

**SPECIAL-STATUS AMPHIBIANS AND REPTILES
STUDY REPORT
DON PEDRO PROJECT
FERC NO. 2299**



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

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Special-Status Amphibians and Reptiles Study Report

TABLE OF CONTENTS

Section No.	Description	Page No.
1.0	INTRODUCTION.....	1-1
1.1	General Description of the Don Pedro Project	1-1
1.2	Relicensing Process	1-3
1.3	Study Plan	1-3
2.0	STUDY GOALS AND OBJECTIVES	2-1
3.0	STUDY AREA.....	3-1
4.0	METHODOLOGY	4-1
4.1	Identify and Map Known Occurrences	4-1
4.2	Identify and Map Potential Habitat and Select Survey Sites	4-1
4.3	Conduct WPT Basking and FYLF Visual Encounter Surveys	4-2
4.3.1	Western Pond Turtle Basking Surveys	4-2
4.3.2	Foothill Yellow-Legged Frog Visual Encounter Surveys	4-3
4.3.3	Incidental Observations	4-3
4.4	Quality Assure/Quality Control Data (QA/QC),	4-4
5.0	RESULTS	5-1
5.1	Western Pond Turtle	5-1
5.1.1	Western Pond Turtle Life History Information	5-1
5.1.2	Western Pond Turtle Historical Occurrences	5-1
5.1.3	Western Pond Turtle Nesting Habitat	5-1
5.1.4	Western Pond Basking Habitat Assessments.....	5-2
5.1.5	Western Pond Turtle Basking Surveys – Non-Reservoir Sites.....	5-10
5.1.6	Reservoir WPT Basking Surveys.....	5-13
5.1.7	Incidental Observations of WPT.....	5-17
5.2	Foothill Yellow-Legged Frog	5-21
5.2.1	Foothill Yellow-legged Frog Life History Information.....	5-21
5.2.2	Foothill Yellow-Legged Frog Historic Occurrences	5-21
5.2.3	Foothill Yellow-Legged Frog Creek Habitat Assessments	5-21
5.2.4	Foothill Yellow-Legged Frog Visual Encounter Surveys	5-26
5.3	Incidental Observations of WPT and FYLF Predators	5-28
6.0	DISCUSSION AND FINDINGS.....	6-1

6.1	Western Pond Turtle	6-1
6.1.1	Observed and Reported Occurrence of Western Pond Turtle in the Study Area	6-1
6.1.2	Habitat Suitability in Study Area.....	6-1
6.1.3	Effects of Project O&M.....	6-2
6.2	Foothill Yellow-Legged Frog	6-3
6.2.1	Observed and Reported Occurrences of Foothill Yellow-legged Frog in the Study Area and Vicinity	6-3
6.2.2	Habitat Suitability in Study Area.....	6-3
6.2.3	Effects of Project O&M.....	6-3
7.0	STUDY VARIANCES AND MODIFICATIONS.....	7-1
8.0	REFERENCES.....	8-1

List of Figures

Figure No.	Description	Page No.
Figure 1.1-1.	Don Pedro Project location.	1-2
Figure 3.0-1.	WPT and FYLF habitat assessment and survey site locations.	3-2
Figure 5.1-1.	Historical records of WPT and FYLF in the study area and surrounding vicinity.	5-20
Figure 6.1-1.	Reservoir water surface elevation change during principal western pond turtle egg-laying period, May – July during 1971 – 2010.	6-3

List of Tables

Table No.	Description	Page No.
Table 5.1-1.	Concentrated areas of potential WPT nesting habitat within the study area.	5-2
Table 5.1-2.	Non-reservoir sites assessed for WPT basking habitat.	5-4
Table 5.1-3.	Reservoir sites assessed for WPT basking habitat.	5-5
Table 5.1-4.	Descriptions of WPT basking habitat at Don Pedro non-reservoir survey sites.	5-10
Table 5.1-5.	WPT basking survey observations at Don Pedro non-reservoir survey sites.	5-11
Table 5.1-6.	Description of WPT basking habitat at Don Pedro reservoir survey sites.....	5-13
Table 5.1-7.	WPT basking survey observations at Don Pedro Reservoir survey sites.	5-15
Table 5.1-8.	Incidental observations of WPT recorded during performance of relicensing studies.	5-17
Table 5.2-1.	Results of FYLF habitat assessments.	5-22
Table 5.2-2.	Summary of 2012 FYLF VES results.....	5-27

Table 5.3-1. Incidental observations of exotic amphibious species during relicensing studies 5-28

List of Attachments

Attachment A	Habitat Assessment and Survey Site Maps
	Part 1: WPT Habitat Assessment and Survey Locations with Nesting Habitat
	Part 2: FYLF Survey Locations
	Part 3: Incidental Observations of WPT, Exotic Amphibians and Predatory Species during Relicensing Studies

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
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 (mi²).

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.

