

**DON PEDRO HYDROELECTRIC PROJECT  
FERC NO. 2299**

**AMENDED FINAL LICENSE APPLICATION**

**APPENDIX E-10  
APPLICANT-PREPARED BIOLOGICAL ASSESSMENT FOR  
TERRESTRIAL SPECIES**



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## List of Acronyms

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ac .....	acres
ACEC .....	Area of Critical Environmental Concern
ACHP .....	Advisory Council for Historic Preservation
ACOE.....	U.S. Army Corps of Engineers
ADA .....	Americans with Disabilities Act (ADA/ABAAG)
AF .....	acre-feet
AFLA .....	Amendment to the Final License Application
AGS.....	Annual Grasslands
ALJ.....	Administrative Law Judge
APE .....	Area of Potential Effect
APEA .....	Applicant-Prepared Environmental Assessment
ARMR.....	Archaeological Resource Management Report
AWQC .....	Ambient Water Quality Criteria
BA .....	Biological Assessment
BDCP .....	Bay-Delta Conservation Plan
BLM.....	U.S. Department of the Interior, Bureau of Land Management
BLM-S .....	Bureau of Land Management – Sensitive Species
BMI.....	Benthic macroinvertebrates
BMP .....	Best Management Practices
BO .....	Biological Opinion
BOW .....	Blue Oak Woodland
°C.....	celsius
CalCOFI.....	California Cooperative Oceanic Fisheries Investigations
CalEPPC .....	California Exotic Pest Plant Council
CalSPA.....	California Sportfishing Protection Alliance
CAS.....	California Academy of Sciences
CBDA .....	California Bay-Delta Authority
CCC.....	Criterion Continuous Concentrations
CCIC .....	Central California Information Center
CCSF.....	City and County of San Francisco
CD .....	Compact Disc

CDBW.....	California Department of Boating and Waterways
CDEC.....	California Data Exchange Center
CESA .....	California Endangered Species Act
CDFA.....	California Department of Food and Agriculture
CDFG.....	California Department of Fish and Game (as of January 2013, CDFW)
CDFW .....	California Department of Fish and Wildlife
CDMG.....	California Division of Mines and Geology
CDOF.....	California Department of Finance
CDPH.....	California Department of Public Health
CDSOD .....	California Division of Safety of Dams
CDWR.....	California Department of Water Resources
CE .....	California Endangered Species
CEC.....	California Energy Commission
CEII.....	Critical Energy Infrastructure Information
CEQA.....	California Environmental Quality Act
CESA .....	California Endangered Species Act
CFR.....	Code of Federal Regulations
cfs.....	cubic feet per second
CGS.....	California Geological Survey
cm.....	centimeters
CMAP .....	California Monitoring and Assessment Program
CMC.....	Criterion Maximum Concentrations
CNDDB.....	California Natural Diversity Database
CNPS.....	California Native Plant Society
CORP .....	California Outdoor Recreation Plan
CPUC .....	California Public Utilities Commission
CPUE .....	Catch Per Unit Effort
CRAM.....	California Rapid Assessment Method
CRC.....	Chamise-Redshank Chaparral
CRLF.....	California Red-Legged Frog
CRRF .....	California Rivers Restoration Fund
CSAS.....	Central Sierra Audubon Society
CSBP .....	California Stream Bioassessment Procedure

CSU.....	California State University
CT .....	California Threatened Species
CTR.....	California Toxics Rule
CTS .....	California Tiger Salamander
CVP.....	Central Valley Project
CVRWQCB .....	Central Valley Regional Water Quality Control Board
CWA .....	Clean Water Act
CWD .....	Chowchilla Water District
CWHR.....	California Wildlife Habitat Relationship
CZMA.....	Coastal Zone Management Act
DDT .....	dichlorodiphenyltrichloroethane
Districts .....	Turlock Irrigation District and Modesto Irrigation District
DLA .....	Draft License Application
DO.....	Dissolved Oxygen
DOI .....	Department of Interior
DPRA.....	Don Pedro Recreation Agency
DPS .....	Distinct Population Segment
DSE.....	Chief Dam Safety Engineer
EA .....	Environmental Assessment
EBMUD .....	East Bay Municipal Utilities District
EC .....	Electrical Conductivity
EFH.....	Essential Fish Habitat
EIR .....	Environmental Impact Report
EIS.....	Environmental Impact Statement
Elev or el .....	Elevation
ENSO .....	El Niño Southern Oscillation
EPA.....	U.S. Environmental Protection Agency
ESA.....	Federal Endangered Species Act
ESRCD.....	East Stanislaus Resource Conservation District
ESU .....	Evolutionary Significant Unit
EVC.....	Existing Visual Condition
EWUA.....	Effective Weighted Useable Area
°F.....	fahrenheit

FERC.....	Federal Energy Regulatory Commission
FFS.....	Foothills Fault System
FL.....	Fork length
FLA.....	Final License Application
FMP.....	Fishery Management Plan
FMU.....	Fire Management Unit
FOT.....	Friends of the Tuolumne
FPA.....	Federal Power Act
FPC.....	Federal Power Commission
FPPA.....	Federal Plant Protection Act
ft.....	feet
ft/mi.....	feet per mile
FWCA.....	Fish and Wildlife Coordination Act
FWUA.....	Friant Water Users Authority
FYLF.....	Foothill Yellow-Legged Frog
g.....	grams
GIS.....	Geographic Information System
GLO.....	General Land Office
GORP.....	Great Outdoor Recreation Pages
GPS.....	Global Positioning System
HCP.....	Habitat Conservation Plan
HSC.....	Habitat Suitability Criteria
HHWP.....	Hetch Hetchy Water and Power
HORB.....	Head of Old River Barrier
hp.....	horsepower
HPMP.....	Historic Properties Management Plan
IFIM.....	Instream Flow Incremental Methodology
ILP.....	Integrated Licensing Process
in.....	inches
ISR.....	Initial Study Report
ITA.....	Indian Trust Assets
IUCN.....	International Union for the Conservation of Nature
KOPs.....	Key Observation Points



kV	.....	kilovolt
kVA	.....	kilovolt-amperes
kW	.....	kilowatt
kWh	.....	kilowatt hours
LWD	.....	large woody debris
m	.....	meters
mm	.....	millimeter
M&I	.....	Municipal and Industrial
MCL	.....	Maximum Contaminant Level
mg/kg	.....	milligrams/kilogram
mg/L	.....	milligrams per liter
mgd	.....	million gallons per day
MGR	.....	Migration of Aquatic Organisms
MHW	.....	Montane Hardwood
mi	.....	miles
mi <sup>2</sup>	.....	square miles
MID	.....	Modesto Irrigation District
MOA	.....	Memorandum of Agreement
MOU	.....	Memorandum of Understanding
MPN	.....	Most Probable Number
MPR	.....	market price referents
MSCS	.....	Multi-Species Conservation Strategy
msl	.....	mean sea level
MUN	.....	municipal and domestic supply
MVA	.....	Megavolt-ampere
MW	.....	megawatt
MWh	.....	megawatt hour
mya	.....	million years ago
NAE	.....	National Academy of Engineering
NAHC	.....	Native American Heritage Commission
NAS	.....	National Academy of Sciences
NAVD 88	.....	North American Vertical Datum of 1988
NAWQA	.....	National Water Quality Assessment

NCCP .....	Natural Community Conservation Plan
NGVD29 .....	National Geodetic Vertical Datum of 1929
NEPA .....	National Environmental Policy Act
NERC .....	North American Electric Reliability Corporation
NGOs .....	Non-Governmental Organizations
NHI .....	Natural Heritage Institute
NHPA.....	National Historic Preservation Act
NISC .....	National Invasive Species Council
NMFS.....	National Marine Fisheries Service
NOAA.....	National Oceanic and Atmospheric Administration
NOI .....	Notice of Intent
NPS .....	U.S. Department of the Interior, National Park Service
NRCS .....	National Resource Conservation Service
NRHP.....	National Register of Historic Places
NRI.....	Nationwide Rivers Inventory
NTU .....	Nephelometric Turbidity Unit
NWI.....	National Wetland Inventory
NWIS .....	National Water Information System
NWR .....	National Wildlife Refuge
O&M.....	operation and maintenance
OEHHA.....	Office of Environmental Health Hazard Assessment
OID .....	Oakdale Irrigation District
ORV .....	Outstanding Remarkable Value
OSHA.....	Occupational Safety and Health Administration
PA .....	Programmatic Agreement
PAD.....	Pre-Application Document
PDAW.....	Project Demand of Applied Water
PDO.....	Pacific Decadal Oscillation
PEIR.....	Program Environmental Impact Report
PGA.....	Peak Ground Acceleration
PG&E.....	Pacific Gas and Electric
PHABSIM.....	Physical Habitat Simulation System
PHG.....	Public Health Goal

PM&E .....	Protection, Mitigation and Enhancement
PMF.....	Probable Maximum Flood
POAOR .....	Public Opinions and Attitudes in Outdoor Recreation
ppb.....	parts per billion
ppm .....	parts per million
PSP .....	Proposed Study Plan
PWA.....	Public Works Administration
QA.....	Quality Assurance
QC .....	Quality Control
RA .....	Recreation Area
RBP .....	Rapid Bioassessment Protocol
REC-1 .....	water contact recreation
REC-2 .....	water non-contact recreation
Reclamation .....	U.S. Department of the Interior, Bureau of Reclamation
RM .....	River Mile
RMP .....	Resource Management Plan
RP.....	Relicensing Participant
RPA.....	Reasonable and Prudent Alternative
rpm .....	Rotations per minute
RPS .....	Renewable Portfolio Standard
RSP .....	Revised Study Plan
RST .....	Rotary Screw Trap
RWG .....	Resource Work Group
RWQCB.....	Regional Water Quality Control Board
SC.....	State candidate for listing under CESA
SCADA .....	Supervisory Control and Data Acquisition
SCD.....	State candidate for delisting under CESA
SCE .....	State candidate for listing as endangered under CESA
SCT .....	State candidate for listing as threatened under CESA
SD1 .....	Scoping Document 1
SD2 .....	Scoping Document 2
SE.....	State Endangered Species under the CESA
SEED.....	U.S. Bureau of Reclamation's Safety Evaluation of Existing Dams

SFP .....	State Fully Protected Species under CESA
SFPUC .....	San Francisco Public Utilities Commission
SHPO .....	State Historic Preservation Officer
SJRA .....	San Joaquin River Agreement
SJRG	San Joaquin River Group Authority
SJTA .....	San Joaquin River Tributaries Authority
SM.....	Standard Method
SMUD .....	Sacramento Municipal Utility District
SPAWN.....	spawning, reproduction and/or early development
SPD .....	Study Plan Determination
SRA.....	State Recreation Area
SRMA .....	Special Recreation Management Area or Sierra Resource Management Area (as per use)
SRMP .....	Sierra Resource Management Plan
SRP .....	Special Run Pools
SSC .....	State species of special concern
ST.....	California Threatened Species under the CESA
STORET .....	Storage and Retrieval
SWAMP .....	Surface Water Ambient Monitoring Program
SWE .....	Snow-Water Equivalent
SWP .....	State Water Project
SWRCB.....	State Water Resources Control Board
TAC.....	Technical Advisory Committee
TAF .....	thousand acre-feet
TCP .....	Traditional Cultural Properties
TCWC .....	Tuolumne County Water Company
TDS .....	Total Dissolved Solids
TID.....	Turlock Irrigation District
TMDL .....	Total Maximum Daily Load
TOC.....	Total Organic Carbon
TRT .....	Tuolumne River Trust
TRTAC .....	Tuolumne River Technical Advisory Committee
UC .....	University of California

USBR .....	U.S. Bureau of Reclamation
USDA.....	U.S. Department of Agriculture
USDOC .....	U.S. Department of Commerce
USDOI .....	U.S. Department of the Interior
USFS .....	U.S. Department of Agriculture, Forest Service
USFWS .....	U.S. Department of the Interior, Fish and Wildlife Service
USGS .....	U.S. Department of the Interior, Geological Survey
USR.....	Updated Study Report
UTM.....	Universal Transverse Mercator
VAMP .....	Vernalis Adaptive Management Plan
VELB .....	Valley Elderberry Longhorn Beetle
VES .....	visual encounter surveys
VRM .....	Visual Resource Management
VRO .....	Visual Resource Objective
WBWG .....	Western Bat Working Group
WECC .....	Western Electricity Coordinating Council
WPA.....	Works Progress Administration
WPT .....	Western Pond Turtle
WQCP .....	Water Quality Control Plan
WSA.....	Wilderness Study Area
WSIP .....	Water System Improvement Program
WSNMB .....	Western Sierra Nevada Metamorphic Belt
WUA .....	weighted usable area
WWTP .....	Wastewater Treatment Plant
WY .....	water year
yd <sup>3</sup> .....	cubic yard
yr .....	year
µS/cm .....	microSeimens per centimeter
µg/L.....	micrograms per liter
µmhos.....	micromhos

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## PREFACE

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On April 28, 2014, the co-licensees of the Don Pedro Hydroelectric Project, Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts), timely filed with the Federal Energy Regulatory Commission (Commission or FERC) the Final License Application (FLA) for the Don Pedro Hydroelectric Project, FERC No. 2299. As noted in the filing and acknowledged by FERC at the time, several studies were ongoing which were likely to inform the development of additional protection, mitigation, and enhancement (PM&E) measures. The Districts have now completed these studies and herein submit this Amendment of Application (Amendment to the Final License Application or AFLA). For ease of review and reference, this AFLA replaces the Districts' April 2014 filing in its entirety.

The Don Pedro Project provides water storage for irrigation and municipal and industrial (M&I) use, flood control, hydroelectric generation, recreation, and natural resource protection (hereinafter, the "Don Pedro Project"). The environmental analysis contained in this AFLA considers all the components, facilities, operations, and maintenance that make up the Don Pedro Project and certain facilities proposed to be included under the new license. The Don Pedro Project is operated to fulfill the following primary purposes and needs: (1) to provide water supply for the Districts for irrigation of over 200,000 acres of Central Valley farmland and M&I use, (2) to provide flood control benefits along the Tuolumne and San Joaquin rivers, and (3) to provide a water banking arrangement for the benefit of the City and County of San Francisco (CCSF) and the 2.6 million people CCSF supplies in the Bay Area. The original license was issued in 1966. In 1995, the Districts entered into an agreement with a number of parties, which resulted in greater flows to the lower Tuolumne River for the protection of aquatic resources.

Hydroelectric generation is a secondary purpose of the Don Pedro Project. Hereinafter, the hydroelectric generation facilities, recreational facilities, and related operations will be referred to as the "Don Pedro Hydroelectric Project," or the "Project". With this AFLA to FERC, the Districts are seeking a new license to continue generating hydroelectric power and implement the Districts' proposed PM&E measures. Based on the information contained in this AFLA, and other sources of information on the record, FERC will consider whether, and under what conditions, to issue a new license for the continued generation of hydropower at the Districts' Don Pedro Project. The Districts are providing a complete description of the facilities and operation of the Don Pedro Project so the effects of the operation and maintenance of the hydroelectric facilities can be distinguished from the effects of the operation and maintenance activities of the overall Don Pedro Project's flood control and water supply/consumptive use purposes.

