

**ENDANGERED SPECIES ACT-LISTED  
AMPHIBIANS - CALIFORNIA  
TIGER SALAMANDER  
STUDY REPORT  
DON PEDRO PROJECT  
FERC NO. 2299**



**Prepared for:**  
**Turlock Irrigation District – Turlock, California**  
**Modesto Irrigation District – Modesto, California**

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**January 2013**

**Endangered Species Act-Listed Amphibians  
California Tiger Salamander  
Study Report**

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Attachment A	CTS Site Assessment
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## List of Acronyms

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ac.....	acres
ACEC.....	Area of Critical Environmental Concern
AF.....	acre-feet
ACOE.....	U.S. Army Corps of Engineers
ADA.....	Americans with Disabilities Act
ALJ.....	Administrative Law Judge
APE.....	Area of Potential Effect
ARMR.....	Archaeological Resource Management Report
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
CalEPPC.....	California Exotic Pest Plant Council
CalSPA.....	California Sports Fisherman Association
CAS.....	California Academy of Sciences
CCC.....	Criterion Continuous Concentrations
CCIC.....	Central California Information Center
CCSF.....	City and County of San Francisco
CCVHJV.....	California Central Valley Habitat Joint Venture
CD.....	Compact Disc
CDBW.....	California Department of Boating and Waterways
CDEC.....	California Data Exchange Center
CDFA.....	California Department of Food and Agriculture
CDFG.....	California Department of Fish and Game (as of January 2013, Department of Fish and Wildlife)
CDMG.....	California Division of Mines and Geology
CDOF.....	California Department of Finance
CDPH.....	California Department of Public Health

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CDPR	California Department of Parks and Recreation
CDSOD	California Division of Safety of Dams
CDWR	California Department of Water Resources
CE	California Endangered Species
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
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
CPUE	Catch Per Unit Effort
CRAM	California Rapid Assessment Method
CRLF	California Red-Legged Frog
CRRF	California Rivers Restoration Fund
CSAS	Central Sierra Audubon Society
CSBP	California Stream Bioassessment Procedure
CT	California Threatened Species
CTR	California Toxics Rule
CTS	California Tiger Salamander
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationship
Districts	Turlock Irrigation District and Modesto Irrigation District
DLA	Draft License Application
DPRA	Don Pedro Recreation Agency
DPS	Distinct Population Segment
EA	Environmental Assessment
EC	Electrical Conductivity

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EFH.....	Essential Fish Habitat
EIR.....	Environmental Impact Report
EIS.....	Environmental Impact Statement
EPA.....	U.S. Environmental Protection Agency
ESA.....	Federal Endangered Species Act
ESRCD.....	East Stanislaus Resource Conservation District
ESU.....	Evolutionary Significant Unit
EWUA.....	Effective Weighted Useable Area
FERC.....	Federal Energy Regulatory Commission
FFS.....	Foothills Fault System
FL.....	Fork length
FMU.....	Fire Management Unit
FOT.....	Friends of the Tuolumne
FPC.....	Federal Power Commission
ft/mi.....	feet per mile
FWCA.....	Fish and Wildlife Coordination Act
FYLF.....	Foothill Yellow-Legged Frog
g.....	grams
GIS.....	Geographic Information System
GLO.....	General Land Office
GPS.....	Global Positioning System
HCP.....	Habitat Conservation Plan
HHWP.....	Hetch Hetchy Water and Power
HORB.....	Head of Old River Barrier
HPMP.....	Historic Properties Management Plan
ILP.....	Integrated Licensing Process
ISR.....	Initial Study Report
ITA.....	Indian Trust Assets
kV.....	kilovolt
m.....	meters
M&I.....	Municipal and Industrial
MCL.....	Maximum Contaminant Level
mg/kg.....	milligrams/kilogram

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mg/L	milligrams per liter
mgd	million gallons per day
mi	miles
mi <sup>2</sup>	square miles
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MSCS	Multi-Species Conservation Strategy
msl	mean sea level
MVA	Megavolt Ampere
MVZ	Museum of Vertebrate Zoology
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
NEPA	National Environmental Policy Act
ng/g	nanograms per gram
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

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NWL.....	National Wetland Inventory
NWIS .....	National Water Information System
NWR .....	National Wildlife Refuge
NGVD 29 .....	National Geodetic Vertical Datum of 1929
O&M.....	operation and maintenance
OEHHA.....	Office of Environmental Health Hazard Assessment
ORV .....	Outstanding Remarkable Value
PAD.....	Pre-Application Document
PDO.....	Pacific Decadal Oscillation
PEIR.....	Program Environmental Impact Report
PGA.....	Peak Ground Acceleration
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
QA.....	Quality Assurance
QC.....	Quality Control
RA.....	Recreation Area
RBP .....	Rapid Bioassessment Protocol
Reclamation .....	U.S. Department of the Interior, Bureau of Reclamation
RM .....	River Mile
RMP .....	Resource Management Plan
RP.....	Relicensing Participant
RSP .....	Revised Study Plan
RST .....	Rotary Screw Trap
RWF .....	Resource-Specific Work Groups
RWG .....	Resource Work Group
RWQCB.....	Regional Water Quality Control Board
SC.....	State candidate for listing under CESA
SCD.....	State candidate for delisting under CESA



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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
SFP	State Fully Protected Species under CESA
SFPUC	San Francisco Public Utilities Commission
SHPO	State Historic Preservation Office
SJRA	San Joaquin River Agreement
SJRG	San Joaquin River Group Authority
SJTA	San Joaquin River Tributaries Authority
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
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TAF	thousand acre-feet
TCP	Traditional Cultural Properties
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

USDA.....	U.S. Department of Agriculture
USDOC.....	U.S. Department of Commerce
USDOJ.....	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
VRM.....	Visual Resource Management
WPT.....	Western Pond Turtle
WSA.....	Wilderness Study Area
WSIP.....	Water System Improvement Program
WWTP.....	Wastewater Treatment Plant
WY.....	water year
µS/cm.....	microSeimens per centimeter

## 1.0 INTRODUCTION

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### 1.1 General Description of the Don Pedro Project

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) are the co-licensees of the 168-megawatt (MW) Don Pedro Project (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>).

