ENDANGERED SPECIES ACT-LISTED AMPHIBIANS - CALIFORNIA RED-LEGGED FROG
STUDY REPORT
DON PEDRO PROJECT
FERC NO. 2299



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Modesto Irrigation District

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

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Endangered Species Act-Listed Amphibians
California Red-Legged Frogs
Study Report

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List of Acronyms

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

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
CHU .....Critical Habitat Unit
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
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
mg/L.....milligrams per liter
mgd .....million gallons per day
mi .....miles
mi^2 .....square miles
MID.....Modesto Irrigation District
MOU .....Memorandum of Understanding
MSCS.....Multi-Species Conservation Strategy
msl.....mean sea level
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
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

NWI.....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

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

SJRGA .....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
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
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

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^2).

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.

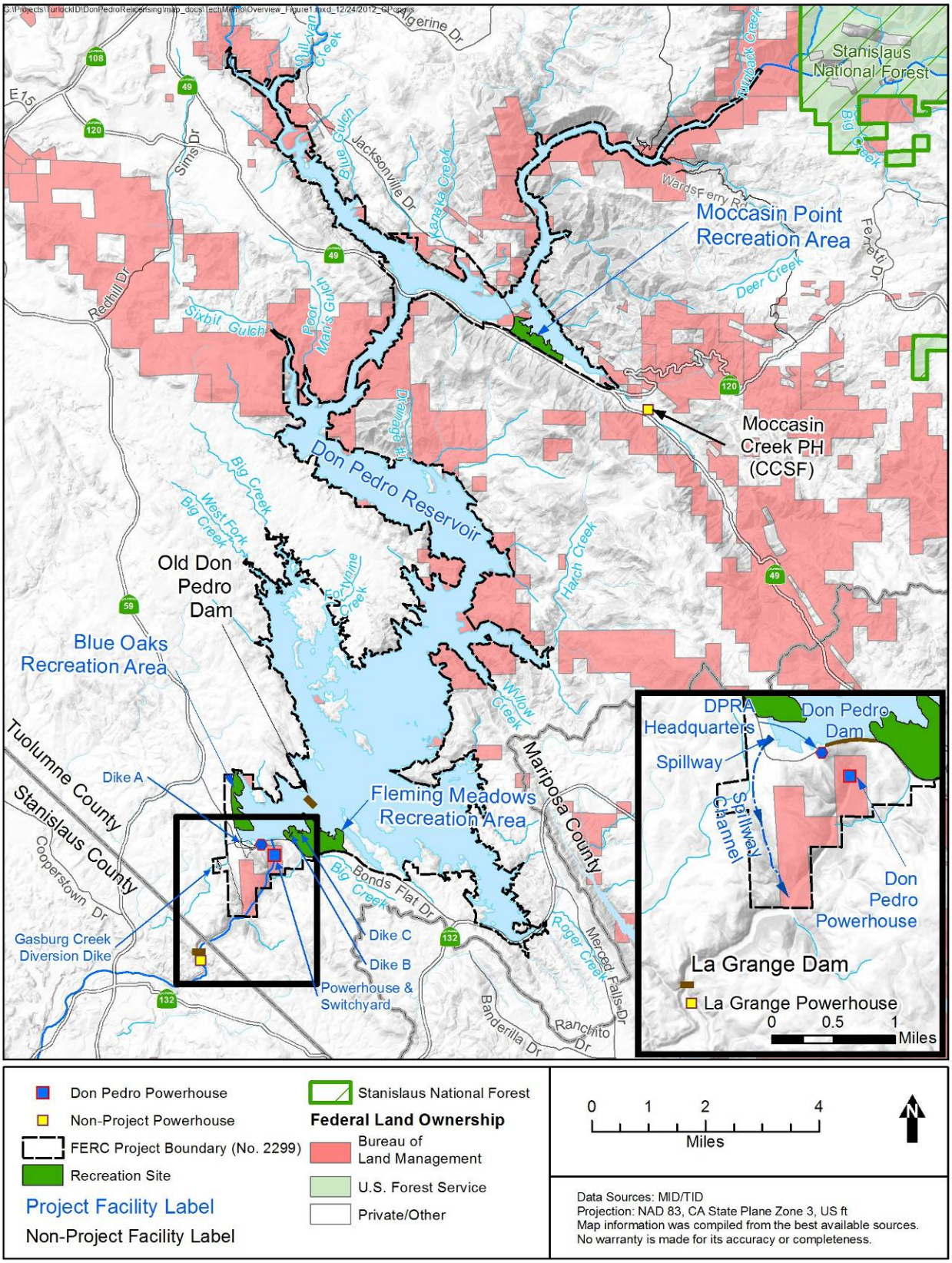

Figure 1.1-1. Don Pedro Project location.

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 Red-Legged Frog Study (TR-07) 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.

1.3 Study Plan

Modesto Irrigation District and Turlock Irrigation District's (the Districts) continued operation and maintenance (O&M) of the Don Pedro Project (Project) have a potential to affect the California red-legged frog (CRLF; *Rana draytonii*), a federally threatened species listed under the Endangered Species Act (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 near Deer Creek and Harney Lane. These effects could involve activities related to Project O&M or to Project-related recreation activities that impact CRLF suitable habitat.

FERC's SPD approved the Districts' red-legged frog study plan as provided in the RSP filing. The study was conducted consistent with the study plan.

2.0 STUDY GOALS AND OBJECTIVES

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 CRLF. The objectives of this study are to:

- Identify, compile, and map known occurrences of CRLF and the distribution of suitable habitats for CRLF.
- Evaluate the likelihood that CRLF currently exists in the Project Boundary using site assessments of habitat suitability and information from historical records.