Being able to differentiate the effects of the hydropower operations from the effects of the flood control and consumptive use purposes and needs of the Don Pedro Project will aid in defining the scope and substance of reasonable PM&E alternatives. As FERC states in Scoping Document 2 in a discussion related to alternative project operation scenarios: "...alternatives that address the consumptive use of water in the Tuolumne River through construction of new structures or methods designed to alter or reduce consumptive use of water are...alternative mitigation strategies that could not replace the Don Pedro *hydroelectric* [emphasis added] project. As such, these recommended alternatives do not satisfy the National Environmental

Policy Act (NEPA) purpose and need for the proposed action and are not reasonable alternatives for the NEPA analysis.”



## 1.0 INTRODUCTION

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### 1.1 Purpose of the Biological Assessment

During National Environmental Policy Act (NEPA) scoping conducted by the Federal Energy Regulatory Commission (FERC) for the relicensing of hydroelectric power generation at the Don Pedro Hydroelectric Project (Project), issues were raised regarding the effects of the Proposed Action on species listed under the federal Endangered Species Act (ESA) and their associated designated critical habitat. Fourteen ESA-listed terrestrial species—four Endangered and 10 Threatened—were identified by FERC as having the potential to occur in the Project vicinity.

Pursuant to the ESA, the Districts have prepared this Applicant-Prepared Biological Assessment (BA) to describe potential effects of the Proposed Action on ESA-listed species in the Action Area. This BA is intended to serve as the basis for consultation between FERC and the United States Fish and Wildlife Services (USFWS) pursuant to Section 7(a)(3) of the ESA.

#### 1.1.1 Regulatory Framework

Under provisions of Section 7(a)(2) of the ESA, FERC is required to consult with the USFWS regarding the relicensing of the Project to ensure that the Proposed Action to be undertaken by FERC (see Section 2.1 of this BA for a description of the Proposed Action) will not jeopardize the continued existence of Layne's ragwort (*Packera layneae*), California vervain (*Verbena californica*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), San Joaquin kit fox (*Vulpes macrotis mutica*), and vernal pool fairy shrimp (*Branchinecta lynchi*) or adversely modify these species' critical habitat (16 United States Code [U.S.C.] Section 1536(c)). There is a single ESA-listed aquatic species that occurs in the Tuolumne River, i.e., the threatened California Central Valley Steelhead Distinct Population Segment (DPS) (*Oncorhynchus mykiss irideus*). The Districts have developed a separate BA for this species for eventual transmittal by FERC (with or without modification) to the National Marine Fisheries Service for ESA consultation purposes.

The Districts, under the direction and guidance of FERC's policies and procedures, have prepared this BA for terrestrial species. FERC will review and potentially modify this BA prior to providing its BA to the USFWS for consultation purposes. The USFWS will prepare and issue a Letter of Concurrence with the Districts' findings or a Biological Opinion (BO) presenting the USFWS's determination as to whether or not the Proposed Action would be likely to jeopardize these species or adversely modify their critical habitat in the Action Area. If a "jeopardy" or "adverse modification" determination is made, the BO will identify any reasonable and prudent alternative (RPA) actions that might be necessary to address the effects of the Proposed Action.

If the USFWS issues either a "no jeopardy" opinion or a "jeopardy" opinion that includes RPAs, the BO may include an incidental take statement. The USFWS must anticipate the quantity of take that could result from the Proposed Action and authorize such take along with a statement that these species will not be jeopardized. The incidental take statement must contain terms and

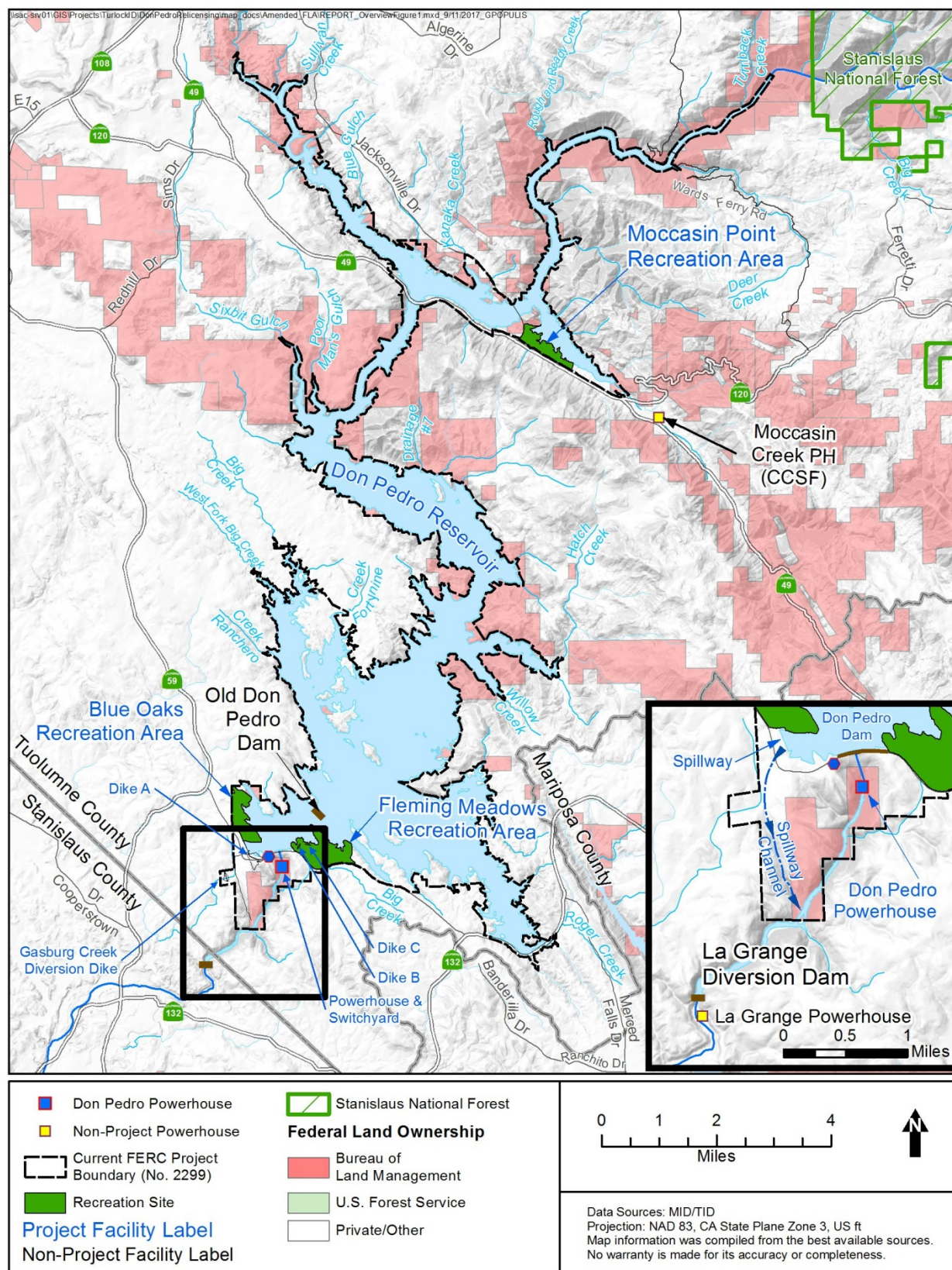
conditions designed to reduce the effect of the anticipated take. These RPAs and the associated take allowances would then be transmitted to FERC.

## **1.2 Project Background**

The Districts are the co-licensees of the 168-megawatt (MW) Don Pedro Hydroelectric Project, located on the Tuolumne River in western Tuolumne County in the Central Valley region of California. The Don Pedro Dam is located at river mile (RM) 54.8 and the Don Pedro Reservoir formed by the dam extends 24 miles upstream at the normal maximum water surface elevation of 830 ft above mean sea level (msl; NGVD 29). At elevation 830 ft, the reservoir stores over 2,000,000 acre-feet (AF) of water and has a surface area slightly less than 13,000 acres (ac). The watershed above Don Pedro Dam is approximately 1,533 square miles (mi<sup>2</sup>). The Project is designated by FERC as Project No. 2299. Both TID and MID are local public agencies authorized under the laws of the State of California to provide water supply for irrigation and M&I uses and to provide retail electric service.

### **1.2.1 Project Boundary and Facilities**

The current Project Boundary extends from RM 53.2, which is one mile downstream of the Don Pedro powerhouse to RM 80.8 corresponding to a water level of 845 feet (ft)(31 FPC 510 [1964]). The current Project Boundary encompasses approximately 18,370 ac, with 74 percent of the lands owned jointly by the Districts and the remaining 26 percent (approximately 4,802 ac) owned by the United States and administered as a part of the U.S. Bureau of Land Management (BLM) Sierra Resource Management Area. The primary Don Pedro Project facilities include the main 585 ft high earth dam, gated and ungated spillways, low level outlet works, a four-unit powerhouse situated at the base of the dam, an electrical switchyard, four rim dikes, and three developed recreation areas. The location of the Don Pedro Project is shown in Figure 1.2-1.



**Figure 1.2-1. Don Pedro Hydroelectric Project site location map.**

### 1.3 Consultation on FERC Relicensing Studies

The Districts consulted with the USFWS regarding ESA-listed species during the relicensing process for the Don Pedro Hydroelectric Project. The current FERC license for the Project expired on April 30, 2016, and the Districts applied for a new license on April 28, 2014. The Districts began the relicensing process by filing a Notice of Intent and Pre-Application Document (PAD) with FERC on February 10, 2011, following the regulations governing the Integrated Licensing Process (ILP). The Districts' PAD included a summary of the extensive existing information available on area resources. The PAD also included 10 draft study plans that described a subset of the Districts' proposed relicensing studies. The Districts then convened a series of Resource Work Group meetings, engaging agencies and other relicensing participants in a collaborative study plan development process culminating in the Districts' Proposed Study Plan (PSP) and Revised Study Plan (RSP) filings with FERC on July 25, 2011 and November 22, 2011, respectively.

On December 22, 2011, FERC issued its Study Plan Determination (SPD) approving, or approving with modifications, 34 studies proposed in the RSP, which included 10 studies addressing terrestrial resources. Following the SPD, a total of seven studies (and associated study elements) that were either not adopted in the SPD, or were adopted with modifications, formed the basis of Study Dispute proceedings. In accordance with the ILP, FERC convened a Dispute Resolution Panel on April 17, 2012, and the Panel issued its findings on May 4, 2012. On May 24, 2012, FERC issued its Formal Study Dispute Determination, with additional clarifications related to the Formal Study Dispute Determination issued on August 17, 2012. Studies were implemented in a manner consistent with this determination.

On January 17, 2013, the Districts filed their Initial Study Report (ISR); included in the ISR was the Districts' NOI to file a Draft License Application (DLA) rather than a Preliminary Licensing Proposal under the ILP. The Districts held the ISR meeting with relicensing participants on January 30 and 31, 2013 in Modesto, California. On February 8, 2013, the Districts filed an ISR meeting summary.

Following the ISR meeting, relicensing participants filed requests for new studies and study modifications. The Districts responded to these comments on April 9, 2013 and agreed to a new computer model and three new studies. On May 21, 2013, FERC issued its Determination on Requests for Study Modifications and New Studies. The determination approved five study modifications and five new studies or study elements. On January 6, 2014, the Districts filed an Updated Study Report (USR), including revised drafts of five study reports, 11 new study reports for studies in progress at the time of the ISR, and progress reports for five studies still underway at the time of the USR. On January 16, 2014, the Districts held a USR meeting in Modesto, and on January 27, 2014 the Districts filed a USR meeting summary. On April 28, 2014, the Districts filed a Final License Application, which including a draft BA for terrestrial species. For ease of review and reference, this terrestrial BA as provided in the AFLA replaces the Districts' April 2014 filing in its entirety.

## 2.0 DESCRIPTION OF PROPOSED ACTION

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### 2.1 Proposed Action

FERC is the federal agency authorized to issue licenses for the construction, operation, and maintenance of the nation's non-federal hydroelectric facilities. In accordance with the Federal Power Act (FPA), FERC is able to issue such licenses for a period not less than 30 years, but no more than 50 years. Upon expiration of an existing license, FERC must decide whether, and under what terms, to issue a new license. Under the FPA, FERC issues licenses that are best adapted to a comprehensive plan for improving or developing a waterway, and in so doing, must consider a suite of beneficial public uses including, among others, water supply, flood control, irrigation, and fish and wildlife. As the federal "action agency," FERC must also comply with the requirements of NEPA, under which FERC must clearly define the specific proposed action it is considering and define the purpose and need for the Proposed Action.

In the case of the Don Pedro Hydroelectric Project, the Proposed Action under review by FERC is the issuance of a new license to the Districts to authorize the continued generation of hydroelectric power at Don Pedro Dam, along with operational changes and resource enhancement measures proposed by the Districts (enhancements are described below in Section 2.1.1 of this BA). As such, and as generally described in FERC's Scoping Document 2 (SD2) issued on July 25, 2011, any alternatives to mitigate the Project's effects must be reasonably related to the purpose and need for the Proposed Action. In this case, the Proposed Action is whether, and under what terms, to authorize the continuation of hydroelectric power generation at the Don Pedro Hydroelectric Project.

Flow releases through the powerhouse from Don Pedro Reservoir are scheduled based on requirements for (1) coordinated flood flow management, including pre-releases in advance of anticipated high flows during wet years, (2) the Districts' irrigation and M&I demands, including flows to maintain water storage in Turlock Lake and Modesto Reservoir, and (3) protection of aquatic resources in the lower Tuolumne River in accordance with the terms of the current FERC license and flow measures described below. Once the weekly and daily flow schedules are established based on these demands, outflows from the Don Pedro powerhouse are scheduled to deliver these flows; hydroelectric power generation is a secondary consideration for all flow scheduling activities.

As part of the Proposed Action, the Districts are proposing a series of flow-related and water supply measures for the protection of aquatic resources in the lower Tuolumne River. These include seasonal flow prescriptions to benefit *O. mykiss* fry and juveniles, Fall-Run Chinook spawning, Fall-Run Chinook juvenile and fry rearing, outmigration baseflows, and Fall-Run Chinook springtime migration. These measures also include a water supply provision that allows the Districts to access "dead pool" water storage by modifying the Project's operational range to allow deeper drawdowns during winter months to provide water for environmental flows. Minimum storage for the Project would be set at 200,000 AF. Prior to accessing the deep-pool storage the Districts would reinforce Don Pedro Dam with riprap.



Issuance of a new FERC license will allow the Districts to continue generating electricity at the Don Pedro Project for the term of the new FERC license, thereby helping to meet the Districts' energy needs by producing low-cost electric power from a non-polluting, renewable resource. The average annual generation by the Project from 1997 to 2012 was approximately 622 million kilowatt hours (kWh) of electricity.

Clean, renewable hydroelectric power generated by the Project constitutes a valuable benefit to the Districts, the Central Valley region, and the State of California. The California Energy Commission (CEC) issued an Updated California Energy Demand Forecast 2011–2022 in May 2011. The report presented an update to the 2009 California Energy Demand electricity forecast adopted for the 2009 Integrated Energy Policy Report in December 2009. The updated forecast was meant to provide the CEC's best estimate of the effect of economic conditions on energy demand since the 2009 forecast was published. Average annual growth rates for consumption for 2010–2022 under low, mid, and high forecast scenarios are estimated to be 1.13 percent, 1.28 percent, and 1.53 percent, respectively (CEC 2011), and sources of clean, reliable energy like that generated at Don Pedro will be an important component to meet demand.