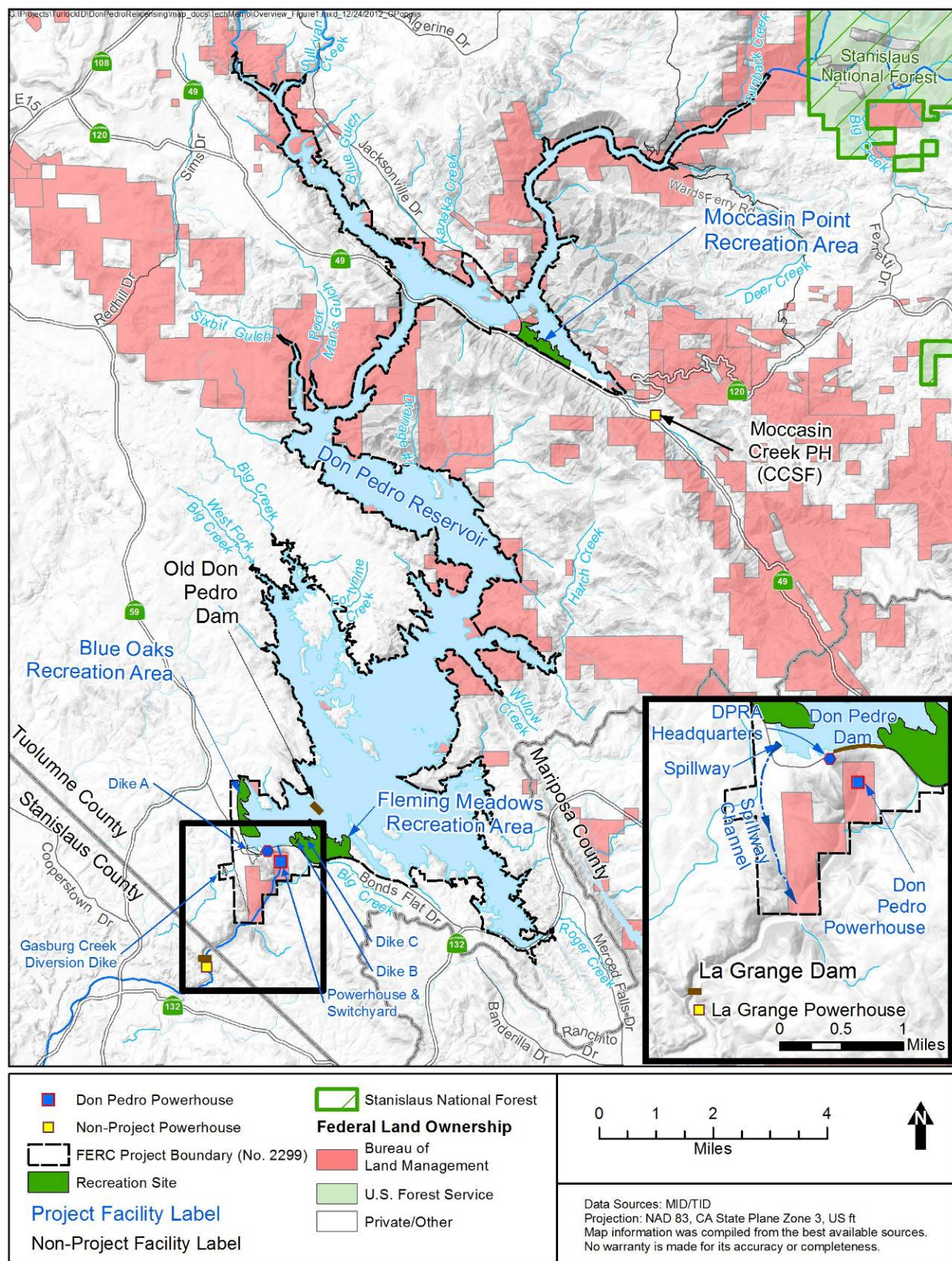


Figure 1.1-1. Don Pedro Project location.

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 Special-Status Amphibians and Reptiles Study (TR-06) 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

Operation and maintenance (O&M) of the Don Pedro Project and/or Project-related recreation activities may have the potential to affect foothill yellow-legged frog (FYLF; *Rana boylei*) and western pond turtle (WPT; *Actinemys* [formerly *Emys* or *Clemmys*] *marmorata*), both special-status amphibians and reptiles that are listed as Species of Special Concern by California Department of Fish and Game (CDFG) and as Sensitive by the Bureau of Land Management (BLM). Water level changes in reservoir tributaries, ground-disturbing activities, recreation foot traffic, and vegetation clearing are Project-related activities that could affect FYLF and WPT and their habitat.

FERC's SPD approved the Districts' Special-Status Amphibians and Reptiles Study Plan as provided in the Districts' PSP filing. Special-status amphibians and reptiles were studied in conjunction with habitat assessment efforts for ESA and CESA-listed amphibians; the results of these efforts are provided in The Districts' Study Report TR-07, California Red-legged Frog (CRLF), and Study Report TR-08, California Tiger Salamander (CTS). This report includes results, mapping, and analyses conducted as required by the Study Plan; site photographs and raw datasheets will be provided separately to resource agencies or other interested parties.

2.0 STUDY GOALS AND OBJECTIVES

The goal of this study is to provide information to the relicensing participants concerning FYLF and WPT associated with the Project, and related Project impacts or activities. The specific objectives of this study are:

- Identify, compile, and map known occurrences of FYLF and WPT, including life history stage and associated habitat information as available.
- Identify and map habitats in the study area potentially suitable for FYLF and WPT, including potential WPT nesting habitat surrounding the Project reservoir, and evaluate the suitability of these habitats for the species.
- Document the distribution and abundance of FYLF and WPT in the study area.
- Perform FYLF and WPT surveys in suitable habitats where there is some evidence of a potential adverse Project effect.
- Compile incidental observations of FYLF and WPT and other aquatic special-status species and non-native amphibians, turtles, and crayfish from other aquatic studies.
- Provide information to enable an assessment of Project effects.