- Compile incidental observations of CRLF observations from other aquatic studies.
- Through incidental observations, document the presence and provide estimates of number of exotic species (e.g., American bullfrogs [*Lithobates catesbeianus*], non-native crayfish, bass, catfish, or mosquito fish), which may limit the occurrence of CRLF in otherwise suitable habitats (USFWS 2002).
- Provide information on Project-affected tributary streams to the Don Pedro Reservoir for evaluation of potential Project-related effects on CRLF.
- Provide information to FERC that can be used to develop a Biological Assessment regarding the effects of Project licensing on CRLF.

3.0 STUDY AREA

As specified in the FERC-approved study plan, the study area for this effort consisted of all suitable aquatic habitats within the Project Boundary and lands within 1 mile of the Project Boundary. Consistent with USFWS guidelines (USFWS, 2005), for defining a "project action area," the study area includes all lands potentially affected by Project O&M.

Land ownership within 1-mile of the Project Boundary is principally MID, TID, and BLM, with some private and other publicly owned 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.

4.0 METHODOLOGY

The study plan approved by FERC in their December 22, 2011 Study Plan Determination outlined five steps for performing the CRLF 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 Red-Legged Frog Study (TR-07). 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

CRLF is typically associated with low-gradient streams (Hayes and Jennings 1988), backwaters, and lentic habitat with emergent vegetation, although habitats lacking vegetation are sometimes used. Suitable CRLF breeding habitat is defined as:

> *Low-gradient fresh water bodies, including natural and manmade (e.g., stock) ponds, backwaters within streams and creeks, marshes, lagoons, and dune ponds….To be considered essential breeding habitat, the aquatic feature must have the capability to hold water for a minimum of 20 weeks in all but the driest of years (USFWS 2010).*

Existing aerial photography and National Wetlands Inventory (NWI) digital map data (USFWS 1987) were used to identify and map locations within the study area that are potentially suitable for CRLF breeding, or aquatic sites that hold water for a minimum of 20 weeks during the CRLF breeding season. Other aquatic habitats potentially affected by the Project that could be utilized by CRLF for dispersal, foraging, or predator avoidance were also identified and mapped through review of available data and reconnaissance level field assessments. Following habitat mapping, potentially suitable aquatic habitats sufficient for field visits were selected based on review of historical data and additional habitat characterization.