### **2.1.1 Proposed Resource Enhancements**

The Districts have developed comprehensive suite of Resource Management Plans, which are included in the AFLA:

- Fire Prevention and Response Management Plan
- Spill Prevention, Control and Countermeasure Management Plan
- Aquatic Invasive Species Management Plan
- Predator Control and Suppression Plan for the Lower Tuolumne River
- Woody Debris Management Plan
- Terrestrial Resources Management Plan (including vegetation management, noxious weeds, bald eagles, western pond turtle, and bats)
- Recreation Resource Management Plan
- Historic Properties Management Plan

Each of these plans include measures to protect and enhance resources within the Project Boundary. Specific to ESA-listed species, the Terrestrial Resource Management Plan incorporates measures to manage ESA-listed and other special status species occurrences within the Project Boundary, including control of noxious weeds, protection of special status plants, and protection of valley elderberry longhorn beetle VELB host plants. As part of this Plan, the Districts propose to follow USFWS Conservation Guidelines pertaining to the VELB for the management of elderberry (USFWS 1999) (Attachment A).

## 2.2 Interrelated and Interdependent Actions

Interrelated actions are actions that are part of a larger action and depend on the larger action for their justification (50 CFR § 402.02), whereas interdependent actions are actions with no independent utility apart from a proposed action (50 CFR § 402.02). If a private activity would not occur were it not for the occurrence of a proposed action, the effects of that private activity are interdependent and interrelated with the proposed action, and the effects of the private activity are considered attributable to the proposed action for ESA consultation purposes.

In contrast, actions that would occur with or without the occurrence of a proposed action are not interdependent or interrelated with the proposed action. The USFWS and the National Marine Fisheries Service (NMFS) (1998) state that if a project would exist independent of a proposed action, it cannot be considered “interrelated” or “interdependent” and included in the effects assessment of the proposed action.

As noted above, the Proposed Action being considered by FERC based on the Districts’ AFLA is the issuance of a new FERC license for the continuation of hydroelectric power generation at the Don Pedro Hydroelectric Project. Water storage and releases to satisfy the Don Pedro Project’s primary purposes of irrigation, M&I uses, including the CCSF’s water bank, and flood control in cooperation with the US Army Corps of Engineers (ACOE), are not dependent on the issuance of a new FERC license for the Project, and will occur with or without the licensing of the Proposed Action. As such, these uses are *not* interrelated or interdependent with the issuance of a FERC license for hydroelectric power generation. Thus, their potential effects are not addressed as part of the Proposed Action in this BA.

## 2.3 Action Area

Section 7 of the ESA requires the identification of an “Action Area” for use in determining the environmental baseline for a given resource and evaluating the potential effects of an action on that resource. The Action Area is defined as the area potentially affected by the direct<sup>1</sup> and indirect<sup>2</sup> effects of a proposed action (50 CFR § 402.02; USFWS and NMFS 1998). To evaluate the potential effects of the Proposed Action on the species addressed in this BA (species identified and described in subsequent sections), the Action Area consists of lands within the current FERC Project Boundary.

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<sup>1</sup> Direct effect: the direct or immediate effects of the project on the species or its habitat (Final ESA § 7 Handbook at 4-25).

<sup>2</sup> Indirect effects: those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur. [50 CFR § 402.02].

## 3.0 SPECIES ADDRESSED IN THIS BA

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### 3.1 ESA Species Potentially Occurring in the Action Area

Threatened and Endangered species investigations began by identifying any terrestrial ESA-listed species with the potential to occur in the vicinity of the Project Boundary. A list of ESA-listed species for the 7.5-minute USGS topographic quadrangles (Chinese Camp, La Grange, Moccasin, Peñon Blanco Peak, Sonora, and Standard), which include lands within the Project Boundary, was generated via the online request service available at the USFWS's website (USFWS 2013). Fourteen terrestrial species with the potential to occur in the vicinity of the Project Boundary were identified, four listed as Endangered and 10 listed as Threatened<sup>3</sup>:

- Endangered:
  - Hartweg's golden sunburst (*Pseudobahia bahiifolia*),
  - Hairy Orcutt grass (*Orcuttia pilosa*),
  - Greene's tuctoria (*Tuctoria greenei*), and
  - San Joaquin kit fox (*Vulpes macrotis mutica*).
- Threatened:
  - Succulent owl's-clover (*Castilleja campestris ssp. succulenta*),
  - Hoover's spurge (*Chamaesyce hooveri*),
  - Colusa grass (*Neostapfia colusana*),
  - Chinese Camp brodiaea (*Brodiaea pallida*),
  - Layne's ragwort (*Packera layneae*),
  - California vervain (*Verbena californica*),
  - Valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*),
  - Vernal pool fairy shrimp (*Branchinecta lynchi*),
  - California tiger salamander (CTS), Central Valley Distinct Population Segment (DPS); *Ambystoma californiense*), and
  - California red-legged frog (CRLF) (*Rana draytonii*)

The species list presented above was refined during the study plan development process to include seven species that could actually be present in or near the Action Area. The Districts conducted terrestrial resource studies in 2012, which included surveys of lands within the Project Boundary, all Don Pedro Project facilities, and developed and dispersed recreation areas. These efforts documented the presence of two threatened plant species within the Action Area: Layne's ragwort and California vervain, both known from five occurrences (a distinct geographic

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<sup>3</sup> The Central Valley steelhead DPS is listed as threatened under the ESA (71 FR 834 [2006]), and is addressed in a separate BA.



grouping of plants) (CDFG 2012). Based on species list inquiries and species habitat requirements, five ESA-listed wildlife species have the potential to occur in the Action Area.

### **3.2 Species Removed from Consideration**

In addition to the 14 ESA-listed species initially considered by the Districts (see previous section), FERC's SD2 identified the following ESA-listed wildlife species to be addressed in FERC's environmental analysis for the Project:

- Riparian brush rabbit (*Sylvilagus bachmani riparius*),
- Riparian wood rat (*Neotoma fuscipes riparia*),
- Least Bell's vireo (*Vireo bellii pusillus*), and
- Conservancy fairy shrimp (*Branchinecta conservatio*).

However, these species and their critical habitats (when designated) have not been reported to occur within five miles of the Project Boundary, nor within Tuolumne County (CDFW 2013). As a result, these species were removed from further consideration. Habitat within the Action Area does not appear to be suitable for any of these species. The closest designated critical habitat for Conservancy fairy shrimp is over 10 miles from the Project Boundary, and no vernal pool habitats, which are required by Conservancy fairy shrimp (typically large or "playa" pools), were found during extensive field studies within the Action Area (Eng et. al 1990). Riparian brush rabbit, riparian wood rat, and least Bell's vireo each require riparian shrub habitats; field studies documented that these habitats are uncommon within the Action Area.

### **3.3 Designated Critical Habitat within the Action Area**

Critical habitat for California red-legged frog was designated on March 13, 2001 (66 FR 14626), with additional critical habitat designated on April 13, 2006 (71 FR 19244), and revised on March 17, 2010 (75 FR 12816). No lands designated as critical habitat are located within the Action Area.

Critical habitat was designated for the Central Population DPS of California tiger salamander on August 23, 2005, (70 FR 79380), including an area approximately one mile southwest of the Action Area in Stanislaus County. No lands designated as critical habitat are located in the Action Area.

Critical habitat for valley elderberry longhorn beetle was designated on August 8, 1980 (45 FR 52803 52807). No lands designated as critical habitat are located in the Action Area.

Critical habitat for vernal pool fairy shrimp, along with other vernal pool species, was originally designated in a final rule on August 6, 2003. A revised final rule for critical habitat, with unit designations by species, was published on February 10, 2006, with 35 critical habitat units for vernal pool fairy shrimp totaling 597,821 acres (ac) (USFWS 2006a). Of these, critical habitat unit VERFS21B is the closest to the Action Area, at approximately 2.6 miles from the edge of the Project Boundary.

No critical habitat has been designated for San Joaquin kit fox, Layne's ragwort or California vervain.

## 4.0 SPECIES ACCOUNTS AND ENVIRONMENTAL BASELINE

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### 4.1 Layne's Ragwort

On October 18, 1996, the USFWS listed Layne's ragwort as threatened under the federal ESA (61 FR54346). A 5-year review was initiated by USFWS for this species in March 2009 (USFWS 2012a). The USFWS has issued a Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada, which included Layne's ragwort (USFWS 2002a).

#### 4.1.1 Habitat Requirements

Layne's ragwort is a perennial herb that grows within dry pine or oak woodlands (USFWS 2012b) in open, disturbed rocky areas on gabbro and serpentine soils between 660 ft and 3,280 ft in elevation (Baldwin 2012; CNPS 2012). The species can occasionally be found along streams as well (CDFG 2012).

#### 4.1.2 Environmental Baseline in the Action Area

This plant has been historically documented within the Chinese Camp and Moccasin quads (CNPS 2012). Botanical surveys in the Action Area were performed as part of relicensing studies on approximately 3,870 ac between March 5 and June 29, 2012. Surveys were carried out by qualified botanists on foot and by boat, and survey times coincided with blooming periods. Resurveys were conducted at areas and features where potential ESA-listed plant species or plant communities were not at the correct phenological stage for proper identification during the earlier bloom period, particularly in areas containing late blooming species.

Surveys were floristic in nature and generally followed CDFG's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). Plants were identified using the (1) *Jepson Manual of Higher Plants of California* (Baldwin 2012), (2) *A field guide to Pacific States wildflowers: Field marks of species found in Washington, Oregon, California, and adjacent areas: a visual approach arranged by color, form, and detail* (Niehaus and Ripper 1976), (3) *Trees and shrubs of California* (Stuart and Sawyer, 2001), (4) *Wildflowers of the Sierra Nevada and the Central Valley* (Blackwell 1999), (5) *Field Guide to the Sedges of the Pacific Northwest* (Wilson et. al 2008), and (6) *Selected Plants of Northern California and Adjacent Nevada* (Oswald 2002). As detailed in the FERC-approved study plan, surveys were conducted using a random meander technique, with additional focus on high quality habitat or areas with a higher probability of supporting ESA-listed plants.

Twenty-five occurrences of Layne's ragwort were recorded within or adjacent to the Action Area during botanical surveys. Occurrences of Layne's ragwort within the Action Area are summarized in Table 4.1-1. Occurrences ranged from five to 250 plants, with a total estimated area of 2.9 ac. The majority of Layne's ragwort was located in gray pine (*Pinus sabiniana*) woodlands, with wedgeleaf ceanothus (*Ceanothus cuneatus*), toyon (*Heteromeles arbutifolia*), chamise (*Adenostoma fasciculatum*), and common manzanita (*Arctostaphylos manzanita*) as common subdominants. Four of the occurrences were in chaparral, dominated by wedgeleaf ceanothus, hollyleaf redberry (*Rhamnus ilicifolia*), and toyon. Special-status plants commonly

co-occurred with Layne's ragwort, including Red Hills onion (*Allium tuolumnense*), Red Hills soaproot (*Chlorogalum grandiflorum*), tripod buckwheat (*Eriogonum tripodum*), Congdon's lomatium (*Lomatium congonii*), and shaggy-haired lupine (*Lupinus spectabilis*).

The California Native Plant Society (CNPS) reports rapid urbanization as the primary threat to Layne's ragwort. In addition, clearing, grazing, road construction, and fire suppression threaten the species (CNPS 2012). Observed potential stressors to Layne's Ragwort within the Action Area include cattle grazing at all occurrences, recreation activities (i.e., trampling) at three occurrences, and noxious weeds at one occurrence. All occurrences were located within Sixbit and Poor Man's gulches, which both have evidence of cattle grazing. Three Layne's ragwort occurrences were recorded at Kanaka Point, near a day-use area off of Jacksonville Road. There are multiple footpaths throughout the area, including one within a few feet of two occurrences. Additionally, distaff thistle (*Carthamus creticus*) was observed within 250 ft of a Layne's ragwort occurrence. Distaff thistle is a noxious weed that spreads quickly and can form dense stands that displace native plants (DiTomaso and Healy 2007).

**Table 4.1-1. Layne's ragwort occurrences located within the Action Area.**

Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDB record?	Occurrence Data
91	BLM (Red Hills ACEC)	Kanaka Point	100% Vegetative	0.012	150-200	No	Found within mixed foothill woodland on island hillslope and below rock outcrop. Other plants at the site include Red Hills onion ( <i>Allium tuolumnense</i> ), serpentine bluecups ( <i>Githopsis pulchella</i> ssp. <i>serpentinicola</i> ), Coyote mint ( <i>Monardella sheldonii</i> ), and Mariposa clarkia ( <i>Clarkia biloba</i> ssp. <i>australis</i> ). Potential stressors include the presence of the weed species distaff thistle ( <i>Carthamus creticus</i> ) within the general vicinity; the area is potentially subject to trampling by recreationists on footpaths throughout area.
609	BLM (Red Hills ACEC)	Poor Man's Gulch	80% Vegetative, 20% Flowering	0.1	25-50	No	Located within Foothill pine woodland; other plants at the site include serpentine bluecups, buck brush ( <i>Ceanothus cuneatus</i> ), chamise ( <i>Adenostoma fasciculatum</i> ), and gold back fern ( <i>Pentagramma triangularis</i> ).
610	BLM (Red Hills ACEC)	Poor Man's Gulch	30% Vegetative, 70% Flowering	0.1	10-25	No	Found in small grassy opening within shrubland dominated by buck brush, toyon ( <i>Heteromeles arbutifolia</i> ), holyleaf redberry ( <i>Rhamnus ilicifolia</i> ), and manzanita ( <i>Arctostaphylos</i> sp.). Potential stressors include grazing, recreation, and noxious weeds. Noxious weeds in the area include barbed goatgrass ( <i>Aegilops triuncialis</i> ) and Bermudagrass ( <i>Cynodon dactylon</i> ).
613	BLM (Red Hills ACEC)	Poor Man's Gulch	10% Vegetative, 90% Flowering	0.006	5-10	No	Located within an open understory in foothill pine woodland. Other plants at the site include serpentine bluecups, buck brush, toyon, holyleaf redberry, purple sanicle ( <i>Sanicula bipinnatifida</i> ), and chaparral false bindweed ( <i>Calystegia occidentalis</i> ). A potential stressor to the occurrence is grazing.

Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDDB record?	Occurrence Data
614	BLM (Red Hills ACEC)	Poor Man's Gulch	40% Vegetative, 60% Flowering	0.1	50-100	No	Found in small grassy opening within foothill pine woodland. Other plants at the site include serpentine bluecups, buck brush, holyleaf redberry, toyon, and chamise. A potential stressor to the occurrence is grazing.
615	BLM (Red Hills ACEC)	Poor Man's Gulch	30% Vegetative, 70% Flowering	0.022	25-50	No	Found in small grassy opening within foothill pine woodland. Other plants located at the site include serpentine bluecups, buck brush, holyleaf redberry, toyon, purple sanicle, and chamise. A potential stressor to the occurrence is grazing.
616	BLM (Red Hills ACEC)	Poor Man's Gulch	30% Vegetative, 70% Flowering	0.5	100-250	No	Found on rocky ground within foothill pine woodland. Other plants at the site include serpentine bluecups, buck brush, holyleaf redberry, toyon, purple sanicle, California melicgrass ( <i>Melica californica</i> ), and snakelily ( <i>Dichelostemma multiflorum</i> ). A potential stressor to the occurrence is grazing.
618	BLM (Red Hills ACEC)	Poor Man's Gulch	60% Vegetative, 40% Flowering	0.1	25-50	No	Located within foothill pine woodland. Other plants at the site include serpentine bluecups, Red Hills onion, buck brush, and toyon. A potential stressor to the occurrence is grazing.
619	BLM (Red Hills ACEC)	Poor Man's Gulch	80% Vegetative, 20% Flowering	0.1	25-50	No	Located within foothill pine woodland with scattered shrubs. Other plants at the site include serpentine bluecups, buck brush, chamise, holyleaf redberry, California melicgrass, and snakelily. A potential stressor to the occurrence is grazing.

Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDDB record?	Occurrence Data
621	BLM (Red Hills ACEC)	Poor Man's Gulch	100% Vegetative	0.022	5-25	No	Found on rocky ground within foothill pine woodland. Other plants at the site include serpentine bluecups, Red Hills onion, buck brush, Chamise, holyleaf redberry, and snakelily. Potential stressors include grazing, recreation, and noxious weeds. An equestrian trail runs near the occurrence. Noxious weeds found in the area include barbed goatgrass and Bermudagrass.
624	BLM (Red Hills ACEC)	Poor Man's Gulch	60% Vegetative, 40% Flowering	0.046	50-100	No	Located within small opening in foothill pine woodland. Other plants at the site include Red Hills soaproot ( <i>Chlorogalum grandiflorum</i> ), Congdon's lomatium ( <i>Lomatium congdonii</i> ), toyon, holyleaf redberry, purple sanicle, and California melicgrass. Potential stressors include grazing, recreation and noxious weeds. Noxious weeds found in the area include barbed goatgrass and Bermudagrass.
631	BLM (Red Hills ACEC)	Poor Man's Gulch	40% Vegetative, 60% Flowering	0.1	50-100	No	Located on rocky understory in foothill pine woodland. Other plants at the site include serpentine bluecups, Red Hills soaproot, purple sanicle, holyleaf redberry, toyon, and California melicgrass. Potential stressors include grazing, recreation, and noxious weeds. Noxious weeds found in the area include barbed goatgrass and Bermudagrass.
632	BLM (Red Hills ACEC)	Poor Man's Gulch	60% Vegetative, 40% Flowering	0.1	25-50	No	Located within small opening in foothill pine woodland. Other plants at the site include serpentine bluecups, Red Hills soaproot, buck brush, holyleaf redberry, California melicgrass, and snakelily; Potential stressors include grazing, recreation, and noxious weeds. Noxious weeds found in the area include barbed goatgrass and Bermudagrass.

Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDDB record?	Occurrence Data
636	BLM (Red Hills ACEC)	Six Bit Gulch	70% Vegetative, 30% Flowering	1.0	100-250	No	Located within foothill pine woodland; other plants at the site include shaggyhair lupine ( <i>Lupinus spectabilis</i> ), snakelily, buckbrush, purple sanicle, and spicebush ( <i>Calycanthus occidentalis</i> ). Potential stressors include grazing, recreation, and noxious weeds. Barbed goatgrass occurs in the immediate vicinity of this occurrence.
638	BLM (Red Hills ACEC)	Six Bit Gulch	60% Vegetative, 40% Flowering	0.022	10-25	No	Located within foothill pine woodland.. Other plants at the site include shaggyhair lupine, Red Hills soaproot, Congdon's lomatium, buck brush, squirrel tail grass ( <i>Elymus elymoides</i> ), and Indian paintbrush ( <i>Castilleja applegatei</i> ). Potential stressors include grazing, recreation, and noxious weeds.
641	BLM (Red Hills ACEC)	Six Bit Gulch	60% Vegetative, 40% Flowering	0.005	100	No	Located within foothill pine woodland. Other plants at the site include shaggyhair lupine, Red Hills soaproot, Congdon's lomatium, Red Hills onion, buck brush, California melicgrass, purple sanicle, and snakelily. Potential stressors include grazing, recreation, and noxious weeds.
647	BLM (Red Hills ACEC)	Six Bit Gulch	80% Vegetative, 20% Flowering	0.069	150	No	Located within foothill pine woodland. Other plants at the site include shaggyhair lupine, Red Hills soaproot, Congdon's lomatium, California melicgrass, holyleaf redberry, and purple sanicle. No potential stressors were identified.
654	BLM (Red Hills ACEC)	Six Bit Gulch	90% Vegetative, 10% Flowering	0.022	75	No	Found on the upperslope of serpentine/ultramafic soils. Other plants at the site include serpentine bluecups, shaggyhair lupine, Red Hills soaproot, Red Hills onion, Congdon's lomatium, tripod buckwheat ( <i>Eriogonum tripodum</i> ), buck brush, snakelily, purple sanicle, and California melicgrass. Potential stressors include grazing, recreation, and noxious weeds.



Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDDB record?	Occurrence Data
656	BLM (Red Hills ACEC)	Six Bit Gulch	50% Vegetative, 50% Flowering	0.064	100	No	Found on the upperslope of serpentine/ultramafic soils. Other plants at the site include serpentine bluecups, shaggyhair lupine, Red Hills soaproot, Red Hills onion, Congdon's lomatium, tripod buckwheat, snakelily, buck brush, and purple sanicle. The potential stressor on this occurrence is recreation.
659	BLM (Red Hills ACEC)	Six Bit Gulch	50% Vegetative, 50% Flowering	0.172	60	No	Found on the upperslope of serpentine/ultramafic soils. Other plants at the site include serpentine bluecups, shaggyhair lupine, Red Hills soaproot, Red Hills onion, Congdon's lomatium, tripod buckwheat, and snakelily. The potential stressor on this occurrence is water-based recreation.
672	BLM (Red Hills ACEC)	Six Bit Gulch	90% Vegetative, 10% Flowering	0.002	10	Yes	Found within foothill pine woodland on serpentine soil. Other plants at the site include Mariposa cryptantha ( <i>Cryptantha mariposae</i> ), serpentine bluecups, Red Hills onion, Congdon's lomatium, snakelily, California melicgrass, and holyleaf redberry. The potential stressor on this occurrence is recreation.
675	BLM (Red Hills ACEC)	Six Bit Gulch	10% Vegetative, 90% Flowering	0.002	10	No	Found on serpentine/ultramafic soils. Other plants at the site include serpentine bluecups, Red Hills soaproot, Red Hills onion, Congdon's lomatium, Mariposa cryptantha, buck brush, snakelily, and California melicgrass. The potential stressor on this occurrence is recreation.
677	BLM (Red Hills ACEC)	Kanaka Point	100% Vegetative	0.002	55	No	Found within foothill pine woodland. Other plants at the site include Red Hills onion, toyon, and purple sanicle. Potential stressors to the occurrence include trampling by recreators due to footpaths throughout area, and the presence of the noxious weed distaff thistle, which occurs within the general vicinity.
679	BLM	Kanaka	99%	0.008	40	No	Found within foothill pine woodland. Other

Occurrence Number	Land Ownership	Site Name	Phenology	Approximate Area (acre)	Estimated Plant Count	Existing CNDDDB record?	Occurrence Data
	(Red Hills ACEC)	Point	Vegetative, 1% Flowering				plants at the site include Mariposa cryptantha, serpentine bluecups, toyon, California melicgrass, coyote mint, and soft brome ( <i>Bromus hordeaceus</i> ). Potential stressors include trampling by recreational users due to footpaths throughout area and the noxious weed, distaff thistle, which occurs within the general vicinity.
693	BLM (Red Hills ACEC)	Poor Man's Gulch	5% Vegetative, 95% Flowering	0.0005	5	No	Found within in gray pine ( <i>Pinus sabiniana</i> ) dominated foothill woodland. Other plants at the site include buckbrush, spicebush, snakelily, California melicgrass and gold back fern. Potential stressors on this occurrence include water-based recreation and the noxious weed, Bermudagrass, which was observed nearby.

## **4.2 California Vervain**

On September 14, 1998, the USFWS listed California vervain as threatened under the federal ESA (Federal Register 63:49002). In December 2007, a five-year review of the species by the USFWS recommended no change in designation (USFWS 2012b). USFWS is currently developing a Recovery Plan for California vervain.

### **4.2.1 Habitat Requirements**

California vervain is only known to grow in the Red Hills of California (CNPS 2012). The species is a perennial herb that is only found along intermittent or small, perennial streams (CDFG 2005), usually within serpentinite, cismontane woodlands in valley and foothill grasslands between 853 ft and 1,312 ft in elevation. It is occasionally found in non-wetland areas (Calflora 2012).

### **4.2.2 Environmental Baseline in the Action Area**

California vervain has been historically documented within the Chinese Camp and Sonora quads, as well as the surrounding Keystone quad (CNPS 2012). Botanical surveys for California vervain were performed in the Action Area as part of the larger botanical survey effort described in Section 4.1. During these surveys, two occurrences of California vervain were documented in the Action Area: one in Poor Man's Gulch and one in Six Bit Gulch. Both occur on public lands administered by the BLM within the Red Hills ACEC. In Poor Man's Gulch, the occurrence consisted of over 200 individuals occupying approximately 0.2 ac. The occurrence in Six Bit Gulch consisted of two individuals occupying approximately 4 ft<sup>2</sup>. Both were located within riparian zones dominated by arroyo willow (*Salix lasiolepis*), sedges (*Carex sp.*), white broadiaea (*Triteleia hyacinthina*), and Baltic rush (*Juncus balticus*). Occurrences of California vervain within the Action Area are summarized in Table 4.2-1.

Observed potential stressors included cattle grazing and recreation near one California vervain occurrence, and noxious weeds (barbed goatgrass [*Aegilops triuncialis*]) near both occurrences. The USFWS reports that threats to California vervain include recreational activities such as gold mining, mountain biking, and hiking. In addition, hydrologic changes resulting from residential developments and mining activities also affect the species (USFWS 2012b).

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**Table 4.2-1. California vervain occurrences located within the Action Area.**

Occurrence Number	Ownership	Site Name	Phenology	Approximate Area (acre)	Plant Count	Existing CNDDDB record?	Occurrence Data
700	BLM (Red Hills ACEC)	Poor Man's Gulch	75% Vegetative, 25% Flowering	0.2	200	No	Found in riparian wetland; other plants at the site include Pacific willow ( <i>Salix lasiandra</i> ), <i>Carex</i> spp., white hedge nettle ( <i>Stachys albens</i> ), panicgrass ( <i>Panicum</i> sp.), rabbitsfoot grass ( <i>Polypogon</i> sp.), and milkweed ( <i>Asclepias</i> sp.); Potential stressors include grazing, noxious weeds, and recreation. Barbed goatgrass was observed nearby.
702	BLM (Red Hills ACEC)	Six Bit Gulch	100% Vegetative	0.00009	2	No	Found within willow dominated riparian wetland. Other plants at the site include Pacific willow, spicebush, <i>Carex</i> spp., panicgrass, and meadow barley ( <i>Horedum brachyantherum</i> ). Potential stressors include grazing and noxious weeds. Barbed goatgrass was observed in immediate vicinity.

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### **4.3 California Red-Legged Frog**

On May 23, 1996, the USFWS listed the CRLF as Threatened throughout its range under the ESA (61 FR 25813 25833). The final CRLF Recovery Plan was issued on September 12, 2002 (67 FR 57830) and critical habitat was designated on March 13, 2001 (66 FR 14626), with additional critical habitat designated on April 13, 2006 (71 FR 19244), and revised on March 17, 2010 (75 FR 12816). No USFWS-designated Critical Habitat Units occur within 29 miles of the Don Pedro Project Boundary. No occurrences of CRLF have been recorded within five miles of the Action Area since 1984, and USFWS's Recovery Plan for the species lists CRLF as extirpated from the Tuolumne River Core Area upstream of the Project and Piney Creek Core Area east of the Project in the Merced River drainage (USFWS 2002b).

#### **4.3.1 Life History and Habitat Requirements**

Depending on elevation and climate, CRLF may breed from late November to late April. Egg masses are attached to emergent vegetation such as cattails or bulrush in natural ponds, stock ponds, marshes, or in deep pools and stream backwaters. Larvae typically metamorphose between July and September (Jennings and Hayes 1994).

Adult dispersal outside the breeding season may be directed upstream, downstream, or upslope of breeding habitat, and may be associated with foraging and pursuit of hiding cover or aestivation habitat. Telemetry and other detection methods indicate that CRLF use small-mammal burrows, leaf litter, and other moist sites as much as 200 ft from riparian areas (Jennings and Hayes 1994; USFWS 2006b). Long-distance dispersal has been documented at distances of up to one mile and probably occurs only during wet periods (USFWS 2006b).

CRLF are primarily associated with perennial ponds or pools and perennial or seasonal streams where water remains for a minimum of 20 weeks beginning in the spring (i.e., sufficiently long for breeding to occur and larvae to complete development) (Jennings and Hayes 1994; USFWS 2006b). Locations with the highest densities of CRLF have dense emergent or shoreline riparian vegetation closely associated with moderately deep (greater than 2.3 ft), still, or slow-moving water. Vegetation that provides the most suitable habitat consists of willows, cattails, and bulrushes at or close to the water level, which shade a substantial area of the water (Hayes and Jennings 1988). Another factor correlated with CRLF occurrence is the absence or near-absence of introduced predators such as American bullfrog and predatory fish, particularly freshwater sunfishes—which feed on the larvae at higher rates than native predatory species (Hayes and Jennings 1988)—and mosquitofish. Hiding cover used to avoid predators may consist of emergent vegetation, undercut banks, and semi-submerged root wads (USFWS 2005). Some habitats that are not suitable for breeding (e.g., shallow or short-seasonal wetlands, pools in intermittent streams, seeps, and springs) may constitute habitats for aestivation, shelter, foraging, predator avoidance, and juvenile dispersal.

#### **4.3.2 Environmental Baseline in the Action Area**

No occurrences of CRLF have been documented within the Action Area. Known historical and current CRLF occurrences near the Action Area are summarized in Table 4.3-1. There are five known historical occurrences of CRLF within 10 miles of the Don Pedro Project (Basey 2010;

Jennings 2010; CDFG 2012; Fellers 2010), two of these within one mile of the Action Area, on Piney Creek prior to 1984. Piney Creek is a tributary to Lake McClure, located east of Don Pedro Reservoir. At these locations CRLF occurred in a ravine with a deep pool upstream of Highway 132 (Basey 2010) and at another pool farther upstream (USFWS 2010; Jennings 2010). American bullfrogs were found in two other pools on Piney Creek at the time of the CRLF observations. CRLF in Piney Creek are generally presumed to be extirpated, based on field investigations conducted by the USFWS (2002b). There are no recent or known extant occurrences of CRLF near the Action Area. The nearest extant occurrence is 29 miles northwest of the Project within Critical Habitat Unit CAL-1 in Calaveras County (CAS 2012).

