. South SWP Hydropower Vicinity Map**

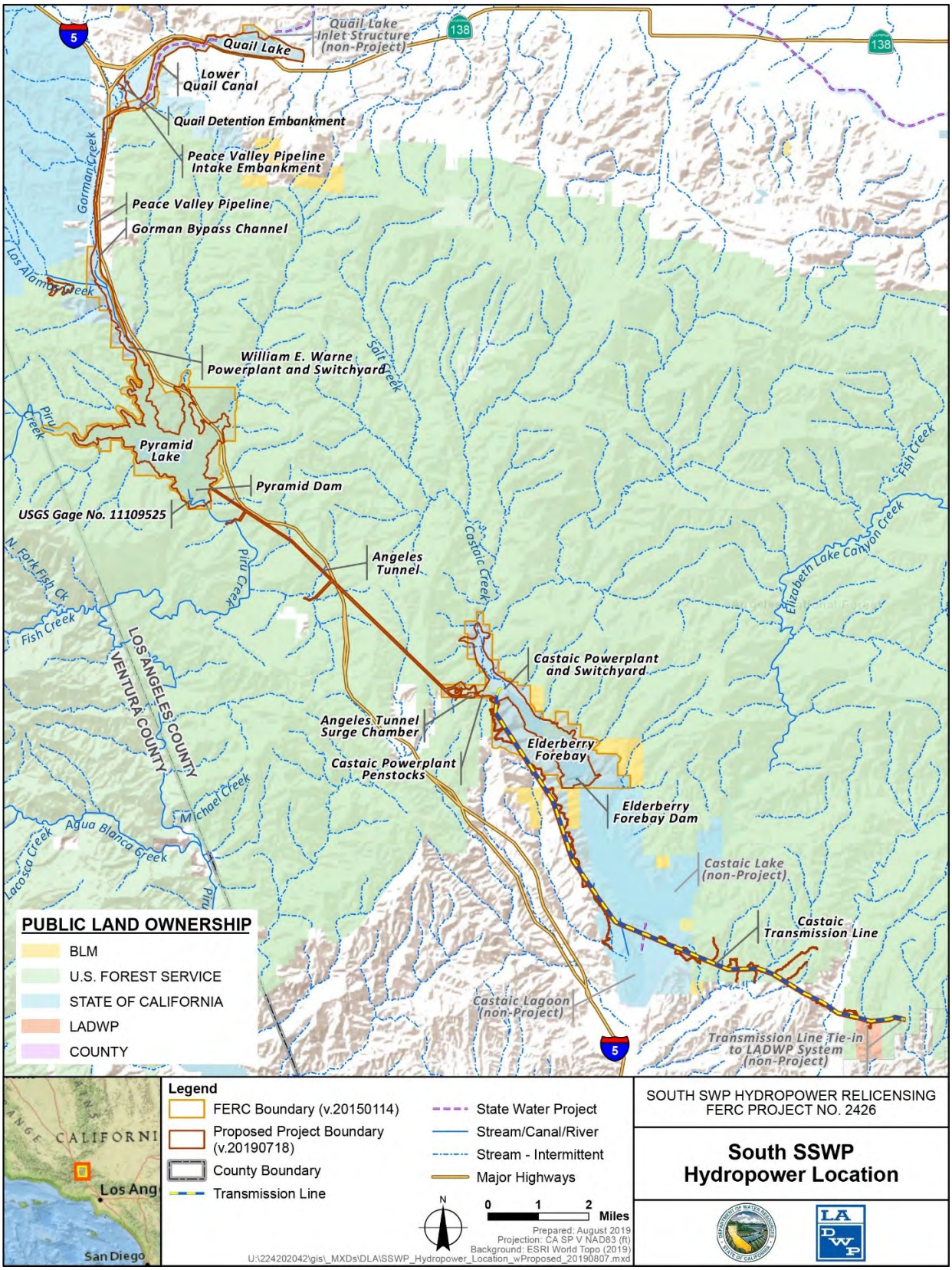


**Figure 1.1-2. South SWP Hydropower Facilities and Land Ownership**

## 1.2 PURPOSE OF THE PLAN

The purpose of this Plan is to provide guidance for fire prevention, response, and investigation, including prevention, emergency response preparedness, reporting, and fire control/extinguishing, during O&M of the Licensees' Proposal. To the extent appropriate, the Licensees will coordinate the efforts required under this Plan with other Project resource efforts, including implementation of other resource management plans and measures included in the new license.

## 1.3 GOALS AND OBJECTIVE OF THE PLAN

The goals of the Plan are to guide O&M in a manner intended to help prevent the ignition and spread of wildfires, and to guide response should fires occur. The objective of the Plan is to describe the fire prevention, protection, and response actions to meet the Plan's purposes and goals.

## 1.4 CONTENTS OF THE FIRE PREVENTION AND RESPONSE PLAN

This Plan includes the following:

- Section 1.0. Introduction. This section includes introductory information, including the purpose, goals, and objective of the Plan.
- Section 2.0. Guiding Information Framework. This section describes the research conducted and relevant documents consulted for the development of the Plan.
- Section 3.0. Fire Prevention and Protection Actions. This section describes fire prevention and protection measures for the Project.
- Section 4.0. Fire Response Actions. This section describes fire response measures for the Project.
- Section 5.0. Plan Review, Consultation, and Revisions. This section describes Plan review and consultation between the Licensees and the ANF and LPNF, and Plan revisions.
- Section 6.0. References Cited. This section provides a list of the references cited in this Plan.

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# 2.0 GUIDING INFORMATION FRAMEWORK

A variety of agency plans, agreements, standards, and codes were identified and used to develop this Plan, all of which are summarized in the sub-sections that follow.

## 2.1 INFORMATION/DATA COLLECTION AND RESEARCH

The information sources and data listed below relating to fire prevention, suppression, and fuel management on lands within the existing Project boundary were reviewed to provide appropriate background and technical reference for the development of this Plan. Not all of the information sources listed below may be applicable to the Project and Licensees, but were reviewed during the preparation of this Plan.

### 2.1.1 Federal Agency Land Use and Resource Management Plans

The following federal land use and resource management plans were reviewed for development of this Plan:

- Land Management Plan Part 1, Southern California National Forests Vision (USFS 2005a)
- Land Management Plan Part 2, ANF Strategy (USFS 2005b)
- Land Management Plan Part 2, LPNF Strategy (USFS 2005c)
- Land Management Plan Part 3, Design Criteria for the Southern California National Forests Vision (USFS 2005d)

### 2.1.2 Fire Management, Fire Prevention, Fire Response, and Fuel Management Plans

The following federal, State, local, and interagency fire prevention, management, and response plans were reviewed for development of this Plan:

- Los Angeles County, Los Angeles County Fire Department – 2018 Strategic Fire Plan (Los Angeles County 2018)
- Forest Service Manual 5100 – Forest Service Policies for Wildland Fire Management – Wildfire Prevention (USFS 2010)
- Forest Service Handbook 5109.18 – Forest Service Wildfire Prevention Handbook (USFS 2019a)
- Angeles National Forest Emergency Communications Center Operating Guide (USFS 2019b)

- California Natural Resources Agency, Department of Forestry and Fire Protection (CAL FIRE), Strategic Plan – January 2019 (CAL FIRE 2019a)
- National Interagency Mobilization Guide, 2019 (National Interagency Fire Center 2019a)
- Interagency Standards for Fire and Fire Aviation Operations, 2019 (National Interagency Fire Center 2019b)
- The National Strategy, The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy, 2014 (Wildland Fire Leadership Council 2014)
- Angeles National Forest, Land Management Plan – Part 2 Angeles National Forest Strategy, 2005 (USFS 2005b)
- Los Padres National Forest, Land Management Plan – Part 2 Los Padres National Forest Strategy, 2005 (USFS 2005c)

### 2.1.3 Agency Management Goals for Implementation of Fire Prevention and Response Actions

The Interagency Standards for Fire and Fire Aviation Operations (National Interagency Fire Center 2019b) contain fire and fire aviation program management direction for federal land managers on federal lands at the following federal agencies: USFS; U.S. Department of the Interior, Fish and Wildlife Service; National Park Service; and Bureau of Indian Affairs. The Interagency Standards work concurrently with the guiding principles of two other main federal policies for management of wildland fires on federal lands: the 1995 Federal Wildland Fire Management Policy and the Guidance for Implementation of Federal Wildland Fire Management Policy. The 1995 Federal Wildland Fire Management Policy has 17 elements that are detailed in the Interagency Standards document. The Guidance for Implementation of Federal Wildland Fire Management Policy details guidelines for implementing policy consistent with federal wildland fire policy. Also, each of the five federal agencies has its own fire management and fire aviation goals that are also outlined in the Interagency Standards.

### 2.1.4 Cooperative Agreements, Regulations, and Codes

Federal, State, and local agencies' cooperative agreements, regulations, and codes related to fire protection, prevention, and suppression activities within or near the proposed Project boundary were reviewed. These references included: California Public Resource Codes (CPRC) 4291-4293, 4421-4423, 4425, 4427-4428, 4430-4431, 4433, 4442, 4442.5, 4443, and 4446; California Health and Safety Codes 12101, 13000, 13001, and 13005; the Forest Service Manual 5100; CAL FIRE Power Line Fire Prevention Field Guide (CAL FIRE 2008); the California Master Cooperative Wildland

Fire Management and Stafford Act Response Agreement (2013-2018); and the current Los Angeles County Fire Code.

### 2.1.5 Emergency Communication Plans

Federal, State, and local fire agency emergency management, fire dispatch, and mobilization plans and documents were reviewed. These included:

- Project-related fire prevention and safety plans
- Angeles National Forest Emergency Communication Center Operating Guide, 2019

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# 3.0 FIRE PREVENTION AND PROTECTION ACTIONS

Fire prevention and protection are activities directed at reducing the number of person-caused fires, including public education, law enforcement, dissemination of information, and the reduction of hazards. The following discusses fire prevention and projection actions, applicable codes and compliance activities, and requirements for the Project area.

## 3.1 GENERAL FIRE PREVENTION AND PROTECTION ACTION SUMMARY

The Licensees' Project operators and contractors will adhere to the following codes, regulations, requirements, measures, and activities on National Forest System (NFS) lands:

- All applicable laws of the CPRCs listed in Section 2.1.4 of this document
- The general fire prevention requirements applicable to Project-related O&M, equipment, tool use, and fire use activities
- ANF's and LPNF's Project Activity Level (PAL) fire restrictions

## 3.2 SPECIFIC FIRE PREVENTION AND PROTECTION REQUIREMENTS APPLICABLE TO PROJECT-RELATED OPERATIONS AND MAINTENANCE

The Licensees will, for the purposes of this Plan, follow the specific fire prevention and protection measures listed below that are applicable to O&M of the Project.

- The Licensees will comply with all applicable laws of the State of California, CPRCs, and California Health and Safety Codes, in compliance with State Fire Marshal annual audits.
- The Licensees will secure special written permission from the applicable ANF or LPNF District Ranger (on NFS lands), District Fire Management Officer (on NFS lands), CAL FIRE battalion chief (on private lands only), or any of their officially designated representatives, before engaging in any of the activities listed below, except in the case of an emergency as noted below (last paragraph):
    - Blasting, and storing explosives and detonators (explosives permit required by California Health and Safety Code, Section 12101)
    - Burning, as authorized under the current operating plan
    - Welding, cutting, and grinding; the Licensees always follow Code of Safe Work Practices and established Licensees' Policies and Procedures for safe work, especially hot work

- Whenever work crews are participating in activities outside the normal O&M activities that may potentially require fire suppression equipment above and beyond hand-held fire extinguishers that are normally in each O&M vehicle (e.g. welding, facilities and equipment repair in heavily vegetated areas, and use of heavy equipment), the Licensees will have the following equipment on-hand whenever working on NFS lands.
    - A round point shovel with an overall length of not less than 46 inches (for clearing away flammable materials); a rake may be used, but it may not be a substitute for the shovel on the vehicle
    - One ABC fire extinguisher
    - An axe and saw
    - Radio for coordination with the Licensees' Area Control Centers (ACC) in the event of a fire on NFS lands
- National Fire Protection Association placards will be posted at locations with hazardous materials to alert emergency responders.

Licensees will contact the USFS or access relevant information to determine the PAL. For PAL requirements, see Appendix A – Fire Plan for Construction and Service Contracts, and Appendix B – Agency Checklist and Instructions for Determining Project Activity Level Variances. If emergency repairs (i.e., those repairs necessary for public safety or to prevent damage to facilities) on NFS lands require welding, grinding, or cutting, and Licensees do not have a permit, Licensees will strive to follow the "Very High" fire rating restrictions, have appropriate fire safety equipment available on-site, and notify the Duty Officer at the ANF and/or LPNF by phone as soon as reasonably possible after responding to the emergency. In the event of an emergency, Licensees' staff on-site will contact the Licensees' ACC, and the ACC will then contact the responsible fire agency while staff on-site proceed with emergency repairs.

## 3.3 PROJECT OPERATIONS REQUIRING THE USE OF FIRE/BURNING

Licensees will obtain permission from ANF and/or LPNF prior to burning on NFS lands.

## 3.4 PROTECTION, APPLICABLE CODES, AND CODE COMPLIANCE ACTIONS

The Licensees are responsible for complying with all applicable laws of the State of California, CPRCs, California Health and Safety Codes, and USFS codes. The Licensees practice ongoing fire protection measures to comply with applicable codes and safeguard Project assets. For example, the Licensees create a defensible space around all Project structures, including the powerplants and recreation facilities, by routinely clearing vegetation in the immediate vicinity. This includes periodic inspections to determine the need for vegetation removal, hazard tree trimming/removal, and

compliance with CPRC clearance requirements. These efforts are expected to provide an effective level of fire protection and prevention within the Project boundary.

### 3.4.1 Applicable Codes

The Licensees will ensure that the Project is managed for compliance with applicable codes and orders, unless otherwise exempt. Licensees are responsible for complying with all USFS rules and California public laws that are applicable to the Licensees' operations of the Project. Any fire code or operating violation will be corrected by the Licensees to the satisfaction of the appropriate USFS representative if it occurs on NFS lands, and/or by a CAL FIRE representative if on non-NFS lands.

### 3.4.2 Project Area Code Compliance and Inspections

Inspections of equipment used for maintenance of the Project facilities and surrounding vegetation are the responsibility of the Licensees. Project compliance inspections will be completed at periodic intervals to comply with applicable State codes and USFS regulations. The purpose of the inspections is to look for missing or damaged equipment that may be an ignition source and identify vegetation that does not comply with all applicable codes.

## 3.5 FIRE PREVENTION REQUIREMENTS FOR PROJECT AREA TOOL AND EQUIPMENT USE

Licensees' operations staff involved with any type of equipment/tool use within the proposed Project boundary will take specific fire prevention actions and measures. Tools and equipment may be inspected by CAL FIRE or USFS, if the work is on NFS lands, to ensure compliance with fire safety rules. The Licensees will follow the applicable equipment use-specific restrictions detailed by PAL ratings, as identified in Appendix A.

## 3.6 FIRE HAZARD ZONE LEVELS

CAL FIRE use the Fire Hazard Zone model to evaluate fire hazard severity zones within the local responsibility areas (CAL FIRE 2018). In turn, the results of the zone model are used as a tool to create local ordinances for planning purposes. The majority of the area within the proposed Project boundary lies within the Very High fire hazard level zone, and the remaining areas lie within the High or Extreme fire hazard level zones. Figure 3.6-1 shows land ownership in the Project vicinity, and Figure 3.6-2 shows fire hazard levels in the Project vicinity, as designated by the ANF, LPNF, and CAL FIRE.

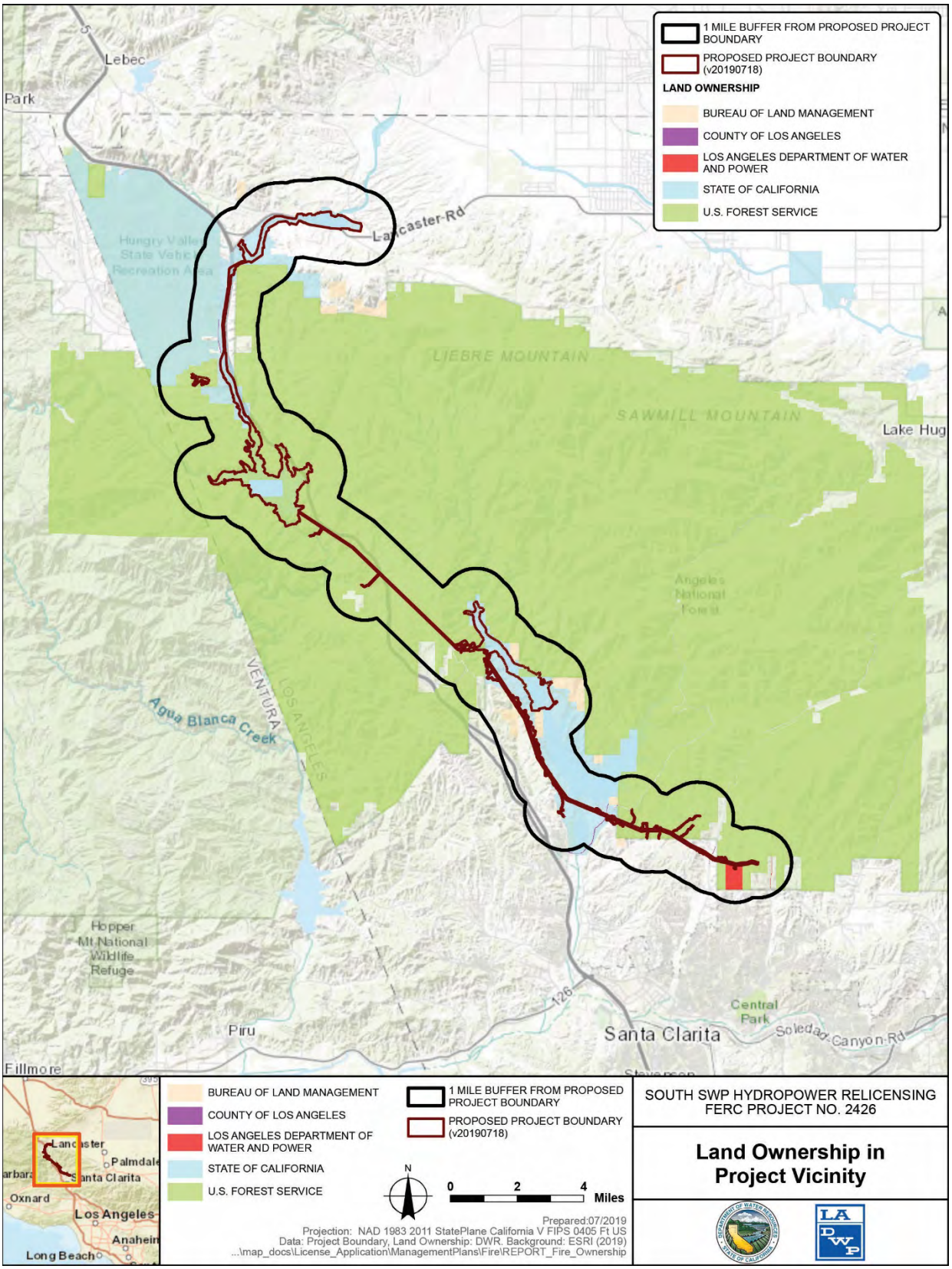


**Figure 3.6-1. Land Ownership in the Project Vicinity**

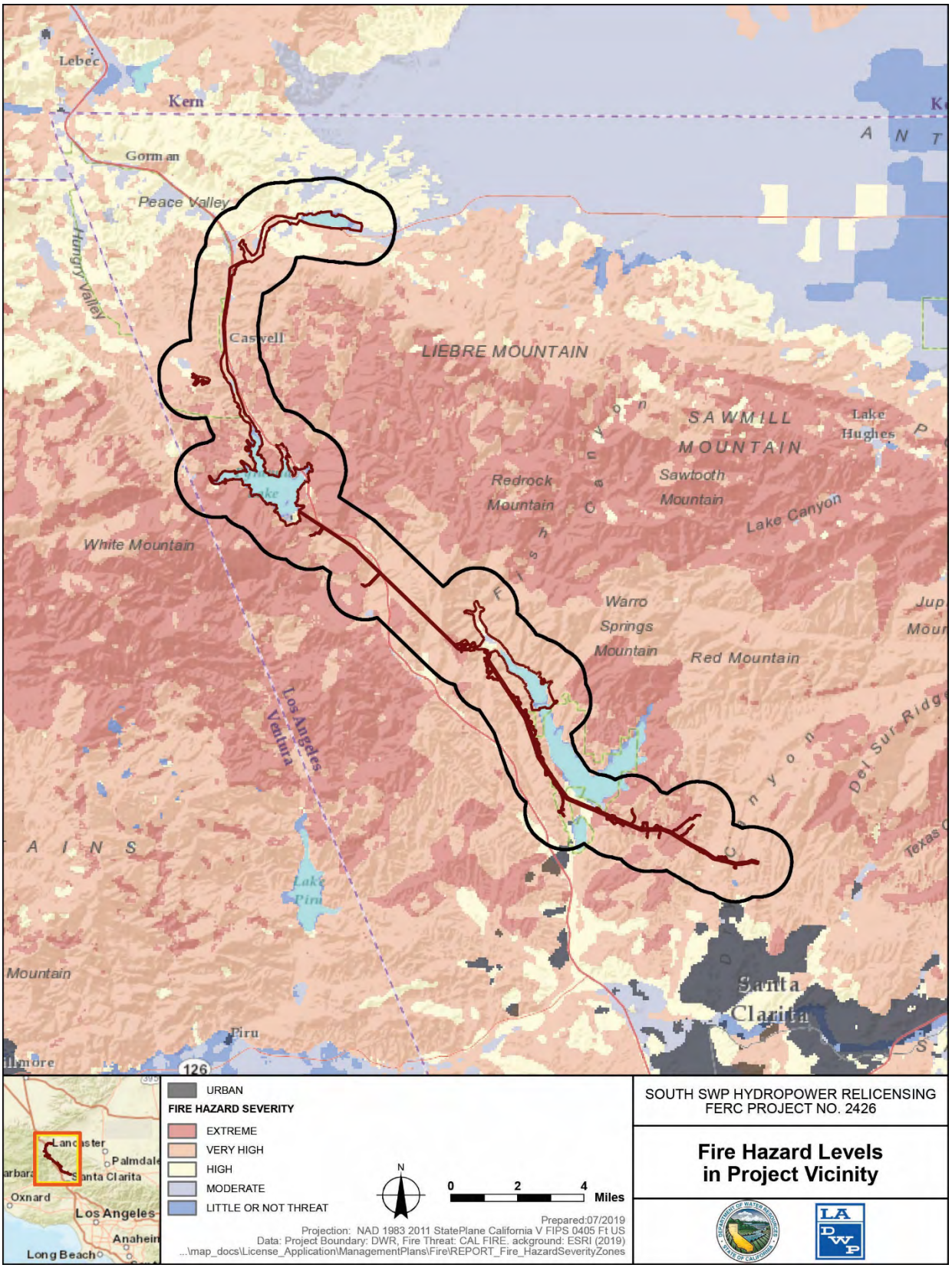


**Figure 3.6-2. Fire Hazard Levels in the Project Vicinity**

## 3.7 PROJECT ACTIVITY LEVEL PLANNING REQUIREMENTS FOR THE PROJECT AREA

USFS has a fire prevention process that determines fire danger each day on NFS lands as displayed by PAL. The PAL is implemented and administered to regulate activities of private companies performing work on NFS lands. For Licensees' Project O&M that involves equipment/tool use within the proposed Project boundary, Licensees will monitor fire danger conditions and comply with the appropriate PAL fire prevention requirements. Project vicinity lands reside within ANF PAL jurisdictions.

The ANF may, in most cases, determine the following day's activity level on NFS lands by 4:00 p.m. each afternoon. The Licensees can obtain Project area PAL fire and activity restrictions on NFS lands for the following day by calling 661-723-2752 or visiting the appropriate PAL website. The Licensees will then comply with the prescribed requirements and restrictions for that day.

# 4.0 FIRE RESPONSE ACTIONS

## 4.1 REPORTING FIRES

The Licensees will report Project-related fires and any fire detected within the proposed Project boundary by calling 9-1-1. When reporting a wildland fire, Licensees' personnel will provide incident information, which may include the following:

- Reporting party's name
- Radio number; office or cell phone call back number
- Approximate location of the fire:
    - Legal or global positioning system location description (township, range, section, or latitude and longitude), if available at the time
    - Descriptive location (road or geographic reference point)
- Best access routes, in Licensees' staff opinion
- Incident size estimate (in acres)
- Incident status
- Estimated rate of fire growth or spread
- Weather conditions
- Radio frequencies
- Special hazards and concerns, if Licensees' operations staff are aware of any
- Additional resource needs, if Licensees' operations staff are aware of any

## 4.2 FIRE CONTROL/EXTINGUISHING FIRES

Fire suppression responsibility within the proposed Project boundary is the responsibility of three agencies. Fire suppression on NFS lands is the responsibility of USFS; for suppression on non-NFS lands, the initial response is the responsibility of the Los Angeles County Fire Department (LACFD). If the fire escapes the initial attempt at containment, CAL FIRE responds with firefighting resources to assist the county (CAL FIRE 2019b). Firefighting resources in the Project vicinity are shown in Figure 4.2-1.

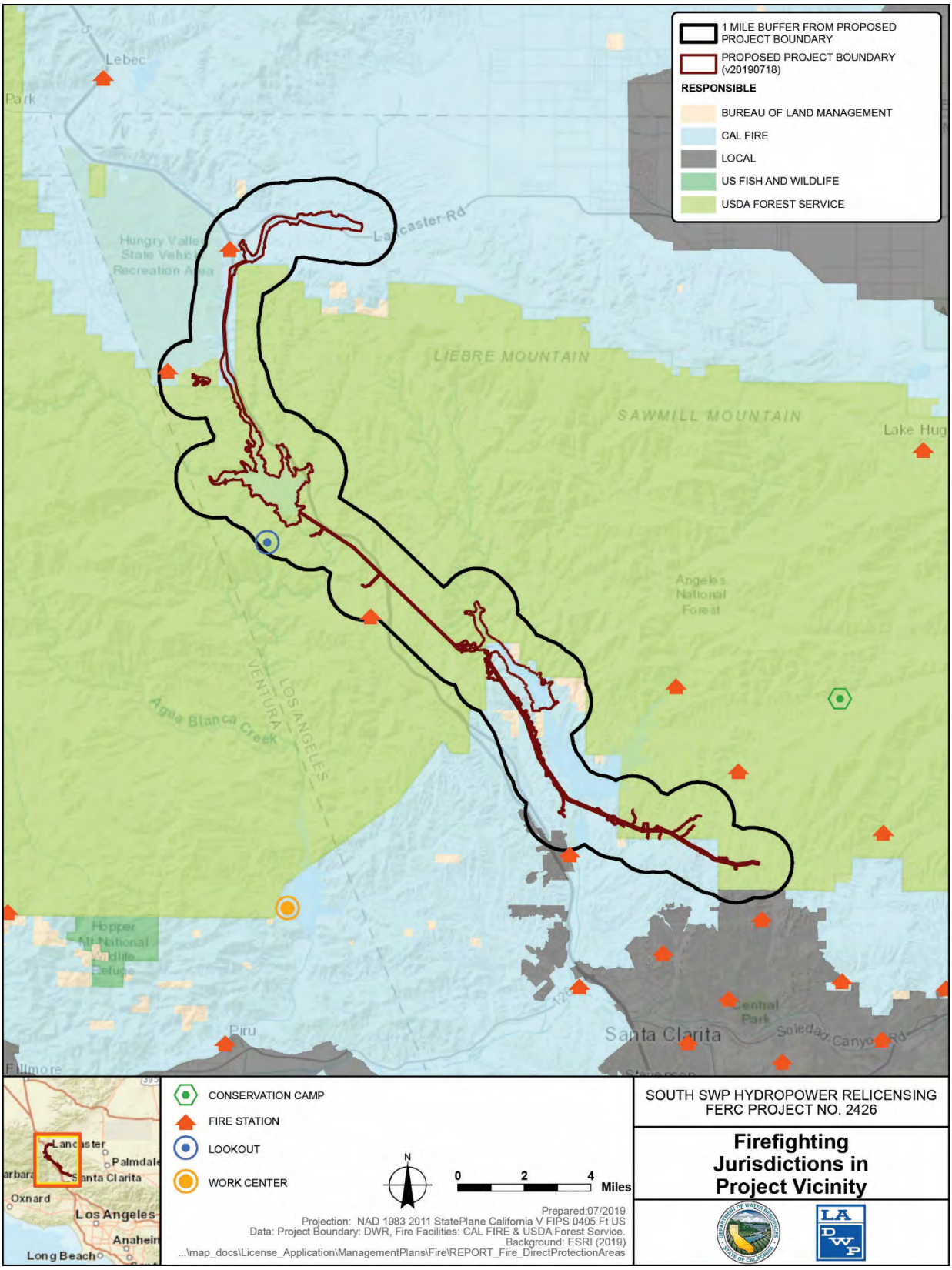


**Figure 4.2-1. Firefighting Jurisdictions in the Project Vicinity**

Each public agency within the proposed Project boundary has its own communication center for coordinating the mobilization of resources for wildland fire and other incidents. Should a wildfire occur within the proposed Project boundary, the Licensees would call 9-1-1, which would contact the appropriate jurisdiction. On NFS lands, the ANF and LPNF Communication Centers are the central locations for coordinating USFS resources. On non-NFS lands, the LACFD, under contract to CAL FIRE (CAL FIRE 2019b), is the central location for coordinating resources.

## 4.3 ROAD ACCESS

Portions of the proposed Project boundary are normally accessible by fire suppression crews through federal, State, and NFS roads, and via the Licensees' Project access roads; though Licensees cannot ensure access by fire suppression crews to these areas under all conditions. The Project is located adjacent to Interstate 5, as shown in Figure 1.1-1. A description of potential access routes from Interstate 5 to Project facilities are provided in Section 4.4.1, and a description of potential routes from Project facilities to Interstate 5 are described in Section 4.4.2.

### 4.3.1 Directions to Project Facilities

#### *4.3.1.1 Quail Lake*

From Interstate 5, take the off-ramp for State Highway 138 (eastbound towards Lancaster, Palmdale). Continue on State Highway 138 for 2.3 miles to a gated driveway for Quail Lake Road on the left (north) side of State Highway 138. Turn left and proceed through gate; Quail Lake is along the right side of the road.

#### *4.3.1.2 Lower Quail Canal*

From Interstate 5, take the off-ramp for State Highway 138 (eastbound towards Lancaster, Palmdale). Continue on State Highway 138 for 2.3 miles to a gated driveway on the right side of State Highway 138. Turn right, proceed through the gate and use either Lower Quail Canal North Road or Lower Quail Canal South Road to access the canal.

#### *4.3.1.3 Peace Valley Pipeline Intake Embankment*

From northbound Interstate 5, take Exit 198B, the Quail Lake Road off-ramp, then turn right onto Quail Lake Road. Proceed approximately 0.3 miles to Quail Detention Embankment Road, a gated road on the left side of Quail Lake Road. Turn left onto Quail Detention Embankment Road and drive about 0.7 miles to a tee intersection with Quail Dam Road. Turn left at the tee intersection and follow Quail Dam Road approximately 0.1 miles up onto the Peace Valley Pipeline Intake Embankment.

#### *4.3.1.4 Peace Valley Pipeline*

The Peace Valley Pipeline can be accessed at several locations along the alignment of the pipeline. This description provides directions to the uphill and downhill ends of the pipeline.

The upper end of Peace Valley Pipeline is accessed at the Peace Valley Pipeline Intake Embankment, as follows: from northbound Interstate 5, take Exit 198B, the Quail Lake Road off-ramp, then turn right onto Quail Lake Road. Proceed approximately 0.3 miles to Quail Detention Embankment Road, a gated road on the left side of Quail Lake Road. Turn left onto Quail Detention Embankment Road and drive about 0.7 miles to a tee intersection with Quail Dam Road. Turn left at the tee intersection and follow Quail Dam Road approximately 0.1 miles up onto the Peace Valley Pipeline Intake Embankment.

The lower end of Peace Valley Pipeline is located at the Warne Powerplant and Switchyard. To get there, take Exit 195, Smokey Bear Road, and turn southwest onto Smokey Bear Road. Drive approximately 0.1 miles to a tee intersection with Pyramid Lake Road and turn south (left). Drive south on Pyramid Lake Road about 1.5 miles to Hard Luck Road and turn right. Proceed 0.1 miles across the overpass to a gated driveway on the left side. Proceed through the gate and into the Warne Powerplant and Switchyard, where the southern end of the Peace Valley Pipeline is located.

#### *4.3.1.5 Gorman Bypass Channel*

Gorman Bypass Channel is located generally adjacent to Interstate 5. To access the upper end of the channel, from Interstate 5, take Exit 198B, the Quail Lake Road off-ramp, then turn right onto Quail Lake Road. Proceed approximately 0.3 miles to Quail Detention Embankment Road, a gated road on the left side of Quail Lake Road. Turn left onto Quail Detention Embankment Road and drive about 0.7 miles to a tee intersection with Quail Dam Road. Turn left at the tee intersection and follow Quail Dam Road approximately 0.1 miles up onto the Peace Valley Pipeline Intake Embankment. Proceed across the embankment and turn left onto Lower Quail Canal South Road. Continue about 0.8 miles along the canal on Lower Quail Canal South Road to the upper end of the Gorman Bypass Channel.

The lower end of the Gorman Bypass Channel is located adjacent to the Warne Powerplant, where it enters Pyramid Lake. From Interstate 5, take Exit 195, Smokey Bear Road, and turn southwest onto Smokey Bear Road. Drive 0.1 miles to a tee intersection with Pyramid Lake Road and turn south (left). Drive south on Pyramid Lake Road about 1.5 miles to Hard Luck Road and turn right. Proceed 0.1 miles across the overpass to a gated driveway on left side. Proceed through the gate and into the Warne Powerplant and Switchyard to access the lower end of the Gorman Bypass Channel.

#### *4.3.1.6 Warne Powerplant and Switchyard*

From Interstate 5, take Exit 195, Smokey Bear Road, and turn southwest onto Smokey Bear Road. Drive 0.1 miles to a tee intersection with Pyramid Lake Road and turn south (left). Drive south on Pyramid Lake Road about 1.5 miles to Hard Luck Road and turn right. Proceed 0.1 miles across the overpass to a gated driveway on the left side. Proceed through the gate and into the Warne Powerplant and Switchyard.

#### *4.3.1.7 Pyramid Lake*

Interstate 5 crosses Pyramid Lake at multiple locations along the east shore of the lake. To access the lake, take Interstate 5 to Exit 183, Templin Highway. Turn southwest onto Templin Highway and proceed 0.1 miles to the tee intersection with Golden State Highway. Turn right onto Golden State Highway and proceed about 5 miles to the gate. Proceed through gate and continue on Golden State Highway for an additional 2 miles, then turn right onto Pyramid Dam Crest Road. Follow Pyramid Dam Crest Road, past two branching intersections (bearing right at each), approximately 0.6 miles to reach the intersection with the Angeles Tunnel Intake Gate Road and Pyramid Lake.

#### *4.3.1.8 Pyramid Dam*

To access Pyramid Dam, take Interstate 5 to Exit 183, Templin Highway. Turn southwest onto Templin Highway and proceed approximately 0.1 miles to the tee intersection with Golden State Highway. Turn right onto Golden State Highway and proceed about 5 miles to the gate. Proceed through the gate and continue on Golden State Highway for 2 additional miles, then turn right onto Pyramid Dam Crest Road. Follow Pyramid Dam Crest Road, past two branching intersections (bearing right at each), approximately 0.6 miles to reach the intersection with the Angeles Tunnel Intake Gate Road. Bear left, staying on Pyramid Dam Crest Road to the gate at edge of the dam crest.

#### *4.3.1.9 Angeles Tunnel*

To access the upper end of the Angeles Tunnel, take Interstate 5 to Exit 183, Templin Highway. Turn southwest onto Templin Highway and proceed approximately 0.1 miles to the tee intersection with Golden State Highway. Turn right onto Golden State Highway and proceed about 5 miles to the gate. Proceed through the gate and continue on Golden State Highway for 2 additional miles, then turn right onto Pyramid Dam Crest Road. Follow Pyramid Dam Crest Road, past two branching intersections (bearing right at each), approximately 0.6 miles to reach the intersection with the Angeles Tunnel Intake Gate Road. Bear right and follow Angeles Tunnel Intake Gate Road about 0.15 miles to the intake gate and the upper end of the Angeles Tunnel.

To access the lower end of the Angeles Tunnel, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed about 2.2 miles to Castaic Penstock Road on the right side of Templin Highway. Proceed along Castaic Penstock

Road approximately 0.1 miles to the gate. Continue through the gate for about 0.8 miles to the end of the Angeles Tunnel at the top of the Castaic Powerplant Penstock.

#### *4.3.1.10 Angeles Tunnel Surge Chamber*

To access the Angeles Tunnel Surge Chamber, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 1.9 miles to an unnamed gated driveway on the right side of Templin Highway. Proceed through the gate for 200 feet to the Angeles Tunnel Surge Chamber.

#### *4.3.1.11 Castaic Powerplant Penstock*

To access the Castaic Powerplant Penstock take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 2.2 miles to Castaic Penstock Road on the right side of Templin Highway. Proceed along Castaic Penstock Road approximately 0.1 miles to the gate. Continue through the gate for 0.8 miles to the top of the Castaic Powerplant Penstock.

#### *4.3.1.12 Castaic Powerplant and Switchyard*

To access the Castaic Powerplant and Switchyard, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 4.2 miles to the roadblock and the driveway onto Los Angeles Water and Power Road (right turn). Proceed along Los Angeles Water and Power Road approximately 1.1 miles to the gate at the Castaic Powerplant and Switchyard. Proceed through the gate into the facility.

#### *4.3.1.13 Elderberry Forebay*

To access Elderberry Forebay, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 4.2 miles to the roadblock and the driveway onto Los Angeles Water and Power Road (right turn). Proceed along Los Angeles Water and Power Road approximately 1.1 miles to the gate at the Castaic Powerplant and Switchyard. Proceed through the gate into the facility. Elderberry Forebay is located adjacent to the powerplant.

#### *4.3.1.14 Elderberry Forebay Dam*

To access Elderberry Forebay Dam, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 4.2 miles to the roadblock and the driveway onto Los Angeles Water and Power Road (right turn). Proceed south along Los Angeles Water and Power Road approximately 1.1 miles to the gate at the Castaic Powerplant and Switchyard. Proceed through the gate southeast, across the Castaic Powerplant and Switchyard site, and continue for 2.9 miles along Los Angeles Water and Power Road to the crest of the Elderberry Forebay Dam.

#### *4.3.1.15 Castaic Transmission Line*

The Castaic Transmission Line originates at the Castaic Powerplant and Switchyard at its western terminus. To access the western terminus of the transmission line, take Interstate 5 to Exit 183, Templin Highway. Turn northeast onto Templin Highway and proceed 4.2 miles to the roadblock and the driveway onto Los Angeles Water and Power Road (right turn). Proceed along Los Angeles Water and Power Road approximately 1.1 miles to the gate at the Castaic Powerplant and Switchyard. Proceed through the gate to the origin (western terminus) of the Castaic Transmission Line; the transmission line extends southeasterly for approximately 11.5 miles to its eastern terminus.

To access the eastern terminus of the transmission line, take Interstate 5 to Exit 160, Newhall Ranch Road. Turn northeast onto Newhall Ranch Road and continue approximately 1.8 miles to the intersection with Copper Hill Road. Turn left onto Copper Hill Road and continue for 4.8 miles to the second driveway on the north side of Copper Hill Road, past the Haskell Canyon Wash (between two parallel transmission lines). Continue north alongside Haskell Canyon Wash on the unnamed road about 1.5 miles to the intersection with City Highline Motorway Fire Road (at the Veluzat Movie Ranch entrance). Turn left onto City Highline Motorway Fire Road and proceed north approximately 1.4 miles to the Castaic Transmission Line.

### 4.3.2 Directions from the Project Facilities

#### *4.3.2.1 Quail Lake*

From Quail Lake, take State Highway 138 for 2.3 miles east to Interstate 5.

#### *4.3.2.2 Lower Quail Canal*

From the north end of the canal (accessed using either Lower Quail Canal North Road or Lower Quail Canal South Road), proceed through the gate and turn left onto State Highway 138. Continue on State Highway 138 for 2.3 miles to Interstate 5.

#### *4.3.2.3 Peace Valley Pipeline Intake Embankment*

From the Peace Valley Pipeline Intake Embankment, depart toward the north from the embankment and drive 0.1 miles on Quail Dam Road to the intersection with Quail Detention Embankment Road. Turn right onto Quail Detention Embankment Road and drive 0.7 miles to the gate and the intersection with Quail Lake Road. Turn right onto Quail Lake Road and proceed approximately 0.3 miles to Interstate 5.

#### *4.3.2.4 Peace Valley Pipeline*

From the upper end of Peace Valley Pipeline, depart toward the north from the embankment and drive 0.1 miles on Quail Dam Road to the intersection with Quail Detention Embankment Road. Turn right onto Quail Detention Embankment Road and

drive 0.7 miles to the gate and the intersection with Quail Lake Road. Turn right onto Quail Lake Road and proceed 0.3 miles to Interstate 5.

From the lower end of the Peace Valley Pipeline at the Warne Powerplant and Switchyard, exit through the north side gated entrance. Immediately turn right onto Hard Luck Road and drive 0.1 miles across overpass to the intersection with Pyramid Lake Road. Turn left onto Pyramid Lake Road and continue 1.5 miles to Smokey Bear Road. Turn right and continue for 0.1 miles to Interstate 5.

#### *4.3.2.5 Gorman Bypass Channel*

From the upper end of the channel, drive south 0.8 miles along the canal on Lower Quail Canal South Road to the Peace Valley Pipeline Intake Embankment. Turn right onto the embankment and proceed across the embankment about 0.1 miles on Quail Dam Road to the intersection with Quail Detention Embankment Road. Turn right onto Quail Detention Embankment Road and drive 0.7 miles to the gate near the intersection with Quail Lake Road. Turn right onto Quail Lake Road and proceed 0.3 miles to Interstate 5.

From the southern end of the Gorman Bypass Channel, proceed to the north gated entrance of the Warne Powerplant and Switchyard. Immediately turn right onto Hard Luck Road and drive 0.1 miles across the overpass to the intersection with Pyramid Lake Road. Turn left onto Pyramid Lake Road and continue about 1.5 miles to Smokey Bear Road. Turn right and continue for 0.1 miles to Interstate 5.

#### *4.3.2.6 Warne Powerplant and Switchyard*

Exit the Warne Powerplant and Switchyard at the north side gated entrance. Immediately turn right onto Hard Luck Road and drive 0.1 miles across the overpass to the intersection with Pyramid Lake Road. Turn left onto Pyramid Lake Road and continue 1.5 miles to Smokey Bear Road. Turn right and continue for 0.1 miles to Interstate 5.

#### *4.3.2.7 Pyramid Lake*

From Pyramid Dam, take Pyramid Dam Crest Road and continue 0.6 miles to the intersection with Golden State Highway. Turn left onto Golden State Highway and continue 2 miles to the gate. Proceed through the gate and continue 5 miles on Golden State Highway to Templin Highway. Turn left onto Templin Highway and proceed approximately 100 feet to Interstate 5.

#### *4.3.2.8 Pyramid Dam*

From the eastern end of the dam crest, take Pyramid Dam Crest Road and continue 0.6 miles to the intersection with Golden State Highway. Turn left onto Golden State Highway and continue 2 miles to the gate. Proceed through the gate and continue 5

miles on Golden State Highway to Templin Highway. Turn left onto Templin Highway and proceed about 100 feet to Interstate 5.

#### *4.3.2.9 Angeles Tunnel*

From the upper end of the Angeles Tunnel, follow the Angeles Tunnel Intake Gate Road 0.15 miles to the intersection with Pyramid Dam Crest Road. Turn left onto Pyramid Dam Crest Road and continue 0.6 mile to the intersection with Golden State Highway. Turn left onto Golden State Highway and continue 2 miles to the gate. Proceed through the gate and continue 5 miles on Golden State Highway to Templin Highway. Turn left onto Templin Highway and proceed about 100 feet to Interstate 5.

From the lower end of the Angeles Tunnel, proceed west along Castaic Penstock Road approximately 0.8 miles to the gate. Continue through the gate for 0.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 2.2 miles to Interstate 5.

#### *4.3.2.10 Angeles Tunnel Surge Chamber*

From the Angeles Tunnel Surge Chamber, drive 200 feet to the gate at Templin Highway. Proceed through the gate and turn left onto Templin Highway; proceed 1.9 miles on Templin Highway to Interstate 5.

#### *4.3.2.11 Castaic Powerplant Penstock*

From the Castaic Powerplant Penstock, proceed west along Castaic Penstock Road for 0.8 miles to the gate. Continue through the gate for 0.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 2.2 miles to Interstate 5.

#### *4.3.2.12 Castaic Powerplant and Switchyard*

From the Castaic Powerplant and Switchyard, exit the gated facility at the north side gate and continue on Los Angeles Water and Power Road north for 1.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 4.2 miles to Interstate 5.

#### *4.3.2.13 Elderberry Forebay*

Elderberry Forebay is located adjacent to the Castaic Powerplant and Switchyard. Exit the gated facility at the north side gate and continue on Los Angeles Water and Power Road north for 1.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 4.2 miles to Interstate 5.

#### *4.3.2.14 Elderberry Forebay Dam*

From the western side of Elderberry Forebay Dam, proceed north along Los Angeles Water and Power Road for 2.9 miles to and through the Castaic Powerplant and Switchyard. Exit the gated facility and continue on Los Angeles Water and Power Road

north for 1.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 4.2 miles to Interstate 5.

#### *4.3.2.15 Castaic Transmission Line*

The Castaic Transmission Line originates at the Castaic Powerplant and Switchyard and extends southeasterly for 11.5 miles. From the western terminus of the transmission line at the Castaic Powerplant and Switchyard, take Los Angeles Water and Power Road north for 1.1 miles to Templin Highway. Turn left onto Templin Highway and proceed 4.2 miles to Interstate 5.

From the eastern terminus of the transmission line, take City Highline Motorway Fire Road and proceed south for 1.4 miles to the unnamed road intersection (at the Veluzat Movie Ranch entrance). Turn right and continue south 1.5 miles alongside Haskell Canyon Wash to Copper Hill Road. Turn right onto Copper Hill Road and continue for 4.8 miles to Newhall Ranch Road. Turn right onto Newhall Ranch Road and continue for 1.8 miles to Interstate 5.

## 4.4 HELICOPTER LANDING ZONES WITHIN THE PROJECT BOUNDARY

While all Project facilities normally may be accessed by road, fire suppression activities may require the use of helicopters. There are no dedicated helicopter landing zones within the proposed Project boundary or within the Project vicinity; however, three helibases are located within 30 miles of the Project: (1) Los Angeles County Sheriff's Wayside Heliport, located approximately 8 miles south of Castaic Lake; (2) LACFD's Camp 14 Heliport, located approximately 20 miles east of Castaic Lake; and (3) SCE's Pardee Substation Helistop, located roughly 10 miles south of Castaic Lake.

## 4.5 FIRE SUPPRESSION EQUIPMENT AND PERSONNEL

The Licensees do not own fire suppression equipment suitable for combating wildland fires (e.g., fire trucks and helicopters). Fire suppression equipment owned by the Licensees within the proposed Project boundary primarily consists of fire extinguishers located at Project buildings and in employee vehicles. Other fire suppression equipment owned by the Licensees is located at various Project facilities and consists of permanently installed carbon dioxide systems within the powerplants and, as mentioned in Appendix A, shovels, picks and axes. This portable equipment is deployed along with Licensees' work crews who are participating in activities that may potentially require fire suppression equipment above and beyond hand-held extinguishers (e.g., welding, facilities and equipment repair in heavily-vegetated areas, and use of heavy equipment). While equipment for suppression is limited, water from all Project reservoirs is available to agencies responding to wildland fires.

The Licensees have personnel available to provide technical information and support for USFS, LACFD and CAL FIRE operations in and adjacent to the Project. Licensees employees and contractors will normally attempt to respond to fires that are a result of

their activities, if the circumstances permit the safe containment and extinguishment of the fire. However, Licensees' operations staff and contractors are not trained or required to fight fires.

As of 2018, LACFD's firefighting resources located within a radius of approximately 50 miles of the Project include the following: 9 operating divisions, 22 battalions, 174 fire stations, and 10 fire suppression camps, along with 4,670 personal on staff, 174 fire stations, 210 fire engines (including 500 series), 4 light forces, 25 quints, 109 paramedic squads, 10 wildland fire suppression camps, 10 bulldozers, 8 helicopters, and 13 Forestry units (Los Angeles County 2018). The LACFD Fire Stations located closest to Pyramid Lake and Castaic Lake are Stations 76, 77, 108, 143, 149, and 156; emergency contact information for these six LACFD stations is provided below in Section 4.7.1.2.

ANF Emergency Communications Center currently provides 24-hour dispatching, 365 days a year. Wildland fires and reports of smoke within ANF Direct Protection Area will receive a first alarm brush assignment. The composition of the first alarm brush currently includes: 5 type 3 engines, 2 type 1 crews, 2 water tenders, 2 dozers, 2 patrol/prevention units, 2 chief officers, 1 air attack, 1 lead plane, 2 air tankers, 1 type 1 helicopter and 1 type 2 helicopter (USFS 2019b, Angeles National Forest Emergency Communications Center Operating Guide, Appendix A). A second alarm response will be sent out upon request of the Incident Commander (IC) or a Chief Officer.

## 4.6 KEY PERSONNEL CONTACT DIRECTORY

### 4.6.1 Emergency Contacts

#### *4.6.1.1 USFS Emergency Contacts – Angeles National Forest*

ANF contacts for emergency fire-related issues:

To report a fire: Angeles National Forest Emergency Command Center: (661) 723-3620

#### *4.6.1.2 USFS Emergency Contacts – Los Padres National Forest*

LPNF contacts for emergency fire-related issues:

To report a fire: 9-1-1

Federal Interagency Communication Center: (909) 383-5652

LPNF Emergency Operations Unit: (805) 961-5727, day or night

LPNF Fire Stations located closest to the Project:

Los Alamos Fire Station, Engine 74
Hardluck Road
Lebec, CA
(661) 248.6307

#### *4.6.1.3 Los Angeles County Fire Department Emergency Contacts*

Los Angeles County Fire Department contacts for emergency fire-related issues:

Los Angeles County Fire Department: 9-1-1

Arson Hotline: (800) 472-7766 (47 ARSON) Ext 1

Los Angeles County Fire Stations located closest to the Project:

Los Angeles County Fire Department -Station 77
46833 Ralphs Ranch Road
Gorman, CA 93243
(661) 248-5284

Los Angeles County Fire Department - Station 149
31770 Ridge Route Road
Castaic, CA 91384
(661) 259-2111

Los Angeles County Fire Department - Station 143
28580 Hasley Canyon Road
Castaic, CA 91384
(661) 257-5009

Los Angeles County Fire Department - Station 108
28799 Rock Canyon Drive
Santa Clarita, CA 91390
(661) 297-8653

Los Angeles County Fire Department - Station 156
24505 Copper Hill Drive
Santa Clarita, CA 91354
(661) 257-6734

Los Angeles County Fire Department - Station 76
27223 Henry Mayo Dr
Valencia, CA 91355
(661) 257-4144

## 4.6.2 Non-Emergency Contacts

### *4.6.2.1 USFS Non-Emergency Contacts – Angeles National Forest*

ANF fire management contacts for non-emergency Project vegetation or fire-related issues:

ANF Supervisor's Office
701 N Santa Anita Ave
Arcadia, CA 91006
(626) 574-1613

### *4.6.2.2 USFS Non-Emergency Contacts – Los Padres National Forest*

LPNF fire management contacts for non-emergency Project vegetation or fire-related issues:

LPNF Supervisor's Office
6750 Navigator Drive #150
Goleta, CA 93117
(805) 968-6640

### *4.6.2.3 Los Angeles County Fire Department Non-Emergency Contacts*

Los Angeles County Fire Department contact for non-emergency Project vegetation or fire-related issues:

Los Angeles County Fire Department: (818) 890-5719

### *4.6.2.4 Licensees' Non-Emergency Contacts – South SWP Hydropower*

DWR contacts for non-emergency fire-related issues:

Main Telephone: (661) 944-8600 – DWR Dispatch

Alternative: (661) 944–8720 Warne Powerplant Facility

LADWP contacts for non-emergency fire-related issues:

Main Telephone: (800) 342--5397 – LADWP non-emergency

Alternative: (213) 367-.4211 – LADWP Operator

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# 5.0 PLAN REVIEW, CONSULTATION, AND REVISIONS

## 5.1 PLAN REVIEW AND CONSULTATION

The Licensees will review with the ANF and LPNF fire prevention and response activities associated with this Plan on NFS lands during the previous calendar year, as well as any activities related to this Plan on NFS lands planned for the current calendar year. In addition, the Licensees will consult with the ANF and/or LPNF, as needed, regarding fire prevention and response on NFS lands.

## 5.2 PLAN REVISIONS

The Licensees, in consultation with the ANF and LPNF, will review, update and/or revise this Plan as it pertains to NFS lands. Any updates to the Plan will be prepared in coordination and consultation with the ANF and LPNF. The ANF and LPNF will have 60 days after receipt of the updated Plan from the Licensees to provide written comment and recommendations before Licensees file the updated Plan with FERC for its approval. Licensees will include documentation of all relevant coordination and consultation with the updated Plan filed with FERC. If the Licensees do not adopt a particular recommendation by the ANF and/or LPNF, the filing will include the Licensees' reasons for not doing so. The Licensees will implement the Plan as approved by FERC. The Plan will not be considered revised until FERC issues its approval.

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# Appendix A

## *Fire Plan for Construction and Service Contracts*

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**FIRE PLAN FOR CONSTRUCTION AND SERVICE CONTRACTS**
**08/02/2012**

## 1. SCOPE:

The provisions set forth below outline the responsibility for fire prevention and suppression activities and establish a suppression plan for fires within the contract area. The contract area is delineated by map in the contract. The provisions set forth below also specify conditions under which contract activities will be curtailed or shut down.

## 2. RESPONSIBILITIES:

### A. CONTRACTOR

(1) Shall abide by the requirements of this Fire Plan.

(2) Shall take all steps necessary to prevent his/her employees, subcontractors and their employees from setting fires not required in completion of the contract, shall be responsible for preventing the escape of fires set directly or indirectly as a result of contract operations, and shall extinguish all such fires which may escape.

(3) Shall permit and assist in periodic testing and inspection of required fire equipment. Contractor shall certify compliance with specific fire precautionary measures in the fire plan, before beginning operations during Fire Precautionary Period and shall update such certification when operations change.

(4) Shall designate in the Fire Plan and furnish on Contract Area, during operating hours, a qualified fire supervisor authorized to act on behalf of Contractor in fire prevention and suppression matters.

### B. Forest Service

The Forest Service may conduct one or more inspections for compliance with the Fire Plan. The number, timing, and scope of such inspections will be at the discretion of agency employees responsible for contract administration. Such inspections do not relieve the Contractor of responsibility for correcting violations of the fire plan or for fire safety in general, as outlined in paragraph 2.A above.

## 3. DEFINITIONS:

The following definitions shall apply:

**Active Landing:** A location the contractor may be skidding logs into, or performing other operations such as delimbing, log manufacturing, and chipping logs. Except for EV and E days, loading logs or stockpiling chips only, on a cleared landing, does not constitute an Active Landing.

**Hot Saw:** A harvesting system that employs a high-speed (>1100 rpm) rotating felling head, i.e., full rotation lateral tilt head.

**Mechanical Operations:** The process of felling, skidding, chipping, shredding, masticating, piling, log processing and/or yarding which requires the use of motorized power which includes, chainsaws, chippers, motorized carriages, masticators, stroke delimbers, skidders , dozers etc.

## 4. TOOLS AND EQUIPMENT:

The Contractor shall comply with the following requirements during the fire precautionary period, as defined by unit administering contracts:

The Fire Precautionary Period is set by the State of California which is April 1 through December 1 of any year.

- **This contract ☐ requires, ☐ does not require, a Fire Box and associated Fire Tools according to CPRC Section 4428.**

**A.** **Fire Tools and Equipment**: Contractor shall meet minimum requirements of Section 4428 of the California Public Resources Code (C.P.R.C.). Fire tools kept at each operating landing shall be sufficient to equip all employees in the felling, yarding, loading, chipping, and material processing operations associated with each landing. Fire equipment shall include two tractor headlights for each tractor dozer used in Contractor's Operations. Tractor headlights shall be attachable to each tractor and served by an adequate power source. All required fire tools shall be maintained in suitable and serviceable condition for fire fighting purposes.

Trucks, tractors, skidders, pickups and other similar mobile equipment shall be equipped with and carry at all times a size 0 or larger shovel with an overall length of not less than 46 inches and a 2-1/2 pound axe or larger with an overall length of not less than 28 inches.

Where cable yarding is used, Contractor shall provide a size 0 or larger shovel with an overall length of not less than 46 inches and a filled backpack can (4 or 5 gallon) with hand pump within 25 feet of each tail and corner block.

**B.** **Fire Extinguishers**: Contractor shall equip each internal combustion yarder, fuel truck, and loader with a fire extinguisher for oil and grease fires (4-A:60-B:C).

Skidders and tractors shall be equipped with a minimum 5-BC fire extinguisher.

All Fire Extinguishers shall be mounted, readily accessible, properly maintained and fully charged.

Contractor shall equip each mechanized harvesting machine with hydraulic systems, powered by an internal combustion engine (chipper, feller/buncher, harvester, forwarder, hot saws, stroke delimber, etc), except tractors and skidders, with at least two 4-A:60-B:C fire extinguishers or equivalent.

**C.** **Spark Arresters and Mufflers:** Contractor shall equip each operating tractor and any other internal combustion engine with a spark arrester, except for motor vehicles equipped with a maintained muffler as defined in C.P.R.C. Section 4442 or tractors with exhaust-operated turbochargers. Spark Arresters shall be a model tested and approved under Forest Service Standard 5100-1a as shown in the. National Wildlife Coordinating Group Spark Arrester Guide, Volumes 1 and 2, and shall be maintained in good operating condition. Every motor vehicle subject to registration shall at all times be equipped with an adequate exhaust system meeting the requirements of the California Vehicle Code.

**D.** **Power Saws:** Each power saw shall be equipped with a spark arrester approved according to C.P.R.C. Section 4442 or 4443 and shall be maintained in effective working order. An Underwriters Laboratories (UL) approved fire extinguisher containing a minimum 14 ounces of fire retardant shall be kept with each operating power saw. In addition, a size 0 or larger shovel with an overall length of not less than 38 inches shall be kept with each gas can but not more than 300 feet from each power saw when used off cleared landing areas.

- **This contract ☐ requires, ☐ does not require, Section 4E of the Fire Plan.**

**E.** **Tank Truck or Trailer:** Contractor shall provide a **water tank truck or trailer** on or in proximity to Contract Area during Contractor's Operations hereunder during Fire Precautionary Period. When Project Activity Level B or higher is in effect, a tank truck or trailer shall be on or immediately adjacent to each active landing, unless otherwise excepted when Hot Saws or Masticators are being used. See Section 6 for specific contract requirements.

The tank shall contain at least 300 gallons of water available for fire suppression. Ample power and hitch shall be readily available for promptly and safely moving tank over roads serving Contract Area. Tank truck or trailer shall be equipped with the following:

(1) Pump, which at sea level, can deliver 23 gallons per minute at 175 pounds per square inch measured at the pump outlet. Pumps shall be tested on Contract Area using a 5/16 inch orifice in the Forester One Inch In-Line Gauge test kit. Pump shall meet or exceed the pressure value in the following table for nearest temperature and elevation:

| Temp | Sea Level | | 1000 Feet | | 2000 Feet | | 3000 Feet | | 4000 Feet | | 5000 Feet | | 6000 Feet | | 7000 Feet | | 8000 Feet | | 9000 Feet | | 10000 Feet | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55 | 179 | 23 | 174 | 23 | 169 | 23 | 165 | 22 | 161 | 22 | 157 | 22 | 153 | 22 | 150 | 21 | 146 | 21 | 142 | 21 | 139 | 21 |
| 70 | 175 | 23 | 171 | 23 | 166 | 22 | 162 | 22 | 158 | 22 | 154 | 22 | 150 | 21 | 147 | 21 | 143 | 21 | 139 | 21 | 136 | 20 |
| 85 | 171 | 23 | 168 | 23 | 163 | 22 | 159 | 22 | 155 | 22 | 151 | 21 | 147 | 21 | 144 | 21 | 140 | 21 | 136 | 20 | 133 | 20 |
| 100 | 168 | 23 | 164 | 23 | 159 | 22 | 155 | 22 | 152 | 22 | 148 | 21 | 144 | 21 | 141 | 21 | 137 | 20 | 133 | 20 | 131 | 20 |
| | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM | PSI | GPM |

The pump outlet shall be equipped with 1-1/2 inch National Standard Fire Hose thread. A bypass or pressure relief valve shall be provided for other than centrifugal pumps.

(2) 300 feet of 3/4-inch inside diameter rubber-covered high-pressure hose mounted on live reel attached to pump with no segments longer than approximately 50 feet, when measured to the extreme ends of the couplings. Hose shall have reusable compression wedge type 1-inch brass or lightweight couplings (aluminum or plastic). One end of hose shall be equipped with a coupling female section and the other end with a coupling male section. The hose shall, with the nozzle closed, be capable of withstanding 200 PSI pump pressure without leaking, distortions, slipping of couplings, or other failures.

(3) A shut-off combination nozzle that meets the following minimum performance standards when measured at 100 P.S.I. at the nozzle:

| | G.P.M. | Horizontal Range |
|---|---|---|
| Straight Stream | 10 | 38 feet |
| Fog Spray | 6 - 20 | N/A |

(4) Sufficient fuel to run the pump at least 2 hours and necessary service accessories to facilitate efficient operation of the pump.

When Contractor is using Hot Saws or Masticators, an additional 250 feet of light weight hose, approved by the Forest Service, shall be immediately available for use and be capable of connecting to the 300 feet of hose and appurturances in (2) and (3) above.

**This equipment and accessories shall be deliverable to a fire in the area of operations and is subject to the requirements for each specific activity level identified in Section 6.**

**F. <u>Compressed Air Foam System</u>:** A Compressed Air Foam System (CAFS) is a fire suppression system where compressed air is added to water and a foaming agent. By agreement, Contractor may substitute a CAFS or functional equivalent in lieu of the tank truck, trailer or fire extinguishers, provided it meets or exceeds the following specifications and requirements:

1. Variable foam expansion ratio – 10:1 to 20:1.
2. Units shall be kept fully charged with air; water and foam concentrate as recommended by the manufacturer and have the appropriate tools to service the system.
3. The unit shall contain enough energy to empty tank and clear hose prior to exhausting propellent.
4. The unit shall be capable of being completely recharged within 10 minutes.
5. When used on cable yarding landings, the unit shall be outfitted for immediate attachment to carriage and transported without damage to the unit.

Fire extinguishers required for Hot Saws, Masticators and similar equipment identified in Section 4 B. above may be substituted with a 3 gallon CAFS.

Tank truck, trailer or equivalent may be substituted with a 30 Gallon CAFS with at least 550 feet of one inch hose and an adjustable nozzle with enough water, air and foam concentrate for at least one recharge.

**This equipment and accessories shall also be deliverable to a fire in the area of operations and subject to the requirements for each specific activity level identified in Section 6.**

## 5. GENERAL

**A.** **State Law**: In addition to the requirements in this Fire Plan, the Contractor shall comply with all applicable laws of the State of California. In particular, see California Public Resource Codes.

**B.** **Permits Required**: The Contractor must secure a special written permit from the District Ranger or designated representative before burning, welding or cutting metal or starting any warming fires. If contract requires Blasting and Storing of Explosives and Detonators, an Explosives Permit may be required pursuant to the California Health and Safety Code, Section 12101.

**C.** **Blasting**: Contractor shall use electric caps only unless otherwise agreed in writing. When blasting is necessary in slash areas, a Fire Patrolperson equipped with a size 0 or larger shovel with an overall length of not less than 46 inches and a filled backpack can (4 or 5 gallon) with hand pump shall remain in the immediate area for an hour after blasting has been completed.

**D.** **Smoking**: Smoking shall not be permitted during fire season, except in a barren area or in an area cleared to mineral soil at least three feet in diameter. In areas closed to smoking, the CO may approve special areas to be used for smoking. The Contractor shall sign designated smoking areas. Contractor shall post signs regarding smoking and fire rules in conspicuous places for all employees to see. Contractor's supervisory personnel shall require compliance with these rules. Under no circumstances shall smoking be permitted during fire season while employees are operating light or heavy equipment, or walking or working in grass and woodlands.

**E.** **Storage and Parking Areas**. Equipment service areas, parking areas, and gas and oil storage areas shall be cleared of all flammable material for a radius of at least 10 feet unless otherwise specified by local administrative unit. Small mobile or stationary internal combustion engine sites shall be cleared of flammable material for a slope distance of at least 10 feet from such engine. The COR shall approve such sites in writing.

**F.** **Reporting Fires**: As soon as feasible but no later than 15 minutes after initial discovery, Contractor shall notify Forest Service of any fires on Contract Area or along roads used by Contractor. Contractor's employees shall report all fires as soon as possible to any of the following Forest Service facilities and/or personnel listed below, but not necessarily in the order shown:

| | Name | Office Address | Office telephone |
|---|---|---|---|
| Dispatch Center | | | |
| Nearest FS Station | | | |
| Inspector | | | |
| COR | | | |
| District Ranger | | | |

**When reporting a fire, provide the following information:**

- Your Name
- Call back telephone number
- Project Name

- Location: Legal description (Township, Range, Section); and Descriptive location (Reference point)
- Fire Information: Including Acres, Rate of Spread and Wind Conditions.