Both TID and MID are local public agencies authorized under the laws of the State of California to provide water supply for irrigation and municipal and industrial (M&I) uses and to provide retail electric service. The Project serves many purposes including providing water storage for the beneficial use of irrigation of over 200,000 ac of prime Central Valley farmland and for the use of M&I customers in the City of Modesto (population 210,000). Consistent with the requirements of the Raker Act passed by Congress in 1913 and agreements between the Districts and City and County of San Francisco (CCSF), the Project reservoir also includes a “water bank” of up to 570,000 AF of storage. CCSF may use the water bank to more efficiently manage the water supply from its Hetch Hetchy water system while meeting the senior water rights of the Districts. CCSF’s “water bank” within Don Pedro Reservoir provides significant benefits for its 2.6 million customers in the San Francisco Bay Area.

The Project also provides storage for flood management purposes in the Tuolumne and San Joaquin rivers in coordination with the U.S. Army Corps of Engineers (ACOE). Other important uses supported by the Project are recreation, protection of the anadromous fisheries in the lower Tuolumne River, and hydropower generation.

The Project Boundary extends from approximately one mile downstream of the dam to approximately RM 79 upstream of the dam. Upstream of the dam, the Project Boundary runs generally along the 855 ft contour interval which corresponds to the top of the Don Pedro Dam. The Project Boundary encompasses approximately 18,370 ac with 78 percent of the lands owned jointly by the Districts and the remaining 22 percent (approximately 4,000 ac) is owned by the United States and managed as a part of the U.S. Bureau of Land Management (BLM) Sierra Resource Management Area.

The primary Project facilities include the 580-foot-high Don Pedro Dam and Reservoir completed in 1971; a four-unit powerhouse situated at the base of the dam; related facilities including the Project spillway, outlet works, and switchyard; four dikes (Gasburg Creek Dike and Dikes A, B, and C); and three developed recreational facilities (Fleming Meadows, Blue Oaks, and Moccasin Point Recreation Areas). The location of the Project and its primary facilities is shown in Figure 1.1-1.

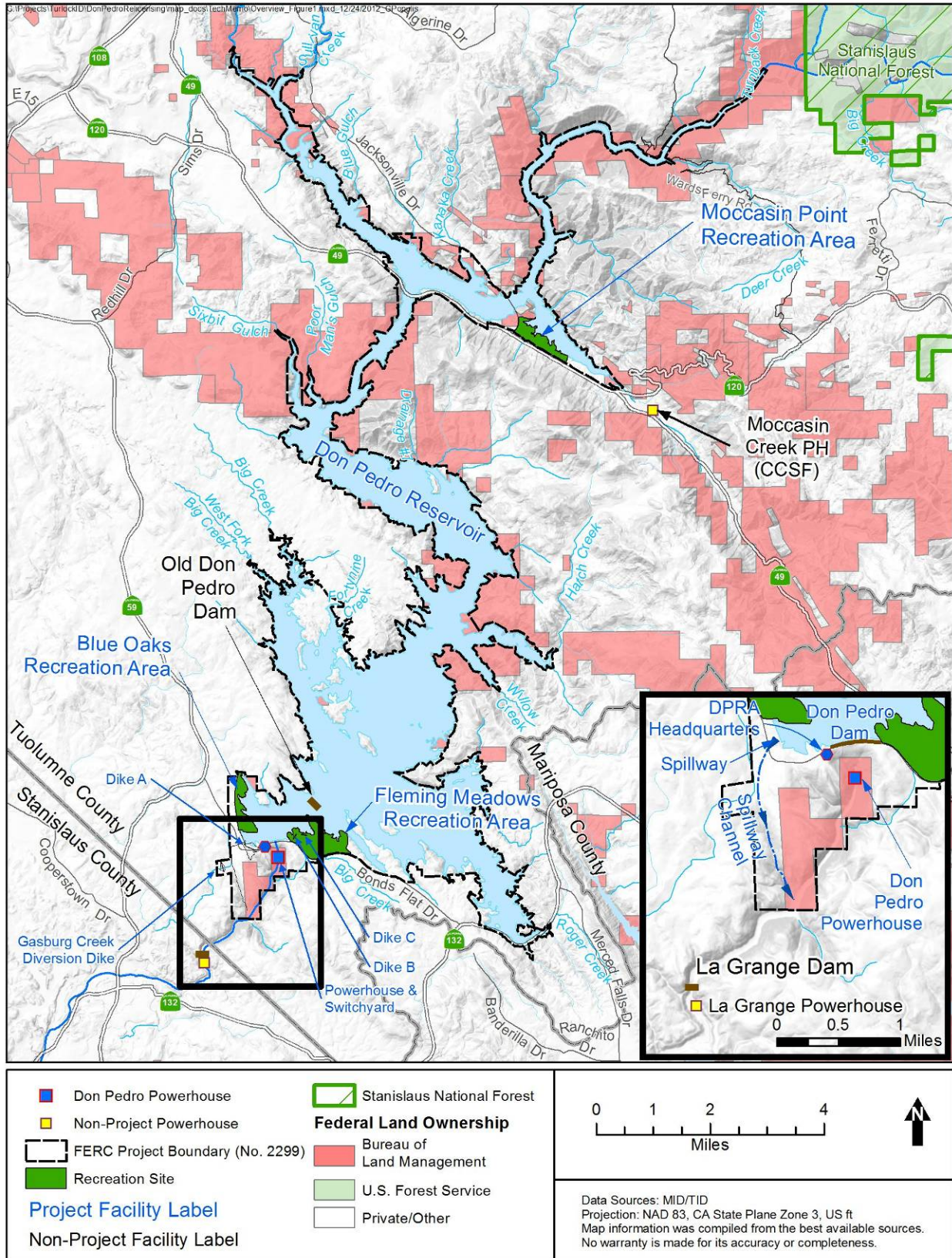


Figure 1.1-1. Don Pedro Project location.

## 1.2 Relicensing Process

The current FERC license for the Project expires on April 30, 2016, and the Districts will apply for a new license no later than April 30, 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 descriptions of the Project facilities, operations, license requirements, and Project lands as well as a summary of the extensive existing information available on Project area resources. The PAD also included ten draft study plans describing 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 to FERC on July 25, 2011 and November 22, 2011, respectively.