**Table 4.3-1. Recorded occurrences of CRLF in Tuolumne, Mariposa, Merced, and Stanislaus counties.**

Occurrence <sup>1</sup>	Distance from the Project and Status of the Occurrence
Piney Creek upstream of Highway 132, Mariposa Co. (3 adults, 1972-1984 <sup>2</sup> )	1.0 mile E of Don Pedro Reservoir. Presumed extirpated <sup>4</sup> .
Piney Creek at Gusano Way, Mariposa Co. (unknown number of individuals, 1972 and 1974 <sup>3</sup> )	1.1 miles E of Don Pedro Reservoir. Presumed extirpated <sup>4</sup> .
Woods Creek, near Columbia and Sonora, Tuolumne Co. (4 adults or juveniles, 1950 collection <sup>4</sup> )	8.5 miles NW of Don Pedro Reservoir. Population in a nonspecific area, possibly extirpated <sup>4</sup> .
Maxwell Creek near Coulterville, Mariposa Co. (1 tadpole, 1992 <sup>5</sup> )	8.3 miles E of Don Pedro Reservoir. Presumed extirpated <sup>4</sup> .
Parrotts Ferry Road, near Columbia, Tuolumne Co. (1 adult or juvenile, 1975 collection <sup>4</sup> )	9.7 miles N of Don Pedro Reservoir. Occurrence “presumed extant” by CNDDB <sup>4</sup> ; however no wildlife professionals consulted could confirm the accuracy of the record or its status if accurate.
Snelling, Merced Co. (adult or juvenile, 1915 collection <sup>6</sup> )	12.5 miles S of Don Pedro Reservoir. Presumed extirpated <sup>4</sup> .
“Merced River Bridge, Highway Crossing,” Merced Co. (1 adult or juvenile, 1922 collection <sup>7</sup> )	Unknown distance. Presumed extirpated <sup>4</sup> .
Jordan Creek, 2 miles N of Greeley Hill Rd., Tuolumne Co. (1 adult female, 1967 <sup>3</sup> )	14.4 miles E of Don Pedro Reservoir. Presumed extirpated <sup>4</sup> .
Mather, near Tuolumne River, Tuolumne Co. (1 unknown life stage, 1922 collection <sup>4</sup> )	22.4 miles E of Don Pedro Reservoir. Population considered possibly extirpated <sup>4</sup> .
Swamp Lake, near Miguel Meadow, Tuolumne Co. (1 unknown life stage, 1940 collection <sup>4</sup> )	23.9 miles E of Don Pedro Reservoir. Population considered possibly extirpated <sup>4</sup> .

<sup>1</sup> Records and critical habitat units in western Stanislaus County and Merced County are not included due to distance from the Project area (greater than 30 miles).

Sources: <sup>2</sup>H.E. Basey, pers. comm., 2010; <sup>3</sup>Dr. M.R. Jennings, pers. comm., 2010; <sup>4</sup>CNDDB (CDFG 2012); <sup>5</sup>Dr. G.M. Fellers, USGS, pers. comm., 2010; <sup>6</sup>MVZ 2012; <sup>7</sup>CAS 2012.

Site assessments and habitat characterizations were performed for CRLF in the vicinity of the Project Boundary, including a review of historical data, identification of potential habitats using aerial photography and National Wetlands Inventory digital maps (USFWS 1987), and site evaluations. Ponds and streams within the vicinity of the Project Boundary are located in a mix of oak pastureland and pine savannah with shrubs, grasses, and forbs adjacent to the aquatic habitat. The study locations varied from large streams with substantial overhanging vegetation to agricultural or water treatment ponds with no cover and limited vegetation. The diversity of study locations was representative of the Don Pedro Project area as a whole. As specified in the



FERC-approved CRLF study plan, the study area for this effort consisted of all suitable aquatic habitats within the Action Area and lands within one mile of the Project Boundary, consistent with USFWS requirements.

Initial assessment using aerial photography and National Wetlands Inventory digital maps determined that a total of 211 locations within the study area met the minimum criterion of 20 weeks of standing or slow-moving water during the CRLF breeding season. Many of the aerially assessed sites that met the 20-week criterion had some emergent and overhanging vegetation, but while these sites were located within the study area, they were not located within the Action Area, and were classified as marginal habitat due to the type of habitat (e.g., human-made agricultural ponds) and the presence of bullfrogs. Table 4.3-2 provides a summary of all sites assessed for CRLF habitat within one mile of the Action Area.

**Table 4.3-2. Summary of sites assessed for CRLF habitat.**

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 20-Week Criterion <sup>1</sup>	Land Ownership <sup>3</sup>		
			MID/TID	BLM	Private/ Other
Within the Action Area					
Streams and Pools in Streams	53	27 (3)	44 <sup>2</sup>	7 <sup>2</sup>	8 <sup>2</sup>
Natural Ponds	1	4(1)	7 <sup>2</sup>	4	2 <sup>2</sup>
Stock/Irrigation/ Detention Pond	7	7	4	3	0
Upland/Developed	4	0	3	1	0
Other	1	1	1	0	0
Total	66	39 (4)	59 <sup>2</sup>	15 <sup>2</sup>	10 <sup>2</sup>
Within One Mile of the Action Area					
Streams and Pools in Streams	58	50	2	1	55
Natural Ponds	129	105	3 <sup>2</sup>	2	125 <sup>2</sup>
Stock/ Irrigation/ Detention Pond	11	9	0	1 <sup>2</sup>	11 <sup>2</sup>
Other Wetlands	62	6	1 <sup>2</sup>	1 <sup>2</sup>	62
Upland <sup>2</sup> / Developed	3	2	0	0	1
Other	2	2	0	0	2
Total	264	172	5 <sup>2</sup>	5 <sup>2</sup>	256 <sup>2</sup>
Study Area Total	330	211(4)	64 <sup>2</sup>	20 <sup>2</sup>	266 <sup>2</sup>

<sup>1</sup> Italic numbers in parenthesis are those sites for which 20-week criterion status is unknown.

<sup>2</sup> Includes locations with multiple ownerships.

<sup>3</sup> Some sites have multiple ownerships; therefore, ownership total exceeds the number of assessed locations.

Following aerial assessment, field surveys to verify habitat characterizations and collect additional information were performed at potential breeding sites within the Action Area, and representative breeding locations on publicly accessible lands within one mile of the Action Area. Field surveys revealed that the majority of these sites provide marginal habitat due to the lack of emergent or overhanging vegetation or because of the presence of predators such as fish and bullfrogs. Of the field-assessed sites, 52 were characterized as potentially suitable CRLF breeding sites based on the minimum criterion, 10 of which were considered more favorable for CRLF breeding due to the presence of suitable vegetation and lack of predators. No CRLF were observed during this or other studies.

Potential stressors to CRLF include predators, cattle grazing, and facilities and recreational area maintenance activities. Exotic species (e.g., American bullfrogs [*Lithobates catesbeianus*], non-native crayfish, sunfish, catfish, or mosquitofish), may limit or preclude the occurrence of CRLF in otherwise suitable habitats (USFWS 2002b).

#### **4.4 California Tiger Salamander**

On August 4, 2004, the Central California DPS of CTS was listed as Threatened under the ESA (69 FR 47212). Critical habitat was designated for the Central California Population DPS on August 23, 2005, (70 FR 79380), including an area approximately 1 mile southwest of the Don Pedro Project Boundary in Stanislaus County.

##### **4.4.1 Life History and Habitat Requirements**

CTS breeding habitat is generally associated with shallow, seasonal (i.e., continuously flooded for a minimum of 10-12 consecutive weeks) or semi-permanent pools and ponds that fill during heavy winter rains, or in permanent ponds (Alvarez 2004a). Adult CTS spend little time at breeding sites before returning to upland habitats. CTS populations generally do not persist where fish, American bullfrog, or predacious insects are well established. Breeding occurs mainly from December through February after rains fill pools and ponds. Eggs are laid singly or in small clusters, often attached to submerged stems and leaves, and hatch in two to four weeks. Larvae transform in about four months (Behler and King 1979) as water recedes in late spring or summer, but larvae may overwinter in permanent ponds (Alvarez 2004b). CTS may not breed at all in drought years when ponds fail to fill. CTS live in vacant or mammal-occupied burrows (e.g., California ground squirrel, *Otospermophilus beecheyi*, and valley pocket gopher, *Thomomys bottae*) (Trenham 2001), or occasionally other underground retreats, throughout most of the year in grassland, savannah, or open woodland habitats. Burrows also provide habitat during dispersal. CTS populations are typically associated with vernal pool complexes, rather than isolated sites not within “rescue” distance of other ponds (Trenham 2001).

##### **4.4.2 Environmental Baseline in the Action Area**

There are five known historical CTS occurrences within five miles of the Action Area. The most recent of these was documented in 2007, approximately 0.4 miles from Don Pedro Reservoir (CDFW 2013). Known historical and current CTS occurrences in the vicinity of the Project Boundary are summarized in Table 4.4-1. No CTS were observed during the site assessments performed as part of 2012 surveys, nor were there any incidental sightings of CTS during other relicensing studies.

**Table 4.4-1. Recorded occurrences of CTS within five miles of the Action Area.**

Occurrence	Distance from the Project Boundary and Status of the Occurrence
Tuolumne Co. (3 larvae, 2007)	0.37 mi S of Don Pedro Reservoir. Presumed extant by CNDDDB.
About 0.5 mi E of La Grange, Stanislaus Co. (unknown number and lifestage, 1973)	3.13 mi SW of Don Pedro Reservoir. Presumed extant by CNDDDB.
Cardoza Lake, E side of Highway J-59, about 1.25 mi S of La Grange, Stanislaus Co. (1 adult, 1986)	3.98 mi SW Don Pedro Reservoir. Presumed extant by CNDDDB.
About 2 mi S of La Grange, Stanislaus Co. (unknown number and lifestage, 1973)	5.00 mi SW of Don Pedro Reservoir. Presumed extant by CNDDDB.
La Grange Regional Park, near Basso Bridge on the Tuolumne River, Stanislaus Co. (unknown number and lifestage, 1973)	5.06 mi SW of Don Pedro Reservoir. Presumed extant by CNDDDB.

Source: CNDDDB (CDFG 2012)

CTS site assessments and habitat characterizations conducted in the vicinity of the Project Boundary consisted of historical data review, identification of potential habitats using aerial photography and National Wetlands Inventory digital maps (USFWS 1987), and site evaluations. As specified in the FERC-approved study plan, the study area for this effort consisted of all suitable aquatic habitats within the Action Area and lands within 1.24 miles of the Action Area, consistent with USFWS requirements. Table 4.4-2 provides a summary of all sites assessed for CTS breeding habitat within 1.24 miles of the Action Area. Study locations varied from large streams with substantial overhanging vegetation to manmade agricultural or water treatment ponds with no cover and limited vegetation. Ponds and streams within the vicinity of the Project Boundary are located in a mix of oak pastureland and pine savannah with shrubs, grasses, and forbs adjacent to the aquatic habitat. The diversity of study locations was representative of the Don Pedro Project area as a whole. Small burrows were present at many sites.

**Table 4.4-2. Summary of sites assessed for CTS breeding habitat.**

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 10-Week Criterion <sup>1</sup>	Land Ownership <sup>3</sup>		
			MID/TID	BLM	Private/ Other
Within the Action Area					
Streams and Pools in Streams	53	27 (3)	45 <sup>2</sup>	10 <sup>2</sup>	8 <sup>2</sup>
Natural Ponds	8	5	7 <sup>2</sup>	4	2 <sup>2</sup>
Stock/Irrigation/ Detention Pond	7	7	4	3	0
Upland/Developed	4	0	3	1	0
Other	1	1	1	0	0
<b>Total</b>	<b>73</b>	<b>40 (3)</b>	<b>60<sup>2</sup></b>	<b>18<sup>2</sup></b>	<b>10<sup>2</sup></b>
Within 1.24 Miles of the Action Area					
Streams and Pools in Streams	72	61	2 <sup>2</sup>	3	68 <sup>2</sup>
Natural Ponds	158	129	4 <sup>2</sup>	2	154 <sup>2</sup>
Stock/ Irrigation/ Detention Pond	13	9	0	1 <sup>2</sup>	13 <sup>2</sup>
Other Wetlands	73	6	1 <sup>2</sup>	1 <sup>2</sup>	73 <sup>2</sup>
Upland <sup>2</sup> / Developed	1	0	0	0	1

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 10-Week Criterion <sup>1</sup>	Land Ownership <sup>3</sup>		
			MID/TID	BLM	Private/ Other
Within the Action Area					
Other	2	2	0	0	2
Total	319	207	7	7	311
Study Area Total	392	247(3)	67 <sup>2</sup>	25 <sup>2</sup>	321 <sup>2</sup>

<sup>1</sup> Italic numbers in parentheses are those sites for which 20-week criterion status is unknown.

<sup>2</sup> Includes locations with multiple ownerships.

<sup>3</sup> Some sites have multiple ownerships; therefore, ownership total exceeds the number of assessed locations.

Potential CTS breeding habitat (standing water for at least 10 weeks during the breeding season) was documented at or near 247 habitat sites within the study area. Many of the aerially assessed sites that held water for at least 10 weeks appeared to have suitable upland dispersal habitat. Following aerial assessment, field surveys to verify habitat conditions and collect additional information were performed at potential breeding sites within the Action Area and representative breeding locations on publicly accessible lands within 1.24 miles of the Action Area. Field surveys revealed that the majority of these sites were perennial streams that were unsuitable because of high gradient or a lack of upland habitat suitable for dispersal. Within the Action Area, 38 field-assessed sites were characterized as potentially suitable CTS breeding sites, 29 of which were considered more favorable to CTS breeding due to the presence of small burrows and upland habitat suitable for dispersal.

Potential stressors to CTS include predators and habitat disturbance from noxious weeds, grazing, and facilities and recreational area maintenance activities. Predatory fish can severely limit the survival of CTS in otherwise suitable breeding habitat (Jennings and Hayes, 1994), and CTS can be excluded from potential habitats due to invasion by noxious weeds or direct disturbance caused by cattle, maintenance activities, and recreation activities (e.g. trampling).

## 4.5 Valley Elderberry Longhorn Beetle

On August 8, 1980, the USFWS listed the VELB as Threatened under the ESA (Federal Register 45:52803). The USFWS issued a VELB Recovery Plan on August 28, 1984 (USFWS 2009). On February 14, 2007, the USFWS completed a five-year review, which resulted in USFWS's recommendation that the species be delisted. In October 2012, the USFWS began the process of reviewing the delisting proposal (USFWS 2012c).

Delisting is being assessed because of evidence that VELB may be widespread and less threatened than it was when initially listed. There are currently over 200 recorded occurrences of VELB, where there had been only ten at the time of listing. Also, the destruction of riparian areas has slowed, and recovery efforts have led to the restoration and replanting of riparian areas, including plantings of elderberry (USFWS 2012c).

### 4.5.1 Life History and Habitat Requirements

The VELB is dependent on its host plant, elderberry (*Sambucus* spp.), which is a common component of riparian corridors and adjacent upland areas in the Central Valley, for all of its life stages (i.e., egg, larva, and adult). VELB primarily occur within the riparian corridor but can

occur infrequently in non-riparian scrub habitats adjacent to the corridor, and less commonly in annual grasslands and live oak woodlands. VELB appear to be capable of limited dispersal and prefer to remain within contiguous patches of high quality riparian habitat.

The VELB life cycle takes one or two years to complete. Eggs are laid on elderberry leaves or bark and hatch within two days. The larvae live within the stems of the plants feeding on the pith for one to two years. Adults emerge from the stems through holes made by larvae prior to pupation. Adults generally emerge from late March through June and are short-lived (USFWS 2009). The exit holes created by larvae prior to pupation are often the only evidence of VELB presence.

#### 4.5.2 Environmental Baseline in the Action Area

A data review for known occurrences of VELB, botanical surveys for elderberry plants, and stem inspections for beetle exit holes on elderberry plants were conducted in 2012. Surveys for elderberry plants followed CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). The study included all Don Pedro Project facilities and recreation sites, dispersed recreation areas along Don Pedro Reservoir, and 10 drainages within the Action Area that were also designated for wetland studies.