- **This contract ☐ requires, ☐ does not require, Section 5G of the Fire Plan.**

**G.** **Communications**: Contractor shall furnish a serviceable telephone, radio-telephone or radio system connecting each operating side with Contractor's headquarters. When such headquarters is at a location which makes communication to it clearly impractical, Forest Service may accept a reasonable alternative location. The communication system shall provide prompt and reliable communications between Contractor's headquarters (or agreed to alternative) and Forest Service via commercial or Forest Service telephone.

- **This contract ☐ requires, ☐ does not require, Section 5H of the Fire Plan.**

**H.** **Fire Patrolperson**: Contractor shall furnish a qualified fire patrolperson each operating day when Project Activity Level C or higher is in effect. When on duty, sole responsibility of patrolperson shall be to patrol the operation for prevention and detection of fires, take suppression action where necessary and notify the Forest Service as required. This Fire patrol is required on foot, unless otherwise agreed. By agreement, one patrolperson may provide patrol on this and adjacent projects. No patrolperson shall be required on Specified Road construction jobs except during clearing operations unless otherwise specified.

The Contractor shall, prior to commencing work, furnish the following information relating to key personnel:

| Title | Name | Telephone Number |
|---|---|---|
| **Fire Supervisor** | | |
| **Fire Patrolperson** | | |

**I. Clearing of Fuels:** Contractor shall clear away, and keep clear, fuels and logging debris as follows:

| | |
|---|---|
| Welding equipment and stationary log loaders, yarders and other equipment listed in California State Law | 10 feet slope radius |
| Tail or corner haulback blocks | All running blocks shall be located in the center of an area cleared to mineral soil at least 15 feet in diameter. |
| Lines near, between or above blocks | Sufficient clearing to prevent line from rubbing on snags, down logs and other dead woody material. |

## 6. EMERGENCY PRECAUTIONS

Contractor's Operations shall conform to the limitations or requirements in the Project Activity Level (PAL) table below. Project Activity Levels applicable to this project shall be the predicted activity levels for the Fire Danger Rating Area(s), or fire weather station(s) stated in the Contract Area Map Legend on Integrated Resource Service Contracts (IRSC's), and other contracts where applicable.

**Fire Danger Rating Area/Fire Weather Station for Project:** _____

The Forest Service, in its sole discretion, may change the predicted activity level if the current fire suppression situation, weather and vegetation conditions warrant an adjustment. If practicable, Forest Service will determine the following day's activity level by 6:00 PM. Contractor shall obtain the predicted Project Activity Level from the appropriate Ranger District Office before starting work each day.

**Phone Number or Website to obtain Predicted Activity Levels:** _____

Forest Service may change the Project Activity Level Table to other values upon revision of the National Fire Danger Rating System. When Contractor is notified, the revised Project Activity Levels will supersede the levels in the Project Activity Level Table below.

## PROJECT ACTIVITY LEVEL

| ***Level*** | ***Project Activity Minimum Requirements and Restrictions. Restrictions at each level are cumulative.*** |
|---|---|
| **A** | Minimum requirements noted above in Sections 4 and 5. |
| **B** | 1. Tank truck, trailer, or approved CAFS substitute shall be on or adjacent to the Active Landing. |
| **C** | 1. When Hot Saws or Masticators are operating, a tank truck, trailer, or approved CAFS substitute shall be within ¼ mile of these operations. Effective communications shall exist between the operator and the Active Landing.<br>2. Immediately after Mechanical Operations cease, Fire patrol is required for two hours. |
| **D** | 1. Immediately after Hot Saw or Masticator operations cease, Fire patrol is required for three hours.<br>2. No Dead Tree felling after 1:00 PM, except recently dead.<br>3 No burning, blasting, welding or cutting of metal after 1:00 PM, except by special permit. |

| *Level* | ***Project Activity Minimum Requirements and Restrictions. Restrictions at each level are cumulative.*** |
|---|---|
| **Ev** | 1. The following activities may operate all day:<br>a) Loading and hauling logs decked at approved landings.<br>b) Loading and hauling chips stockpiled at approved landings.<br>c) Servicing equipment at approved sites.<br>d) Dust abatement, road maintenance (Chainsaw use prohibited)**,** culvert installation within cleared area, chip sealing, paving, earth moving or rock aggregate stock pile loading and installation (does not include pit or quarry development).<br>e) Chainsaw and log processing operations associated with loading logs or other forest products at approved landings.<br>2. Hot Saws or Masticators may operate until 1:00 PM; provided that:<br>a) A tractor or other equipment with a blade capable of constructing fireline is on or adjacent to the active landing or within ¼ mile of the operating equipment. This piece of equipment shall have effective communication with the Hot Saw or Masticator.<br>b) Any additional restrictions specified by the Forest.<br>3. All other conventional Mechanical Operations are permitted until 1:00 PM.<br>4. Some operations may be permitted after 1:00 PM, on a case-by-case basis, under the terms of a PAL Ev Variance Agreement. Activities for which a Variance may be issued are:<br>• Rubber Tire Skidding<br>• Chipping on Landings<br>• Helicopter Yarding<br>• Fire Salvage<br>When approved by a Line Officer, a Variance Agreement can be implemented when the criteria specified in the agreement are met and mitigation measures are in place. This approval is good for ten (10) days unless cancelled sooner or extended by the Contracting Officer for an additional ten (10) days. Variance approval can be withdrawn at the sole discretion of the Forest Service. Variance approval is contingent on the 7-day fire weather forecast, fuel conditions, site characteristics, current fire situation, state of Contractor's equipment for prevention and suppression readiness, type of operation and social and community considerations etc. (See attached Project Activity Level Variance Agreement). |
| **E** | The following activities may operate all day:<br>1. Loading and hauling logs decked at approved landings.<br>2. Loading and hauling chips stockpiled at approved landings.<br>3. Servicing Equipment at approved sites.<br>4. Dust abatement, road maintenance (chainsaw use prohibited) or loading stock piles and rock aggregate installation (does not include pit or quarry development).<br>5. Chainsaw operation associated with loading at approved landings.<br>All other activities are prohibited. |

This Project utilizes "The Project Activity Level" (PAL), an industrial operation's fire precaution system. The following Climatology Chart indicates the Historic Activity Levels for the Project Fire Danger Rating Area or Fire Weather Station utilized on this Project. This is only a historical average of the Activity Levels for the identified Fire Danger Rating Area or Weather Station.

| Project Activity Level Climatology | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Fire Danger Rating Area/Weather Station | | | | | Years Analyzed | | | |
| | A | B | C | D | Ev | E | Days | |
| Month | Expected Days per Month at Each PAL Value | | | | | | Analyzed | |
| July | | | | | | | | |
| August | | | | | | | | |
| September | | | | | | | | |
| October | | | | | | | | |
| | | | | | | | | |

**Region 5 Project Activity Level (PAL) Ev Variance Application/Agreement**

Project Name: _____
Contract Number: _____
Contractor Name: _____
Request #__, for period: _____
Units/Subdivisions Affected: _____

| **Location of operation:** | |
|---|---|
| Slope | |
| Aspect | |
| Elevation | |
| Fuels on site | |
| Fuels in surrounding area | |
| 7 Day PAL Outlook | |
| Short range predictions (Red Flags) | |
| **Fuel Moistures** | |
| Response time of suppression resources | |
| Potential for ignition | |
| RAWS location | |
| | |
| **Current Fire Situation:** | |
| Draw down information | |
| National Readiness Level | |
| | |
| **Contractual considerations:** | |
| Normal Operating Season | |
| Frequency of recent contract fires in area | |
| Type of operation | |
| Contractors past/current performance & equipment readiness | |
| Other site specific mitigation or precaution (i.e. Contractors proposals) | |
| | |
| **Social & Community Considerations:** | |
| Proximity of high value resources | |
| Sensitivity of location | |
| | |

**Proposed Actions:**

**Description of Mitigation Measures:**

**Remarks:**

Fire Management Officer Concurrence — Date

Line Officer Approval — Date

I have considered the above request and determined the specified mitigation measures or actions must be implemented to continue operations in Project Activity Level Ev. Unless extended, the approval remains in effect for ten (10) calendar days unless cancelled sooner or extended by the Forest Service for an additional ten (10) days. At the sole discretion of the Forest Service, this variance can be modified and/or cancelled at no cost to the government.

Contracting Officer — Date

Contractor Representative — Date

# Appendix B

## *Agency Checklist and Instructions for Determining Project Activity Level Variances*

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Project Name: _____
Contract Number: _____
Purchaser/Contractor Name: _____
Request #__, for period: _____
Units/Subdivisions Affected: _____

| **Location of operation:** | |
|---|---|
| Slope<br>Aspect<br>Elevation | |
| Fuels on site | |
| Fuels in surrounding area | |
| 10 day Forecast | |
| Short range predictions (Red Flags) | |
| **Fuel Moistures** | |
| Response time of suppression resources | |
| Potential for ignition<br>RAWS location | |
| | |
| **Current Fire Situation:** | |
| Draw down information | |
| National Readiness Level | |
| | |
| **Contractual considerations:** | |
| Operating Season | |
| Frequency of recent contract fires in area | |
| Type of operation | |

| | |
|---|---|
| Purchaser/Contractors past performance | |
| Other site specific mitigation or precaution (i.e. Purchaser/Contractors proposals) | |
| | |
| **Social & Community Considerations:** | |
| Proximity of high value resources | |
| Sensitivity of location | |
| | |
| **Remarks:** | |

I have considered the above items and have determined the following actions must be implemented to continue operations in Project Activity Levels _____ through EV

- 
- 
- 
- 

☐ Fire Management Consulted _____
Name

☐ Line Officer Concurred_____
Name

Contracting Officer or Delegated Representative _____

Date:_____

Purchaser/Contractor Rep._____ Date_____

## Instructions for Determining Variances for Continued Operations Within Specific Units and With a Specific Time Frame

1. Variances are in addition to the stated requirements for the Predicted Activity Level.

2. The Line Officer in consultation with the Forest Fire Management Officer or his/her representative will evaluate the items in the above check list as they relate to the existing and planned activities, add any mitigation measures as needed and the Line Officer will advise the Contracting Officer to execute the variance. The name of the Fire Management Representative and the Line Officer involved must be filled in but a signature is not required.

3. The delegated authority can be at the FSR/COR level since they would usually have more knowledge of the ground and access to the District Ranger.

4. The project area should be evaluated for differences in potential fire activity if a fire starts. This could necessitate the use of multiple forms. Examples of this would be units on a north slope near riparian areas vs. those on south slopes that would be dryer and expected to have more severe fire conditions or there is a significant difference from the predicted PAL and the actual conditions.

5. The Purchaser/Contractor or their representative should be consulted when determining types of variances that are being considered. They might be able to come up with other options.

6. Examples of written variances are:

    A. Local assessment determines that existing precautions are adequate
    B. Use of specialized detection equipment such as an infrared detection device for locating heat sources is required
    C. Provide additional fire suppression resources ( i.e. crews, equipment etc.) to achieve shorter response time.

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# Attachment 5

## *Visual Resources Management Plan*

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# SOUTH SWP HYDROPOWER
# FERC PROJECT NO. 2426-227

# VISUAL RESOURCES MANAGEMENT PLAN

August 2019



**State of California**
**California Natural Resources Agency**
**DEPARTMENT OF WATER RESOURCES**
**Hydropower License Planning and Compliance Office**

**Los Angeles**
**DEPARTMENT OF WATER AND POWER**

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# TABLE OF CONTENTS

## LIST OF FIGURES



## LIST OF TABLES

## COMMONLY USED TERMS, ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ANF | Angeles National Forest |
| Application for New License | Application for a New License for Major Project – Existing Dam for the South SWP Hydropower, FERC Project Number 2426 |
| BEIG | Built Environment Image Guide, a U.S. Department of the Agriculture, Forest Service document that guides how the elements of the built environment (e.g., administrative and recreation buildings, landscape structures, site furnishings, signs, etc.) shall be incorporated into the natural and cultural landscape |
| BLM | U.S. Department of the Interior, Bureau of Land Management |
| DWR | California Department of Water Resources |
| existing Project boundary | The boundary of the Project as approved by FERC in the existing license |
| FERC | Federal Energy Regulatory Commission |
| Interstate 5 Corridor | The area visible by travelers on Interstate 5 between State Highway 138 on the north and the community of Castaic on the south |
| LADWP | Los Angeles Department of Water and Power |
| Licensees | California Department of Water Resources and Los Angeles Department of Water and Power |
| LPNF | Los Padres National Forest |
| NFS | National Forest System |
| O&M | operations and maintenance |
| Plan | Visual Resources Management Plan |
| PM&E measures | Protection, Mitigation, and Enhancement measures, which are operation and management activities to: (1) protect resources against impacts from continued operation and maintenance of the Project; (2) mitigate any impacts from continued operation and maintenance of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project operation and maintenance |

| | |
|---|---|
| Project | South SWP Hydropower, FERC Project Number 2426 |
| Project boundary | The area to which the Licensees require access for normal Project operations and maintenance |
| proposed Project boundary | The boundary of the Project as proposed by the Licensees, pending approval from FERC in the new license. Includes all existing Project facilities, but adjusts the boundary to: (1) add lands to the existing Project boundary that are currently utilized with a preponderance of use related to Project O&M, and (2) remove lands from the existing Project boundary that do not have Project facilities and are not used or necessary for Project O&M. |
| SIO | Scenic Integrity Objective |
| SWP | State Water Project |
| U.S. | United States |
| USFS | U.S. Department of Agriculture, Forest Service |
| Warne Powerplant | William E. Warne Powerplant |

# 1.0 INTRODUCTION

In XXXX 2019, the California Department of Water Resources (DWR) and the Los Angeles Department of Water and Power (LADWP) (Licensees), pursuant to Title 18 of the Code of Federal Regulations, Subchapter B (Regulation under the Federal Power Act), Part 4, Subpart F (Application for License for Major Project – Existing Dam) (Integrated Licensing Process), filed with the Federal Energy Regulatory Commission (FERC) an Application for a New License for Major Project – Existing Dam (Application for New License) for the Licensee's South SWP Hydropower, FERC Project Number 2426 (Project).

The Licensees have included this Visual Resources Management Plan (Plan) in their Application for New License. All elevation data in this exhibit are in United States (U.S.) Department of Commerce, National Oceanic and Atmospheric Association, National Geodetic Survey Vertical Datum of 1929, unless otherwise stated.

## 1.1 BACKGROUND

### 1.1.1 Brief Description of the Project

The existing Project is part of a larger water storage and delivery system, the State Water Project (SWP), which is the largest state-owned and operated water supply project of its kind in the United States. The SWP provides southern California with many benefits, including affordable water supply, reliable regional clean energy, opportunities to integrate green energy, accessible public recreation opportunities, and environmental benefits.

The Project is located in Los Angeles County in southern California, on the West Branch of the SWP. The existing Project has a FERC-authorized installed capacity of 1,349,290 kilowatts. Project facilities range in elevation from 3,325 feet to 1,130 feet, and include Warne Power Development and Castaic Power Development. The major features of the existing Warne Power Development include: (1) Quail Lake, Quail Lake Embankment and Quail Lake Outlet; (2) Lower Quail Canal; (3) Peace Valley Pipeline Intake, Peace Valley Pipeline Intake Embankment, and Peace Valley Pipeline; (4) Gorman Bypass Channel; (5) William E. Warne Powerplant (Warne Powerplant) and Switchyard; (6) Warne Transmission Line; (7) Primary Project Roads and Trails; (8) Quail Lake recreation facilities and (9) streamflow and reservoir stage gages. The major features of the existing Castaic Power Development include: (1) Pyramid Dam and Lake; (2) Angeles Tunnel and Surge Chamber; (3) Castaic Penstocks; (4) Castaic Powerplant and Switchyard; (5) Elderberry Forebay Dam, Forebay, and Outlet; (6) Storm Bypass Channel and Check Dams; (7) Castaic Transmission Line; (8) Primary Project Roads and Trails; and (9) Pyramid Lake recreation facilities.

The Licensees' Proposal includes the following changes to Project facilities: the addition of the existing Quail Detention Embankment to the Warne Power Development as a flood-management structure; removal of the 3-mile-long Warne Transmission Line

(owned and operated by Southern California Edison) from the Warne Power Development; addition of 99 existing road segments as Primary Project Roads associated with the Warne Power Development and the Castaic Power Development; and addition of one existing streamflow gage to the Castaic Power Development. Facilities upstream of the Angeles Tunnel Surge Chamber are operated and managed by DWR. The remainder of the downstream facilities, including the Surge Chamber, are operated and managed by LADWP.

The existing Project is operated as a power recovery project using SWP water. For that reason, Project operations do not vary based on changes in local hydrological conditions. In essence, the Project is operated in a run-of-river mode, generating power as SWP water is provided for downstream consumptive use, with the exception that Castaic Powerplant is a pumping–generating plant that reuses SWP water to generate electricity before it is delivered to downstream water users.

The Licensees propose several changes to the existing Project boundary to more accurately define lands necessary for the safe operation and maintenance (O&M) of the Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. The net effect of modifying the existing Project boundary is the reduction of area within the boundary from 6,928.0 acres to 4,563.8 acres, a reduction of 2,364.2 acres. This change would reduce 3,287.3 acres of federal land (47.5 percent of the total area within the existing Project boundary) to 2,007.0 acres (approximately 44.0 percent of the total area within the proposed Project boundary), resulting in 1,334.6 acres within the Angeles National Forest (ANF) and 665.9 acres within the Los Padres National Forest (LPNF), all of which are managed and administered by the ANF, and 6.5 acres managed by the U.S. Department of the Interior, Bureau of Land Management (BLM). The U.S. Department of Agriculture, Forest Service (USFS) administers the ANF and LPNF in conformance with the ANF and LPNF Land Management Plans (USFS 2005a, 2005b, 2005c, 2005d).

The Licensees propose to operate the Project as it has been operated historically, with the addition of a number of Protection, Mitigation, and Enhancement (PM&E) measures, which are operation and management activities to: (1) protect resources against potential impacts from continued O&M of the Project; (2) mitigate any impacts from continued O&M of the Project (if the resource cannot be fully protected); and (3) enhance resources affected by continued Project O&M. This Plan is one of those PM&E measures.

Figure 1.1-1 shows the Project vicinity. Figure 1.1-2 shows the Project facilities, including land ownership. The existing Project boundary and the proposed Project boundary are shown in Figure 1.1-2 for reference purposes.

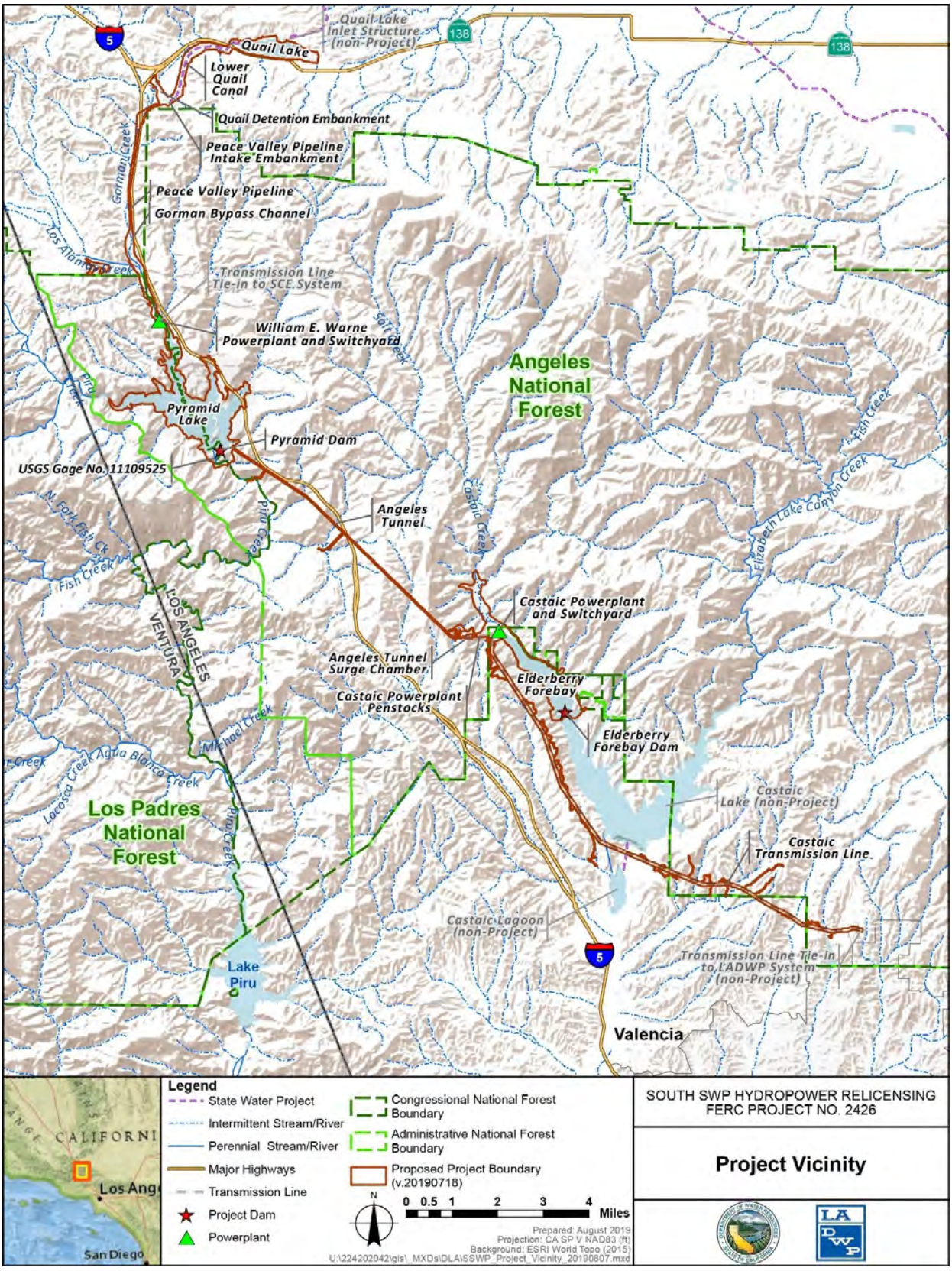



**Figure 1.1-1. South SWP Hydropower Vicinity Map**

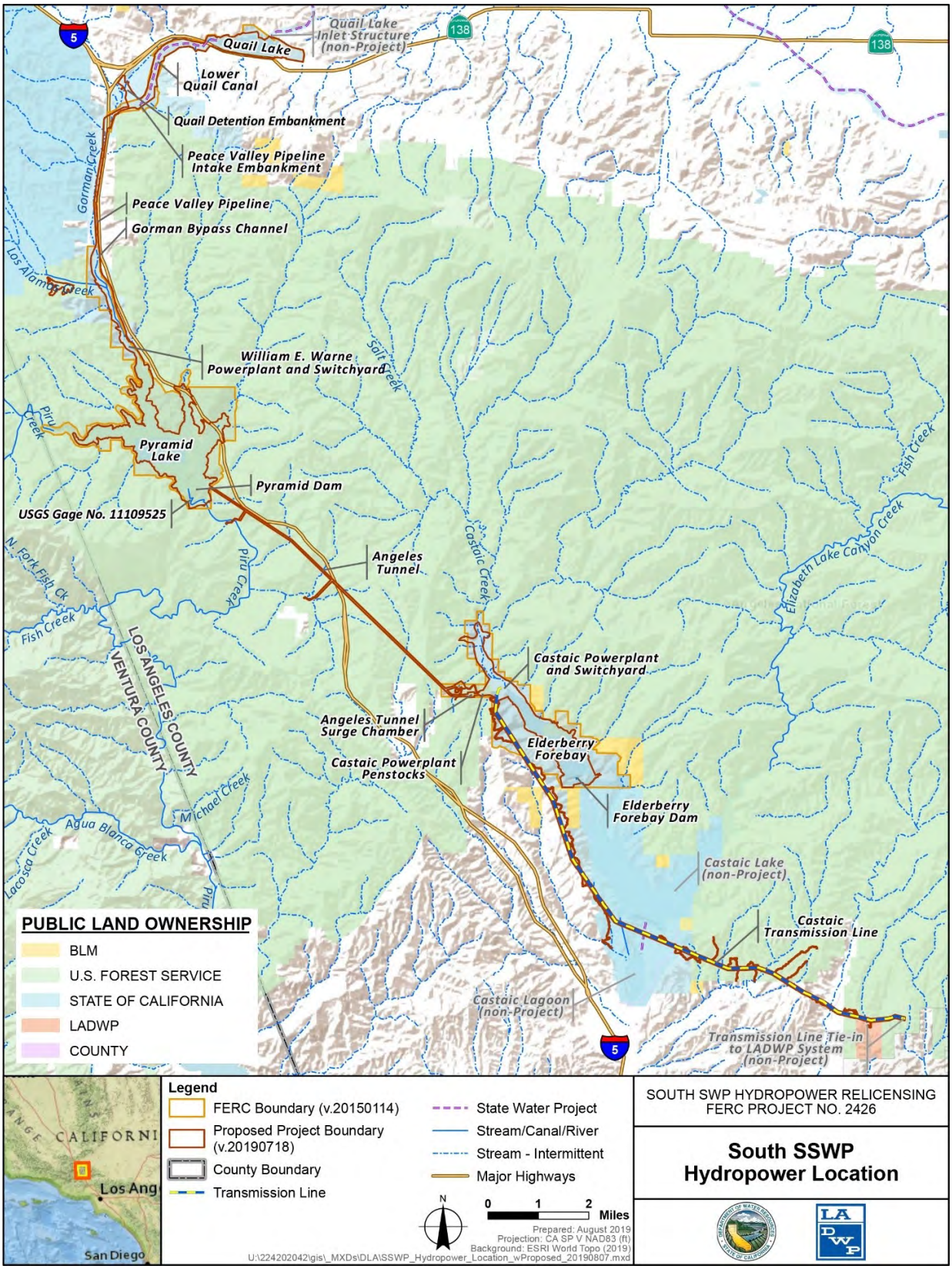



**Figure 1.1-2. South SWP Hydropower Facilities and Land Ownership**

## 1.2 PURPOSE OF THE PLAN

This Plan provides guidance for the implementation of PM&E measures related to visual resources in the Project vicinity and the visual quality of Project facilities. In addition, this Plan provides a framework for addressing visual quality when there are changes to the Project. To the extent appropriate, the Licensees will coordinate the efforts required under this Plan with other Project resource efforts, including implementation of other resource management plans and measures included in the new license.

## 1.3 GOALS AND OBJECTIVES

The primary goals of this Plan are to describe the PM&E measures for maintaining, updating and enhancing visual quality conditions affected by Project facilities and features, and to describe the consultation process and the consideration of new mitigation measures if there are changes to the Project that could affect visual quality. The objective of the Plan is to provide the guidance necessary to meet Plan goals under the Licensees' Proposal.

## 1.4 CONTENTS OF THE PLAN

The Plan includes the following:

- Section 1.0. Introduction. This section includes introductory information, including a brief description of the Project and the purpose, goals, and objective of the Plan.

- Section 2.0. Visual Resource Setting. This section summarizes the visual resource setting and context of the Licensees' Proposal. The summary focuses on the management framework and visual resources environmental considerations that are a backdrop for PM&E measures related to visual resources.

- Section 3.0. Proposed Protection, Mitigation, and Enhancement Measures. This section identifies visual resource management considerations, and PM&E measures for Project facilities where feasible measures are identified.

- Section 4.0. Schedule for Implementation. This section includes the schedule for implementing proposed PM&E measures.

- Section 5.0. Consultation, Reporting, and Plan Revisions. This section includes a plan for consultation and reporting with the ANF, LPNF, and BLM; and identifies when the Licensees will review, update, and/or revise the Plan, in consultation with the ANF, LPNF and BLM, as it pertains to visual resources on National Forest System (NFS) and BLM lands.

- Section 6.0. References. This section includes the resource documents cited in this Plan.

# 2.0 VISUAL RESOURCE SETTING

This section summarizes the visual resource setting in the context of the Licensees' Proposal. The summary includes a description of the overall aesthetic character of the Project vicinity, as well as the management framework and visual resources environmental considerations that are a backdrop for PM&E measures related to visual resources.

## 2.1 AESTHETIC CHARACTER OF PROJECT VICINITY

The Project is located on the western edges of the Sierra Pelona Mountains. This rugged mountain range separates the Antelope Valley from the Santa Clarita Valley. West of the Project, the Santa Clara canyons rise up from the Santa Clara River at elevations starting at approximately 1,200 feet and reach up to 5,000 feet.

The Interstate 5 Corridor, which may be defined as the area visible by travelers on Interstate 5 between State Highway 138 on the north and the community of Castaic on the south, functions as a gateway and transitional landscape for travelers driving between the Los Angeles metropolitan area and the San Joaquin Valley. Elevations within the Interstate 5 Corridor in the vicinity of the Project range from approximately 2,100 to 3,000 feet. The deep canyon holding Pyramid Lake, along with its various lesser side canyons, are a point of interest within this landscape. The mostly temperate to hot climate affects vegetation types and water availability. All but the larger streams are dry through the summer. The predominant plant community at lower elevations is mixed chaparral, which is continuous on many slopes. Pine and juniper are present at higher elevations. Canyon and coast live oaks are present in dense woodlands along shaded slopes and canyons. (USFS 2005d).

The Project is generally accessed from Interstate 5 and State Highways 14, 126, and 138. The southern part of the Project vicinity includes steep to very steep ridges with sharp to rounded summits, and deep, narrow canyons. The lower elevation edge is marked by the urban interface with the community of Santa Clarita. The higher elevation edge is marked by a series of peaks and ridges. Steeper slopes are barren and show evidence of erosion. Canyons have steep, rocky sides with large boulders (USFS 2005d).

## 2.2 PERTINENT VISUAL RESOURCE MANAGEMENT PLANS

The Project is situated primarily on State, federal, and private lands. Pertinent management plans in the Project vicinity include federal land management plans for the ANF and LPNF, and lands administered by BLM. Each of these plans is described below as they relate to visual resources at the Project.

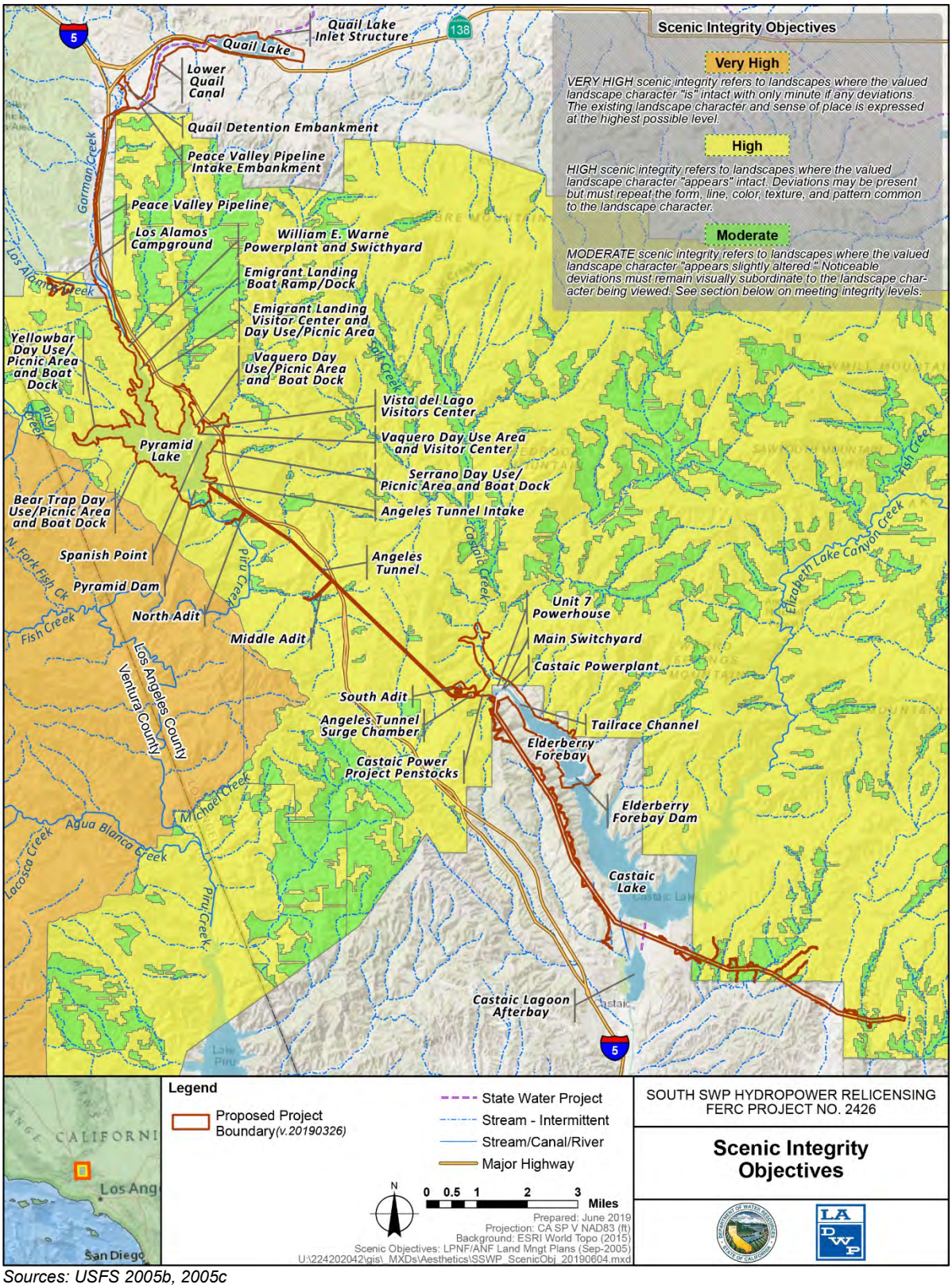
The Project lies within the Los Angeles County's Antelope Valley and Santa Clarita Valley planning areas, each of which has an area plan (i.e., Antelope Valley Area Plan and Santa Clarita Valley Area Plan); and includes planning guidance related to visual

resources. However, these plans were prepared by a local government agency and do not apply to State and federal agencies.

### 2.2.1 Angeles and Los Padres National Forest Land Management Plans

Policies and programs associated with the ANF and LPNF apply only to NFS lands. Generally, landscapes that are most attractive and viewed from popular travel routes are assigned higher Scenic Integrity Objectives (SIO) by the USFS. Each SIO depicts a level of scenic integrity used to direct landscape management on NFS lands. Figure 2.2-1 shows the SIOs for NFS lands in and around the proposed Project boundary. Based on the SIO maps in the ANF and LPNF Land Management Plans (USFS 2005b, 2005c), the SIO for NFS lands within and around the proposed Project boundary is predominately High (i.e., landscape appears unaltered), whereby deviations from the natural landscape may be present, but must repeat the form, line, color, texture, and pattern common to the landscape character. There are a few small areas of Moderate SIO (i.e., landscape appears slightly altered), whereby noticeable deviations must remain visually subordinate to the landscape character being viewed. Project facilities on NFS lands include:

- Pyramid Dam and Lake
- Pyramid Lake recreation facilities, including Emigrant Landing Entrance Area, Emigrant Landing Boat Launch, Emigrant Landing Picnic and Fishing Areas One and Two, Emigrant Landing Swim and Picnic Area, Vista Del Lago Visitor Center, Vaquero Day Use Area, Spanish Point Boat-in Picnic Area, Serrano Boat-in Picnic Area, Bear Trap Boat-in Picnic Area, Yellow Bar Boat-in Picnic Area, Los Alamos Campground, and Los Alamos Group Campground
- Angeles Tunnel and Surge Chamber
- A portion of the Castaic Penstocks
- Portions of the Castaic Transmission Line (at the southern end of line)




*Sources: USFS 2005b, 2005c*

**Figure 2.2-1. USFS Scenic Integrity Objectives for National Forest System Lands Within and Around the Proposed Project Boundary**

### 2.2.2 Bureau of Land Management South Coast Resource Management Plan

BLM's South Coast Resource Management Plan guides the management of BLM-administered lands within and adjacent to the proposed Project boundary as part of the Los Angeles County Management Area, which utilizes a visual resource management system to determine visual values, classes, and objectives. The lands within the proposed Project boundary are managed to a visual resource management Class 3 (i.e., partially retain the existing character of the landscape; level of change to the characteristic landscape is moderate) (BLM 1994). Specifically, the BLM lands within the proposed Project boundary are located adjacent to the eastern shoreline of Elderberry Forebay. None of the Project facilities are located on BLM lands.

# 3.0 PROPOSED PROTECTION, MITIGATION, AND ENHANCEMENT MEASURES

This section describes visual resource management considerations, and PM&E measures for Project facilities where feasible measures are identified. These measures include near-term actions, as well as actions or measures at the time of rehabilitation or modification of Project facilities.

## 3.1 PYRAMID LAKE

### 3.1.1 Pyramid Dam

Pyramid Dam is located deep in a canyon, and the upstream side of the dam is primarily visible from facilities at Pyramid Lake and by boaters on the reservoir. Viewpoints from Interstate 5 southbound are limited and short in duration due to the high speed of vehicle travel (i.e., 55 mph and faster). Typically, only the top 5 to 9 feet of the upstream face of Pyramid Dam are visible; however, the vast majority of the time, the reservoir's water surface elevation is within 5 feet of the normal maximum water surface elevation, or 2,573 feet. The metallic railings, guardrails, and chain-link fence along the top of the dam present moderate visual contrast, particularly when reflecting sunlight. To mitigate these visual effects, the Licensees will treat or stain the railings, guardrails, and chain-link fence to match one or more of the dominant darker colors found in the natural setting.

In addition, Pyramid Dam is viewed from its downstream side at the terminus of Golden State Highway in Piru Creek Canyon. The old paved road is gated approximately 3 miles before its terminus, which requires the public to walk or bike to the terminus, so public access and the viewing population are very limited. From this viewpoint, the visual contrast is low overall for the dam due to textures and colors that mimic the surrounding landscape. However, at ground level, the chain-link fence is visible in the immediate foreground, and the light gray colors and linear elements do not match the surrounding landscape. In the more distant foreground, a light-colored guardrail along the access road midway up the dam face does not match the surrounding landscape coloration and form. To mitigate these visual effects, the Licensees will treat or stain the chain-link fence and guardrails to match one or more of the dominant darker colors found in the natural setting.

### 3.1.2 Pyramid Lake Recreation Facilities

The recreation facilities at Pyramid Lake are nestled low in the canyon, with the predominant views from the local recreation area access roads and boaters on the reservoir. The site design and materials used in the recreation facilities were designed and approved by USFS. Since the time of the development of the existing recreation facilities (built in the 1970s) the ANF and LPNF have implemented updated land management plans (USFS 2005a). Today, any new or redeveloped/rehabilitated recreation developments are guided by the USFS' Built Environment Image Guide (BEIG) (USFS 2001); Forest Service Handbook 2309.13 (USFS 2018); and the ANF's

and LPNF's Land Management Plans (USFS 2005b, 2005c). A few select elements at the existing recreation facilities do not blend well with the surrounding landscape, which are discussed below along with measures to mitigate their visual effects. The remaining recreation facility elements blend well with the surroundings and are visually subordinate to the overall recreation facility character being viewed.

#### *3.1.2.1 Emigrant Landing Boat Launch*

Emigrant Landing Boat Launch provides picnic facilities, boat launch, marina, and parking facilities. Overall, these facilities blend in well with the landscape from most viewpoints, except for the white doors and other light-colored features on the floating restroom buildings and a highly reflective metal light standard at the boat launch ramp. To mitigate the light standard's visual effects, the Licensees will replace or apply color treatments to the light standard. Regarding the white doors on the floating restroom buildings, the doors are typically colored white or a light color for visibility by reservoir boaters while located out on the reservoir. Further, the floating restroom buildings are only temporarily moored at the marina/boat launch area for maintenance purposes. Thus, the Licensees did not propose any mitigation measures for the white doors due to their safety function.

#### *3.1.2.2 Emigrant Landing Swim and Picnic Area*

Emigrant Landing Swim and Picnic Area provides picnic facilities and a swim beach area. Overall, these facilities blend in well with the landscape; except for a chain-link fence in the immediate foreground, along the riprapped shoreline within the swim beach boundary, that presents moderate visual contrast. To mitigate this visual effect, the Licensees will treat, stain, or replace the chain-link fencing with a color of fencing that either complements the marina or conforms generally to the USFS' BEIG Southwest Province architectural style.

#### *3.1.2.3 Vaquero Day Use Area*

Vaquero Day Use Area provides swimming, picnicking, and boat launch facilities. All of the facilities blend well with the surrounding landscape, with the exception of seven tall metal light standards in the parking area, the adjacent maintenance yard, and transformer boxes. To mitigate these visual effects, the Licensees will:

- Treat, paint, or replace the light standards in the parking area with a color or materials that match the darker tones found in the natural background
- Re-paint the transformer boxes using a darker green that more closely matches one of the prominent vegetative greens in the background
- Apply a treatment to the chain-link fence to provide a weathered appearance and install green or brown slats (diagonally) in the chain-link fence

A lifeguard station on the swim beach does present high visual contrast, but the station needs to be highly visible for safety reasons.

#### *3.1.2.4 Yellow Bar Boat-in Picnic Area*

Yellow Bar Boat-in Picnic Area is located in the steep canyon of the westernmost arm of Pyramid Lake and is seen in the foreground by boaters. Overall, the facilities present low visual contrast, with the exception of the galvanized fence panels, white light standard near the restroom building, and the light-colored restroom exterior. These features present moderate and high visual contrast with the surrounding dark green vegetation and earth tones. To mitigate these visual effects, the Licensees will:

- Apply a treatment to the metal fencing and railing to match the tones found in the natural background
- Re-paint or treat the white top of the light standard using a darker tone matching vegetative or earth tones in the natural background
- Re-paint or treat the exterior of the restroom using a darker tone matching the vegetative or earth tones in the natural background
- Replace the restroom with a structure that generally conforms with the USFS BEIG Southwest Province architectural style and color when the restroom building reaches the end of its useful life

#### *3.1.2.5 Bear Trap Boat-in Picnic Area*

Bear Trap Boat-in Picnic Area is located in a steep canyon on the southwest side of Pyramid Lake, and is seen in the foreground by boaters. Overall, the facilities present low visual contrast, with the exception of the galvanized fence panels, the light-colored restroom exterior, and the dark brown shade structures. These features present moderate and high visual contrast with the surrounding dark green vegetation. To mitigate these visual effects, the Licensees will:

- Apply a treatment to the metal fencing and railing to match the tones found in the darker green forested background
- Replace the restroom and shade structures with structures that generally conform with the USFS' BEIG Southwest Province architectural style and color when they reach the end of their useful life

#### *3.1.2.6 Spanish Point Boat-in Picnic Area*

Spanish Point Boat-in Picnic Area is located just south of and below the Vista Del Lago Visitor Center. All the recreation structures seen in the foreground from the reservoir by boaters blend well with the surrounding landscape. However, a cover for an emergency release valve located above the beach presents high visual contrast due to the cover's

white color and geometric shape. The valve cover must retain its white color to protect it and the underlying valve from fatigue caused by thermal expansion and, therefore, cannot be re-coated in a darker color. To mitigate this visual effect, the Licensees will:

- Plant and maintain a vegetative screen that blocks views of the valve cover from boaters and shoreline recreation areas.

- Replace the roof of the maintenance building with a design that generally conform to the USFS' BEIG Southwest Province architectural style and color when it reaches the end of its useful life

In addition, to maintain consistency with the architectural style and color scheme selected for Pyramid Lake, at such time when the Licensees will be replacing or substantially modifying the restroom and shade structure facilities, the Licensees will replace those facilities with structures that generally conform with the USFS' BEIG Southwest Province architectural style and color.

#### *3.1.2.7 Vista Del Lago Visitor Center*

The Vista Del Lago Visitor Center is visible in middleground to the north, primarily by reservoir boaters and vehicle passengers along Interstate 5. The orange roof of the structure does not blend in with the surrounding landscape. At such a time when the roof top will need replacing or a substantial upgrade, the Licensee's will install a roof that generally conforms with USFS' BEIG Southwest Province architectural style and color.

## 3.2 ANGELES TUNNEL

### 3.2.1 North Adit

While the Angeles Tunnel is not visible above the ground surface, the North Adit, located approximately 4,000 feet south of the terminus of Golden State Highway, is visible to the east in the foreground from the road. The North Adit face and drainage canal present high contrast with the surrounding landscape because the light-colored concrete and smooth texture does not blend with the tan rock formations with more rugged and rough textures. To mitigate this visual effect, the Licensees will apply a concrete stain color treatment to the faces of the North Adit structure and drainage canal that matches the dominant color of the existing rock face directly above the structure.

### 3.2.2 Surge Chamber

The Angeles Tunnel Surge Chamber is seen in the foreground from the Ridge Route Road looking in an eastward direction while driving. Its coloration of very light green with hints of yellow and gray presents a high visual contrast against the surrounding natural landscape. The surge chamber's shade of green is not similar to the surrounding dark greens of the native vegetation. To mitigate this visual effect, when the facility is

planned for a new paint coating or substantial upgrade or replacement, the Licensees will consult with USFS to discuss a color treatment that will help the surge chamber blend better visually with the surrounding landscape.

## 3.3 CASTAIC TRANSMISSION LINES

The Castaic Transmission Line and its associated dual steel lattice towers spans 11.4 miles from the west shore of Elderberry Forebay, adjacent to Castaic Lake State Recreation Area, and ends in San Francisquito Canyon. There are several views of the Castaic Transmission Line from several non-Project roadways and recreation sites, all on State, LADWP, or private lands. The portions of the transmission line located on NFS land (i.e., approximately 3.27 miles) are not visible from public viewpoints. The visual contrast of the transmission towers varies throughout the span of the transmission line, but the towers present moderate to low contrast depending on the lighting, due to the light gray color of the towers that are sporadically in silhouette in front of varying colors of hillsides and surrounding terrain. Throughout much of the transmission line corridor located on State, LADWP, or private lands, the transmission line and towers are not visible; are in the distant middleground; or are visually subordinate to other significant non-Project facilities and developments (i.e., Castaic Dam, spillway and appurtenant facilities), dense residential developments, and other local transmission lines, towers, and circuits. However, to mitigate the visual effects on NFS land, at such time over the license term when the Licensees determine that a major upgrade, improvement, rehabilitation, or replacement of the transmission line towers is necessary, the Licensees will consult with USFS to perform a full scenery analysis.

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# 4.0 SCHEDULE FOR IMPLEMENTATION

This section includes a schedule for the implementation of the measures identified in Section 3.0, including, when possible, the year during which the measure will be completed. Table 4.0-1 provides the mitigation schedule for the measures discussed in Section 3.0.

**Table 4.0-1. South SWP Project Visual Resources Mitigation Schedule**

| Project Area | Project Facility | Measure | Timeline |
|---|---|---|---|
| Pyramid Lake | Pyramid Dam | • Treat or stain the railings and guardrails atop the dam and along the downstream face of dam to match one or more of the dominant darker colors found in the natural setting<br>• Treat or stain the existing chain-link fence at the terminus of Golden State Highway to match the dominant colors found in the natural setting | Within 7 years after issuance of the new license |
| | Emigrant Landing Boat Launch | • Replace or apply color treatments to the light standard. | Within 7 years after issuance of the new license |
| | Emigrant Landing Swim and Picnic Area | • Treat, stain, or replace the chain-link fence with a color of fencing that either complements the marina or conforms to the USFS' BEIG Southwest Province architectural style selected for Pyramid Lake | Within 7 years after issuance of the new license |
| | Vaquero Day Use Area maintenance yard | • Re-paint the transformer boxes using a darker green that more closely matches one of the prominent vegetative greens in the background<br>• Install green or brown slats (diagonally) on the chain-link fence<br>• Apply a treatment to the chain-link fence to provide a weathered appearance | Within 7 years after issuance of the new license |

**Table 4.0-1. South SWP Project Visual Resources Mitigation Schedule (continued)**

| Project Area | Project Facility | Measure | Timeline |
|---|---|---|---|
| Pyramid Lake | Vaquero Day Use Area | • Treat, paint, or replace the light standards with a color or materials that match the darker tones found in the natural background | Within 7 years after issuance of the new license |
| | Yellow Bar Boat-in Picnic Area | • Apply a treatment to the metal fencing and railing to match the tones found in the natural background<br>• Re-paint or treat the white top of the light standard using a darker tone matching vegetative or earth tones in the natural background<br>• Re-paint or treat the exterior of the restroom using a darker tone matching the vegetative or earth tones in the natural background | Within 7 years after issuance of the new license |
| | | • Replace the restroom with a structure that generally conforms to the USFS BEIG Southwest Province architectural style and color selected for Pyramid Lake | When the restroom structure reaches the end of its useful life |
| | Bear Trap Boat-in Picnic Area | • Apply a treatment to the metal fencing and railing to match the tones found in the natural background | Within 7 years after issuance of the new license |
| | | • Replace the restroom and shade structures with structures that generally conform to the USFS' BEIG Southwest Province architectural style and color selected for Pyramid Lake | When the structure reaches the end of its useful life |
| | Spanish Point Boat-in Picnic Area | • Replace the restroom and shade structures with structures that generally conform to the USFS' BEIG Southwest Province architectural style and color selected for Pyramid Lake | When the structures reach the end of their useful life |

**Table 4.0-1. South SWP Project Visual Resources Mitigation Schedule (continued)**

| Project Area | Project Facility | Measure | Timeline |
|---|---|---|---|
| Pyramid Lake | Spanish Point Boat-in Picnic Area (Maintenance Yard) | • Plant and maintain a vegetative screen that blocks views of the emergency release valve cover from boaters and shoreline recreation areas | Within 7 years after issuance of the new license |
| | | • Replace the roof for the maintenance building with a design that generally conforms to the USFS' BEIG Southwest Province architectural style and color selected for Pyramid Lake | When the roof reaches the end of its useful life |
| | Vista Del Lago Visitor Center | • Replace the roof structure with a design that generally conforms to the USFS' BEIG Southwest Province architectural style and color selected for Pyramid Lake | When the Licensees' periodic inspections indicate that the roof will need replacing or a substantial upgrade |
| Angeles Tunnel | North Adit | • Apply a concrete stain color treatment to the faces of the adit structure including the drainage canal that matches the dominant color of the existing rock face directly above the structure | Within 7 years after issuance of the new license |
| | Surge Chamber | • Licensees will consult with USFS to discuss a color treatment that will help the surge chamber blend better visually with the surrounding landscape | Within 10 years after issuance of the new license |
| Castaic Transmission Line | Transmission Line towers on NFS land | • Licensees will consult with USFS to perform a full scenery analysis | When the Licensees determine that a major upgrade, improvement, rehabilitation, or replacement of the transmission line towers is necessary |

*Key:*
*BEIG = Built Environment Image Guide*
*USFS = U.S. Department of Agriculture, Forest Service*
*NFS = National Forest Service*

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# 5.0 CONSULTATION, REPORTING, AND PLAN REVISIONS

## 5.1 CONSULTATION AND REPORTING

For Project activities conducted on NFS lands that are subject to this Plan, the Licensees will meet with the ANF and/or the LPNF to review any Licensees' activities that could affect visual resources as seen from NFS lands that are completed in the previous calendar year, as well as any Licensee activities planned for NFS lands for the current calendar year.

None of the Project facilities are located on BLM lands. The Licensees do not anticipate any Project activities that could affect visual resources for the BLM lands abutting the eastern shoreline of Elderberry Forebay. However, if any future activities are planned for BLM lands that could affect visual resources, then the Licensees will review these activities with BLM.

## 5.2 PLAN REVISIONS

The Licensees, in consultation with the ANF and LPNF, will review, update, and/or revise this Plan as it pertains to visual resources on NFS lands; and in consultation with the BLM as it pertains to visual resources on BLM lands. Any updates to the Plan will be prepared in coordination and consultation with the ANF and LPNF; and the BLM, as necessary. The Licensees will provide the ANF, LPNF, and BLM (as needed) 60 days to provide written comments and recommendations before the Licensees file the updated Plan with FERC for approval. The updated Plan will include documentation of all relevant coordination and consultation. If the Licensees do not adopt a particular recommendation by the ANF, LPNF, and/or BLM, the filing will include the Licensees' reasons for not doing so. The Licensees will implement the Plan as approved by FERC. The Plan will not be considered revised until FERC issues its approval.

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# 6.0 REFERENCES

U.S. Department of Agriculture, Forest Service (USFS). 2018. Forest Service Handbook 2309.13 – Recreation Site Handbook, Chapter 10 – Planning and Design of Developed Recreation Sites and Facilities. FSH 2309.13-2018-1. January 25, 2018.

_____. 2005a. Land Management Plan Part 1, Southern California National Forests Vision. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-075. September 2005.

_____. 2005b. Land Management Plan Part 2, ANF Strategy. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-076. September 2005.

_____. 2005c. Land Management Plan Part 2, LPNF Strategy. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-078. September 2005.

_____. 2005d. Land Management Plan Part 3, Design Criteria for the Southern California National Forests Vision. U.S. Department of Agriculture, Forest Service. Pacific Southwest Region. R5-MB-080. September 2005.

_____. 2001. The Built Environment Image Guide (BEIG) for the National Forests and Grasslands. Pacific Southwest Region. FS-710. September 2001.

U.S. Department of the Interior, Bureau of Land Management (BLM). 1994. South Coast Resource Management Plan and Record of Decision. California Desert District, Palm Springs-South Coast Resource Area. June 1994.

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# Attachment 6

***Historic Properties Management Plan (Privileged)***

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# SOUTH SWP HYDROPOWER

## HISTORIC PROPERTIES MANAGEMENT PLAN

FERC typically completes Section 106 of the National Historic Preservation Act (NHPA) by entering into a Programmatic Agreement with the Advisory Council on Historic Preservation and the State Historic Preservation Officer (SHPO) that typically requires the license applicant(s) to develop and implement a Historic Properties Management Plan (HPMP). The HPMP is a plan for considering and managing Project effects on historic properties. Through an approved HPMP, FERC can require the Licensees' consideration and appropriate management of effects of the Licensees' Proposal on historic properties throughout the term of the license – thereby allowing FERC to meet the requirements of NHPA Section 106 for its undertakings.

The HPMP included in this DLA contains sensitive, confidential, and privileged information. As such, the HPMP will only be distributed to interested tribes, USFS, Angeles National Forest (ANF), Los Padres National Forest (LPNF), U.S. Department of the Interior, Bureau of Land Management (BLM), and the SHPO for review and comment as part of the NHPA Section 106 consultation process. Following consultation with the participating tribes, USFS, ANF, LPNF, BLM, and SHPO, the HPMP will be filed with FERC as "Privileged" in the License Application.

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# Appendix B

## *Study Plans, Field Results and Data Summaries, and Associated Data Files*

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# APPENDIX B

## STUDY PLANS, FIELD RESULTS AND DATA SUMMARIES, AND ASSOCIATED DATA FILES

Appendix B includes the Licensees' study plans, field results and data summaries, and associated data files, for a total of 2,521 files representing 2.77 GB of data. Appendix B will be filed separately with the Federal Energy Regulatory Commission (FERC) on a Disc.

Note that some of the files within the ZIP folders included on the Disc are not in acceptable FERC e-filing formats, such as CPG and SHP.XML files. The Licensees can be contacted for a copy of this Appendix B.

Table B-1, below, lists the contents of Appendix B, including total file sizes for the data contained on the Disc.

## Table B-1. Contents of Appendix B

| Contents |
|---|
| **Study Plans, Field Results and Data Summaries, and Associated Data Files** |
| Study 4.1.1 Aquatic Invasive Species |
| Study 4.1.2 Quail Lake Fisheries Assessment |
| Study 4.1.3 Pyramid Reach Fish Populations Study |
| Study 4.1.4 Special-Status Aquatic Amphibians and Semi-Aquatic Snakes |
| Study 4.1.5 Botanical Resources |
| Study 4.1.6 Non-Native Invasive Plants |
| Study 4.1.7 Special-Status Terrestrial Wildlife Species – California Wildlife Habitat Relationships |
| Study 4.1.8 ESA-Listed Plants |
| Study 4.1.9 ESA-Listed Amphibians – California Red-legged Frog |
| Study 4.1.10 ESA-Listed Riparian Bird Species, Southwestern Willow Flycatcher, Least Bell's Vireo, and Yellow-billed Cuckoo Riparian Habitat Evaluations |
| Study 4.1.11 Recreation Facilities Demand Analysis and Condition Assessment |
| Study 4.1.12 Cultural Resources |
| Study 4.1.13 Tribal Resources |
| Study 4.1.14 Indicators of Hydrologic Alteration |
| Study 4.1.15 Scenic Integrity |
| Study 4.1.16 Water Quality and Temperature |
| Study 4.1.17 Fish Entrainment Risk Assessment |
| Study 4.1.18 ESA-Listed Terrestrial Wildlife Species – California Wildlife Habitat Relationships |
| Study 4.1.19 Whitewater Boating |
| Study 4.1.20 Special-Status Raptors |
| Study 4.1.21 Pyramid Reach Benthic Macroinvertebrates |
| Study 4.1.22 Pyramid Lake Tributaries Fish Passage Barriers |
| **Total Size: 2.77 GB on Disc** |

# Appendix C

## *PM&E Consultation Materials*

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# AGENDA

# South SWP Hydropower Relicensing
# Draft License Application
# PM&E Kick-off Meeting

**FERC Project No. 2426**

**Date:** February 14, 2019

**Time:** 09:00 A.M. - 4:00 P.M.*

**Location:** Courtyard Marriott, 28523 Westinghouse Place, Valencia, CA 91355

**Objectives:** To discuss Study Status and PM&E collaboration relative to the South SWP Hydropower Draft License Application

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- Introduction & Purpose
- Safety Moment
- Relicensing Schedule
- Study Status Update
- PM&E Collaboration
- Action Items and Next Steps

*These agenda items may be addressed in a different order and may go faster depending on discussions by participants at the meeting.


# PM&E Kickoff Meeting
## Thursday, 9:00 am – 4:00 pm / February 14, 2019
## Courtyard Marriott Valencia, Ca
## Sign-In Sheet

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Bowes, Stephen* | National Parks Service | 415-623-2321 | Stephen_bowes@nps.gov | |
| Burr, Doug | Stantec | 916-418-8356 | douglas.burr@stantec.com | |
| Chua, Pjoy* | LADWP | 213-367-1750 | Pjoy.Chua@ladwp.com | |
| D'Artois Melanie | LADWP | | Melanie.D'Artois@ladwp.com | |
| Direen, Josh | USFS | 909-382-2609 | jdireen@fs.fed.us | |
| Driscoll, Syndi | LADWP | 213-367-4363 | syndi.driscoll@ladwp.com | |
| Fisch, Nathan | SWRCB | 916-322-6796 | nathan.fisch@waterboards.ca.gov | |
| Flores, Carlos | USFS | | carlosflores@fs.fed.us | CF |
| Foster, Bill | NOAA | 916-930-6317 | william.foster@noaa.gov | |
| Gamez, Ramon | LADWP | 213-367-4853 | Ramon.Gamez@ladwp.com | RG |
| Gibson, Joanna | CDFW | (909) 987-7449 | Joanna.Gibson@Wildlife.ca.gov | |
| Gilbert, Kirby | Stantec | 425-896-6954 | kirby.gilbert@stantec.com | |
| Gleim, James | DWR – HLPCO | 916-541-9025 | james.gleim@water.ca.gov | |
| Goebl, Scott | DWR – HLPCO | 916-557-4561 | scott.goebl@water.ca.gov | |
| Gonzalez, Brian | LADWP | | Brian.gonzalez@ladwp.com | |
| Grison, Chloe* | LADWP | 213-367-1339 | Chloe.grison@ladwp.com | |
| Hedrick, Robert* | | 916-653-5761 | Robert.Hedrick@water.ca.gov | |
| Henriquez-Santos, Jose | USFS | 626-574-5277 | jhenriquezsantos@fs.fed.us | J.H. |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Kass, Anitra | PCTA | 951-257-4100 | akass@pcta.org | |
| Knittweis, Gwen | DWR-HLPCO | 916-557-4554 | Gwen.Knittweis@water.ca.gov | |
| Lee, Lisa | DWR – HLPCO | 916-557-4557 | lisa.lee@water.ca.gov | |
| Lewis, Edward | LADWP | 661-294-3221 | Edward.lewis@ladwp.com | |
| Lynch, Jim | HDR | 916-679-8740 | Jim.Lynch@hdrinc.com | |
| Mcbride, Jenness | USFS | 760-805-5610 | jenness_mcbride@fws.gov | |
| McNeil, Jeremiah | DWR – SFD | 916-563-0359 | Jeremiah.Mcneil@water.ca.gov | |
| Miller, Aaron* | DWR | 916-557-4560 | Aaron.S.Miller@water.ca.gov | |
| Miller, Jill | Stantec | 916-418-8439 | jill.miller2@stantec.com | |
| Padgett, Karmina | SWRCB | 916-323-4642 | karmina.padget@waterboards.ca.gov | |
| Perez, Jarome | USFS | 707- 562-8737 | jeromeperez@fs.fed.us | |
| Ralph Torres* | DWR – HLPCO | 916-798-9825 | torresraphael13@yahoo.com | |
| Rorie, Bryan | Stantec | 916-296-8653 | bryan.rorie@stantec.com | |
| Rubin, Katherine | LADWP | 213-367-0436 | Katherine.rubin@ladwp.com | |
| Salazar, Joseph | DWR – SFD | 661-944-8449 | joseph.salazar@water.ca.gov | |
| Schmoker, Kelly | CDFW | 949-581-1015 | Kelly.Schmoker@wildlife.ca.gov | |
| Seastrand, Justin | USFS | 626-574-5235 | jseastrand@fs.fed.us | |
| Swiger, Mike | VNF | 202-298-1891 | mas@vnf.com | |
| Sy, Anton* | LADWP | 213-367-2332 | Anton.Sy@ladwp.com | |
| Tang, Victoria | CDFW | 916-445-0411 | Victoria.Tang@wildlife.ca.gov | |
| Taylor, Robert | USFS | 909-382-2660 | rgtaylor@fs.fed.us | |
| Velazquez, Gabino | DWR – SFD | 661-944-8555 | gabino.velazquez@water.ca.gov | |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Ware, Raphaela | FWS | 8005-644-1766 | raphaela_ware@fws.gov | RW |
| Williams, Victoria | DWR-SFD | 661.944.8571 | Victoria.Williams@water.ca.gov; | VW |
| Wood, Julia | VNF | 202-298-1938 | JSW@vnf.com | JSW |
| Zewdu, Simon | LADWP | 213-367-2525 | Simon.zewdu@ladwp.com | |
| JAMAHL BUTLER | USFS | 818-899-1900 | NJBUTLER@FS.FED.US | 1/13 |
| Kelsha Anderson | USFS | 626-632-1709 | kelsha.anderson@usda.gov | |
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* Call in via Skype

* Call in via Skype

| | |
|---|---|
| **From:** | Burr, Douglas |
| **To:** | Taylor, Robert G -FS; Schmoker, Kelly@Wildlife; Padgett, Karmina@Waterboards; Bowes, Stephen; raphaela_ware@fws.gov; Tang, Victoria@Wildlife; Henriquez-Santos, Jose O -FS; Flores, Carlos - FS; raphaela_ware@fws.gov; njbutler@fs.fed.us; kelsha.anderson@usda.gov |
| **Cc:** | McNeil, Jeremiah@DWR; Goebl, Scott@DWR; Lee, Lisa D.@DWR; Miller, Aaron S.@DWR; Gleim, James@DWR; Knittweis, Gwen@DWR; Miller, Jill (Sacramento); Chua, Pjoy; Gamez, Ramon; Rorie, Bryan; Sy, Anton; Lynch, Jim; Gilbert, Kirby; torresraphael13@yahoo.com; Mike Swiger; Hedrick, Robert@DWR; Salazar, Joseph@DWR; Victoria.Williams@water.ca.gov; Julia Wood; Velazquez, Gabino@DWR; D"Artois, Melanie; Zewdu, Simon; Driscoll, Syndi; Gonzalez, Brian; Grison, Chloe; Lewis, Edward Ronald; Rubin, Katherine |
| **Subject:** | RE: Kick-Off Meeting for SSWP PM&E Development - Follow up Action Items - PM&E List |
| **Date:** | Friday, February 15, 2019 12:41:00 PM |
| **Attachments:** | image001.png<br>image003.png<br>image004.png<br>image005.png<br>image006.png<br>image007.png<br>image008.png<br>image002.png |

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All,
I want to extend the team's appreciation for participating in the South SWP Hydropower Relicensing PM&E Development Kickoff Meeting yesterday.

Please find the PM&E List developed during the meeting below.

1. Wildlife Movement
2. Safety
3. Law Enforcement
4. Accessibility Suitability Plan at Pyramid Recreation Facilities
5. Aquatic Invertebrate Management Plan
6. Pyramid Reach Sedimentation
7. Trash / Litter Control
8. Sensitive Area Management / Signage
9. Signage Plan
10. Water Quality
11. Visual Resources Management Plan
12. Erosion Control
13. Hazardous Materials Management Plan
14. Transportation
15. Aquatic Invasive Species
16. Integrated Vegetation - Native / Non-Native
17. Recreation
18. Cultural Resources
19. Fish Stocking
20. Fire Management and Response
21. Pyramid Reach Flow – Releases
22. Monitoring and Management – Stream Flow
23. Quail Lake Flow Monitoring and Management
24. Sediment Transport (In and Out)
25. Biological Monitoring (All Species)
26. Reporting Requirements
27. Adaptive Management (for all above)

28. Collaboration Implementation of Discussions Post-License
29. Predator Control

If you have any adjustments or additions to the list above please provide them by Friday, February 22, 2019.

Also, towards the end of the meeting alternative locations for future meetings were discussed. Our next guaranteed meeting is the USR meeting which will likely be held the week of May 24th or May 31st. If you have thoughts on locations for this meeting or other future potential PM&E meetings please reply all to this email so we can evaluate the various options.

Thanks again and have a great weekend.