On December 22, 2011, FERC issued its Study Plan Determination (SPD) for the Project, approving, or approving with modifications, 34 studies proposed in the RSP that addressed Cultural and Historical Resources, Recreational Resources, Terrestrial Resources, and Water and Aquatic Resources. In addition, as required by the SPD, the Districts filed three new study plans (W&AR-18, W&AR-19, and W&AR-20) on February 28, 2012 and one modified study plan (W&AR-12) on April 6, 2012. Prior to filing these plans with FERC, the Districts consulted with relicensing participants on drafts of the plans. FERC approved or approved with modifications these four studies on July 25, 2012.

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, the Director of FERC issued his Formal Study Dispute Determination, with additional clarifications related to the Formal Study Dispute Determination issued on August 17, 2012.

This study report describes the objectives, methods, and results of the ESA-Listed Amphibians - California Tiger Salamander Study (TR-08) as implemented by the Districts in accordance with FERC's SPD and subsequent study modifications and clarifications. Documents relating to the Project relicensing are publicly available on the Districts' relicensing website at [www.donpedro-relicensing.com](http://www.donpedro-relicensing.com).

## 1.3 Study Plan

The Districts' continued operation and maintenance (O&M) of the Don Pedro Project has the potential to affect the terrestrial and aquatic habitat of the California tiger salamander (CTS; *Ambystoma californiense*). Don Pedro Project O&M includes normal operations within the currently licensed elevation range (up to 830 feet), as well as operation of three formal recreation areas (Moccasin Point, Blue Oaks, and Fleming Meadows), vegetation management within these recreation areas and Project facilities, and ongoing reservoir debris removal and disposal. The Central Valley CTS population is listed as threatened under the federal Endangered Species Act (ESA) and as threatened under the California Endangered Species Act (CESA). These effects

could involve activities related to Project O&M or to Project-related recreation activities that impact CTS suitable habitat.

FERC's SPD approved the Districts' California Tiger Salamander Study Plan as provided in the RSP filing. The study was completed consistent with the study plan.

## **2.0 STUDY GOALS AND OBJECTIVES**

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The goal of this study is to provide FERC with information supporting consultation with the US Fish and Wildlife Service (USFWS) regarding the effects of Project licensing on CTS. The objectives of this study are to:

- Identify and map known occurrences of CTS and determine, if appropriate, the closest known breeding locality;
- Evaluate the likelihood that CTS currently exist in the study area using habitat assessments and historical records;
- Compile incidental observations of CTS from other relicensing studies; and
- Provide information to FERC that can be used to develop a Biological Assessment regarding the effects of Project licensing on CTS.



### **3.0 STUDY AREA**

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The study area for this effort consisted of suitable aquatic habitats within the Project Boundary and lands within 1.24 miles (2 kilometers) of the Project Boundary. Consistent with USFWS guidelines (USFWS, 2003a) for defining a “project action area,” the study area includes all lands potentially affected by Project O&M.

Land ownership within the 1.24-mile study area is principally MID, TID, and BLM, with some private and other land. Existing land uses include ranching, limited residential development and recreation. Uplands in the study area consist of blue and live oak woodland, oak-foothill pine, scrub-shrub chaparral, and annual grassland. Much of the terrain is rugged and was inaccessible for field assessments due to private property restrictions, steep slopes, and lack of roads. Potential barriers to CTS dispersal include steep terrain, highways, including State Route (SR) 120, SR 59, SR 139, and SR 49, and Don Pedro Reservoir.



## 4.0 METHODOLOGY

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The study plan approved by FERC in their December 22, 2011 Study Plan Determination outlined five steps for performing the CTS study. Those steps were as follows:

- (1) Site Assessment.
- (2) Prepare, Format, and Quality Assurance/Quality Control Data.
- (3) Consult with the Districts' Project O&M Staff.
- (4) Prepare Report.
- (5) Consult with USFWS.

The following methods described for site assessment and habitat characterization were conducted in compliance with Steps 1 - 3 of the FERC-approved ESA-listed Amphibian California Tiger Salamander Study (TR-08). This document was created to comply with Step 4 and will be submitted to USFWS in compliance with Step 5.

### 4.1 Site Assessment and Habitat Characterization

According to the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (USFWS 2003a), the criteria for CTS breeding habitat include the presence of standing water for a period sufficient for larvae to achieve metamorphosis. Breeding generally occurs between December and February. Larvae may metamorphose in as little as 10-12 weeks, although typically not until May to July (Laabs et al. 2001). Natural vernal pools, stock ponds, drainage ditches, and pools in low gradient streams are potential habitat. Permanent ponds may be suitable, but not if predatory fish are established. The presence of American bullfrog (*Lithobates [Rana] catesbeianus*), introduced crayfish, and predacious insects may also decrease site suitability. Suitable upland habitats, which are described in Section 5.1, are equally important to the occurrence of CTS.

Potential study sites within the Project Boundary and within 1.24 miles of the Project Boundary were identified, characterized, and mapped based on review of existing aerial photography, NWI maps, and other pertinent resource agency GIS layers as available. Using available information, these aquatic habitat sites were characterized by habitat type (e.g., natural seasonal pond, stock pond, or creek), surface area, depth, seasonality, topography, and types of associated aquatic or emergent vegetation. Lands adjacent to the aquatic habitats were described by plant community, burrow presence, current land use, and an assessment of potential barriers to CTS movement. Following habitat mapping, the district selected potentially suitable aquatic habitats for field visits and additional characterization.

#### 4.1.1 Review of Historical Data

Known CTS records in the study area were compiled from a review of the following sources:

- California Department of Fish and Game's (CDFG) California Natural Diversity Database (CNDDDB) (CDFG 2012);

- University of California Berkeley’s Museum of Vertebrate Zoology (MVZ) Data Access (MVZ 2012);
- California Academy of Sciences (CAS) online records (CAS 2012); and
- Peggy Cranston from the Mother Lode Field Office of the BLM on 3/18/2012 (Cranston 2012).