4.1.1 Review of Historical Data

Known CRLF 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 (CNDDB) (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);

- California Red-Legged Frog Recovery Plan (USFWS 2002);
- Geographic Information System (GIS) shapefile of the Final Critical Habitat for the California Red-Legged Frog (USFWS 2009); and
- Peggy Cranston from the Mother Lode Field Office of the BLM on 3/18/2012 (Cranston 2012).

4.1.2 Habitat Characterization Methods

Study sites that were suspected to hold water for at least 20 weeks during the CRLF breeding season were identified through initial review of aerial imagery and NWI digital map data (USFWS 1987). Following the selection of study sites with potentially suitable habitat, site assessments of aquatic habitat were performed in accordance with Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog (USFWS 2005). Locations within the Project Boundary and a representative set of locations that were publically accessible outside of the Project Boundary were examined in the field. The Districts selected locations in the study area for site evaluations in order to further characterize habitats based on the following criteria:

- All potential breeding locations within the existing Project Boundary.
- Representative breeding locations on publicly accessible lands (and private lands where permission to enter could be obtained) within 1 mile of the Project Boundary.

All data specified and required by USFWS guidelines (Appendix D of USFWS 2005) were collected at each site where reconnaissance level examination was performed, along with photographs depicting habitat and other notable findings. These data are presented in Attachment A. Potential habitats were evaluated using aerial images and then assessed in the field. Field assessed habitats were photographed from opposite directions, both up and down drainage, where possible, in order to document seasonal cover and foraging habitat adjacent to aquatic habitat. Areas that did not appear to represent suitable habitat were not field examined but were instead characterized from aerial imagery, existing site photographs, and U.S. Geological Service (USGS) topographic mapping and other existing descriptive information.

Based on the site assessments, aquatic habitats were mapped and characterized by habitat type (e.g., stream or depressional emergent wetland), apparent seasonality, dominant vegetation type (e.g., emergent or overhanging shrubs), water depth at the time of the site assessment, bank-full depth, stream gradient (i.e., percent slope), substrate, and description of bank. The field crew was also cognizant of and prepared to note the presence of fish, non-native crayfish, American bullfrog, and other incidental observations of amphibians, reptiles, and turtles. A map of upland vegetation types was created from available CalVeg data (USFS, 2009). 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 CRLF movement.

4.2 Data Management and Consultation with Districts

Standard data QA/QC procedures were performed, including: 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 CRLF 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 CRLF breeding habitats and historical occurrences were mapped, Project operations staff was consulted to identify Project O&M, recreation and other Project-related activities that typically occur near potentially suitable CRLF breeding habitat that have a potential to adversely affect CRLF.

5.0 RESULTS

5.1 CRLF Life History Information

CRLF is 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 2006). Locations with the highest densities of CRLF exhibit dense emergent or shoreline riparian vegetation closely associated with moderately deep (greater than 2.3 ft), still, or slow-moving water. Vegetation that provide the most suitable structure are willows, cattails, and bulrushes at or close to the water level, which shade a substantial area of the water (Hayes and Jennings 1988). Another correlation to CRLF occurrence is the absence or near-absence of introduced predators such as American bullfrog and predatory fish—particularly centrarchids (i.e., freshwater sunfishes), which feed on the larvae at higher rates than native predatory species (Hayes and Jennings 1988)—and mosquitofish. Hiding cover from predators may be provided by 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.

Depending on elevation and climate, CRLF may breed from late November to late April. Egg masses attach 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 utilize small-mammal burrows, leaf litter, and other moist sites as much as 200 ft from riparian areas (Jennings and Hayes 1994; USFWS 2006). Long-distance dispersal has been documented at distances of up to a mile and probably occurs only during wet periods (USFWS 2006).