**Doug Burr, P.G., PMP**
Supervising Geologist
Project Manager, Waterpower & Dams
Stantec
3301 C Street, Sacramento, CA 95816
Direct line - (916) 418-8356
Mobile line - (916) 761-3793
Facsimile - (916) 924-9102
Douglas.Burr@stantec.com



-----Original Appointment-----
**From:** Burr, Douglas
**Sent:** Friday, December 28, 2018 9:12 AM
**To:** Burr, Douglas; McNeil, Jeremiah@DWR; Goebl, Scott@DWR; Lee, Lisa D.@DWR; Miller, Aaron S.@DWR; Gleim, James@DWR; Miller, Jill (Sacramento); Chua, Pjoy; Taylor, Robert G -FS; Knittweis, Gwen@DWR; Schmoker, Kelly@Wildlife; Padgett, Karmina@Waterboards; nathan.fisch@waterboards.ca.gov; Pareti, Jennifer@Wildlife; William Foster - NOAA Federal; Chang, Lena; Gamez, Ramon; Sy, Anton; Bryan Rorie (Bryan.Rorie@stantec.com); Bowes, Stephen; Lynch, Jim; Kirby Gilbert (kirby.gilbert@stantec.com); torresraphael13@yahoo.com; Mike Swiger; Hedrick, Robert@DWR; Salazar, Joseph@DWR; Victoria.Williams@water.ca.gov; Julia Wood
**Cc:** Seastrand, Justin -FS; Velazquez, Gabino@DWR; raphaela_ware@fws.gov; D'Artois, Melanie; Perez, Jerome - FS; Tang, Victoria@Wildlife; Henriquez-Santos, Jose O -FS; Flores, Carlos - FS; Zewdu, Simon
**Subject:** Kick-Off Meeting for SSWP PM&E Development
**When:** Thursday, February 14, 2019 9:00 AM-4:00 PM (UTC-08:00) Pacific Time (US & Canada).
**Where:** Courtyard by Marriot Valencia, 28523 Westinghouse Place, Valencia, CA 91355

All, Please find the Agenda for this meeting attached.

Thank you,

Doug

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All, this meeting will be held from 9:00 AM to 4:00 PM at the Courtyard by Marriot in Valencia, CA.

Please find the address and contact information below.

28523 Westinghouse Place
Valencia, CA 91355
Ph: 661-257-3220
Fax: 661-290-2802

This meeting invite has been updated to reflect this time and location.

Thank you,

Doug

---

All, this is a placeholder for the SSWP PM&E the Kick-Off Meeting Development process. This invite will be updated with the meeting location and time in early this month.

Regards,

**Doug Burr, P.G., PMP**
Supervising Geologist
Project Manager, Waterpower & Dams
Stantec
3301 C Street, Sacramento, CA 95816
Direct line - (916) 418-8356
Mobile line - (916) 761-3793
Facsimile - (916) 924-9102
Douglas.Burr@stantec.com

| | |
|---|---|
| **From:** | Burr, Douglas |
| **To:** | Taylor, Robert G -FS; Schmoker, Kelly@Wildlife; Padgett, Karmina@Waterboards; Bowes, Stephen; raphaela_ware@fws.gov; Tang, Victoria@Wildlife; Henriquez-Santos, Jose O -FS; Flores, Carlos - FS; raphaela_ware@fws.gov; njbutler@fs.fed.us; kelsha.anderson@usda.gov |
| **Cc:** | McNeil, Jeremiah@DWR; Goebl, Scott@DWR; Lee, Lisa D.@DWR; Miller, Aaron S.@DWR; Gleim, James@DWR; Knittweis, Gwen@DWR; Miller, Jill (Sacramento); Chua, Pjoy; Gamez, Ramon; Rorie, Bryan; Sy, Anton; Lynch, Jim; Gilbert, Kirby; torresraphael13@yahoo.com; Mike Swiger; Hedrick, Robert@DWR; Salazar, Joseph@DWR; Victoria.Williams@water.ca.gov; Julia Wood; Velazquez, Gabino@DWR; D"Artois, Melanie; Zewdu, Simon; Driscoll, Syndi; Gonzalez, Brian; Grison, Chloe; Lewis, Edward Ronald; Rubin, Katherine |
| **Subject:** | RE: Kick-Off Meeting for SSWP PM&E Development - Follow up Action Items - PM&E List |
| **Date:** | Friday, April 5, 2019 10:14:00 AM |
| **Attachments:** | image001.png<br>image010.png<br>image011.png<br>image012.png<br>image013.png<br>image014.png<br>image015.png<br>image003.png |

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Good Morning Relicensing Participants,

At our South SWP Hydropower (SSWP) relicensing meeting on February 14, 2019 in Valencia, California, the Licensees asked you to brainstorm about potential measures to develop and include in their September 2019 Draft License Application (DLA). The Licensees have reviewed your list of ideas in light of the results of the relicensing studies and they propose collaborative discussion with the Relicensing Participants or independent development of the following measures, some of which would require preparation of a plan.

1. Visual Resources Management Plan (collaborative)
2. Recreation Plan (collaborative and would include recreation signage, litter control, accessibility)
3. Cultural Resources (The Licensees will collaboratively develop a Historic Properties Management Plan through the NHPA Section 106 process. It will address management of sensitive cultural resource areas)
4. Fish Stocking Measure (collaborative)
5. Pyramid Reach Flow Releases (this measure will be developed collaboratively)
6. Erosion Control Management Plan (collaborative)
7. Hazardous Materials Management Plan (collaborative)
8. Safety Plan (This plan would include Critical Energy Infrastructure Information [CEII], so would not be developed collaboratively. It would include safety-related signage.)
9. Transportation System Management Plan (collaborative)
10. Aquatic Invasive Species Management Plan (collaborative and will mention aquatic invasive invertebrates)
11. Integrated Vegetation Management Plan (collaborative and will address management of sensitive areas for plants and natural communities)
12. Fire Prevention and Response Plan (collaborative)

Whereas, for some of these measures/plans, in-person meetings would be the best collaborative approach, conference calls and email exchanges may be appropriate for others. Because the DLA must be filed on or before September 3, 2019, we will want balance our collective time and travel commitments with the ability to achieve concurrence and results. So we wish to consider the most

efficient and effective means of developing these measures.

As a next step, the Licensees suggest a conference call to reach agreement on issues for discussion and agree on a process to begin those discussions. Depending on the specific issue or measure, the process could begin with the Licensees or Relicensing Participants preparing a first draft to jump start the collaboration process, or it could include additional meetings/calls to further clarify the issue before we start drafting the details of a measure. At a minimum, the process call would include setting a schedule (meeting/call dates, and venues for meetings) for each issue and identifying who should participate in each meeting/call. We suggest grouping meetings/calls by subject matter to efficiently and effectively use staff time.

Assuming scheduling this process call is acceptable to you, **please expect Stantec to contact you in the next few days to schedule a date and time for the process call.**

Thank you,

**Doug Burr, P.G., PMP**
Supervising Geologist
Project Manager, Waterpower & Dams
Stantec
3301 C Street, Sacramento, CA 95816
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Facsimile - (916) 924-9102
Douglas.Burr@stantec.com

# AGENDA

# South SWP Hydropower Relicensing
# PM&E Process Call Meeting

**FERC Project No. 2426**

**Date:** April 30, 2019

**Time:** 2:00 P.M. - 4:00 P.M.*

**Location:** Skype Invitation. (916) 330-5000, Conference number: 856045785

**Objectives:** To discuss PM&E development and collaboration relative to the South SWP Hydropower Draft License Application

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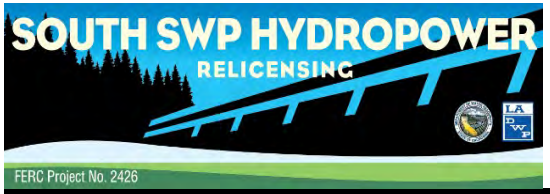
- Welcome & Introductions
- Meeting Purpose
- Overview of ILP Process and DLA Schedule
  - DLA Filing Date – September 3, 2019
- PM&E Collaboration Process Discussion
  - Review Previously Identified PM&E Measures and Approach for Collaboration
    1. Pyramid Lake Fish Stocking Measure
    2. Erosion and Sediment Control Management Plan
    3. Hazardous Materials Management Plan
    4. Fire Prevention and Response Plan
    5. Pyramid Reach Flow Releases Measure
    6. Recreation Management Plan
    7. Visual Resources Management Plan
    8. Integrated Vegetation Management Plan
    9. Aquatic Invasive Species Management Plan
    10. Transportation System Management Plan
    11. Project Safety Plan
    12. Cultural Resources (HPMP)
- Action Items and Next Steps

*These agenda items may be addressed in a different order and may go faster depending on discussions by participants at the meeting.




# SSWP Relicensing PM&E Process Call
## Tuesday, 2:00 PM – 4:00 PM / April 30, 2019
## Sign-In Sheet

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Tang, Victoria | CDFW | | Victoria.Tang@wildlife.ca.gov | |
| Schmoker, Kelly | CDFW | | Kelly.schmoker@wildlife.ca.gov | |
| Hedrick, Robert | DWR | | Robert.Hedrick@water.ca.gov | |
| Stoddard, Tera | DWR | | Tera.Stoddard@water.ca.gov | |
| Gleim, James | DWR-HLPCO | 916-541-9025 | James.Gleim@water.ca.gov | |
| Goebl, Scott | DWR-HLPCO | 916-557-4561 | Scott.Goebl@water.ca.gov | |
| Knittweis, Gwen | DWR-HLPCO | | Gwen.Knittweis@water.ca.gov | |
| Lee, Lisa D. | DWR-HLPCO | 916-557-4557 | Lisa.Lee@water.ca.gov | |
| McNeil, Jeremiah | DWR-HLPCO | 916-557-4555 | Jeremiah.McNeil@water.ca.gov | |
| Miller, Aaron S. | DWR-HLPCO | 916-557-4560 | Aaron.S.Miller@water.ca.gov | |
| Parsons, Jeff | DWR-HLPCO | | Jeffrey.Parsons@water.ca.gov | |
| Sandoval, Ricardo | DWR-HLPCO | | Ricardo.Sandoval@water.ca.gov | |
| Salazar, Joseph | DWR-SFD | 661-944-8449 | Joseph.Salazar@water.ca.gov | |
| Torres, Ralph | DWR-HLPCO | 916-798-9825 | torresraphael13@yahoo.com | |
| Velazquez, Gabino | DWR-SFD | | Gabino.Velazquez@water.ca.gov | |
| Williams, Victoria | DWR-SFD | | Victoria.Williams@water.ca.gov | |
| Lynch, Jim | HDR | 916-679-8740 | Jim.Lynch@hdrinc.com | |
| Chua, Pjoy T. | LADWP | 213-367-1750 | Pjoy.chua@ladwp.com | |
| D'Artois, Melanie | LADWP | | Melanie.D'Artois@ladwp.com | |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Driscoll, Syndi | LADWP | 213-367-4363 | Syndi.Driscoll@ladwp.com | |
| Fick, Robert | LADWP | | Robert.Fick@ladwp.com | |
| Gamez, Ramon | LADWP | 213-367-4853 | Ramon.Gamez@ladwp.com | |
| Gonzalez, Brian | LADWP | | brian.gonzalez@ladwp.com | |
| Grison, Chloe | LADWP | | chloe.grison@ladwp.com | |
| Hirashima, Scott | LADWP | | Scott.Hirashima@ladwp.com | |
| Lewis, Edward | LADWP | 661-294-3221 | Edward.Lewis@ladwp.com | |
| Parker, Nadia | LADWP | 213-367-1745 | Nadia.Parker@ladwp.com | |
| Peace, Graham | LADWP | | Graham.Peace@ladwp.com | |
| Rubin, Katherine | LADWP | 213-367-0436 | Katherine.Rubin@ladwp.com | |
| Sy, Anton | LADWP | 213-367-2332 | Anton.Sy@ladwp.com | |
| Zewdu, Simon | LADWP | 213-367-2525 | simon.zewdu@ladwp.com | |
| Bowes, Stephen | NPS | 415-623-2321 | stephen_bowes@nps.gov | |
| Barrientez, Michael | Stantec | (916) 418-8264 | Michael.Barrientez@stantec.com | |
| Burr, Doug | Stantec | (916) 761-3793 | Douglas.Burr@stantec.com | |
| Gilbert, Kirby | Stantec | (425) 896-6954 | Kirby.gilbert@stantec.com | |
| Miller, Jill | Stantec | (916) 418-8439 | jill.miller2@stantec.com | |
| Rorie, Bryan | Stantec | 916-669-5974 | Bryan.Rorie@stantec.com | |
| Padgett, Karmina | SWRCB | 916-323-4642 | Karmina.Padgett@Waterboards.ca.gov | |
| Anderson, Kelsha | USDA | | kelsha.anderson@usda.gov | |
| Butler, Jamahl | USFS | 818-899-1900 | njbutler@fs.fed.us | |
| Flores, Carlos | USFS | | carlosflores@fs.fed.us | |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Henriquez-Santos, Jose O. | USFS | | jhenriquezsantos@fs.fed.us | |
| Taylor, Robert G. | USFS | 909-382-2660 | rgtaylor@fs.fed.us | |
| Ware, Raphaela | USFWS | (805) 677-3319 | raphaela_ware@fws.gov | |
| Swiger, Mike | VNF | | mas@vnf.com | |
| Wood, Julia | VNF | | JSW@vnf.com | |
| Moyle, Joanna | DWR – SFD | | | |
| Westbrook, Aaron | Cascade Power Plant | | | |
| Gomez, Edward | LADWP | | | |

* Call in via Skype

South SWP Hydropower, FERC Project No. 2426-227

# AGENDA

## Draft License Application PM&E Meeting

| | |
|---|---|
| **Date:** | June 18, 2019 |
| **Time:** | 12:30 pm – 4:00 pm* |
| **Location:** | Hilton Garden Inn<br>199 N. 2nd Avenue<br>Arcadia, California 91006 |
| **Objectives:** | To collaborate on the potential development of a integrated vegetation management plan relative to the South SWP Hydropower Draft License Application. |

- Welcome
- Introductions & Purpose
- Safety Moment
- Integrated Vegetation Management Plan Outline
- Action Items and Next Steps
- Adjourn

*These agenda items may be addressed in a different order and may go faster depending on discussions by participants at the meeting.

SOUTH SWP HYDROPOWER RELICENSING

FERC Project No. 2426

# SSWP Relicensing PM&E Meeting
## Tuesday, 12:30 PM – 4:00 PM / June 18, 2019
## Sign-In Sheet

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Schmoker, Kelly | CDFW | | Kelly.schmoker@wildlife.ca.gov | |
| Tang, Victoria | CDFW | | Victoria.Tang@wildlife.ca.gov | |
| Gleim, James | DWR-HLPCO | 916-541-9025 | James.Gleim@water.ca.gov | |
| Goebl, Scott | DWR-HLPCO | 916-557-4561 | Scott.Goebl@water.ca.gov | |
| Hedrick, Robert | DWR-HLPCO | 916-653-5761 | Robert.Hedrick@water.ca.gov | |
| Knittweis, Gwen | DWR-HLPCO | 916-557-4554 | Gwen.Knittweis@water.ca.gov | |
| Lee, Lisa D. | DWR-HLPCO | 916-557-4557 | Lisa.Lee@water.ca.gov | |
| McNeil, Jeremiah | DWR-HLPCO | 916-557-4555 | Jeremiah.McNeil@water.ca.gov | |
| Miller, Aaron S. | DWR-HLPCO | 916-557-4560 | Aaron.S.Miller@water.ca.gov | |
| Parsons, Jeff | DWR-HLPCO | 916-557-4558 | Jeffrey.Parsons@water.ca.gov | |
| Stoddard, Tera | DWR-HLPCO | 916-557-4553 | Tera.Stoddard@water.ca.gov | |
| Torres, Ralph | DWR-HLPCO | 916-798-9825 | torresraphael13@yahoo.com | |
| McElvain, Doug | DWR-SFD | 661-944-8445 | Doug.McElvain@water.ca.gov | |
| Moyle, Joanalyn | DWR-SFD | (661-944-8537 | Joanalyn.Moyle@water.ca.gov | |
| Salazar, Joseph | DWR-SFD | 661-944-8449 | Joseph.Salazar@water.ca.gov | |
| Velazquez, Gabino | DWR-SFD | | Gabino.Velazquez@water.ca.gov | |
| Williams, Victoria | DWR-SFD | | Victoria.Williams@water.ca.gov | |
| Lynch, Jim | HDR | 916-679-8740 | Jim.Lynch@hdrinc.com | |
| Chua, Pjoy T. | LADWP | 213-367-1750 | Pjoy.chua@ladwp.com | |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| D'Artois, Melanie | LADWP | | Melanie.D'Artois@ladwp.com | |
| Driscoll, Syndi | LADWP | 213-367-4363 | Syndi.Driscoll@ladwp.com | |
| Fick, Robert | LADWP | | Robert.Fick@ladwp.com | |
| Gamez, Ramon | LADWP | 213-367-4853 | Ramon.Gamez@ladwp.com | |
| Gomez, Edgar | LADWP | | Edgar.Gomez@ladwp.com | |
| Gonzalez, Brian | LADWP | | brian.gonzalez@ladwp.com | |
| Grison, Chloe | LADWP | | chloe.grison@ladwp.com | |
| Hirashima, Scott | LADWP | | Scott.Hirashima@ladwp.com | |
| Parker, Nadia | LADWP | 213-367-1745 | Nadia.Parker@ladwp.com | |
| Peace, Graham | LADWP | | Graham.Peace@ladwp.com | |
| Rubin, Katherine | LADWP | 213-367-0436 | Katherine.Rubin@ladwp.com | |
| Sy, Anton | LADWP | 213-367-2332 | Anton.Sy@ladwp.com | |
| Westbrook, Aaron | LADWP | | Aaron.Westbrook@ladwp.com | |
| Zewdu, Simon | LADWP | 213-367-2525 | simon.zewdu@ladwp.com | |
| Bowes, Stephen | NPS | 415-623-2321 | stephen_bowes@nps.gov | |
| Gilbert, Kirby | Stantec | (425) 896-6954 | Kirby.gilbert@stantec.com | |
| Miller, Jill | Stantec | (916) 418-8439 | jill.miller2@stantec.com | |
| Rorie, Bryan | Stantec | 916-669-5974 | Bryan.Rorie@stantec.com | |
| Padgett, Karmina | SWRCB | 916-323-4642 | Karmina.Padgett@Waterboards.ca.gov | |
| Anderson, Kelsha | USDA | | kelsha.anderson@usda.gov | |
| Butler, Jamahl | USFS | 818-899-1900 | njbutler@fs.fed.us | |
| Flores, Carlos | USFS | | carlosflores@fs.fed.us | |

* Call in via Skype

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Henriquez-Santos, Jose O. | USFS | | jhenriquezsantos@fs.fed.us | |
| Taylor, Robert G. | USFS | 909-382-2660 | rgtaylor@fs.fed.us | RT |
| Ware, Raphaela | USFWS | 805-677-3319 | raphaela_ware@fws.gov | |
| Swiger, Mike | VNF | | mas@vnf.com | |
| Wood, Julia | VNF | | JSW@vnf.com | |
| Simpson, Lloyd | USFS - botany | | | ✓ |
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* Call in via Skype

South SWP Hydropower, FERC Project No. 2426-227

# AGENDA

## Draft License Application PM&E Meeting

**Date:** June 19, 2019

**Time:** 9:00 am – 3:00 pm*

**Location:** Hilton Garden Inn
199 N. 2nd Avenue
Arcadia, California 91006

**Objectives:** To collaborate on potential development of PM&E management plans for visual resources and recreation management relative to the South SWP Hydropower Draft License Application.

- Introductions & Purpose
- Safety Moment
- Visual Resources Management Plan Outline
- Recreation Management Plan Outline
- Action Items and Next Steps
- Adjourn

*These agenda items may be addressed in a different order and may go faster depending on discussions by participants at the meeting.

SOUTH SWP HYDROPOWER RELICENSING

FERC Project No. 2426

# SSWP Relicensing PM&E Meeting
## Wednesday, 9:00 AM – 3:00 PM / June 19, 2019
## Sign-In Sheet

| Name | Organization | Phone Number | E-mail | Initial |
|---|---|---|---|---|
| Schmoker, Kelly | CDFW | | Kelly.schmoker@wildlife.ca.gov | |
| Tang, Victoria | CDFW | | Victoria.Tang@wildlife.ca.gov | |
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| Wood, Julia | VNF | | JSW@vnf.com | |
| Muradyan, Joseph | DWR | | | |
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* Call in via Skype

South SWP Hydropower, FERC Project No. 2426-227

# AGENDA

# Recreation PM&E Site Visit

**Date:** July 31, 2019
**Time:** 9:00 AM – 3:00 PM
**Location:** SSWP Project Recreation Sites
**Objectives:** To continue collaboration and conduct a site visit to view and discuss project related facilities, signage, and accessibility in relation to the protection, mitigation, and enhancement (PM&E) Recreation Management Plan for the South SWP Hydropower Draft License Application. The intent is to obtain input from the USFS on locations and priorities to apply their Forest Service Accessibility Guidelines. Participants should bring appropriate clothing, sturdy footwear, their own food/lunch/drinks (minimal lunch options while on site), and be prepared to walk on unpaved road sections.

- Meet at Vista Del Lago Visitor Center — 9:00 AM
  - Welcome, Sign-In, and Introductions
  - Meeting Purpose / Site Visit Logistics
  - Job Hazards Analysis / Safety Moment
- Mobilize to Area Below Vista Del Lago Visitor Center (15 mins) — 9:45 AM
  - Spanish Point
  - Vaquero
- Mobilize to Emigrant Landing (15 mins) — 11:00 AM
  - Picnic and Fishing Area One
  - Picnic and Fishing Area Two
  - Boat Launch
  - Swim and Picnic Area
- Working Lunch (please bring your own lunch, water will be available)
- Mobilize to Los Alamos Campgrounds (15 mins) — 1:00 PM
  - Los Alamos Campground Loops 1-4
  - Group Campsites
- Next Steps and Action Items (30 mins) — 2:30 PM
  - Should time permit, visit Frenchman's Flat for those interested/available
- Adjourn — 3:00 PM

  *Meeting end time may be adjusted depending on progress

SOUTH SWP HYDROPOWER RELICENSING

FERC Project No. 2426

# SSWP Relicensing Recreation Site Visit
## Wednesday, 8:45 AM – 3:00 PM / July 31, 2019
## Sign-In Sheet

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|---|---|---|---|---|
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South SWP Hydropower, FERC Project No. 2426-227

# AGENDA

# South SWP Hydropower Relicensing PM&E Call

**Date:** August 2, 2019
**Time:** 9:00 am – 3:00 pm
**Location:** Skype Invitation. (916) 330-5000, Conference number: 633717896
**Objectives:** To review relicensing participant's redline comments on each of the potential protection, mitigation, and enhancement (PM&E) plans identified below and continue collaborative discussions on plan development for inclusion in the South SWP Hydropower Draft License Application.

- Welcome and Roll Call 9:00am
- Review Agenda
- Introductions and Meeting Purpose
- PM&E Plan Discussions 9:30am
    - Review Redline Comments on PM&E Plans
        - Erosion and Sediment Control Management Plan 10:30am
        - Break (10mins)
        - Hazardous Materials Management Plan 11:30am
        - Break (10mins)
        - Fire Prevention and Response Plan 12:30pm
        - Break (10mins)
        - Visual Resources Management Plan 1:30pm
        - Break (10mins)
    - Integrated Vegetation Management Plan (Status Update) 2:30pm
- Action Items and Next Steps 3:00pm

*Meeting end time may be adjusted depending on progress and breaks can be adjusted as needed.


# SSWP Relicensing PM&E Call
## Friday, 9:00 AM – 3:00 PM / August 2, 2019
## Sign-In Sheet

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|---|---|---|---|---|
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# Appendix D

## *USDA-NRCS Custom Soil Resource Report of the Quail Lake, Lower Quail Canal, and Quail Detention Embankment Areas*

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United States Department of Agriculture

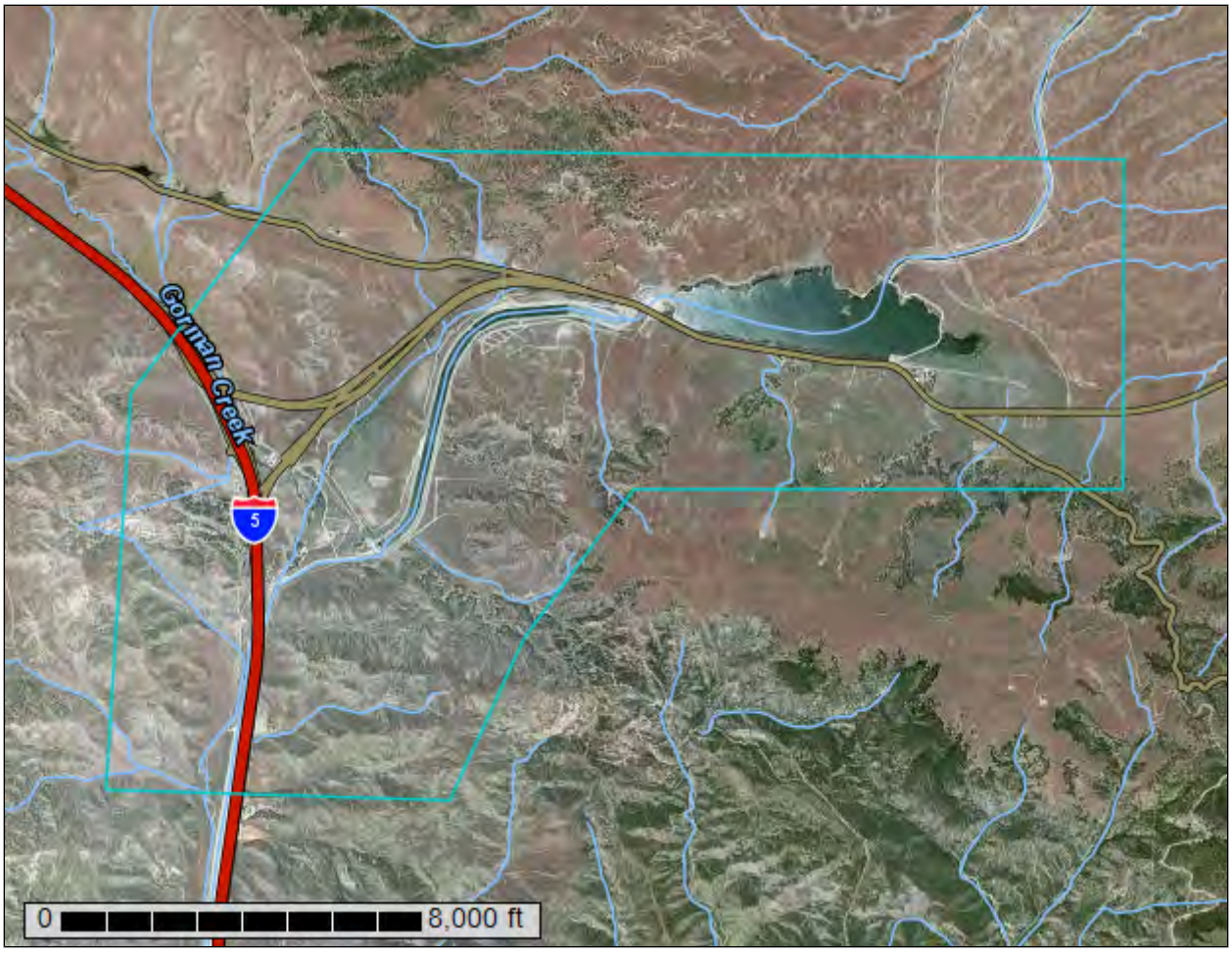
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Angeles National Forest Area, California, and Antelope Valley Area, California

## Quail Lake and Lower Quail Canal




November 9, 2015

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

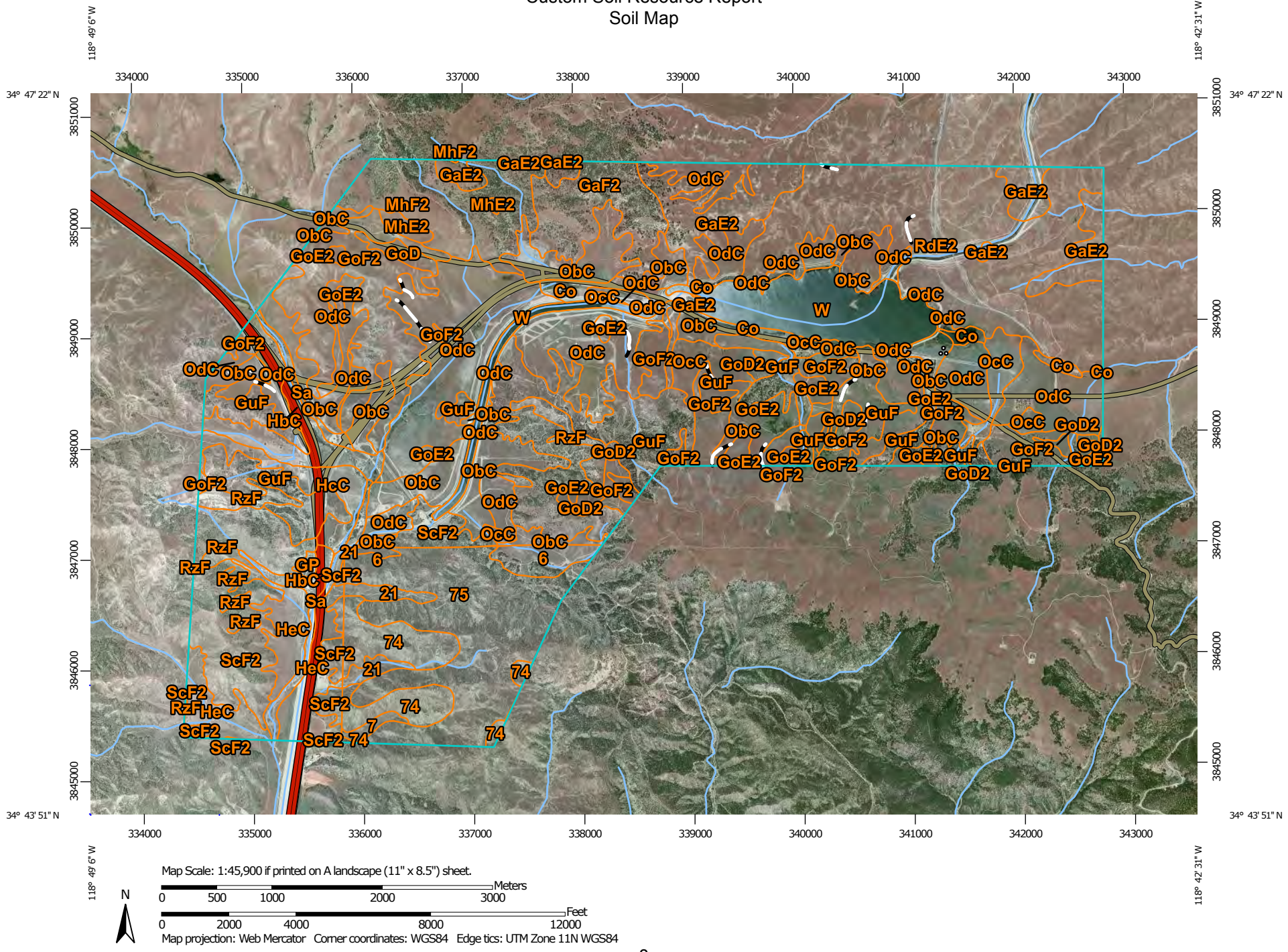
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map



## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Angeles National Forest Area, California (CA776) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 6 | Typic Haploxeralfs, 3 to 50 percent slopes | 58.9 | 0.8% |
| 7 | Hanford family, 3 to 25 percent slopes | 13.5 | 0.2% |
| 21 | Riverwash | 43.5 | 0.6% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 175.9 | 2.4% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 513.1 | 7.0% |
| **Subtotals for Soil Survey Area** | | **804.9** | **11.0%** |
| **Totals for Area of Interest** | | **7,293.8** | **100.0%** |

| Antelope Valley Area, California (CA675) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| Co | Chino loam | 63.5 | 0.9% |
| GaE2 | Gaviota rocky sandy loam, 15 to 30 percent slopes, eroded | 302.2 | 4.1% |
| GaF2 | Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded | 202.2 | 2.8% |
| GoD | Gorman sandy loam, 9 to 15 percent slopes | 22.3 | 0.3% |
| GoD2 | Gorman sandy loam, 9 to 15 percent slopes, eroded | 94.3 | 1.3% |
| GoE2 | Gorman sandy loam, 15 to 30 percent slopes, eroded | 146.4 | 2.0% |
| GoF2 | Gorman sandy loam, 30 to 50 percent slopes, eroded | 743.1 | 10.2% |
| GP | Gravel pits | 7.0 | 0.1% |
| GuF | Gullied land | 721.3 | 9.9% |
| HbC | Hanford coarse sandy loam, 2 to 9 percent slopes | 130.2 | 1.8% |
| HcC | Hanford sandy loam, 2 to 9 percent slopes | 88.3 | 1.2% |
| HeC | Hanford sandy loam, calcareous variant, 2 to 9 percent slopes | 231.0 | 3.2% |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | 22.7 | 0.3% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | 263.1 | 3.6% |
| ObC | Oak Glen sandy loam, 2 to 9 percent slopes | 579.8 | 7.9% |

| Antelope Valley Area, California (CA675) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| OcC | Oak Glen gravelly sandy loam, 2 to 9 percent slopes | 107.1 | 1.5% |
| OdC | Oak Glen loam, 2 to 9 percent slopes | 1,037.7 | 14.2% |
| RdE2 | Ramona sandy loam, 9 to 30 percent slopes, eroded | 841.9 | 11.5% |
| RzF | Rough broken land | 100.6 | 1.4% |
| Sa | Sandy alluvial land | 67.3 | 0.9% |
| ScF2 | Saugus loam, 30 to 50 percent slopes, eroded | 401.4 | 5.5% |
| W | Water | 315.4 | 4.3% |
| **Subtotals for Soil Survey Area** | | **6,489.0** | **89.0%** |
| **Totals for Area of Interest** | | **7,293.8** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Angeles National Forest Area, California

## 6—Typic Haploxeralfs, 3 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* hm7m
*Elevation:* 2,450 to 3,400 feet
*Mean annual precipitation:* 11 to 16 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Typic haploxeralfs and similar soils:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Typic Haploxeralfs

#### Setting

*Landform:* Terraces
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Alluvium derived from sedimentary rock

#### Typical profile

*H1 - 0 to 10 inches:* gravelly loam
*H2 - 10 to 36 inches:* gravelly clay loam
*H3 - 36 to 59 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 3 to 50 percent
*Depth to restrictive feature:* 15 to 50 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 4.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C

### Minor Components

#### Mollic haploxerolls

*Percent of map unit:* 10 percent

## 7—Hanford family, 3 to 25 percent slopes

### Map Unit Setting

*National map unit symbol:* hm80
*Elevation:* 2,700 to 4,400 feet
*Mean annual precipitation:* 11 to 15 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Hanford family and similar soils:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hanford Family

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 13 inches:* sandy loam
*H2 - 13 to 36 inches:* fine sandy loam, sandy loam
*H2 - 13 to 36 inches:* sandy loam
*H3 - 36 to 60 inches:*

#### Properties and qualities

*Slope:* 3 to 25 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* A

**Minor Components**

**Typic haploxeralfs**
*Percent of map unit:* 5 percent

**Vista family**
*Percent of map unit:* 5 percent

**Trigo family**
*Percent of map unit:* 5 percent

**Hanford family**
*Percent of map unit:* 5 percent

**Riverwash**
*Percent of map unit:* 5 percent
*Landform:* Channels

## 21—Riverwash

**Map Unit Setting**
*National map unit symbol:* hm6p
*Elevation:* 1,800 to 4,800 feet
*Mean annual precipitation:* 14 to 30 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Riverwash:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Riverwash**

**Setting**
*Landform:* Alluvial flats
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium

**Typical profile**
*H1 - 0 to 60 inches:* extremely stony coarse sand

**Properties and qualities**
*Slope:* 2 to 10 percent
*Percent of area covered with surface fragments:* 25.0 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low

*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Frequency of flooding:* Frequent
*Available water storage in profile:* Very low (about 0.6 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8w

**Minor Components**

**Hanford family**
*Percent of map unit:* 7 percent

**Vista family**
*Percent of map unit:* 6 percent

**Capistrano family**
*Percent of map unit:* 6 percent

**Tujunga family**
*Percent of map unit:* 6 percent

## 74—Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm87
*Elevation:* 2,200 to 3,730 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Rock outcrop:* 25 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Calleguas Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Rock Outcrop**

**Setting**

*Landform:* Scarps
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 10 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 0 inches to paralithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e

**Minor Components**

**Rubble land**

*Percent of map unit:* 4 percent

**Unnamed, colluvial soils**

*Percent of map unit:* 3 percent

**Trigo family, fine textured**

*Percent of map unit:* 3 percent

## 75—Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes

**Map Unit Setting**

*National map unit symbol:* hm88
*Elevation:* 2,400 to 4,000 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Haploxeralfs and similar soils:* 15 percent

*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**
*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Calleguas Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**
*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)

*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Haploxeralfs

### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

### Typical profile

*H1 - 0 to 6 inches:* gravelly loam
*H2 - 6 to 15 inches:* gravelly clay loam, gravelly sandy clay loam
*H2 - 6 to 15 inches:* unweathered bedrock
*H3 - 15 to 19 inches:*

### Properties and qualities

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 7 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Minor Components

### Osito family

*Percent of map unit:* 3 percent

### Unnamed, moderately deep soils

*Percent of map unit:* 3 percent

### Modesto family

*Percent of map unit:* 3 percent

### Rock outcrop

*Percent of map unit:* 2 percent

**Vertic xerochrepts**
*Percent of map unit:* 2 percent

**Caperton family**
*Percent of map unit:* 2 percent

# Antelope Valley Area, California

## Co—Chino loam

### Map Unit Setting

*National map unit symbol:* hcdd
*Elevation:* 3,100 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 230 to 340 days
*Farmland classification:* Prime farmland if irrigated and drained

### Map Unit Composition

*Chino and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Chino

#### Setting

*Landform:* Valleys
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 60 inches:* silty clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* About 16 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 7.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2w
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* C/D
*Ecological site:* WET MEADOW 9-20" (R019XD067CA)

### Minor Components

#### Unnamed

*Percent of map unit:* 10 percent

**Hanford**
*Percent of map unit:* 2 percent

**Mocho**
*Percent of map unit:* 1 percent

**Sorrento**
*Percent of map unit:* 1 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GaE2—Gaviota rocky sandy loam, 15 to 30 percent slopes, eroded

### Map Unit Setting

*National map unit symbol:* hcdk
*Elevation:* 100 to 4,000 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 45 to 61 degrees F
*Frost-free period:* 110 to 275 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Gaviota and similar soils:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Gaviota

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 14 inches:* sandy loam
*H2 - 14 to 17 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None

*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 1.7 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

**Minor Components**

**Millsholm**
*Percent of map unit:* 4 percent

**Rock outcrop**
*Percent of map unit:* 3 percent

**Unnamed**
*Percent of map unit:* 3 percent
*Landform:* Drainageways

## GaF2—Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded

**Map Unit Setting**
*National map unit symbol:* hcdl
*Elevation:* 100 to 4,000 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 45 to 61 degrees F
*Frost-free period:* 110 to 275 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Gaviota and similar soils:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gaviota**

**Setting**
*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 14 inches:* sandy loam
*H2 - 14 to 17 inches:* unweathered bedrock

**Properties and qualities**
*Slope:* 30 to 50 percent

*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 1.7 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

**Minor Components**

**Millsholm**
*Percent of map unit:* 5 percent

**Rock outcrop**
*Percent of map unit:* 2 percent

**Saugus**
*Percent of map unit:* 2 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GoD—Gorman sandy loam, 9 to 15 percent slopes

**Map Unit Setting**
*National map unit symbol:* hcdq
*Elevation:* 4,000 to 4,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Gorman and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gorman**

**Setting**
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave

*Across-slope shape:* Concave
*Parent material:* Alluvium derived from granite

**Typical profile**
*H1 - 0 to 43 inches:* sandy loam
*H2 - 43 to 84 inches:* sandy clay loam

**Properties and qualities**
*Slope:* 9 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.1 inches)

**Interpretive groups**
*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**
*Percent of map unit:* 10 percent

**Oak glen**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GoD2—Gorman sandy loam, 9 to 15 percent slopes, eroded

**Map Unit Setting**
*National map unit symbol:* hcdr
*Elevation:* 4,000 to 4,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Gorman and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gorman**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 30 inches:* sandy loam
*H2 - 30 to 60 inches:* sandy clay loam

**Properties and qualities**

*Slope:* 9 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* C
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Oak glen**

*Percent of map unit:* 4 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GoE2—Gorman sandy loam, 15 to 30 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hcds
*Elevation:* 4,000 to 4,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 55 degrees F

*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Gorman and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gorman**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 43 inches:* sandy loam
*H2 - 43 to 60 inches:* sandy clay loam

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Oak glen**

*Percent of map unit:* 4 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GoF2—Gorman sandy loam, 30 to 50 percent slopes, eroded

### Map Unit Setting

*National map unit symbol:* hcdt
*Elevation:* 4,000 to 4,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Gorman and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Gorman

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 25 inches:* sandy loam
*H2 - 25 to 60 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.5 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* C
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**
*Percent of map unit:* 10 percent

**Oak glen**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## GP—Gravel pits

**Map Unit Composition**
*Gravel pits:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gravel Pits**

**Setting**
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Sandy and gravelly alluvium

## GuF—Gullied land

**Map Unit Composition**
*Gullied land:* 90 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Gullied Land**

**Setting**
*Landform position (two-dimensional):* Backslope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum

**Typical profile**
*H1 - 0 to 60 inches:* variable

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

**Minor Components**

**Gorman**
*Percent of map unit:* 3 percent

**Ramona**
*Percent of map unit:* 3 percent

**Seridan**
*Percent of map unit:* 3 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## HbC—Hanford coarse sandy loam, 2 to 9 percent slopes

**Map Unit Setting**
*National map unit symbol:* hcf2
*Elevation:* 2,600 to 4,200 feet
*Mean annual precipitation:* 9 to 12 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 200 to 250 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**
*Hanford and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Hanford**

**Setting**
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**
*H1 - 0 to 8 inches:* coarse sandy loam
*H2 - 8 to 39 inches:* sandy loam, coarse sandy loam
*H2 - 8 to 39 inches:* gravelly loamy coarse sand, gravelly coarse sandy loam
*H3 - 39 to 70 inches:*
*H3 - 39 to 70 inches:*

**Properties and qualities**
*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Very high (about 13.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Greenfield**

*Percent of map unit:* 8 percent

**Ramona**

*Percent of map unit:* 5 percent

**Unnamed**

*Percent of map unit:* 2 percent

## HcC—Hanford sandy loam, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcf5
*Elevation:* 2,600 to 4,200 feet
*Mean annual precipitation:* 9 to 12 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 200 to 250 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Hanford and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Hanford**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 8 inches:* sandy loam
*H2 - 8 to 70 inches:* fine sandy loam, sandy loam
*H2 - 8 to 70 inches:*

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Very high (about 14.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Greenfield**

*Percent of map unit:* 10 percent

**Unnamed**

*Percent of map unit:* 5 percent

## HeC—Hanford sandy loam, calcareous variant, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcf7
*Elevation:* 2,800 to 3,000 feet
*Mean annual precipitation:* 10 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 220 to 260 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Hanford variant and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Hanford Variant**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 16 inches:* sandy loam
*H2 - 16 to 36 inches:* fine sandy loam, coarse sandy loam
*H2 - 16 to 36 inches:* sandy loam
*H3 - 36 to 56 inches:* sandy loam, coarse sandy loam
*H4 - 56 to 80 inches:*
*H4 - 56 to 80 inches:*

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 8.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Hanford**

*Percent of map unit:* 5 percent

## MhE2—Millsholm rocky loam, 15 to 30 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hcfs
*Elevation:* 300 to 4,000 feet
*Mean annual precipitation:* 8 to 50 inches
*Mean annual air temperature:* 45 to 63 degrees F
*Frost-free period:* 110 to 330 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Millsholm and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Millsholm

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 20 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

### Minor Components

#### Rock outcrop

*Percent of map unit:* 5 percent

#### Gaviota

*Percent of map unit:* 5 percent

#### Unnamed

*Percent of map unit:* 3 percent
*Landform:* Drainageways

#### Castaic

*Percent of map unit:* 2 percent

## MhF2—Millsholm rocky loam, 30 to 50 percent slopes, eroded

### Map Unit Setting

*National map unit symbol:* hcft
*Elevation:* 300 to 4,000 feet
*Mean annual precipitation:* 8 to 50 inches

*Mean annual air temperature:* 45 to 63 degrees F
*Frost-free period:* 110 to 330 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Millsholm and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Millsholm**

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

**Minor Components**

**Rock outcrop**

*Percent of map unit:* 5 percent

**Unnamed**

*Percent of map unit:* 5 percent

**Castaic**

*Percent of map unit:* 3 percent

**Gaviota**

*Percent of map unit:* 1 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## ObC—Oak Glen sandy loam, 2 to 9 percent slopes

### Map Unit Setting

*National map unit symbol:* hcg1
*Elevation:* 3,400 to 5,200 feet
*Mean annual precipitation:* 15 to 25 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 175 to 200 days
*Farmland classification:* Prime farmland if irrigated

### Map Unit Composition

*Oak glen and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Oak Glen

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 32 inches:* sandy loam
*H2 - 32 to 60 inches:* fine sandy loam, sandy loam, coarse sandy loam
*H2 - 32 to 60 inches:*
*H2 - 32 to 60 inches:*

#### Properties and qualities

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very high (about 13.9 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Hanford**
*Percent of map unit:* 10 percent

**Unnamed**
*Percent of map unit:* 5 percent

## OcC—Oak Glen gravelly sandy loam, 2 to 9 percent slopes

**Map Unit Setting**
*National map unit symbol:* hcg2
*Elevation:* 3,400 to 5,200 feet
*Mean annual precipitation:* 15 to 25 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 175 to 200 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**
*Oak glen and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Oak Glen**

**Setting**
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**
*H1 - 0 to 32 inches:* gravelly sandy loam
*H2 - 32 to 60 inches:* gravelly fine sandy loam, gravelly sandy loam, gravelly coarse sandy loam
*H2 - 32 to 60 inches:*
*H2 - 32 to 60 inches:*

**Properties and qualities**
*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Oak glen**

*Percent of map unit:* 5 percent

## OdC—Oak Glen loam, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcg4
*Elevation:* 3,400 to 5,200 feet
*Mean annual precipitation:* 15 to 25 inches
*Mean annual air temperature:* 55 degrees F
*Frost-free period:* 175 to 200 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Oak glen and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Oak Glen**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 40 inches:* loam
*H2 - 40 to 60 inches:* fine sandy loam, sandy loam, coarse sandy loam
*H2 - 40 to 60 inches:*
*H2 - 40 to 60 inches:*

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very high (about 13.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R020XE024CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Oak glen**

*Percent of map unit:* 5 percent

## RdE2—Ramona sandy loam, 9 to 30 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hcgm
*Elevation:* 2,700 to 3,900 feet
*Mean annual precipitation:* 9 to 12 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Ramona and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Ramona**

**Setting**

*Landform:* Terraces
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 12 inches:* sandy loam
*H2 - 12 to 23 inches:* fine sandy loam
*H3 - 23 to 90 inches:* sandy clay loam

**Properties and qualities**

*Slope:* 9 to 30 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Vernalis**

*Percent of map unit:* 5 percent

**Gullied land**

*Percent of map unit:* 5 percent

**Unnamed**

*Percent of map unit:* 4 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## RzF—Rough broken land

**Map Unit Setting**

*National map unit symbol:* hch4
*Mean annual precipitation:* 14 inches
*Mean annual air temperature:* 61 degrees F
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Rough broken land:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Rough Broken Land**

**Setting**

*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave
*Across-slope shape:* Concave

**Typical profile**
*H1 - 0 to 60 inches:* variable

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

**Minor Components**

**Gullied land**
*Percent of map unit:* 5 percent

**Badlands**
*Percent of map unit:* 5 percent

**Rock outcrop**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Flood plains

## Sa—Sandy alluvial land

**Map Unit Setting**
*National map unit symbol:* hch5
*Mean annual precipitation:* 14 inches
*Mean annual air temperature:* 61 degrees F
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Sandy alluvial land:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sandy Alluvial Land**

**Setting**
*Landform:* Flood plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium

**Typical profile**
*H1 - 0 to 10 inches:* sand
*H2 - 10 to 30 inches:* stratified sand to loam
*H3 - 30 to 60 inches:* stratified gravelly sand to gravelly loam

**Properties and qualities**

*Slope:* 0 to 2 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* About 10 inches
*Frequency of flooding:* Frequent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 6.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* B
*Ecological site:* SANDY 9-20" (R020XE025CA)

**Minor Components**

**Riverwash**

*Percent of map unit:* 10 percent
*Landform:* Drainageways

**Unnamed**

*Percent of map unit:* 5 percent

## ScF2—Saugus loam, 30 to 50 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hch8
*Elevation:* 600 to 2,500 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 275 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Saugus and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Saugus**

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Weakly consoildated alluvium

**Typical profile**

*H1 - 0 to 15 inches:* loam
*H2 - 15 to 42 inches:* loam, sandy loam
*H2 - 15 to 42 inches:* weathered bedrock
*H3 - 42 to 46 inches:*

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 40 to 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 9.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Gaviota**

*Percent of map unit:* 5 percent

**Rough broken land**

*Percent of map unit:* 5 percent

**Balcom**

*Percent of map unit:* 3 percent

**Castaic**

*Percent of map unit:* 2 percent

## W—Water

**Map Unit Composition**

*Water:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Water**

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

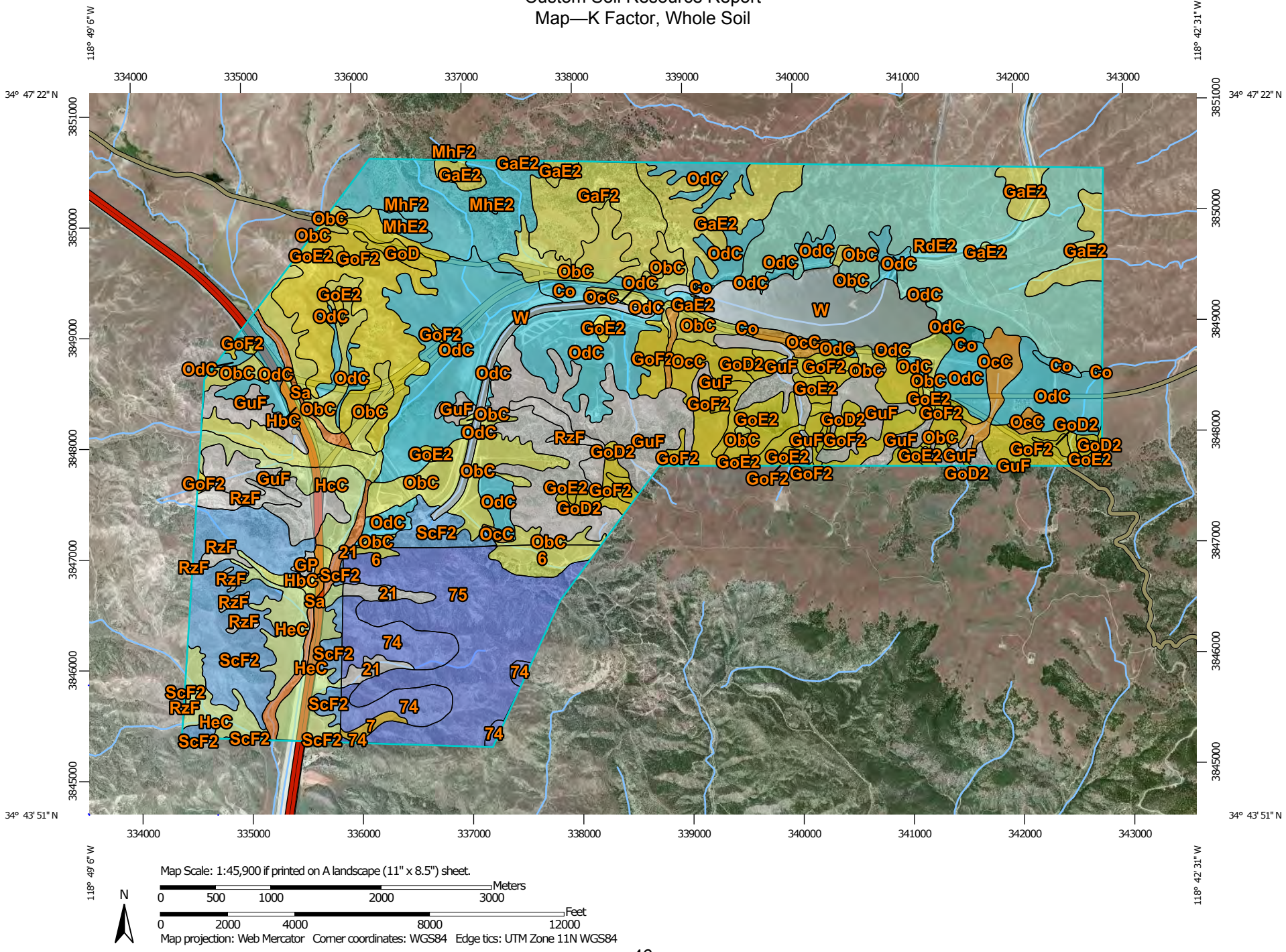
## Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.


118° 49' 6" W
118° 42' 31" W
34° 47' 22" N
34° 43' 51" N
334000
335000
336000
337000
338000
339000
340000
341000
342000
343000
3851000
3850000
3849000
3848000
3847000
3846000
3845000
MhF2
GaE2
MhE2
GaF2
OdC
ObC
GoE2
GoF2
GoD
RdE2
Co
OcC
W
GoD2
GuF
Sa
HbC
RzF
HcC
GP
ScF2
HeC
21
6
75
74
7
Map Scale: 1:45,900 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 500 1000 2000 3000
Feet
0 2000 4000 8000 12000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—K Factor, Whole Soil

| K Factor, Whole Soil— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 6 | Typic Haploxeralfs, 3 to 50 percent slopes | .20 | 58.9 | 0.8% |
| 7 | Hanford family, 3 to 25 percent slopes | .15 | 13.5 | 0.2% |
| 21 | Riverwash | | 43.5 | 0.6% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | .49 | 175.9 | 2.4% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | .49 | 513.1 | 7.0% |
| **Subtotals for Soil Survey Area** | | | **804.9** | **11.0%** |
| **Totals for Area of Interest** | | | **7,293.8** | **100.0%** |

| K Factor, Whole Soil— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| Co | Chino loam | .37 | 63.5 | 0.9% |
| GaE2 | Gaviota rocky sandy loam, 15 to 30 percent slopes, eroded | .20 | 302.2 | 4.1% |
| GaF2 | Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded | .20 | 202.2 | 2.8% |
| GoD | Gorman sandy loam, 9 to 15 percent slopes | .17 | 22.3 | 0.3% |
| GoD2 | Gorman sandy loam, 9 to 15 percent slopes, eroded | .17 | 94.3 | 1.3% |
| GoE2 | Gorman sandy loam, 15 to 30 percent slopes, eroded | .17 | 146.4 | 2.0% |
| GoF2 | Gorman sandy loam, 30 to 50 percent slopes, eroded | .17 | 743.1 | 10.2% |
| GP | Gravel pits | | 7.0 | 0.1% |
| GuF | Gullied land | | 721.3 | 9.9% |
| HbC | Hanford coarse sandy loam, 2 to 9 percent slopes | .20 | 130.2 | 1.8% |
| HcC | Hanford sandy loam, 2 to 9 percent slopes | .24 | 88.3 | 1.2% |
| HeC | Hanford sandy loam, calcareous variant, 2 to 9 percent slopes | .24 | 231.0 | 3.2% |

| K Factor, Whole Soil— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | .37 | 22.7 | 0.3% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | .37 | 263.1 | 3.6% |
| ObC | Oak Glen sandy loam, 2 to 9 percent slopes | .20 | 579.8 | 7.9% |
| OcC | Oak Glen gravelly sandy loam, 2 to 9 percent slopes | .10 | 107.1 | 1.5% |
| OdC | Oak Glen loam, 2 to 9 percent slopes | .37 | 1,037.7 | 14.2% |
| RdE2 | Ramona sandy loam, 9 to 30 percent slopes, eroded | .32 | 841.9 | 11.5% |
| RzF | Rough broken land | | 100.6 | 1.4% |
| Sa | Sandy alluvial land | .05 | 67.3 | 0.9% |
| ScF2 | Saugus loam, 30 to 50 percent slopes, eroded | .43 | 401.4 | 5.5% |
| W | Water | | 315.4 | 4.3% |
| **Subtotals for Soil Survey Area** | | | **6,489.0** | **89.0%** |
| **Totals for Area of Interest** | | | **7,293.8** | **100.0%** |

### Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

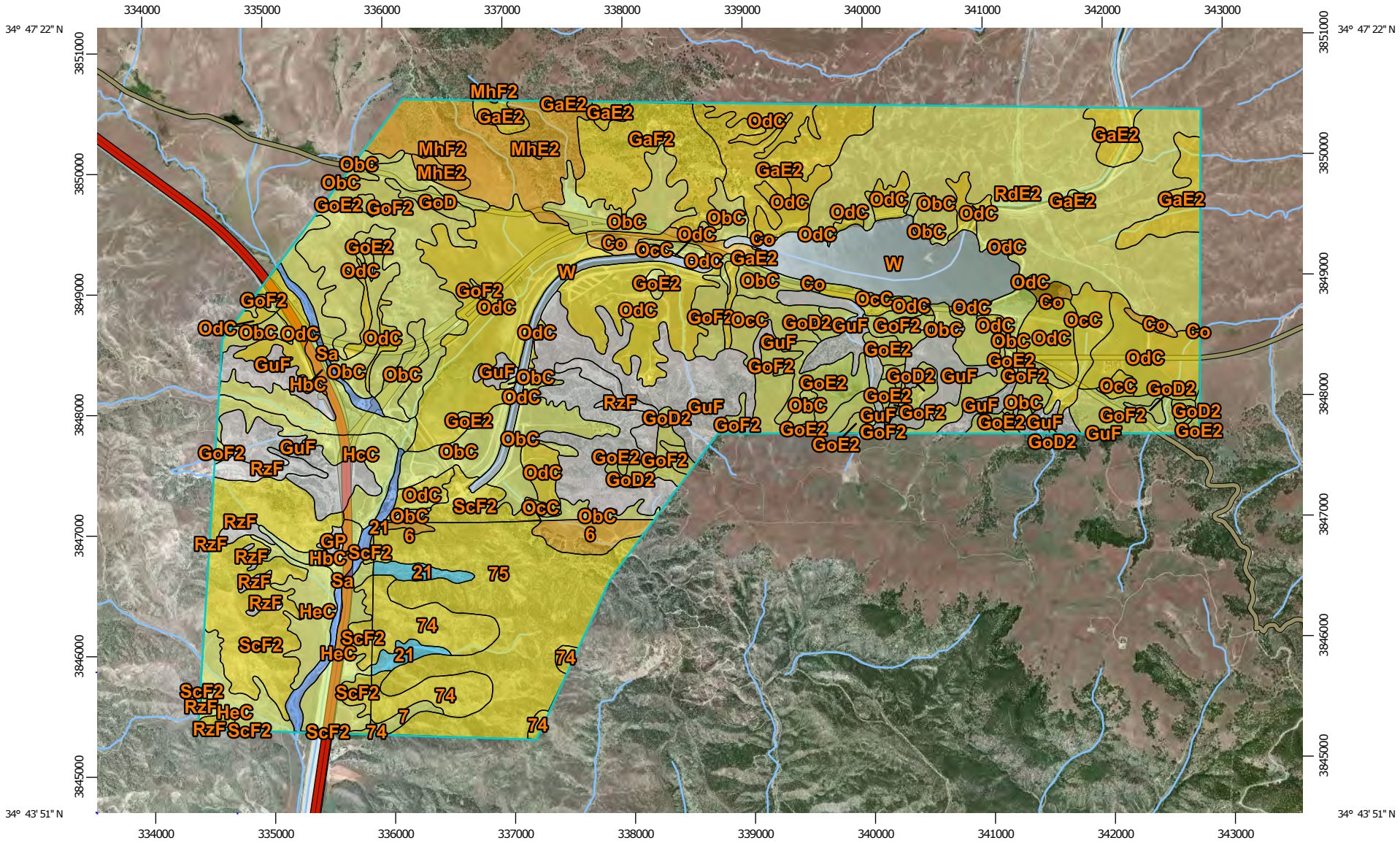
*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

## Wind Erodibility Index

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.