#### 4.1.2 Habitat Characterization Methods

Field reconnaissance of a representative set of aquatic habitat features was performed under the provisions of ESA-Listed Amphibians – California Red-Legged Frog Study (TID/MID, 2013) at sites within 1 mi around the Project Boundary. Additional field reconnaissance within the FERC Project Boundary was conducted for Special-Status Amphibians and Aquatic Reptiles Study (TID/MID 2013). In addition, 55 sites within 1.24 miles of the project boundary, which were outside of the other studies’ assessment areas, were examined to supplement other sources of information. Under each methodology, sites were photographed depicting aquatic and upland habitat and other notable findings. Locations on private property were typically assessed from the adjacent road, aided by binoculars. Field visits to verify habitat characterizations and collect additional information were performed at sites selected as follows:

- All potential breeding locations within the Project Boundary.
- Representative potential breeding locations on publicly accessible lands (and private lands for which access permission could be obtained) within 1.24 miles outside of the Project Boundary.

All habitat and site assessment data required by the Interim Guidance (USFWS 2003a) were collected at each site where reconnaissance level examination was performed, along with photographs depicting habitat and other notable findings. These data are included in Attachment A. Information collected during field visits included topography; soil type; plant communities; water body presence, location, types, and size; fossorial mammals detected; current land use, and a description of adjacent lands, including uplands. A summary of the data collected is provided in the site assessments for CTS, California Red-Legged Frog, and Special Status Amphibians, which are attached to each of the appropriate study reports. Each site was photographed to depict habitat and other notable findings. The presence of fish, American bullfrogs (*Lithobates catesbeianus*), and other incidental observations of amphibians was also noted. Upland habitats were characterized based on description of upland vegetation communities, land uses, and any potential barriers to CTS movement. Sites were evaluated to determine if water was present for at least 10 weeks during the CTS breeding season and suitable upland habitat, including underground refugia, the key components of CTS breeding habitat according to the USFWS (2003a).

For aquatic habitat sites not depicted on existing NWI maps, biologists evaluated seasonality from water depth, feature size, and the presence of water and associated emergent and aquatic vegetation. Bankfull features and pool dimensions were visually estimated on the ground or measured from aerial photographs. Observations of incidental amphibian and potential predator presence, including fish, American bullfrog, and introduced crayfish (not identified to species)

were collected during site visits for CTS and the Districts' other relicensing studies. Substrate was described when viewed on-site. Aquatic habitats were then mapped, differentiating locations where potential CTS breeding habitat might occur or were believed to be present based on the information described above. Areas that did not appear to represent suitable habitat, or that weren't accessible or viewable from a distance, were not field examined, but instead were characterized from aerial imagery, existing ground photographs, and other existing descriptive information.

Characterization of upland habitats drew upon data from CalVeg data (USFS 2009 adjacent to the feature. CalVeg is a two-level hierarchical classification system of actual vegetation designed to assess broad scale resources throughout California. Upland habitats were further characterized based on adjacent land uses and any potential barriers to CTS movement.

## **4.2 Data Management and Consultation with Districts' Staff**

Standard data QA/QC procedures were performed, including, but not limited to: daily QA/QC of field data sheets, spot-checks of transcription during data compilation, and comparison of Geographic Information System (GIS) maps with field notes and field maps to verify locations. Data were entered into a database and crosschecked by a second scientist to ensure data were properly recorded. GIS maps, depicting the CTS occurrences, and Project facilities and features, were generated to display field collected GPS information and used as a second method to verify that all special-status plant occurrence locations matched the information on the data sheets.

After all potentially suitable CTS breeding habitat and historical occurrences were verified and mapped, Project operations staff was consulted to identify Project O&M, recreation and other Project-related activities that typically occur in the area of the CTS occurrences that have a potential to adversely affect the occurrences.

## 5.0 RESULTS

### 5.1 CTS Life History Information

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. Populations in Sonoma County, California, are closely associated with the presence of pocket gopher burrows (USFWS 2003b). 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). Adults spend little time in breeding sites before returning to upland habitats. CTS populations generally do not persist where fish, American bullfrogs, 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 2 to 4 weeks. Larvae transform in about 4 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. The number of larvae that successfully metamorphose at a given site tends to be "boom or bust" (Loredo and Van Vuren 1996).

### 5.2 Historical and Current Occurrence of CTS in the Project Vicinity

Known historical and current CTS occurrences near the Project are summarized in Table 5.2-1 and depicted on Figure 5.4-1. There are five known historical CTS occurrences within five miles of the Don Pedro Project. The most recent occurrence was observed in 2007, approximately 0.4 miles from Don Pedro Reservoir.

There is one known historical CTS occurrence within one mile of the Don Pedro Reservoir study area, in Tuolumne County, near Big Creek south of Don Pedro Reservoir.

**Table 5.2-1. Recorded occurrences of CTS within 5 miles of the Project**

Occurrence	Distance from the Project and Status of the Occurrence
Tuolumne Co. (3 larvae, 2007)	0.37 mi S of Don Pedro Reservoir. Presumed extant.
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.
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.
About 2 mi S of La Grange, Stanislaus Co. (unknown number and lifestage, 1973)	5.00 mi SW of Don Pedro Reservoir. Presumed extant.
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.

Source: CDFG 2012

### 5.3 Site Assessment and Habitat Characterization

A total of 392 sites were assessed in the Don Pedro Reservoir study area, including 73 sites within the FERC Project Boundary. Of the sites within the FERC Project Boundary, 20 sites are proximate to project facilities or Don Pedro Reservoir and are therefore considered potentially affected by Project O&M. Of the 392 sites, 88 were assessed in the field, including 66 that occur within the FERC Project Boundary. One site was assessed from a distance due to safety concerns. The remaining 304 sites were not accessible for on-site assessment or were not within the FERC Project Boundary, and were therefore assessed from aerial imagery.

Sites within the study area consisted of 125 sections of streams or pools in streams; 166 natural ponds; 20 stock, irrigation, and detention ponds; 73 other wetlands; and eight uplands or constructed areas. A total of 88 stream sites, 134 ponds, 16 stock/irrigation/detention ponds, six emergent wetlands, a constructed public swimming pool, a constructed swimming lagoon, and a constructed reservoir appear to meet the minimum criterion of 10 weeks of standing or slow-moving water. It was unknown if two seasonal streams and one manually filled stock pond met the 10-week criterion. Many of the field assessed sites meeting the 10-week criterion were perennial streams with too high of a gradient or lacked upland habitat suitable for dispersal.