3.0 STUDY AREA

As required by the study plan, as specified by the FERC approved study plan, the special-status amphibian and reptile study area consisted of: 1) suitable aquatic habitats within the Don Pedro Project Boundary within 0.5 mile (mi) from the normal maximum water surface elevation of Don Pedro Project reservoir, including accessible sections of the Tuolumne River up to River Mile 79, and 2) tributaries up to 1.0 mi upstream of the reservoir.

Figure 3.0-1 provides an overview of the entire study area and indicates all areas where field work was performed. Attachment A provides a more detailed view of the study area and indicates areas where field work was performed, including survey locations. Per the study plan, areas with unsafe terrain, as identified in the field, was not surveyed.

Access to private lands outside the Project Boundary but within the study area was requested in a letter sent by the Districts to 158 landowners on March 13, 2012. Of these, 112 granted and 46 denied access to their land; private lands for which access was denied were not surveyed. For safety reasons, unreturned letters were considered denials to land access.

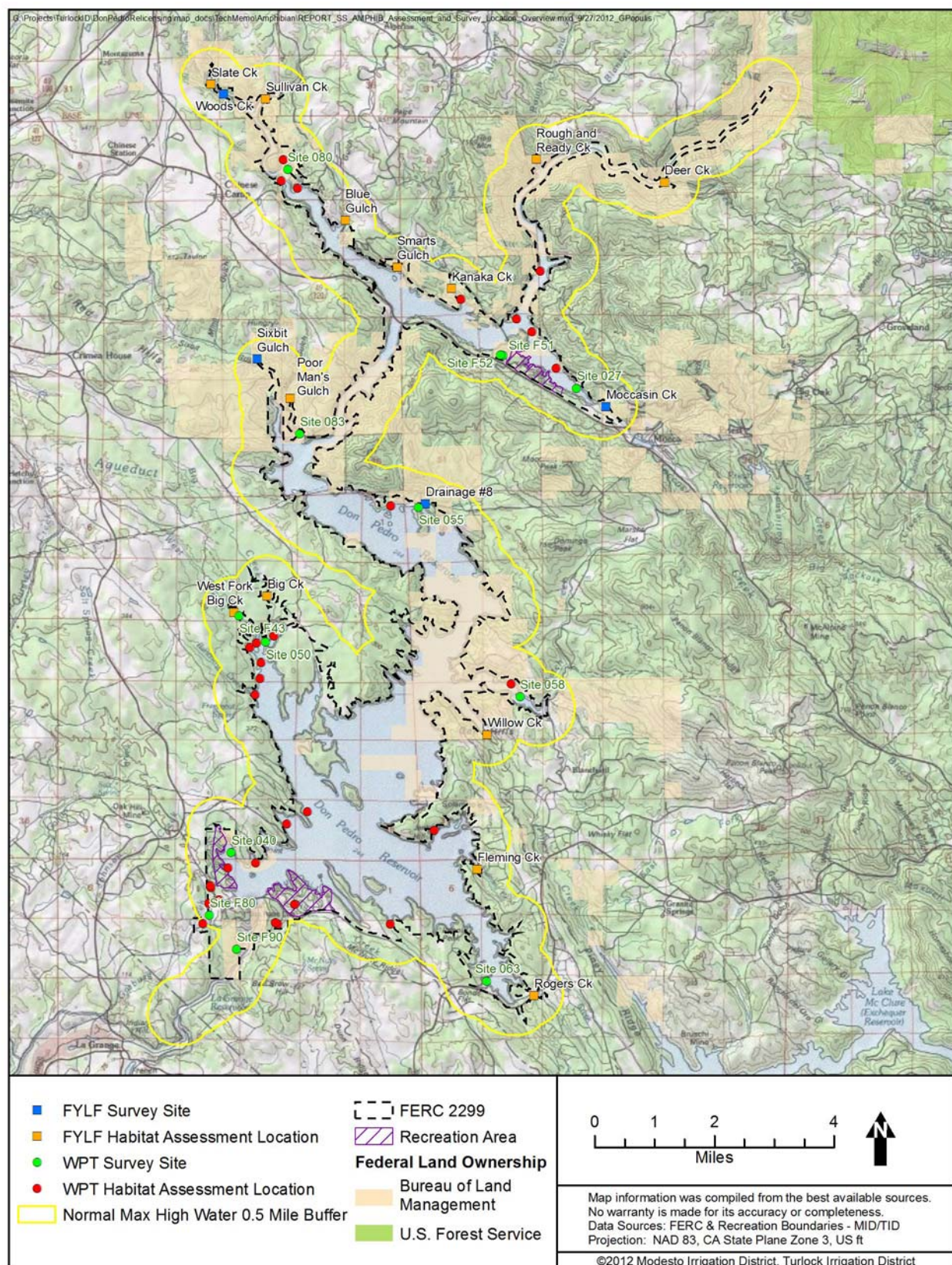


Figure 3.0-1. WPT and FYLF habitat assessment and survey site locations.

4.0 METHODOLOGY

The study plan outlined six steps for performing the Special-Status Amphibians and Reptiles study. Those steps were as follows:

- (1) Identify and map known occurrences of WPT and FYLF to prepare for the field effort;
- (2) Identify and map potential habitat using field reconnaissance and available GIS and related data;
- (3) Select survey sites using mapping of potential habitat;
- (4) Conduct surveys for FYLF and WPT at survey sites, and compile incidental observations;
- (5) Compile and quality assure/quality control data (QA/QC); and
- (6) Prepare a report on the study.