Map Scale: 1:45,900 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Soil Rating Lines**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Soil Rating Points**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—Wind Erodibility Index

| Wind Erodibility Index— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| 6 | Typic Haploxeralfs, 3 to 50 percent slopes | 48 | 58.9 | 0.8% |
| 7 | Hanford family, 3 to 25 percent slopes | 86 | 13.5 | 0.2% |
| 21 | Riverwash | 180 | 43.5 | 0.6% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 56 | 175.9 | 2.4% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 56 | 513.1 | 7.0% |
| **Subtotals for Soil Survey Area** | | | **804.9** | **11.0%** |
| **Totals for Area of Interest** | | | **7,293.8** | **100.0%** |

| Wind Erodibility Index— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| Co | Chino loam | 48 | 63.5 | 0.9% |
| GaE2 | Gaviota rocky sandy loam, 15 to 30 percent slopes, eroded | 56 | 302.2 | 4.1% |
| GaF2 | Gaviota rocky sandy loam, 30 to 50 percent slopes, eroded | 56 | 202.2 | 2.8% |
| GoD | Gorman sandy loam, 9 to 15 percent slopes | 86 | 22.3 | 0.3% |
| GoD2 | Gorman sandy loam, 9 to 15 percent slopes, eroded | 86 | 94.3 | 1.3% |
| GoE2 | Gorman sandy loam, 15 to 30 percent slopes, eroded | 86 | 146.4 | 2.0% |
| GoF2 | Gorman sandy loam, 30 to 50 percent slopes, eroded | 86 | 743.1 | 10.2% |
| GP | Gravel pits | | 7.0 | 0.1% |
| GuF | Gullied land | | 721.3 | 9.9% |
| HbC | Hanford coarse sandy loam, 2 to 9 percent slopes | 86 | 130.2 | 1.8% |
| HcC | Hanford sandy loam, 2 to 9 percent slopes | 86 | 88.3 | 1.2% |

| Wind Erodibility Index— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| HeC | Hanford sandy loam, calcareous variant, 2 to 9 percent slopes | 86 | 231.0 | 3.2% |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | 48 | 22.7 | 0.3% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | 48 | 263.1 | 3.6% |
| ObC | Oak Glen sandy loam, 2 to 9 percent slopes | 86 | 579.8 | 7.9% |
| OcC | Oak Glen gravelly sandy loam, 2 to 9 percent slopes | 56 | 107.1 | 1.5% |
| OdC | Oak Glen loam, 2 to 9 percent slopes | 56 | 1,037.7 | 14.2% |
| RdE2 | Ramona sandy loam, 9 to 30 percent slopes, eroded | 86 | 841.9 | 11.5% |
| RzF | Rough broken land | | 100.6 | 1.4% |
| Sa | Sandy alluvial land | 220 | 67.3 | 0.9% |
| ScF2 | Saugus loam, 30 to 50 percent slopes, eroded | 56 | 401.4 | 5.5% |
| W | Water | | 315.4 | 4.3% |
| **Subtotals for Soil Survey Area** | | | **6,489.0** | **89.0%** |
| **Totals for Area of Interest** | | | **7,293.8** | **100.0%** |

## Rating Options—Wind Erodibility Index

*Units of Measure:* tons per acre per year

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

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# Appendix E

## *USDA-NRCS Custom Soil Resource Report of the Peace Valley Areas*

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United States Department of Agriculture

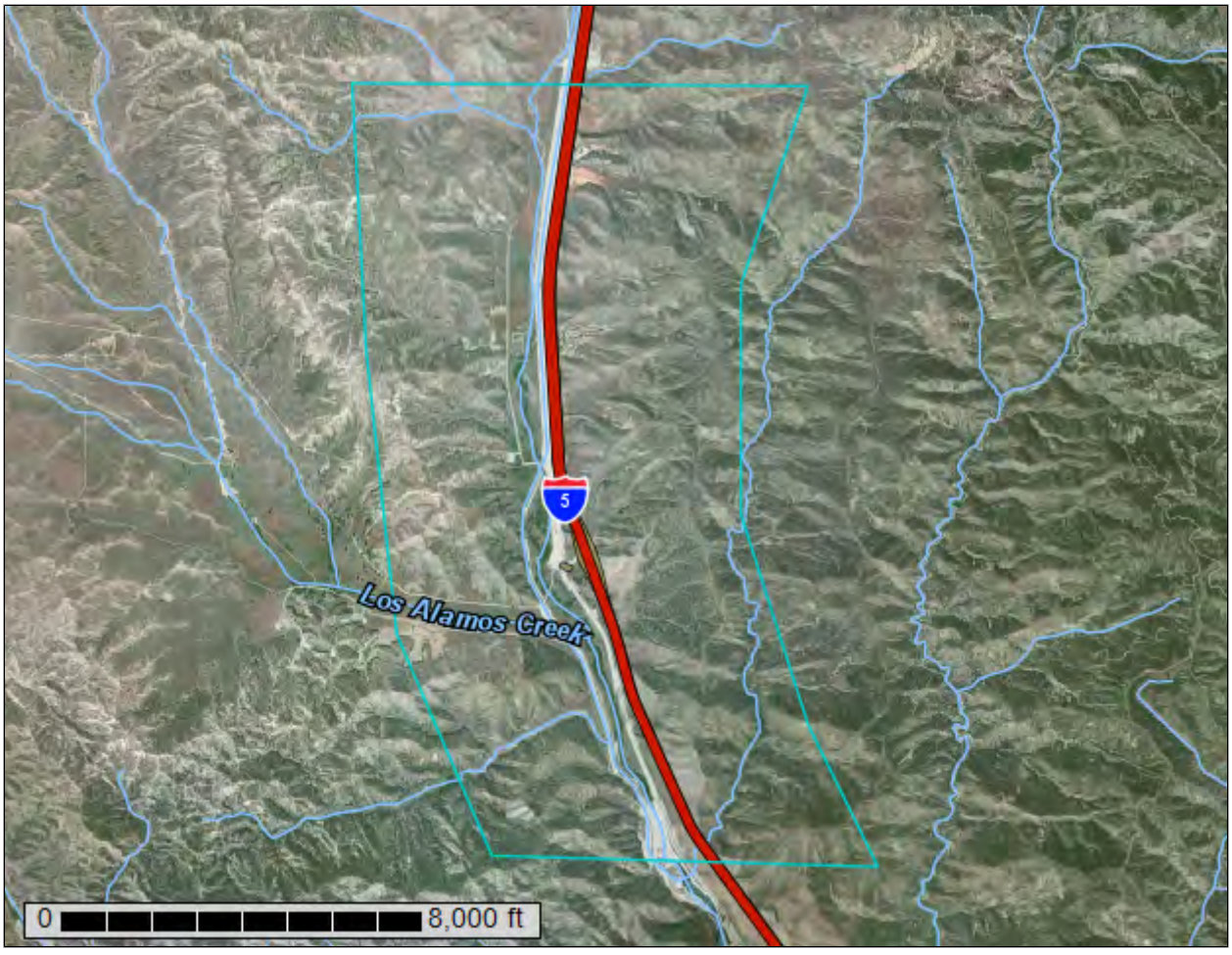
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Angeles National Forest Area, California, and Antelope Valley Area, California

## Peace Valley




November 9, 2015

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

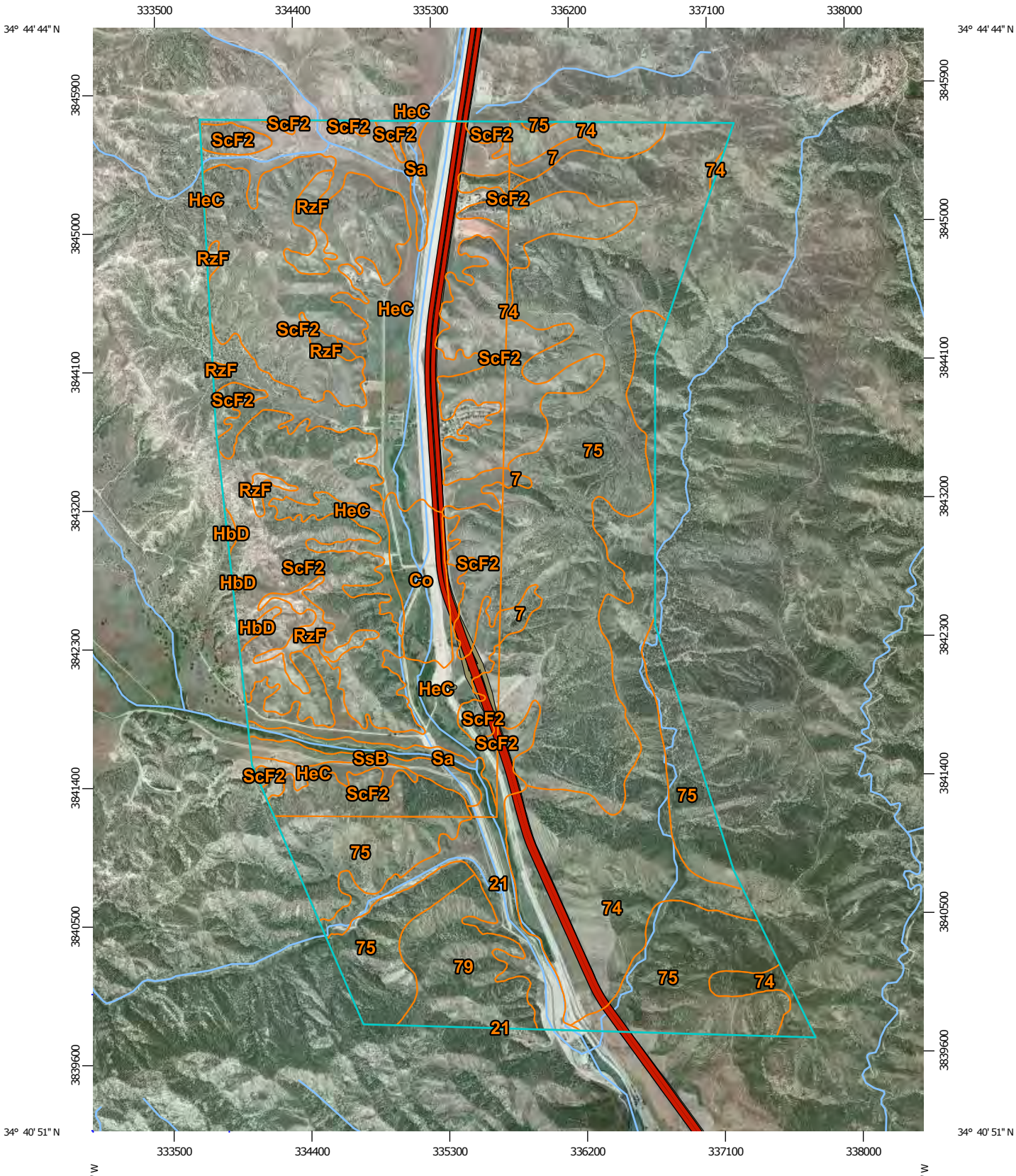
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:35,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Angeles National Forest Area, California (CA776) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 7 | Hanford family, 3 to 25 percent slopes | 28.7 | 0.7% |
| 21 | Riverwash | 141.7 | 3.3% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 670.1 | 15.6% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 1,279.2 | 29.7% |
| 79 | Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes | 140.6 | 3.3% |
| **Subtotals for Soil Survey Area** | | **2,260.3** | **52.6%** |
| **Totals for Area of Interest** | | **4,300.3** | **100.0%** |

| Antelope Valley Area, California (CA675) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| Co | Chino loam | 86.0 | 2.0% |
| HbD | Hanford coarse sandy loam, 9 to 15 percent slopes | 10.4 | 0.2% |
| HeC | Hanford sandy loam, calcareous variant, 2 to 9 percent slopes | 709.5 | 16.5% |
| RzF | Rough broken land | 81.0 | 1.9% |
| Sa | Sandy alluvial land | 57.5 | 1.3% |
| ScF2 | Saugus loam, 30 to 50 percent slopes, eroded | 1,056.9 | 24.6% |
| SsB | Sorrento loam, 2 to 5 percent slopes | 38.7 | 0.9% |
| **Subtotals for Soil Survey Area** | | **2,040.0** | **47.4%** |
| **Totals for Area of Interest** | | **4,300.3** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape,

however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and

relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Angeles National Forest Area, California

## 7—Hanford family, 3 to 25 percent slopes

### Map Unit Setting

*National map unit symbol:* hm80
*Elevation:* 2,700 to 4,400 feet
*Mean annual precipitation:* 11 to 15 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Hanford family and similar soils:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hanford Family

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 13 inches:* sandy loam
*H2 - 13 to 36 inches:* fine sandy loam, sandy loam
*H2 - 13 to 36 inches:* sandy loam
*H3 - 36 to 60 inches:*

#### Properties and qualities

*Slope:* 3 to 25 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* A

### Minor Components

#### Typic haploxeralfs

*Percent of map unit:* 5 percent

#### Vista family

*Percent of map unit:* 5 percent

**Trigo family**
*Percent of map unit:* 5 percent

**Hanford family**
*Percent of map unit:* 5 percent

**Riverwash**
*Percent of map unit:* 5 percent
*Landform:* Channels

## 21—Riverwash

### Map Unit Setting

*National map unit symbol:* hm6p
*Elevation:* 1,800 to 4,800 feet
*Mean annual precipitation:* 14 to 30 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Riverwash:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Riverwash

#### Setting

*Landform:* Alluvial flats
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 60 inches:* extremely stony coarse sand

#### Properties and qualities

*Slope:* 2 to 10 percent
*Percent of area covered with surface fragments:* 25.0 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Frequency of flooding:* Frequent
*Available water storage in profile:* Very low (about 0.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8w

**Minor Components**

**Hanford family**
*Percent of map unit:* 7 percent

**Vista family**
*Percent of map unit:* 6 percent

**Capistrano family**
*Percent of map unit:* 6 percent

**Tujunga family**
*Percent of map unit:* 6 percent

## 74—Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm87
*Elevation:* 2,200 to 3,730 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Rock outcrop:* 25 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**
*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock

*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Calleguas Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Rock Outcrop

**Setting**

*Landform:* Scarps
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 10 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 0 inches to paralithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e

**Minor Components**

**Rubble land**

*Percent of map unit:* 4 percent

**Unnamed, colluvial soils**

*Percent of map unit:* 3 percent

**Trigo family, fine textured**

*Percent of map unit:* 3 percent

## 75—Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes

**Map Unit Setting**

*National map unit symbol:* hm88
*Elevation:* 2,400 to 4,000 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Haploxeralfs and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave

*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Calleguas Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Haploxeralfs

### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

### Typical profile

*H1 - 0 to 6 inches:* gravelly loam
*H2 - 6 to 15 inches:* gravelly clay loam, gravelly sandy clay loam
*H2 - 6 to 15 inches:* unweathered bedrock
*H3 - 15 to 19 inches:*

### Properties and qualities

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 7 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Minor Components

### Osito family

*Percent of map unit:* 3 percent

### Unnamed, moderately deep soils

*Percent of map unit:* 3 percent

### Modesto family

*Percent of map unit:* 3 percent

### Rock outcrop

*Percent of map unit:* 2 percent

### Vertic xerochrepts

*Percent of map unit:* 2 percent

### Caperton family

*Percent of map unit:* 2 percent

## 79—Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes

### Map Unit Setting

*National map unit symbol:* hm8c
*Elevation:* 2,500 to 4,000 feet
*Mean annual precipitation:* 15 to 21 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Trigo family and similar soils:* 45 percent
*Lodo family and similar soils:* 25 percent
*Haploxerolls, warm, and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Trigo Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 20 inches:*

#### Properties and qualities

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Lodo Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from schist

**Typical profile**

*H1 - 0 to 17 inches:* gravelly loam
*H2 - 17 to 21 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 6 to 19 inches to lithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Haploxerolls, Warm

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Colluvium derived from sandstone and/or colluvium derived from schist

**Typical profile**

*H1 - 0 to 10 inches:* gravelly loam
*H2 - 10 to 60 inches:* very gravelly loam, very gravelly sandy loam
*H2 - 10 to 60 inches:* weathered bedrock
*H3 - 60 to 64 inches:*

**Properties and qualities**

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 60 to 60 inches to paralithic bedrock
*Natural drainage class:* Well drained

*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* A

**Minor Components**

**Rock outcrop**

*Percent of map unit:* 5 percent

**Mollic haploxeralfs**

*Percent of map unit:* 5 percent

**Caperton family**

*Percent of map unit:* 5 percent

# Antelope Valley Area, California

## Co—Chino loam

### Map Unit Setting

*National map unit symbol:* hcdd
*Elevation:* 3,100 feet
*Mean annual precipitation:* 8 to 20 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 230 to 340 days
*Farmland classification:* Prime farmland if irrigated and drained

### Map Unit Composition

*Chino and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Chino

#### Setting

*Landform:* Valleys
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 60 inches:* silty clay loam

#### Properties and qualities

*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* About 16 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 7.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 2w
*Land capability classification (nonirrigated):* 4w
*Hydrologic Soil Group:* C/D
*Ecological site:* WET MEADOW 9-20" (R019XD067CA)

### Minor Components

#### Unnamed

*Percent of map unit:* 10 percent

**Hanford**
*Percent of map unit:* 2 percent

**Mocho**
*Percent of map unit:* 1 percent

**Sorrento**
*Percent of map unit:* 1 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## HbD—Hanford coarse sandy loam, 9 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hcf3
*Elevation:* 2,600 to 4,200 feet
*Mean annual precipitation:* 9 to 12 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 200 to 250 days
*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Hanford and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hanford

#### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 8 inches:* coarse sandy loam
*H2 - 8 to 39 inches:* sandy loam, coarse sandy loam
*H2 - 8 to 39 inches:* gravelly loamy coarse sand, gravelly coarse sandy loam
*H3 - 39 to 70 inches:*
*H3 - 39 to 70 inches:*

#### Properties and qualities

*Slope:* 9 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)

*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Very high (about 13.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 3e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 5 percent

**Ramona**

*Percent of map unit:* 5 percent

**Greenfield**

*Percent of map unit:* 5 percent

## HeC—Hanford sandy loam, calcareous variant, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcf7
*Elevation:* 2,800 to 3,000 feet
*Mean annual precipitation:* 10 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 220 to 260 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Hanford variant and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Hanford Variant**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

**Typical profile**

*H1 - 0 to 16 inches:* sandy loam
*H2 - 16 to 36 inches:* fine sandy loam, coarse sandy loam
*H2 - 16 to 36 inches:* sandy loam

*H3 - 36 to 56 inches:* sandy loam, coarse sandy loam
*H4 - 56 to 80 inches:*
*H4 - 56 to 80 inches:*

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 8.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Unnamed**

*Percent of map unit:* 10 percent

**Hanford**

*Percent of map unit:* 5 percent

## RzF—Rough broken land

**Map Unit Setting**

*National map unit symbol:* hch4
*Mean annual precipitation:* 14 inches
*Mean annual air temperature:* 61 degrees F
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Rough broken land:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Rough Broken Land**

**Setting**

*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave

**Typical profile**
*H1 - 0 to 60 inches:* variable

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

**Minor Components**

**Gullied land**
*Percent of map unit:* 5 percent

**Badlands**
*Percent of map unit:* 5 percent

**Rock outcrop**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Flood plains

## Sa—Sandy alluvial land

**Map Unit Setting**
*National map unit symbol:* hch5
*Mean annual precipitation:* 14 inches
*Mean annual air temperature:* 61 degrees F
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Sandy alluvial land:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sandy Alluvial Land**

**Setting**
*Landform:* Flood plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium

**Typical profile**
*H1 - 0 to 10 inches:* sand
*H2 - 10 to 30 inches:* stratified sand to loam
*H3 - 30 to 60 inches:* stratified gravelly sand to gravelly loam

**Properties and qualities**
*Slope:* 0 to 2 percent

*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* About 10 inches
*Frequency of flooding:* Frequent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Moderate (about 6.1 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* B
*Ecological site:* SANDY 9-20" (R020XE025CA)

**Minor Components**

**Riverwash**
*Percent of map unit:* 10 percent
*Landform:* Drainageways

**Unnamed**
*Percent of map unit:* 5 percent

## ScF2—Saugus loam, 30 to 50 percent slopes, eroded

**Map Unit Setting**
*National map unit symbol:* hch8
*Elevation:* 600 to 2,500 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 275 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Saugus and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Saugus**

**Setting**
*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Weakly consoildated alluvium

**Typical profile**
*H1 - 0 to 15 inches:* loam
*H2 - 15 to 42 inches:* loam, sandy loam

*H2 - 15 to 42 inches:* weathered bedrock
*H3 - 42 to 46 inches:*

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 40 to 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 9.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Gaviota**

*Percent of map unit:* 5 percent

**Rough broken land**

*Percent of map unit:* 5 percent

**Balcom**

*Percent of map unit:* 3 percent

**Castaic**

*Percent of map unit:* 2 percent

## SsB—Sorrento loam, 2 to 5 percent slopes

**Map Unit Setting**

*National map unit symbol:* hchh
*Elevation:* 80 to 1,800 feet
*Mean annual precipitation:* 12 to 20 inches
*Mean annual air temperature:* 64 degrees F
*Frost-free period:* 200 to 300 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Sorrento and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

## Description of Sorrento

### Setting

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Mixed alluvium

### Typical profile

*H1 - 0 to 7 inches:* loam
*H2 - 7 to 72 inches:* loam

### Properties and qualities

*Slope:* 2 to 5 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* High (about 9.6 inches)

### Interpretive groups

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B

## Minor Components

### Metz

*Percent of map unit:* 5 percent

### Mocho

*Percent of map unit:* 5 percent

### Yolo

*Percent of map unit:* 5 percent

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

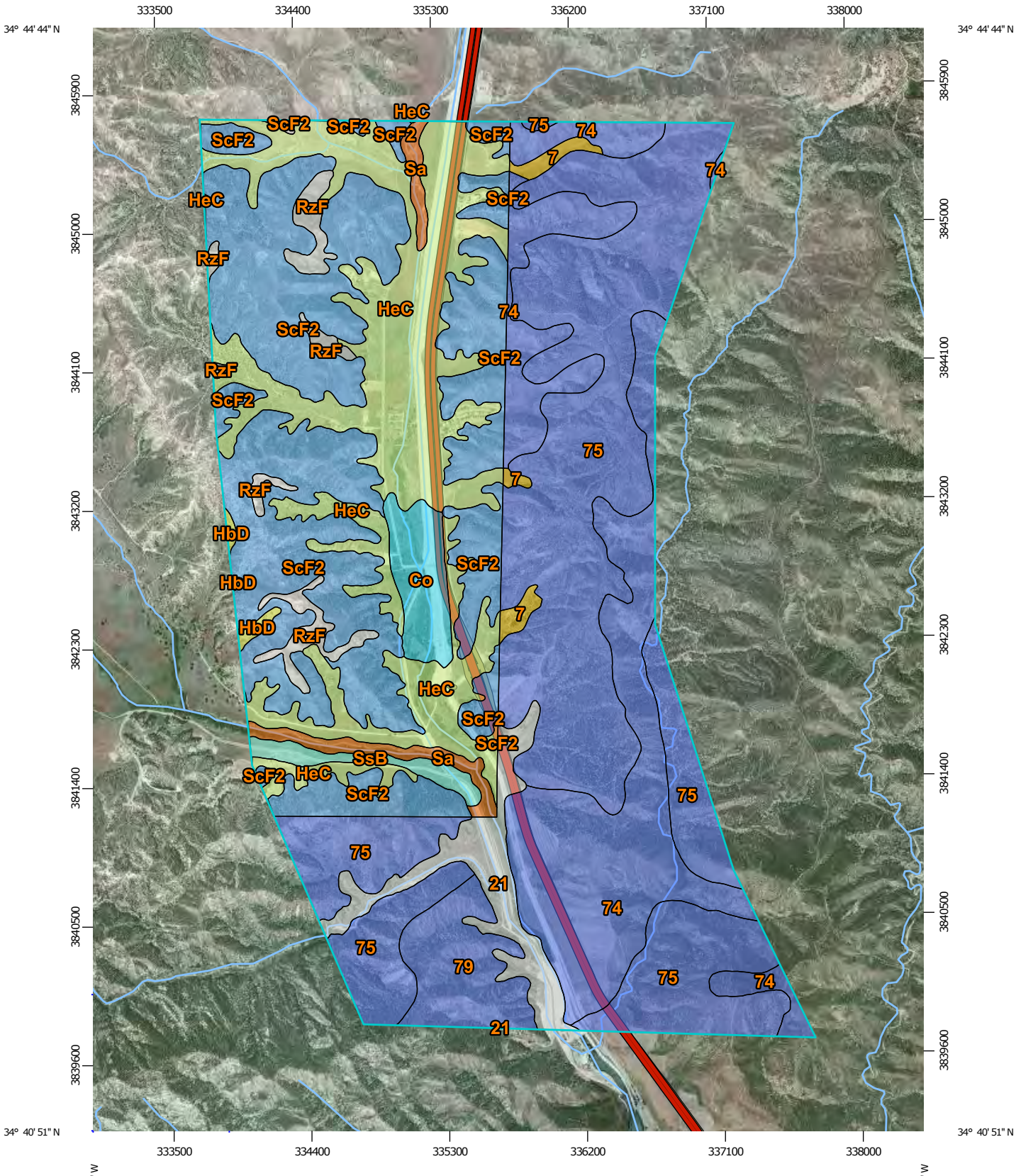
## Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.




Map Scale: 1:35,000 if printed on A portrait (8.5" x 11") sheet.

N

0 500 1000 2000 3000 Meters

0 1500 3000 6000 9000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—K Factor, Whole Soil

| K Factor, Whole Soil— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 7 | Hanford family, 3 to 25 percent slopes | .15 | 28.7 | 0.7% |
| 21 | Riverwash | | 141.7 | 3.3% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | .49 | 670.1 | 15.6% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | .49 | 1,279.2 | 29.7% |
| 79 | Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes | .49 | 140.6 | 3.3% |
| **Subtotals for Soil Survey Area** | | | **2,260.3** | **52.6%** |
| **Totals for Area of Interest** | | | **4,300.3** | **100.0%** |

| K Factor, Whole Soil— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| Co | Chino loam | .37 | 86.0 | 2.0% |
| HbD | Hanford coarse sandy loam, 9 to 15 percent slopes | .20 | 10.4 | 0.2% |
| HeC | Hanford sandy loam, calcareous variant, 2 to 9 percent slopes | .24 | 709.5 | 16.5% |
| RzF | Rough broken land | | 81.0 | 1.9% |
| Sa | Sandy alluvial land | .05 | 57.5 | 1.3% |
| ScF2 | Saugus loam, 30 to 50 percent slopes, eroded | .43 | 1,056.9 | 24.6% |
| SsB | Sorrento loam, 2 to 5 percent slopes | .32 | 38.7 | 0.9% |
| **Subtotals for Soil Survey Area** | | | **2,040.0** | **47.4%** |
| **Totals for Area of Interest** | | | **4,300.3** | **100.0%** |

## Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

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# Appendix F

## *USDA-NRCS Custom Soil Resource Report of the Pyramid Dam and Lake Areas*

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United States Department of Agriculture

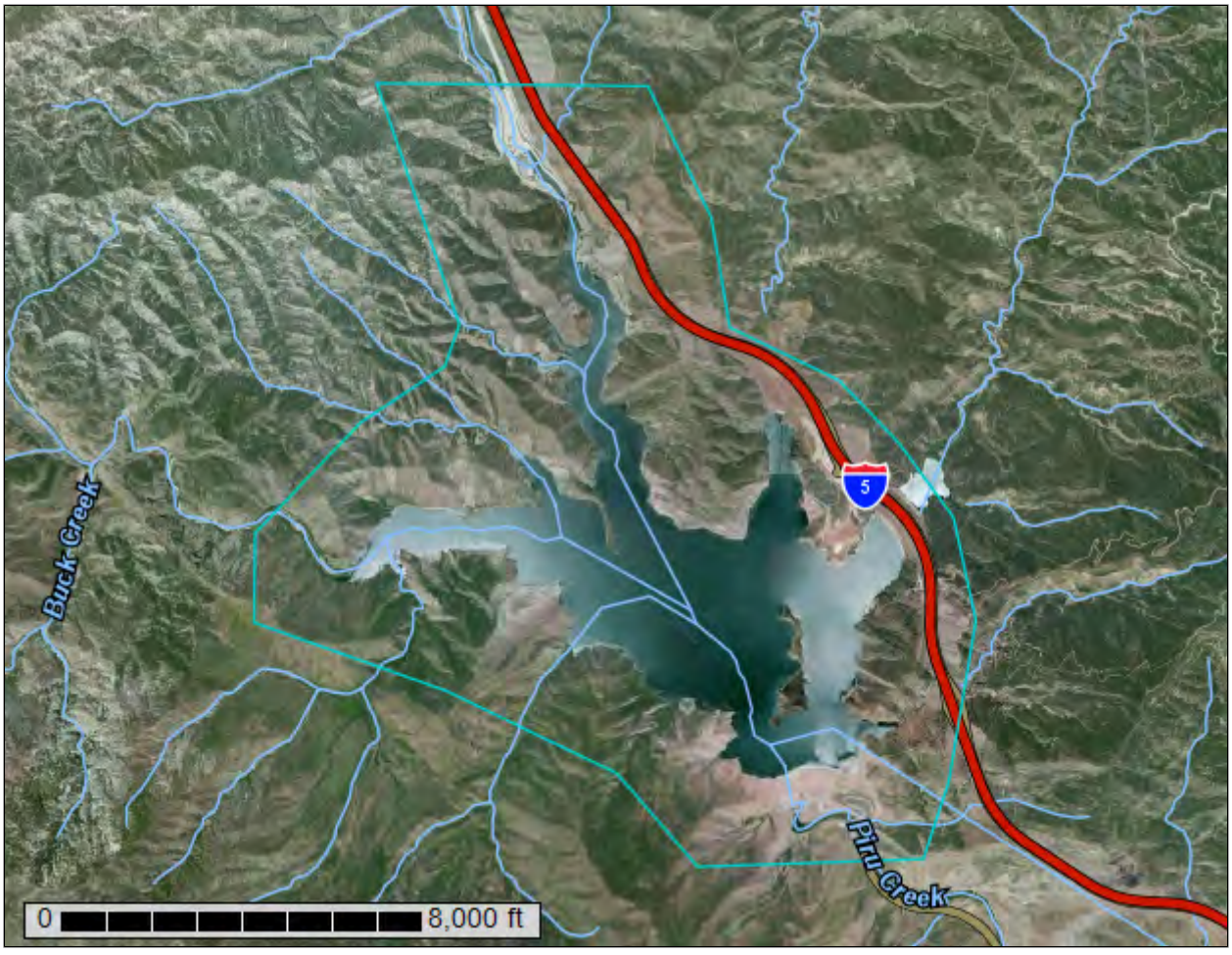
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Angeles National Forest Area, California, and Los Padres National Forest Area, California

## Pyramid Dam and Lake




November 9, 2015

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

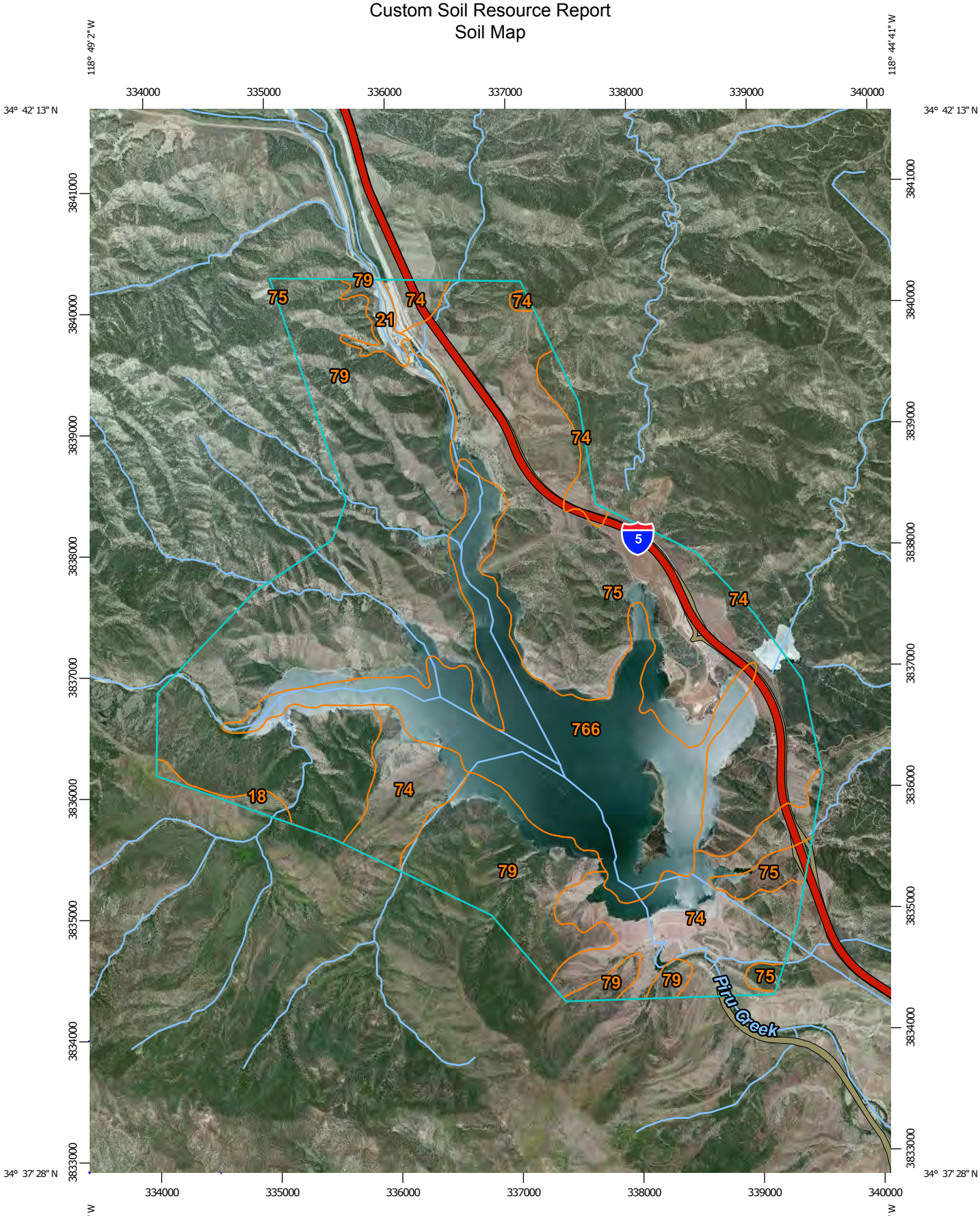
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map




Map Scale: 1:42,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Los Padres National Forest Area, California
Survey Area Data: Version 7, Sep 3, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Angeles National Forest Area, California (CA776) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 21 | Riverwash | 44.9 | 0.9% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 690.2 | 14.1% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 1,399.2 | 28.5% |
| 79 | Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes | 1,839.1 | 37.5% |
| 766 | Water | 910.7 | 18.5% |
| **Subtotals for Soil Survey Area** | | **4,884.1** | **99.5%** |
| **Totals for Area of Interest** | | **4,909.8** | **100.0%** |

| Los Padres National Forest Area, California (CA772) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 18 | Lodo-Modjeska-Botella families association, 10 to 70 percent slopes | 25.6 | 0.5% |
| **Subtotals for Soil Survey Area** | | **25.6** | **0.5%** |
| **Totals for Area of Interest** | | **4,909.8** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a

particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Angeles National Forest Area, California

## 21—Riverwash

### Map Unit Setting

*National map unit symbol:* hm6p
*Elevation:* 1,800 to 4,800 feet
*Mean annual precipitation:* 14 to 30 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Riverwash:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Riverwash

#### Setting

*Landform:* Alluvial flats
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 60 inches:* extremely stony coarse sand

#### Properties and qualities

*Slope:* 2 to 10 percent
*Percent of area covered with surface fragments:* 25.0 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Frequency of flooding:* Frequent
*Available water storage in profile:* Very low (about 0.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8w

### Minor Components

#### Hanford family

*Percent of map unit:* 7 percent

#### Vista family

*Percent of map unit:* 6 percent

#### Capistrano family

*Percent of map unit:* 6 percent

#### Tujunga family

*Percent of map unit:* 6 percent

## 74—Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes

### Map Unit Setting

*National map unit symbol:* hm87
*Elevation:* 2,200 to 3,730 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Rock outcrop:* 25 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Trigo Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

#### Properties and qualities

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Description of Calleguas Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Description of Rock Outcrop

#### Setting

*Landform:* Scarps
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 10 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 0 inches to paralithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e

**Minor Components**

**Rubble land**
*Percent of map unit:* 4 percent

**Unnamed, colluvial soils**
*Percent of map unit:* 3 percent

**Trigo family, fine textured**
*Percent of map unit:* 3 percent

## 75—Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm88
*Elevation:* 2,400 to 4,000 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Haploxeralfs and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**
*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock

*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Calleguas Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**
*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Haploxeralfs**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 6 inches:* gravelly loam
*H2 - 6 to 15 inches:* gravelly clay loam, gravelly sandy clay loam
*H2 - 6 to 15 inches:* unweathered bedrock
*H3 - 15 to 19 inches:*

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 7 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Minor Components**

**Osito family**

*Percent of map unit:* 3 percent

**Unnamed, moderately deep soils**

*Percent of map unit:* 3 percent

**Modesto family**

*Percent of map unit:* 3 percent

**Rock outcrop**

*Percent of map unit:* 2 percent

**Vertic xerochrepts**

*Percent of map unit:* 2 percent

**Caperton family**

*Percent of map unit:* 2 percent

## 79—Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes

**Map Unit Setting**

*National map unit symbol:* hm8c
*Elevation:* 2,500 to 4,000 feet
*Mean annual precipitation:* 15 to 21 inches

*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Trigo family and similar soils:* 45 percent
*Lodo family and similar soils:* 25 percent
*Haploxerolls, warm, and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 20 inches:*

**Properties and qualities**

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Description of Lodo Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from schist

**Typical profile**

*H1 - 0 to 17 inches:* gravelly loam
*H2 - 17 to 21 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 6 to 19 inches to lithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Haploxerolls, Warm

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Colluvium derived from sandstone and/or colluvium derived from schist

**Typical profile**

*H1 - 0 to 10 inches:* gravelly loam
*H2 - 10 to 60 inches:* very gravelly loam, very gravelly sandy loam
*H2 - 10 to 60 inches:* weathered bedrock
*H3 - 60 to 64 inches:*

**Properties and qualities**

*Slope:* 50 to 90 percent
*Depth to restrictive feature:* 60 to 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* A

## Minor Components

**Rock outcrop**

*Percent of map unit:* 5 percent

**Mollic haploxeralfs**

*Percent of map unit:* 5 percent

**Caperton family**
*Percent of map unit:* 5 percent

## 766—Water

**Map Unit Composition**
*Water:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Water**

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

# Los Padres National Forest Area, California

## 18—Lodo-Modjeska-Botella families association, 10 to 70 percent slopes

### Map Unit Setting

*National map unit symbol:* hm54
*Elevation:* 1,300 to 5,800 feet
*Mean annual precipitation:* 14 to 22 inches
*Mean annual air temperature:* 57 to 64 degrees F
*Frost-free period:* 250 to 300 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Modjeska family and similar soils:* 30 percent
*Lodo family and similar soils:* 30 percent
*Botella family and similar soils:* 20 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lodo Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 7 inches:* sandy loam
*H2 - 7 to 16 inches:* gravelly sandy loam
*H3 - 16 to 26 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 10 to 70 percent
*Depth to restrictive feature:* 15 to 20 inches to lithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 1.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Description of Modjeska Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank

*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from granodiorite

**Typical profile**

*H1 - 0 to 13 inches:* sandy loam
*H2 - 13 to 27 inches:* extremely gravelly sandy loam, very gravelly sandy loam
*H2 - 13 to 27 inches:* unweathered bedrock
*H3 - 27 to 31 inches:*

**Properties and qualities**

*Slope:* 10 to 70 percent
*Depth to restrictive feature:* 20 to 40 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* B

**Description of Botella Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 9 inches:* sandy loam
*H2 - 9 to 40 inches:* gravelly sandy loam, gravelly sandy clay loam
*H2 - 9 to 40 inches:* unweathered bedrock
*H3 - 40 to 44 inches:*

**Properties and qualities**

*Slope:* 10 to 70 percent
*Depth to restrictive feature:* 40 to 60 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 8.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* A

**Minor Components**

**Rock outcrop**
*Percent of map unit:* 7 percent

**Oak glen family**
*Percent of map unit:* 7 percent

**Chualar family**
*Percent of map unit:* 6 percent

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Erosion Factors

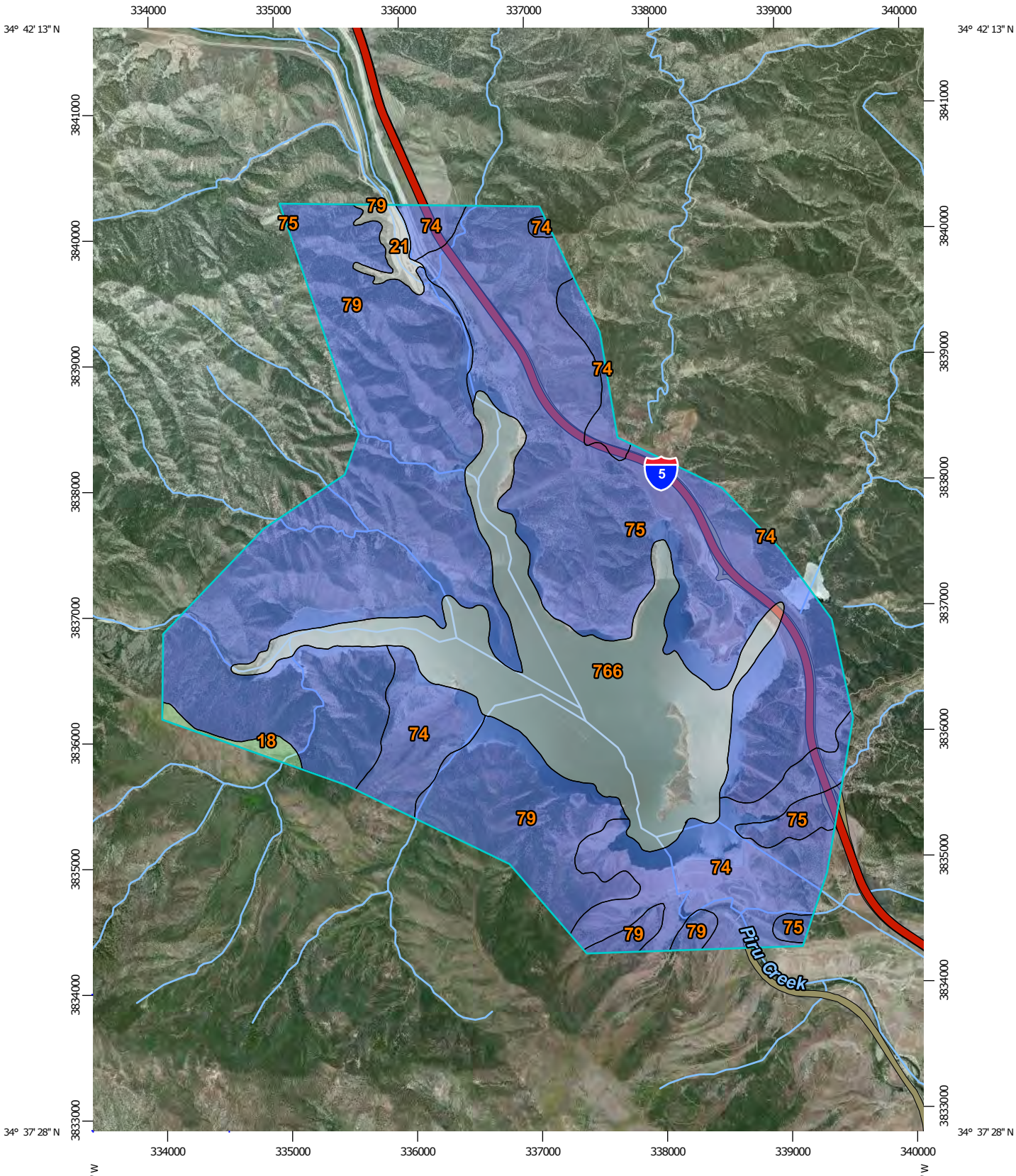
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

# Custom Soil Resource Report
## Map—K Factor, Whole Soil




Map Scale: 1:42,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Los Padres National Forest Area, California
Survey Area Data: Version 7, Sep 3, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—K Factor, Whole Soil

| K Factor, Whole Soil— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 21 | Riverwash | | 44.9 | 0.9% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | .49 | 690.2 | 14.1% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | .49 | 1,399.2 | 28.5% |
| 79 | Trigo-Lodo families-Haploxerolls, warm complex, 50 to 90 percent slopes | .49 | 1,839.1 | 37.5% |
| 766 | Water | | 910.7 | 18.5% |
| **Subtotals for Soil Survey Area** | | | **4,884.1** | **99.5%** |
| **Totals for Area of Interest** | | | **4,909.8** | **100.0%** |

| K Factor, Whole Soil— Summary by Map Unit — Los Padres National Forest Area, California (CA772) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 18 | Lodo-Modjeska-Botella families association, 10 to 70 percent slopes | .28 | 25.6 | 0.5% |
| **Subtotals for Soil Survey Area** | | | **25.6** | **0.5%** |
| **Totals for Area of Interest** | | | **4,909.8** | **100.0%** |

## Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

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# Appendix G

## *USDA-NRCS Custom Soil Resource Report of the Castaic Penstocks and Powerplant Areas and Elderberry Forebay Dam and Forebay Area*

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United States Department of Agriculture

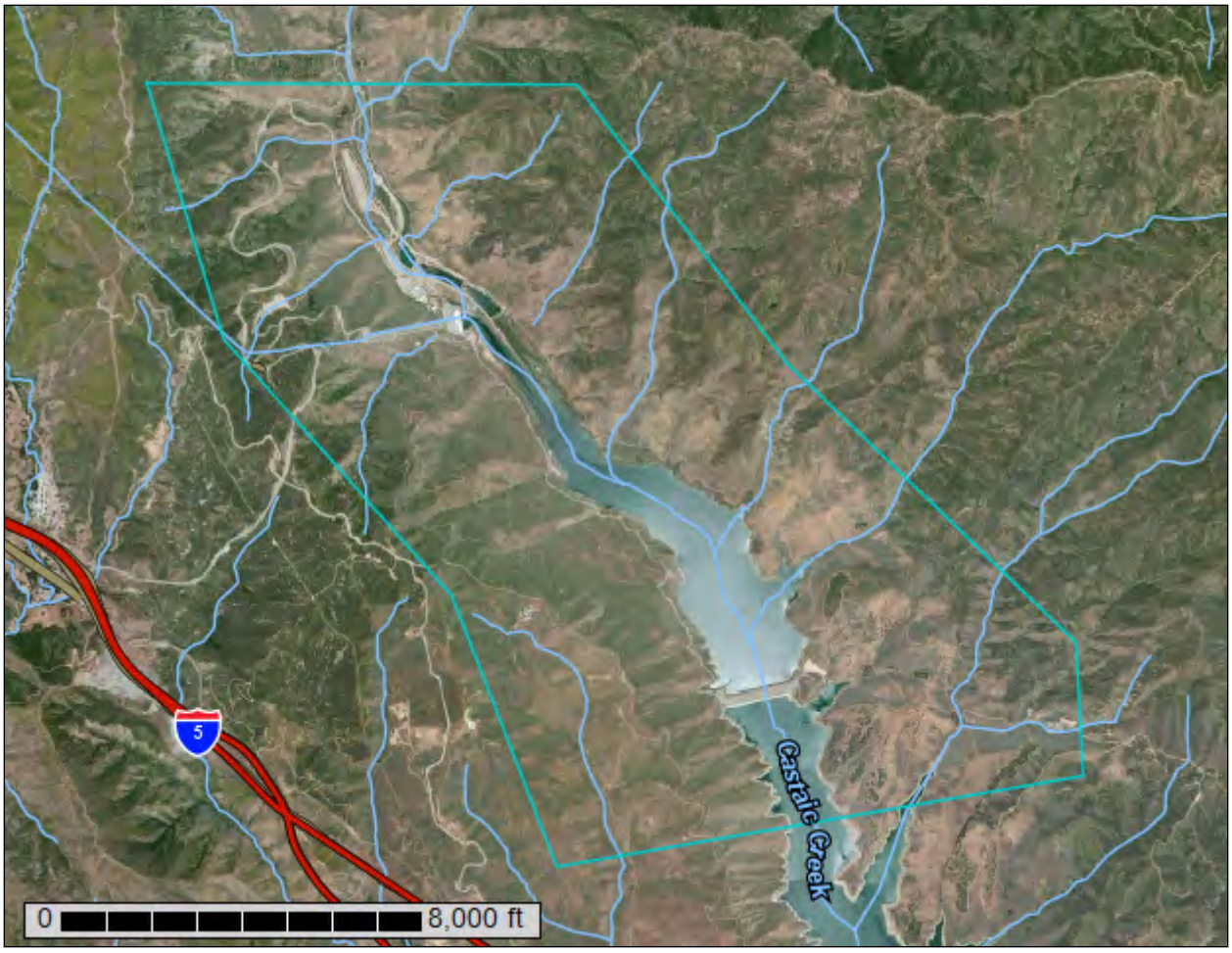
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

# Custom Soil Resource Report for Angeles National Forest Area, California, and Antelope Valley Area, California

## Castaic-Elderberry




November 9, 2015

# Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# Contents

# How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

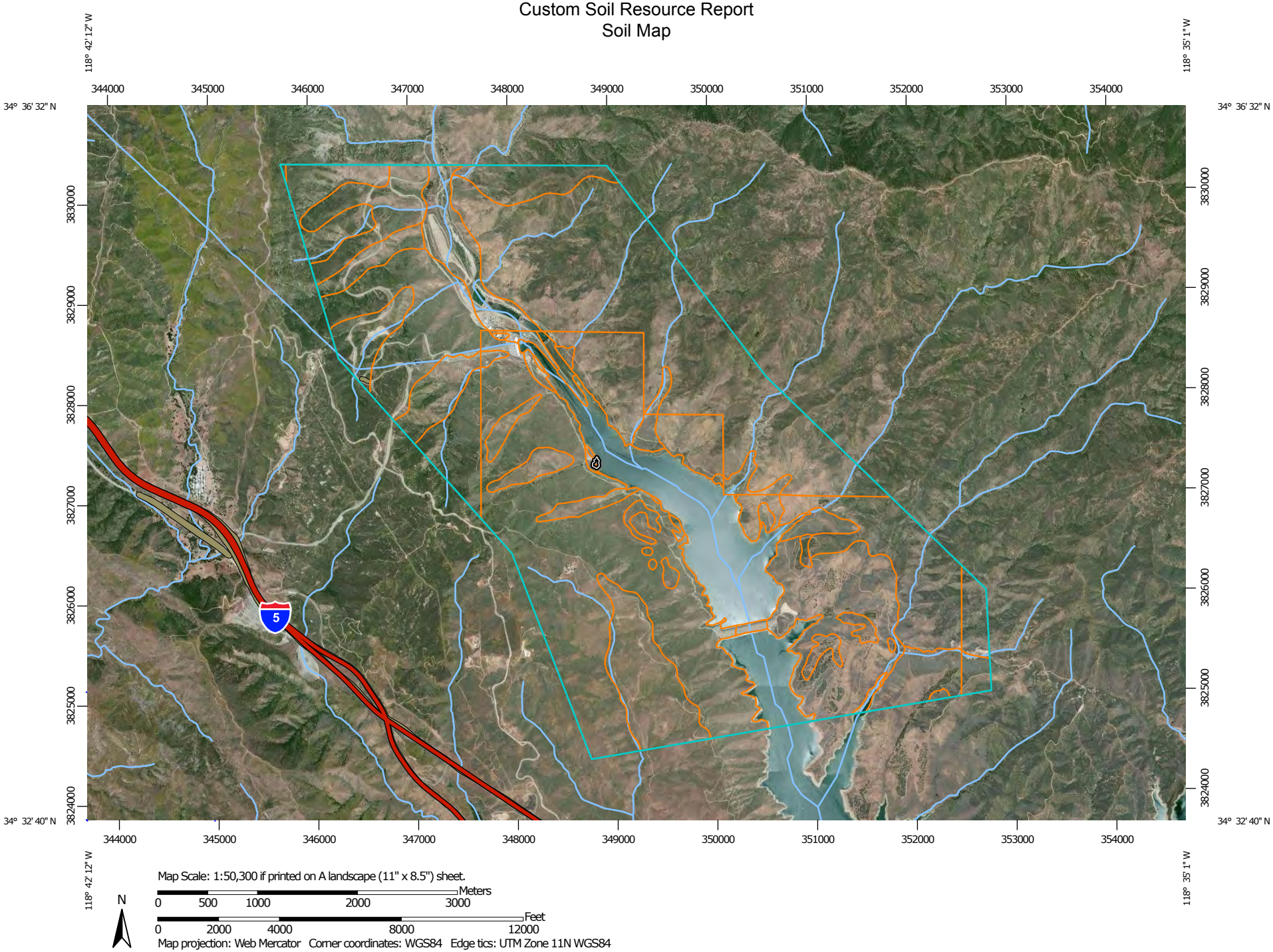
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report
## Soil Map



## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

**Transportation**
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

# Map Unit Legend

| Angeles National Forest Area, California (CA776) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| 19 | Trigo family-Calcixerollic Xerochrepts-Vista family complex, 30 to 70 percent slopes | 27.0 | 0.5% |
| 21 | Riverwash | 149.7 | 2.6% |
| 26 | Stonyford-Millsholm families complex, 30 to 70 percent slopes | 1,195.7 | 21.0% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 361.1 | 6.3% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 589.2 | 10.3% |
| 82 | Vertic Xerochrepts, 5 to 50 percent slopes | 1.4 | 0.0% |
| 316 | Rock outcrop-Chilao family-Haploxerolls, warm association, 15 to 120 percent slopes | 99.8 | 1.8% |
| 714 | Trigo-Millsholm families-Rock outcrop complex, 45 to 90 percent slopes | 0.1 | 0.0% |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | 37.7 | 0.7% |
| **Subtotals for Soil Survey Area** | | **2,461.7** | **43.2%** |
| **Totals for Area of Interest** | | **5,697.8** | **100.0%** |

| Antelope Valley Area, California (CA675) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| CmE | Castaic-Balcom silty clay loams, 15 to 30 percent slopes | 97.5 | 1.7% |
| CmF | Castaic-Balcom silty clay loams, 30 to 50 percent slopes | 846.7 | 14.9% |
| CmF2 | Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded | 103.9 | 1.8% |
| CnG3 | Castaic and Saugus soils, 30 to 65 percent slopes, severely eroded | 99.5 | 1.7% |
| CyA | Cortina sandy loam, 0 to 2 percent slopes | 15.0 | 0.3% |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | 27.4 | 0.5% |

| Antelope Valley Area, California (CA675) | | | |
|---|---|---|---|
| **Map Unit Symbol** | **Map Unit Name** | **Acres in AOI** | **Percent of AOI** |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | 34.5 | 0.6% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | 1,406.6 | 24.7% |
| RcD | Ramona coarse sandy loam, 9 to 15 percent slopes | 5.0 | 0.1% |
| Sa | Sandy alluvial land | 37.5 | 0.7% |
| W | Water | 554.5 | 9.7% |
| YoC | Yolo loam, 2 to 9 percent slopes | 8.0 | 0.1% |
| **Subtotals for Soil Survey Area** | | **3,236.1** | **56.8%** |
| **Totals for Area of Interest** | | **5,697.8** | **100.0%** |

# Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that

have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

# Angeles National Forest Area, California

## 19—Trigo family-Calcixerollic Xerochrepts-Vista family complex, 30 to 70 percent slopes

### Map Unit Setting

*National map unit symbol:* hm6n
*Elevation:* 430 to 2,200 feet
*Mean annual precipitation:* 12 to 22 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Trigo family and similar soils:* 35 percent
*Calcixerollic xerochrepts and similar soils:* 30 percent
*Vista family and similar soils:* 20 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Trigo Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone and shale

#### Typical profile

*A - 0 to 3 inches:* loam
*C - 3 to 17 inches:* gravelly sandy loam
*Cr - 17 to 21 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Description of Calcixerollic Xerochrepts

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone and shale

**Typical profile**

*H1 - 0 to 5 inches:* clay loam
*H2 - 5 to 39 inches:* clay loam, loam
*H2 - 5 to 39 inches:* weathered bedrock
*H3 - 39 to 59 inches:*

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 15 to 42 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 5 percent
*Available water storage in profile:* Very high (about 12.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* C

## Description of Vista Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone and shale

**Typical profile**

*A - 0 to 9 inches:* sandy loam
*B1 - 9 to 29 inches:* sandy loam
*B2 - 29 to 50 inches:* sandy loam
*C - 50 to 60 inches:* gravelly coarse sandy loam
*Cr - 60 to 79 inches:* bedrock

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 6.9 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* A

**Minor Components**

**Rock outcrop**

*Percent of map unit:* 4 percent

**Modesto family**

*Percent of map unit:* 4 percent

**Millsholm family**

*Percent of map unit:* 4 percent

**Trigo family, silt loam surface**

*Percent of map unit:* 3 percent

## 21—Riverwash

**Map Unit Setting**

*National map unit symbol:* hm6p
*Elevation:* 1,800 to 4,800 feet
*Mean annual precipitation:* 14 to 30 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Riverwash:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Riverwash**

**Setting**

*Landform:* Alluvial flats
*Landform position (two-dimensional):* Toeslope
*Landform position (three-dimensional):* Talf
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium

**Typical profile**

*H1 - 0 to 60 inches:* extremely stony coarse sand

**Properties and qualities**

*Slope:* 2 to 10 percent

*Percent of area covered with surface fragments:* 25.0 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High to very high (5.95 to 19.98 in/hr)
*Frequency of flooding:* Frequent
*Available water storage in profile:* Very low (about 0.6 inches)

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8w

**Minor Components**

**Hanford family**
*Percent of map unit:* 7 percent

**Vista family**
*Percent of map unit:* 6 percent

**Capistrano family**
*Percent of map unit:* 6 percent

**Tujunga family**
*Percent of map unit:* 6 percent

## 26—Stonyford-Millsholm families complex, 30 to 70 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm6r
*Elevation:* 1,800 to 3,700 feet
*Mean annual precipitation:* 16 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Stonyford family and similar soils:* 50 percent
*Millsholm family and similar soils:* 30 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Stonyford Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 5 inches:* gravelly clay loam
*H2 - 5 to 19 inches:* gravelly clay loam
*H3 - 19 to 29 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Millsholm Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 5 inches:* clay loam
*H2 - 5 to 17 inches:* clay loam
*H3 - 17 to 27 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 12 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

**Minor Components**

**Rock outcrop**
*Percent of map unit:* 4 percent

**Modesto family**
*Percent of map unit:* 4 percent

**Typic haploxeralfs**
*Percent of map unit:* 4 percent

**Exchequer family**
*Percent of map unit:* 4 percent

**Lodo family**
*Percent of map unit:* 4 percent

## 74—Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes

**Map Unit Setting**

*National map unit symbol:* hm87
*Elevation:* 2,200 to 3,730 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Rock outcrop:* 25 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Calleguas Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Rock Outcrop

**Setting**

*Landform:* Scarps
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex

*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**
*H1 - 0 to 10 inches:* unweathered bedrock

**Properties and qualities**
*Slope:* 60 to 100 percent
*Depth to restrictive feature:* 0 inches to paralithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e

**Minor Components**

**Rubble land**
*Percent of map unit:* 4 percent

**Unnamed, colluvial soils**
*Percent of map unit:* 3 percent

**Trigo family, fine textured**
*Percent of map unit:* 3 percent

## 75—Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm88
*Elevation:* 2,400 to 4,000 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Trigo family and similar soils:* 35 percent
*Calleguas family and similar soils:* 30 percent
*Haploxeralfs and similar soils:* 15 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Trigo Family**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 59 inches:*

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Calleguas Family

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* silt loam
*H2 - 4 to 11 inches:* silt loam
*H3 - 11 to 15 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 15 percent
*Available water storage in profile:* Very low (about 1.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Description of Haploxeralfs

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 6 inches:* gravelly loam
*H2 - 6 to 15 inches:* gravelly clay loam, gravelly sandy clay loam
*H2 - 6 to 15 inches:* unweathered bedrock
*H3 - 15 to 19 inches:*

#### Properties and qualities

*Slope:* 30 to 70 percent
*Depth to restrictive feature:* 7 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

### Minor Components

#### Osito family

*Percent of map unit:* 3 percent

#### Unnamed, moderately deep soils

*Percent of map unit:* 3 percent

#### Modesto family

*Percent of map unit:* 3 percent

#### Rock outcrop

*Percent of map unit:* 2 percent

#### Vertic xerochrepts

*Percent of map unit:* 2 percent

#### Caperton family

*Percent of map unit:* 2 percent

## 82—Vertic Xerochrepts, 5 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* hm8f
*Elevation:* 2,200 to 4,000 feet
*Mean annual precipitation:* 19 to 22 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Vertic xerochrepts and similar soils:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Vertic Xerochrepts

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Mountainbase
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from calcareous shale

#### Typical profile

*H1 - 0 to 8 inches:* silty clay
*H2 - 8 to 30 inches:* channery silty clay, silty clay
*H2 - 8 to 30 inches:* weathered bedrock
*H3 - 30 to 34 inches:*

#### Properties and qualities

*Slope:* 5 to 50 percent
*Depth to restrictive feature:* 18 to 45 inches to paralithic bedrock
*Natural drainage class:* Moderately well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Available water storage in profile:* Moderate (about 7.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* D

**Minor Components**

**Unnamed, deep, well developed soil**
*Percent of map unit:* 13 percent

**Osito family**
*Percent of map unit:* 12 percent

## 316—Rock outcrop-Chilao family-Haploxerolls, warm association, 15 to 120 percent slopes

**Map Unit Setting**
*National map unit symbol:* hm6z
*Elevation:* 430 to 5,500 feet
*Mean annual precipitation:* 11 to 30 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Rock outcrop:* 40 percent
*Chilao family and similar soils:* 35 percent
*Haploxerolls, warm, and similar soils:* 15 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Rock Outcrop**

**Setting**
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from granodiorite

**Typical profile**
*R - 0 to 10 inches:* unweathered bedrock

**Properties and qualities**
*Slope:* 15 to 120 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

**Interpretive groups**
*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e

### Description of Chilao Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from granodiorite

#### Typical profile

*A - 0 to 5 inches:* gravelly loam
*C - 5 to 18 inches:* very cobbly loam, very gravelly loam, very gravelly sandy loam
*C - 5 to 18 inches:* weathered bedrock
*C - 5 to 18 inches:*
*C - 18 to 28 inches:*

#### Properties and qualities

*Slope:* 15 to 85 percent
*Depth to restrictive feature:* 6 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 4.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e
*Hydrologic Soil Group:* D

### Description of Haploxerolls, Warm

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainbase
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Colluvium

#### Typical profile

*A - 0 to 10 inches:* gravelly loam
*C - 10 to 60 inches:* very gravelly loam, very gravelly sandy loam
*C - 10 to 60 inches:* weathered bedrock
*Cr - 60 to 70 inches:*

#### Properties and qualities

*Slope:* 15 to 85 percent
*Depth to restrictive feature:* 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None

*Frequency of ponding:* None
*Available water storage in profile:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8e
*Hydrologic Soil Group:* A

## Minor Components

### Shortcut family

*Percent of map unit:* 2 percent
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex

### Exchequer family

*Percent of map unit:* 2 percent
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex

### Lodo family

*Percent of map unit:* 2 percent
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave

### Hanford family

*Percent of map unit:* 2 percent
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Concave
*Across-slope shape:* Convex

### Modjeska family

*Percent of map unit:* 1 percent
*Landform:* Terraces
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Riser
*Down-slope shape:* Concave
*Across-slope shape:* Convex

### Vista family

*Percent of map unit:* 1 percent
*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave

## 714—Trigo-Millsholm families-Rock outcrop complex, 45 to 90 percent slopes

### Map Unit Setting

*National map unit symbol:* hm82
*Elevation:* 1,800 to 4,200 feet
*Mean annual precipitation:* 15 to 21 inches
*Mean annual air temperature:* 55 to 64 degrees F
*Frost-free period:* 150 to 200 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Trigo family and similar soils:* 45 percent
*Millsholm families and similar soils:* 20 percent
*Rock outcrop:* 15 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Trigo Family

#### Setting

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sandstone

#### Typical profile

*H1 - 0 to 8 inches:* silt loam
*H2 - 8 to 16 inches:* gravelly silt loam, gravelly loam
*H2 - 8 to 16 inches:* weathered bedrock
*H3 - 16 to 20 inches:*

#### Properties and qualities

*Slope:* 45 to 90 percent
*Depth to restrictive feature:* 3 to 19 inches to paralithic bedrock
*Natural drainage class:* Somewhat excessively drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 3.97 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Millsholm Families

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 5 inches:* clay loam
*H2 - 5 to 17 inches:* clay loam
*H3 - 17 to 21 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 45 to 90 percent
*Depth to restrictive feature:* 12 to 19 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* D

## Description of Rock Outcrop

**Setting**

*Landform:* Mountains
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Mountainflank
*Down-slope shape:* Convex
*Across-slope shape:* Convex
*Parent material:* Residuum weathered from sandstone

**Typical profile**

*H1 - 0 to 4 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 45 to 90 percent
*Depth to restrictive feature:* 0 inches to lithic bedrock
*Natural drainage class:* Excessively drained
*Runoff class:* Very high

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8e

**Minor Components**

**Modesto, mod deep family**
*Percent of map unit:* 7 percent

**Osito family**
*Percent of map unit:* 7 percent

**Chilao family, mod deep**
*Percent of map unit:* 6 percent

## CzC—Cortina cobbly sandy loam, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* v5jh
*Elevation:* 30 to 2,400 feet
*Mean annual precipitation:* 12 to 40 inches
*Mean annual air temperature:* 61 to 63 degrees F
*Frost-free period:* 275 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Cortina and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Cortina**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from sedimentary rock

**Typical profile**

*H1 - 0 to 6 inches:* cobbly sandy loam
*H2 - 6 to 60 inches:* stratified very cobbly sandy loam to very gravelly sandy loam

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Excessively drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches

*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.8 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4s
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* A
*Ecological site:* SANDY 9-20" (R019XD065CA)

**Minor Components**

**Metz**

*Percent of map unit:* 10 percent

**Unnamed**

*Percent of map unit:* 4 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

# Antelope Valley Area, California

## CmE—Castaic-Balcom silty clay loams, 15 to 30 percent slopes

### Map Unit Setting

*National map unit symbol:* hcd7
*Elevation:* 50 to 2,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 61 to 63 degrees F
*Frost-free period:* 280 to 300 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Castaic and similar soils:* 50 percent
*Balcom and similar soils:* 40 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Castaic

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 9 inches:* silty clay loam
*H2 - 9 to 26 inches:* silty clay loam
*H3 - 26 to 30 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 22 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 3 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 4.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

### Description of Balcom

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 10 inches:* silty clay loam
*H2 - 10 to 28 inches:* silty clay loam
*H3 - 28 to 32 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 5.0 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 4e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

### Minor Components

#### Saugus

*Percent of map unit:* 9 percent

#### Unnamed

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## CmF—Castaic-Balcom silty clay loams, 30 to 50 percent slopes

### Map Unit Setting

*National map unit symbol:* hcd8
*Elevation:* 50 to 2,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 61 to 63 degrees F

*Frost-free period:* 280 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Castaic and similar soils:* 50 percent
*Balcom and similar soils:* 40 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Castaic**

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**

*H1 - 0 to 11 inches:* silty clay loam
*H2 - 11 to 28 inches:* silty clay loam
*H3 - 28 to 32 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 22 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 3 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 5.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

**Description of Balcom**

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**

*H1 - 0 to 10 inches:* silty clay loam
*H2 - 10 to 28 inches:* silty clay loam

*H3 - 28 to 32 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 5.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

**Minor Components**

**Gaviota**

*Percent of map unit:* 4 percent

**Saugus**

*Percent of map unit:* 3 percent

**Unnamed**

*Percent of map unit:* 3 percent
*Landform:* Drainageways

## CmF2—Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hcd9
*Elevation:* 50 to 2,500 feet
*Mean annual precipitation:* 15 inches
*Mean annual air temperature:* 61 to 63 degrees F
*Frost-free period:* 280 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Castaic and similar soils:* 50 percent
*Balcom and similar soils:* 40 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Castaic

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 9 inches:* silty clay loam
*H2 - 9 to 26 inches:* silty clay loam
*H3 - 26 to 30 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 22 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 3 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 4.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

### Description of Balcom

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 7 inches:* silty clay loam
*H2 - 7 to 25 inches:* silty clay loam
*H3 - 25 to 29 inches:* weathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches

*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 10 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 4.5 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* C
*Ecological site:* CLAYEY 9-20" (R019XD063CA)

**Minor Components**

**Saugus**

*Percent of map unit:* 4 percent

**Gaviota**

*Percent of map unit:* 3 percent

**Unnamed**

*Percent of map unit:* 3 percent
*Landform:* Drainageways

## CnG3—Castaic and Saugus soils, 30 to 65 percent slopes, severely eroded

**Map Unit Setting**

*National map unit symbol:* hcdc
*Elevation:* 50 to 2,500 feet
*Mean annual precipitation:* 14 to 20 inches
*Mean annual air temperature:* 61 to 63 degrees F
*Frost-free period:* 280 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Castaic and similar soils:* 45 percent
*Saugus and similar soils:* 35 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Castaic**

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**

*H1 - 0 to 9 inches:* silty clay loam
*H2 - 9 to 26 inches:* silty clay loam
*H3 - 26 to 30 inches:* weathered bedrock

**Properties and qualities**

*Slope:* 30 to 65 percent
*Depth to restrictive feature:* 22 to 40 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum in profile:* 3 percent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water storage in profile:* Low (about 4.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* C

## Description of Saugus

**Setting**

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**

*H1 - 0 to 8 inches:* loam
*H2 - 8 to 40 inches:* loam, sandy loam
*H2 - 8 to 40 inches:* weathered bedrock
*H3 - 40 to 44 inches:*

**Properties and qualities**

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 35 to 60 inches to paralithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 9.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7e
*Hydrologic Soil Group:* B

**Minor Components**

**Balcom**
*Percent of map unit:* 10 percent

**Unnamed**
*Percent of map unit:* 10 percent
*Landform:* Drainageways

## CyA—Cortina sandy loam, 0 to 2 percent slopes

**Map Unit Setting**
*National map unit symbol:* hcdf
*Elevation:* 30 to 2,400 feet
*Mean annual precipitation:* 8 to 40 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 275 to 300 days
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**
*Cortina and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Cortina**

**Setting**
*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from sedimentary rock

**Typical profile**
*H1 - 0 to 12 inches:* sandy loam
*H2 - 12 to 28 inches:* very gravelly sandy loam
*H3 - 28 to 60 inches:* very cobbly sandy loam

**Properties and qualities**
*Slope:* 0 to 2 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Occasional
*Frequency of ponding:* None
*Available water storage in profile:* Low (about 3.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 4s
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* A
*Ecological site:* SANDY 9-20" (R019XD065CA)

**Minor Components**

**Metz**

*Percent of map unit:* 10 percent

**Unnamed**

*Percent of map unit:* 4 percent

**Unnamed**

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## CzC—Cortina cobbly sandy loam, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcdh
*Elevation:* 30 to 2,400 feet
*Mean annual precipitation:* 12 to 40 inches
*Mean annual air temperature:* 61 to 63 degrees F
*Frost-free period:* 275 to 300 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Cortina and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Cortina**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from sedimentary rock