Based on these factors, 37 of the 88 field-assessed sites appear to represent suitable breeding habitat for CTS, including 22 within the FERC Project Boundary. Of the 37 suitable sites, 14 had either American bullfrog or fish present, predators which can diminish the overall habitat suitability for CTS. Six sites located within the FERC Project Boundary, perennial pools within the spillway channel that are connected via a seasonal stream during high flow conditions, were not field accessible due to unsafe conditions and were evaluated from an aerial photograph. As such, the sites were assumed to be suitable, although the presence of suitable upland habitat and aquatic predators is unknown. Table 5.3-1 summarizes the conditions encountered at the 38 sites determined to be potentially suitable habitat for CTS.

**Table 5.3-1. Summary of field assessed sites potentially suitable for CTS habitat.**

Site <sup>1</sup>	Habitat Feature/Seasonality/Location	Burrows Observed	Emergent Vegetation Present	Overhanging Vegetation Present	Bullfrog Present	Fish Present
F3	Stream, perennial (unnamed), near Marshes Flat Road	x	x	--	x	--
F13	Stream, perennial (unnamed), 49er Bay	x	x	--	x	x
F15	Stream, perennial (Big Creek), near Old Don Pedro Road	x	x	--	x	--
F17	Stream, perennial, Poor Man's Gulch	x	x	x	--	--
F22	Stream, perennial and associated pond, Big Creek Arm	x	x	--	x	x
F24	Stream, ephemeral, Upper Bay	--	x	--	--	--
F25	Stream, perennial, Wreck Bay	x	x	--	x	x
F30	Stream, perennial, Kanaka Creek, near Jacksonville Road	x	x	x	--	--
F35	Stream, perennial, Woods	x	x	x	x	--

Site <sup>1</sup>	Habitat Feature/Seasonality/Location	Burrows Observed	Emergent Vegetation Present	Overhanging Vegetation Present	Bullfrog Present	Fish Present
	Creek					
F36	Stream, seasonal (unnamed), near Molina Street	--	x	--	--	--
F39	Stream, seasonal (unnamed), 49er Bay	x	x	--	--	--
F40	Pond, seasonal (unnamed), near SR 132	x	x	--	--	--
F41	Pond, perennial, near SR 132	x	x	--	x	--
F43	Pond, perennial, impoundment in West Fork Big Creek	--	x	x	--	--
F53	Stream, seasonal (unnamed), near Hoyito Circle	x	x	x	--	--
F60	Pond, seasonal, near Jacksonville Road	--	x	x	x	--
F68	Stream, seasonal	x	x	x	--	--
F75	Stream, seasonal		x		x	--
F77	Series of ponds, perennial, near Bonds Flat Road	x	x	--	x	--
F78	Pond, perennial, near Bonds Flat Road	x	x	--	--	--
F80	Pond, perennial, near Bonds Flat Road	x	x	x	--	--
F81	Stock pond, near Bonds Flat Road	x	x	x	--	--
F84	Stream, perennial (Big Creek), crosses La Grange Road	x	x	x	--	--
N52	Pond, perennial, near Marshes Flat Road and Hatch Creek Road	x	x	x	x	--
N60	Pond, perennial, near Marshes Flat Road	x	x	x	--	--
N75	Stream, perennial	x	x	x	--	--
N82	Pond, perennial, near Shawmut Road	x	x	--	--	--
N133	Pond, perennial, near El Encanto and SR 59 behind gravel parking area	--	x	x	--	--
N141	Pond, perennial, near La Grange Road	x	x	--	--	--
N143	Pond, perennial, near Paseo Seven Legends	x	x	x	--	--
N148	Pond, perennial, near La Grange Road	x	x	x	x	--
N158	Pond, perennial, near Paseo Seven Legends	x	x	--	x	--
N161	Pond, perennial	x	x	x	x	
N164	Pond, seasonal, near Paseo Seven Legends	x	--	--	--	--
N172	Pond, perennial, near La Grange Road	x	x	--	--	--
N179	Pond, seasonal, near Paseo	x	--	x	--	--

Site <sup>1</sup>	Habitat Feature/Seasonality/Location	Burrows Observed	Emergent Vegetation Present	Overhanging Vegetation Present	Bullfrog Present	Fish Present
	Seven Legends					
N222	Pond, perennial, by Egan Road	x	x	x	x	--
N305	Pond, seasonal, by La Grange Road	x	x	--	--	--

<sup>1</sup> Sites within the FERC Boundary are denoted by the letter "F" and sites outside of the FERC Boundary are denoted by the letter "N."

Descriptions of upland and aquatic habitats within the FERC Project Boundary surrounding Don Pedro Reservoir, including detailed descriptions of all aquatic habitats potentially suitable for CTS breeding habitat, total acreages, elevation range, general topography, vegetation communities, land use, and other aspects are presented in Attachment A. Summary information concerning all other aquatic habitats that met minimal criteria for CTS breeding habitat is presented in Attachment A, in Table 1.2-1 for sites in the study area. Attachment B presents maps showing locations of all aquatic habitats within the study.

BLM (2009, 1980) reports that fish known to occur in the Project area include the green sunfish, largemouth bass, Sacramento sucker, and the mosquito fish, roach, Sacramento pikeminnow, rainbow trout, largemouth bass, and blue gill. The presence of predatory fish can severely limit the survival of CTS in otherwise suitable breeding habitat (Jennings and Hayes, 1994), and was considered an important factor in characterizing field assessed habitat.

Based on a review of aerial videography, stream habitat mapping photographs, and results of habitat assessments performed as part of this and other studies, stream reaches potentially affected by the project generally lack the essential components of CTS breeding habitat.

### 5.3.1 Sites Potentially Affected by Project O&M

Based on their proximity to project facilities or Don Pedro Reservoir, 20 sites were considered potentially affected by Project O&M, of these 20 sites, the essential components of CTS breeding habitat were identified at 18 locations. Lack of emergent or overhanging vegetation or the presence of aquatic predators diminishes the potential suitability of most of the sites (Table 5.3-2). Sites F31 and F73, streams in the Moccasin Point Recreation Area, do not meet the 10-week criterion.