Surveys recorded a total of 73 elderberry plant occurrences within the Action Area. VELB boreholes were observed at 14 of the elderberry occurrences, ranging from two to 43 exit holes (Table 4.5-1). Of the 14 elderberry plants with exit holes, only two were found in riparian areas; the majority were in partially-disturbed habitat near roads or developed recreation areas.

**Table 4.5-1. Elderberry shrubs with observed boreholes within the Action Area.**

Occurrence	Riparian Yes No	Stem Count <sup>1</sup>	Class	Number of Exit Holes	Recent Yes No	Land Ownership	Site Location
4	No	15	II	15	No	MID/TID	Moccasin Point Recreation Area
6	No	13	II	7	No	MID/TID	Moccasin Point Recreation Area
9	Yes	10	III	43	Yes	MID/TID	Moccasin Point Recreation Area
10	Yes	1	I	2	No	BLM	Moccasin Point Recreation Area
17	No	1	III	8	No	MID/TID	Below dam
18	No	1	III	5	No	MID/TID	Beside sewage pond across from Blue Oaks Recreation Area
26	No	1	III	10	No	MID/TID	Hatch Creek
31	No	1	II	6	No	BLM	Jacksonville Road
32	No	1	II	3	No	BLM	Jacksonville Road
38	No	1	II	2	No	MID/TID	Jacksonville Road
46	No	1	III	2	No	BLM	Jacksonville-Harney Road

Occurrence	Riparian Yes No	Stem Count <sup>1</sup>	Class	Number of Exit Holes	Recent Yes No	Land Ownership	Site Location
47	No	Unknown – not accessed for safety reasons	I, II, III	19	No	MID/TID	Moccasin transmission line
301	No	18	I, II, III	8	No	MID/TID	Rogers Creek Arm
304	No	7	III	9	No	MID/TID	Rogers Creek Arm

<sup>1</sup> Stems one inch or greater at the base.

Similar to ESA-listed plants, observed potential stressors to elderberry plants, and thus VELB, include cattle grazing, invasion by noxious weeds, maintenance activities, and trampling in recreation areas. Elderberry occurrences 19, 20, 24, and 25 are within lands permitted for grazing by the Districts, and occurrences 5, 6, 8-13, 39, 44-5, 603-4, 612, and 901 were all observed to be in close proximity to noxious weeds. At Moccasin Point Recreation Area, elderberry occurrences 1-4, 13 and 45 are located in areas where there is the potential for disturbance (roads and/or campsites) due to recreation and management activities. Occurrence 300 at Blue Oaks Recreation Area is also located in an area with disturbances (roads and/or campsites) resulting from recreation and management activities. Occurrences 14 and 18 are located near a sewage pond and potentially subject to disturbance by vegetation management. Occurrences 28 and 32-36 at Kanaka Point, 42 at Harney Road, 26 at Hatch Creek, 40-1 on Shawmut Road, and 301-306 and 308 at Rogers Creek Arm are potentially subject to disturbances caused by day-use recreation, particularly during the summer months. Similarly, occurrence 45 is located in the middle of a campground at Moccasin Point Recreation Area.

## 4.6 San Joaquin Kit Fox

The San Joaquin kit fox was originally listed as endangered in 1967 under the Endangered Species Preservation Act (32 FR 4001). It is currently ESA-listed as an endangered species. The Final Recovery Plan for Upland Species of the San Joaquin Valley, including San Joaquin kit fox, was issued on September 30, 1998 (Williams et. al. 1998). A five-year review was completed for the species in February 2010, and no change to listing status was recommended.

### 4.6.1 Life History and Habitat Requirements

San Joaquin kit foxes mate in winter and have between four and seven young in February or March. They use multiple underground dens throughout the year, sometimes using pipes or culverts as den sites in addition to burrows. Their primary prey is usually the most abundant nocturnal rodent or lagomorph in their area. They also feed opportunistically on carrion, birds, reptiles, insects, and fruits (NatureServe 2009).

San Joaquin kit foxes are reported to use a wide range of habitats, including alkali sink, valley grassland, and foothill woodlands (NatureServe 2009), at times in proximity to agriculture and grazing lands (Bell 1994). Kit foxes prefer loose-textured soils (Grinnell et al. 1937, Hall 1946, Egoscue 1962, Morrell 1972) but are found on virtually every soil type. Dens appear to be

scarce in areas with shallow soils (O'Farrell and Gilbertson 1979, O'Farrell et al. 1980), high water tables (McCue et al. 1981), or impenetrable hardpan layers (Morrell 1972). However, kit foxes will occupy soils with high clay content, such as those in the Altamont Pass area in Alameda County, where they modify burrows excavated by other animals (Orloff et al. 1986).

#### **4.6.2 Environmental Baseline in the Action Area**

The California Natural Diversity Database (CNDDDB) includes a single record of a San Joaquin kit fox within the general vicinity of the Project Boundary, approximately 2.1 mi southwest of the Action Area. The record is from 1972-1973, in an area that is currently an OHV recreation development (CDFW 2013). No occurrences of San Joaquin kit fox have been recorded within five miles of the Action Area since 1973 (CDFW 2013).

No kit fox sightings or large burrows were documented during extensive terrestrial surveys conducted in the Action Area during 2012, but apparently suitable habitat for the species is common. As a result, the presence of kit foxes cannot be ruled out.

#### **4.7 Vernal Pool Fairy Shrimp**

On September 19, 1994, vernal pool fairy shrimp were listed as Threatened under the ESA (59 FR 48136-48153). Critical habitat for vernal pool fairy shrimp, along with other vernal pool species, was originally designated in a final rule on August 6, 2003. A revised final rule for critical habitat, with unit designations by species, was published on February 10, 2006, with 35 critical habitat units for vernal pool fairy shrimp totaling 597,821 ac (USFWS 2006a). Of these, critical habitat unit VERFS21B is the closest to the Project, at approximately 2.6 miles from the edge of the Action Area.

The USFWS issued a draft Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon in October 2004; the recovery plan was finalized on December 15, 2005 (USFWS 2005a). A five-year status review for vernal pool fairy shrimp and other species was initiated on May 25, 2011 (USFWS 2011).

##### **4.7.1 Life History and Habitat Requirements**

Vernal pool fairy shrimp occur mostly in vernal pools, but may also occur in natural and artificial seasonal wetland habitats, such as alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock outcrop pools (NatureServe 2009). Vernal pool fairy shrimp occupy a variety of different vernal pool habitats, from small clear sandstone rock pools to large turbid alkaline grassland valley floor pools (Eng et al. 1990, Helm 1998). Although the vernal pool fairy shrimp has been collected from large vernal pools, including one exceeding 25 ac in area (Eriksen and Belk 1999), it tends to occur primarily in smaller pools (Platenkamp 1998) and is most frequently found in pools measuring less than 0.05 ac (Gallagher 1996, Helm 1998). The vernal pool fairy shrimp typically occurs at elevations from 30 to 4,000 ft (Eng et al. 1990), although the species has been found at two sites in the Los Padres National Forest at an elevation of 5,600 ft. The vernal pool fairy shrimp has been collected at water temperatures as low as 4.5°C (Eriksen and Belk 1999) and has not been found in water with temperatures above

about 23°C (Helm 1998, Eriksen and Belk 1999). The species is typically found in pools with low to moderate salinity or total dissolved solids concentrations (Collie and Lathrop 1976, Keeley 1984, Syrdahl 1993). Because vernal pools are mostly rain-fed, they usually have low nutrient levels and often have dramatic daily fluctuations in pH, dissolved oxygen, and carbon dioxide (Keeley and Zedler 1998).

#### **4.7.2 Environmental Baseline in the Action Area**

Most of the known occurrences of vernal pool fairy shrimp are in the Central Valley and Coast Ranges of California, with disjunct populations in San Luis Obispo County, Santa Barbara County, and Riverside County (Eng et al. 1990, Erickson and Belk 1999). The CNDDDB includes a record of one occurrence within the Sonora quad, which is adjacent to Don Pedro Project quads (CDFW 2013). The Districts engaged in detailed terrestrial resource studies in 2012, during which no vernal pools, or vernal pool plants that might indicate their presence, were located.



## **5.0 EFFECTS OF THE PROPOSED ACTION**

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### **5.1 Direct and Indirect Effects of the Proposed Action**

There would be no direct or indirect effects as a result of the Proposed Action on the seven ESA-listed species addressed in this BA. The Proposed Action, i.e., relicensing of existing hydropower operations at Don Pedro Dam along with proposed resource enhancements, would have no effect on recreational use, or maintenance activities in the Action Area, and as a result no adverse effect on habitat for listed species. Accessing dead pool storage for environmental flows would result in lower reservoir elevations during winter months, but because the drawdown zone is not suitable or potential habitat for any of the seven ESA-listed species addressed here it will not affect these species or their habitats.

Electric power is generated at the Don Pedro Hydroelectric Project using flows released for other purposes. Irrigation, municipal, and industrial water deliveries are pre-scheduled based on forecasted demands and actual projected inflow and then released through the powerhouse up to its hydraulic capacity. These releases are shaped during periods of peak electrical demand, when consistent with water supply requirements and subject to irrigation infrastructure constraints, to release more flow during on-peak rather than off-peak hours. However, such minor variability in flow releases immediately downstream of Don Pedro Dam as the result of hydroelectric operations has no significant influence on water surface elevation or other conditions in Don Pedro Reservoir. Reservoir levels reflect operations related to diversions and releases made in association with unrelated and non-interdependent actions, e.g., providing water for irrigation and M&I uses, as well as flood management in accordance with ACOE guidelines. Hydroelectric generation at the Don Pedro Project cannot adversely impact ESA-listed species in the Action Area, because environmental variability in the reservoir is not linked to power production and, absent power production at the Don Pedro Project, the operations, including recreation, would remain as they are under existing conditions, i.e., driven by uses other than hydropower production.

As noted in Section 2.1 of this BA, the Districts propose to implement a Terrestrial Resources Management Plan that includes measures to manage special status species occurrences within the Project Boundary, including control of noxious weeds, protection of special status plants, and protection of VELB. In addition, the Districts proposed to follow USFWS Conservation Guidelines pertaining to the VELB for the management of elderberry within the Action Area (USFWS 1999). These enhancement measures are expected to benefit ESA-listed species by limiting noxious weed distributions and providing protection of VELB habitat.

### **5.2 Effects from Interrelated and Interdependent Actions**

As noted above, the Districts are seeking a new FERC license to allow for the continuation of hydroelectric power generation at existing facilities at the Don Pedro Dam, and for the upgrade of power production by replacing the existing turbines and uprating the generators. None of the work associated with the upgrade would entail construction outside the powerhouse. Water storage and releases for irrigation, M&I uses, and flood management are in no way dependent on the issuance of a FERC license for the Project, and will occur with or without the licensing of the

Proposed Action. As such, these uses are *not* interrelated or interdependent with the issuance of a FERC license for hydroelectric power generation. Thus, the effects of relevant O&M actions associated with the non-hydropower water uses are addressed as independent actions in the cumulative effects analysis section of this BA. The Districts are aware of no other actions that have the potential to affect ESA-listed species in the Action Area that could be considered related to or interdependent with the Proposed Action.

### **5.3 Cumulative Effects of the Proposed Action**

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (50 C.F.R. §1508.7), "cumulative effects on a resource are the result of the combined influence of past, present, and reasonably foreseeable future actions within a specified geographical range (FERC 2008), regardless of what agency (federal or non-federal) or person undertakes such actions." Cumulative effects may be beneficial or adverse.

#### **5.3.1 O&M Actions in the Action Area**

All actions described and evaluated below are related to the Don Pedro Project's primary purposes (which have been described above). These actions are unrelated to the Proposed Action and would not contribute in any way to cumulative adverse effects on ESA-listed species. Nevertheless, the evaluations below are being provided for informational purposes.

##### **5.3.1.1 Facilities and Road Maintenance**

As part of operating the Don Pedro Project to achieve its primary purposes, the Districts maintain developed facilities and roads using a combination of mechanical mowing and periodic use of pre-emergent herbicides to manage vegetation. Areas maintained by the Districts are typically managed in proportion to their use. Developed facilities (e.g., housing areas near Don Pedro Dam) and associated roads are managed with pre-emergent herbicides annually after the first fall rain (usually in November). Similarly, the perimeters of wastewater treatment facilities are sprayed annually, using herbicides labeled for aquatic use when appropriate, to manage vegetation or aquatic weeds and algae. Mechanical removal of aquatic weeds is also conducted when growth is excessive. Main access road shoulders are mechanically mowed or treated with herbicides. In contrast, unpaved roads leading to Don Pedro Dam from the main road are rarely used, and no formal management is conducted. Some roads may be treated for specific uses, e.g., a small access road leading to La Grange Diversion Dam is typically unmanaged but was mowed in 2012 to allow access for water quality monitoring. All herbicide use is conducted by licensed applicators in accordance with label requirements.

##### **5.3.1.2 Recreation Area Maintenance**

The Districts' three developed recreation areas are managed to control vegetation and the associated risk of fire. High-use sections of each recreation area are subject to mechanical mowing and trimming on a frequent basis, and pads, road edges, firebreaks, and the immediate area around restrooms and Don Pedro Recreation Agency (DPRA) facilities are sprayed with

pre-emergent and/or post-emergent herbicides annually after the first rains. All herbicide use is conducted by licensed applicators in accordance with label requirements.

Project O&M includes periodic gopher and ground squirrel management in developed recreation areas. Beginning in 2016, the Districts ceased use of burrow blasting and pelleted rodent poison, and now use a GopherX smoke and carbon monoxide system that presents no risk to other wildlife and leaves burrows intact following treatment. The Districts plan to continue use of this system during the course of a new license term. If the need to use rodenticides within the Project Boundary arises, the Districts and DPRA will do so in accordance with federal and State law, and prior to application will consult with the CDFW, BLM, and USFWS on the type and location of use.

The Districts have a Prescribed Burn Program that allows the use of prescribed burns for vegetation management. The Prescribed Burn Program includes limitations on the timing and frequency of burns, depending on weather conditions, to minimize fire risk and the potential for damage to adjacent habitats. The Districts use prescribed burning on a limited basis as a management tool; the last burn conducted under the Program occurred in 2009, but the Districts will continue to use prescribed burns as conditions permit.

#### 5.3.1.3 Woody Debris Management

Article 52 of the existing FERC license requires the implementation of the Districts' Log and Debris Removal Plan. Under the Plan, the Districts collect and remove debris at Don Pedro Dam and at other areas of the reservoir as needed. Debris is collected in boom rafts, piled in un-vegetated areas below the high-water mark along the reservoir's edge, and burned during fall and winter.

### 5.3.2 Effects Analysis for O&M Actions

The following sections assess, for each ESA-listed species addressed in this BA, the potential effects of O&M activities (described in Section 5.3.1.) conducted to support the Don Pedro Project's primary purposes of water supply and flood control. Effects discussed in the following sections are unrelated to the Proposed Action for the reasons described in Section 5.1.

#### 5.3.2.1 Layne's Ragwort and California Vervain

Potential stressors and disturbances to Layne's ragwort and California vervain include terrestrial recreation, cattle grazing, noxious weeds, vegetation management, and road maintenance. Small portions of several Layne's ragwort occurrences are located below the normal maximum water surface elevation of the reservoir. These plants are not currently adversely affected by variation in water surface elevation related to the Don Pedro Project's primary purposes of water supply and flood control.