The methods for these steps are described below.

4.1 Identify and Map Known Occurrences

Occurrence records for WPT and FYLF were reviewed using a query of the CDFG's California Natural Diversity Database (CNDDDB), recent known studies, museum records, and consultation with regional experts. The CNDDDB query encompassed the Don Pedro reservoir and all surrounding USGS quadrangles.

4.2 Identify and Map Potential Habitat and Select Survey Sites

Potentially suitable habitat for WPT and FYLF in the study area was identified using habitat requirements specified in the study plan and a GIS-based assessment of local habitat conditions. Following these efforts, field reconnaissance was conducted in areas identified as potentially-suitable habitat and survey sites for both WPT and FYLF were selected. Resource agencies were provided the opportunity to participate in survey site selection field work, and were advised of the results of site selection via email on May 7, 2012 and May 18, 2012. No comments were received on site selection or other components of field work.

During all habitat assessment and survey site selection efforts, areas investigated were logged by Global Positioning System (GPS) position, photographs were taken from various angles, and pertinent habitat characteristics were noted. Habitat characteristics documented include habitat type, hydrologic regime, vegetation types (e.g., aquatic, emergent, overhanging, and canopy), gradient, aquatic substrate, and stream channel form. Field reconnaissance for potential WPT habitat was performed on February 7, February 8, April 2, and April 3, 2012. Field reconnaissance of streams for potential FYLF habitat was performed on April 2, April 3, April 17 and April 18, 2012. The selection of survey sites took into account site-specific conditions, including safety, accessibility (i.e., road or trail access and topography), permission from landowners to survey on private lands, and potential influence of Project O&M based on proximity to Project features.

Additionally, potential WPT nesting habitat within the Project Boundary was modeled and mapped in GIS using the following criteria:

- Within 100 m of the Don Pedro reservoir or other water bodies;
- Slope of 2 to 15 degrees;
- Southeast, south or southwest aspect.

The special-status amphibians and reptiles study plan also specified the following parameters to be assessed for their utility in mapping potential WPT nesting habitat:

- Canopy cover of less than 10 percent; and
- Compacted soils of clay or loam, if soil maps providing this information were available.

Data layers describing local canopy cover and soil compaction were not located during WPT nesting habitat mapping efforts. As a result, these parameters were not included in the GIS model describing these habitats. The following data sources were included in the GIS model of potential WPT nesting habitat: aerial imagery; United States Department of Interior (USDOI), Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps; and United States Geological Survey (USGS) 1:24,000 topographic quadrangle maps. Maps of potential WPT nesting habitat are provided in Attachment A.

4.3 Conduct WPT Basking and FYLF Visual Encounter Surveys

4.3.1 Western Pond Turtle Basking Surveys

WPT surveys were conducted at suitable basking sites as identified during field reconnaissance and survey site selection. Following study plan direction, visual survey methods were supplemented by the deployment of artificial basking platforms. The use of basking platforms has been shown to increase detection rates, particularly in areas where existing basking sites are limited (Alvarez 2006). Platforms were placed at survey sites in suitable open water areas where potential basking substrates were scarce or obscured by vegetation. Artificial basking platforms were deployed at seven of the eight reservoir survey sites; no platform was used at Site 40 (West Bay) because it is located near the Don Pedro Marina, a high-use area considered to have strong likelihood of platform disturbance.

Artificial basking platforms consisted of a rectangular, rough-textured wood board with additional floatation at one end and weights anchoring two sides of the platform (modified from Alvarez 2006). The platforms were left in place for five to seven days prior to each survey to allow the turtles to become acclimated and adopt the platforms for basking.

Surveys for basking WPT were performed at each survey site by one or two observers equipped with binoculars and a tripod-mounted spotting scope. Surveys were conducted under sunny conditions for a period of up to two hours per survey site or a minimum of 30 minutes if WPT was observed. The first two surveys of each field day were timed to occur in morning. Observers arrived before or soon after the potential basking substrates were sunlit, thereby

increasing the likelihood of observing WPT as they emerged. Observers used survey recommendations described by Reese (undated) and performed the following procedures: 1) approached the sites slowly and quietly; 2) assumed a distant, stationary position from which to view potential basking substrates when they were sun-exposed; and 3) observed the site with binoculars and spotting scope.

At the beginning of each survey, the following data were recorded: date, observer, time, general weather description, ambient air temperature, average wind speed, water temperature, and estimated water velocity. While each survey was being conducted the following information was recorded: presence or absence of slow moving water; water depths greater than or equal to 0.5 m; type (sunny rocks, open banks, fallen logs, and other) and quantity (none, few, or many) of basking sites; presence and type of potential aquatic and streamside refugia (undercut banks, submerged tree roots, woody debris, rock crevices, aquatic submerged vegetation, emergent vegetation, and floating material); and upland habitat. All survey sites were photographed from multiple vantage points. At sites where WPT were detected during surveys, the following data were also noted: presence and type, or absence of exotic plant species; presence of exotic turtles or bullfrogs; percent overhead canopy; percent submergent and emergent vegetation; type of upland and riparian vegetation community; and presence and type of any recent site disturbance.

4.3.2 Foothill Yellow-Legged Frog Visual Encounter Surveys

Visual encounter surveys (VES) for FYLF were performed on June 18-22, 2012. Consistent with study plan direction, surveys followed VES protocols developed by PG&E for hydroelectric project applications (Seltenrich and Pool 2002). Specifically, two surveyors worked in tandem and searched stream banks, back channel areas, and potential instream habitats for FYLF. Habitats along each bank were searched if safely accessible. To aid in the detection of eggs and larvae, surveyors used a viewing box in shallow margin areas.