**Table 5.3-2. Summary of sites potentially affected by Project O&M assessed for CTS habitat.**

Site Number	Habitat Description	Area (acres)	Ownership	Meets 10-Week Criterion	Fish Known to Occur at Project Site
F31	Stream in Moccasin Point Recreation Area	0.39	MID/TID	N	None
F45	Sewage Treatment Pond near Fleming Meadows Recreation Area	1.51	MID/TID	Y	None
F46	Sewage Treatment Pond near Blue Oaks Recreation Area	1.53	MID/TID	Y	None
F47	Swimming lagoon at Fleming Meadows Recreation Area	2.16	MID/TID	Y	None

Site Number	Habitat Description	Area (acres)	Ownership	Meets 10-Week Criterion	Fish Known to Occur at Project Site
F49	Sewage Treatment Pond near Fleming Meadows Recreation Area	0.12	MID/TID	Y	None
F50	Sewage Treatment Pond near Blue Oaks Recreation Area	0.71	MID/TID	Y	None
F51	Sewage Treatment Pond near Moccasin Point Recreation Area	0.68	BLM	Y	None
F52	Sewage Treatment Pond near Moccasin Point Recreation Area	0.02	BLM	Y	None
F73	Stream in Moccasin Point Recreation Area	0.22	MID/TID	N	None
F77	Pool in spillway channel	0.14	MID/TID	Y	Not likely
F78	Pool in spillway channel	0.06	MID/TID	Y	Not likely
F80	Pool in spillway channel	1.61	MID/TID	Y	Not likely
F81	Pond at base of Gasburg Creek Dike, adjacent spillway channel.	0.88	MID/TID	Y	None
F82	Pool in spillway channel	0.33	MID/TID	Y	Not likely
F83	Pool in spillway channel	0.45	MID/TID	Y	Not likely
F85	Pool in spillway channel	0.33	MID/TID	Y	Not likely
F86	Pool in spillway channel	0.80	MID/TID	Y	Not likely
F87	Pool in spillway channel	0.32	MID/TID	Y	Not likely
F88	Pool in spillway channel	0.33	MID/TID	Unknown	Not likely
F89	Pool in spillway channel	0.06	BLM	Y	Not likely

Most of the sites potentially affected by Project O&M with the essential components of CTS breeding habitat were relatively small water bodies (i.e., 0.06 – 2.17 acres), that were either man-made sewage treatment ponds or pools in the spillway channel. Sewage treatment ponds had minimal or no emergent and overhanging vegetation, where pools in the spillway channel had emergent vegetation and overhanging oaks or willows present but limited upland dispersal habitat. American bullfrogs, which also likely diminish CTS suitability, were observed at three pools in the spillway (F77, F78, and F80).

Three of the Project sites are situated on public land administered by the BLM. These sites include two sewage treatment ponds near Moccasin Point Recreation Area, Sites F51 and F52, and a pool in the spillway channel near the Tuolumne River, Site F89.

Don Pedro Reservoir itself does not possess the essential components of CTS breeding habitat because of the absence of suitable vegetation. This reservoir is also stocked with a variety of introduced, predatory fish, which diminish suitability for CTS.

### 5.3.2 Sites Not Affected by Project O&M

Aquatic habitats within the 1.24-mile radius study area surrounding the Project but not proximate to and therefore not affected by Project O&M included streams (ephemeral, seasonal, and perennial), pools in streams, natural ponds, and stock ponds. Some of the areas identified for assessment based on NWI maps were determined to be uplands. Other locations lacking the essential components of CTS breeding habitat were intermittent streams unlikely to provide standing water for a sufficient period. Seventy-four of the 372 sites not affected by the Project



were assessed in the field, while the remaining sites were assessed aerially, with the presence of essential CTS breeding habitat determined based on available information. Most field assessed sites met the 10-week criterion for CTS breeding habitat, but lacked suitable upland habitat, underground refugia, or some combination of both. Many of the sites assessed aerially were assumed to meet the 10-week criterion, but were lacking some component of suitable vegetation (either emergent or overhanging).

Within the Project Boundary, 23 of the 53 sites assessed held water for at least 10 weeks during the CTS breeding season, and it was unknown if 2 sites met the 10-week criterion. The majority of sites meeting the 10-week criterion were perennial streams, many of which contained fish and/or American bullfrogs. Table 5.3-3 summarizes the assessment results at sites located within the Project Boundary, excluding those potentially affected by Project O&M.

**Table 5.3-3. Summary of other (non-Project affected) sites assessed for CTS habitat within the Project Boundary.**

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
Streams and Pools in Streams	41	18 (2)	34 <sup>2</sup>	9 <sup>2</sup>	8 <sup>2</sup>
Natural Ponds	7	4	6 <sup>2</sup>	4	2 <sup>2</sup>
Stock/Irrigation/Detention Pond	1	1	0	1	0
Upland/Developed	4	0	3	1	0
<b>Total</b>	<b>53</b>	<b>23 (2)</b>	<b>43</b>	<b>15</b>	<b>10</b>

<sup>1</sup> Italic numbers in parenthesis are those sites for which 10-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.

Outside of the Project Boundary, 207 of the 319 sites assessed held water for at least 10 weeks during the CTS breeding season. The majority of the sites assessed were natural ponds or other wetlands located on private land. Most of these ponds met the 10-week criterion, but were lacking either emergent or overhanging vegetation. Predators were present at many of the field assessed sites but could not be determined for sites assessed aerially. Table 5.3-4 summarizes the assessment results at sites located within one mile outside of the Project Boundary.

**Table 5.3-4. Summary of results at other (non-Project affected) aquatic habitat locations within 1.24 mile of Project sites assessed for CTS habitat (excluding sites within Project Boundary).**

Aquatic Habitat Type	Number of Aquatic Habitat Locations <sup>1</sup>	Number of Locations that Meet 10-Week Criterion	Land Ownership <sup>2</sup>		
			TID/MID	BLM	Private/Other
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>

Aquatic Habitat Type	Number of Aquatic Habitat Locations <sup>1</sup>	Number of Locations that Meet 10-Week Criterion	Land Ownership <sup>2</sup>		
			TID/MID	BLM	Private/Other
Upland <sup>1</sup> /Developed	1	0	0	0	1
Other	2	2	0	0	2
<b>Total</b>	<b>319</b>	<b>207</b>	<b>7</b>	<b>7</b>	<b>311</b>

<sup>1</sup> Includes locations with multiple ownerships.