5.2 Historical and Current Occurrence of CRLF in the Project Vicinity

Known historical and current CRLF occurrences near the Project are summarized in Table 5.2-1 and depicted on Figure 5.4-1. There are 5 known historical CRLF occurrences within 10 miles of the Don Pedro Project (Basey 2010; Jennings 2010; CDFG 2012; Fellers 2010). There are no recent or extant occurrences of CRLF near the Project. The nearest extant occurrence is 29miles northwest of the Project within Critical Habitat Unit CAL-1 (Calaveras County) (CAS 2012).

There are two known historical CRLF occurrences within 1 mile of the Don Pedro Reservoir study area, on Piney Creek prior to 1984. Piney Creek is a tributary to Lake McClure, located east of Don Pedro Reservoir. These occurrences were located in a ravine with a deep pool upstream of Highway 132 (Basey 2010), and at another pool further upstream (USFWS 2010; Jennings 2010). American bullfrogs were also found in two other pools on Piney Creek at the

time of the CRLF observations. The Piney Creek occurrence is generally presumed extirpated, based on field investigations conducted by the USFWS (2002).

Table 5.2-1. Recorded occurrences of CRLF in Tuolumne, Mariposa, Merced, and Stanislaus counties.

Occurrence[1]	Distance from the Project and Status of the Occurrence
Piney Creek upstream of Highway 132, Mariposa Co. (3 adults, 1972-1984[2])	1.0 mile E of Don Pedro Reservoir. Presumed extirpated.
Piney Creek at Gusano Way, Mariposa Co. (unknown number of individuals, 1972 and 1974[3])	1.1 miles E of Don Pedro Reservoir. Presumed extirpated.
Woods Creek, near Columbia and Sonora, Tuolumne Co. (4 adults or juveniles, 1950 collection[4])	8.5 miles NW of Don Pedro Reservoir. Possibly extirpated population in a nonspecific area.
Maxwell Creek near Coulterville, Mariposa Co. (1 tadpole, 1992[5])	8.3 miles E of Don Pedro Reservoir. Presumed extirpated.
Parrotts Ferry Road, near Columbia, Tuolumne Co. (1 adult or juvenile, 1975 collection[4])	9.7 miles N of Don Pedro Reservoir. Occurrence "presumed extant" by CNDDB; 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[6])	12.5 miles S of Don Pedro Reservoir. Presumed extirpated.
"Merced River Bridge, Highway Crossing," Merced Co. (1 adult or juvenile, 1922 collection[7])	Unknown distance. Presumed extirpated.
Jordan Creek, 2 miles N of Greeley Hill Rd., Tuolumne Co. (1 adult female, 1967[3])	14.4 miles E of Don Pedro Reservoir. Presumed extirpated.
Mather, near Tuolumne River, Tuolumne Co. (1 unknown life stage, 1922 collection[4])	22.4 miles E of Don Pedro Reservoir. Possibly extirpated population.
Swamp Lake, near Miguel Meadow, Tuolumne Co. (1 unknown life stage, 1940 collection[4])	23.9 miles E of Don Pedro Reservoir. Possibly extirpated population.

[1] Records and critical habitat units in western Stanislaus County and Merced County are not included.
Sources: [2]H.E. Basey, pers. comm., 2010; [3]Dr. M.R. Jennings, pers. comm., 2010; [4]CDFG 2012; [5]Dr. G.M. Fellers, USGS, pers. comm., 2010; [6]MVZ 2012; [7]CAS 2012.

5.3 Site Assessment and Habitat Characterization

All habitat and site assessment data required by USFWS guidelines (Appendix D of USFWS 2005) are presented in Attachment A. Attachment B presents maps showing locations of aquatic habitats within the study area and maps showing the geographical extent of the upland study area. Table 5.3-1 summarizes information associated with sites potentially affected by Project O&M, including land ownership, assessment results at the study site, and fish known to occur.