**Typical profile**

*H1 - 0 to 6 inches:* cobbly sandy loam
*H2 - 6 to 60 inches:* stratified very cobbly sandy loam to very gravelly sandy loam

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Excessively drained

*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* Rare
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.8 inches)

**Interpretive groups**
*Land capability classification (irrigated):* 4s
*Land capability classification (nonirrigated):* 7s
*Hydrologic Soil Group:* A
*Ecological site:* SANDY 9-20" (R019XD065CA)

**Minor Components**

**Metz**
*Percent of map unit:* 10 percent

**Unnamed**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## MhE2—Millsholm rocky loam, 15 to 30 percent slopes, eroded

**Map Unit Setting**
*National map unit symbol:* hcfs
*Elevation:* 300 to 4,000 feet
*Mean annual precipitation:* 8 to 50 inches
*Mean annual air temperature:* 45 to 63 degrees F
*Frost-free period:* 110 to 330 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Millsholm and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Millsholm**

**Setting**
*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

**Typical profile**
*H1 - 0 to 16 inches:* loam

*H2 - 16 to 20 inches:* unweathered bedrock

**Properties and qualities**

*Slope:* 15 to 30 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

**Minor Components**

**Rock outcrop**

*Percent of map unit:* 5 percent

**Gaviota**

*Percent of map unit:* 5 percent

**Unnamed**

*Percent of map unit:* 3 percent
*Landform:* Drainageways

**Castaic**

*Percent of map unit:* 2 percent

## MhF2—Millsholm rocky loam, 30 to 50 percent slopes, eroded

**Map Unit Setting**

*National map unit symbol:* hcft
*Elevation:* 300 to 4,000 feet
*Mean annual precipitation:* 8 to 50 inches
*Mean annual air temperature:* 45 to 63 degrees F
*Frost-free period:* 110 to 330 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Millsholm and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Millsholm

#### Setting

*Landform:* Hills
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Side slope
*Down-slope shape:* Concave
*Across-slope shape:* Concave
*Parent material:* Residuum weathered from sedimentary rock

#### Typical profile

*H1 - 0 to 16 inches:* loam
*H2 - 16 to 20 inches:* unweathered bedrock

#### Properties and qualities

*Slope:* 30 to 50 percent
*Depth to restrictive feature:* 10 to 20 inches to lithic bedrock
*Natural drainage class:* Well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low (0.00 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Very low (about 2.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6e
*Hydrologic Soil Group:* D
*Ecological site:* SHALLOW LOAMY 9-20" (R019XD066CA)

### Minor Components

#### Rock outcrop

*Percent of map unit:* 5 percent

#### Unnamed

*Percent of map unit:* 5 percent

#### Castaic

*Percent of map unit:* 3 percent

#### Gaviota

*Percent of map unit:* 1 percent

#### Unnamed

*Percent of map unit:* 1 percent
*Landform:* Drainageways

## RcD—Ramona coarse sandy loam, 9 to 15 percent slopes

### Map Unit Setting

*National map unit symbol:* hcgl
*Elevation:* 2,700 to 3,900 feet
*Mean annual precipitation:* 9 to 12 inches
*Mean annual air temperature:* 63 degrees F
*Frost-free period:* 210 to 240 days
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Ramona and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Ramona

#### Setting

*Landform:* Terraces
*Landform position (two-dimensional):* Backslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium derived from granite

#### Typical profile

*H1 - 0 to 20 inches:* coarse sandy loam
*H2 - 20 to 31 inches:* fine sandy loam
*H3 - 31 to 90 inches:* sandy clay loam

#### Properties and qualities

*Slope:* 9 to 15 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high (0.20 to 0.57 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* Moderate (about 7.8 inches)

#### Interpretive groups

*Land capability classification (irrigated):* 3e
*Land capability classification (nonirrigated):* 4e
*Hydrologic Soil Group:* C
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Greenfield**
*Percent of map unit:* 5 percent

**Hanford**
*Percent of map unit:* 5 percent

**Unnamed**
*Percent of map unit:* 4 percent

**Unnamed**
*Percent of map unit:* 1 percent
*Landform:* Drainageways

## Sa—Sandy alluvial land

**Map Unit Setting**
*National map unit symbol:* hch5
*Mean annual precipitation:* 14 inches
*Mean annual air temperature:* 61 degrees F
*Farmland classification:* Not prime farmland

**Map Unit Composition**
*Sandy alluvial land:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sandy Alluvial Land**

**Setting**
*Landform:* Flood plains
*Landform position (two-dimensional):* Footslope
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Alluvium

**Typical profile**
*H1 - 0 to 10 inches:* sand
*H2 - 10 to 30 inches:* stratified sand to loam
*H3 - 30 to 60 inches:* stratified gravelly sand to gravelly loam

**Properties and qualities**
*Slope:* 0 to 2 percent
*Natural drainage class:* Excessively drained
*Runoff class:* Very low
*Capacity of the most limiting layer to transmit water (Ksat):* High (1.98 to 5.95 in/hr)
*Depth to water table:* About 10 inches
*Frequency of flooding:* Frequent
*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Moderate (about 6.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 7w
*Hydrologic Soil Group:* B
*Ecological site:* SANDY 9-20" (R020XE025CA)

**Minor Components**

**Riverwash**

*Percent of map unit:* 10 percent
*Landform:* Drainageways

**Unnamed**

*Percent of map unit:* 5 percent

## W—Water

**Map Unit Composition**

*Water:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Water**

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 8

## YoC—Yolo loam, 2 to 9 percent slopes

**Map Unit Setting**

*National map unit symbol:* hcj9
*Elevation:* 30 to 400 feet
*Mean annual precipitation:* 16 to 22 inches
*Mean annual air temperature:* 61 degrees F
*Frost-free period:* 240 to 300 days
*Farmland classification:* Prime farmland if irrigated

**Map Unit Composition**

*Yolo and similar soils:* 85 percent
*Minor components:* 15 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Yolo**

**Setting**

*Landform:* Alluvial fans
*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Tread
*Down-slope shape:* Concave
*Across-slope shape:* Convex
*Parent material:* Alluvium derived from sedimentary rock

**Typical profile**

*H1 - 0 to 18 inches:* loam
*H2 - 18 to 72 inches:* loam

**Properties and qualities**

*Slope:* 2 to 9 percent
*Depth to restrictive feature:* More than 80 inches
*Natural drainage class:* Well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water storage in profile:* High (about 9.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* 2e
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* B
*Ecological site:* LOAMY 9-20" (R019XD064CA)

**Minor Components**

**Metz**

*Percent of map unit:* 5 percent

**Sorrento**

*Percent of map unit:* 5 percent

**Unnamed**

*Percent of map unit:* 5 percent

# Soil Information for All Uses

## Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## Soil Erosion Factors

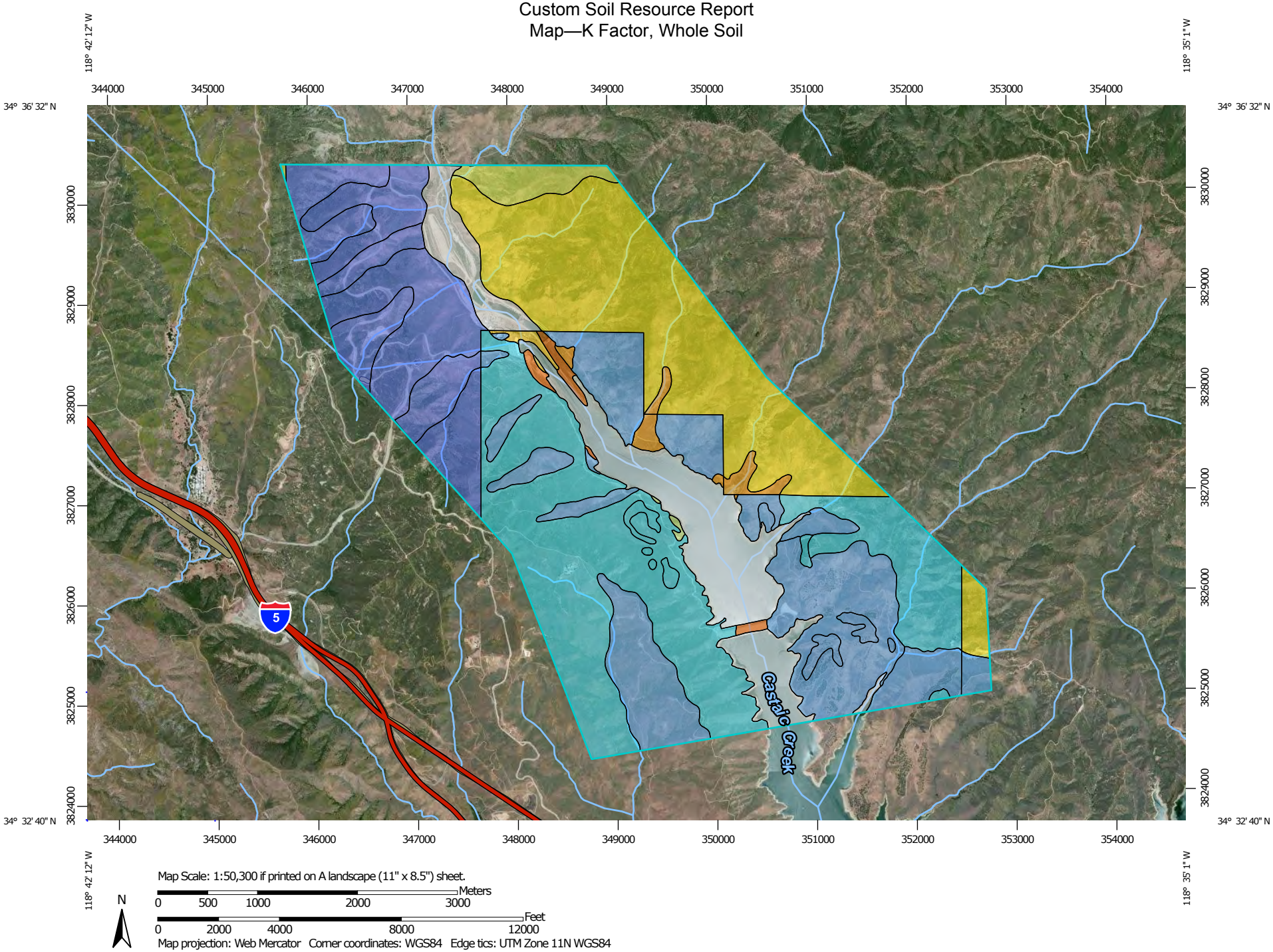
Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

### K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

# Custom Soil Resource Report
## Map—K Factor, Whole Soil



## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Lines**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Soil Rating Points**

.02
.05
.10
.15
.17
.20
.24
.28
.32
.37
.43
.49
.55
.64
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—K Factor, Whole Soil

| K Factor, Whole Soil— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| 19 | Trigo family-Calcixerollic Xerochrepts-Vista family complex, 30 to 70 percent slopes | .43 | 27.0 | 0.5% |
| 21 | Riverwash | | 149.7 | 2.6% |
| 26 | Stonyford-Millsholm families complex, 30 to 70 percent slopes | .17 | 1,195.7 | 21.0% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | .49 | 361.1 | 6.3% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | .49 | 589.2 | 10.3% |
| 82 | Vertic Xerochrepts, 5 to 50 percent slopes | .20 | 1.4 | 0.0% |
| 316 | Rock outcrop-Chilao family-Haploxerolls, warm association, 15 to 120 percent slopes | .20 | 99.8 | 1.8% |
| 714 | Trigo-Millsholm families-Rock outcrop complex, 45 to 90 percent slopes | .49 | 0.1 | 0.0% |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | .10 | 37.7 | 0.7% |
| **Subtotals for Soil Survey Area** | | | **2,461.7** | **43.2%** |
| **Totals for Area of Interest** | | | **5,697.8** | **100.0%** |

| K Factor, Whole Soil— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating** | **Acres in AOI** | **Percent of AOI** |
| CmE | Castaic-Balcom silty clay loams, 15 to 30 percent slopes | .43 | 97.5 | 1.7% |
| CmF | Castaic-Balcom silty clay loams, 30 to 50 percent slopes | .43 | 846.7 | 14.9% |
| CmF2 | Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded | .43 | 103.9 | 1.8% |
| CnG3 | Castaic and Saugus soils, 30 to 65 percent slopes, severely eroded | .43 | 99.5 | 1.7% |
| CyA | Cortina sandy loam, 0 to 2 percent slopes | .15 | 15.0 | 0.3% |

| K Factor, Whole Soil— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | .10 | 27.4 | 0.5% |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | .37 | 34.5 | 0.6% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | .37 | 1,406.6 | 24.7% |
| RcD | Ramona coarse sandy loam, 9 to 15 percent slopes | .24 | 5.0 | 0.1% |
| Sa | Sandy alluvial land | .05 | 37.5 | 0.7% |
| W | Water | | 554.5 | 9.7% |
| YoC | Yolo loam, 2 to 9 percent slopes | .43 | 8.0 | 0.1% |
| **Subtotals for Soil Survey Area** | | | **3,236.1** | **56.8%** |
| **Totals for Area of Interest** | | | **5,697.8** | **100.0%** |

### Rating Options—K Factor, Whole Soil

*Aggregation Method:* Dominant Condition

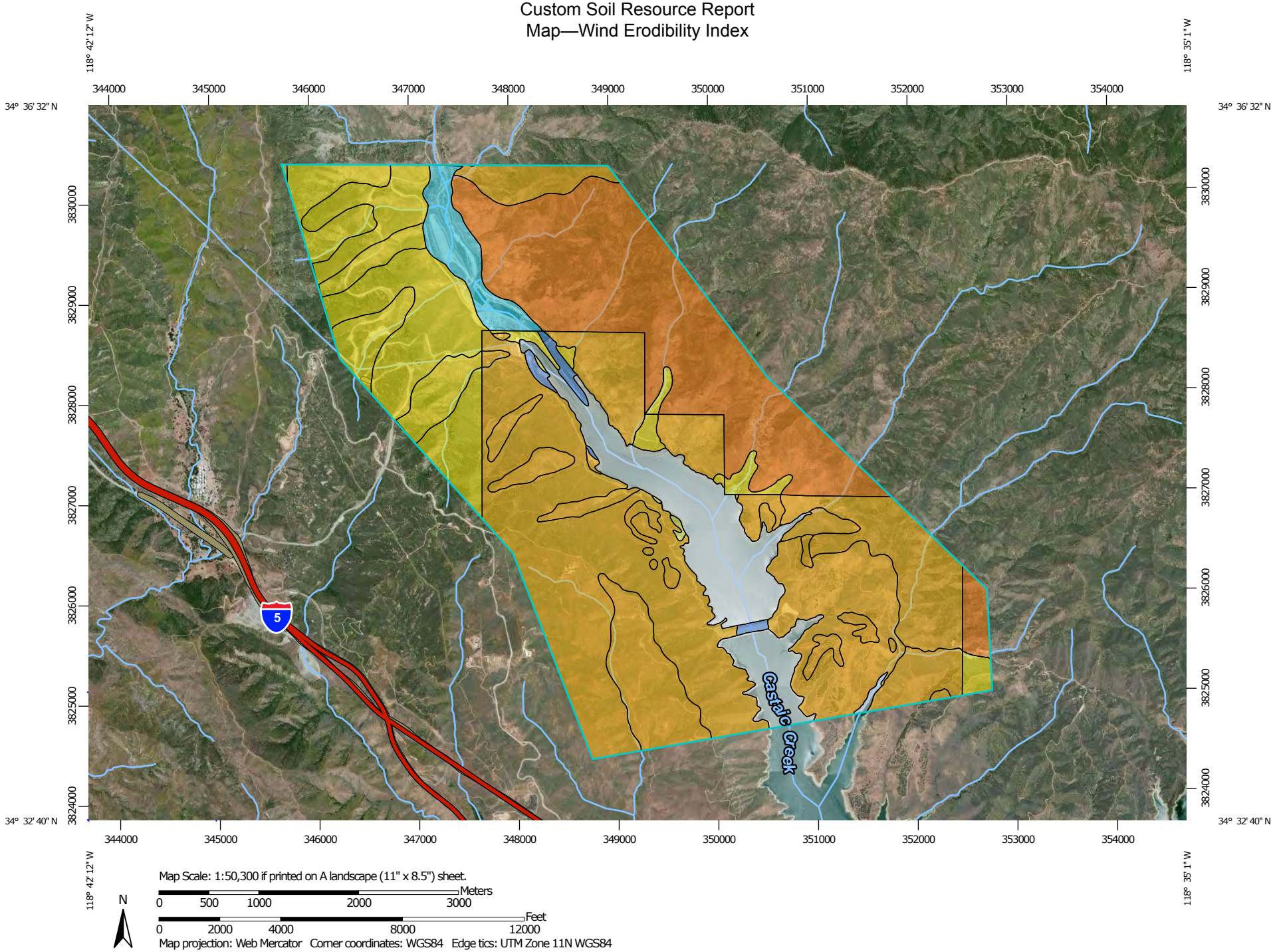
*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

*Layer Options (Horizon Aggregation Method):* Surface Layer (Not applicable)

## Wind Erodibility Index

The wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.


118° 42' 12" W
118° 35' 1" W
344000
345000
346000
347000
348000
349000
350000
351000
352000
353000
354000
34° 36' 32" N
34° 32' 40" N
3830000
3829000
3828000
3827000
3826000
3825000
3824000
5
Castaic Creek
Map Scale: 1:50,300 if printed on A landscape (11" x 8.5") sheet.
N
Meters
0 500 1000 2000 3000
Feet
0 2000 4000 8000 12000
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

## MAP LEGEND

**Area of Interest (AOI)**

Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Soil Rating Lines**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Soil Rating Points**

0
38
48
56
86
134
160
180
220
250
310
Not rated or not available

**Water Features**

Streams and Canals

**Transportation**

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

**Background**

Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

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This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Angeles National Forest Area, California
Survey Area Data: Version 9, Sep 18, 2015

Soil Survey Area: Antelope Valley Area, California
Survey Area Data: Version 8, Sep 17, 2015

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 3, 2010—Aug 31, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Table—Wind Erodibility Index

| Wind Erodibility Index— Summary by Map Unit — Angeles National Forest Area, California (CA776) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| 19 | Trigo family-Calcixerollic Xerochrepts-Vista family complex, 30 to 70 percent slopes | 56 | 27.0 | 0.5% |
| 21 | Riverwash | 180 | 149.7 | 2.6% |
| 26 | Stonyford-Millsholm families complex, 30 to 70 percent slopes | 38 | 1,195.7 | 21.0% |
| 74 | Trigo-Calleguas families-Rock outcrop complex, 60 to 100 percent slopes | 56 | 361.1 | 6.3% |
| 75 | Trigo-Calleguas families-Haploxeralfs complex, 30 to 70 percent slopes | 56 | 589.2 | 10.3% |
| 82 | Vertic Xerochrepts, 5 to 50 percent slopes | 86 | 1.4 | 0.0% |
| 316 | Rock outcrop-Chilao family-Haploxerolls, warm association, 15 to 120 percent slopes | 48 | 99.8 | 1.8% |
| 714 | Trigo-Millsholm families-Rock outcrop complex, 45 to 90 percent slopes | 56 | 0.1 | 0.0% |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | 56 | 37.7 | 0.7% |
| **Subtotals for Soil Survey Area** | | | **2,461.7** | **43.2%** |
| **Totals for Area of Interest** | | | **5,697.8** | **100.0%** |

| Wind Erodibility Index— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| CmE | Castaic-Balcom silty clay loams, 15 to 30 percent slopes | 48 | 97.5 | 1.7% |
| CmF | Castaic-Balcom silty clay loams, 30 to 50 percent slopes | 48 | 846.7 | 14.9% |
| CmF2 | Castaic-Balcom silty clay loams, 30 to 50 percent slopes, eroded | 48 | 103.9 | 1.8% |
| CnG3 | Castaic and Saugus soils, 30 to 65 percent slopes, severely eroded | 48 | 99.5 | 1.7% |

| Wind Erodibility Index— Summary by Map Unit — Antelope Valley Area, California (CA675) | | | | |
|---|---|---|---|---|
| **Map unit symbol** | **Map unit name** | **Rating (tons per acre per year)** | **Acres in AOI** | **Percent of AOI** |
| CyA | Cortina sandy loam, 0 to 2 percent slopes | 56 | 15.0 | 0.3% |
| CzC | Cortina cobbly sandy loam, 2 to 9 percent slopes | 56 | 27.4 | 0.5% |
| MhE2 | Millsholm rocky loam, 15 to 30 percent slopes, eroded | 48 | 34.5 | 0.6% |
| MhF2 | Millsholm rocky loam, 30 to 50 percent slopes, eroded | 48 | 1,406.6 | 24.7% |
| RcD | Ramona coarse sandy loam, 9 to 15 percent slopes | 86 | 5.0 | 0.1% |
| Sa | Sandy alluvial land | 220 | 37.5 | 0.7% |
| W | Water | | 554.5 | 9.7% |
| YoC | Yolo loam, 2 to 9 percent slopes | 48 | 8.0 | 0.1% |
| **Subtotals for Soil Survey Area** | | | **3,236.1** | **56.8%** |
| **Totals for Area of Interest** | | | **5,697.8** | **100.0%** |

## Rating Options—Wind Erodibility Index

*Units of Measure:* tons per acre per year

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Higher

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# Appendix H

## *Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan*

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## Table H-1. Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan

| Parameter | Summary of Water Quality Objectives |
|---|---|
| Non-degradation Objective | Lahontan: Whenever the existing quality of water is better than the quality of water established in this Basin Plan as objectives (both narrative and numerical), such existing quality shall be maintained unless appropriate findings are made under the policy.<br>Los Angeles: Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not reasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies. |
| Unionized Ammonia | Lahontan and Los Angeles: Ammonia concentrations shall not exceed the values listed in Basin Plan Tables 3-1 to 3-4 derived from EPA ammonia criteria for freshwater and based on temperature and pH conditions.<br>Lahontan: Separate objectives for temperature and pH values not listed in Basin Plan Tables 3-1 to 3-3; objectives are calculated from for one-hour and four-day averages are determined using equations (Page 3-3 and Page 3-4 of the Basin Plan).<br>Los Angeles: Additional objectives for freshwater four-day objective (2.5 times the 30-day average objective) based on pH, temperature and presence/absence of early life stage fish; for inland surface waters not characteristic of freshwater (one-hour average and four-day average based on fixed concentrations of un-ionized ammonia at which four-day average concentration of un-ionized ammonia not to exceed 0.035 mg/L and one-hour average concentration not to exceed 0.233 mg/L); and inland surface waters characteristic of freshwater (not to exceed the values calculated for appropriate instream conditions of Basin Plan Tables 3-1 to 3-3). |
| Coliform Bacteria | Lahontan: Waters shall not contain concentrations of coliform organisms attributable to anthropogenic sources, including human and livestock wastes. The fecal coliform concentration during any 30-day period shall not exceed a log mean of 20/100 ml, nor shall more than 10 percent of all samples collected during any 30-day period exceed 40/100 ml.<br>Los Angeles:<br>In Fresh Waters Designated for Water Contact Recreation<br>1. Geometric Mean Limits - *E.coli* density shall not exceed 126/100 ml.<br>2. Single Sample Limits - *E.coli* density shall not exceed 235/100 ml.<br>In Fresh Waters Designated for Limited Contact Recreation<br>Geometric Mean Limits - *E.coli* density shall not exceed 126/100 ml.<br>Single Sample Limits - *E.coli* density shall not exceed 576 / 100 ml.<br>In waters designated for non-water contact recreation and not designated for water contact recreation, the fecal coliform concentration shall not exceed a log mean of 2,000/100 ml (based on a minimum of not less than four samples for any 30-day period), nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000/100 ml. |

**Table H-1. Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan (continued)**

| Parameter | Summary of Water Quality Objectives |
|---|---|
| Biostimulatory Substances | Lahontan and Los Angeles: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect the water for beneficial uses. |
| Chemical Constituents | Lahontan and Los Angeles: Waters designated as Municipal and Domestic Supply shall not contain concentrations of chemical constituents in excess of the maximum contaminant level or secondary maximum contaminant level based upon drinking water standards specified in CCR Title 22. Waters designated as Agricultural Supply shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes). Waters shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses.<br>Lahontan: Waters designated as AGR shall not contain concentrations of chemical constituents in amounts that adversely affect the water for beneficial uses (i.e., agricultural purposes) |
| Total Residual Chlorine | Lahontan: For the protection of aquatic life, total chlorine residual shall not exceed either a median value of 0.002 mg/L or a maximum value of 0.003 mg/L.<br>Los Angeles: Chlorine residual shall not be present in surface water discharges at concentrations that exceed 0.1 mg/L and shall not persist in receiving waters at any concentration that causes impairment of beneficial uses. |
| DO | Lahontan: The dissolved oxygen concentration, as percent saturation, shall not be depressed by more than 10 percent, nor shall the minimum dissolved oxygen concentration be less than 80 percent of saturation. Waters designated as Cold Freshwater Habitat shall have a minimum 30 day mean DO of 6.5 mg/L; for Warm Freshwater Habitat, the minimum 30 day mean shall be at 5.5 mg/L (Basin Plan Table 3-6).<br>Los Angeles: At a minimum (see specifics below), the mean annual dissolved oxygen concentration of all waters shall be greater than 7 mg/L, and no single determination shall be less than 5 mg/L, except when natural conditions cause lesser concentrations.<br>The dissolved oxygen content of all surface waters designated as Warm Freshwater Habitat shall not be depressed below 5 mg/L as a result of waste discharges.<br>The dissolved oxygen content of all surface waters designated as Cold Freshwater Habitat shall not be depressed below 6 mg/L as a result of waste discharges.<br>The dissolved oxygen content of all surface waters designated as both Cold Freshwater Habitat and Spawning, Reproduction, and/or Early Development shall not be depressed below 7 mg/L as a result of waste discharges. |
| Color | Lahontan and Los Angeles: Waters shall be free of coloration that causes nuisance or adversely affects the water for beneficial uses. |

## Table H-1. Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan (continued)

| Parameter | Summary of Water Quality Objectives |
|---|---|
| Floating Materials | Lahontan and Los Angeles: Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect the water for beneficial uses.<br>Lahontan: For natural high-quality waters, the concentrations of floating material shall not be altered to the extent that such alterations are discernable at the 10 percent significance level. |
| Exotic Vegetation | Los Angeles: Exotic vegetation shall not be introduced around stream courses to the extent that such growth causes nuisance or adversely affects beneficial uses. |
| Nitrogen | Los Angeles: Waters shall not exceed 10 mg/L nitrogen as nitrate-nitrogen plus nitrite-nitrogen ($NO_3$-N + $NO_2$-N), 45 mg/L as nitrate ($NO_3$), 10 mg/L as nitrate-nitrogen ($NO_3$-N), 1 mg/L as nitrite-nitrogen ($NO_2$-N), or as otherwise designated in Table 3-10. |
| Oil and Grease | Lahontan and Los Angeles: Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water that cause nuisance or otherwise adversely affect the water for beneficial uses.<br>Lahontan: For natural high-quality waters, the concentration of oils, greases, or other film or coat-generating substances shall not be altered. |
| Nondegradation of Aquatic Communities and Populations | Lahontan: All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants, or that lead to the presence of undesirable or nuisance aquatic life. All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical, and hydrologic processes. |
| pH | Lahontan: In fresh waters with designated beneficial uses of Cold Freshwater Habitat or Warm Freshwater Habitat, changes in normal ambient pH levels shall not exceed 0.5 pH units. For all other waters of the Region, the pH shall not be depressed below 6.5 nor raised above 8.5. The RWQCB recognizes that some waters of the Region may have natural pH levels outside of the 6.5 to 8.5 range. Compliance with the pH objective for these waters will be determined on a case-by-case basis.<br>Los Angeles: The pH of inland surface waters shall not be depressed below 6.5 or raised above 8.5 as a result of waste discharges. Ambient pH levels shall not be changed more than 0.5 units from natural conditions as a result of waste discharge. |
| Polychlorinated Biphenyls | Los Angeles: Pass-through or uncontrollable discharges to waters of the Region, or at locations where the waste can subsequently reach water of the Region, are limited to 70 pg/L (30 day average) for protection of human health and 14 ng/L and 30 ng/L (daily average) to protect aquatic life in inland fresh waters and estuarine waters respectively. |

## Table H-1. Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan (continued)

| Parameter | Summary of Water Quality Objectives |
|---|---|
| Radioactivity | Lahontan: Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life or that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated as Municipal and Domestic Supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of CCR Title 22.<br>Los Angeles: Waters designated for use as Municipal and Domestic Supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 64442 of Section 64442 (Gross Alpha Particle Activity, Radium-226, Radium-228, and Uranium) and Table 64443 of Section 64443 (Beta Particle and Photon Radioactivity) of CCR Title 22. |
| Sediment | Lahontan: The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses. |
| Settleable Materials | Lahontan: Waters shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses. For natural high-quality waters, the concentration of settleable materials shall not be raised by more than 0.1 milliliter per liter.<br>Los Angeles: Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses. |
| Suspended Materials | Lahontan: Waters shall not contain suspended materials in concentrations that cause nuisance or that adversely affect the water for beneficial uses. For natural high-quality waters, the concentration of total suspended materials shall not be altered to the extent that such alterations are discernible at the 10 percent significance level.<br>Lost Angeles: Waters shall not contain suspended or settleable material in concentrations that cause nuisance or adversely affect beneficial uses. |
| Taste and Odor | Lahontan and Los Angeles: Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish or other edible products of aquatic origin, that cause nuisance, or that adversely affect the water for beneficial uses.<br>Lahontan: For natural high-quality waters, the taste and odor shall not be altered. |
| Temperature | Lahontan and Los Angeles: The natural receiving water temperature of all waters shall not be altered unless it can be demonstrated to the satisfaction of the RWQCB that such an alteration in temperature does not adversely affect the water for beneficial uses. For waters designated Warm Freshwater Habitat, water temperature shall not be altered by more than 5 degrees Fahrenheit (5°F) above or below the natural temperature.<br>Lahontan: For waters designated Cold Freshwater Habitat, the temperature shall not be altered.<br>Los Angeles: For waters designated Cold Freshwater Habitat, water temperature shall not be altered by more than 5°F above the natural temperature. |

**Table H-1. Summary of Water Quality Objectives for Surface Waters in the Los Angeles and Lahontan Basin Plan (continued)**

| Parameter | Summary of Water Quality Objectives |
|---|---|
| Toxicity | Lahontan and Los Angeles: All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. |
| Turbidity | Lahontan and Los Angeles: Waters shall be free of changes in turbidity that cause nuisance or adversely affect the water for beneficial uses.<br>Lahontan: Increases in turbidity shall not exceed natural levels by more than 10 percent.<br>Los Angeles: Where natural turbidity is between 0 and 50 NTU, increases shall not exceed 20 percent. Where natural turbidity is greater than 50 NTU, increases shall not exceed 10 percent. |
| Pesticide | Los Angeles: No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.<br>There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. Waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of pesticides in excess of the limiting concentrations specified in Table 64444-A of Section 64444 (Organic Chemicals) of Title 22 of the California Code of Regulations which is incorporated by reference into this plan. This incorporation by reference is prospective including future changes to the incorporated provisions as the changes take effect. (See Table 3-9.) |

*Source: Lahontan RWQCB 1995 and Los Angeles RWQCB 2015, DWR 2015c.*
*Key:*
*CCR = California Code of Regulations DO = dissolved oxygen*
*EPA = United States Environmental Protection Agency MBAS = Methylene Blue Activated Substances*
*mg/L = milligrams per liter mL = milliliters*
*NTU = Nephelometric Turbidity Unit*
*RWQCB = Regional Water Quality Control Board*

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# Appendix I

## *Sample Locations*

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## Special-Status Terrestrial Species - CWHR Study Sample Location Data

| ID | Mapped Habitat | Groundtruthed Habitat | Dominant Species Observed | Associate Species Observed | Notes |
|---|---|---|---|---|---|
| SGB1 | SGB | SGB | *Ericameria nauseosa* | *Cryptantha intermedia*<br>*Brassica sp*<br>*Bromus madritensis*<br>*Sambucus nigra*<br>*Artemisia dracunculus*<br>*Juniperus californica*<br>*Hirschfeldia incana* | |
| SGB2 | SGB | SGB | *Ericameria nauseosa* | *Bromus madritensis*<br>*Bromus tectorum*<br>*Erodium cicutarium*<br>*Poa secunda*<br>*Brassica sp*<br>*Cryptantha intermedia*<br>*Stephanomeria virgata* | |
| SGB3 | SGB | CSC | *Eriodictyon crassifolium*<br>*Eriogonum fasciculatum*<br>*Artemisia californica* | *Bromus madritensis*<br>*Rhus ovata* | |
| SGB4 | SGB | SGB | *Ericameria nauseosa* | *Bromus madritensis*<br>*Stephanomeria virgata*<br>*Hirschfeldia incana*<br>*Centaurea melitensis*<br>*Stipa cernua*<br>*Croton setiger* | |
| AGS5 | AGS | SGB | *Ericameria nauseosa* | *Bromus madritensis*<br>*Croton setiger*<br>*Eriogonum elongata*<br>*Stephanomeria virgata*<br>*Corethrogyne filaginifolia* | |
| AGS6 | AGS | AGS | *Hordeum murinum ssp. leporinum* | *Brassica sp* | |
| AGS7 | AGS | AGS | *Ambrosia acanthocarpa*<br>*Bromus sp.* | *Hirschfeldia incana*<br>*Croton setiger*<br>*Lepidospartum squamatum* | No transect data. Inaccessible, over the fence assessment |
| BAR8 | BAR | BAR | none | *Erodium cicutarium*<br>*Salsola tragus*<br>*Bromus madritensis*<br>*Croton setiger*<br>*Atriplex semibaccata* | |
| BAR9 | BAR | AGS | *Bromus madritensis*<br>*Salsola tragus* | *Eucalyptus sp*<br>*Atriplex semibaccata* | |
| BOP10 | BOP | BOW | *Quercus douglasii* | *Bromus madritensis*<br>*Peritoma arborea*<br>*Hesperoyucca whipplei*<br>*Poa secunda* | Small size of accessible area (private property/fence cut off actual point and bulk of BOP polygon) allowed for only 2 plots. Moved point due to inaccessability |
| BOP11 | BOP | MCH | *Quercus john-tuckeri* | *Pinus monophylla*<br>*Bromus madritensis*<br>*Ericameria pinifolia*<br>*Juniperus californica*<br>*Arctostaphylos glauca*<br>*Eriogonum fasciculatum*<br>*Cercocarpus betuloides* | |
| BOW12 | BOW | BOP | *Pinus sabiniana*<br>*Quercus lobata*<br>*Quercus sp* | *Juniperus californicus*<br>*Ericameria nauseosa*<br>*Poa secunda* | No transect data. Inaccessible, private property. Had to use binoculars from 0.5 mile away, and observed adjacent similar area. |
| COW13 | COW | VRI | *Platanus racemosa* | *Populus fremontii*<br>*Baccharis salicifolia*<br>*Stipa milacea*<br>*Ericameria nauseosa*<br>*Fuchsia californica*<br>*Eriodictyon crassifolia* | |

## Special-Status Terrestrial Species - CWHR Study Sample Location Data

| | | | | | |
|---|---|---|---|---|---|
| COW14 | COW | COW | *Quercus agrifolia*<br>*Platanus racemosa* | *mixed Bromus*<br>*Eucalyptus*<br>*Avena fatua*<br>*Eriogonum fasciculatum*<br>*Stipa miliaceae* | |
| CRC15 | CRC | CRC | *Adenostoma fasciculatum* | *Eriogonum fasciculatum*<br>*Bromus madritensis*<br>*Eriodictyon crassifolia*<br>*Hesperoyucca whipplei*<br>*Opuntia sp*<br>*Juniperus californicus* | |
| CRC16 | CRC | CRC | *Adenostoma fasciculatum* | *Eriogonum fasciculatum*<br>*Eriodictyon crassifolia*<br>*Hesperoyucca whipplei* | |
| CRC17 | CRC | CSC | *Eriogonum fasciculatum*<br>*Salvia leucophylla* | *Bromus diandrus*<br>*Bromus madritensis*<br>*Artemisia californica*<br>*Quercus berberidifolia*<br>*Poa secunda*<br>*Eriodictyon crassifolia*<br>*Tamarix ramosissima*<br>*Atriplex canescens* | Moved point due to large burned area. |
| CRC18 | CRC | CRC | *Adenostoma fasciculatum*<br>*Salvia mellifera* | *Artemisia californica*<br>*Salvia leucophylla*<br>*Ceanothus perplexans*<br>*Bromus madritensis*<br>*Eriogonum fasiculatum*<br>*Quercus berberidifolia* | |
| CRC19 | CRC | CRC | *Adenostoma faciculatum* | *Arctostaphylos glauca*<br>*Hesperoyucca whipplei*<br>*Cercocarpus betuloides*<br>*Eriogonum fasciculatum*<br>*Salvia leucophylla* | Moved plots due to inaccessability; however, accidently moved to area mapped as CSC. Despite this, area is still CRC on ground - change map |
| CSC20 | CSC | CRC | *Adenostoma fasciculatum* | *Ericameria pinifolia*<br>*Bromus madritensis*<br>*Lonicera sp*<br>*Opuntia basilaris*<br>*Juniperus californica*<br>*Arctostaphylos glauca*<br>*Salvia columbariae* | |
| CSC21 | CSC | CRC | *Adenostoma fasciculatum* | *Malacothamnus densiflorus*<br>*Bromus madritensis*<br>*Salvia leucophylla*<br>*Avena fatua*<br>*Eriogonum fasciculatum*<br>*Quercus sp*<br>*Hesperoyucca whipplei*<br>*Calystegia macro* | |
| CSC22 | CSC | CSC | *Eriogonum fasciculatum*<br>*Eriodictyon crassifolium*<br>*Malacothamnus fasciculatus* | *Adenostoma fasciculatum*<br>*Bromus madritensis*<br>*Avena fatua*<br>*Poa secunda*<br>*Bromus tectorum*<br>*Epilobium canum* | |
| CSC23 | CSC | CSC | *Adenostoma fasciculatum*<br>*Salvia mellifera*<br>*Eriogonum fasciculatum* | *Hesperoyucca whipplei*<br>*Bromus madritensis*<br>*Poa secunda*<br>*Avena fatua* | Moved plots over 0.6 mile south due to large burned area |
| CSC24 | CSC | CSC | *Eriogonum fasciculatum*<br>*Salvia leucophylla* | *Avena fatua*<br>*Bromus diandrus*<br>*Lepidospartum squamatum*<br>*Hesperoyucca whipplei*<br>*Atriplex canescens*<br>*Datura wrightii*<br>*Croton setiger*<br>*Artemisia californica* | Moved point due to large burned area. |
| CSC25 | CSC | CSC | *Salvia mellifera*<br>*Eriodictyon crassifolium*<br>*Adenostoma fasciculatum* | *Hesperoyucca whipplei* | |

## Special-Status Terrestrial Species - CWHR Study Sample Location Data

| | | | | | |
|---|---|---|---|---|---|
| DRI26 | DRI | URB | *Populus fremontii*<br>*Hesperocyparis*<br>*Ailanthus altissima* | | No transect data. Inaccessible - private residence. Conducted over the fence checklist |
| DSW27 | DSW | DRI | *Eriodictyon crassifolium*<br>*Eriogonum fasciculatum*<br>*Baccharis salicifolia*<br>*Tamarix ramosissima* | *Bromus madritensis*<br>*Avena fatua*<br>*Stephanomeria*<br>*Salvia apiana*<br>*Artemisia californica*<br>*Populus fremontii* | |
| DSW28 | DSW | DSW | *Salix sp* | *Eriogonum fasiculatum*<br>*Lepidospartum squamatum*<br>*Populus fremontii* | No transect data. Inaccessible - private area fenced off, over the fence checklist |
| FEW29 | FEW | FEW | *Schoenoplectus californicus* | *Juncus balticus*<br>*Populus fremontii* | Inundated, did not do transects for FEW |
| FEW30 | FEW | FEW | *Schoenoplectus californicus*<br>*Typha latifolia* | | Inundated, did not do transects for FEW |
| JST31 | JST | MCH | *Quercus john-tuckeri*<br>*Eriodictyon crassifolium*<br>*Artemisia tridentata* | *Bromus tectorum*<br>*Bromus madritensis*<br>*Eriophyllum sp*<br>*Arctostaphylos sp*<br>*Cercocarpus betuloides*<br>*Eriogonum fasciculatum*<br>*Lessingia grandiflorum*<br>*Cryptantha sp* | Some plots outside of poly, due to steep slopes and comparable to upslope areas |
| JUN32 | JUN | MCH | *Eriogonum fasciculatum*<br>*Quercus berberidifolia*<br>*Hesperoyucca whipplei* | *Bromus madritensis*<br>*Encelia sp*<br>*Arctostaphylos*<br>*Erodium cicutarium*<br>*Ephedra sp*<br>*Eriodictyon crassifolium*<br>*Ericameria nauseosa*<br>*Adenostoma fasciculatum*<br>*Poa secunda* | |
| JUN33 | JUN | - | - | - | Completely inaccessible, could not bino check |
| MCH34 | MCH | JST | *Yucca brevifolia*<br>*Bromus madritensis* | *Eriogonum fasciculatum*<br>*Eriodictyon*<br>*Bromus tectorum*<br>*Stephanomeria* | |
| MCH35 | MCH | SGB | *Ericameria nauseosus* | *Bromus madritensis*<br>*Bromus tectorum*<br>*Eriogonum elongatum*<br>*Stephanomeria sp*<br>*Salsola tragus* | |
| MCH36 | MCH | MCH | *Eriogonum fasciculatum* | *Bromus tectorum*<br>*Cryptantha sp*<br>*Elymus elymoides*<br>*Ericameria nauseosus*<br>*Ericamerica pinifolia*<br>*Artemisia tridentata*<br>*Bromus madritensis*<br>*Juniperus californica*<br>*Hesperoyucca whipplei* | |
| MCH37 | MCH | MCH | *Quercus berberidifolia*<br>*Adenostoma fasciculatum* | *Bromus madritensis*<br>*Salvia mellifera*<br>*Phoradendron sp* | |
| MCH38 | MCH | CSC | *Adenostoma fasciculatum*<br>*Salvia leucophylla*<br>*Salvia mellifera* | *Bromus madritensis*<br>*Bromus tectorum*<br>*Poa secunda*<br>*Bromus hordeaceus*<br>*Hesperoyucca*<br>*Allium sp*<br>*Sisymbrium sp*<br>*Arctostaphylos sp*<br>*Avena sp*<br>*Opuntia sp*<br>*Ceanothus sp* | Moved point due to large burned area. |

## Special-Status Terrestrial Species - CWHR Study Sample Location Data

| | | | | | |
|---|---|---|---|---|---|
| MCH39 | MCH | CSC | *Adenostoma fasciculatum*<br>*Eriogonum fasciculatum*<br>*Salvia mellifera* | *Bromus madritensis*<br>*Poa secunda*<br>*Ceanothus sp*<br>*Arctostaphylos sp* | |
| MCP40 | MCP | MCH | *Eriodictyon crassifolium*<br>*Ericameria nauseosus* | *Elymus condensatus*<br>*Marrubium vulgare*<br>*Artemisia tridentata* | |
| MHC41 | MHC | MHC | *Pseudotsuga menziesii*<br>*Arctostaphylos*<br>*Quercus berberidifolia* | *Cercocarpus sp*<br>*Heteromeles arbutifolia*<br>*Yucca sp*<br>*Lonicera sp*<br>*Poa secunda*<br>*Bromus diandrus* | Only 1 plot collected due to very steep slopes - safety/inaccessibility and small patch size |
| MHW42 | MHW | VRI | *Populus fremontii*<br>*Salix laevigata* | *Salix exigua*<br>*Salix lasiolepis*<br>*Tamarix sp*<br>*Elymus condensatus*<br>*Heliotropiumsp* | |
| MHW43 | MHW | VOW | *Quercus lobata*<br>*Quercus agrifolia* | *Corethrogyne filaginifolia*<br>*Eriophyllum confertiflorum*<br>*Avena sp*<br>*Stipa cernua*<br>*Eriogonum elongatum*<br>*Anthriscus caucalis*<br>*Rhamnus ilicifolia*<br>*Bromus diandrus*<br>*Bromus madritensis*<br>*Poa secunda*<br>*Galium aparine* | |
| MRI44 | MRI | VRI | *Populus fremontii*<br>*Salix goodingii* | *Juncus balticus*<br>*Asclepias fascicularis*<br>*Baccharis salicifolia*<br>*Elymus triticoides*<br>*Heliotropum curassavicum*<br>*Urtica dioica*<br>*Melilotus sp*<br>*Distichlis spicata*<br>*Bromus tectorum* | Location moved due to inundation of original point. Some plots partially inundated, thus cover/data eyeballed. |
| MRI45 | MRI | VRI | *Salix goodingii*<br>*Populus fremontii* | *Juncis balticus*<br>*Quercus lobata*<br>*Urtica dioica*<br>*Juniperus californica*<br>*Sambucus nigra*<br>*Solidago sp*<br>*Artemisia sp*<br>*Elymus triticoides* | |
| PAS46 | PAS | AGS | *Bromus* | *Avena fatua*<br>*Salsola tragus*<br>*Hirschfeldia incana* | No transect data. Inaccessible, beyond fence. Over fence checklist. |
| PGS47 | PGS | PGS | *Elymus glaucus*<br>*Distichlis spicata* | *Elymus triticoides*<br>*Sisymbrium cf altosissimum* | |
| PGS48 | PGS | AGS | *Bromus tectorum* | *Ericamerica nauseosus*<br>*Brassica sp*<br>*Stephanomeria* | No transect data. Inaccessible, beyond fence. Over fence checklist. |
| PJN49 | PJN | MCH | *Quercus john tuckeri*<br>*Arctostaphylos* | *Artemisia tridentata*<br>*Juniperus sp* | No transect data. Inaccessible, beyond fence. Over fence checklist. |
| PJN50 | PJN | BOP | *Quercus sp*<br>*Juniperus californica* | *Ephedra viridis*<br>*Ericameria nauseosus*<br>*Bromus tectorum*<br>*Eriogonum fasciculatum*<br>*Artemisia tridentata*<br>*Rhus aromatica* | |
| PJN51 | PJN | MCH | *Quercus sp*<br>*Juniperus californica* | *Juniperus californica*<br>*Ericameria pinifolia*<br>*Eriogonum fasciculatum*<br>*Elymus condensatus*<br>*Lonicera subspicata* | |
| SMC52 | SMC | MHC | *Quercus chrysolepis*<br>*Pseudotsuga menziesii*<br>*Bromus diandrus* | *Toxicodendron diversilobum*<br>*Prunus ilicifolia* | Only 1 plot collected due to most of veg type occurring on very steep, inaccessible slopes. |

## Special-Status Terrestrial Species - CWHR Study Sample Location Data

| | | | | | |
|---|---|---|---|---|---|
| URB53 | URB | URB | hardscape | *Pinus sp*<br>*Pinus halepensis*<br>unknown ornamentals | |
| URB54 | URB | URB | hardscape | *Juniperus* (ornamental)<br>*Oleo europaea*<br>*Rosmarinus officinalis* | |
| VOW55 | VOW | COW | *Quercus agrifolia*<br>*Bromus diandrus* | *Salvia mellifera*<br>*Eriogonum faciculatum*<br>*Baccharis pilularis*<br>*Ericameria nauseosus*<br>*Rhus aromatica* | Small patch with steep slopes, only 1 plot fit. |
| VOW56 | VOW | VOW | *Quercus lobata*<br>*Bromus diandrus*<br>*Bromus tectorum* | *Quercus sp*<br>*Ericameria nauseosus*<br>*Ericameria pinifolia* | |
| VRI57 | VRI | DRI | *Populus fremontii* | *Baccharis salicifolia*<br>*Eriodictyon*<br>*Juglans californica*<br>*Stephanomeria*<br>*Bromus madritensis*<br>*Tamarix sp*<br>*Stipa miliacea*<br>*Salvia leucophylla*<br>*Nicotiana glauca*<br>*Bromus diandrus* | |
| VRI58 | VRI | VRI | *Populus fremontii*<br>*Salix goodingii*<br>*Salix exigua*<br>*Sambucus nigra*<br>*Elymus triticoides* | *Peritoma arborea*<br>*Lonicera sp*<br>*Artemisia tridentata*<br>*Salvia mellifera*<br>*Artemisia sp*<br>*Bromus tectorum*<br>*Bromus madritensis*<br>*Ericameria nauseosus* | |
| WTM59 | WTM | WTM | *Leptochloa*<br>*Carex sp*<br>*Cyperus eragrostis* | *Salix exigua*<br>*Persicaria sp*<br>*Xanthium strumarium*<br>*Lepidium latifolium*<br>*Eleocharis sp* | |
| WTM60 | WTM | FEW | *Tamarix sp*<br>*Typha sp* | | |
| WTM61 | WTM | CSC | *Eriogonum fasciculatum*<br>*Cytisus scoparius* | *Bromus madritensis*<br>*Bromus diandrus*<br>*Eriogonum sp*<br>*Brassica sp* | |
| UNK62 | UNK | AGS | *Bromus madritensis*<br>*Bromus tectorum* | *Avena sp*<br>*Brassica sp*<br>*Heterotheca grandiflora*<br>*Acmispon americanus*<br>*Lactuca serriola*<br>*Helianthus annuus* | |
| UNK63 | UNK | SGB | *Ericameria nauseosa*<br>*Bromus madritensis* | *Stephanomeria tenuifolia*<br>*Croton setiger*<br>*Heterotheca villosa*<br>*Erodium sp*<br>*Avena sp*<br>*Brassica sp.*<br>*Eriogonum elongatum*<br>*Bromus diandrus* | |
| UNK64 | UNK | SGB | *Ericameria nauseosa*<br>*Bromus madritensis*<br>*Bromus tectorum* | *Stephanomeria tenuifolia*<br>*Croton setiger*<br>*Helianthus annuus* | |
| UNK65 | UNK | SGB | *Ericameria nauseosa*<br>*Bromus madritensis* | *Eriogonum elongatum*<br>*Heterotheca villosa*<br>*Ambrosia acanthicarpa*<br>*Leptosiphon liniflorus*<br>*Poa secunda*<br>*Stipa cernua*<br>*Stephanomeria tenuifolia*<br>*Corethrogyne filaginifolia* | |

| | | | | | |
|---|---|---|---|---|---|
| UNK66 | UNK | AGS | *Poa secunda*<br>*Bromus tectorum*<br>*Elymus triticoides* | *Amsinckia sp*<br>*Corethrogyne filaginifolia*<br>*Erodium sp*<br>*Brassica sp*<br>*Cryptantha sp*<br>*Lactuca serriola*<br>*Croton setiger*<br>*Helianthus annuus*<br>*Acmispon americanus* | |

# Appendix J

***Habitat Study Area***

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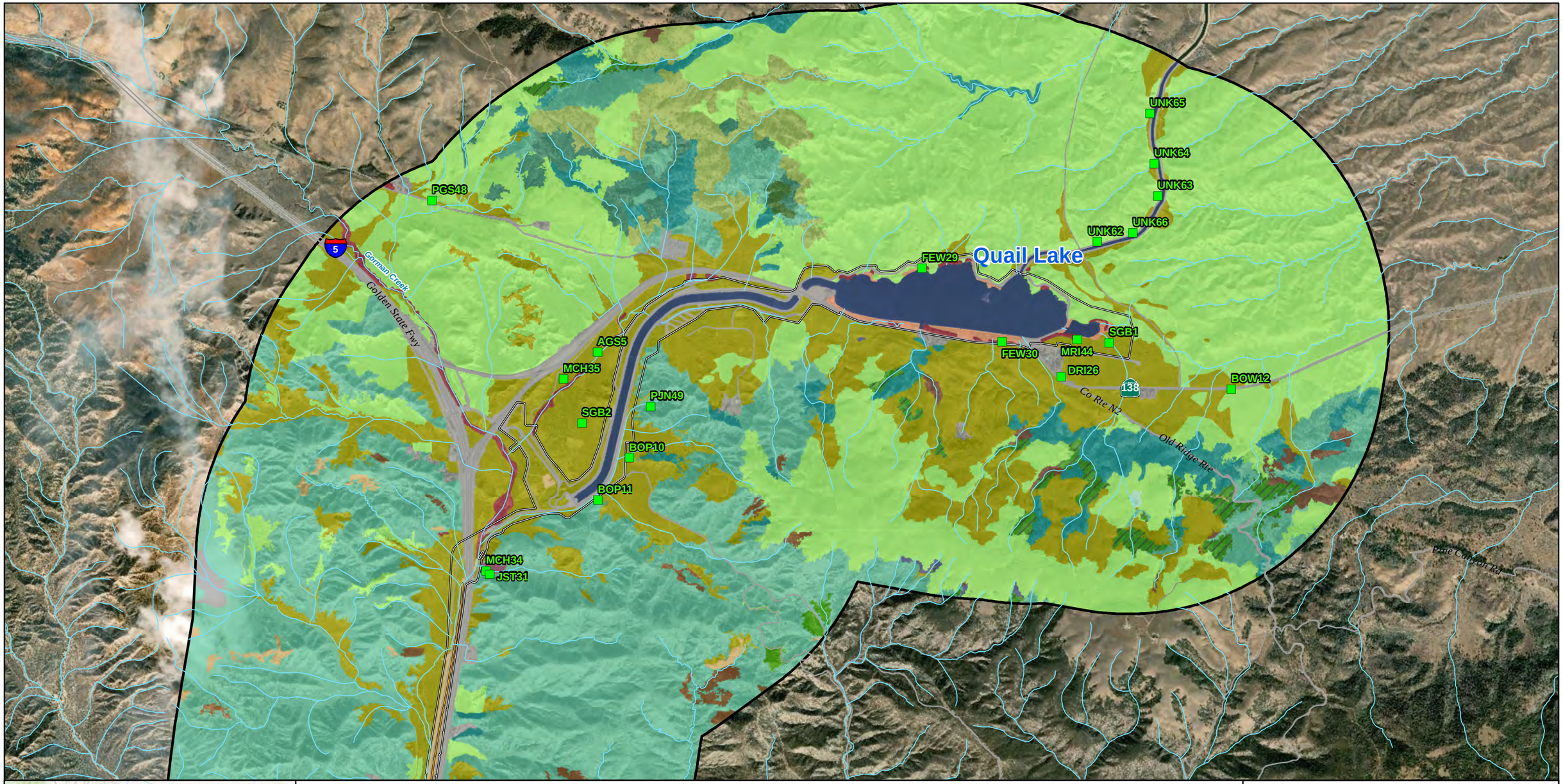


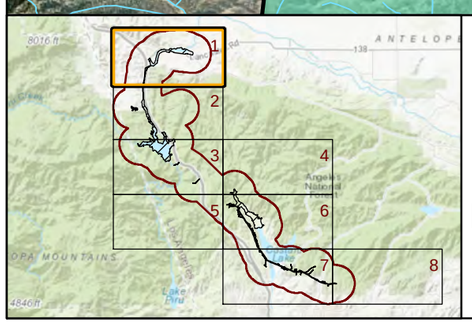


## Legend

- Survey Location
- StreamRiver
- CanalDitch
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Blue Oak - Foothill Pine
- Blue Oak Woodland
- Chamise - Redshank Chaparral
- Coastal Scrub
- Fresh Emergent Wetland
- Joshua Tree
- Juniper
- Lacustrine
- Mixed Chaparral
- Montane Chaparral
- Montane Hardwood
- Perennial Grassland
- Pinyon - Juniper
- Sagebrush
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland
- Wet Meadow

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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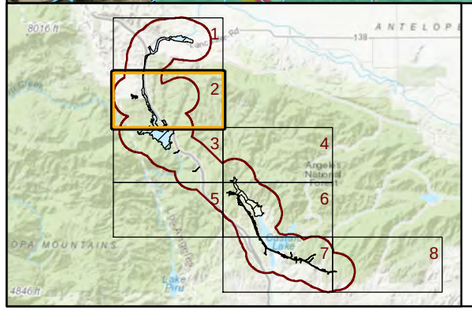
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 1

JUN32
MCP40
VRI58
German Creek
CRC15
CSC20
PGS47
PJN50
VOW56
AGS6
MRI45
MCH36
PJN51
SGB4
URB53
BAR8
Golden State Fwy
5
Pyramid Lake
Piru Creek
Salt Creek




**Legend**

- Survey Location
- StreamRiver
- CanalDitch
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Blue Oak - Foothill Pine
- Chamise - Redshank Chaparral
- Coastal Scrub
- Juniper
- Lacustrine
- Mixed Chaparral
- Montane Chaparral
- Montane Hardwood
- Montane Hardwood - Conifer
- Perennial Grassland
- Pinyon - Juniper
- Sagebrush
- Sierran Mixed Conifer
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland
- Wet Meadow

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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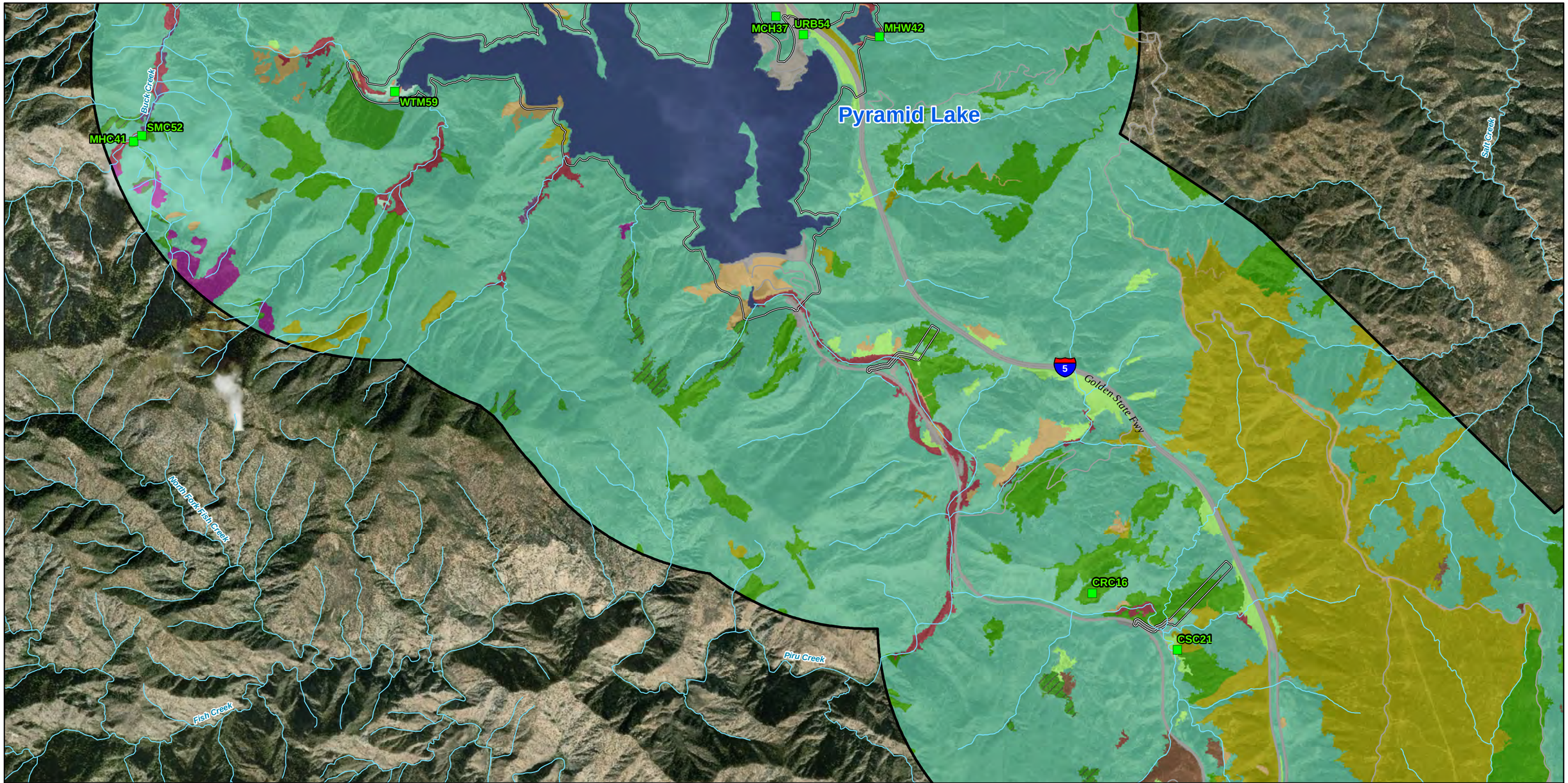
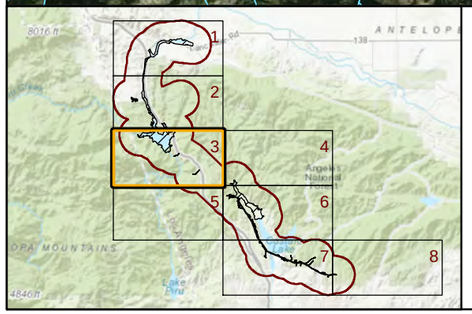
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 2




## Legend

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Chamise - Redshank Chaparral
- Coastal Oak Woodland
- Coastal Scrub
- Fresh Emergent Wetland
- Lacustrine
- Mixed Chaparral
- Montane Chaparral
- Montane Hardwood
- Montane Hardwood - Conifer
- Montane Riparian
- Sagebrush
- Sierran Mixed Conifer
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland
- Wet Meadow

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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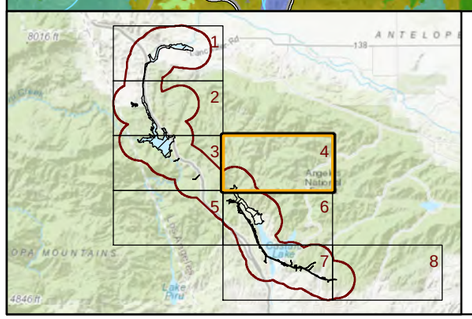
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 3

LA DWP


**Legend**

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Chamise - Redshank Chaparral
- Coastal Oak Woodland
- Coastal Scrub
- Desert Riparian
- Mixed Chaparral
- Montane Hardwood
- Montane Hardwood - Conifer
- Sierra Mixed Conifer
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 4

MHW43

5

Golden State Fwy

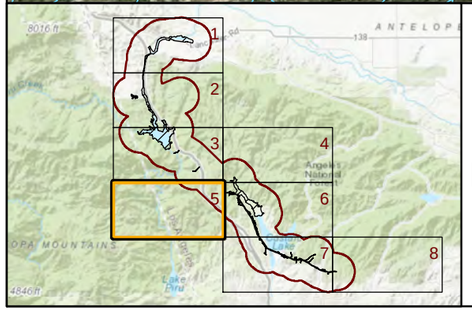
Piru Creek

Michael Creek

Agua Blanca Creek

Sulphur Creek

Lacoya Creek




## Legend

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Chamise - Redshank Chaparral
- Coastal Scrub
- Mixed Chaparral
- Montane Hardwood
- Urban
- Valley Oak Woodland

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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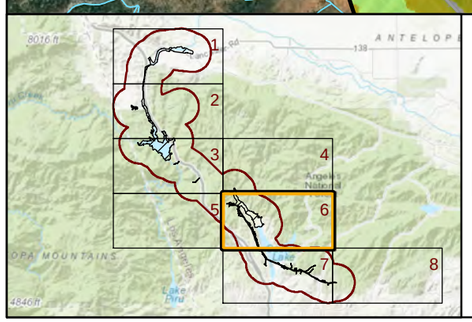
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 5

VOW55
VRI57
SGB3
WTM60
CRC19
CSC25
WTM61
Castaic Creek
Los Angeles Water and Power Road
Elderberry Forebay
Golden State Fwy
5
Lake Hughes Rd




**Legend**

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Blue Oak - Foothill Pine
- Chamise - Redshank Chaparral
- Coastal Oak Woodland
- Coastal Scrub
- Desert Riparian
- Fresh Emergent Wetland
- Lacustrine
- Mixed Chaparral
- Sagebrush
- Urban
- Valley Foothill Riparian
- Valley Oak Woodland
- Wet Meadow