<sup>2</sup> Some sites have multiple ownerships; therefore, ownership total exceeds the number of assessed locations.

### 5.3.3 Potential Sites on BLM Administered Public Land

The study areas encompassed aquatic habitats located on public land administered by BLM at 25 locations. Table 5.3-5 summarizes the sites located at least partially on BLM land.

**Table 5.3-5. Summary of aquatic habitat locations on BLM administered land.**

Site Number <sup>1</sup>	Habitat Description	Area <sup>1</sup> (m <sup>2</sup> )	Additional Ownership	Meets 10-Week Criterion	Fish Known to Occur at Project Site
F17	Poor Man's Gulch	60	N/A	Y	Likely
F24	Unnamed ephemeral tributary to Upper Bay	10	N/A	Y	Likely
F27	Deer Creek	5	N/A	Y	None
F30	Kanaka Creek	15	MID/TID	Y	Likely
F32	Perennial stream near Jacksonville Road	2.25	N/A	Y	Likely
F33	Stream, seasonal (unnamed), near Grizzly Road	3	MID/TID	N	None
F34	Stream, seasonal (unnamed), near Moccasin Creek D Road	4.5	MID/TID	N	None
F35	Woods Creek	200	N/A	Y	Yes
F38	Stream, ephemeral, Upper Bay	Unknown	N/A	N	None
F51	Perennial pond near Jacksonville Road	2,760	N/A	Y	None
F52	Perennial pond near Jacksonville Road	95	N/A	Y	None
F54	Sixbit Gulch	6	N/A	Y	Yes
F60	Seasonal pond near Jacksonville Road	650	N/A	Y	None
F70	No aquatic feature present	N/A	N/A	N	None
F88	Pool in perennial stream near Bonds Flat Road	1,350	MID/TID	N	None
F89	Perennial pond near La Grange Impoundment	235	N/A	Y	None
F90	Stock pond near La Grange Impoundment	570	N/A	Y	None
N61	Perennial pond near Arbolada Drive	90	N/A	Y	None
N78	Sixbit Gulch	Unknown	Private	Y	Yes
N215	Stream impoundment, perennial	18	N/A	Y	None
N217	Emergent wetland	155	Private	N	None

Site Number <sup>1</sup>	Habitat Description	Area <sup>1</sup> (m <sup>2</sup> )	Additional Ownership	Meets 10-Week Criterion	Fish Known to Occur at Project Site
N218	Pool in stream, near Old Priest Grade	Unknown	N/A	N	None
N252	Stock pond	140	N/A	Y	None
N224	Perennial Stream Impoundment	120	N/A	Y	None
N271	Pond, seasonal, near New Priest Grade Road	50	N/A	N	None

<sup>1</sup> Total surface area (m<sup>2</sup>) of aquatic habitat; for streams, dimensions are maximums of pool habitats.

#### 5.4 Incidental Observations and Recorded Occurrences

No CTS were observed during the site assessments performed as part of this study, nor were there any incidental sightings of CTS during performance of the other relicensing studies during 2012.

Other incidental observations that may be pertinent to the potential occurrence of CTS in the study area include the presence of predatory fish particularly bass, sunfish, and mosquitofish; American bullfrog, and introduced crayfish. Observations of these species at CTS assessment sites are presented in Attachment A. Other pertinent incidental observations of these predatory species occurring during relicensing studies in 2012 are summarized in the Special-Status Amphibians and Reptiles Study (TID/MID 2013) and the ESA Listed Amphibians – California Red Legged Frog Study (TID/MID 2013).