Three occurrences of Layne's ragwort and one occurrence of California vervain were found near recreation sites, but no occurrences were found adjacent to roads or other facilities. Recreation activities, particularly equestrian trail riding, take place in the vicinity of several occurrences of

Layne's ragwort and California vervain in Poor Man's Gulch. A cleared trail runs close by Layne's ragwort occurrence 631. Equestrians ride into the Action Area from upstream of the Don Pedro Project. Very few recreationists appear to access portions of the Action Area in the gulches from the reservoir. On Kanaka Point, recreationists access the Action Area via a free day-use parking lot, and there is evidence of a walking trail in the vicinity of all Layne's ragwort surveyed in the area.

#### 5.3.2.2 California Red-Legged Frog and California Tiger Salamander

CRLF are not known to occur within the Action Area; no occurrences are known within a 5-mile radius of the Don Pedro Project, and the species has been extirpated from the known occupancy sites within the Tuolumne River watershed. Because the species is not thought to occur in the Action Area, there is little to no potential for facilities and road maintenance, recreation, recreation area maintenance, and woody debris management to have an adverse effect on CRLF.

CTS are not known to occur within the Action Area, but are reported to occur in the Don Pedro Project vicinity. CTS breeding habitat is present within the Action Area, but it is considered to be of marginal quality. As a result, adverse effects on CTS breeding habitat resulting from facilities and road maintenance, recreation, or recreation area maintenance are unlikely. Management of uplands within the recreation areas, including targeted ground squirrel control, is associated with operations of the Don Pedro Project to achieve its primary purposes unrelated to the Proposed Action and will not contribute in any way to cumulative adverse effects on CTS.

Ten of the sites that met the minimum criteria for both CTS and CRLF breeding habitats are located within or adjacent to the Don Pedro Dam spillway channel. However, flow has only been passed through the spillway twice since Project construction (during the 1997 flood, and again in 2017). The rare use of the spillway makes potential adverse effects on any CTS or CRLF, if they were present, highly unlikely.

CRLF and CTS breeding habitat was documented at seven sites located at recreational facilities, i.e., one constructed swimming lagoon and six sewage treatment ponds. Each of these sites is lined with either concrete or gravel and has little or no surrounding upland vegetation. Although these sites all hold water for at least 10 weeks during the CTS breeding season and 20 weeks during the CRLF breeding season, they are considered marginal habitat for CRLF due to their lack of overhanging and emergent vegetation and marginal for both CRLF and CTS due to the lack of suitable adjacent upland habitat. Therefore, they are unlikely to support CRLF or CTS. No potential CRLF or CTS breeding habitat was documented adjacent to roads or other facilities.

#### 5.3.2.3 Valley Elderberry Longhorn Beetle

VELB host plants (i.e., elderberry) and evidence of VELB were documented within the Action Area. Most elderberry shrubs are located on shorelines or hillsides that are not affected by the Don Pedro Project. The elderberry plants located in developed recreation areas and adjacent to Don Pedro Project facilities were vigorous at the time of the 2012 surveys, showing no signs of stress.

Elderberry occurrences 47 and 307 are located near the normal maximum surface elevation of Don Pedro Reservoir. Under existing conditions, these plants are not adversely affected by variation in water surface elevation related to the Don Pedro Project's primary purposes of water supply and flood management.

Two elderberry occurrences are located near a sewage pond, where vegetation management activities are conducted. Six occurrences at Moccasin Point and one occurrence at Blue Oaks Recreation Area are located near roads and campsites, and nine occurrences at Kanaka Point, Harney Road, Hatch Creek, Shawmut Road, and Rogers Creek Arm are potentially subject to trampling caused by day-use recreation, particularly during the summer months.

Under existing conditions, elderberry found near roads and recreation areas showed no signs of stress from human disturbance. In addition, the Districts propose to follow USFWS Conservation Guidelines for the VELB for the management of elderberry within the Action Area (USFWS 1999). The Districts also propose to develop a Vegetation Management Plan, which will include measures to manage noxious weeds within the Action Area using methods specified to ensure protection of ESA-listed plants and other important vegetation. As noted previously, these measures are expected to benefit ESA-listed species by limiting noxious weed distributions and providing protection of VELB habitat. Therefore, under existing conditions, road maintenance, recreation facilities maintenance, and woody debris management are expected to have no significant adverse effects on elderberry, and as a result should have no effects on VELB. Disturbance by recreational users is possible, as stated above, but because elderberry found near roads and recreation areas showed no signs of stress from human disturbance under existing conditions, it is reasonable to assume that disturbance is likely to be limited in the future.

#### 5.3.2.4 San Joaquin Kit Fox

San Joaquin kit fox are not reported to occur within the Action Area, and during extensive terrestrial field surveys conducted in 2012 no kit foxes were sighted and no large burrows were documented. However, suitable habitat and nearby historical occurrence records indicate that kit foxes have the potential to be present in the Action Area. The Districts do not engage in predator control that could affect San Joaquin kit fox, and no habitat conversions are proposed that would alter potential San Joaquin kit fox habitat within the Action Area. As a result, adverse effects on any kit foxes that might occur in the Action Area are unlikely.

#### 5.3.2.5 Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp are not reported to occur within the Action Area, and the Districts' extensive terrestrial resources field surveys conducted in 2012 documented no vernal pools or plant species indicating the presence of vernal pools. Given the absence of the vernal pool fairy shrimp and its habitat, there will be no adverse effects on the species associated with any maintenance or recreation activities in the Action Area.

## 6.0 CONCLUSIONS

Table 6.0-1 summarizes potential effects of the Proposed Action on ESA-listed species and their habitats in the Action Area.

**Table 6.0-1. Effects determinations associated with the Proposed Action for ESA-listed species potentially occurring in the Action Area.**

	ESA-listed Threatened Species	Effect Determination (Species)	Effect Determination (Critical Habitat)	Comments
1	Layne's ragwort	No adverse effect	Critical Habitat not designated	<p>The Proposed Action would have no effect on O&amp;M actions or recreation, and thereby no effect on ESA-listed plant species in the Action Area. Environmental measures including dead-pool storage access would not affect ESA-listed plant species because they do not exist in the drawdown zone.</p> <p>The Districts propose to implement a Terrestrial Resources Management Plan that will include measures to manage noxious to provide protection for ESA-listed plants. This enhancement measure is expected to benefit ESA-listed plants in the Action Area.</p>
2	California vervain	No adverse effect	Critical Habitat not designated	See Row 1.
3	California red-legged frog	No adverse effect	No adverse effect	<p>The Proposed Action would have no effect on O&amp;M actions or recreation, and thereby no effect on ESA-listed wildlife species in the Action Area. Environmental measures including dead-pool storage access would not affect ESA-listed wildlife species because they do not exist in the drawdown zone.</p>
4	California tiger salamander	No adverse effect	No adverse effect	See Row 3.

	<b>ESA-listed Threatened Species</b>	<b>Effect Determination (Species)</b>	<b>Effect Determination (Critical Habitat)</b>	<b>Comments</b>
5	Valley elderberry longhorn beetle	No adverse effect	No adverse effect	See Row 3.  The Districts propose to manage elderberry by adhering to USFWS Conservation Guidelines for VELB. This enhancement measure is expected to help protect VELB habitat in the Action Area.
6	San Joaquin Kit Fox	No adverse effect	Critical Habitat not designated	See Row 3
7	Vernal pool fairy shrimp	No adverse effect	No adverse effect	The species and its habitat do not occur in the Action Area.

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**APPLICANT-PREPARED BIOLOGICAL ASSESSMENT FOR  
TERRESTRIAL SPECIES**

**ATTACHMENT A**

**CONSERVATION GUIDELINES FOR THE VALLEY ELDERBERRY  
LONGHORN BEETLE 9 JULY 1999**

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# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Sacramento Fish and Wildlife Office  
2800 Cottage Way, Room W-2605  
Sacramento, California 95825

Conservation Guidelines for the  
Valley Elderberry Longhorn Beetle  
9 July 1999

The following guidelines have been issued by the U.S. Fish and Wildlife Service (Service) to assist Federal agencies and non-federal project applicants needing incidental take authorization through a section 7 consultation or a section 10(a)(1)(B) permit in developing measures to avoid and minimize adverse effects on the valley elderberry longhorn beetle. The Service will revise these guidelines as needed in the future. The most recently issued version of these guidelines should be used in developing all projects and habitat restoration plans. The survey and monitoring procedures described below are designed to avoid any adverse effects to the valley elderberry longhorn beetle. Thus a recovery permit is not needed to survey for the beetle or its habitat or to monitor conservation areas. If you are interested in a recovery permit for research purposes please call the Service's Regional Office at (503) 231-2063.

## Background Information

The valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), was listed as a threatened species on August 8, 1980 (Federal Register 45: 52803-52807). This animal is fully protected under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The valley elderberry longhorn beetle (beetle) is completely dependent on its host plant, elderberry (*Sambucus* species), which is a common component of the remaining riparian forests and adjacent upland habitats of California's Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time the elderberry produces flowers. The adult stage is short-lived. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in a report by Barr (1991) and the recovery plan for the beetle (USFWS 1984).

## Surveys

Proposed project sites within the range of the valley elderberry longhorn beetle should be surveyed for the presence of the beetle and its elderberry host plant by a qualified biologist. The beetle's range extends throughout California's Central Valley and associated foothills from about the 3,000-foot elevation contour on the east and the watershed of the Central Valley on the west (Figure 1). All or portions of 31 counties are included: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Madera, Mariposa, Merced, Napa, Nevada, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba.

If elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level occur on or adjacent to the proposed project site, or are otherwise located where they may be directly or indirectly affected by the proposed action, minimization measures which include planting replacement habitat (conservation planting) are required (Table 1).

All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur on or adjacent to a proposed project site must be thoroughly searched for beetle exit holes (external evidence of beetle presence). In addition, all elderberry stems one inch or greater in diameter at ground level must be tallied by diameter size class (Table 1). As outlined in Table 1, the numbers of elderberry seedlings/cuttings and associated riparian native trees/shrubs to be planted as replacement habitat are determined by stem size class of affected elderberry shrubs, presence or absence of exit holes, and whether a proposed project lies in a riparian or non-riparian area.

Elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level are unlikely to be habitat for the beetle because of their small size and/or immaturity. Therefore, no minimization measures are required for removal of elderberry plants with no stems measuring 1.0 inch or greater in diameter at ground level with no exit holes. Surveys are valid for a period of two years.

## Avoid and Protect Habitat Whenever Possible

Project sites that do not contain beetle habitat are preferred. If suitable habitat for the beetle occurs on the project site, or within close proximity where beetles will be affected by the project, these areas must be designated as avoidance areas and must be protected from disturbance during the construction and operation of the project. When possible, projects should be designed such that avoidance areas are connected with adjacent habitat to prevent fragmentation and isolation of beetle populations. Any beetle habitat that cannot be avoided as described below should be considered impacted and appropriate minimization measures should be proposed as described below.



### Avoidance: Establishment and Maintenance of a Buffer Zone

Complete avoidance (i.e., no adverse effects) may be assumed when a 100-foot (or wider) buffer is established and maintained around elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. Firebreaks may not be included in the buffer zone. In buffer areas construction-related disturbance should be minimized, and any damaged area should be promptly restored following construction. The Service must be consulted before any disturbances within the buffer area are considered. In addition, the Service must be provided with a map identifying the avoidance area and written details describing avoidance measures.

### Protective Measures

1. Fence and flag all areas to be avoided during construction activities. In areas where encroachment on the 100-foot buffer has been approved by the Service, provide a minimum setback of at least 20 feet from the dripline of each elderberry plant.
2. Brief contractors on the need to avoid damaging the elderberry plants and the possible penalties for not complying with these requirements.
3. Erect signs every 50 feet along the edge of the avoidance area with the following information: "This area is habitat of the valley elderberry longhorn beetle, a threatened species, and must not be disturbed. This species is protected by the Endangered Species Act of 1973, as amended. Violators are subject to prosecution, fines, and imprisonment." The signs should be clearly readable from a distance of 20 feet, and must be maintained for the duration of construction.
4. Instruct work crews about the status of the beetle and the need to protect its elderberry host plant.

### Restoration and Maintenance

1. Restore any damage done to the buffer area (area within 100 feet of elderberry plants) during construction. Provide erosion control and re-vegetate with appropriate native plants.
2. Buffer areas must continue to be protected after construction from adverse effects of the project. Measures such as fencing, signs, weeding, and trash removal are usually appropriate.
3. No insecticides, herbicides, fertilizers, or other chemicals that might harm the beetle or its host plant should be used in the buffer areas, or within 100 feet of any elderberry plant with one or more stems measuring 1.0 inch or greater in diameter at ground level.

4. The applicant must provide a written description of how the buffer areas are to be restored, protected, and maintained after construction is completed.
5. Mowing of grasses/ground cover may occur from July through April to reduce fire hazard. No mowing should occur within five (5) feet of elderberry plant stems. Mowing must be done in a manner that avoids damaging plants (e.g., stripping away bark through careless use of mowing/trimming equipment).

#### Transplant Elderberry Plants That Cannot Be Avoided

Elderberry plants must be transplanted if they can not be avoided by the proposed project. All elderberry plants with one or more stems measuring 1.0 inch or greater in diameter at ground level must be transplanted to a conservation area (see below). At the Service's discretion, a plant that is unlikely to survive transplantation because of poor condition or location, or a plant that would be extremely difficult to move because of access problems, may be exempted from transplantation. In cases where transplantation is not possible the minimization ratios in Table 1 may be increased to offset the additional habitat loss.

Trimming of elderberry plants (e.g., pruning along roadways, bike paths, or trails) with one or more stems 1.0 inch or greater in diameter at ground level, may result in take of beetles. Therefore, trimming is subject to appropriate minimization measures as outlined in Table 1.

1. Monitor. A qualified biologist (monitor) must be on-site for the duration of the transplanting of the elderberry plants to insure that no unauthorized take of the valley elderberry longhorn beetle occurs. If unauthorized take occurs, the monitor must have the authority to stop work until corrective measures have been completed. The monitor must immediately report any unauthorized take of the beetle or its habitat to the Service and to the California Department of Fish and Game.
2. Timing. Transplant elderberry plants when the plants are dormant, approximately November through the first two weeks in February, after they have lost their leaves. Transplanting during the non-growing season will reduce shock to the plant and increase transplantation success.
3. Transplanting Procedure.
  - a. Cut the plant back 3 to 6 feet from the ground or to 50 percent of its height (whichever is taller) by removing branches and stems above this height. The trunk and all stems measuring 1.0 inch or greater in diameter at ground level should be replanted. Any leaves remaining on the plant should be removed.

- b. Excavate a hole of adequate size to receive the transplant.
- c. Excavate the plant using a Vemeer spade, backhoe, front end loader, or other suitable equipment, taking as much of the root ball as possible, and replant immediately at the conservation area. Move the plant only by the root ball. If the plant is to be moved and transplanted off site, secure the root ball with wire and wrap it with burlap. Dampen the burlap with water, as necessary, to keep the root ball wet. Do not let the roots dry out. Care should be taken to ensure that the soil is not dislodged from around the roots of the transplant. If the site receiving the transplant does not have adequate soil moisture, pre-wet the soil a day or two before transplantation.
- d. The planting area must be at least 1,800 square feet for each elderberry transplant. The root ball should be planted so that its top is level with the existing ground. Compact the soil sufficiently so that settlement does not occur. As many as five (5) additional elderberry plantings (cuttings or seedlings) and up to five (5) associated native species plantings (see below) may also be planted within the 1,800 square foot area with the transplant. The transplant and each new planting should have its own watering basin measuring at least three (3) feet in diameter. Watering basins should have a continuous berm measuring approximately eight (8) inches wide at the base and six (6) inches high.
- e. Saturate the soil with water. Do not use fertilizers or other supplements or paint the tips of stems with pruning substances, as the effects of these compounds on the beetle are unknown.
- f. Monitor to ascertain if additional watering is necessary. If the soil is sandy and well-drained, plants may need to be watered weekly or twice monthly. If the soil is clayey and poorly-drained, it may not be necessary to water after the initial saturation. However, most transplants require watering through the first summer. A drip watering system and timer is ideal. However, in situations where this is not possible, a water truck or other apparatus may be used.