Following the VES, surveyors completed a habitat characterization of each study location, including key habitat parameters such as substrate, water velocity and temperature, instream and adjacent vegetation, and presence of predatory species (bullfrog, crayfish, and Sierra newt). The Districts obtained necessary CDFG scientific collection permits and adhered to accepted decontamination guidelines to minimize the likelihood of transmitting diseases (USFWS 2005).

4.3.3 Incidental Observations

In addition to WPT basking surveys and FYLF VES, incidental observations of WPT, FYLF, and known predator species were collected during the performance of this and other relicensing studies. WPT and FYLF photographs and field sheets were distributed among field staff; any sightings of WPT, FYLF, or key predators were compiled. Information requested from field staff for incidental observations included species identification, estimated size, behavior, location, time, and a brief description or photograph of the habitat. Field crews were also instructed to document skeletal remains and evidence of WPT nests, such as the scrapes produced by females when digging nest-holes, signs of nests opened by predators, and remnants of hatched eggshells.

4.4 Quality Assure/Quality Control Data (QA/QC),

All data were subjected to QA/QC procedures including, but not limited to: daily QA/QC of field data sheets, spot-checks of transcription during data compilation, and comparison of GIS maps with field notes and field maps to verify locations of survey sites and recorded species observations.

5.0 RESULTS

5.1 Western Pond Turtle

5.1.1 Western Pond Turtle Life History Information

WPT occurs in a wide variety of aquatic habitats, including permanent ponds, lakes, and low-flow sections of rivers. Adults may also use seasonal streams or ponds when available. To attain suitable body temperature (“thermoregulate”), individuals engage in basking behavior upon emergent large woody debris, overhanging vegetation, rock outcrops, or mats of submergent vegetation. Factors limiting population distribution and abundance may be the availability of terrestrial areas suitable for oviposition, aquatic habitats suitable for hatchlings (i.e., warm, shallow water with ample hiding cover in the form of dense submergent or short emergent vegetation), and basking sites for juveniles and adults (Jennings and Hayes 1994, Buskirk 2002). WPT is reportedly rare in reservoirs (Hays et al. 1999) which tend to be unsuitable because of predation upon hatchlings by introduced centrarchid fishes (especially large-mouth bass) and American bullfrog (Holland 1991a).

5.1.2 Western Pond Turtle Historical Occurrences

A total of two records of WPT are known from the study area (Cranston 2012), with additional records just outside the 0.5 mile boundary outside the normal maximum water surface elevation of Don Pedro reservoir that defines the non-tributary edge of the study area:

- Drainage #7, Tuolumne County: Multiple individuals observed of unknown lifestage, approximately 0.5-3 km N of Don Pedro Reservoir, Upper Bay.
- Drainage #8, Tuolumne County: Multiple individuals observed of unknown lifestage, approximately 0.5-3 km N of Don Pedro Reservoir, Upper Bay.

Additional WPT occurrences are known from further outside the study area (e.g., reservoirs in Mariposa County); none of these are in areas affected by Project O&M (Figure 5.1-1).

5.1.3 Western Pond Turtle Nesting Habitat

Much of the shoreline of Don Pedro Reservoir is not suitable WPT nesting habitat due to excessively steep slopes and unsuitable aspect. Nevertheless, potential WPT nesting habitat within the study area is abundant: GIS modeling shows that approximately 1865 acres within the study area may represent suitable nesting habitat, including 1648 acres occur within the Project Boundary (Attachment A). Areas where the greatest concentration of modeled WPT nesting habitat occur are listed in Table 5.1-1.

Table 5.1-1. Concentrated areas of potential WPT nesting habitat within the study area.

Potential Nesting Habitat Locations	Nearby Study Site Name	Comments
Downstream of Emergency Spillway	F90, F80	Northwest hillside
West Bay	41, 40, 30, 42	Western and southern shores
Big Creek Arm and 49er Bay	45, 46, 47, 48, 49, 50, 51	North and eastern shoreline of bays
Woods Creek Arm	78, 79, 80, 81	North and northeastern shoreline of arm
Rough and Ready Creek	No WPT sites	Northeastern shore
Tuolumne River	No WPT sites	Upstream of Ward's Ferry Bridge, on north shore
Moccasin Arm	25, 28, 27	Northern shore
Highway 49	F51, F52	Northern Shore
Upper Bay	52, 55	Northern shore
Hatch Creek Arm	59, 58	Northeastern shore
Rock Island and adjacent Reservoir Shoreline	52, 55	Upper Bay, near Drainage #7 and Drainage #8; Historic BLM records of WPT nearby.
South Bay (Fleming Creek, Ramos Creek Arm)	62	Most of the shoreline of South Bay, northern shoreline of Ramos Creek Arm
Rogers Creek Arm	63	Most of the shoreline

Potentially suitable habitats for juvenile WPT, which consist of shallow water with dense submergent vegetation or short emergent vegetation, were not observed in most areas of Don Pedro Reservoir. Limited areas of submerged or emergent vegetation were observed mostly during FYLF habitat assessments in streams upstream of the reservoir. Streams with sparse areas of emergent vegetation include: West Fork Big Creek, Big Creek, Six-Bit Gulch, Poor Man's Gulch, Woods Creek, Slate Creek, Sullivan Creek, Blue Gulch, Smarts Gulch, Kanaka Creek, Rough and Ready Creek, Deer Creek, Drainage #8, Willow Creek, and Fleming Creek. Emergent vegetation was present in sparse amounts of WPT habitat assessment sites in the Don Pedro Emergency Spillway (Site F80), and West Fork Big Creek (Site F43). In upstream areas, these sites had moderate to low gradient slopes. West Fork Big Creek, Big Creek, Six-Bit Gulch, Poor Man's Gulch, Woods Creek, Sullivan Creek, Blue Gulch, Smarts Gulch, Rough and Ready Creek likely have waters deep enough to support juvenile WPT.