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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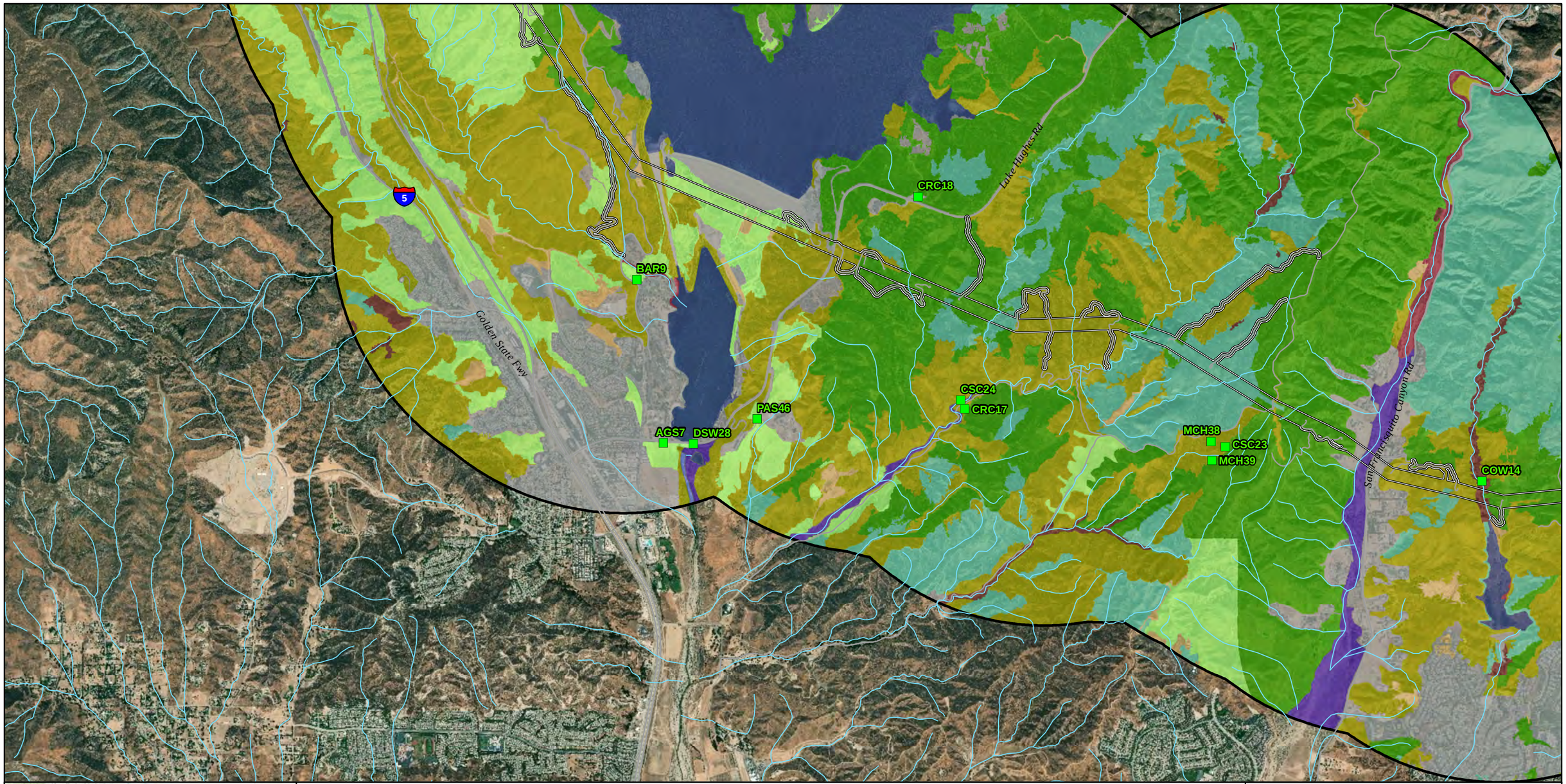
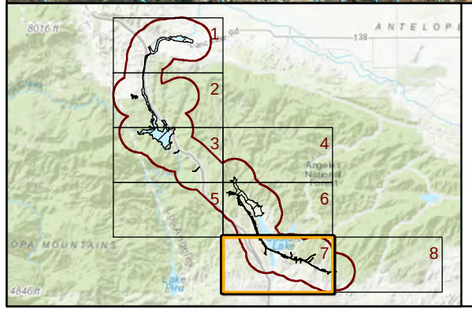
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 6




## Legend

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Barren
- Chamise - Redshank Chaparral
- Coastal Oak Woodland
- Coastal Scrub
- Desert Riparian
- Desert Wash
- Lacustrine
- Mixed Chaparral
- Urban
- Valley Foothill Riparian

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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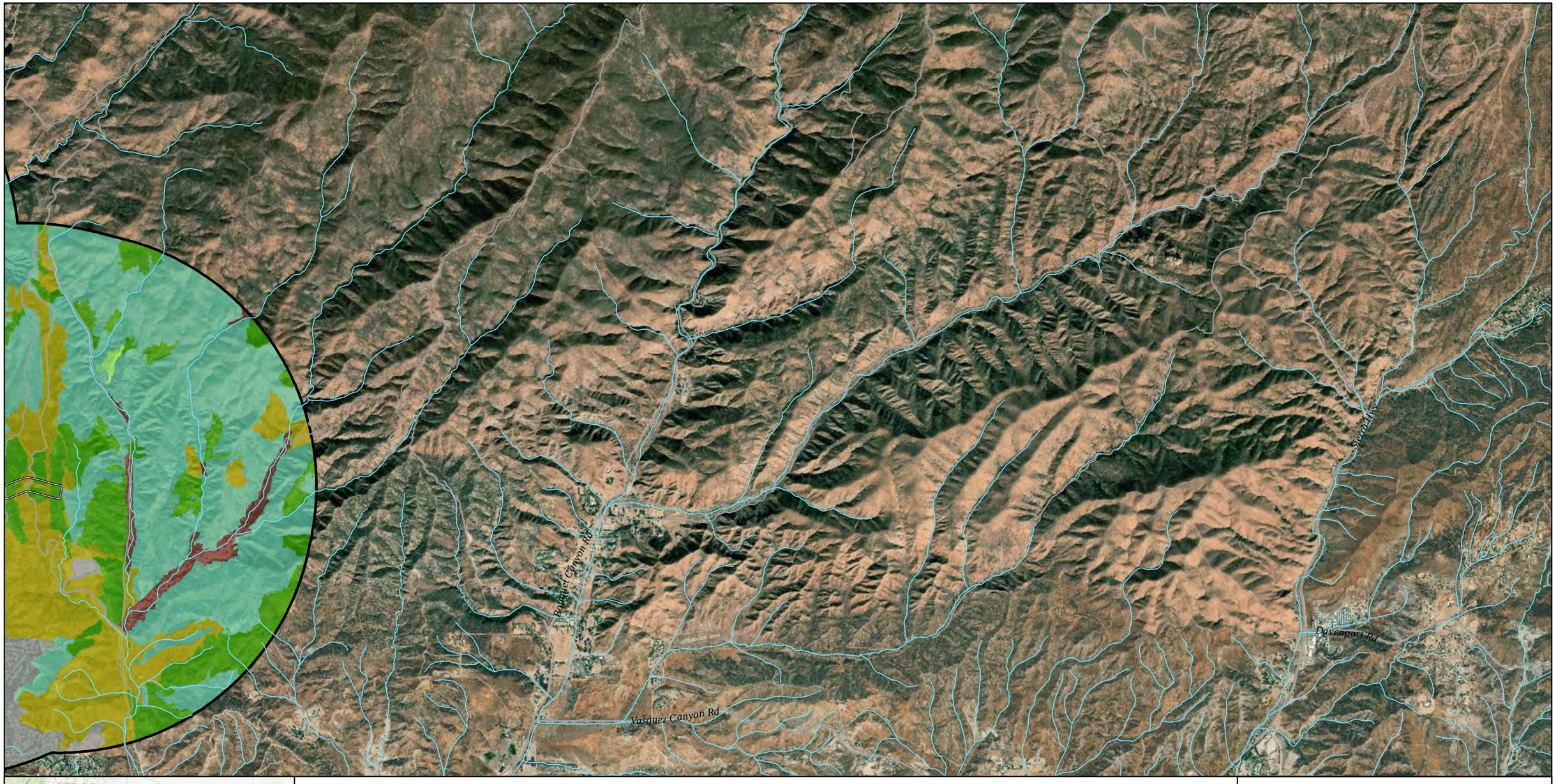
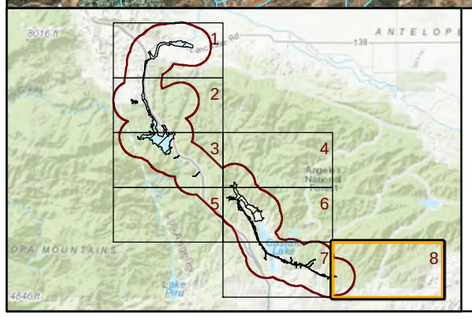
SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 7




**Legend**

- Survey Location
- StreamRiver
- Proposed Project Boundary (v.20190326) Angeles Tunnel Removed
- Study Boundary

**Habitat**

- Annual Grassland
- Chamise - Redshank Chaparral
- Coastal Oak Woodland
- Coastal Scrub
- Mixed Chaparral
- Urban

N

0 2,000 4,000 Feet

Prepared:4/24/2019
Projection: NAD 1983 StatePlane California V FIPS 0405 Feet
Data and/or Background: HDR (2018), Bing Map
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SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# CWHR Habitat Types and Survey Locations within the Study Area Map 8

# Appendix K

## *Botanical Inventory*

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**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SANIC5 | *Sambucus nigra* ssp. *caerulea* | Blue elderberry | Adoxaceae | Native | shrub | — | x | x | | X | | X | x | X | X | X | x |
| HEWH | *Hesperoyucca whipplei* | Chaparral yucca | Agavaceae | Native | shrub | — | x | x | x | x | x | x | x | x | x | | x |
| YUCCA | *Yucca* sp. | yucca | Agavaceae | — | tree | — | | | | | | x | | | | | |
| ALTR7 | *Alisma triviale* | Northern water plantain | Alismataceae | Native | perennial herb (aquatic) | — | | x | | | | | | | | | |
| ALOE | *Aloe* sp. | aloe | Aloaceae | — | perrenial herb | — | | | | | | x | | | | | |
| AMBL | *Amaranthus blitoides* | Prostrate pigweed | Amaranthaceae | Native | annual herb | — | | x | | | | | | | | | |
| AMRE | *Amaranthus retroflexus* | Rough pigweed | Amaranthaceae | Non-native | annual herb | — | | x | | | | | | | | | |
| RHAR4 | *Rhus aromatica* | Fragrant sumac | Anacardiaceae | Native | shrub | — | | x | | x | x | | | x | x | | |
| RHGL | *Rhus glabra* | Smooth sumac | Anacardiaceae | Non-native | tree | — | | | | | | x | | | | | |
| RHIN2 | *Rhus integrifolia* | Lemonade berry | Anacardiaceae | Native | shrub | — | | | | x | | | | | | | x |
| RHOV | *Rhus ovata* | Sugar bush | Anacardiaceae | Native | shrub | — | | | x | x | x | x | x | x | X | | |
| SCMO | *Schinus molle* | Peruvian pepper tree | Anacardiaceae | Non-native | tree | Cal-IPC (Limited) | | | x | x | | x | | x | x | | |
| SCTE | *Schinus terebinthifolius* | Brazilian pepper tree | Anacardiaceae | Non-native | tree/shrub | CAL-IPC (Moderate) | | | | | | | | x | | | |
| SELA10 | *Searsia lancea* | African sumac | Anacardiaceae | Non-native | tree | — | | | x | | | | | | | | |
| TODI | *Toxicodendron diversilobum* | Poison oak | Anacardiaceae | Native | vine/shrub | — | | | | x | | x | x | x | x | | x |
| CYLE7 | *Cyclospermum leptophyllum* | Marsh parsley | Apiaceae | Non-native | annual herb | — | | | | | | | | x | x | | |
| DAPU3 | *Daucus pusillus* | American wild carrot | Apiaceae | Native | annual herb | — | x | x | | | | | | | x | | x |
| FOVU | *Foeniculum vulgare* | Sweet fennel | Apiaceae | Non-native | perrenial herb | Cal-IPC (Moderate) | | | | x | | | | | | | |
| LONE | *Lomatium nevadense* | Nevada lomatium | Apiaceae | Native | perennial herb | — | | | | x | | | | | | | |
| LOUT | *Lomatium utriculatum* | Hog fennel | Apiaceae | Native | perennial herb | — | x | | | x | | | | | x | | |
| SACR2 | *Sanicula crassicaulis* | Gamble weed | Apiaceae | Native | perennial herb | — | | | | | | | | | x | | |
| APCA | *Apocynum cannabinum* | Indian hemp | Apocynaceae | Native | perennial herb | — | | | | | | | | x | | | |
| ASCA3 | *Asclepias californica* | California milkweed | Apocynaceae | Native | perennial herb | — | x | | | | | | | | | | |
| ASFA | *Asclepias fascicularis* | Narrow leaf milkweed | Apocynaceae | Native | perennial herb | — | x | | | x | | | x | x | x | | x |
| NEOL | *Nerium oleander* | Oleander | Apocynaceae | Non-native | tree | — | | | x | | | x | | x | | | |
| ZAAE | *Zantedeschia aethiopica* | Callalily | Araceae | Non-native | perennial herb | Cal-IPC (Limited) | | | | | | x | | | | | |
| TEPA3 | *Tetrapanax papyrifer* | Rice-paper plant | Araliaceae | Non-native | shrub | — | | | | | | x | | | | | |
| CHHU7 | *Chamaerops humilis* | European fan palm | Arecaceae | Non-native | shrub | — | | | | | | x | | | | | |
| PHDA4 | *Phoenix dactylifera* | Date palm | Arecaceae | Non-native | tree | — | | | x | | | | | | | | |
| WAFI | *Washingtonia filifera* | California fan palm | Arecaceae | Native | tree | — | | | | | | x | | | | | |
| — | *Gasteria carinata* | Bredasdorp Gasteria | Asphodelaceae | Non-native | succulent | — | | | | | | x | | | | | |
| ACMI3 | *Acourtia microcephala* | Sacapellote | Asteraceae | Native | perennial herb | — | | | | | | | | x | x | | |
| AMAC2 | *Ambrosia acanthicarpa* | Annual burrweed | Asteraceae | Native | annual herb | — | x | x | | x | | | x | x | x | | |
| AMAR2 | *Ambrosia artemisiifolia* | Annual ragweed | Asteraceae | Non-native | annual herb | — | | | | | | x | | x | | | |
| AMPS | *Ambrosia psilostachya* | Ragweed | Asteraceae | Native | perennial herb | — | x | x | | x | | | | x | x | | |
| AMSA7 | *Ambrosia salsola* | Burrobrush | Asteraceae | Native | shrub | — | | x | | | | | | x | | | x |
| AMTR | *Ambrosia trifida* | Giant ragweed | Asteraceae | Non-native | annual herb | — | | | x | | | x | | | | | |
| ANMA | *Anaphalis margaritacea* | Pearly everlasting | Asteraceae | Native | perennial herb | — | | | | x | | | | | | | |
| ARBI2 | *Artemisia biennis* | Biennial sagewort | Asteraceae | Non-native | annual/perrenial herb | — | | | | | | | | x | | | |
| ARCA11 | *Artemisia californica* | California sagebrush | Asteraceae | Native | shrub | — | x | x | | x | x | x | x | x | x | | x |
| ARDO3 | *Artemisia douglasiana* | California mugwort | Asteraceae | Native | perennial herb | — | | x | | x | | x | x | x | x | | x |
| ARDR4 | *Artemisia dracunculus* | Wild tarragon | Asteraceae | Native | perennial herb | — | x | x | | x | | | | | x | | x |
| ARTR2 | *Artemisia tridentata* | Common sagebrush | Asteraceae | Native | shrub | — | x | | | | | | | | x | | |
| ARTRT | *Artemisia tridentata* var. *tridentata* | Basin big sagebrush | Asteraceae | Native | shrub | — | x | x | | x | | | | | | x | |
| ARTRV2 | *Artemisia tridentata* var. *vaseyana* | Mountain big sagebrush | Asteraceae | Native | shrub | — | | x | | | | | | | | | |

**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ARVU | *Artemisia vulgaris* | Common wormwood | Asteraceae | Non-native | perennial herb or shrub | — | | | | | | x | | | | | |
| BAPI | *Baccharis pilularis* | Coyote brush | Asteraceae | Native | shrub | — | x | x | | x | | x | x | x | x | x | x |
| BASA4 | *Baccharis salicifolia* | Mule fat | Asteraceae | Native | shrub | — | x | x | x | x | | x | x | x | x | | x |
| BASA2 | *Baccharis sarothroides* | Desertbroom baccharis | Asteraceae | Native | shrub | — | | | | x | | x | | x | | | |
| BRCA3 | *Brickellia californica* | California brickellia | Asteraceae | Native | perennial herb | — | | | | x | | x | | x | x | | |
| CAPY2 | *Carduus pycnocephalus* | Italian thistle | Asteraceae | Non-native | annual herb | Cal-IPC (Moderate); CDFA-C | | | | | | | | x | x | | |
| CEME2 | *Centaurea melitensis* | Tocalote | Asteraceae | Non-native | annual herb | Cal-IPC (Moderate); CDFA-C | x | x | | x | | | | x | x | | x |
| CESO3 | *Centaurea solstitialis* | Yellow star thistle | Asteraceae | Non-native | annual herb | Cal-IPC (High); CDFA-C | x | x | | x | | x | | x | | | |
| CEPU14 | *Centromadia pungens* | Common tarweed | Asteraceae | Native | annual herb | — | | x | | | | | | | | | |
| CHGL | *Chaenactis glabriuscula* | Common yellow chaenactis | Asteraceae | Native | annual herb | — | x | | | | | | | x | x | | |
| CHGLM | *Chaenactis glabriuscula* var. *megacephala* | Yellow pincushion | Asteraceae | Native | annual herb | — | | | | | | | | x | x | | |
| CHXA | *Chaenactis xantiana* | Fleshcolor pincushion | Asteraceae | Native | annual herb | — | x | | | | | | | | | | |
| CHVI8 | *Chrysothamnus viscidiflorus* | Stickyleaf rabbitbrush | Asteraceae | Native | shrub | — | | x | | x | | | | | | | |
| CIAR4 | *Cirsium arvense* | Canada thistle | Asteraceae | Non-native | perennial herb | Cal-IPC (Moderate); CDFA-B | | | | x | | | x | | | | |
| CIOC | *Cirsium occidentale* | Western thistle | Asteraceae | Native | perennial herb | — | | x | | | | | x | | | | x |
| CIOCO | *Cirsium occidentale* var. *occidentale* | Cobweb thistle | Asteraceae | Native | perennial herb | — | x | x | | x | | | x | x | | | |
| CIOCC4 | *Cirsium occidentale* var. *californicum* | Bigelow thistle | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| CIVU | *Cirsium vulgare* | Bull thistle | Asteraceae | Non-native | perennial herb | Cal-IPC (Moderate); CDFA-C | x | x | | x | | x | | x | | | x |
| COFIC | *Corethrogyne filaginifolia* var. *californica* | California sandaster | Asteraceae | Native | perennial herb | — | | | | | | | | x | x | | |
| COFIF | *Corethrogyne filaginifolia* var. *filaginifolia* | Common sandaster | Asteraceae | Native | perennial herb | — | x | x | x | x | | x | x | x | x | | x |
| HEFA | *Deinandra fasciculata* | Clustered tarweed | Asteraceae | Native | annual herb | — | | | | | | | | x | x | | |
| ENAC | *Encelia actoni* | Acton encelia | Asteraceae | Native | shrub | — | x | | | | | | | | x | | x |
| ENCA | *Encelia californica* | Bush sunflower | Asteraceae | Native | shrub | — | | | | x | | | | | x | | |
| ENFA | *Encelia farinosa* | Brittlebush | Asteraceae | Native | shrub | — | | | | | | | | | x | | |
| ERAR27 | *Ericameria arborescens* | Golden fleece | Asteraceae | Native | shrub | — | | | | | | | | x | | | |
| ERER11 | *Ericameria ericoides* | California goldenbush | Asteraceae | Native | shrub | — | | | | | | | | x | | | |
| ERLI6 | *Ericameria linearifolia* | Interior goldbush | Asteraceae | Natve | shrub | — | x | x | x | x | | | | x | x | | |
| ERNA10 | *Ericameria nauseosa* | Rubber rabbitbrush | Asteraceae | Native | shrub | — | x | x | x | x | | | | x | | x | x |
| — | *Ericameria nauseosa* var. *bernardina* | San bernardino rubber rabbitbrush | Asteraceae | Native | shrub | — | x | | | | | | | | | | |
| — | *Ericameria nauseosa* var. *oreophila* | Rubber rabbitbrush | Asteraceae | Native | shrub | — | x | | | | | | | | | | |
| ERPI7 | *Ericameria pinifolia* | Pine bush | Asteraceae | Native | shrub | — | | | | | | | | x | x | | |
| ERSU13 | *Ericameria suffruticosa* | Alpine macronema | Asteraceae | Native | shrub | — | | | | | | | | | x | | |
| ERBO4 | *Erigeron bonariensis* | Flax-leaved horseweed | Asteraceae | Non-native | annual herb | — | | | | x | | x | | | | | |
| ERCA20 | *Erigeron canadensis* | Canada horseweed | Asteraceae | Native | annual herb | — | x | x | | x | | x | | x | | | |
| ERFO2 | *Erigeron foliosus* | Leafy daisy | Asteraceae | Native | perennial herb | — | x | | | | | | | x | x | | |

**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ERFOF | *Erigeron foliosus* var. *foliosus* | Leafy fleabane | Asteraceae | Native | perennial herb or shrub | — | x | | | | | | | | | | |
| ERCOC12 | *Eriophyllum confertiflorum* var. *confertiflorum* | Golden yarrow | Asteraceae | Native | shrub | — | x | x | | x | x | | x | x | x | | x |
| EUOC4 | *Euthamia occidentalis* | Western goldenrod | Asteraceae | Native | perennial herb | — | | x | | | | | | | | | |
| GALI4 | *Gazania linearis* | Treasureflower | Asteraceae | Non-native | perennial herb | Cal-IPC (Moderate) | | | | | | | | x | | | |
| GRSQ | *Grindelia squarrosa* | Curlycup gumweed | Asteraceae | Non-native | perennial herb | — | | | | | | x | | | | | |
| GUCA | *Gutierrezia californica* | Snakeweed | Asteraceae | Native | perennial herb or shrub | — | x | | | x | | | | | x | | |
| GUTIE | *Gutierrezia sp.* | — | Asteraceae | Native | — | — | | | | | | | | | x | | |
| HASQ2 | *Hazardia squarrosa* | Saw toothed goldenbush | Asteraceae | Native | shrub | — | x | | | x | | | | x | x | | |
| HEPU2 | *Helenium puberulum* | Rosilla | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| HEAN3 | *Helianthus annuus* | Common sunflower | Asteraceae | Native | annual herb | — | x | x | | | | x | | x | x | x | x |
| HECA5 | *Helianthus californicus* | California sunflower | Asteraceae | Native | perennial herb | — | | | | | | | | x | x | | |
| HEGR3 | *Helianthus gracilentus* | Slender sunflower | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| HENUN | *Helianthus nuttallii* ssp. *nuttallii* | Nuttall's sunflower | Asteraceae | Native | perennial herb | — | | | | x | | | | | | | |
| HEGR7 | *Heterotheca grandiflora* | Telegraph weed | Asteraceae | Native | annual/perennial herb | — | x | | | | | | | x | x | | x |
| HESE | *Heterotheca sessiliflora* | Sessileflower false goldenaster | Asteraceae | Native | annual, perennial herb | — | x | | | | | | | | x | | |
| HOHE | *Holocarpha heermannii* | Heermann's tarweed | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| HYGL2 | *Hypochaeris glabra* | Smooth cat's ear | Asteraceae | Non-native | annual herb | — | x | x | | | | | | | | | |
| ISME5 | *Isocoma menziesi* | Menzies' goldenbush | Asteraceae | Native | shrub | — | | | | | | | | | x | | |
| IVAX | *Iva axillaris* | Povertyweed | Asteraceae | Native | perennial herb | — | x | x | | | | | | x | x | | x |
| LASE | *Lactuca serriola* | Prickly lettuce | Asteraceae | Non-native | annual herb | — | x | x | | x | | x | | x | x | | |
| LACO13 | *Laennecia coulteri* | Coulter's horseweed | Asteraceae | Native | annual herb | — | | | | | | | | x | | | |
| LACA7 | *Lasthenia californica* | Common goldfields | Asteraceae | Native | annual herb | — | x | | | | | x | | x | x | | |
| LAGR10 | *Lasthenia gracilis* | Needle goldfields | Asteraceae | Native | annual herb | — | | | | | | | | x | x | | |
| LAPL | *Layia platyglossa* | Coastal tidytips | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| LESQ | *Lepidospartum squamatum* | Scalebroom | Asteraceae | Native | shrub | — | | x | | x | | | x | x | x | x | |
| LEBI4 | *Leptosyne bigelovii* | Bigelow coreopsis | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| LEGL18 | *Lessingia glandulifera* | Valley vinegar weed | Asteraceae | Native | annual herb | — | x | | | | | | | | | | |
| LOCA19 | *Logfia filaginoides (californica)* | California cottonrose | Asteraceae | Native | annual herb | — | | | | | | | | x | | | |
| MAEL | *Madia elegans* | Common madia | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| MASA2 | *Malacothrix saxatilis* | Cliff aster | Asteraceae | Native | perennial herb | — | | | | x | | | x | x | x | | |
| MASAT | *Malacothrix saxatilis* var. *tenuifolia* | Cliff desert dandelion | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| MADI6 | *Matricaria discoidea* | Pineapple weed | Asteraceae | Native | annual herb | — | x | | | x | | | | | x | | x |
| MIDO | *Microseris douglasii* | Douglas' silverpuffs | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| — | *Pseudognaphalium beneolens* | Cudweed | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| PSCA13 | *Pseudognaphalium californicum* | Ladies' tobacco | Asteraceae | Native | annual/perrenial herb | — | x | x | | x | | | x | x | x | | x |
| PSCA11 | *Pseudognaphalium canescens* | Wright's cudweed | Asteraceae | Native | perennial herb | — | x | | | x | | | | | | | |
| PSLU6 | *Pseudognaphalium luteoalbum* | Jersey cudweed | Asteraceae | Non-native | annual herb | — | | | | | | x | | x | | | |
| — | *Pseudognaphalium thermale* | Small headed cudweed | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| PSBR | *Psilocarphus brevissimus* | Woolly marbles | Asteraceae | Native | annual herb | — | | | | x | | | | | | | |
| SECA | *Senecio californicus* | California butterweed | Asteraceae | Native | annual herb | — | | | | | | | | | x | | |
| SEFL3 | *Senecio flaccidus* | Shrubby ragwort | Asteraceae | Native | shrub | — | | | | | | | | x | | | |
| SEVU | *Senecio vulgaris* | Common groundsel | Asteraceae | Non-native | annual herb | — | | | | x | | x | | x | x | | |

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| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SIMA3 | *Silybum marianum* | Milk thistle | Asteraceae | Non-native | annual/perennial herb | Cal-IPC (Limited) | x | | | | | | | x | | | |
| SOVE6 | *Solidago velutina* | Threenerve goldenrod | Asteraceae | Native | perennial herb | — | | | | | | x | | | | | |
| SOAR2 | *Sonchus arvensis* | Perennial sow thistle | Asteraceae | Non-native | perennial herb | — | | x | | | | | | | | | |
| SOAS | *Sonchus asper* | Spiny sowthistle | Asteraceae | Non-native | annual herb | — | x | | | x | | x | | x | x | | |
| SOOL | *Sonchus oleraceus* | Common sow thistle | Asteraceae | Non-native | annual herb | — | x | x | | x | | | | x | x | | x |
| STEX | *Stephanomeria exigua* | Small wirelettuce | Asteraceae | Native | annual herb | — | | | x | | | | | | | | |
| STVI2 | *Stephanomeria virgata* | Twiggy wreath plant | Asteraceae | Native | annual herb | — | x | | | x | | x | | x | x | | |
| STVIP | *Stephanomeria virgata* ssp. *pleurocarpa* | Tall stephanomeria | Asteraceae | Native | annual herb | — | x | | | | | | | | | | |
| SYLA6 | *Symphyotrichum lanceolatum* | White panicle aster | Asteraceae | Native | perennial herb | — | | | | | | | | x | | | |
| TAOF | *Taraxacum officinale* | Red-seeded dandelion | Asteraceae | Non-native | perennial herb | — | | | x | x | | | | | | | |
| TRDU | *Tragopogon dubius* | Goat's beard | Asteraceae | Non-native | perennial herb | — | | | | x | | | | x | x | | |
| MILI5 | *Uropappus (microseris) lindleyi* | Silver puffs | Asteraceae | Native | annual herb | — | x | | | | | | | x | x | | x |
| XAST | *Xanthium strumarium* | Cocklebur | Asteraceae | Native | annual herb | — | x | | | x | | x | x | x | x | | x |
| BEPI | *Berberis pinnata* | Shiny leaf mahonia | Berberidaceae | Native | shrub | — | | | | x | | x | | x | | | |
| ALRH2 | *Alnus rhombifolia* | White alder | Betulaceae | Native | tree | — | | | | x | | | | x | | | |
| CHLI2 | *Chilopsis linearis* | Desert willow | Bignoniaceae | Native | shrub | — | | | | | | x | | | | | |
| AMIN3 | *Amsinckia intermedia* | Common fiddleneck | Boraginaceae | Native | annual herb | — | | | | | | x | | x | | | |
| AMME | *Amsinckia menziesii* | Menzies' fiddleneck | Boraginaceae | Native | annual herb | — | x | x | | | | | | x | x | | x |
| AMTET | *Amsinckia tessellata* var. *tessellata* | Devil's lettuce | Boraginaceae | Native | annual herb | — | x | x | | x | | | | x | | | |
| CRIN8 | *Cryptantha intermedia* | Common cryptantha | Boraginaceae | Native | annual herb | — | x | | | x | | | | x | x | | |
| CRMU2 | *Cryptantha muricata* | Pointed cryptantha | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| CRMUJ | *Cryptantha muricata var. jonesii* | Jones' cryptantha | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| EMPEP | *Emmenanthe penduliflora* var. *penduliflora* | Whispering bells | Boraginaceae | Native | annual herb | — | | x | | | x | | | | x | | x |
| ERCRC | *Eriodictyon crassifolium* var. *crassifolium* | Thick leaved yerba santa | Boraginaceae | Native | shrub | — | x | x | | x | x | x | x | x | x | x | x |
| EUCHC | *Eucrypta chrysanthemifolia* var. *chrysanthemifolia* | Spotted hideseed | Boraginaceae | Native | annual herb | | | | | x | | x | | x | x | | |
| HECU3 | *Heliotropium curassavicum* | Chinese parsley | Boraginaceae | Native | perennial herb | — | x | x | | x | | | | x | x | | x |
| NEMEM | *Nemophila menziesii* var. *menziesii* | Baby blue eyes | Boraginaceae | Native | annual herb | — | x | | | | | | | | | | |
| NEPUF | *Nemophila pulchella* var. *fremontii* | Fremont's baby blue eyes | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| PELIF2 | *Pectocarya linearis* ssp. *ferocula* | Sagebrush combseed | Boraginaceae | Native | annual herb | — | | | | | | x | | x | | | |
| PEPE26 | *Pectocarya penicillata* | Winged pectocarya | Boraginaceae | Native | annual herb | — | x | x | | x | | | | x | x | x | |
| PHCI | *Phacelia cicutaria* | Caterpillar phacelia | Boraginaceae | Native | annual herb | — | | | | | | | | x | x | | |
| PHCR | *Phacelia crenulata* | Notch leaved phacelia | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| PHMI | *Phacelia minor* | California bluebell | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| PHPA3 | *Phacelia parryi* | Parry's phacelia | Boraginaceae | Native | annual herb | — | | x | | | | | | x | x | | x |
| — | *Phacelia viscida* var. *viscida* | Sticky phacelia | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| PHCIC | *Phacelia cicutaria* var. *cicutaria* | Caterpillar phacelia | Boraginaceae | Native | annual herb | — | | | | | | | | x | x | | |
| PHCR2 | *Phacelia cryptantha* | Hiddenflower phacelia | Boraginaceae | Native | annual herb | — | | | | | | x | | | | | |
| PHDI | *Phacelia distans* | Distant phacelia | Boraginaceae | Native | annual herb | — | | | | | | | | | x | | |
| PHRA2 | *Phacelia ramosissima* | Branching phacelia | Boraginaceae | Native | perennial herb | — | | | | | | | | x | | | |
| PHIMP | *Phacelia imbricata* var. *patula* | Imbricate phacelia | Boraginaceae | Native | perennial herb | — | x | | | | | | | | | | |
| PLCAC3 | *Plagiobothrys canescens* var. *canescens* | Valley popcorn flower | Boraginaceae | Native | annual herb | — | x | x | | | x | | | x | x | | x |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BRNI | *Brassica nigra* | Black mustard | Brassicaceae | Non-native | annual herb | Cal-IPC (Moderate) | x | x | x | x | | x | | x | x | | x |
| BRTO | *Brassica tournefortii* | Saharan mustard | Brassicaceae | Non-native | annual herb | Cal-IPC (High) | x | | | | | | | | | | |
| CABU2 | *Capsella bursa-pastoris* | Sheperd's purse | Brassicaceae | Non-native | annual herb | — | | | | x | | | | | x | | |
| DEPI | *Descurainia pinnata* | Yellow tansy mustard | Brassicaceae | Native | annual herb | — | x | x | | | | | | | x | | |
| DESO2 | *Descurainia sophia* | Fix weed | Brassicaceae | Non-native | annual herb | Cal-IPC (Limited) | x | | | | | | | | | | |
| ERCAC | *Erysimum capitatum* var. *capitatum* | Sanddune wallflower | Brassicaceae | Native | perennial herb | — | | | | x | | | | | | | |
| HIIN3 | *Hirschfeldia incana* | Mediterranean hoary mustard | Brassicaceae | Non-native | perennial herb | Cal-IPC (Moderate) | x | x | x | x | | x | | x | x | x | x |
| LEDR | *Lepidium (cardaria) draba (pubescens)* | Whitetop | Brassicaceae | Non-native | perennial herb | Cal-IPC (Moderate); CDFA-B | | | | x | | x | | x | | | |
| LELA2 | *Lepidium latifolium* | Broad leaved pepper grass | Brassicaceae | Non-native | perennial herb | Cal-IPC (High); CDFA-B | | x | | | | | | | | | x |
| LENI | *Lepidium nitidum* | Shining pepperweed | Brassicaceae | Native | annual herb | — | | | | | | | | | x | | |
| LEVI3 | *Lepidium virginicum* | Virginia pepperweed | Brassicaceae | Native | annual herb | — | | | | | | | | x | x | | |
| NAOF | *Nasturtium officinale* | Watercress | Brassicaceae | Native | perennial herb (aquatic) | — | | x | | | | | | | | | x |
| — | *Peritoma arborea* var. *arborea* | Bladderpod | Brassicaceae | Native | shrub | — | x | x | x | x | | x | | x | x | x | x |
| ROPA2 | *Rorippa palustris* | Bog yellow cress | Brassicaceae | Native | annual/perennial herb | — | x | | | | | | | | | | |
| SIAR4 | *Sinapis arvensis* | Charlock mustard | Brassicaceae | Non-native | annual herb | Cal-IPC (Limited) | | | | | | x | | x | | | |
| SIAL2 | *Sisymbrium altissimum* | Tumble mustard | Brassicaceae | Non-native | annual herb | — | x | x | | x | | | | | x | | |
| STPIP | *Stanleya pinnata* var. *pinnata* | Desert princesplume | Brassicaceae | Native | perennial herb or shrub | — | | | | | | | x | | x | | |
| THCU | *Thysanocarpus curvipes* | Sand fringepod | Brassicaceae | Native | annual herb | — | | | | | | | | x | x | | |
| THLA3 | *Thysanocarpus laciniatus* | Mountain fringepod | Brassicaceae | Native | annual herb | — | | | | | | | | | x | | |
| CEHI3 | *Cereus hildmannianus* | Hedge cactus | Cactaceae | Non-native | shrub/tree | — | | | | | | x | | | | | |
| OPBAB2 | *Opuntia basilaris* var. *basilaris* | Beavertail cactus | Cactaceae | Native | shrub (stem succulent) | — | | | | | | | | | x | | |
| OPBAB | *Opuntia basilaris* var. *brachyclada* | Short joint beavertail | Cactaceae | Native | shrub (stem succulent) | CNPS 1B.2 | | | | | | | | | x | | |
| OPOC2 | *Opuntia* x *occidentalis* | Western prickly pear | Cactaceae | Native | shrub (stem succulent) | — | | | | | | x | | | | | |
| LOIN4 | *Lonicera interrupta* | Chaparral honeysuckle | Caprifoliaceae | Native | vine/shrub | — | x | | | x | | | | | | | x |
| LOSU2 | *Lonicera subspicata* | Southern honeysuckle | Caprifoliaceae | Native | shrub | — | | | | | x | | | | | | |
| POTE | *Polycarpon tetraphyllum* | Four leaved all seed | Caryophyllaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| SIGA | *Silene gallica* | Common catchfly | Caryophyllaceae | Non-native | annual herb | — | | | | x | | | | | | | |
| STME2 | *Stellaria media* | Chickweed | Caryophyllaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| ATCAC | *Atriplex canescens* var. *canescens* | Fourwing saltbush | Chenopodiaceae | Native | shrub | — | | x | x | x | x | x | x | x | x | x | x |
| ATLE | *Atriplex lentiformis* | Big saltbush | Chenopodiaceae | Native | shrub | — | | x | x | x | | x | | x | | x | x |
| ATLE2 | *Atriplex leucophylla* | Sea scale | Chenopodiaceae | Native | shrub | — | | | | x | | x | | | | | |
| ATPO | *Atriplex polycarpa* | Cattle spinach | Chenopodiaceae | Native | shrub | — | | | | x | | x | | x | | | |
| ATSE | *Atriplex semibaccata* | Austrailian saltbush | Chenopodiaceae | Non-native | perennial herb | Cal-IPC (Moderate) | | | | x | | x | | x | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BASC5 | *Bassia (Kochia) scoparia* | Mexican fireweed | Chenopodiaceae | Non-native | annual herb | Cal-IPC (Limited) | | | x | | | x | | x | | | |
| CHAL7 | *Chenopodium album* | Lamb's quarters | Chenopodiaceae | Non-native | annual herb | — | | x | | | | x | x | x | x | | |
| CHCA3 | *Chenopodium californicum* | California goosefoot | Chenopodiaceae | Native | perrenial herb | — | | | | | | | | | x | | |
| CHMU2 | *Chenopodium murale* | Nettle leaf goosefoot | Chenopodiaceae | Non-native | annual herb | — | | | | | | | | | x | | |
| HAGL | *Halogeton glomeratus* | Halogeton | Chenopodiaceae | Non-native | annual herb | Cal-IPC (Moderate); CDFA-A | | x | | | | | | | | | |
| SAKA | *Salsola kali* | Russian thistle | Chenopodiaceae | Non-native | annual herb | — | x | | | | | | | x | | | |
| SATR12 | *Salsola tragus* | Prickly russian thistle | Chenopodiaceae | Non-native | annual/perrenial herb | Cal-IPC (Limted); CDFA-C | x | x | x | x | | x | | x | x | x | x |
| CAMA24 | *Calystegia macrostegia* | Island flase bindweed | Convolvulaceae | Native | perennial herb or vine | — | | | | | | | | x | | | |
| CAMAP | *Calystegia malacophylla* ssp. *pedicellata* | Jepson's morning glory | Convolvulaceae | Native | perennial herb | — | | | | x | | | | | | | |
| CAOC6 | *Calystegia occidentalis* | Chaparral false bindweed | Convolvulaceae | Native | perennial herb | — | | | | | | x | | x | x | | |
| CAOCO | *Calystegia occidentalis* ssp. *occidentalis* | Chaparral false bindweed | Convolvulaceae | Native | perennial herb | — | | | | | | | | x | | | |
| CAPE18 | *Calystegia peirsonii* | Peirson's morning glory | Convolvulaceae | Native | perennial herb (rhizomatous) | CNPS 4.2 | | | | x | | | | x | x | | |
| COAR4 | *Convolvulus arvensis* | Field bindweed | Convolvulaceae | Non-native | perennial herb/vine | — | | | | | | x | | | | | |
| CUCAC | *Cuscuta californica* var. *californica* | California dodder | Convolvulaceae | Native | annual herb or vine (parasitic) | — | | | | | | | | x | x | | |
| — | *Cuscuta occidentalis* | California dodder | Convolvulaceae | Native | annual herb or vine (parasitic) | — | | | | | | | | x | | | |
| CRCO34 | *Crassula connata* | Pigmy weed | Crassulaceae | Native | annual herb | — | | | | | | | | | x | | |
| DUCYP2 | *Dudleya cymosa* ssp. *pumila* | Canyon liveforever | Crassulaceae | Native | perennial herb | — | | | | x | | | | | | | x |
| DULA | *Dudleya lanceolata* | Southern california dudleya | Crassulaceae | Native | perennial herb | — | x | | | x | | | | x | x | | |
| DUPU | *Dudleya pulverulenta* | Chalk dudleye | Crassulaceae | Native | perennial herb | — | | | | x | | | | | | | |
| CUFO | *Cucurbita foetidissima* | Missouri gourd | Cucurbitaceae | Native | perennial herb or vine | — | | | | | | | | | x | | |
| MAFA3 | *Marah fabacea* | California man-root | Cucurbitaceae | Native | perennial herb or vine | — | x | | | x | x | | | x | x | | |
| MAMA8 | *Marah macrocarpa* | Chilicothe | Cucurbitaceae | Native | perennial herb or vine | — | | | | x | | x | | x | x | | |
| CADE27 | *Calocedrus decurrens* | Incense cedar | Cupressaceae | Native | tree | — | | x | | x | | | | | | | |
| CUSE2 | *Cupressus sempervirens* | Italian cypress | Cupressaceae | Non-native | tree | — | | | | x | | x | | | | | |
| JUCA7 | *Juniperus californica* | California juniper | Cupressaceae | Native | shrub | — | x | x | x | x | | x | | | | | x |
| JUCO6 | *Juniperus communis* | Common juniper | Cupressaceae | Native | shrub/tree | — | | | | | | x | | | | | |
| ELACA | *Eleocharis acicularis* var. *acicularis* | Needle spike rush | Cyperaceae | Native | perennial grasslike herb | — | | | | | | | | x | | | |
| SCACO2 | *Schoenoplectus acutus* var. *occidentalis* | Tule | Cyperaceae | Native | perennial grasslike herb | — | x | | | | | | | | | | |
| SCAM6 | *Schoenoplectus americanus* | Chairmaker's bulrush | Cyperaceae | Native | perennial grasslike herb | — | | x | | | | | | | | | |
| SCCA11 | *Schoenoplectus californicus* | California bulrush | Cyperaceae | Native | perennial grasslike herb | — | x | | | x | | | | x | | | |
| BOMAP4 | *Bolboschoenus maritimus* ssp. *paludosus* | Alkali bulrush | Cyperaceae | Native | perennial grasslike herb | — | | x | | | | | | | | | |

**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CAPR5 | *Carex praegracilis* | Clustered field sedge | Cyperaceae | Native | perennial grasslike herb | — | | | | x | | | | | | | |
| CYER | *Cyperus eragrostis* | Tall cyperus | Cyperaceae | Native | perennial grasslike herb | — | | | | x | | | | x | | | |
| CYFL | *Cyperus flavescens* | Yellow flatsedge | Cyperaceae | Non-native | annual grasslike herb | — | | | | | | x | | | | | |
| CYPER | *Cyperus* sp. | — | Cyperaceae | — | grasslike herb | — | | | | x | | | | | | | |
| SCAC3 | *Schoenoplectus acutus* | Hardstem bulrush | Cyperaceae | Native | perennial grasslike herb | — | x | x | | | | x | | x | | | x |
| DISA9 | *Dipsacus sativus* | Indian teasel | Dipsacaceae | Non-native | biennial herb | CAL-IPC (Moderate) | | | x | | | | | | | | |
| EPVI | *Ephedra viridis* | Green ephedra | Ephedraceae | Native | shrub | — | x | x | | x | | | | | | | |
| EQAR | *Equisetum arvense* | Common horsetail | Equisetaceae | Native | fern | — | | | | x | | | | | | | x |
| EQHYA2 | *Equisetum hyemale* ssp. affine | Giant scouring rush | Equisetaceae | Native | fern | — | | | | | | | | x | | | |
| EQLA | *Equisetum laevigatum* | Smooth scouring rush | Equisetaceae | Native | fern | | | | | | | | | x | | | |
| ARGL4 | *Arctostaphylos glauca* | Big berry manzanita | Ericaceae | Native | tree/shrub | — | x | x | | x | x | | | x | x | | x |
| CRSE11 | *Croton setiger* | Turkey-mullein | Euphorbiaceae | Native | annual herb | — | x | x | | | | | | x | x | | |
| EUMA7 | *Euphorbia maculata* | Spotted spurge | Euphorbiaceae | Non-native | annual herb | — | | | | x | | | | | | | |
| CHAL11 | *Euphorbia (Chamaesyce) albomarginata* | Whitemargin sandmat | Euphorbiaceae | Native | perennial herb | — | x | | | x | | | | x | x | | |
| RICO3 | *Ricinus communis* | Castor bean | Euphorbiaceae | Non-native | shrub | CAL-IPC (Limited) | | | | | | | | x | | | |
| STLI3 | *Stillingia linearifolia* | Queen's root | Euphorbiaceae | Native | perennial herb | — | | | | | | | | | x | | |
| ACACI | *Acacia* sp. | Acacia | Fabaceae | Non-native | tree | — | | | | | | | | | x | | |
| LOSC2 | *Acmispon (Lotus) glaber (scoparius)* | Deerweed | Fabaceae | Native | perennial herb | — | x | x | | x | x | x | x | x | x | | x |
| LOSA | *Acmispon (Lotus) maritimus (salsuginosus)* | Coastal lotus | Fabaceae | Native | annual herb | — | | | | | | | | x | | | |
| LOSAS | *Acmispon (Lotus) maritimus (salsuginosus) var. maritimus (salsuginosus)* | Coastal lotus | Fabaceae | Native | annual herb | — | | | | | | | | | x | | |
| LOMI | *Acmispon (Lotus) parviflorus (micranthus)* | Hill lotus | Fabaceae | Native | annual herb | — | | x | | | | | | | | | |
| LOST4 | *Acmispon (Lotus) strigosus* | Strigose lotus | Fabaceae | Native | annual herb | — | | | | x | | x | | | x | | x |
| LOWR2 | *Acmispon (Lotus) wrangelianus* | Chilean trefoil | Fabaceae | Native | annual herb | — | | | | x | | | x | x | | | |
| ASDO | *Astragalus douglasii* | Douglas's milkvetch | Fabaceae | Native | perennial herb | — | | x | | | | | | | | | |
| ASGA | *Astragalus gambelianus* | Dwarf loco weed | Fabaceae | Native | annual herb | — | | | | | | | | | x | | |
| ASLE8 | *Astragalus lentiginosus* | Freckled milk vetch | Fabaceae | Native | annual/perennial herb | — | | | | | | | | | x | | |
| ASTR6 | *Astragalus trichopodus* | Santa barbara milk vetch | Fabaceae | Native | perennial herb | — | | | x | x | | x | | x | x | | |
| ASTRP | *Astragalus trichopodus* var. *phoxus* | Santa barbara milk vetch | Fabaceae | Native | perennial herb | — | | | | x | | | | | x | | |
| CEOC3 | *Cercis occidentalis* | Western redbud | Fabaceae | Native | tree/shrub | — | | | | x | | | | | | | |
| CYSC4 | *Cytisus scoparius* | Scotch broom | Fabaceae | Non-native | shrub | Cal-IPC (High); CDFA-C | | | | | | x | | x | | | |
| GLTR | *Gleditsia triacanthos* | Honeylocust | Fabaceae | Non-native | shrub/tree | — | | | | | | x | | | | | |
| GLLE3 | *Glycyrrhiza lepidota* | American licorice | Fabaceae | Native | perennial herb | — | | | | | | | | | x | | |
| LOCO6 | *Lotus corniculatus* | Bird's foot trefoil | Fabaceae | Non-native | perennial herb | — | x | | | x | | | | x | x | | |
| LUAL3 | *Lupinus albicaulis* | Sickle keeled lupine | Fabaceae | Native | perennial herb | — | | | | | | | | x | | | |
| LUAL4 | *Lupinus albifrons* | Silver bush lupine | Fabaceae | Native | shrub | — | x | | | | | | | | x | | x |
| LUBI | *Lupinus bicolor* | Bicolored lupine | Fabaceae | Native | annual/perrenial herb | — | | | | x | | | | x | x | | x |
| LUEXA | *Lupinus excubitus* var. *austromonanus* | Southern montane grape lupine | Fabaceae | Native | shrub | — | x | | | | | | | | | | |
| LUEXH | *Lupinus excubitus* var. *hallii* | Hall's bush lupine | Fabaceae | Native | shrub | — | | | | | | | | | x | | |

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| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LUFOF | *Lupinus formosus* var. *formosus* | Summer lupine | Fabaceae | Native | perennial herb | — | | | | x | | | | | | | |
| LUHI3 | *Lupinus hirsutissimus* | Stinging annual lupine | Fabaceae | Native | annual herb | — | | | | | | | | x | x | | |
| LUMID3 | *Lupinus microcarpus* var. *densiflorus* | Whitewhorl lupine | Fabaceae | Native | annual herb | — | | | | | | x | | | | | |
| LUMIM4 | *Lupinus microcarpus* var. *microcarpus* | Chick lupine | Fabaceae | Native | annual herb | — | x | | | | | | | | x | | |
| LUNA3 | *Lupinus nanus* | Sky lupine | Fabaceae | Native | annual herb | — | | | | | | | | x | x | | |
| LUSP2 | *Lupinus sparsiflorus* | Coulter's lupine | Fabaceae | Native | annual herb | — | | | | | | | | x | x | | |
| LUSU3 | *Lupinus succulentus* | Succulent lupine | Fabaceae | Native | annual herb | — | | | | | | | | | x | | |
| MELU | *Medicago lupulina* | Black medick | Fabaceae | Non-native | annual/perennial herb | — | | | | x | | | | x | | | |
| MEPO3 | *Medicago polymorpha* | California burclover | Fabaceae | Non-native | annual herb | Cal-IPC (Limited) | x | x | | x | | x | | x | x | | x |
| MEAL2 | *Melilotus albus* | White sweetclover | Fabaceae | Non-native | annual or biennial herb | — | x | x | | x | | x | x | x | x | | |
| MEIN2 | *Melilotus indicus* | Annual yellow sweetclover | Fabaceae | Non-native | annual herb | — | x | x | | x | | | | x | x | | x |
| MEOF | *Melilotus officinalis* | Yellow sweetclover | Fabaceae | Non-native | annual or biennal herb | — | | | | x | | x | | x | x | | |
| PAAC3 | *Parkinsonia aculeata* | Jerusalem thorn | Fabaceae | Non-native | Tree | — | | | | | | x | | | | | |
| PIMO5 | *Pickeringia montana* | Montana chaparral pea | Fabaceae | Native | shrub | — | | | | x | | | | | | | |
| ROPS | *Robinia pseudoacacia* | Black locust | Fabaceae | Non-native | tree | Cal-IPC (Limited) | | | | x | | x | | x | | | |
| SPJU2 | *Spartium junceum* | Spanish broom | Fabaceae | Non-native | shrub | Cal-IPC (High); CDFA-C | | | | x | | x | | x | | | x |
| TRAL5 | *Trifolium albopurpureum* | Rancheria clover | Fabaceae | Native | annual herb | — | | | | | | | | | x | | |
| TRCA5 | *Trifolium campestre* | Field clover | Fabaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| TRDU2 | *Trifolium dubium* | Shamrock clover | Fabaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| TRHI4 | *Trifolium hirtum* | Rose clover | Fabaceae | Non-native | annual herb | Cal-IPC (Limited) | x | | | | | | | | | | |
| TRRE3 | *Trifolium repens* | White clover | Fabaceae | Non-native | perennial herb | — | | x | | x | | | | | | | |
| TRWI3 | *Trifolium willdenovii* | Tomcat clover | Fabaceae | Native | annual herb | — | | | | | | | | | x | | |
| TRGR5 | *Tropidocarpum gracile* | Slender keel fruit | Fabaceae | Native | annual herb | — | | | | x | | | | | | | |
| VIVI | *Vicia villosa* | Hairy vetch | Fabaceae | Non-native | annual herb or vine | — | | | | | | x | | | x | | |
| QUAGA | *Quercus agrifolia* var. *agrifolia* | Coast live oak | Fagaceae | Native | tree | — | | x | | x | | x | | x | x | | x |
| QUBE5 | *Quercus berberidifolia* | Inland scrub oak | Fagaceae | Native | tree | — | | x | x | x | x | x | | x | x | | x |
| QUJO3 | *Quercus john-tuckeri* | Tucker's oak | Fagaceae | Native | tree | — | x | | | x | | | | | x | | |
| QULO | *Quercus lobata* | Valley oak | Fagaceae | Native | tree | — | | | | x | | | | x | | | |
| ERBO | *Erodium botrys* | Big heron bill | Geraniaceae | Non-native | annual herb | — | | | | | | | | x | x | | |
| ERBR14 | *Erodium brachycarpum* | Foothill filaree | Geraniaceae | Non-native | annual herb | — | | | | | | | | x | x | | |
| ERCI6 | *Erodium cicutarium* | Red-stem filaree | Geraniaceae | Non-native | annual herb | Cal-IPC (Limited) | x | x | x | x | | x | x | x | x | | x |
| RIAU | *Ribes aureum* | Golden currant | Grossulariaceae | Native | shrub | — | | | | | | | | | x | | |
| RICA | *Ribes californicum* | California gooseberry | Grossulariaceae | Native | shrub | — | x | | | | | | | | | | |
| RICEC2 | *Ribes cereum* var. *cereum* | Wax currant | Grossulariaceae | Native | shrub | — | | | | | | | | | x | | |
| RIMA | *Ribes malvaceum* | Chaparral currant | Grossulariaceae | Native | shrub | — | | | x | x | | x | | x | x | | |
| RIQU | *Ribes quercetorum* | Oak gooseberry | Grossulariaceae | Native | shrub | — | x | | | | | | | | | | |
| RIVE | *Ribes velutinum* | Desert gooseberry | Grossulariaceae | Native | shrub | — | x | | | | | | | | | | |
| LIST2 | *Liquidambar styraciflua* | Sweetgum | Hamamelidaceae | Non-native | tree | — | | | | x | | x | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IRSI | *Iris sibirica* | Siberian iris | Iridaceae | Non-native | perennial herb (rhizomatous) | — | | | | | | x | | | | | |
| JUCA | *Juglans californica* ( var. *californica)* | Southern black walnut | Juglandaceae | Native | tree | CNPS 4.2 | | | | | | | x | | x | | |
| JUAC2 | *Juncus acutus* | Spiny rush | Juncaceae | Native | perrenial grasslike herb (rhizomatous) | — | | | | | | | | x | | | |
| JUBA | *Juncus balticus* | Wire rush | Juncaceae | Native | perennial grasslike herb | — | x | x | | | | x | | | x | | |
| JUEF | *Juncus effusus* | Common rush | Juncaceae | Native | perennial grasslike herb | — | | | | | | | | | x | | |
| JUNCU | *Juncus* sp. | Rush | Juncaceae | — | perennial grasslike herb | — | x | x | x | x | | | | | x | | x |
| JUXI | *Juncus xiphioides* | Iris leaved rush | Juncaceae | Native | perennial grasslike herb | — | | x | | | | | | x | | | |
| LAAM | *Lamium amplexicaule* | Henbit | Lamiaceae | Non-native | annual herb | — | | | | x | | | | | | | |
| MAVU | *Marrubium vulgare* | White horehound | Lamiaceae | Non-native | perennial herb | Cal-IPC (Limited) | | x | x | x | | x | | x | x | | x |
| MEPU | *Mentha pulegium* | Pennyroyal | Lamiaceae | Non-native | perennial herb | CAL-IPC (Moderate) | | | | | | | | x | | | |
| ROOF | *Rosmarinus officinalis* | Rosemary | Lamiaceae | Non-native | shrub | — | | | | x | | x | | | | | |
| SAAP2 | *Salvia apiana* | White sage | Lamiaceae | Native | shrub | — | x | x | | x | | | x | x | x | | x |
| SACO6 | *Salvia columbariae* | Chia sage | Lamiaceae | Native | annual herb | — | x | | | x | | | x | x | x | | x |
| SALE3 | *Salvia leucophylla* | Purple sage | Lamiaceae | Native | shrub | — | | x | x | x | | x | x | x | x | | x |
| SAME3 | *Salvia mellifera* | Black sage | Lamiaceae | Native | shrub | — | x | x | | x | x | x | x | x | x | x | x |
| SCSI6 | *Scutellaria siphocampyloides* | Curve flowered skullcap | Lamiaceae | Native | perennial herb | — | | | | | | | | x | | | x |
| TRLA3 | *Trichostema lanatum* | Woolly bluecurls | Lamiaceae | Native | shrub | — | | | | x | | | | | x | | |
| PEAM3 | *Persea americana* | Avocado | Lauraceae | Non-native | tree | — | | | | | | x | | | | | |
| UMCA | *Umbellularia californica* | California laurel | Lauraceae | Native | tree | — | | | | | | x | | | | | |
| CACLG | *Calochortus clavatus* var. *gracilis* | Slender mariposa lily | Liliaceae | Native | perennial herb (bulb) | CNPS 1B.2 | | | | x | | | | | x | | |
| CASP | *Calochortus splendens* | Splendid mariposa lily | Liliaceae | Native | perennial herb | — | | | | | | | | x | | | |
| CAVE3 | *Calochortus venustus* | Butterfly mariposa lily | Liliaceae | Native | perennial herb | — | | | | | | | | | x | | |
| CHPA7 | *Chlorogalum parviflorum* | Smallflower soap plant | Liliaceae | Native | perennial herb | — | | | | | | | | | x | | |
| CHPOP4 | *Chlorogalum pomeridianum* var. *pomeridianum* | Wavyleaf soap plant | Liliaceae | Native | perennial herb | — | | | | | | | | x | x | | |
| MEAL6 | *Mentzelia albicaulis* | White stemmed blazing star | Loasaceae | Native | annual herb | — | x | | | | | | | | | | |
| MELA2 | *Mentzelia laevicaulis* | Giant blazingstar | Loasaceae | Native | perennial herb | — | | | | x | | | | | x | | |
| LYCA4 | *Lythrum californicum* | Common loosestrife | Lythraceae | Native | perennial herb | — | | | | | | | | x | | | |
| LYHY3 | *Lythrum hyssopifolia* | Hyssop loosestrife | Lythraceae | Non-native | annual/perrenial herb | Cal-IPC (Moderate); CDFA-B | x | | | x | | | | x | | | |
| — | *Malacothamnus fasciculatus* var. *fasciculatus* | Chaparral bush mallow | Malvaceae | Native | shrub | — | x | x | | x | | | | x | x | | |
| MAFR2 | *Malacothamnus fremontii* | Fremont's bush mallow | Malvaceae | Native | shrub | — | | | | | | | | x | | | |
| MANE | *Malva neglecta* | Common mallow | Malvaceae | Non-native | annual/perrenial herb | — | | | | | | x | | | | | |
| MANI2 | *Malva nicaeensis* | Bull mallow | Malvaceae | Non-native | annual herb | — | | | | | | | | | x | | |
| MAPA5 | *Malva parviflora* | Cheeseweed mallow | Malvaceae | Non-native | annual herb | — | x | | | | | | | | x | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CLPAP | *Claytonia parviflora* ssp. *parviflora* | Narrow leaved miner's lettuce | Montiaceae | Native | annual herb | — | x | | | x | | | | | x | | |
| CLPE | *Claytonia perfoliata* | Miner's lettuce | Montiaceae | Native | annual herb | — | | | | x | | | | | x | | |
| CLPEP | *Claytonia perfoliata* ssp. *perfoliata* | Miner's lettuce | Montiaceae | Native | annual herb | — | | | | | | | | | x | | |
| FICA | *Ficus carica* | Common fig | Moraceae | Non-native | tree | Cal-IPC (Moderate) | | x | | | | | | x | | | x |
| MOAL | *Morus alba* | White mulberry | Moraceae | Non-native | tree | — | | | | | | x | | | | | |
| ANAR | *Lysimachia (Anagallis) arvensis* | Scarlet pimpernel | Myrsinaceae | Non-native | annual herb | — | | | | | | x | | x | | | |
| CALLI12 | *Callistemon* sp. | — | Myrtaceae | Non-native | — | — | | | | x | | | | | | | |
| COCI4 | *Eucalyptus (Corymbia) citriodora* | Lemonscented gum | Myrtaceae | Non-native | tree | — | | | | | | x | | | | | |
| EUCA2 | *Eucalyptus camaldulensis* | River redgum | Myrtaceae | Non-native | tree | Cal-IPC (Limited) | | | | | | x | | | | | |
| COCA48 | *Eucalyptus (Corymbia) calophylla* | Redgum | Myrtaceae | Non-native | tree | — | | | | x | | | | | | | |
| MILAC4 | *Mirabilis laevis* var. *crassifolia* | California four o'clock | Nyctaginaceae | Native | perennial herb | — | | | | x | | x | | x | x | | |
| NIGL | *Nicotiana glauca* | Tree tobacco | Solanaceae | Non-native | tree/shrub | Cal-IPC (Moderate) | | | | x | | x | x | x | x | | x |
| NIQU | *Nicotiana quadrivalvis* | Indian tobacco | Solanaceae | Native | annual herb | — | x | | | | | | | | | | |
| FRDI2 | *Fraxinus dipetala* | California ash | Oleaceae | Native | tree/shrub | — | | x | | x | | | | x | | | |
| FRLA | *Fraxinus latifolia* | Oregon ash | Oleaceae | Native | tree | — | | | | | | x | x | | | | |
| FRVE2 | *Fraxinus velutina* | Arizona ash | Oleaceae | Native | tree | — | | x | | x | | | | | | | |
| OLEA | *Olea* sp. | Olive | Oleaceae | Non-native | — | — | | | | x | | | | | | | |
| CACA32 | *Camissonia (Camissoniopsis) californica (bistorta)* | California sun cup | Onagraceae | Native | annual herb | — | | | | | | | | | x | | |
| CACAC8 | *Camissonia campestris* ssp. *campestris* | field sun cup | Onagraceae | Native | annual herb | — | x | | | | | | | | | | |
| CAST20 | *Camissonia strigulosa* | Contorted primrose | Onagraceae | Native | annual herb | — | | | | | | | | | x | | |
| CLARK | *Clarkia* sp. | Clarkia | Onagraceae | — | — | — | | | | | | | | x | x | | |
| CLUN | *Clarkia unguiculata* | Elegant clarkia | Onagraceae | Native | annual herb | — | | | | | | | | | x | | |
| CLXA | *Clarkia xantiana* | Xantus' clarkia | Onagraceae | Native | annual herb | — | | | | | | | | x | | | |
| EPCA3 | *Epilobium canum* | Hummingbird trumpet | Onagraceae | Native | perennial herb | — | | | | x | | | x | x | x | | |
| EPCI | *Epilobium ciliatum* | Fringed willowherb | Onagraceae | Native | perennial herb | — | | | | | | | | | x | | |
| CABOD2 | *Eremothera (Camissonia) boothii* ssp. *desertorum* | Booth's desert primrose | Onagraceae | Native | annual herb | — | | | | x | | | | | | | |
| CACA32 | *Eulobus (Camissonia) californicus (californica)* | California primrose | Onagraceae | Native | annual herb | — | | | | | | | | x | x | | |
| OEDE2 | *Oenothera deltoides* | Desert lantern | Onagraceae | Native | annual herb | — | x | | | | | | | | | | |
| EPGI | *Epipactis gigantea* | Stream orchid | Orchidaceae | Native | perennial herb | — | | x | | x | | | | | | | x |
| CAEX14 | *Castilleja exserta* | Owl's clover | Orobanchaceae | Native | annual herb | — | | | | | | | | | x | | |
| CAEXE | *Castilleja exserta* ssp. *exserta* | Exserted Indian paintbrush | Orobanchaceae | Native | annual herb | — | | | | | | | | | x | | |
| CAFO2 | *Castilleja foliolosa* | Texas paintbrush | Orobanchaceae | Native | perennial herb | — | | | | x | x | x | | x | x | | x |
| CALI4 | *Castilleja linariifolia* | Desert paintbrush | Orobanchaceae | Native | perennial herb | — | | | | x | | | | | | | |
| CAMI13 | *Castilleja minor* | Little paintbrush | Orobanchaceae | Native | annual herb | — | | | | | | | | | x | | |
| OXCA | *Oxalis californica* | California wood sorrel | Oxalidaceae | Native | perennial herb | — | | | | | | | | x | | | |
| OXCO | *Oxalis corniculata* | Creeping woodsorrel | Oxalidaceae | Non-native | perrenial herb | — | | | | | | x | | x | | | |
| ARMU | *Argemone munita* | Prickly poppy | Papaveraceae | Native | annual/perennial herb | — | | | | | | | x | x | x | | |
| EHCH | *Ehrendorferia chrysantha* | Golden eardrops | Papaveraceae | Native | perennial herb | — | | | | x | | | | | | | |
| ESCA | *Eschscholzia caespitosa* | Foothill poppy | Papaveraceae | Native | annual herb | — | | | | | | | | | x | | |
| ESCA2 | *Eschscholzia californica* | California poppy | Papaveraceae | Native | annual/perennial herb | — | x | | | x | | | | | x | | |
| DIAU | *Diplacus (Mimulus) aurantiacus* | Bush monkey flower | Phrymaceae | Native | shrub | — | | | | | | | x | x | x | | |