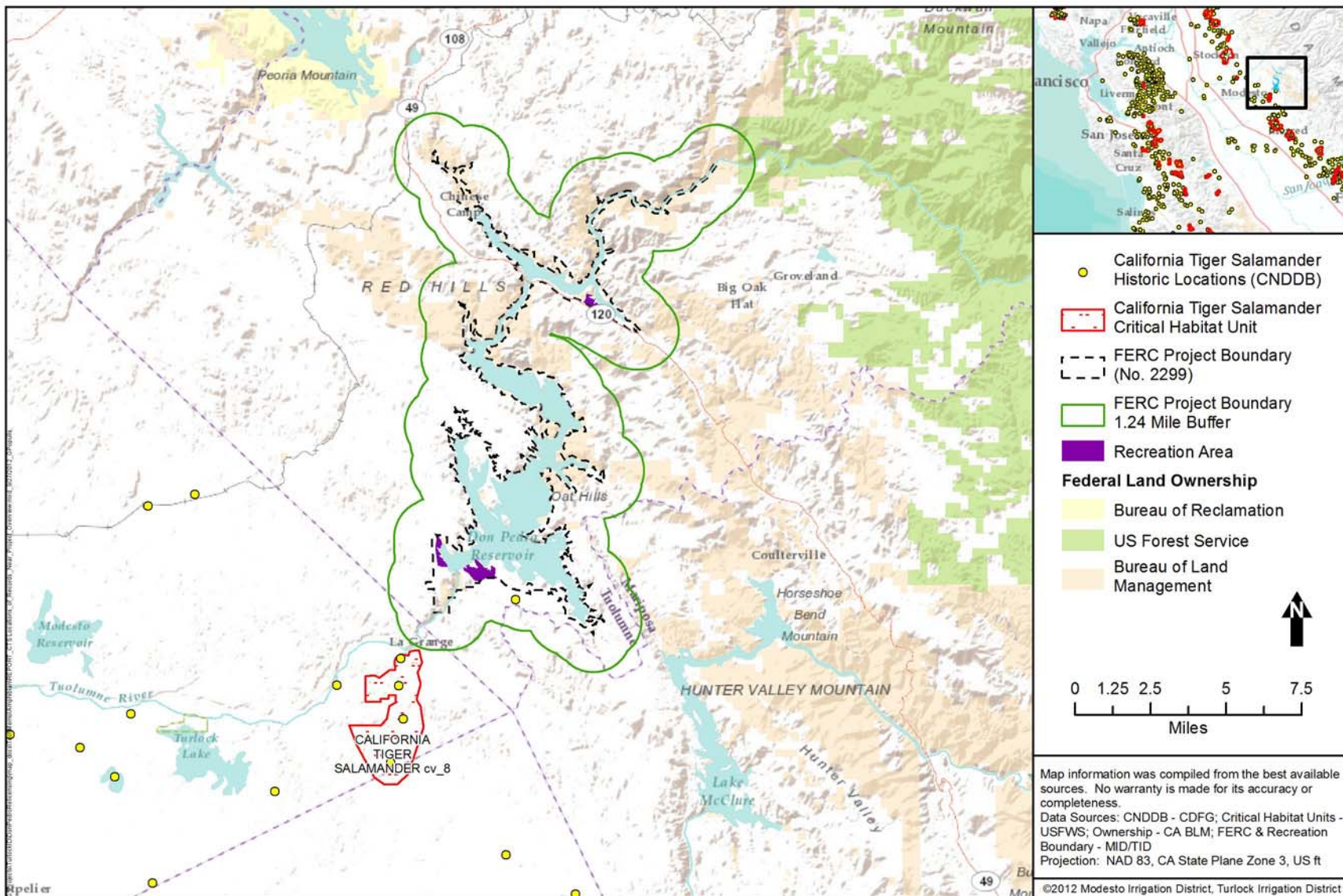


Figure 5.4-1. Locations of current and historical California tiger salamander occurrences and Critical Habitat Units.

## 6.0 DISCUSSION AND FINDINGS

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### 6.1 Summary

No occurrences of CTS have been recorded within the Project Boundary. Field assessments documented the minimum components of CTS breeding habitat were documented at 38 sites within the study area. A total of sixteen sites within the study area both met the minimum criteria for CTS breeding habitat and are potentially affected by Project O&M, based on their proximity to Project facilities. Nine of these sites are in or adjacent to the spillway channel; these met the minimum criteria for CTS breeding habitat based on field or aerial assessments, but each was considered marginal CTS habitat due to limited upland dispersal habitat. Additionally, seven sites located at Project recreation facilities (sewage treatment ponds and a swimming lagoon) met some components of breeding habitat (each held water for at least 10 weeks during the CTS breeding season), but did not provide suitable upland dispersal habitat. Because Project-affected lands in the study area represent generally poor habitat for CTS, the study concludes that Project O&M, including normal operations within the currently licensed elevation range, operation of the three recreation areas, vegetation management within these recreation areas and Project facilities, ongoing reservoir debris removal and permitted grazing, are not likely to affect CTS or its habitat.

### 6.2 Project Effects

FERC's Scoping Document 2 identified the following issues potentially affecting species listed under the ESA:

- Effects of project operation, including water level fluctuations, ground-disturbing activities, and maintenance on plants and wildlife species listed as threatened or endangered under the ESA.
- Effects of maintenance and use of project recreation facilities by recreationists on species listed as threatened or endangered under the ESA.
- Effects of project operation and maintenance on designated critical habitat under the ESA.
- Effects of vegetation clearing for project maintenance on species listed as threatened or endangered under the ESA.

Don Pedro Project O&M includes normal operations within the currently licensed elevation range (up to 830 feet), as well as operation of three formal recreation areas (Moccasin Point, Blue Oaks, and Fleming Meadows), vegetation management within these recreation areas and Project facilities, and ongoing reservoir debris removal and disposal. Recreation activities occur along portions of the shoreline and include dispersed camping, fishing and hiking. Additionally, the Districts have granted four grazing permits on a limited area within the Project Boundary, on a total of 559 acres.

There is one known occurrence of CTS in the vicinity of Don Pedro Reservoir, approximately 0.4 miles south of Don Pedro Reservoir near Big Creek. However, Don Pedro Reservoir itself is characterized by deep, still or slowly moving water with steep banks in most areas and limited

vegetation below the high-water mark; it does not constitute aquatic breeding habitat for CTS (USFWS 2003a). Because CTS does not occur at Don Pedro Reservoir, Project reservoir operations are not likely to affect the species or its habitat.

CTS site assessments documented a total of sixteen sites within the study area that met the minimum criteria for CTS breeding habitat and are potentially affected by Project O&M, based on their proximity to Project facilities. Nine of these sites are located in or adjacent to the spillway channel (F77, F78, F80, F81, F82, F83, F85, F86, F87, F88). These nine sites are considered marginal habitat due to limited adjacent upland dispersal habitat, and are not likely to support CTS. As a result, Project O&M at these locations is not likely to affect CTS or its potential habitat. Additionally, potential habitats in the spillway channel are not subject to any Project activities under normal O&M procedures; the spillway has released water only once since Project construction, in 1997. The spillway channel is included in lands permitted for grazing by the Districts, but access to the area is limited by steep slopes; no cattle were observed during field work.

Seven of the nine assessment sites located at Project recreational facilities met the 10-week criterion; one constructed swimming lagoon (F47) and 6 sewage treatment ponds (F45, F46, F49, F50, F51, and F52). Each of these sites is lined with either concrete or gravel and has none or minimal surrounding upland vegetation. While these sites all hold water for at least 10 weeks during the CTS breeding season, they are considered marginal habitat due to their lack of suitable adjacent upland habitat and are not likely to support CTS.

Ground squirrel control occurs annually at Project recreation facilities, which could limit the ground squirrel burrows available for CTS use, but CTS occurrence at the sites near these control efforts is not anticipated due to the lack of suitable adjacent upland habitat. Additionally, despite ground squirrel control, burrows were observed at six of the seven sites located at Project recreational facilities. Project O&M at recreational facilities is not likely to affect CTS or its habitat.

The Project is not located within USFWS designated critical habitat for CTS. The closest designated critical habitat is located approximately one mile southwest of the FERC Project Boundary in Stanislaus County. Therefore, Project O&M will have no impact on CTS critical habitat.

Project-related vegetation clearing and management is limited to roads, the three Project recreation areas, and Project facilities. As described above, available CTS habitat in the three Project recreation areas and facilities is considered marginal and are not likely to support CTS, and vegetation clearing and management is not likely to affect CTS or its habitat.

## **7.0 STUDY VARIANCES AND MODIFICATIONS**

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The study was conducted consistent with the FERC-approved ESA-listed Amphibians - California Tiger Salamander Study Plan (TR-08). No variances occurred.

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