5.1.4 Western Pond Basking Habitat Assessments

Don Pedro Reservoir is a large, deep reservoir, with mostly steep slopes and open expanses of water that are not suitable habitat for WPT. Review of aerial imagery and field reconnaissance indicated that potentially suitable habitats for WPT were largely concentrated in backwater inlets, usually associated with seasonal or perennial tributary streams where shallower water occurs. In many areas, the only potential basking substrate was along the steep banks. Partially submerged woody debris and cut stumps were rarely observed on the aerial imagery but were observed in some locations during field reconnaissance. Boulders and bedrock outcrops were also identified as potential basking sites and were most numerous when the water surface elevation of Don Pedro Reservoir was low. At high water, partly submerged shoreline vegetation may provide basking habitat.

A total of 15 non-reservoir and 29 reservoir sites were assessed for essential WPT habitat characteristics. Tables 5.1-2 through 5.1-8 describe study site locations, habitat characteristics, and any known historical records or incidental observations of WPT at all habitat assessment sites.

Table 5.1-2. Non-reservoir sites assessed for WPT basking habitat.

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent of Potential Nesting Habitat	Survey Conducted?
Sewage treatment ponds near Blue Oaks Recreation Area	F46 and F50	Two ponds: one large (F46), one small (F50). F46 has moderately-sloped banks with sparse emergent grasses. F50 has steep, gunite-lined banks.	None	Large contiguous patch of oak savannah north of ponds.	No
Pond on West Fork Big Creek	F43	Large deep pond. Multiple areas of shallow water and emergent vegetation. Multiple large patches of overhanging willows. Multiple large patches of LWD. Basking substrates have morning sun exposure.	5-6 turtles, sex and lifestage not identified, (not identified to species) observed on 4/17/12.	Large contiguous patch north and east of pond.	Yes
Sewage treatment ponds near Moccasin Point Recreation Area	F51 and F52	Two ponds: one large (F51), one small (F52). F51 is about 55 x 130m, has moderately-sloped banks, with algae and <i>Scirpus</i> on north end. F52 has steep, gunite-lined banks.	None	Moderate patch north of ponds. Somewhat isolated.	Yes
Lucas Gulch	F48	Impounded section of Lucas Gulch, below high water line (HWL).	None	Moderate patches nearby, but only small isolated patches in immediate vicinity.	No - reservoir survey site in vicinity.
Swimming lagoon at Fleming Meadows Recreation Area	F47	Swimming lagoon with sand and concrete banks and substrate.	None	Large patch, but associated with Recreation Area.	No - disturbance is likely.
Sewage treatment ponds near Fleming Meadows Recreation Area	F45 and F49	Two ponds: one large (F45), one small (F49). F45 has moderately-sloped banks with sparse emergent grasses and two patches of <i>Typha</i> sp. on south bank. F49 has steep, gunite-lined banks.	None	Large contiguous patch north of ponds.	No
Stock pond between spillway and Tuolumne River below Don Pedro Dam	F90	Moderate depth pond, measuring 22 x 30m (15 x 20m in dry season). Stock pond. Vegetation limited to overhanging blue oak on north end of pond.	None	Moderate patch surrounding pond and moderate patches in vicinity.	Yes
Stock pond near	F81	Irregular L-shaped pond. Pond was dry upon	None	Moderate patch north	No

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent of Potential Nesting Habitat	Survey Conducted?
spillway		inspection in February 2012. Oak trees overhanging on NW side, no LWD. Banks with moderate to steep slopes with emergent vegetation.		of stock pond.	
Pond in spillway	F80	Long deep pond, about 30 x 190m (15 x 100m in dry season). Bedrock-confined spillway channel. Gravel road berm on south end of pond. Multiple patches of <i>Typha</i> and sedges; scattered overhanging buckeye and black willow.	1 adult WPT, sex not identified, observed on 3/28/12 downstream of Project.	Moderate to large patches adjacent pond.	Yes
Pond in spillway	F78	Two connected ponds measuring 20 x 20m and 23 x 7m. Bedrock-confined spillway channel. Aquatic vegetation includes <i>Azolla</i> and <i>Mimulus</i> , cattail and bulrush emergent. One willow overhanging.	1 adult WPT, sex not identified, observed on 3/28/12 downstream of Project.	Large contiguous patch on north side of spillway.	No - close to road
Pond in spillway	F79	Irregular shaped, deep pond, about 20 x 47m (9 x 26m in dry season). Bedrock-confined spillway channel. Aquatic vegetation includes <i>Azolla</i> and <i>Mimulus</i> , cattail and bulrush emergent. Multiple buckeye and willow are overhanging. NE and SW edges of pond are shallow with emergent vegetation.	1 adult WPT, sex not identified, observed on 3/28/12 downstream of Project.	Large contiguous patch on north side of spillway.	No
Pond in spillway	F77	Large, irregular deep pond about 30 x 45m (20 x 30m in dry season). Bedrock-confined spillway channel. Just below spillway. Cattail, bulrush and monkeyflower emergent. Aquatic vegetation is algae and duckweed.	None	Large contiguous patch on north side of spillway.	No - close to road

Table 5.1-3. Reservoir sites assessed for WPT basking habitat.