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| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MIBR4 | *Diplacus (Mimulus) brevipes* | Wide throated yellow monkeyflower | Phrymaceae | Native | annual herb | — | | | | | | | | | x | | |
| MIGU | *Erythranthe (Mimulus) guttata (guttatus)* | Yellow monkey flower | Phrymaceae | Native | annual/perennial herb (rhizomatous) | — | | | | | | | | | x | | |
| CEDE2 | *Cedrus deodara* | Deodar cedar | Pinaceae | Non-native | tree | — | | | | x | | x | | | | | |
| PIBRE | *Pinus brutia* var. *eldarica* | Afghan Pine | Pinaceae | Non-native | tree | — | | | x | x | | | | | | | |
| PICA15 | *Pinus canariensis* | Canary Island pine | Pinaceae | Non-native | tree | — | | x | | x | | | | | | | |
| PICO3 | *Pinus coulteri* | Coulter pine | Pinaceae | Native | tree | — | x | x | | x | | x | | x | | | |
| PIEL6 | *Pinus eldarica* | Afghan Pine | Pinaceae | Non-native | tree | — | | | | | | x | | | | | |
| PIHA7 | *Pinus halepensis* | Aleppo pine | Pinaceae | Non-native | tree | — | | | | | | x | | x | | | |
| PIMO | *Pinus monophylla* | Single leaf pinyon | Pinaceae | Native | tree | — | x | x | | x | | | | | | | |
| SACO13 | *Antirrhinum (Sairocarpus) coulterianum (coulterianus)* | Coulter snapdragon | Plantaginaceae | Native | annual herb | — | | | | | | | | | x | | |
| KECO | *Keckiella cordifolia* | Heart leaved keckiella | Plantaginaceae | Native | shrub | — | | | | x | | | | | | | |
| KETE | *Keckiella ternata* | Blue stemmed keckiella | Plantaginaceae | Native | shrub | — | | | | | x | | | | | | |
| KETES2 | *Keckiella ternata* var. *septentrionalis* | Northern blue stemmed keckiella | Plantaginaceae | Native | shrub | — | | | | | x | | | | | | |
| PECE2 | *Penstemon centranthifolius* | Scarlet bugler | Plantaginaceae | Native | perennial herb | — | x | x | | x | x | | | | x | | x |
| PEHE3 | *Penstemon heterophyllus* | Bunchleaf penstemon | Plantaginaceae | Native | perennial herb | — | | | | x | | | | | | | x |
| PLER3 | *Plantago erecta* | Dotseed plantain | Plantaginaceae | Native | annual herb | — | | | | x | | | | x | x | | |
| PLLA | *Plantago lanceolata* | Narrow leaved plantain | Plantaginaceae | Non-native | perennial herb | Cal-IPC (Limited) | | | | | | x | | | | | |
| PLMA2 | *Plantago major* | Common plantain | Plantaginaceae | Non-native | perennial herb | — | | | | x | | | | x | x | | |
| PLRA | *Platanus racemosa* | Western sycamore | Platanaceae | Native | tree | — | | x | | x | | x | x | x | x | | x |
| AGST2 | *Agrostis stolonifera* | Creeping bentgrass | Poaceae | Non-native | perennial grass | Cal-IPC (Limited) | | | | | | | | x | | | |
| ALCA4 | *Alopecurus carolinianus* | Carolina foxtail | Poaceae | Native | annual grass | — | | | | | | | | x | | | |
| ARPU9 | *Aristida purpurea* | Purple three awn | Poaceae | Native | perennial grass | — | | | | x | | | | | | | |
| ARGI | *Arundinaria gigantea* | Giant cane | Poaceae | Non-native | tree | — | | | | | | x | | | | | |
| ARDO4 | *Arundo donax* | Giant reed | Poaceae | Non-native | perennial grass | Cal-IPC (High); CDFA-B | | x | x | x | | x | | | x | | |
| AVBA | *Avena barbata* | Slim oat | Poaceae | Non-native | annual/perennial grass | Cal-IPC (Moderate) | x | | x | x | | x | x | x | x | | |
| AVFA | *Avena fatua* | Wildoats | Poaceae | Non-native | annual grass | Cal-IPC (Moderate) | x | | x | x | x | x | | x | x | | |
| BRAR3 | *Bromus arenarius* | Australian brome | Poaceae | Non-native | annual grass | — | | | | | | | | x | | | |
| BRDI3 | *Bromus diandrus* | Ripgut brome | Poaceae | Non-native | annual grass | Cal-IPC (Moderate) | x | x | x | x | | x | x | x | x | | x |
| BRHO2 | *Bromus hordeaceus* | Soft chess | Poaceae | Non-native | annual grass | — | x | | | | | | | x | x | x | x |
| BRMAM3 | *Bromus madritensis* ssp. *madritensis* | Foxtail chess | Poaceae | Non-native | annual grass | — | x | | | x | | x | | x | x | | x |
| BRMAR | *Bromus madritensis* ssp. *rubens* | Red brome | Poaceae | Non-native | annual grass | Cal-IPC (High) | x | x | x | x | x | | | x | x | | x |
| BRTE | *Bromus tectorum* | Cheat grass | Poaceae | Non-native | annual grass | Cal-IPC (High) | x | x | x | x | x | x | | x | x | x | x |
| COJU2 | *Cortaderia jubata* | Andean pampas grass | Poaceae | Non-native | perennial grass | Cal-IPC (High); CDFA-B | | x | | | | | | | | | |
| COSE4 | *Cortaderia selloana* | Pampas grass | Poaceae | Non-native | perennial grass | Cal-IPC (High); CDFA-B | | | | x | | | | | | | x |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CYDA | *Cynodon dactylon* | Bermuda grass | Poaceae | Non-native | perennial grass | Cal-IPC (Moderate) | x | x | x | x | | x | | x | x | | x |
| DEDA | *Deschampsia danthonioides* | Annual hairgrass | Poaceae | Native | annual grass | — | | | | | | | | x | | | |
| DIIS | *Digitaria ischaemum* | Smooth crab grass | Poaceae | Non-native | annual grass | — | | x | | x | | | | | | | |
| DISA | *Digitaria sanguinalis* | Hairy crab grass | Poaceae | Non-native | annual grass | — | | x | | x | | x | | | | | x |
| DISP | *Distichlis spicata* | Salt grass | Poaceae | Native | perennial grass | — | x | x | | x | | | | x | | x | |
| ECCR | *Echinochloa crus-galli* | Barnyard grass | Poaceae | Non-native | annual grass | — | | | | | | x | | | | | |
| LECI4 | *Elymus (Leymus) cinereus* | Great Basin wild rye | Poaceae | Native | perennial grass | — | x | x | | x | | x | x | x | x | | |
| ELCO4 | *Elymus condensatus* | Giant wild rye | Poaceae | Native | perennial grass | — | | | | x | | | | x | x | | |
| ELEL5 | *Elymus elymoides* | Squirrel tail grass | Poaceae | Native | perennial grass | — | x | | | x | | | | | | | |
| ELGL | *Elymus glaucus* | Blue wild rye | Poaceae | Native | perennial grass | — | x | x | | x | | | | x | x | | |
| THIN6 | *Elymus (Thinopyrum) hispidus (intermedium)* | Intermediate wheatgrass | Poaceae | Non-native | perennial grass | — | | | | | | | | x | | | |
| ELMU3 | *Elymus multisetus* | Big squirreltail grass | Poaceae | Native | perennial grass | — | x | | | | | | | | | | |
| — | *Elymus ponticus* | Tall wheat grass | Poaceae | Non-native | perennial grass | — | | | | x | | | x | | | | |
| ELRE4 | *Elymus repens* | Quack grass | Poaceae | Non-native | perennial grass | — | | | | | | | | x | | | |
| ELTR3 | *Elymus triticoides* | Beardless wild rye | Poaceae | Native | perennial grass | — | x | x | | x | | x | | x | | | |
| SCAR7 | *Festuca (Schedonorus) arundinacea (arundinaceus)* | Reed fescue | Poaceae | Non-native | perennial grass | Cal-IPC (Moderate) | | Los Alamos | | | | x | | | x | | |
| FECA | *Festuca californica* | California fescue | Poaceae | Native | perennial grass | — | | | | x | | | | | | | |
| FEMI2 | *Festuca microstachys* | Small fescue | Poaceae | Native | annual grass | — | x | | | | | | | | | | |
| VUMY | *Festuca (Vulpia) myuros* | Rattail sixweeks grass | Poaceae | Non-native | annual grass | Cal-IPC (Moderate) | x | | | x | | | | | x | | |
| LOPE | *Festuca (Lolium) perennis (perenne)* | Italian rye grass | Poaceae | Non-native | annual/perennial grass | Cal-IPC (Moderate) | | | | | | | | x | | | |
| SCPR4 | *Festuca (Schedonorus) pratensis* | Meadow fescue | Poaceae | Non-native | perennial grass | — | | | | x | | | | | | | |
| HOJU | *Hordeum jubatum* | Foxtail barley | Poaceae | Native | perennial grass | — | x | x | | x | | | | x | | | x |
| HOMUL | *Hordeum murinum* ssp. *leporinum* | Hare barley | Poaceae | Non-native | annual grass | — | x | x | | x | | x | | x | x | x | x |
| HOVU | *Hordeum vulgare* | Common barley | Poaceae | Non-native | annual grass | — | x | | | | | | | | | | |
| LAAU | *Lamarckia aurea* | Goldentop grass | Poaceae | Non-native | annual grass | — | | | | x | | | | | | | |
| MEIM | *Melica imperfecta* | Coast range melic | Poaceae | Native | perennial grass | — | | | | x | | | | | x | | x |
| MURI2 | *Muhlenbergia rigens* | Deergrass | Poaceae | Native | perennial grass | — | | | | x | | | x | | | | |
| NATE3 | *Nassella (Stipa) tenuissima* | Mexican feathergrass | Poaceae | Non-native | perennial grass | — | x | | | | | | | | | | |
| PAAC5 | *Panicum acuminatum* | Western panicgrass | Poaceae | Native | perennial grass | — | | | | | | | | x | | | |
| PADI3 | *Paspalum dilatatum* | Dallis grass | Poaceae | Non-native | perennial grass | — | | | | | | | | x | | | |
| PEPU2 | *Pennisetum purpureum* | Elephant grass | Poaceae | Non-native | perennial grass | — | | | x | | | | | | | | |
| PESE3 | *Pennisetum setaceum* | Crimson fountaingrass | Poaceae | Non-native | perennial grass | Cal-IPC (Moderate) | | | | | | x | | x | | | |
| PHAQ | *Phalaris aquatica* | Bulbous canarygrass | Poaceae | Non-native | perennial grass | CAL-IPC (Moderate) | | | | | | | | | x | | |
| PHAU7 | *Phragmites australis* | Common reed | Poaceae | Native | perennial grass | — | | | x | x | | | | | | | x |
| POAN | *Poa annua* | Annual bluegrass | Poaceae | Non-native | annual grass | — | | | x | | | | | x | x | | |
| POPA2 | *Poa palustris* | Fowl blue grass | Poaceae | Non-native | perennial grass | — | | | | | | | | x | | | |
| POPR | *Poa pratensis* | Kentucky blue grass | Poaceae | Non-native | perennial grass | Cal-IPC (Limited) | | x | | x | | x | | | x | | |
| POSE | *Poa secunda* | Pine bluegrass | Poaceae | Native | perennial grass | — | x | | | x | | | | | x | | |
| POMO5 | *Polypogon monspeliensis* | Annual beard grass | Poaceae | Non-native | annual grass | Cal-IPC (Limited) | x | | x | x | | x | | x | x | | x |
| SCAR | *Schismus arabicus* | Arabian schismus | Poaceae | Non-native | annual grass | Cal-IPC (Limited) | x | x | | x | | | | | x | | |
| SCBA | *Schismus barbatus* | Common mediterranean grass | Poaceae | Non-native | annual grass | Cal-IPC (Limited) | x | | | x | | | | x | x | x | x |
| SEVI4 | *Setaria viridis* | Green foxtail | Poaceae | Native | annual grass | — | | | | x | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPAI | *Sporobolus airoides* | Alkali sacaton | Poaceae | Native | perennial grass | — | | | | | | x | | | | | |
| NACE | *Stipa (Nassella) cernua* | Nodding needle grass | Poaceae | Native | perennial grass | — | | | | | | | x | x | x | | |
| STCO4 | *Stipa comata* | Needle-and-thread | Poaceae | Native | perennial grass | — | | | | | | | | | x | | |
| PIMI3 | *Stipa miliacea* var. *miliacea (Piptatherum miliaceum)* | Smilo grass | Poaceae | Non-native | perennial grass | Cal-IPC (Limited) | | | | x | | x | | x | x | | x |
| NAPU4 | *Stipa (Nassella) pulchra* | Purple needle grass | Poaceae | Native | perennial grass | — | x | x | | | | | | x | x | | x |
| ACSP12 | *Stipa (Achnatherum) speciosa (speciosum)* | Desert needle grass | Poaceae | Native | perennial grass | — | x | | x | x | | | | x | | | |
| NALE2 | *Stipa (Nassella) lepida* | Foothill needle grass | Poaceae | Native | perennial grass | — | x | | | | | | | x | x | | |
| ERDI2 | *Eriastrum diffusum* | Miniature eriastrum | Polemoniaceae | Native | annual herb | — | | | | | | | | | x | | |
| GIACA | *Gilia achilleifolia* ssp. *achilleifolia* | California gilia | Polemoniaceae | Native | annual herb | — | | | | | | | | x | x | | |
| LELI14 | *Leptosiphon liniflorus* | Narrowflower flax flower | Polemoniaceae | Native | annual herb | — | x | | | | | | | | | | |
| LEPA51 | *Leptosiphon parviflorus* | Variable linanthus | Polemoniaceae | Native | annual herb | — | | | | | | | | | x | | |
| PHAU3 | *Phlox austromontana* | Southern mountain phlox | Polemoniaceae | Native | perennial herb | — | | | | | | | | | x | | |
| CHXAX | *Chorizanthe xanti* var. *xanti* | Riverside spineflower | Polygonaceae | Native | annual herb | — | x | | | | | | x | | x | | |
| ERAN3 | *Eriogonum angulosum* | Angle stem buckwheat | Polygonaceae | Native | annual herb | — | x | | | | | | | | x | | |
| ERCI5 | *Eriogonum cinereum* | Coastal buckwheat | Polygonaceae | Native | shrub | — | x | | | | | | | | | | x |
| EREL6 | *Eriogonum elongatum* | Longstem buckwheat | Polygonaceae | Native | perennial herb | — | x | | x | x | | | | x | x | | |
| ERFAF2 | *Eriogonum fasciculatum* var. *foliolosum* | California buckwheat | Polygonaceae | Native | shrub | — | x | x | x | x | x | x | x | x | x | | x |
| ERGR5 | *Eriogonum gracile* | Slender buckwheat | Polygonaceae | Native | annual herb | — | | | | x | | x | | x | x | | |
| ERNU3 | *Eriogonum nudum* | Naked buckwheat | Polygonaceae | Native | shrub | — | | | | x | | | | | x | | |
| ERRO6 | *Eriogonum roseum* | Wand buckwheat | Polygonaceae | Native | annual herb | — | x | | | | | | | | | | |
| ERVI5 | *Eriogonum vimineum* | Wicker buckwheat | Polygonaceae | Native | annual herb | — | x | x | | x | | | | | | | x |
| POHY2 | *Persicaria (Polygonum) hydropiperoides* | Water pepper | Polygonaceae | Native | perennial herb | — | | | | | | | | x | | | |
| POLA4 | *Persicaria (Polygonum) lapathifolia (lapathifolium)* | Common knotweed | Polygonaceae | Native | annual herb | — | | | | | | x | | | | | |
| POPE3 | *Persicaria (Polygonum) maculosa (persicaria)* | Spotted ladysthumb | Polygonaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| POAV | *Polygonum aviculare* | Prostrate knotweed | Polygonaceae | Non-native | annual/perennial herb | — | | | | | | | | x | x | | |
| POLYG4 | *Polygonum* sp. | — | Polygonaceae | — | — | — | | | | x | | | | | | | |
| RUCO2 | *Rumex conglomeratus* | Clustered dock | Polygonaceae | Non-native | perennial herb | — | | | | | | | | x | | | |
| RUCR | *Rumex crispus* | Curly dock | Polygonaceae | Non-native | perennial herb | Cal-IPC (Limited) | x | x | | x | | | | x | | | x |
| RUSA | *Rumex salicifolius* | Willow dock | Polygonaceae | Native | perennial herb | — | x | | | | | | | x | | | |
| RUST4 | *Rumex stenophyllus* | Narrowleaf dock | Polygonaceae | Non-native | perennial herb | — | | | | x | | | | x | | | |
| — | *Calandrinia menziesii* | Red maids | Montiaceae | Native | annual herb | — | | | | | | | | x | x | | |
| — | *Primula clevelandii* var. *clevelandii* | Cleveland's shooting star | Primulaceae | Native | perennial herb | — | | | | | | | | x | x | | |
| PEAN2 | *Pellaea andromedifolia* | Coffee fern | Pteridaceae | Native | fern | — | | | | | | | | x | x | | |
| PEMU | *Pellaea mucronata* | Bird's foot fern | Pteridaceae | Native | fern | — | | | | | | | | x | | | |
| PETR7 | *Pentagramma triangularis* | Gold back fern | Pteridaceae | Native | fern | — | | | | | | | | | x | | |
| DEPAP5 | *Delphinium parryi* ssp. *parryi* | Parry's larkspur | Ranunculaceae | Native | perennial herb | — | | | | | | | | | x | | |
| DEPAP6 | *Delphinium parryi (parishii)* ssp. *purpureum* | Mt. Pinos larkspur | Ranunculaceae | Native | perennial herb | CNPS 4.3 | | | | | | | | | | | |
| DELPH | *Delphinium* sp. | — | Ranunculaceae | — | — | — | x | | | | | | | | x | | |
| RANUN | *Ranunculus* sp. | — | Ranunculaceae | — | — | — | | | | | | | | | x | | |
| CECRP | *Ceanothus crassifolius* var. *planus* | Hoary leaved ceanothus | Rhamnaceae | Native | shrub | — | | x | | x | | x | | x | x | | |
| CECU | *Ceanothus cuneatus* | Buck brush | Rhamnaceae | Native | shrub | — | | | | x | x | | | | x | | |
| FRCAC5 | *Frangula californica* ssp. *californica* | California coffeeberry | Rhamnaceae | Native | shrub | — | x | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADFA | *Adenostoma fasciculatum* | Chamise | Rosaceae | Native | shrub | — | x | x | | x | x | x | x | x | x | | x |
| CEBE3 | *Cercocarpus betuloides* | Birch leaf mountain mahogany | Rosaceae | Native | tree/shrub | — | x | | | x | x | | | | x | | x |
| HEAR5 | *Heteromeles arbutifolia* | Toyon | Rosaceae | Native | shrub | — | x | x | x | x | | x | | x | x | | |
| PRCE2 | *Prunus cerasifera* | Cherry plum | Rosaceae | Non-native | tree | Cal-IPC (Limited) | | | | | | x | | | | | |
| PRDU | *Prunus dulcis* | Domestic almond | Rosaceae | Non-native | tree | — | | | | | | | | x | | | |
| PRIL | *Prunus ilicifolia* | Holly leaf cherry | Rosaceae | Native | tree/shrub | — | x | | | x | | x | | x | x | | x |
| PRUNU | *Prunus* sp. (cultivar) | — | Rosaceae | — | — | — | x | | | x | | | | | | | |
| PYAN | *Pyracantha angustifolia* | Narrowleaf firethorn | Rosaceae | Non-native | shrub | Cal-IPC (Limited) | | | | x | | x | | x | | | |
| PYCA80 | *Pyrus calleryana* | Callery pear | Rosaceae | Non-native | tree | — | | | | x | | | | | | | |
| ROCA2 | *Rosa californica* | California wildrose | Rosaceae | Native | shrub | — | | x | | x | | | | | | | x |
| RUAR9 | *Rubus discolor (armeniacus)* | Himalayan blackberry | Rosaceae | Non-native | shrub | Cal-IPC (High) | | x | | | | | | | | | x |
| GAANA | *Galium andrewsii* ssp. *andrewsii* | Andrew's bedstraw | Rubiaceae | Native | perennial herb | — | | | | x | | x | | | x | | |
| GAAN2 | *Galium angustifolium* | Narrow leaved bedstraw | Rubiaceae | Native | perennial herb | — | | | | | | | | x | x | | |
| GAANA2 | *Galium angustifolium* ssp. *angustifolium* | Narrow leaved bedstraw | Rubiaceae | Native | perennial herb | — | | | | | | | | x | | | |
| GAANN | *Galium angustifolium* ssp. *nudicaule* | Naked stem bedstraw | Rubiaceae | Native | perennial herb | — | | | | | | | | | x | | |
| GAPA5 | *Galium parisiense* | Wall bedstraw | Rubiaceae | Non-native | annual herb | — | | | | | | | | x | | | |
| GATR2 | *Galium trifidum* | Three petaled bedstraw | Rubiaceae | Native | perennial herb | — | | | | | | | | x | | | |
| POFRF3 | *Populus fremontii* ssp. *fremontii* | Fremont cottonwood | Salicaceae | Native | tree | — | x | x | x | x | | x | x | x | x | x | x |
| SAEX | *Salix exigua* | Narrowleaf willow | Salicaceae | Native | tree/shrub | — | x | x | x | x | | x | x | x | x | | x |
| SAGO | *Salix gooddingii* | Goodding's black willow | Salicaceae | Native | tree | — | x | x | x | x | | | | x | | | x |
| SALA3 | *Salix laevigata* | Polished willow | Salicaceae | Native | tree | — | x | x | | x | | x | x | x | | | |
| SALA5 | *Salix lasiandra* | Pacific willow | Salicaceae | Native | tree | — | | | x | x | | | | | x | | |
| SALA6 | *Salix lasiolepis* | Arroyo willow | Salicaceae | Native | tree/shrub | — | x | x | | x | | x | | x | x | | x |
| ACMA3 | *Acer macrophyllum* | Bigleaf maple | Sapindaceae | Native | tree | — | | x | | x | | | | | | | |
| ANCA10 | *Anemopsis californica* | yerba mansa | Saururaceae | Native | perennial herb | — | x | x | x | x | | | | | | | x |
| VEBL | *Verbascum blattaria* | Moth mullein | Scrophulariaceae | Non-native | perennial herb | — | | | | | | | | | x | | |
| VETH | *Verbascum thapsus* | Woolly mullein | Scrophulariaceae | Non-native | perennial herb | Cal-IPC (Limited) | | | | x | | x | | | | | |
| SCCA2 | *Scrophularia californica* | California bee plant | Scrophulariaceae | Native | perennial herb | — | x | x | | | | | | | | | |
| CAEXE | *Castilleja exserta* ssp. *exserta* | Exserted Indian paintbrush | Orobanchaceae | Native | annual herb | — | | | | | | | | x | x | | |
| VEAN2 | *Veronica anagallis-aquatica* | Water speedwell | Plantaginaceae | Non-native | perennial herb | — | | x | | | | | | x | x | | |
| VEPEX2 | *Veronica peregrina* ssp. *xalapensis* | Neckweed | Plantaginaceae | Native | annual herb | — | | | | x | | | | | | | |
| SEBI | *Selaginella bigelovii* | Bigelow's moss fern | Selaginellaceae | Native | fern (mosslike) | — | | | | | | | | | x | | |
| AIAL | *Ailanthus altissima* | Tree of heaven | Simaroubaceae | Non-native | tree | Cal-IPC (Moderate); CDFA-C | | x | | | | x | | | | | x |
| DAST | *Datura stramonium* | Jimsonweed | Solanaceae | Native | annual herb | — | x | | | x | | | | x | x | | x |
| DAWR2 | *Datura wrightii* | Sacred thorn apple | Solanaceae | Native | perennial herb | — | x | x | | x | | x | x | x | x | x | x |
| LYES | *Lycopersicon esculentum* | Tomato | Solanaceae | Non-native | annual/perennial herb | — | | | | | | | | x | | | |
| SODO | *Solanum douglasii* | Douglas' nightshade | Solanaceae | Native | perennial herb | — | | | | | | | | | x | | |
| SOEL | *Solanum elaeagnifolium* | Horse nettle | Solanaceae | Non-native | perennial herb | — | | | | x | | x | | x | x | | |
| SONI | *Solanum nigrum* | Black nightshade | Solanaceae | Non-native | annual herb | — | | | | | | | | x | x | | |

**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SOPA | *Solanum parishii* | Parish's nightshade | Solanaceae | Native | shrub | — | | | | | | | | x | | | |
| SOXA | *Solanum xanti* | Chaparral nightshade | Solanaceae | Native | perennial herb/shrub | — | x | | | x | | | | x | x | | x |
| TARA | *Tamarix ramosissima* | Saltcedar | Tamaricaceae | Non-native | tree/shrub | Cal-IPC (High); CDFA-B | x | x | x | x | | x | x | x | x | | x |
| BLCRC | *Bloomeria crocea* var. *crocea* | Common goldenstar | Themidaceae | Native | perennial herb | — | x | | | | | | | x | x | | |
| DICA14 | *Dichelostemma capitatum* | Blue dicks | Themidaceae | Native | perennial herb | — | x | | | x | | x | | x | x | | x |
| DICO19 | *Dichelostemma congestum* | Ookow | Themidaceae | Native | perennial herb | — | | | | | | | | | x | | |
| TYGL | *Typha × glauca* | — | Typhaceae | Native | perennial herb (aquatic) | — | | | | x | | | | | | | |
| TYAN | *Typha angustifolia* | Narrow leaf cattail | Typhaceae | Non-native | perennial herb (aquatic) | — | | x | x | x | | x | | | | | |
| TYDO | *Typha domingensis* | Southern Cattail | Typhaceae | Native | perennial herb | — | | | | x | | | | x | | | |
| TYLA | *Typha latifolia* | Broadleaf cattail | Typhaceae | Native | perennial herb (aquatic) | — | x | x | x | x | | | | x | | | x |

**Appendix K - Botanical Inventory**

| USDA Species Code | Scientific Name | Common Name | Family | California Nativity | Lifeform | Status | Quail Lake (QC) | Gorman Creek (GC) | Warne Powerplant (WP) | Pyramid Lake (PL) | Warne T-Line (WT) | Castaic Powerplant (CP) | Castaic Creek (CC) | Elderberry Forebay (EF) | Castaic T-Line (CT) | Peace Valley Pipeline (PVP) | PFC Obs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ULAM | *Ulmus americana* | American elm | Ulmaceae | Non-native | tree | — | x | | | | | | | | | | x |
| ULPU | *Ulmus pumila* | Siberian elm | Ulmaceae | Non-native | tree | — | | | x | x | | | | | | | |
| URDI | *Urtica dioica* | Stinging nettle | Urticaceae | Native | perennial herb | — | x | x | | x | | | | | | | x |
| VELAL2 | *Verbena lasiostachys* var. *lasiostachys* | Western vervain | Verbenaceae | Native | perennial herb | — | | | | | | x | | | | | |
| PHJU | *Phoradendron juniperinum* | Juniper mistletoe | Viscaceae | Native | shrub (parasitic) | — | | | | x | | | | | | | |
| PHMAM2 | *Phoradendron leucarpum (macrophyllum)* ssp. *macrophyllum* | Big leaf misteltoe | Viscaceae | Native | shrub (parasitic) | — | x | x | | x | | | | | | | |
| TRTE | *Tribulus terrestris* | Puncture vine | Zygophyllaceae | Non-native | annual herb | Cal-IPC (Limited); CDFA-C | | x | | | | | | | | | |

| Status Ranks and Definitions | |
|---|---|
| **Cal-IPC Ratings** | |
| Limited | These species are invasive but their ecological impacts are minor on a Statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic. |
| Moderate | These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread. |
| High | These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically. |
| **CDFA Ratings** | |
| A | An organism of known economic importance subject to state (or commissioner when acting as a state agent) enforced action involving: eradication, quarantine regulation, containment, rejection, or other holding action. |
| B | An organism of known economic importance subject to: eradication, containment, control or other holding action at the discretion of the individual county agricultural commissioner. OR An organism of known economic importance subject to state endorsed holding action and eradication only when found in a nursery. |
| C | An organism subject to no state enforced action outside of nurseries except to retard spread. At the discretion of the county agricultural commissioner. OR An organism subject to no state enforced action except to provide for pest cleanliness in nurseries. |
| **CNPS Plant Ranks** | |
| 1B | Plants rare, threatened, or endangered in California and elsewhere |
| 4 | Watch List: Plants of limited distribution |
| **CNPS Threat Ranks** | |
| 0.2 | Moderately threatened in California (20-80 percent occurrences threatened / moderate degree and immediacy of threat) |
| 0.3 | Not very threatened in California (less than 20 percent of occurrences threatened / low degree and immediacy of threat) |

| Location Notes |
|---|
| Pyramid Lake includes Pyramid Dam and Piru Creek species |
| Gorman Creek includes Los Alamos Campground; overflow from EF species to CC species |

# Appendix L

## *Incidental Wildlife Observations*

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## Quail Lake

| Species | Observation Type |
|---|---|
| Cinnamon Teal (*Spatula cyanoptera* ) | Visual |
| Mallard (*Anas platyrhynchos* ) | Visual |
| Lesser Scaup (*Aythya affinis* ) | Visual |
| Bufflehead (*Bucephala albeola* ) | Visual |
| Common Merganser (*Mergus merganser* ) | Visual |
| California Quail (*Callipepla californica* ) | Visual |
| Pied-billed Grebe (*Podilymbus podiceps* ) | Visual |
| Sora (*Porzana carolina* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Killdeer (*Charadrius vociferus* ) | Visual |
| Wilson's Snipe (*Gallinago delicata* ) | Visual |
| Double-crested Cormorant (*Phalacrocorax auritus* ) | Visual |
| Great Egret (*Ardea alba* ) | Visual |
| Black-crowned Night-Heron (*Nycticorax nycticorax* ) | Visual |
| Turkey Vulture (*Cathartes aura* ) | Visual |
| Northern Harrier (*Circus hudsonius* ) | Visual |
| Red-tailed Hawk (*Buteo jamaicensis* ) | Visual |
| Downy Woodpecker (*Dryobates pubescens* ) | Visual |
| Northern Flicker (*Colaptes auratus* ) | Visual |
| Black Phoebe (*Sayornis nigricans* ) | Visual |
| Western Kingbird (*Tyrannus verticalis* ) | Visual |
| Common Raven (*Corvus corax* ) | Visual |
| California Thrasher (*Toxostoma redivivum* ) | Visual |
| Chipping Sparrow (*Spizella passerina* ) | Visual |
| Lark Sparrow (*Chondestes grammacus* ) | Visual |
| White-crowned Sparrow (*Zonotrichia leucophrys* ) | Visual |
| Song Sparrow (*Melospiza melodia* ) | Visual |
| Spotted Towhee (*Pipilo maculatus* ) | Visual |
| Western Meadowlark (*Sturnella neglecta* ) | Visual |
| Red-winged Blackbird (*Agelaius phoeniceus* ) | Visual |
| Brewer's Blackbird (*Euphagus cyanocephalus* ) | Visual |
| Great-tailed Grackle (*Quiscalus mexicanus* ) | Visual |
| Common Yellowthroat (*Geothlypis trichas* ) | Visual |
| Yellow-rumped Warbler (*Setophaga coronata* ) | Visual |
| Desert cottontail (*Sylvilagus audubonii* ) | Visual |
| Coyote (*Canis latrans* ) | Sign |
| Grey fox (*Urocyon cinereoargenteus* ) | Sign |
| Dusky-footed woodrat (*Neotoma fuscipes* ) | Sign |
| California ground squirrel (*Otospermophilus beecheyi* ) | Visual |
| Western fence lizard (*Sceloporus occidentalis* ) | Visual |
| Desert spiny lizard (*Sceloporus magister* ) | Visual |

## Lower Quail Canal

| Species | Observation Type |
|---|---|
| Lesser Scaup (*Aythya affinis* ) | Visual |
| Bufflehead (*Bucephala albeola* ) | Visual |
| Ruddy Duck (*Oxyura jamaicensis* ) | Visual |
| California Quail (*Callipepla californica* ) | Visual |
| Pied-billed Grebe (*Podilymbus podiceps* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Killdeer (*Charadrius vociferus* ) | Visual |
| Double-crested Cormorant (*Phalacrocorax auritus* ) | Visual |
| Turkey Vulture (*Cathartes aura* ) | Visual |
| Red-tailed Hawk (*Buteo jamaicensis* ) | Visual |
| American Kestrel (*Falco sparverius* ) | Visual |
| Black Phoebe (*Sayornis nigricans* ) | Visual |
| Western Kingbird (*Tyrannus verticalis* ) | Visual |
| Common Raven (*Corvus corax* ) | Visual |
| Northern Rough-winged Swallow (*Stelgidopteryx serripennis* ) | Visual |
| Tree Swallow (*Tachycineta bicolor* ) | Visual |
| Violet-green Swallow (*Tachycineta thalassina* ) | Visual |
| Barn Swallow (*Hirundo rustica* ) | Visual |
| Cliff Swallow (*Petrochelidon pyrrhonota* ) | Visual |
| Rock Wren (*Salpinctes obsoletus* ) | Visual |
| Bewick's Wren (*Thryomanes bewickii* ) | Visual |
| Blue-gray Gnatcatcher (*Polioptila caerulea* ) | Visual |
| Northern Mockingbird (*Mimus polyglottos* ) | Visual |
| House Finch (*Haemorhous mexicanus* ) | Visual |
| Lesser Goldfinch (*Spinus psaltria* ) | Visual |
| White-crowned Sparrow (*Zonotrichia leucophrys* ) | Visual |
| California Towhee (*Melozone crissalis* ) | Visual |
| Western Meadowlark (*Sturnella neglecta* ) | Visual |
| Red-winged Blackbird (*Agelaius phoeniceus* ) | Visual |

## Peace Valley Pipeline

| Species | Observation Type |
|---|---|
| California Scrub Jay (*Aphelocoma californica* ) | Visual |

## Gorman Bypass

| Species | Observation Type |
|---|---|
| California Quail (*Callipepla californica* ) | Visual |
| Greater Roadrunner (*Geococcyx californianus* ) | Visual |
| Red-tailed Hawk (*Buteo jamaicensis* ) | Visual |
| Barn Owl (*Tyto alba* ) | Sign |
| Black Phoebe (*Sayornis nigricans* ) | Visual |
| Common Raven (*Corvus corax* ) | Visual |
| Mountain Chickadee (*Poecile gambeli* ) | Visual |
| Western Bluebird (*Sialia mexicana* ) | Visual |
| White-crowned Sparrow (*Zonotrichia leucophrys* ) | Visual |
| Brewer's Blackbird (*Euphagus cyanocephalus* ) | Visual |
| California ground squirrel (*Otospermophilus beecheyi* ) | Visual |
| Side-blotched lizard (*Uta stansburiana* ) | Visual |
| Western fence lizard (*Sceloporus occidentalis* ) | Visual |
| Pacific tree frog (*Pseudacris regilla* ) | Audio |

## Warne Powerplant

| Species | Observation Type |
|---|---|
| Blue-winged Teal (*Spatula discors* ) | Visual |
| Cinnamon Teal (*Spatula cyanoptera* ) | Visual |
| Hooded Merganser (*Lophodytes cucullatus* ) | Visual |
| Ruddy Duck (*Oxyura jamaicensis* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Double-crested Cormorant (*Phalacrocorax auritus* ) | Visual |
| California Scrub-Jay (*Aphelocoma californica* ) | Visual |
| Common Raven (*Corvus corax* ) | Visual |
| California Thrasher (*Toxostoma redivivum* ) | Visual |
| Mule deer (*Odocoileus hemionus* ) | Sign |
| Desert cottontail (*Sylvilagus audubonii* ) | Visual |
| Coast horned lizard (*Phrynosoma coronatum* ) | Visual |
| Side-blotched lizard (*Uta stansburiana* ) | Visual |
| Western fence lizard (*Sceloporus occidentalis* ) | Visual |

## Pyramid Lake

| Species | Observation Type |
|---|---|
| Mallard (*Anas platyrhynchos* ) | Visual |
| Greater Scaup (*Aythya marila* ) | Visual |
| Bufflehead (*Bucephala albeola* ) | Visual |
| Hooded Merganser (*Lophodytes cucullatus* ) | Visual |
| Sora (*Porzana carolina* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Double-crested Cormorant (*Phalacrocorax auritus* ) | Visual |
| Great Blue Heron (*Ardea herodias* ) | Visual |
| Great Egret (*Ardea alba* ) | Visual |
| Turkey Vulture (*Cathartes aura* ) | Visual |
| Osprey (*Pandion haliaetus* ) | Visual |
| Belted Kingfisher (*Megaceryle alcyon* ) | Visual |
| Steller's Jay (*Cyanocitta stelleri* ) | Visual |
| Common Raven (*Corvus corax* ) | Visual |
| White-breasted Nuthatch (*Sitta carolinensis* ) | Visual |
| California Thrasher (*Toxostoma redivivum* ) | Visual |
| Red-winged Blackbird (*Agelaius phoeniceus* ) | Visual |
| Great-tailed Grackle (*Quiscalus mexicanus* ) | Visual |
| Common Yellowthroat (*Geothlypis trichas* ) | Visual |
| Yellow-rumped Warbler (*Setophaga coronata* ) | Visual |
| California ground squirrel (*Otospermophilus beecheyi* ) | Visual |
| Mule deer (*Odocoileus hemionus* ) | Sign |
| North American raccoon (*Procyon lotor* ) | Visual |
| Western fence lizard (*Sceloporus occidentalis* ) | Visual |
| Coast horned lizard (*Phrynosoma coronatum* ) | Visual |
| Western rattlesnake (*Crotalus oreganus* ) | Audio |
| Gopher snake (*Pituophis catenifer* ) | Visual |

## Castaic Powerplant

| Species | Observation Type |
|---|---|
| Hooded Merganser (*Lophodytes cucullatus* ) | Visual |
| Anna's Hummingbird (*Calypte anna* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Killdeer (*Charadrius vociferus* ) | Visual |
| Great Egret (*Ardea alba* ) | Visual |
| Cattle Egret (*Bubulcus ibis* ) | Visual |
| Horned Lark (*Eremophila alpestris* ) | Visual |
| Blue-gray Gnatcatcher (*Polioptila caerulea* ) | Visual |

## Elderberry Forebay

| Species | Observation Type |
|---|---|
| Mallard (*Anas platyrhynchos* ) | Visual |
| Ruddy Duck (*Oxyura jamaicensis* ) | Visual |
| California Quail (*Callipepla californica* ) | Visual |
| Lesser Nighthawk (*Chordeiles acutipennis* ) | Visual |
| American Coot (*Fulica americana* ) | Visual |
| Great Blue Heron (*Ardea herodias* ) | Visual |
| Bald Eagle (*Haliaeetus leucocephalus* ) | Visual |
| Bewick's Wren (*Thryomanes bewickii* ) | Visual |
| Lark Sparrow (*Chondestes grammacus* ) | Visual |
| California Towhee (*Melozone crissalis* ) | Visual |
| Red-winged Blackbird (*Agelaius phoeniceus* ) | Visual |
| Mule deer (*Odocoileus hemionus* ) | Sign |
| Western fence lizard (*Sceloporus occidentalis* ) | Visual |
| Side-blotched lizard (*Uta stansburiana* ) | Visual |
| Western rattlesnake (*Crotalus oreganus* ) | Audio |

## Castaic Transmission Line

| Species | Observation Type |
|---|---|
| California condor (*Gymnogyps californianus* ) | Visual |
| California Quail (*Callipepla californica* ) | Visual |
| Mourning Dove (*Zenaida macroura* ) | Visual |
| Great Blue Heron (*Ardea herodias* ) | Visual |
| Turkey Vulture (*Cathartes aura* ) | Visual |
| Cooper's Hawk (*Accipiter cooperii* ) | Visual |
| Red-tailed Hawk (*Buteo jamaicensis* ) | Visual |
| American Kestrel (*Falco sparverius)* | Visual |
| Western Kingbird (*Tyrannus verticalis* ) | Visual |
| Bushtit (*Psaltriparus minimus* ) | Visual |
| Bewick's Wren (*Thryomanes bewickii* ) | Visual |
| Blue-gray Gnatcatcher (*Polioptila caerulea* ) | Visual |
| Wrentit (*Chamaea fasciata* ) | Visual |
| Northern Mockingbird (*Mimus polyglottos* ) | Visual |
| Phainopepla (*Phainopepla nitens* ) | Visual |
| Lark Sparrow (*Chondestes grammacus* ) | Visual |
| White-crowned Sparrow (*Zonotrichia leucophrys* ) | Visual |
| Song Sparrow (*Melospiza melodia* ) | Visual |
| California Towhee (*Melozone crissalis* ) | Visual |
| Spotted Towhee (*Pipilo maculatus* ) | Visual |

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# Appendix M

***Movement Photo Log***

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SPECIAL-STATUS TERRESTRIAL SPECIES - CWHR MOVEMENT STUDY PHOTO LOG

| Photo Number | Photo Description | Photo |
|---|---|---|
| 1 | Below Lower Quail Lake Canal |  |
| 2 | Lower Quail Lake Canal |  |
| 3 | Transmission Lines Over Lower Quail Lake Canal |  |

| Photo Number | Photo Description | Photo |
|---|---|---|
| 4 | Culvert Under Quail Lake Canal - 4 FT Clearance |  |
| 5 | Transmission Lines Over Lower Quail Lake Canal |  |
| 6 | Culvert Under Quail Lake Canal |  |

| Photo Number | Photo Description | Photo |
|---|---|---|
| 7 | Fencing Around South End of Quail Lake Canal |  |
| 8 | Fence Around Top of Penstocks - Elderberry Forebay |  |
| 9 | Fence South of Penstocks - Elderberry Forebay |  |

NOTE: PHOTOS 10-13 WERE REMOVED FROM PHOTOLOG DUE TO PERMISSIONS

| Photo Number | Photo Description | Photo |
|---|---|---|
| 14 | Drainage Ditch Under Penstocks - Elderberry Forebay |  |
| 15 | Drainage Ditch Under Penstocks - Elderberry Forebay |  |
| 16 | Drainage Ditch Under Penstocks - Elderberry Forebay |  |

# Appendix N

## *CWHR Species Summary Table*

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## Appendix N - CWHR Species Summary Table

| Scientific Name | Common Name | USFWS | CDFW | BLM | USFS | Habitat Characteristics | Potential | Rationale | Citation |
|---|---|---|---|---|---|---|---|---|---|
| **Invertebrates** | | | | | | | | | |
| *Branchinecta conservatio* | Conservancy fairy shrimp | FE | - | - | - | Vernal pools, often large and turbid pools (USFWS 2005). | N | Suitable habitat not present. No vernal pools known to occur in study area. Nearest known population in Ventura County approximately 10 miles west of study area (CDFW 2018a). | United States Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. United States Fish and Wildlife Service. Portland, OR.<br><br>California Department of Fish and Wildlife (CDFW). 2018a. California Department of Fish and Wildlife California Natural Diversity Database |
| *Branchinecta lynchi* | vernal pool fairy shrimp | FT | - | - | - | Found only in vernal pools and vernal pool-like habitats (USFWS 2005). | N | Suitable habitat not present. No vernal pools known to occur in study area. See Section 5.4.3 for more information. | United States Fish and Wildlife Service (USFWS). 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. United States Fish and Wildlife Service. Portland, OR. |
| *Danaus plexippus pop. 1* | monarch (California overwintering population) | - | - | - | FSS | Typically overwinter in groves of eucalyptus (*Eucalyptus* spp.), Monterey pine (*Pinus radiata*), or Monterey cypress (*Hesperocyparis macrocarpa*) along the California coast (IELP 2012). | N | Sensitive species in Los Padres NF; however, only known to overwinter in coastal areas (LP Forest Watch 2013) | International Environmental Law Project (IELP). 2012. Report on Monarch Legal Status. Available online: <http://www.xerces.org/wp-content/uploads/2008/09/legal-status-of-california-monarchs.pdf>. Accessed November 19, 2018. Last updated 2012. International Environmental Law Project. Portland, OR.<br><br>Los Padres Forest Watch (LP Forest Watch). 2013. Yellow-Blotched Salamander. Available online: https://lpfw.org/our-region/wildlife/yellow-blotched-salamander/Species Accounts. Accessed November 12, 2018. Last updated 2013. Los Padres ForestWatch. Santa Barbara, CA. |
| *Euphydryas editha quino* | Quino checkerspot butterfly | FE | - | - | - | Known to be associated with chaparral, cismontane woodlands, sage scrub, and various grasslands. Larval host plants include California plantain (*Plantago erecta*), woolly plantain (*Plantago patagonica*), southern Chinese houses (*Colinsia bicolor*), purple owls clover (*Castilleja exserta*), Coulter's snapdragon (*Antirrhinum coulterianum*), and dark-tipped bird's beak (*Cordylanthus rigidus*). The current range for Quino includes multiple areas in southern Riverside County, south into Mexico. (USFWS 2003). | N | Study area outside species range (USFWS 2009). | USFWS. 2003. Quino Checkerspot Butterfly (*Euphydryas editha quino*) 5-Year Review: Summary and Evaluation. Carlsbad Fish and Wildlife Office. Carlsbad, CA. |
| *Plebejus saepiolus aureolus* | San Gabriel Mountains blue butterfly | - | - | - | FSS | Considered extinct. Historically lived in wet meadows of the San Gabriel mountains of southern California (Suckling et al 2004). | N | Species considered extinct. Study area outside species range. | Suckling, K., et. al. 2004. Extinction and the Endangered Species Act. Available online: <https://www.biologicaldiversity.org/publications/papers/ExtinctAndESA.pdf>. Accessed November 19, 2018. Last updated May 1, 2004. Center for Biological Diversity. Tucson, AZ. |
| *Plebulina emigdionis* | San Emigdio blue butterfly | - | - | - | FSS | San Emigdio blue butterfly is a nectivore that is known to reside in the host plant fourwing saltbush (*Atriplex canescens*). The species typically prefers riparian areas, as well as dry river courses and intermittent stream sides and surrounds flat lands with adults emerging from April to September (NatureServe 2018). | Y | Suitable habitat present. Species hostplant, fourwing saltbush, commonly found in study area. | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018. |
| **Amphibians** | | | | | | | | | |
| *Anaxyrus californicus* | arroyo toad | FE | SSC | - | - | Breeding habitat = slow moving streams with shallow pools, nearby sandbars and adjacent stream terraces. Often breed in shallow, sandy pools bordered by sand/gravel flood terraces. Inhabit upland habitats when not breeding, such as sycamore-cottonwood woodlands, oak woodlands, coastal sage scrub, chaparral and grassland (USFWS 2009). | Y | Suitable habitat present. Known to occur in study area. See Section 5.4.3 for more information. | USFWS. 2009. Arroyo Toad (*Bufo californicus (=microscaphus)*) 5-Year Review: Summary and Evaluation. USFWS; Ventura, CA. |
| *Batrachoseps gabrieli* | San Gabriel Mountains slender salamander | - | - | - | FSS | Known from select localities in the San Gabriel Mountains and the Mt. Baldy area of Los Angeles County and the western end of the San Bernardino Mountains in San Bernardino County, with an elevation range of 1,200 - 5,085 feet amsl. Occurs on talus slopes surrounded by a variety of conifer and montane hardwood species (CDFW 2018b). | N | Study area outside species range (Nafis 2018). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx<br><br>Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Batrachoseps incognitus* | San Simeon slender salamander | - | - | - | FSS | Inhabits open and closed forests of yellow pine, laurel, sycamore, and oak woodland. Found only in the Santa Lucia Mountains in northwestern San Luis Obispo County and extreme southwestern Monterey County, where the mountains meet the ocean. From sea level to near 3,280 feet amsl (Nafis 2018). | N | Study area outside species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Batrachoseps minor* | lesser slender salamander | - | SSC | - | FSS | Palustrine habitats include riparian zones while terrestrial habitats include hardwood forests. Species is known to prefer deeply shaded slopes with abundant leaf litter in wooded canyons. Individuals known to burrow in soil or fallen debris (NatureServe 2018). | N | Study area outside species range (Nafis 2018). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018.<br><br>Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Batrachoseps stebbinsi* | Tehachapi slender salamander | - | ST | BLMS | - | Inhabits north-facing moist canyons and ravines in oak and mixed woodlands in arid to semi-arid locations. Found under rocks, logs, bark, and other debris in moist areas, especially in areas with a lot of leaf-litter, often near talus slopes. Found in scattered populations in the Caliente Creek drainage at the juncture of the Sierra Nevada and the Tehachapi Mountains, and in isolated canyons on the northern slopes of the Tehachapi Mountains from Tejon Canyon to Fort Tejon. Occurs at elevations of 2,000 - 4,600 feet amsl (Nafis 2018). | N | Study area outside accepted range for this species. No known occurrences south of Tejon Ranch, this species occurs on the northern slopes of Tehachapi Range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Ensatina eschscholtzii croceater* | yellow-blotched salamander | - | - | BLMS | FSS | Palustrine habitats include riparian zones while terrestrial habitats include hardwood forests. Species is known to prefer shaded slopes with abundant leaf litter, rock, logs, debris to take cover in/under. Individuals known in abundance in areas with large volumns of woody debris (NatureServe 2018). | N | Suitable habitat present. Study area adjacent to species range (Nafis 2018). However, proposed Project boundary is well below species elevation range. | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018.<br><br>Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Rana boylii* | foothill yellow-legged frog | - | SCT, SSC | BLMS | FSS | Frequents rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools. From sea level to 6,700 feet amsl. Occurs in the Coast Ranges from the Oregon border south to the Transverse Mountains in Los Angeles County, in most of northern California west of the Cascade crest, and along the western flank of the Sierra south to Kern County (Nafis 2018). | Y | Suitable habitat present and historical CNDDB occurrences in study area; however, surveys were negative for this species. See Section 5.3 for more information. | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Rana draytonii* | California red-legged frog | FT | SSC | - | - | Ponds/streams in humid forests, woodlands, grasslands, coastal scrub, and streamsides with plant cover in lowlands or foothills. Breeding habitat includes permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. From sea level to 5,000 feet amsl (Nafis 2018). | Y | Suitable habitat present, may occur in study area. See Section 5.4.3 for more information. | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Rana muscosa* | southern mountain yellow-legged frog | FE | SE | - | - | Lakes, ponds, meadow streams, isolated pools, sunny riverbanks in the southern Sierra Nevada Mountains. Rocky streams in narrow canyons and in the chaparral belt in the mountains of southern California. From 984 feer to above 12,000 feet amsl (Nafis 2018). All known extant populations of the listed entity occur within the San Bernardino and Angeles National Forests (USFWS 2012). | N | All known extant populations of the listed entity occur within the San Bernardino and Angeles National Forests (USFWS 2012). However, study area is outside species range (Nafis 2018, USFWS 2012). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/<br><br>USFWS. 2012. Mountain Yellow-Legged Frog (*Rnanamuscosa*), Southern California Distinct Population Segment 5-Year Review: Summary and Evaluation. Carlsbad Fish and Wildlife Office. Carlsbad, CA. |
| *Spea hammondii* | western spadefoot | - | SSC | BLMS | - | Open areas with sandy/gravelly soils. Variable habitats including mixed woodlands, grasslands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rainpools which do not contain bullfrogs, fish, or crayfish are necessary for breeding (Nafis 2018). | Y | Suitable habitat present. May occur in study area. See Section 5.3 for more information. | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Taricha torosa* | coast range newt | - | SSC | - | - | Found in wet forests, oak forests, chaparral and rolling grasslands. In southern California, drier chaparral, oak woodland and grassland are used. Found along the coast and coast range mountains from Mendocino county south to San Diego county (Nafis 2018). | N | Study area outside accepted range for this species. Does occur in southern portions of Los Angeles County; however, not known from northern half of the county where the study area is located (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| **Reptiles** | | | | | | | | | |
| *Anniella pulchra* | Northern California legless lizard | - | SSC | - | FSS | Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodland, desert scrub, sandy washes, and stream terraces from sea level to around 5,900 feet amsl (Nafis 2018). | Y | Suitable habitat present. Range map for legless lizards shows northern Los Angeles as an area where *Anniella* are present, but the species has not yet been determined (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |

**Appendix N - CWHR Species Summary Table**

| Scientific Name | Common Name | USFWS | CDFW | BLM | USFS | Habitat Characteristics | Potential | Rationale | Citation |
|---|---|---|---|---|---|---|---|---|---|
| *Anniella stebbinsi* | Southern California legless lizard | - | SSC | - | - | Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodland, desert scrub, sandy washes, and stream terraces from sea level to around 5,900 feet amsl (Nafis 2018). | Y | Suitable habitat present. Range map for legless lizards shows northern Los Angeles as an area where *Anniella* are present, but the species has not yet been determined (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Arizona elegans occidentalis* | California glossy snake | - | SSC | - | - | Mainly a nocturnal species, individuals spend time during the day in burrows and rock outcrops. Requires loose soil for egg laying near vegetation bases and/or mammal burrows. Known to prefer areas with scattered brush and rock outcrops (CDFW 2018b). | Y | Suitable habitat present. Three CNDDB occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Aspidoscelis tigris stejnegeri* | coastal whiptail | - | SSC | - | - | This subspecies is found in coastal Southern California, mostly west of the Peninsular Ranges and south of the Transverse Ranges, and north into Ventura County. Ranges south into Baja California. Found in a variety of ecosystems, primarily hot and dry open areas with sparse foliage - chaparral, woodland, and riparian areas. (Nafis 2018). | Y | Suitable habitat present. Two CNDDB occurrence in the study area (CDFW 2018a). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Charina umbratica* | southern rubber boa | - | ST | - | - | Inhabits oak-conifer and mixed-conifer forests in montane southern California (Nafis 2018). | Y | Suitable habitat present. Study area adjacent to species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Crotalus ruber* | red-diamond rattlesnake | - | SSC | - | - | Inhabits arid scrub, coastal chaparral, oak and pine woodlands, rocky grassland and cultivated areas. Prefers rocky areas with dense vegetation (Nafis 2018). | N | Species range only overlaps with small portion of southwest Los Angeles County. Study area well outside of range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Diadophis punctatus modestus* | San Bernardino ringneck snake | - | - | - | FSS | Palustrine habitat includes riparian and temporary pools. Also known to be found near creeks and streams. Terrestrial habitats include croplands, hardwood forests, grasslands, and chaparral. Species known to prefer moist habitats and can found under various cover objects including bark, rock, and logs (NatureServe 2018). | Y | Suitable habitat present. Study area overlaps with species range (Nafis 2018). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018.<br><br>Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Emys marmorata* | western pond turtle | - | SSC | BLMS | FSS | Found in a wide variety of habitats throughout California, but associated with permanent ponds, lakes, streams, irrigation ditches, and permanent pools along intermittent streams. Occurs tthroughout California, west of the Sierra-Cascade crest and absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. (CDFW 2018b). | Y | Suitable habitat present, may occur in study area. See Section 5.4.3 for more information. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Gambelia sila* | blunt-nosed leopard lizard | FE | SE, FP | - | - | Semiarid grasslands, alkali flats, and washes. Flat areas with open space for running, avoids densely vegetated areas. Uses mammal dens and burrows for cover and shelter. The number of available burrows will determine the size of this lizard's population in an area (Nafis 2018). | N | Study area outside known species range. Not known to occur in Los Angeles County (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Gopherus agassizii* | desert tortoise | FT | ST | - | - | Known in the Mojave Desert north and west of the Colorado River in California, Nevada, Arizona, and Utah. The majority of their life is spent underground. The species prefers sandy flats, rocky foothills, washes, canyons, and alluvial fans where suitable soil for den construciton is found (USFWS 2018). | N | Study area outside known species range. Does not occur west of Antelope Valley (Nafis 2018). | United States Fish and Wildlife Service (USFWS). 2018. Mojave Desert Tortoise (*Gopherus agassizii*). Available online: <https://www.fws.gov/nevada/desert_tortoise/dt/dt_life.html>. Accessed November 21, 2018. Last updated July 5, 2018. Nevada Fish and Wildlife Office. Reno, NV. |
| *Lampropeltis zonata parvirubra* | California mountain kingsnake (San Bernardino population) | - | - | BLMS | FSS | Found in diverse habitats including coniferous forest, oak-pine woodlands, riparian woodland, chaparral, manzanita, and coastal sage scrub between 804 and 9,022 feet amsl in elevation (Nafis 2018). | Y | Suitable habitat present. Study area overlaps with species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Lichanura orcutti* | coastal rosy boa (northern three-lined boa) | - | - | - | FSS | Inhabits arid scrublands, semi-arid shrublands, rocky shrublands, rocky deserts, canyons, and other rocky areas. Appears to be common in riparian areas, but does not require permanent water (Nafis 2018). | Y | Suitable habitat present. Study area overlaps with species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Masticophis flagellum ruddocki* | San Joaquin coachwhip | - | SSC | - | - | Occurs in open, dry, treeless areas, including grassland and saltbush scrub. Takes refuge in rodent burrows, under shaded vegetation, and under surface objects (Nafis 2018). | N | Study area outside known species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Phrynosoma blainvillii* | coast horned lizard | - | SSC | BLMS | - | Occurs in valley-foothill hardwood, conifer and riparian habitats, as well as in pine-cypress, juniper and annual grassland habitats. Ranges up to 4,000 feet amsl in the Sierra Nevada foothills, and up to 6,000 feet amsl in the mountains of southern California (CDFW 2018b). | Y | Suitable habitat present. There are ten known occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx<br><br>California Department of Fish and Wildlife (CDFW). 2018a. California Department of Fish and Wildlife California Natural Diversity Database |
| *Salvadora hexalepis virgultea* | coast patch-nosed snake | - | SSC | - | - | Inhabits semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains at elevations from below sea level to around 7,000 feet amsl (Nafis 2018). | Y | Suitable habitat present. Study area overlaps with species range (Nafis 2018). | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/ |
| *Thamnophis hammondii* | two-striped gartersnake | - | SSC | BLMS | FSS | Found around pools, creeks, cattle tanks, and other water sources, often in rocky areas, in oak woodland, chaparral, brushland and coniferous forest (Nafis 2018). Highly aquatic. Associated with permanent and semi-permanent water bordered by dense vegetation in a variety of habitats from sea level to 8,000 feet amsl (LP ForestWatch 2013). | Y | Suitable habitat present, may occur in study area. See Section 5.3 for more information. | Nafis, Gary. 2018. California Herps: A Guide to Reptiles and Amphibians of California. http://www.californiaherps.com/<br><br>Los Padres ForestWatch (LP ForestWatch). 2013. Two-striped garter snake. Available online: < https://lpfw.org/our-region/wildlife/two-striped-garter-snake/>. Accessed November 12, 2018. Last updated 2013. Los Padres ForestWatch. Santa Barbara, CA. |
| **Birds** | | | | | | | | | |
| *Accipiter gentilis* | northern goshawk | - | SSC | BLMS | FSS | Mature and old-growth forests including Pacific Ponderosa pine, Jeffrey pine, Lodgepole pine, mixed conifer, Douglas-fir, mixed Redwood-Doulas-fir hardwood, and quaking aspen. Occurs in North Coast Ranges through Sierra Nevada, Klamath, Cascade, and Warner Mts., in Mt. Pinos and San Jacinto, San Bernardino, and White Mts. (Shuford and Gardali 2008). | Y | Suitable habitat present. Study area adjacent to species range (CDFW 2018a). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni<br><br>California Department of Fish and Wildlife (CDFW). 2018a. California Department of Fish and Wildlife California Natural Diversity Database |
| *Agelaius tricolor* | tricolored blackbird | - | SCE, SSC | BLMS | - | Preferred nesting habitat includes cattails, bulrushes, Himalayan berry, and agricultural silage. Dense vegetation is preferred but heavily lodged cattails not burned in recent years may preclude settlement. Need access to open water. Strips of emergent vegetation along canals are avoided as nest sites unless they are about 10 or more m wide but in some ponds, especially where associated with Himalayan blackberries and deep water, settlement may be in narrower fetches of cattails. (Hamilton 2004). | Y | Suitable habitat present. CNDDB occurrences in the study area in addition to several sightings around Quail Lake (CDFW 2018a; DWR, per comm., May 15, 2018). | Hamilton, W. J. 2004. Tricolored Blackbird (Agelaius tricolor). In The Riparian Bird Conservation Plan:a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. \| CDFW. 2017. California Wildlife Habitat<br><br>California Department of Fish and Wildlife (CDFW). 2018a. California Department of Fish and Wildlife California Natural Diversity Database |
| *Ammodramus savannarum* | grasshopper sparrow | - | SSC | - | - | Frequents dense, dry or well-drained grassland, especially native grassland with a mix of grasses and forbs for foraging and nesting. Uses scattered shrubs for singing perches (CDFW 2018b). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Aquila chrysaetos* | golden eagle | BGEPA | FP | BLMS | - | Habitat includes rolling foothills and mountain terrain, wide arid plateaus deeply cut by streams and canyons, open mountain slopes, and cliffs and rock outcrops. Uncommon resident and migrant throughout California, except the center of the Central Valley. (CDFW 2018b). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Asio flammeus* | short-eared owl | - | SSC | - | - | Found in open, treeless areas with elevated sites for perches, and dense vegetation for roosting and nesting. Associated with perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands. Breeds in coastal areas in Del Norte and Humboldt Counties, San Francisco Bay Delta, northeastern Modoc plateau, east Sierras from Lake Tahoe to Inyo County and San Joaquin Valley. Winters in the Central Valley, western Sierra Nevada foothills and along the coastline (CDFW 2018b). | Y | Study area does not overlap with breeding range (CDFW 2018b); however, suitable wintering habitat is present. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Asio otus* | long-eared owl | - | SSC | - | - | Riparian habitat required; also uses live oak thickets and other dense stands of trees. Found in dense conifer stands at high elevations (CDFW 2018b). | Y | Suitable habitat present and study area falls within breeding range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |

## Appendix N - CWHR Species Summary Table

| Scientific Name | Common Name | USFWS | CDFW | BLM | USFS | Habitat Characteristics | Potential | Rationale | Citation |
|---|---|---|---|---|---|---|---|---|---|
| *Athene cunicularia* | burrowing owl | - | SSC | BLMS | - | Nesting habitat includes open areas with mammal burrows, including rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub, vacant lots and human disturbed lands. Soils must be friable for burrows (Bates 2006). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | Bates, C. 2006. Burrowing Owl (Athene cunicularia). In The Draft Desert Bird Conservation Plan: a strategy for reversing the decline of desert-associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/htmldocs/desert.html |
| *Aythya americana* | redhead | - | SSC | - | - | Usually nest in freshwater emergent wetlands where dense stands of cattails (*Typha* spp.) and tules (*Schoenoplectus* spp.) are interspersed with areas of deep, open water. Also observed nesting in somewhat alkaline marshes and potholes (Shuford and Gardali 2008). | Y | Suitable habitat present. Study area overlaps with species range (Shuford and Gardali 2008). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Buteo swainsoni* | Swainson's hawk | - | ST | BLMS | - | Nests in stands with few trees in riparian areas, juniper-sage flats, and oak savannah. Forages in adjacent grasslands, agricultural fields and pastures. Breeding resident and migrant in the Central Valley, Klamath Basin, Northeastern Plateau, Lassen County, and Mojave Desert. Very limited breeding reported from Lanfair Valley, Owens Valley, Fish Lake Valley, and Antelope Valley (CDFW 2018b). | Y | This species restricted to valleys and deserts. Occurs in Central Valley to the north of the study area and the Antelope Valley to the east; however, unlikely to occur in mountainous areas (CDFW 2018a). Potential to nest near Quail Lake, and potential for foraging elsewhere. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Campylorhynchus brunneicapillus sandiegensis* | coastal cactus wren | - | SSC | - | - | Frequents desert succulent shrub, Joshua tree and desert wash habitats. Found in arid parts of westward-draining slopes of southern California. Nests in cholla or other large, branching cactus, in yucca, or in stiff-twigged, thorny shrub or small tree (Shuford and Gardali 2008). | N | Study area outside of species range (CDFW 2018b). | Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. |
| *Charadrius alexandrinus nivosus* | western snowy plover | FT | SSC | - | - | Coastal populations nest on dune-backed beaches, sand spits, beaches at creeks and river mouths, and salt pans at lagoons and estuaries (USFWS 2007). Inland populations nest along barren to sparsely vegetated flats and along shores of alkaline and saline lakes, reservoirs, ponds, braided river channels, agricultural wastewater ponds, and salt evaporation ponds (Shuford and Gardali 2008). Inland nesting areas occur at the Salton Sea, Mono Lake,and at isolated sites on the shores of alkali lakes in northeastern California, in the Central Valley, and southeastern deserts (CDFW 2018b). | N | Study area outside of species range (CDFW 2018b). | USFWS. 2007. Recovery Plan for the Pacific Coast Population of the Western Snowy Plover (Charadrius alexandrinus nivosus). In 2 volumes. USFWS; Sacramento, CA. xiv + 751 pages. \| Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Spe |
| *Charadrius montanus* | mountain plover | - | SSC | BLMS | - | Frequents open plains with low, herbaceous or scattered shrub vegetation below 3,200 feet amsl (CDFW 2018b). | Y | Suitable wintering habitat present. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Circus hudsonius* | northern harrier | - | SSC | - | - | Nest on the ground in patches of dense, tall vegetation in undisturbed areas. Breed and forage in variety of open habitats such as marshes, wet meadows, weedy borders of lakes, rivers and steams, grasslands, pastures, croplands, sagebrush flats and desert sinks (Shuford and Gardali 2008). | Y | Suitable habitat present. DWR observations in study area (DWR, pers. comm., May 15, 2018). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Coccyzus americanus occidentalis* | western yellow-billed cuckoo | FT | SE | BLMS | FSS | Requires large, dense tracts of riparian woodland with well-developed understories. Occurs in deciduous trees or shrubs. Prefers willow, but will also nest in orchards adjacent to streams in Sacramento Valley. Restricted to moist habitats along slow-moving waterways during breeding season (CDFW 2018b). | Y | Outside known species range. See Section 5.4.3 for more information. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Contopus cooperi* | olive-sided flycatcher | - | SSC | - | - | Preferred habitat is forest and woodland, with adjacent meadows, lakes or open terrain for foraging. Occurs throughout California exclusive of the deserts, the Central Valley, and other lowland valleys and basins (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Cypseloides niger* | black swift | - | SSC | - | - | Breeding sites are very specific: behind or beside permanent or semipermanent waterfalls, on perpendicular cliffs near water and in sea caves. Breeds very locally in the Sierra Nevada and Cascade Range, the San Gabriel, San Bernardino, and San Jacinto Mts., and in coastal bluffs and mountains from San Mateo County south to San Luis Obispo County (Shuford and Gardali 2008). | N | Suitable habitat not present. | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Dendragapus fuliginosus howardi* | Mount Pinos sooty grouse | - | SSC | - | - | All records in southern portion of species range appear to be from *Abies/Pinus* (fir/pine) forest; however, Likely utilize surrounding shrublands as well (Shuford and Gardali 2008). | N | Study area outside current known species range. Thought to be extirpated from southern edge of range near study area (Shuford and Gardali 2008). | Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. |
| *Elanus leucurus* | white-tailed kite | - | FP | BLMS | - | Occurs in herbaceous and open stages of valley lowland habitats, usually near agricultural land. Forages in undisturbed, open grasslands, meadows, farmlands and emergent wetlands (cDFW 2018b). Typically nest in the upper third of trees that may be 10–160 ft. (33-525 m.) tall. These can be open-country trees growing in isolation, or at the edge of or within a forest (Cornell 2018). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | Cornell Lab of Ornithology (Cornell). 2018. White-Tailed Kite. Available online: <https://www.allaboutbirds.org/guide/White-tailed_Kite/id>. Accessed November 21, 2018. Last updated 2017. Cornell Lab of Ornithology. Ithica, NY. |
| *Falco peregrinus anatum* | American peregrine falcon | FD | SD, FP | - | - | Breeds near wetlands lakes, rivers, or other waters on cliffs, banks, dunes or mounds, mostl yin woodland, forest and coastal habitats. Nest is a scrape on a depression or ledge in an open site. May use man-made structures, snags, or trees for nesting (CDFW 2018b). | Y | Study area does not overlap with breeding range (CDFW 2018b); however, suitable wintering habitat is present. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Gavia immer* | common loon | - | SSC | - | - | Commonly found in estuarine and subtidal marine habitats along entire coast. Also less commonly found on large, deep lakes in valleys and foothills throughout the state. May rarely breed in large mountain lakes (CDFW 2018b). | Y | Suitable habitat present. Portions of study area overlap with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Gymnogyps californianus* | California condor | FE | SE, FP | - | - | Chaparral, coniferous forest and oak savannah in southern and central California. Nest in cliff cavities, large rock outcrops, or large trees. Roost on large liffs or trees near feeding areas (USFWS 1996). | Y | Known to occur in the study area. See Section 5.4.3 for more information. | USFWS. 1996. Recovery Plan for the California Condor. USFWS; Portland, OR. |
| *Haliaeetus leucocephalus* | bald eagle | BGEPA, FD | SE, FP | BLMS | FSS | Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine. Requires large bodies of water or rivers with abundant fish, and adjacent snags. Permanent resident, and uncommon winter migrant, now restricted to breeding mostly in Butte, Lake, Lassen, Modoc, Plumas, Shasta, Siskiyou, and Trinity cos. About half of the wintering population is in the Klamath Basin (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Icteria virens* | yellow-breasted chat | - | SSC | - | - | Nest in early-successional riparian habitats with a well-developed shrub layer and an open canopy. Restricted to narrow border of streams, creeks, sloughs and rivers. Often nest in dense thicket plants such as blackberry and willow (Shuford and Gardali 2008). | Y | Suitable habitat present. Study area overlaps with summer species range (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Ixobrychus exilis* | least bittern | - | SSC | - | - | Common summer resident at Salton Sea and Colorado River in dense emergent wetlands near freshwater and in desert riparian (saltcedar scrub). Likely nests only in emergent wetlands. Rare in deserts and coastal lowlands (CDFW 2018b). | N | Study area outside known species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Lanius ludovicianus* | loggerhead shrike | - | SSC | - | - | Breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground (Shuford and Gardali 2008). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Pelecanus erythrorhynchos* | American white pelican | - | SSC | - | - | In California, nests only in large lakes in Klamath Basin. Roosts along water edges, beaches, sandbars, or old driftwood (Shuford and Gardali 2008). | Y | Suitable roosting habitat present. | Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. |
| *Pelecanus occidentalis californicus* | California brown pelican | FD | SD, FP | BLMS | FSS | Warm coastal marine and estuarine environments. Rare inland. Breeds primarily on islands (Cornell 2018). | N | Outside species range. Typically is restricted to coast. | Cornell Lab of Ornithology (Cornell). 2018. Whit-Tailed Kite. Available online: <https://www.allaboutbirds.org/guide/White-tailed_Kite/id>. Accessed November 21, 2018. Last updated 2017. Cornell Lab of Ornithology. Ithica, NY. |
| *Piranga rubra* | summer tanager | - | SSC | - | - | Breed primarily in mature riparian woodland with extensive cottonwood canopy, some records of orchard nesting. Need tall, shady trees (Shuford and Gardali 2008). | N | Study area outside known species range (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Polioptila californica californica* | coastal California gnatcatcher | FT | SSC | - | - | Scrub dominated plant communities, strongly associated with coastal scrub, sage scrub, and coastal succulent scrub communities. Distribution ranges from southern Ventura County down through Los Angeles, Orange, Riverside, San Bernadino and San Diego counties (USFWS 2010). | Y | Suitable habitat present. See Section 5.4.3 for more information. | USFWS. 2010. Coastal California Gnatcatcher (Polioptila californica californica) 5-year Review: Summary and Evaluation. USFWS; Carlsbad, CA. |