A total of 337 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 considered potentially affected by Project O&M. Of the 337 sites, 85 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 252 sites were not accessible for on-site assessment or were not within the FERC Project Boundary, and were therefore assessed from aerial imagery. Sites were evaluated to determine if water was present for at least 20 weeks

during the CRLF breeding season, the key component of CRLF breeding habitat according to the USFWS (2010).

Sites within the study area consisted of 111 sections of streams or pools in streams; 137 natural ponds; 18 stock, irrigation, or treatment ponds; 62 other wetlands; 6 uplands, or constructed areas. A total of 77 stream sites, 110 natural ponds, 16 stock/irrigation/treatment ponds, six emergent wetlands; a constructed public swimming lagoon, a constructed swimming pool, and a constructed reservoir appear to meet the minimum criterion of 20 weeks of standing or slow-moving water. It was unknown if two seasonal streams and one manually filled stock pond met the 20-week criterion. Many of the surveyed sites that met the 20 week criterion were considered marginal habitat based on the presence of predators such as fish and bullfrogs or the lack of emergent or aquatic vegetation. Based on these factors, 42 of the 52 field assessed sites that met (or were undetermined to meet) the 20 week criterion represent marginal or unsuitable habitat for CRLF breeding. The remaining 10 sites (F17, F30, F43, F53, F81, N60, N75, N133, N143, and N179) appear to represent suitable breeding habitat for CRLF due to the presence of suitable vegetation and lack of fish or other predatory species. None of these sites will be potentially affected by Project O&M due to proximity to project facilities or Don Pedro Reservoir.

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 CRLF 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 the Special Status Amphibians and Aquatic Reptiles Study (TID/MID 2013). Stream reaches potentially affected by the Project generally lack the essential components of CRLF 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 CRLF breeding habitat were identified at 17 locations, with one site unknown. Lack of emergent or overhanging vegetation or the presence of bullfrogs diminishes the potential suitability of most of the sites (Table 5.3-1). Sites F31 and F73, streams in the Moccasin Point Recreation Area, do not meet the 20 week criterion.

Table 5.3-1. Summary of sites potentially affected by Project O&M.

Site Number	Habitat Description	Area (acres)	Ownership	Meets 20-Week Criterion	Fish Known to Occur at 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

Site Number	Habitat Description	Area (acres)	Ownership	Meets 20-Week Criterion	Fish Known to Occur at Site
F47	Swimming lagoon at Fleming Meadows Recreation Area	2.16	MID/TID	Y	None
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	Unknown	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 CRLF 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, limiting their suitability as CRLF habitat. Pools in the spillway channel generally had emergent vegetation and overhanging shrubs or trees present. However, American bullfrogs were observed at three pools in the spillway channel and are likely present in each, also limiting their suitability as potential habitat.

Three of the sites potentially affected by Project O&M 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 CRLF 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 CRLF. Deep lacustrine water bodies like Don Pedro Reservoir are not known to provide breeding habitat for CRLF, although adult CRLF have been reported to occur at some reservoirs (USFWS 2002).

5.3.2 Sites Not Affected by Project O&M

Aquatic habitats within the 1.0 mile radius study area but not in proximity to potential Project O&M included streams (ephemeral, seasonal, and perennial), pools in streams, natural ponds,

stock ponds, and other wetlands. Some of the areas identified for assessment based on National Wetland Inventory maps were determined to be uplands. Other locations lacking the essential components of CRLF breeding habitat were intermittent streams unlikely to provide standing water for 20 weeks. Field assessment was performed for 70 of the 317 sites not affected by Project O&M, and the remaining sites were assessed aerially. The presence of essential CRLF breeding habitat was determined based on information available from the assessment. Most field assessed sites met the 20-week criterion for CRLF breeding habitat, but lacked suitable vegetation, had predatory species present, or some combination of both. Many of the sites assessed aerially were assumed to meet the 20-week criterion, but were lacking a component of suitable vegetation (either emergent or overhanging).