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent or Potential Nesting Habitat	Survey Conducted?
West Bay SW Arm of Reservoir	41	Associated with small seasonal tributary inlet adjacent Blue Oaks Recreation Area. Moderate rocky slopes with soil at tributary mouth, basking substrate is boulders and bedrock, emergent grasses limited to tributary mouth.	None	Extensive large patches, associated with Recreation Area.	No
West Bay	40	Associated with small seasonal tributary inlet adjacent	None	Extensive large	Yes

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent or Potential Nesting Habitat	Survey Conducted?
SW Arm of Reservoir		Blue Oaks Recreation Area. Moderate rocky soil slopes, basking substrate is boulders, grasses and forbs limited to tributary mouth.		patches, partly associated with Recreation Area.	
West Bay SW Arm of Reservoir	42	Associated with small seasonal tributary inlet. Moderate rocky soil slopes, basking substrate is boulders and bedrock, forbs and grasses on bank margin.	None	One large patch, multiple smaller patches.	No
West Bay SW Arm of Reservoir	43	Associated with small seasonal tributary inlet. Moderate rocky soil slopes, basking substrate is few scattered boulders, scarce emergent grasses on bank margin.	None	One large isolated patch.	No
West Bay SW Arm of Reservoir	44	Exposed bank. Gentle rocky soil slopes, basking substrates boulders, no vegetation.	None	One large isolated patch.	No
Big Creek Arm W Arm of Reservoir	45	Associated with small seasonal tributary inlet. Moderate to steep rocky/bedrock soil banks, basking substrate is few partially submerged LWD and boulder/bedrock, grasses on bank margins.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites.	One moderately-sized isolated patch.	No
Big Creek Arm W Arm of Reservoir	46	Associated with small inlet present at low to moderate reservoir levels, exposed bank at high levels. Gentle to moderate rocky soil slopes, basking substrate is two partially submerged LWD, gently sloping banks with grasses on bank at inlet mouth.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites.	Few small isolated patches, mostly below HWL on W bank, large patch on E bank.	No
Big Creek Arm W Arm of Reservoir	47	Associated with small inlet at low to moderate reservoir levels, exposed bank at high levels. Gentle to moderate rocky soil slopes, basking substrate is about eight scattered partially submerged LWD, grasses limited to bank margin at inlet mouth.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites.	Few small isolated patches, mostly below HWL on W bank, large patch on E bank.	No
Big Creek Arm W Arm of Reservoir	48	Associated with small seasonal tributary inlet. Moderate rocky soil slopes, basking substrate limited to one partially submerged LWD and boulders, grasses	Five incidental turtles, sex and lifestage not identified, observed in	Multiple large patches.	No

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent or Potential Nesting Habitat	Survey Conducted?
		on bank margin at tributary inlet.	pond on West Fork Big Creek, ~1,000 – 2,000m from sites.		
Big Creek Arm W Arm of Reservoir	49	Associated with small inlet near West Fork Big Creek. Moderate rocky soil slopes, basking substrate is about three partially submerged LWD and few boulders (more LWD is present above the water line on the banks, but not in water), grasses on bank margins.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites.	Multiple large patches.	No
Big Creek Arm W Arm of Reservoir	50	Associated with small inlet near Big Creek. Moderate rocky soil slopes, basking substrate is partially submerged LWD in two main patches and boulders, grasses limited to bank margins near tributary mouths.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites	Multiple large patches	Yes
Big Creek Arm W Arm of Reservoir	51	Associated with small inlet near Big Creek. Moderate to steep rocky soil slopes, basking substrate is three partially submerged snags, and three partially submerged LWD at tributary mouth, grasses on bank margins.	Five incidental turtles, sex and lifestage not identified, observed in pond on West Fork Big Creek, ~1,000 – 2,000m from sites.	Multiple large patches.	No
Poor Man's Gulch	83	Narrow reservoir cove. Moderate to steep rocky soil slopes, basking substrate consists of angular boulder outcrops at the water line, and vegetation mats along the creek outlet. Some partially submerged standing snags along the cove.	1 adult basking 4/24/12 and 1 adult swimming 5/18/12 about 100 m from WPT survey site.	Riparian area at Poor Mans Creek outlet.	Yes
Woods Creek Arm NW Arm of Reservoir	79	Associated with exposed seasonal tributary inlet. Steep rocky slopes, basking substrate is partially submerged LWD at tributary mouth and boulders, no vegetation.	1 adult basking on 4/18/12, 1 juvenile basking and 1 deceased on 6/18/12, about 2,500m from sites.	Few small isolated patches.	No
Woods Creek Arm NW Arm of Reservoir	81	Associated with seasonal tributary inlet. Gentle slopes limited to inlet, steep slopes elsewhere, basking substrate is four partially submerged LWD at mouth of tributary and about ten along bank in	1 adult basking on 4/18/12, 1 juvenile basking and 1 deceased on 6/18/12, about	Few moderate-sized isolated patche.	No