## Appendix N - CWHR Species Summary Table

| Scientific Name | Common Name | USFWS | CDFW | BLM | USFS | Habitat Characteristics | Potential | Rationale | Citation |
|---|---|---|---|---|---|---|---|---|---|
| *Pooecetes gramineus affinis* | Oregon vesper sparrow | - | SSC | - | - | Obligate grassland species. Open ground with little vegetation or short grass and low annuals, including stubble fields, meadows and road edges (Shuford and Gardali 2008). | Y | Study area does not overlap with breeding range; however, study area is adjacent to wintering range and this species may occur (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Pranga rubra* | summer tanager | - | SSC | - | - | Breed primarily in mature riparian woodland with extensive cottonwood canopy, some records of orchard nesting. Need tall, shady trees (Shuford and Gardali 2008). | N | Study area outside known species range (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Progne subis* | purple martin | - | SSC | - | - | Inhabits open forests, woodlands,and riparian areas in breeding season. Found in a variety of open habitats during migration, including grassland, wet meadow, and fresh emergent wetland, usually near water. In southern California, now only a rare and local breeder on the coast and in interior mountain ranges, with few breeding localities. Absent fromhigher desert regions except as a rare migrant. In northern California, an uncommon to rare local breeder on the coast and inland to Modoc and Lassen counties (CDFW 2018b). | Y | Study area on edge of known species range (CDFW 2018b). Suitable habitat present. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Pyrocephalus rubinus* | vermilion flycatcher | - | SSC | - | - | A yearlong resident along the Colorado River, especially in vicinity of Blythe, Riverside Co. Nesters inhabit cottonwood, willow, mesquite, and other vegetation in desert riparian habitat adjacent to irrigated fields, irrigation ditches, pastures and other open, mesic areas in isolated patches throughout central southern California (CDFW 2018b). | N | Study area outside known species range (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| *Riparia riparia* | bank swallow | - | ST | BLMS | - | Riparian areas with sandy, vertical bluffs or riverbanks. Also nest in earthen banks and bluffs, as well as sand and gravel pits (Shuford and Gardali 2008). | Y | Study area outside CDFW species range map (CDFW 2018b); however there are several occurrences in the region, including along the Santa Clara River to the south. (CDFW 2018a). Gorman Creek and other waterways in the study area have very steep, deep vertical banks that provide suitable habitat for this species. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Rynchops niger* | black skimmer | - | SSC | - | - | Requires calm, shallow water for foraging, and sand bars, beaches, or dikes for roosting and nesting (Shuford and Gardali 2008). | N | Study area outside known species range (CDFW 2018b). | Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. |
| *Setophaga petechia* | yellow warbler | - | SSC | - | - | Breeding occurs from the coast range in Del Norte county, east to the Modoc plateau, south along the coast range to Santa Barbara and Ventura counties, and along the western slope of the Sierra Nevada south to Kern County (CDFW 2018b). | Y | Suitable habitat present. Observed during 2018 studies. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Strix occidentalis occidentalis* | California spotted owl | - | SSC | BLMS | FSS | Forests and woodlands with large mature trees and snags containing a high basal area, dense canopy (>70%) cover, multiple canopy layers, and downed woody debris. Breeding range extends west of the Cascade Range through the North Coast Ranges, the Sierra Nevada, and in more localized areas of the Transverse and Peninsular Ranges. May move downslope in winter along the eastern and western slopes of the Sierra Nevada, and in other areas. (Shuford and Gardali 2008). | Y | Suitable habitat present. Activity centers and observations in and adjacent to the study area (CDFW 2018b. | Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento. |
| *Toxostoma lecontei* | Le Conte's thrasher | - | SSC | - | - | Occurs primarily in open desert wash, desert scrub, alkali desert scrub and desert succulent shrub habitats (CDFW 2018b). | Y | On the edge of species range. Joshua tree habitat present. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Vireo bellii pusillus* | least Bell's vireo | FE | SE | - | - | Obligate riparian breeder. Cottonwood willow, oak woodlands, and mule fat scrub along watercourses (USFWS 1998). | Y | Suitable habitat present. See Section 5.4.3 for more information. | USFWS. 1998. Least Bell's Vireo 5-Year Review. USFWS; Carlsbad, CA. |
| *Vireo vicinior* | gray vireo | - | SSC | BLMS | FSS | Breed in mature, arid chaparral, or open pinyon-juniper woodland mixed with chapparal, desert scrub, or sagebrush (Winter and Hargrove 2004). | Y | Suitable habitat present. Portions of study area overlap with species range (CDFW 2018b). | Winter, K and L. Hargrove. 2004. Gray Vireo (Vireo vicinior). In The Coastal Scrub and Chaparral Bird Conservation Plan: a strategy for protecting and managing coastal scrub and chaparral habitats and associated birds in California. California Partners in |
| *Xanthocephalus xanthocephalus* | yellow-headed blackbird | - | SSC | - | - | Nest in marshes with tall, emergent vegetation (e.g., tules and cattails) adjacent to deepwater (Shuford and Gardali 2008). | Y | Suitable habitat present. Study area adjacent to summer species range (CDFW 2018b). | Shuford, W.D. and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation in California. Studies of Western Birds 1. Western Field Orni |
| **Mammals** | | | | | | | | | |
| ***Bats*** | | | | | | | | | |
| *Antrozous pallidus* | pallid bat | - | SSC | BLMS | FSS | Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings (CDFW 2018b). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Corynorhinus townsendii* | Townsend's big-eared bat | - | SSC | BLMS | FSS | Cave-dwelling, also roosts in old mine-workings, occasionally found in buildings. Population concentrations in areas with cavity-forming rock and in old mining districts (Bolster 1998). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | Bolster, B.C., editor. 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Report submitted to California Department of Fish and Game Wild |
| *Euderma maculatum* | spotted bat | - | SSC | BLMS | - | The known species range covers British Columbia south through eastern Oregon and Washington to Montana and south through Wyoming, Colorado and New Mexico to the east and eastern California and Nevada to the west (Gervais 2016). Individuals are nocturnal and known to utilize crevices and caves for roosting. Additionally, they are known to use conifer and aspen stands for night roosting. Meadows, riparian areas, shrub-steppe, and open stands of forest are typical foraging habitat (Gervais 2016). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | Gervais, Jennifer. 2016. *Conservation Assessment for the Spotted Bat (Euderma maculatum) in Oregon and Washington.* Oregon Wildlife Institute. Corvallis, OR. |
| *Eumops perotis californicus* | western mastiff bat | - | SSC | BLMS | - | Open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, annual and perennial grasslands, palm oases, chaparral, desert scrub, and urban areas. Roosts in crevices on vertical cliff faces, high buildings, trees, and tunnels (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Lasiurus blossevillii* | western red bat | - | SSC | - | - | Roosting habitat includes forests and woodlands, often in edge habitats adjacent to streams, fields, or urban areas (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Lasiurus xanthinus* | western yellow bat | - | SSC | - | - | Associated with palm trees in valley foothill riparian, desert riparian, desert wash and palm oasis habitats below 2,000 ft (CDFW 2018b). | N | Palm tree oases not present in study area. | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Macrotus californicus* | California leaf-nosed bat | - | SSC | BLMS | - | The species is nocturnal and individuals are known to forage close to the ground in a hovering fashion. The species feeds on flying insects taken from vegetation or off the ground. Individuals inhabit lowland desert scrub and are known to roost in caves and abandoned mine tunnels during the day, while night roosts include buildings, rock, porches, mines, and caves (NatureServe 2018). Night roosts are typically separate from those used during winter (NatureServe 2018). Long migrations are not typical, but small seasonal roost changes are known to occur (NatureServe 2018). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018. |
| *Myotis ciliolabrum* | small-footed myotis | - | - | BLMS | - | The species is common in arid regions of California. Known ranges include Contra Costa County south, the west side of the Sierra Nevada, various areas of the Great Basin, and areas of Modoc, Kern, and San Bernardino Counties (CDFW 2018a). Individuals are nocturnal and typically inhabit arid upland locations, preferring open stands of forest and brush near water sources. Individuals are known to shelter and roost in small groups of 50 plus in mines, natural crevices, buildings, caves and bridges (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Myotis evotis* | long-eared myotis | - | - | BLMS | - | The species is uncommon throughout its known range, although it is known to be widespread throughout California (CDFW 2018a). Unlike similar species, the long-eared myotis avoids arid regions and is know to occur along the California coast, parts of the Great Basin, as well as the Sierra Nevada and Tehachapi mountain ranges. The long-eared myotis forages fairly close to the ground on insects, with a special attraction to beetles, in open stands of trees, shrubs, and over water sources (CDFW 2017). The species is known to roost singly or in very small groupings within infrastructure, behind tree bark or snags, and in caves. Feeding habits include foraging in open areas along habitat edges and over water (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Myotis thysanodes* | fringed myotis | - | - | BLMS | FSS | Widespread in California, occurring in all but the Central Valley and Colorado and Mojave deserts. It occurs in a wide variety of habitats; records range in elevation from sea level to 2850 m (9350 ft) in New Mexico (Barbour and Davis 1969). Optimal habitats are pinyon-juniper, valley foothill hardwood and hardwood-conifer, generally at 4000-7000 ft (1300-2200m). (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | Barbour, R. W., and W. H. Davis. 1969. Bats of America. Univ. of Kentucky Press, Lexington. 286pp. \| Zeiner, D.C., W.F.Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sac |
| *Myotis yumanensis* | Yuma myotis | - | - | BLMS | - | Yuma myotis is known to be widespread and extremely common in California, occurring from sea level to 11,000 ft in elevation. Preferred habitats include open woodlands and forests with adequate access to water. The species is known to feed heavily over water on small insects using echolocation. Individuals are known to roost in various infrastructures, mines, caves, and other natural crevices. Maternity roosts typically consist of several thousand females and young in similar roost locations with preferred temperatures no greater than 40°C (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |

## Appendix N - CWHR Species Summary Table

| Scientific Name | Common Name | USFWS | CDFW | BLM | USFS | Habitat Characteristics | Potential | Rationale | Citation |
|---|---|---|---|---|---|---|---|---|---|
| ***Other Mammals*** | | | | | | | | | |
| *Ammospermophilus nelsoni* | Nelson's antelope squirrel | - | ST | BLMS | - | Species known to occur in desert, grassland, and other herbaceous habitats. Species typically burrows in soil. Habitat consists of dry terrain with marginal slopes, on alluvial to loamy soils (NatureServe 2018). | N | Study area outside known species range (CDFW 2018b). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018. |
| *Bassaricus astutus* | ringtail | - | FP | - | - | Species known to inhabit arid oak woodlands, chaparral, deserts, and rocky canyons (LPFW 2013). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | https://lpfw.org/our-region/wildlife/ring-tailed-cat/ |
| *Chaetodipus californicus femoralis* | Dulzura pocket mouse | - | SSC | - | - | Variety of habitats including chaparral, grassland and coastal sage scrub (CDFW 2018b). | N | The only occurrences north of Los Angeles are in Ventura. Species not known from study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Chaetodipus fallax fallax* | northwestern San Diego pocket mouse | - | SSC | - | - | Sandy herbaceous areas in coastal scrub, chaparral, sagebrush, deserts scrub and washes, and annual grassland (CDFW 2018b). | N | Study area outside known species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Chaetodipus fallax pallidus* | pallid San Diego pocket mouse | - | SSC | - | - | Species perfers sandy, somewhat herbaceous areas with some rock and gravel present. In San Diego County, individuals occur in arid coastal areas (CDFW 2018b). | N | In Los Angeles County, species is restricted to desert areas south of Palmdale (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Dipodomys nitratoides nitratoides* | Tipton kangaroo rat | FE | SE | - | - | Species known on the west side of the San Joaquin Valley. Prefers sandy loam soils with finer particulates with minimal annual grasses and forbs (CDFW 2018b). | N | Outside known species range. Does not occur south of Central Valley (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Dipodomys stephensi* | Stephens' kangaroo rat | FE | ST | - | - | Often found in transition areas between grassland and coastal sage scrub habitat where perennial vegetation is sparse, including disturbed areas. Deep, friable soil is needed for burrowing. Plants commonly associated with suitable habitat are chamise, buckwheat, brome grass and filaree (CDFW 2018b). | N | Outside known species range. Not known to occur in Los Angeles County (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Lepus californicus bennettii* | San Diego black-tailed jackrabbit | - | SSC | - | - | Herbaceous and desert-shrub areas and open, early stages of forest and chaparral habitats (CDFW 2018b). | Y | Suitable habitat present. CNDDB occurrences in the study area (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
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| *Neotoma lepida intermedia* | San Diego desert woodrat | - | SSC | - | - | Common to abundant in Joshua tree,pinyon-juniper, mixed and chamise-redshank chaparral, sagebrush, and most desert habitats. Also found in a variety of other habitats. Moderate to dense canopies preferred. Desert woodrats are particularlyabundant in rock outcrops and rocky cliffs and slopes. Most abundant in rocky areas with Joshua trees. Elevational range from sea level to 8,500 feet amsl (CDFW 2018b). | N | Outside known species range. Does not occur north of Santa Monica and San Gabriel mountains (CDFW 2018a). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Neotoma macrotis luciana* | Monterey dusky-footed woodrat | - | SSC | - | - | Occurs in coastal California from Monterey Bay to Morro Bay. Associated with riparian, forest/woodland, and shrubland/chaparral habitats (NatureServe 2018). | N | Outside known species range. Restricted to central California coast (CDFW 2018a). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018. |
| *Onychomys torridus ramona* | southern grasshopper mouse | - | SSC | - | - | Common in California in arid desert habitats of the Mojave Desert and southern Central Valley including alkalie desert scrub and desert scrub. Lower population densities in succulent shrub, wash and riparian areas (CDFW 2017). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Ovis canadensis nelsoni* | San Gabriel Mountains bighorn sheep | FE | FT, FP | - | - | Inhabit areas with steep mountain slopes and cliffs so they can evade predators. Cliffs are often near open grazing areas where the sheep can graze with good visibility and flee to the safety of the cliffs or "escape habitat" when threatened (LP ForestWatch 2013). | N | Outside known species range. Occurs in Mojave Desert, east of the Sierra Nevada, and the San Gabriel Mountains (CDFW 2018a). Some transplanted individuals likely still surviving in Sespe Wilderness to the east of the study area (LP Forestwatch 2013). | Los Padres ForestWatch (LP ForestWatch). 2013. Species Accounts. Accessed November 12, 2018. Last updated 2013. Los Padres ForestWatch. Santa Barbara, CA. |
| *Perognathus alticolus inexpectatus* | Tehachapi pocket mouse | - | SSC | - | FSS | The known range spans from Tehachapi Pass, west to Mount Pinos, and south to Quail Lake, varying from 3,380 to 6,000 feet in elevation. The species is rare and not widespread. The preferred habitat for the species near Mount Pinos includes grassy flats and yellow pine forests. Additionally, it is known to occur in various rangelands and chaparral (Bolster 1998). | Y | CNDDB occurrences in study area (CDFW 2018a). | Bolster, B.C., editor. 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Report submitted to California Department of Fish and Game Wild |
| *Perognathus inornatus inornatus* | San Joaquin pocket mouse | - | - | BLMS | - | The San Joaquin pocket mouse prefers dry, grassy, open fields in annual grasslands, desert-scrub, and savannas. On the east side of the San Joaquin valley, individuals are known to occur in low density up to 1500 ft in elevation (NatureServe 2018). The species is known to burrow and feeds on various grass seeds, forbs, and other vegetative varieties (NatureServe 2018). | Y | Occurrence in adjacent to study area Hungry Valley (CDFW 2018a). | NatureServe. 2018. NatureServe Explorer – Online Database. Available online: < http://explorer.natureserve.org>. Accessed November 8, 2018. |
| *Perognathus longimembris brevinasus* | Los Angeles pocket mouse | - | SSC | - | - | Low elevation grasslands, alluvial sage scrub, and coastal sage scrub (Bolster 1998). | N | Outside known species range. Does not occur north of San Gabriel Mountains (CDFW 2018a). | Bolster, B.C., editor. 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report prepared by P.V. Brylski, P.W. Collins, E.D. Pierson, W.E. Rainey and T.E. Kucera. Report submitted to California Department of Fish and Game Wild |
| *Tamias speciosus callipeplus* | Mount Pinos lodgepole chipmunk | - | - | - | FSS | Lodgepole chipmunk prefers lodgepole, mixed conifer, and Jeffrey pine forests with open canopy ranging in elevation from 6,000 to 10,350 ft in elevation (CDFW 2018a). The species feeds on various grasses and forbs, berries, fungus, and some invertebrates (CDFW 2018a). The lodgepole chipmunk is known to nest in small cavities within vegetation, as well as burrows underground (CDFW 2018a). | N | Outside known species range. Found only on the upper slopes and summits of Mount Pinos, Cerro Noreste, and Frazier Mountain in the Los Padres National Forest near the Kern/Ventura county line (CDFW 2018b; LP Forestwatch 2013). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Taxidea taxus* | American badger | - | SSC | - | - | Open shrub, forest and herbaceous habitats with friable soils. Associated with treeless regions, prairies, park lands and cold desert areas. Range includes most of California, except the North Coast (CDFW 2018b). | Y | Suitable habitat present. Study area overlaps with species range (CDFW 2018b). | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |
| *Vulpes macrotis mutica* | San Joaquin kit fox | FE | ST | - | - | Occur in desert-like habitats characterized by sparse or absent shrub cover, sparse ground cover, and short vegetative structure. Areas having open, level, sandy ground (USFWS 2010b). | N | Outside known species range. See Section 5.4.3 for more information. | USFWS. 2010. San Joaquin Kit Fox 5-Year Review. USFWS; Sacramento, CA. |
| *Xerospermophilus mohavensis* | Mohave ground squirrel | - | ST | BLMS | - | Optimal habitats are open desert scrub, alkali desert scrub, and Joshua tree. Prefers sandy to gravelly soils, avoids rocky areas. Elev: 1,657-5,003 feet amsl (CDFW 2018b). | N | Outside known species range (CDFW 2018b) | CDFW. 2018b. California Wildlife Habitat Relationships System Life History Accounts and Range Maps (online edition). CDFW Biogeographic Data Branch; Sacramento, CA. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx |

*Note: All occurrence info from CNDDB*

**Species Status Key:**

| Federal (USFWS-USFS) | State (CDFW) |
|---|---|
| BGEPA Bald and Golden Eagle Protection Act | SE Endangered |
| FE Endangered | ST Threatened |
| FT Threatened | SCE Candidate Endangered |
| FCE Candidate Endangered | SCT Candidate Threatened |
| FCT Candidate Threatened | SCD Candidate for delisting |
| FCD Candidate for delisting | FP Fully Protected |
| FSS Forest Service Sensitive | SSC Species of Special Concern |

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# Appendix O

## *ESA-Listed Species*

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**ESA-Listed Species**

| Common Name/ Scientific Name | Status | Habitat Associations | Known Occurrences in Project Vicinity Quadrangles | Occurrence in Project Area | USFWS Recovery Plans and 5-Year Reviews |
|---|---|---|---|---|---|
| Vernal Pool Fairy Shrimp (*Branchinecta lynchi*) | FT | Branchiopod endemic to seasonally flooded landscape depressions, including vernal pools, swales, alkaline pools, and sandstone or basaltic rock pools, mostly in the Central Valley of California, but with disjunct occurrences in the Coast Ranges and Riverside County. See Section 5.4.3 for additional information. | Mint Canyon | Unknown | Recovery Plan (USFWS 2005)<br>5-Year Review (USFWS 2007) |
| Riverside Fairy Shrimp (*Streptocephalus woottoni*) | FE | Branchiopod endemic to vernal pools (mostly where multiple pools occur) and seasonally flooded alkali playas. Known occurrences in inland areas of Riverside, Orange, and San Diego Counties in California and coastal areas of San Diego County and northwestern Baja California, Mexico. One or two other occurrences in coastal Los Angeles County are described in the 5-year review as extirpated. | None | No – Project is outside of species range | Recovery Plan (USFWS 1998d)<br>5-Year Review (USFWS 2008c) |
| Santa Ana Sucker (*Catostomus santaanae*) | FT (excludes Santa Clara River and tributaries) | Fish endemic to the Los Angeles, San Gabriel, Santa Ana, and Santa Clara River systems. In the lower Santa Clara River system hybridizes with Owens sucker (*C. fumeiventris*). Found mostly in permanent streams less than 25 feet wide and with coarse substrates.<br>Populations of Santa Ana sucker in the Santa Clara River and its tributaries, including Piru Creek and Castaic Creek, which were previously regarded as introduced are not included in the final rule listing the species as threatened (65 FR 19686). | Val Verde, Piru, Newhall, and Cobblestone Mountain | Occurs in Piru Creek below Pyramid Lake and in Castaic Creek, but is not listed as FT in these streams | Recovery Plan (USFWS 2017b)<br>5-Year Review (USFWS 2011d) |
| Unarmored Threespine Stickleback (*Gasterosteus aculeatus williamsonii*) | FE, SE, SFP | Small fish found mostly native to perennial headwaters of the Santa Clara, Los Angeles, San Gabriel, and Santa Ana Rivers. Isolation at most times from mainstem streams is important to exclude armored forms of threespine stickleback and larger, predatory fish. See Section 5.4.3 for additional information. | Green Valley, Piru, Newhall, and Mint Canyon, Warm Springs Mountain | No – May occur in upper San Francisquito Creek where the taxon has been recently reintroduced, but not in the Project area. | Recovery Plan (USFWS 1985)<br>5-Year Review (USFWS 2009e) |
| Southern California Steelhead Distinct Population Segment (DPS) (*Oncorhynchus mykiss*) | FE | "Steelhead" is the name commonly applied to the anadromous form of *O. mykiss*. Relatively small numbers of returning steelhead have been recorded each year at the Vern Freeman Diversion Dam on the Santa Clara River. Steelhead spawning habitat is mostly associated with upper stream reaches and tributaries where cool, clean, well-oxygenated water occurs.<br>Redds are located in areas with small- to medium-sized gravel substrates free of excessive silt. Juveniles may remain in freshwater, mature, and eventually spawn in freshwater or out-migrate after one or more years. The Southern California DPS inhabits coastal drainages from the Santa Maria River in San Luis Obispo County, California, down to the United States-Mexico border. | Not reported by CNDDB. Considered by NMFS to have occurred historically in the Piru Creek drainage | Santa Felicia Dam blocks all upstream steelhead migration into Piru Creek above Lake Piru. | Recovery Plan (NMFS 2012)<br>5-Year Review (NMFS 2010) |

**ESA-Listed Species (continued)**

| Common Name/ Scientific Name | Status | Habitat Associations | Known Occurrences in Project Vicinity Quadrangles | Occurrence in Project Area | USFWS Recovery Plans and 5-Year Reviews |
|---|---|---|---|---|---|
| Arroyo Toad (*Anaxyrus* [*Bufo*] *californicus*) | FE, SSC | Amphibian that breeds in low-gradient perennial and seasonal streams; forages and aestivates in associated riparian habitat; and may venture into adjacent uplands. The most robust populations occur where fluvial processes maintain sand/gravel substrates, and periodic flooding scours encroaching vegetation and restores shallow pools. Found from Monterey County, California to Baja California, Mexico in coastal streams and some inland draining streams. See Section 5.4.3 for additional information. | Black Mountain, Cobblestone Mountain, Newhall, Whitaker Peak | Yes – occurs in Piru Creek below Pyramid Lake and in Castaic Creek | Recovery Plan (USFWS 1999a)<br>5-Year Review (USFWS 2009a) |
| California Red-legged Frog (*Rana draytonii*) | FT, SSC | Amphibian that is largely aquatic except during dispersal, summer aestivation, and foraging in riparian areas. Breeds in still or slow-moving water with emergent and overhanging vegetation, including emergent wetlands, ponds, small lakes, and low-gradient stream reaches with permanent pools. Few known extant populations in southern California. See Section 5.4.3 for additional information. | Cobblestone Mountain, Warm Springs Mountain | Unknown – may occur in Piru Creek, downstream of Pyramid Lake, and in San Francisquito Creek with a known breeding site upstream of the Castaic transmission line crossing | Recovery Plan (USFWS 2002a)<br>5-Year Review (none) |
| Blunt-nosed Leopard Lizard (*Gambelia sila* [*silus*]) | FE, SE, SFP | Reptile endemic to San Joaquin Valley and adjacent foothills at elevations below 2,600 feet in open, sparsely vegetated areas of grassland and scrub. Most of the extant populations are in undeveloped areas on the Central Valley floor from Merced County to Kern County. | Lebec | No – Project is outside of species range (no known historical or extant occurrences in Los Angeles County) | Recovery Plan (USFWS 1998c)<br>5-Year Review (USFWS 2010a) |
| Mojave Desert Tortoise (*Gopherus agassizii*) | FT, ST | A large, terrestrial, burrowing turtle found in the Mojave and Sonoran Deserts north and west of the Colorado River. Habitats are primarily in creosote bush (*Larrea tridentata*) flats, less frequently on sloping ground in salt desert scrub and alluvial fans. | None | No – Project is outside of species range. In addition to information in the Recovery Plan, the species range is based on information in Germano et al. (1994) and Nussear et al. (2009) | Recovery Plan (USFWS 2011b)<br>5-Year Review (USFWS 2010c) |
| California Condor (*Gymnogyps californianus*) | FE, SE, SFP | Very large, soaring bird that seeks carrion in open habitats and nests mostly in cavities on escarpments and in hollows of old growth conifers. All wild California condors are descendants of birds removed from the wild for a captive breeding program, which continues to supplement natural breeding. See Section 5.4.3 for additional information. | Liebre Mountain, Black Mountain, Piru, Cobblestone Mountain, Whittaker Peak | Yes | Recovery Plan (USFWS 1996)<br>5-Year Review (USFWS 2013) |
| Coastal California Gnatcatcher (*Polioptila californica californica*) | FT, SSC | Non-migratory songbird associated with coastal sage scrub and less often within chaparral in coastal California to Baja California, Mexico, mostly below 2,000 feet elevation. See Section 5.4.3 for additional information. | Lebec, Mint Canyon, Newhall | Unknown – suitable habitat may be present | Recovery Plan (none)<br>5-Year Review (USFWS 2010b) |
| Southwestern Willow Flycatcher (*Empidonax traillii extimus*) | FE, SE | Migratory songbird found during the breeding season in dense, riparian thickets along streams and wetlands. Range includes southern California from Kern County south. See Section 5.4.3 for additional information. | None | Unknown – suitable habitat may be present | Recovery Plan (USFWS 2002b)<br>5-Year Review (USFWS 2017a) |

**ESA-Listed Species (continued)**

| Common Name/ Scientific Name | Status | Habitat Associations | Known Occurrences in Project Vicinity Quadrangles | Occurrence in Project Area | USFWS Recovery Plans and 5-Year Reviews |
|---|---|---|---|---|---|
| Least Bell's Vireo (*Vireo bellii pusillus*) | FE, SE | Migratory songbird found during the breeding season in dense, willow-dominated riparian habitat and adjacent chaparral in river valleys. Found historically from interior northern California to northwestern Baja California, Mexico. See Section 5.4.3 for additional information. | Val Verde, Newhall, Warm Springs Mountain. Piru | Unknown – suitable habitat may be present | Recovery Plan (USFWS 1998a)<br>5-Year Review (USFWS 2006) |
| Western Yellow-billed Cuckoo, western DPS (*Coccyzus americanus*) | FT, SE | Migratory songbird associated with large blocks of riparian habitat, which contain trees of different ages, especially large, mature trees required for nesting and foraging. As such, breeding populations generally not found on smaller streams. Winters in South America. See Section 5.4.3 for additional information. | Val Verde | No – no recent records, Project is not within species' current known range, and the species was not identified by IPaC as a concern | Recovery Plan (none)<br>5-Year Review (none) |
| San Joaquin Kit Fox (*Vulpes macrotis mutica*) | FE, ST | Small canid found associated with open, level, sandy ground where deep, sub-surface dens are inhabited. Occurs in San Joaquin Valley as far south as Kern County and northeastern Santa Barbara County. Habitats include alkali scrub/shrub and arid grasslands. | None | No – Project is outside of the species range | Recovery Plan (USFWS 1998c)<br>5-Year Review (USFWS 2010d) |
| Slender-horned Spineflower (*Dodecahema* [*Centrostegia*] *leptoceras*) | FE, SE | Annual herb (Family Polygonaceae) found on floodplain terraces and sandy benches, areas that flood infrequently. Occurrences are associated with alluvial fan scrub. See Section 5.4.3 for additional information. | Newhall, Mint Canyon | Unknown | Recovery Plan (none)<br>5-Year Review (USFWS 2010) |
| Marsh Sandwort (*Arenaria paludicola*) | FE, SE | Annual herb (Family Caryophyllaceae) found historically in scattered sites in swamps and freshwater marshes (sea level to 1,480 feet). Currently known to occur at only two sites in San Luis Obispo County, California. Some sources suggest the species may be under-reported due to misidentification. See Section 5.4.3 for additional information. | None | Unknown | Recovery Plan (USFWS 1998b, 2018b)<br>5-Year Review (USFWS 2008a) |
| Nevin's barberry (*Berberis nevinii*) | FE, SE | Perennial (evergreen) shrub (Family Berberidaceae) native to chaparral and adapted to the natural fire regime for this habitat (also in washes). Endemic to southern California in scattered occurrences in Riverside, Los Angeles, and San Bernardino Counties (mostly 1,400 to 1,700 feet in elevation, rarely to 2,000 feet). See Section 5.4.3 for additional information. | Newhall, Warm Springs Mountain | Unknown – assessment is complicated by horticultural introductions | Recovery Plan (none)<br>5-Year Review (USFWS 2009b) |
| Gambel's Watercress (*Nasturtium* [*Rorippa*] *gambelii*) | FE, ST | Perennial herb (Family Brassicaceae) found historically at scattered sites in freshwater marshes and near streams in southern California and a site in Mexico. Nearly all known populations have been extirpated, including hybridization with common watercress (*N. aquaticum*). Currently known to occur at one site in Santa Barbara County and introduced at another site in San Luis Obispo County. Some sources suggest the species may be under-reported. See Section 5.4.3 for additional information. | None | Unknown | Recovery Plan (USFWS 1998b, 2018b)<br>5-Year Review (USFWS 2011c) |

**ESA-Listed Species (continued)**

| Common Name/ Scientific Name | Status | Habitat Associations | Known Occurrences in Project Vicinity Quadrangles | Occurrence in Project Area | USFWS Recovery Plans and 5-Year Reviews |
|---|---|---|---|---|---|
| Conejo Dudleya (*Dudleya parva* [*D. abramsii* ssp. *parva*]) | FT | Succulent perennial herb (Family Crassulaceae) endemic to the western part of the Simi Hills south of the Santa Clara River between Moorpark and Thousand Oaks. Found only in a band of Conejo volcanics and growing in shallow rocky soils at the base of outcrops. | None | No – Project is outside of species range | Recovery Plan (USFWS 1999b)<br>5-Year Review (USFWS 2015) |
| Braunton's Milk-vetch (*Astragalus brauntonii)* | FE | Perennial herb (Family Fabaceae) associated with carbonate substrates (or downwash sites below carbonate substrates) in chaparral and coastal sage scrub where shrubs are sparse.<br>Appears after fire or mechanical soil disturbance, but short-lived. Known only from small disjunct areas in Simi Hills, Santa Monica Mountains, and Santa Ana Mountains in Ventura, Los Angeles, and Orange Counties (800 to 2,100 feet in elevation). | None | No – Project is outside of species range | Recovery Plan (USFWS 1999b)<br>5-Year Review (USFWS 2009c) |
| Spreading Navarretia (*Navarretia fossalis*) | FT | Annual herb (Family Polemoniaceae) occurring in vernal pools and poorly drained, seasonally flooded, alkali playas Known only from Riverside County, San Diego County, and a few sites in Los Angeles County, as well as in northwestern Baja California, Mexico (100 to 2,200 feet in elevation). See Section 5.4.3 for additional information. | Mint Canyon | Unknown | Recovery Plan (USFWS 1998d)<br>5-Year Review (USFWS 2009d) |
| Lyon's Pentachaeta (*Pentachaeta lyonii)* | FE, SE | Annual herb (Family Asteraceae) associated with rocky, clay soils in relatively open pocket grasslands transitional to shrublands within chaparral and coastal sage scrub. Does not compete well with introduced annual grasses and weeds. Currently known only from two areas of coastal California in Ventura and Los Angeles Counties (extirpated from Palos Verdes Peninsula and Santa Catalina Island) (280 to 2,060 feet in elevation). | None | No – Project is outside of species range | Recovery Plan (USFWS 1999b)<br>5-Year Review (USFWS 2008b) |
| California Orcutt Grass (*Orcuttia californica*) | FE, SE | Annual grass (Family Poaceae) endemic to deep vernal pools with clay soils in Ventura, Los Angeles, Riverside, and San Diego Counties. Typically found in the parts of vernal pools that remain wet for the longest period. See Section 5.4.3 for additional information. | Mint Canyon | Unknown | Recovery Plan (USFWS 1998d)<br>5-Year Review (USFWS 2011a) |

*Sources: CDFW 2018, USFWS 2018a*
*Note:*
*Species identified by queries for Project Vicinity quadrangles on USFWS' online Information for Planning and Consultation (IPaC) (USFWS 2018a), the California Native Plant Society (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2018), and the California Fish and Wildlife California Natural Diversity Database (CNDDB) (CDFW 2018).*
*Key:*
*FE = federal endangered, FT = federal threatened, SE = California State endangered, ST = California State threatened, SFP = California State fully protected, SSC = California State species of special concern*

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_____. 1998b. Recovery plan for marsh sandwort (*Arenaria paludicola*) and Gambel's watercress (*Rorripa gambelii*). U.S. Fish and Wildlife Service, Portland, Oregon. 50 pp.

_____. 1998c. Recovery plan for upland species of the San Joaquin Valley, California. U.S. Fish and Wildlife Service, Portland, Oregon. 319 pp.

_____. 1998d. Recovery plan for vernal pools of southern California. U.S Fish and Wildlife Service, Portland, Oregon.

_____.1996. Recovery plan for the California condor. U.S. Fish and Wildlife Service, Portland, Oregon. 62 pp.

_____. 1985. Revised recovery plan for unarmored threespine stickleback. U.S. Fish and Wildlife Service, Portland, Oregon. 80 pp.

# Appendix P

## *Project Recreation Facilities Mapbook*

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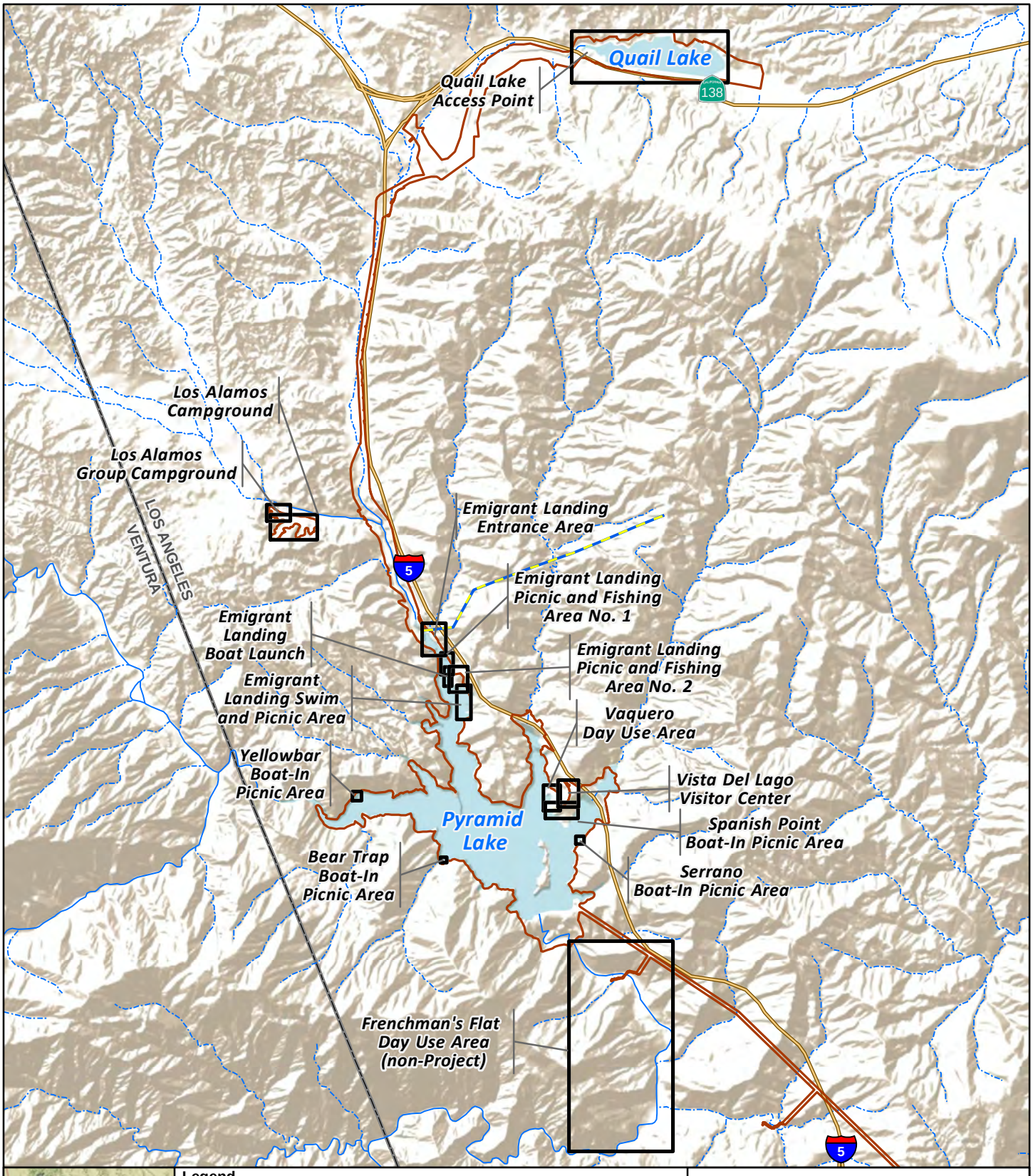




**Legend**

- Transmission Line
- Intermittent Stream/River
- Perennial Stream/River
- Major Highways
- Proposed Project Boundary (v.20190718)
- Individual Recreation Map Book Page Extent
- County Boundary

N

0 0.7 1.4 Miles

Prepared: August 2019
Projection: CA SP V NAD83 (ft)
Background: ESRI World Topo (2019)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_Index_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

# Recreation Map Book Page Index

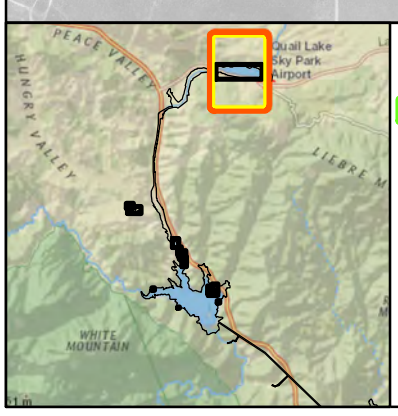
Gravel Road

Gravel Parking

Portable Restroom

Shoreline Access Trail

Gravel Road




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Portable Restroom
- Gravel Parking
- Gravel Access Road/Trail

N

0 385 770 1,540 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

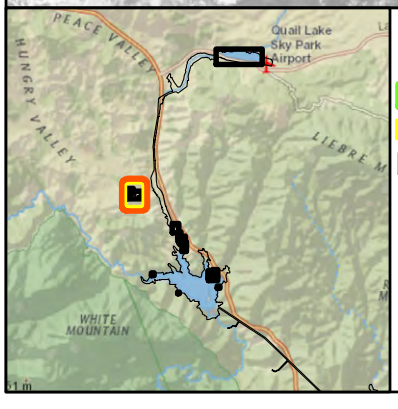
**South State Water Project Recreation Facilities**

## Quail Lake Day Use Area
## Figure 1 of 15

Hard Luck Road

Accessible Campsite

Accessible Campsite




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Campsite (Accessible)
- Gate
- Spigot
- Restroom
- Trash
- Shade Ramada
- Gravel Access Road/Trail

N

0 115 230 460 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
\\Us0349-ppfss01\shared_projects\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Los Alamos Campground

**Figure 2 of 15**

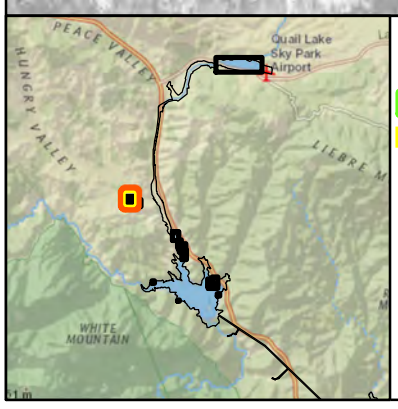
Hard Luck Road

Los Alamos Campground Loop 4

Los Alamos Campground Loop 3

Los Alamos Campground Loop 4

Los Alamos Campground Loop 4




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Group Campsite
- Gate
- Spigot
- Restroom
- Trash
- Shade Ramada
- Gravel Access Road/Trail

N

0 62.5 125 250 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Los Alamos Group Campground
# Figure 3 of 15

Boat Inspection Station

Emigrant Landing Entrance Station (Closed)

Warne Powerplant Access

German Creek E Road

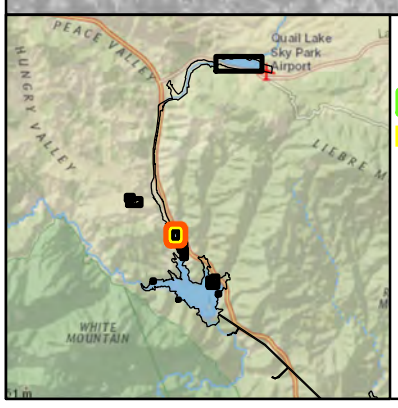
Warne Powerplant Access

Emigrant Landing Access

Boat Inspection Station

Emigrant Landing Kiosk

Emigrant Landing Parking Loop




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Building
- Entrance Building
- Kiosk
- Gate

N

0 62.5 125 250 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

**Emigrant Landing Entrance Station**
**Figure 4 of 15**

Accessible Fishing Platform

Accessible Walkway

Parking Lot A

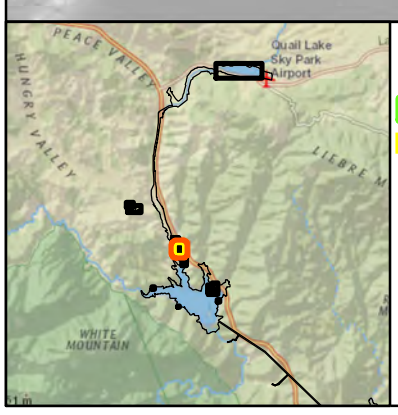
Parking Lot A

German Creek E. Road

Emigrant Landing Parking Loop

Emigrant Landing Access

Pyramid Lake Road (Emigrant Landing Access)




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Fish Cleaning Station
- Spigot
- Restroom
- Trash
- Shade Ramada
- Paved Access Road

N

0 40 80 160 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Emigrant Landing Picnic and Fishing Area No. 1

**Figure 5 of 15**

Parking Lot B

Parking Lot B

Storage Yard

Heli Pad

Administration Building and Sheriff's Office

Boat Ramps

Sheriff's Dock

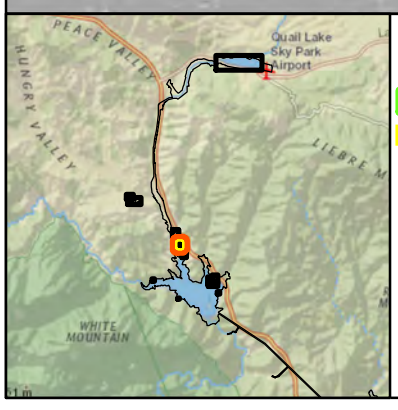
Accessible Walkway

Emigrant Landing Parking Loop

Emigrant Landing Access

Pyramid Lake Road (Emigrant Landing Access)

Emigrant Landing Parking Loop




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Spigot
- Restroom
- Boat Dock
- Paved Access Road

N

0 30 60 120 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

**Emigrant Landing Boat Launch**
**Figure 6 of 15**

Emigrant Landing Parking Loop

Emigrant Landing Parking Access

Emigrant Landing Access

Stairs

Emigrant Landing Parking Loop

Pyramid Lake Road / Emigrant Landing Access

Parking Lot C

Emigrant Landing Parking Loop

Parking Lot C

Stairs

Pedestrian Overlook

Accessible Walkway

Storage Yard

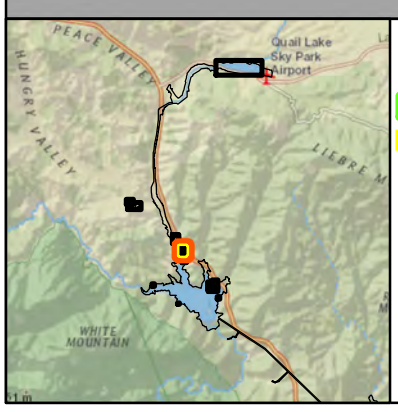
Stairs

Stairs

Concessionaire Store

Emigrant Landing Parking Loop

Emigrant Landing Parking Loop




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Concessionaire
- Spigot
- Restroom
- Trash
- Boat Dock
- Shade Ramada
- Paved Access Road

N

0 50 100 200 Feet

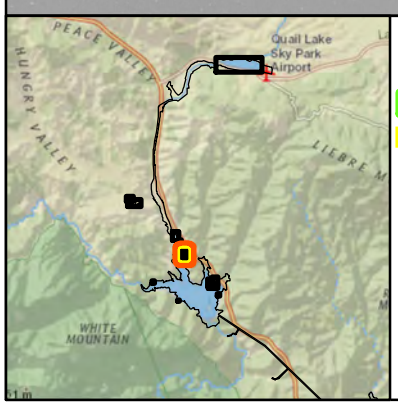
Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

## Emigrant Landing Picnic and Fishing Area No. 2

**Figure 7 of 15**


**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Spigot
- Lifeguard Tower
- Restroom
- Trash
- Shade Ramada

N

0 62.5 125 250 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
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SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Emigrant Landing Swim and Picnic Area

**Figure 8 of 15**

Vista del Lago Parking Loop

Visitor Center

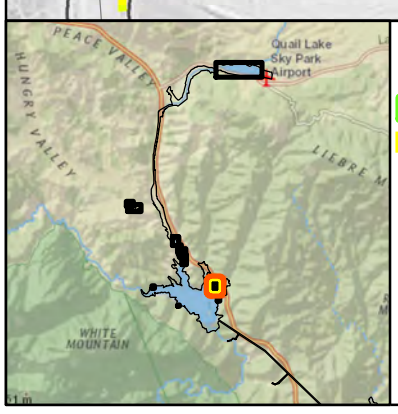
Vaquero Entrance Station

Vaquero Road

Vista del Lago Road

Spanish Point Road

Spanish Point Road




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Building
- Entrance Building
- Gate
- Trash

N

0 50 100 200 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
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SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

## Vista Del Lago Visitor Center
## Figure 9 of 15

DWR Storage Area

Boat Launch

Swim Beach

Lifeguard Tower

Stairs

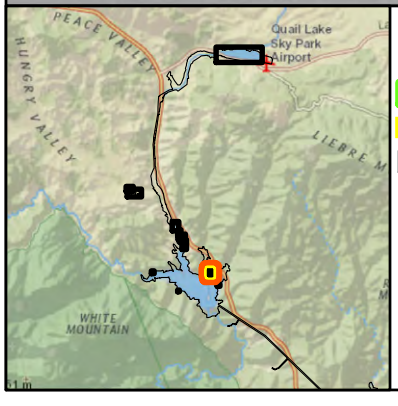
Stairs

Vaquero Parking Loop

Vaquero Road

Vista del Lago Road

Spanish Point Road




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Spigot
- Lifeguard Tower
- Restroom
- Trash
- Boat Dock
- Shade Ramada

N

0 50 100 200 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
\\Us0349-ppfss01\shared_projects\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

## Vaquero Day Use Area
## Figure 10 of 15

Vaqueros Parking Loop

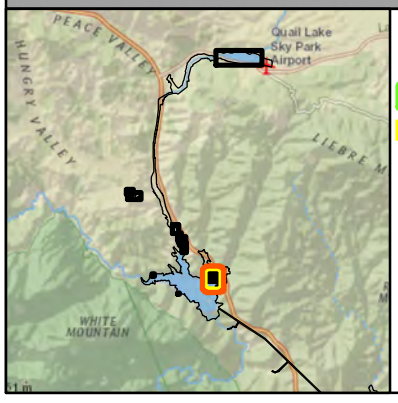
Vaqueros Road

Vista del Lago Parking Loop

Vista del Lago Road

Heli Pad

Spanish Point Road




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Adjacent Recreation Site
- Existing Recreation Plan Common Features
- Gate
- Restroom
- Trash
- Shade Ramada

N

0 85 170 340 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

## Spanish Point Boat-In Picnic Area
## Figure 11 of 15


**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Restroom
- Trash
- Boat Dock
- Shade Ramada

N

0 30 60 120 Feet

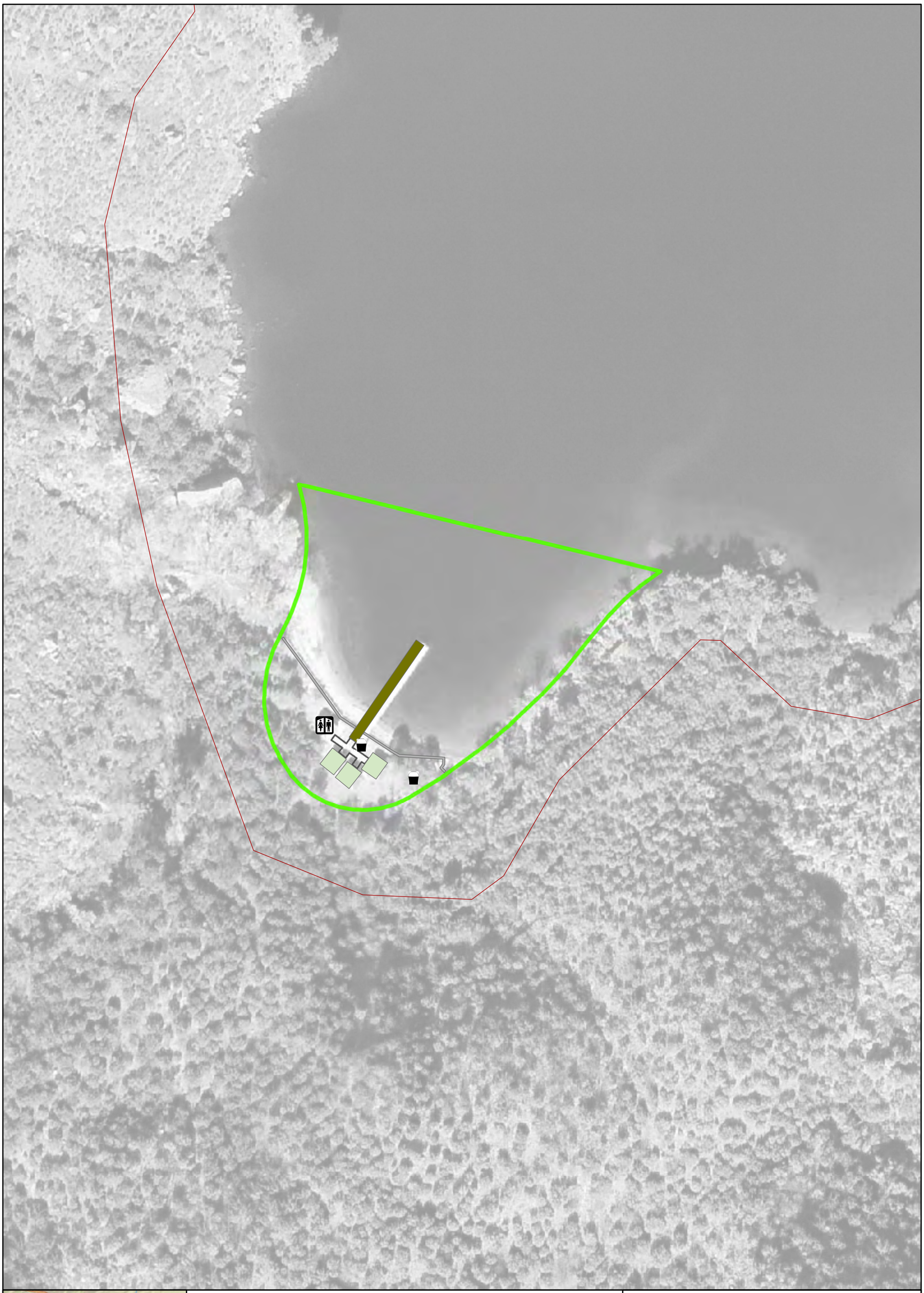
Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Serrano Boat-In Picnic Area

**Figure 12 of 15**




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Existing Recreation Plan Common Features
- Restroom
- Trash
- Boat Dock
- Retaining Wall
- Shade Ramada

N

0 30 60 120 Feet

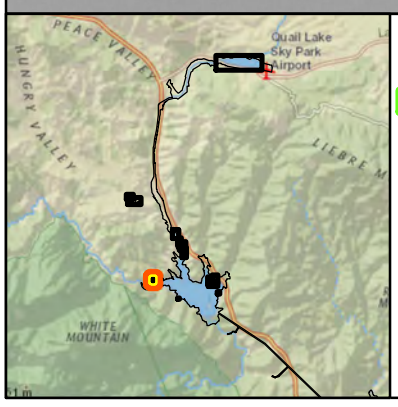
Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Bear Trap Boat-In Picnic Area
## Figure 13 of 15

Accessible
Walkway




**Legend**

- Proposed Project Boundary (v.20190718)
- Recreation Site
- Existing Recreation Plan Common Features
- Restroom
- Trash
- Boat Dock
- Retaining Wall
- Shade Ramada

N

0 30 60 120 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

## Yellowbar Boat-In Picnic Area
## Figure 14 of 15

Piru Creek

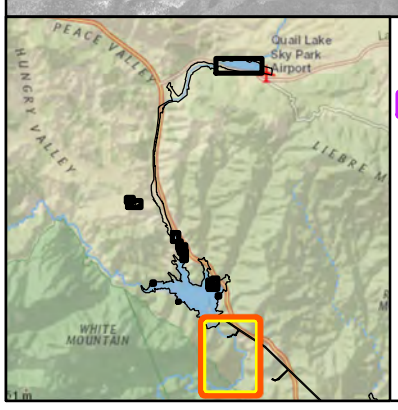
Crest Road

Adit 1 Access

(Closed to Public Vehicular Access)
Old Golden State Highway

Dispersed Campsites

Piru Creek




**Legend**

- Proposed Project Boundary (v.20190718)
- Non-Project Recreation Area
- Existing Recreation Plan Common Features
- Gate
- Restroom
- Trash

N

0 385 770 1,540 Feet

Prepared: August 2019
Projection: NAD 1983 2011 StatePlane California V FIPS 0405 Ft US
Background: USGS (2013)
U:\224202042\gis_MXDs\Recreation\SSWP_Recreation_Mapbook_20190819.mxd

SOUTH SWP HYDROPOWER RELICENSING
FERC PROJECT NO. 2426

**South State Water Project Recreation Facilities**

# Frenchman's Flat (Non-Project) Dispersed Use Area

**Figure 15 of 15**

# Appendix Q

## *Pyramid and Quail Lake Visitor Use Summary 2018*

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# APPENDIX Q -PYRAMID AND QUAIL LAKE VISITOR USE SURVEY 2018

The Department of Water Resources is conducting interviews of visitors at Pyramid and Quail Lake Recreation Sites as well as Frenchman's Flat. The information collected will help us better serve our visitors by knowing what activities they do, how long they stay, and how satisfied they are with the facilities and services provided. Your participation is voluntary, and all information is confidential. Scan the QR code to the right to take this survey on your smart device.

**Screening Questions**

**Date:** **Time:** **Site:** **Suveyor:**

1. I need to select just one of you to complete this interview. Which of you had the most recent birthday and is 16 years of age or older? *(Direct ALL questions to only this person)*
2. What is your home ZIP code? _____ or if visiting from outside of U.S., name of country you are visiting from:_____ (Optional)
3. What is the primary purpose of your visit? *(Choose only one)*

| | |
|---|---|
| ☐ | Working or commuting to work. **End Survey** *"Thank you. That's all the information I need today."* |
| ☐ | Only stopping to use the bathroom. **End Survey** *"Thank you. That's all the information I need today."* |
| ☐ | Only passing through, going somewhere else. **End Survey** *"Thank you. That's all the information I need today."* |
| ☐ | Some other reason. **End Survey** *"Thank you. That's all the information I need today."* |
| ☐ | Recreation *(GO TO Q5)* |

4. When did you arrive at Pyramid Lake, Los Alamos Campground, Frenchman's Flat, and/or Quail Lake?
   Date: _____ Time: _____ a.m. p.m.
5. When do you plan to leave Pyramid Lake, Los Alamos Campground, Frenchman's Flat, and/or Quail Lake? (Choose only one)

| | |
|---|---|
| ☐ | Not leaving this site today. |
| ☐ | Don't know. |
| ☐ | Leaving now Time: _____ ☐a.m. ☐p.m. |
| ☐ | Leaving later Time/Date: _____ ☐a.m. ☐ p.m. |

**Regarding your recreation activities**

6. Including this visit, how many times have you come to this site for recreation in the past 12 months?_____

**7.** Which of the following activities have you participated in or intend to participate in during this visit to the area?

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | RV/trailer camping | ☐ | Water skiing | ☐ | Sunbathing | ☐ | Jet skiing |
| ☐ | Tent camping | ☐ | Windsurfing | ☐ | Picnicking | ☐ | Family time/reunion |
| ☐ | Fishing from shore | ☐ | Sailing | ☐ | Sightseeing | ☐ | Paddle boarding |
| ☐ | Fishing from boat | ☐ | Sports/exercise | ☐ | Wildlife viewing | ☐ | Swimming |
| ☐ | Fishing (belly boat) | ☐ | Canoeing/ kayaking | ☐ | Hiking | ☐ | Biking |
| ☐ | Motor boating | ☐ | Pontoon boating | ☐ | Pet play | ☐ | Other_____ |

**8.** Which of the above activities is your primary activity for this recreation visit?

_____

**9.** How many hours do you anticipate participating in the primary activity noted above during this visit? _____

**10.** Are you interested in a remote stream based camping experience? ☐ Yes ☐ No

**11.** If yes to the above question, would you like more of this type of experience available near Pyramid and/or Quail Lake? ☐ Yes No

**12.** Overall how satisfied are you with this visit to Pyramid Lake, Los Alamos Campground, Frenchman's Flat, and/or Quail Lake?

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | Very dissatisfied | ☐ | Somewhat dissatisfied | ☐ | Neither dissatisfied nor satisfied | ☐ | Somewhat satisfied | ☐ | Very satisfied |

**13.** What is the number one improvement you would like to see at Pyramid Lake, Los Alamos Campground, Frenchman's Flat, and/or Quail Lake?

_____

**14.** The following section lists things you may or may not have experienced at Pyramid Lake, Los Alamos Campground, Frenchman's Flat, and/or Quail Lake. Please rate the following amenities or conditions.

| | A big problem | A moderate problem | A slight problem | Not a problem | No Opinion |
|---|---|---|---|---|---|
| Easy access to the destination | □ | □ | □ | □ | □ |
| Availability of trash receptacles | □ | □ | □ | □ | □ |
| Feeling of safety | □ | □ | □ | □ | □ |
| Condition of Restrooms | □ | □ | □ | □ | □ |
| Availability of shaded areas | □ | □ | □ | □ | □ |
| Availability of desired picnic sites/ tables | □ | □ | □ | □ | □ |
| Noise or disturbances from other users | □ | □ | □ | □ | □ |
| Site crowding | □ | □ | □ | □ | □ |
| Ease of getting around between recreation areas | □ | □ | □ | □ | □ |
| Adequacy of directional or information signs | □ | □ | □ | □ | □ |
| Quality of fishing | □ | □ | □ | □ | □ |
| Facility fees | □ | □ | □ | □ | □ |
| Availability of desired campsites | □ | □ | □ | □ | □ |
| Wait times to launch a boat | □ | □ | □ | □ | □ |
| Numbers of watercraft on the lake | □ | □ | □ | □ | □ |
| Choice of food/supplies at concession area | □ | □ | □ | □ | □ |
| Other:_____ _____ _____ _____ | □ | □ | □ | □ | □ |

**15.** How do you feel about the following?

| | Too High | About Right | Too Low | No Opinion | Specific Location (if applicable) |
|---|---|---|---|---|---|
| Availability of electric power sources | ☐ | ☐ | ☐ | ☐ | |
| Amount of nearby parking | ☐ | ☐ | ☐ | ☐ | |
| Law enforcement presence | ☐ | ☐ | ☐ | ☐ | |
| The availability of trails/paths between recreation sites | ☐ | ☐ | ☐ | ☐ | |
| Number of group facilities | ☐ | ☐ | ☐ | ☐ | |
| Access to areas on shoreline | ☐ | ☐ | ☐ | ☐ | |
| Amount of screening/privacy between campsites | ☐ | ☐ | ☐ | ☐ | |
| Amount of educational signs and information | ☐ | ☐ | ☐ | ☐ | |
| Availability of cell phone service | ☐ | ☐ | ☐ | ☐ | |
| Other:_____ | ☐ | ☐ | ☐ | ☐ | |

**16.** What, if anything, enhanced your recreation experience today?

_____

**Regarding you and your group (optional)**

(This set of questions will help us better understand you and compare your answers to those of other people. Your answers will not be used for anything other than to create general categories of recreation visitors.)

**17.** How many people (including you) traveled here in the same vehicle as you? _____

**18.** How many are children (under the age of 16)? _____

**19.** What is your age group? ☐ 6-25 years ☐ 25-40 years ☐ 40-60 years ☐ 60 + years

**20.** Do you or anyone in your group have a disability? ☐ Yes ☐ No

**21.** If yes, were the facilities or areas you visited accessible (The Department of Water Resources wants to make sure they provide opportunities for everyone including those with disabilities)? Yes ☐ No ☐

**22.** With which ethnic group(s) do you most closely identify? *(please choose one or more - Optional)*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ☐ | Hispanic or Latino(a) | ☐ | American Indian/Alaska Native | ☐ | Asian | ☐ | Black/African American |
| ☐ | Native Hawaiian or other Pacific Islander | ☐ | White | ☐ | Other | | |