Within the Project Boundary, 23 of the 53 sites assessed held water for at least 20 weeks during the CRLF breeding season, and it was unknown if 2 sites met the criterion. The majority of sites meeting the 20-week criterion were perennial streams, many of which contained fish and/or American bullfrogs. Table 5.3-2 summarizes the assessment results at sites located within the Project Boundary, excluding those potentially affected by Project O&M.

Table 5.3-2. Summary of other (non-Project affected) sites assessed for CRLF habitat within the Project Boundary.

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 20-Week Criterion[1]	Land Ownership[3]		
			MID/TID	BLM	Private/ Other
Streams and Pools in Streams	41	18 (*2*)	33[2]	6[2]	8[2]
Natural Ponds	7	4	6[2]	4	2[2]
Stock/Irrigation/ Detection Pond	1	1	0	1	0
Upland/Developed	4	0	3	1	0
Total	**53**	**23 (*2*)**	**42[2]**	**12[2]**	**10[2]**

[1] Italic numbers in parenthesis are those sites for which 20-week criterion status is unknown.
[2] Includes locations with multiple ownerships.
[3] Some sites have multiple ownerships; therefore, ownership total exceeds the number of assessed locations.

Outside of the Project Boundary, 172 of the 264 sites assessed held water for at least 20 weeks during the CRLF breeding season. The majority of the sites assessed were natural ponds or other wetlands located on private land. Most of these ponds met the 20-week criterion, but were lacking either emergent or overhanging vegetation. Table 5.3-3 summarizes the assessment results at sites located within one mile outside of the Project Boundary.

Table 5.3-3. Summary of results at other (non-Project affected) aquatic habitat locations within 1.0 mile of the sites assessed for CRLF habitat (excluding sites within Project Boundary).

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 20-Week Criterion	Land Ownership[1]		
			TID/ MID	BLM	Private/ Other
Streams and Pools in Streams	58	50	2	1	55
Natural Ponds	129	105	3[2]	2	125[2]

Aquatic Habitat Type	Number of Aquatic Habitat Locations	Number of Locations that Meet 20-Week Criterion	Land Ownership[1]		
			TID/ MID	BLM	Private/ Other
Stock/ Irrigation/ Detention Pond	11	9	0	1[2]	11[2]
Other Wetlands	62	6	1[2]	1[2]	62
Upland[2]/ Developed	3	2	0	0	1
Other	2	2	0	0	2
Total	**264**	**172**	**5[2]**	**5[2]**	**256[2]**

[1] Includes locations with multiple ownerships.
[2] Some sites have multiple ownerships; therefore, ownership total exceeds the number of assessed locations.

5.3.3 Sites on BLM Administered Public Land

The study area included aquatic habitats located on public land administered by BLM at 23 locations. Table 5.3-4 summarizes the sites located at least partially on BLM land.

Table 5.3-4 Summary of aquatic habitat locations on BLM-administered land.

Site Number	Habitat Description	Area[1] (m^2)	Additional Ownership	Meets 20-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 Bonds Flat Road	235	N/A	Y	None
F90	Stock pond near Bonds Flat Road	570	N/A	Y	None
N61	Perennial pond near Arbolada Drive	90	N/A	Y	None
N78	Sixbit Gulch	Unknown	Private	Y	Yes
N217	Emergent wetland	155	Private	N	None

Site Number	Habitat Description	Area[1] (m^2)	Additional Ownership	Meets 20-Week Criterion	Fish Known to Occur at Project Site
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

[1] Total surface area (m^2) of aquatic habitat; for streams, dimensions are maximums of pool habitats.