#### Plant Additional Seedlings or Cuttings

Each elderberry stem measuring 1.0 inch or greater in diameter at ground level that is adversely affected (i.e., transplanted or destroyed) must be replaced, in the conservation area, with elderberry seedlings or cuttings at a ratio ranging from 1:1 to 8:1 (new plantings to affected stems). Minimization ratios are listed and explained in Table 1. Stock of either seedlings or cuttings should be obtained from local sources. Cuttings may be obtained from the plants to be transplanted if the project site is in the vicinity of the conservation area. If the Service determines that the elderberry plants on the proposed project site are unsuitable candidates for

transplanting, the Service may allow the applicant to plant seedlings or cuttings at higher than the stated ratios in Table 1 for each elderberry plant that cannot be transplanted.

### Plant Associated Native Species

Studies have found that the beetle is more abundant in dense native plant communities with a mature overstory and a mixed understory. Therefore, a mix of native plants associated with the elderberry plants at the project site or similar sites will be planted at ratios ranging from 1:1 to 2:1 [native tree/plant species to each elderberry seedling or cutting (see Table 1)]. These native plantings must be monitored with the same survival criteria used for the elderberry seedlings (see below). Stock of saplings, cuttings, and seedlings should be obtained from local sources. If the parent stock is obtained from a distance greater than one mile from the conservation area, approval by the Service of the native plant donor sites must be obtained prior to initiation of the revegetation work. Planting or seeding the conservation area with native herbaceous species is encouraged. Establishing native grasses and forbs may discourage unwanted non-native species from becoming established or persisting at the conservation area. Only stock from local sources should be used.

### Examples

#### Example 1

The project will adversely affect beetle habitat on a vacant lot on the land side of a river levee. This levee now separates beetle habitat on the vacant lot from extant Great Valley Mixed Riparian Forest (Holland 1986) adjacent to the river. However, it is clear that the beetle habitat located on the vacant lot was part of a more extensive mixed riparian forest ecosystem extending farther from the river's edge prior to agricultural development and levee construction. Therefore, the beetle habitat on site is considered riparian. A total of two elderberry plants with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The two plants have a total of 15 stems measuring over 1.0 inch. No exit holes were found on either plant. Ten of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are greater than 5.0 inches in diameter. The conservation area is suited for riparian forest habitat. Associated natives adjacent to the conservation area are box elder (*Acer negundo californica*), walnut (*Juglans californica* var. *hindsii*), sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), willow (*Salix gooddingii* and *S. laevigata*), white alder (*Alnus rhombifolia*), ash (*Fraxinus latifolia*), button willow (*Cephalanthus occidentalis*), and wild grape (*Vitis californica*).

Minimization (based on ratios in Table 1):

- Transplant the two elderberry plants that will be affected to the conservation area.
- Plant 40 elderberry rooted cuttings (10 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)
- Plant 40 associated native species (ratio of associated natives to elderberry plantings is 1:1 in areas with no exit holes):
  - 5 saplings each of box elder, sycamore, and cottonwood
  - 5 willow seedlings
  - 5 white alder seedlings
  - 5 saplings each of walnut and ash
  - 3 California button willow
  - 2 wild grape vines
  - Total: 40 associated native species
- Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 80 plants must be planted (40 elderberries and 40 associated natives), a total of 0.33 acre (14,400 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

Example 2

The project will adversely affect beetle habitat in Blue Oak Woodland (Holland 1986). One elderberry plant with at least one stem measuring 1.0 inch or greater in diameter at ground level will be affected by the proposed action. The plant has a total of 10 stems measuring over 1.0 inch. Exit holes were found on the plant. Five of the stems are between 1.0 and 3.0 inches in diameter and five of the stems are between 3.0 and 5.0 inches in diameter. The conservation area is suited for elderberry savanna (non-riparian habitat). Associated natives adjacent to the conservation area are willow (*Salix* species), blue oak (*Quercus douglasii*), interior live oak (*Q. wislizenii*), sycamore, poison oak (*Toxicodendron diversilobum*), and wild grape.

Minimization (based on ratios in Table 1):

- Transplant the one elderberry plant that will be affected to the conservation area.
- Plant 30 elderberry seedlings (5 affected stems compensated at 2:1 ratio and 5 affected stems compensated at 4:1 ratio, cuttings planted:stems affected)

- Plant 60 associated native species (ratio of associated natives to elderberry plantings is 2:1 in areas with exit holes):

20 saplings of blue oak, 20 saplings of sycamore, and 20 saplings of willow, and seed and plant with a mixture of native grasses and forbs

- Total area required is a minimum of 1,800 sq. ft. for one to five elderberry seedlings and up to 5 associated natives. Since, a total of 90 plants must be planted (30 elderberries and 60 associated natives), a total of 0.37 acre (16,200 square feet) will be required for conservation plantings. The conservation area will be seeded and planted with native grasses and forbs, and closely monitored and maintained throughout the monitoring period.

#### Conservation Area—Provide Habitat for the Beetle in Perpetuity

The conservation area is distinct from the avoidance area (though the two may adjoin), and serves to receive and protect the transplanted elderberry plants and the elderberry and other native plantings. The Service may accept proposals for off-site conservation areas where appropriate.

1. **Size.** The conservation area must provide at least 1,800 square feet for each transplanted elderberry plant. As many as 10 conservation plantings (i.e., elderberry cuttings or seedlings and/or associated native plants) may be planted within the 1800 square foot area with each transplanted elderberry. An additional 1,800 square feet shall be provided for every additional 10 conservation plants. Each planting should have its own watering basin measuring approximately three feet in diameter. Watering basins should be constructed with a continuous berm measuring approximately eight inches wide at the base and six inches high.

The planting density specified above is primarily for riparian forest habitats or other habitats with naturally dense cover. If the conservation area is an open habitat (i.e., elderberry savanna, oak woodland) more area may be needed for the required plantings. Contact the Service for assistance if the above planting recommendations are not appropriate for the proposed conservation area.

No area to be maintained as a firebreak may be counted as conservation area. Like the avoidance area, the conservation area should connect with adjacent habitat wherever possible, to prevent isolation of beetle populations.

Depending on adjacent land use, a buffer area may also be needed between the conservation area and the adjacent lands. For example, herbicides and pesticides are

often used on orchards or vineyards. These chemicals may drift or runoff onto the conservation area if an adequate buffer area is not provided.

2. Long-Term Protection. The conservation area must be protected in perpetuity as habitat for the valley elderberry longhorn beetle. A conservation easement or deed restrictions to protect the conservation area must be arranged. Conservation areas may be transferred to a resource agency or appropriate private organization for long-term management. The Service must be provided with a map and written details identifying the conservation area; and the applicant must receive approval from the Service that the conservation area is acceptable prior to initiating the conservation program. A true, recorded copy of the deed transfer, conservation easement, or deed restrictions protecting the conservation area in perpetuity must be provided to the Service before project implementation.

Adequate funds must be provided to ensure that the conservation area is managed in perpetuity. The applicant must dedicate an endowment fund for this purpose, and designate the party or entity that will be responsible for long-term management of the conservation area. The Service must be provided with written documentation that funding and management of the conservation area (items 3-8 above) will be provided in perpetuity.

3. Weed Control. Weeds and other plants that are not native to the conservation area must be removed at least once a year, or at the discretion of the Service and the California Department of Fish and Game. Mechanical means should be used; herbicides are prohibited unless approved by the Service.
4. Pesticide and Toxicant Control. Measures must be taken to insure that no pesticides, herbicides, fertilizers, or other chemical agents enter the conservation area. No spraying of these agents must be done within one 100 feet of the area, or if they have the potential to drift, flow, or be washed into the area in the opinion of biologists or law enforcement personnel from the Service or the California Department of Fish and Game.
5. Litter Control. No dumping of trash or other material may occur within the conservation area. Any trash or other foreign material found deposited within the conservation area must be removed within 10 working days of discovery.
6. Fencing. Permanent fencing must be placed completely around the conservation area to prevent unauthorized entry by off-road vehicles, equestrians, and other parties that might damage or destroy the habitat of the beetle, unless approved by the Service. The applicant must receive written approval from the Service that the fencing is acceptable prior to initiation of the conservation program. The fence must be maintained in perpetuity, and must be repaired/replaced within 10 working days if it is found to be damaged. Some conservation areas may be made available to the public for appropriate recreational and educational opportunities with written approval from the Service. In

these cases appropriate fencing and signs informing the public of the beetle's threatened status and its natural history and ecology should be used and maintained in perpetuity.

7. Signs. A minimum of two prominent signs must be placed and maintained in perpetuity at the conservation area, unless otherwise approved by the Service. The signs should note that the site is habitat of the federally threatened valley elderberry longhorn beetle and, if appropriate, include information on the beetle's natural history and ecology. The signs must be approved by the Service. The signs must be repaired or replaced within 10 working days if they are found to be damaged or destroyed.

### Monitoring

The population of valley elderberry longhorn beetles, the general condition of the conservation area, and the condition of the elderberry and associated native plantings in the conservation area must be monitored over a period of either ten (10) consecutive years or for seven (7) years over a 15-year period. The applicant may elect either 10 years of monitoring, with surveys and reports every year; or 15 years of monitoring, with surveys and reports on years 1, 2, 3, 5, 7, 10, and 15. The conservation plan provided by the applicant must state which monitoring schedule will be followed. No change in monitoring schedule will be accepted after the project is initiated. If conservation planting is done in stages (i.e., not all planting is implemented in the same time period), each stage of conservation planting will have a different start date for the required monitoring time.

Surveys. In any survey year, a minimum of two site visits between February 14 and June 30 of each year must be made by a qualified biologist. Surveys must include:

1. A population census of the adult beetles, including the number of beetles observed, their condition, behavior, and their precise locations. Visual counts must be used; mark-recapture or other methods involving handling or harassment must not be used.
2. A census of beetle exit holes in elderberry stems, noting their precise locations and estimated ages.
3. An evaluation of the elderberry plants and associated native plants on the site, and on the conservation area, if disjunct, including the number of plants, their size and condition.
4. An evaluation of the adequacy of the fencing, signs, and weed control efforts in the avoidance and conservation areas.



5. A general assessment of the habitat, including any real or potential threats to the beetle and its host plants, such as erosion, fire, excessive grazing, off-road vehicle use, vandalism, excessive weed growth, etc.

The materials and methods to be used in the monitoring studies must be reviewed and approved by the Service. All appropriate Federal permits must be obtained prior to initiating the field studies.

**Reports.** A written report, presenting and analyzing the data from the project monitoring, must be prepared by a qualified biologist in each of the years in which a monitoring survey is required. Copies of the report must be submitted by December 31 of the same year to the Service (Chief of Endangered Species, Sacramento Fish and Wildlife Office), and the Department of Fish and Game (Supervisor, Environmental Services, Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814; and Staff Zoologist, California Natural Diversity Data Base, Department of Fish and Game, 1220 S Street, Sacramento, California 95814). The report must explicitly address the status and progress of the transplanted and planted elderberry and associated native plants and trees, as well as any failings of the conservation plan and the steps taken to correct them. Any observations of beetles or fresh exit holes must be noted. Copies of original field notes, raw data, and photographs of the conservation area must be included with the report. A vicinity map of the site and maps showing where the individual adult beetles and exit holes were observed must be included. For the elderberry and associated native plants, the survival rate, condition, and size of the plants must be analyzed. Real and likely future threats must be addressed along with suggested remedies and preventative measures (e.g. limiting public access, more frequent removal of invasive non-native vegetation, etc.).

A copy of each monitoring report, along with the original field notes, photographs, correspondence, and all other pertinent material, should be deposited at the California Academy of Sciences (Librarian, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118) by December 31 of the year that monitoring is done and the report is prepared. The Service's Sacramento Fish and Wildlife Office should be provided with a copy of the receipt from the Academy library acknowledging receipt of the material, or the library catalog number assigned to it.

**Access.** Biologists and law enforcement personnel from the California Department of Fish and Game and the Service must be given complete access to the project site to monitor transplanting activities. Personnel from both these agencies must be given complete access to the project and the conservation area to monitor the beetle and its habitat in perpetuity.

### Success Criteria

A minimum survival rate of at least 60 percent of the elderberry plants and 60 percent of the associated native plants must be maintained throughout the monitoring period. Within one year of discovery that survival has dropped below 60 percent, the applicant must replace failed plantings to bring survival above this level. The Service will make any determination as to the

applicant's replacement responsibilities arising from circumstances beyond its control, such as plants damaged or killed as a result of severe flooding or vandalism.

#### Service Contact

These guidelines were prepared by the Endangered Species Division of the Service's Sacramento Fish and Wildlife Office. If you have questions regarding these guidelines or to request a copy of the most recent guidelines, telephone (916) 414-6600, or write to:

U.S. Fish and Wildlife Service  
Ecological Services  
2800 Cottage Way, W-2605  
Sacramento, CA 95825



**Figure 1: Range of the Valley Elderberry Longhorn Beetle**

### Literature Cited

- Barr, C. B. 1991. The distribution, habitat, and status of the valley elderberry longhorn beetle *Desmocerus californicus dimorphus*. U.S. Fish and Wildlife Service; Sacramento, California.
- Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished Report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, California.
- USFWS. 1980. Listing the valley elderberry longhorn beetle as a threatened species with critical habitat. Federal Register 45:52803-52807.
- USFWS. 1984. Recovery plan for the valley elderberry longhorn beetle. U.S. Fish and Wildlife Service, Endangered Species Program; Portland, Oregon.

**Table 1: Minimization ratios based on location (riparian vs. non-riparian), stem diameter of affected elderberry plants at ground level, and presence or absence of exit holes.**

Location	Stems (maximum diameter at ground level)	Exit Holes on Shrub Y/N (quantify) <sup>1</sup>	Elderberry Seedling Ratio <sup>2</sup>	Associated Native Plant Ratio <sup>3</sup>
non-riparian	stems > = 1" & < 3"	No:	1:1	1:1
		Yes:	2:1	2:1
non-riparian	stems > 3" & < 5"	No:	2:1	1:1
		Yes:	4:1	2:1
non-riparian	stems >= 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 1" & < 3"	No:	2:1	1:1
		Yes:	4:1	2:1
riparian	stems > 3" & < 5"	No:	3:1	1:1
		Yes:	6:1	2:1
riparian	stems > = 5"	No:	4:1	1:1
		Yes:	8:1	2:1

<sup>1</sup> All stems measuring one inch or greater in diameter at ground level on a single shrub are considered occupied when exit holes are present anywhere on the shrub.

<sup>2</sup> Ratios in the *Elderberry Seedling Ratio* column correspond to the number of cuttings or seedlings to be planted per elderberry stem (one inch or greater in diameter at ground level) affected by a project.

<sup>3</sup> Ratios in the *Associated Native Plant Ratio* column correspond to the number of associated native species to be planted per elderberry (seedling or cutting) planted.

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