5.4 Incidental Observations and Recorded Occurrences

No CRLF were observed during the site assessments performed as part of this study, nor were there any incidental sightings of CRLF during performance of the other relicensing studies during 2012. The known historical occurrences of CRLF closest to the Project Boundary are probably not extant; CRLF are considered extirpated from the Tuolumne River watershed (USFWS 2002). The nearest known extant occurrence (Young's Creek) is about 29.3 miles from the Project, within the CAL-1 Critical Habitat Unit (CHU). This CHU consists of 2,764 acres on privately owned land and is the nearest CHU to the Project.

Other incidental observations that may be pertinent to the potential occurrence of CRLF 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 CRLF study sites are presented in Attachment A.

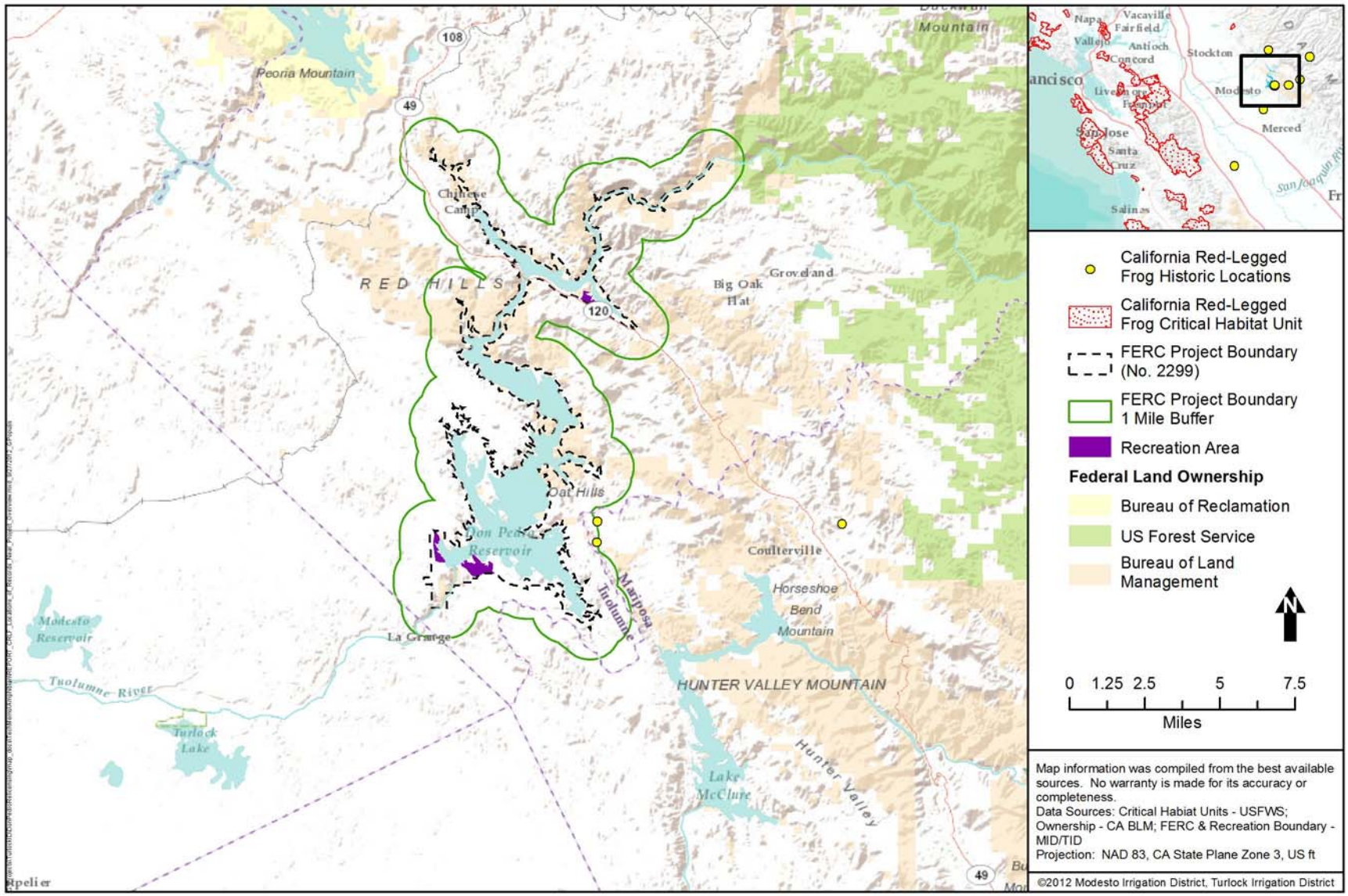

Figure 5.4-1. Locations of historical California red-legged frog occurrences and designated Critical Habitat Units.

6.0 DISCUSSION AND FINDINGS

6.1 Summary

CRLF are not likely to occur in the Don Pedro Project Boundary or the study area. No occurrences of CRLF have been recorded within 5 miles of the Project Boundary since 1984, and USFWS's recovery plan for the species lists CRLF as extirpated from the Tuolumne River watershed (USFWS 2002). No USFWS-designated Critical Habitat Units occur within 29 miles of the Project Boundary.

Potential CRLF breeding habitat was documented at or near 167 sites within the study area. Of these sites, 10 may be affected by Project operations because they are in or adjacent to the spillway channel. However, the potential habitats observed are of generally poor quality due to presumed bullfrog presence, and potential habitats in the spillway channel are not subject to any Project activities under normal O&M. Additionally, seven sites located at Project recreation facilities (sewage treatment ponds and a swimming lagoon) met the 20 week criterion for potential CRLF breeding habitat, but did not provide suitable overhanging and emergent vegetation.

Because CRLF are not known to occur in the study area, and because Project-affected lands in the study area represent generally poor habitat for CRLF, 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 CRLF 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 are no known CRLF occurrences in the vicinity of Don Pedro Reservoir, and CRLF are considered extirpated from the Tuolumne River watershed (USFWS 2002). Don Pedro Reservoir 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 CRLF. As a result, CRLF is not likely to occur at Don Pedro Reservoir and Project reservoir operations are not likely to affect the species or its potential habitat.

CRLF site assessments documented the essential component of CRLF breeding habitat (i.e., "the capability to hold water for a minimum of 20 weeks in all but the driest of years") at or near 167 sites within the study area, with four sites unknown. Based on proximity to Project facilities, Project O&M may affect may affect potential CRLF breeding habitat at 10 of the assessment locations (F77, F78, F80, F82, F83, F85, F86, F87, F88, F89) in the spillway channel and one pond (F81) adjacent to the spillway channel. However, American bullfrog were observed at three of the pools in the spillway channel and are likely present in each, limiting their suitability as potential habitat. Because CRLF do not occur in the study area and the potential habitats observed are of generally poor quality, Project O&M is unlikely to affect CRLF in these areas. 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 study sites located at Project recreational facilities met the 20-week criterion and represent potential habitat; one constructed swimming lagoon (F47) and six sewage treatment ponds (F45, F47, F49, F50, F51, and F52). Each of these sites is lined with either concrete or gravel and has minimal surrounding vegetation. While these sites all hold water for at least 20 weeks during the CRLF breeding season, they are considered marginal habitat due to their lack of overhanging and emergent vegetation and are not likely to support CRLF.

The Project is not located within USFWS designated critical habitat for CRLF. The closest designated critical habitat is located approximately 29 miles northwest of the FERC Boundary in Calaveras County. Therefore, Project O&M will have no impact on CRLF critical habitat.

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

7.0 STUDY VARIANCES AND MODIFICATIONS

The study was conducted consistent with the FERC-approved ESA-listed Amphibians - California Red-Legged Frog Study Plan (Study TR-07). No variances occurred.

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