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent or Potential Nesting Habitat	Survey Conducted?
		morning sun, grasses and forbs on margin of banks.	2,500m from sites.		
Woods Creek Arm NW Arm of Reservoir	80	Associated with inlet with two small seasonal tributary mouths. Moderate soil slopes, basking substrate is 5 partially submerged LWD scattered throughout site, emergent grasses associated with inlets.	1 adult basking on 4/18/12, 1 juvenile basking and 1 deceased on 6/18/12, about 2,500m from sites.	Few moderate-sized isolated patches.	Yes
Woods Creek Arm NW Arm of Reservoir	78	Associated with small seasonal tributary inlet. Moderate rocky soil slopes, basking substrate is about ten scattered partially submerged downed logs and a few boulders, scattered tussocks of emergent vegetation.	1 adult basking on 4/18/12, 1 juvenile basking and 1 deceased on 6/18/12, about 2,500m from sites.	Three moderate-sized patches.	No
Tuolumne River Arm N Arm of Reservoir	32	Inlet of Kanaka Creek. Gentle rock/soil slopes, basking substrate is scattered boulders, grasses and forbs on bank margin.	None	Few isolated moderate-sized patches.	No
Tuolumne River Arm N Arm of Reservoir	28	Associated with small seasonal stream inlet. Moderate soil slopes, basking substrate is banks (some downed logs at HWL, but not near water line during assessment), forbs and grasses on bank margin.	None	Few very small patches.	No
Tuolumne River Arm N Arm of Reservoir	29	Associated with small seasonal stream inlet. Steep soil and boulder/cobble slopes, basking substrate is banks and boulders (some downed logs at HWL, but not near water line during assessment), few grasses on bank margin.	None	Scarce.	No
Moccasin Arm NE Arm of Reservoir	25	Near marina, along open slope. Steep rocky banks, basking substrate is boulders, no vegetation.	One BLM record ~4.7 km southwest of Moccasin Arm.	Small isolated patches.	No
Moccasin Arm NE Arm of Reservoir	26	Adjacent Moccasin Point Recreation Area. Gentle soil slopes, basking substrate includes partially submerged downed logs along bank and snags with some boulders, grasses on bank margin.	One BLM record ~4.7 km southwest of Moccasin Arm.	Small dispersed patches.	No

Location	Site Number	Description of Habitat	Incidental Observations or Known Occurrences Nearby?	Extent or Potential Nesting Habitat	Survey Conducted?
Moccasin Arm NE Arm of Reservoir	27	Associated with seasonal stream inlet. Gentle soil slopes, basking substrate includes partially submerged downed logs and other LWD in inlet, forbs and grasses on bank margin.	One BLM record ~4.7 km southwest of Moccasin Arm.	Large extensive patch.	Yes
Upper Bay Middle of Reservoir	52	Associated with small inlet. Gentle to moderate rocky soil slopes, basking substrate is four partially submerged stumps and boulders, grasses on bank margin.	1 adult, sex not identified, basking on 5/20/12; Five BLM records in tributary near site.	Extensive large contiguous patches, with a few smaller patches.	No
Upper Bay Middle of Reservoir	55	Associated with tributary inlet. Gentle to moderate rocky soil slopes, basking substrate is multiple patches of partially submerged LWD, grasses on bank margin.	1 adult, sex not identified, basking on 5/20/12; Five BLM records in tributary near site.	Large contiguous patch, with a few smaller patches.	Yes
Hatch Creek Arm E Arm of Reservoir	59	Associated with small inlet. Moderate rocky soil slopes, basking substrate is limited to banks, grasses on bank margins at tributary mouths.	None	Extensive moderate-sized patches.	No
Hatch Creek Arm E Arm of Reservoir	58	Associated with small inlet. Gentle to moderate rocky soil slopes, basking substrate is one stump and one boulder on bank margin (both not submerged) and banks, grasses on bank margin.	None	Extensive large contiguous patch.	Yes
Ramos Creek Area South Bay SE Area of Reservoir	62	Associated with ephemeral inlet. Gentle to moderate soil slopes, basking substrate consists of several large logs above water line.	None	Extensive large contiguous patch.	No
Rogers Creek Arm SE Arm of Reservoir	63	Associated with two small seasonal inlets. Gentle soil and rocky soil slopes, basking substrate is 4 partially submerged snags and scattered boulders at waterline, grasses on bank margins.	None	Multiple moderately sized patches.	Yes

5.1.5 Western Pond Turtle Basking Surveys – Non-Reservoir Sites

Outside of Don Pedro Reservoir, habitats with open water over one meter deep as well as with aquatic and terrestrial refugia are scarce in the study area. Amounts of basking substrate varied between sites. Five non-reservoir sites were chosen for WPT basking surveys. One WPT was observed at Site F43, on Big Arm Creek. F43 is approximately 300 meters upstream of the reservoir, and has the best overall WPT habitat of all non-reservoir sites assessed. This site has excellent aquatic and terrestrial refugia and abundant basking substrate. Red-eared sliders and over 50 bullfrogs were also observed at this site. No other observations of WPT occurred at non-reservoir sites during surveys. Table 5.1-4 describes habitat and survey conditions for WPT that were used to determine which sites were suitable for the WPT non-reservoir basking surveys. Table 5.1-5 describes WPT non-reservoir basking survey results.

Table 5.1-4. Descriptions of WPT basking habitat at Don Pedro non-reservoir survey sites.

Site Name and Location/ General Characteristics of the Site	Potential WPT Habitat	Other Comments
Site F43 – Big Arm Creek		
Survey site is located on an impounded area of Big Arm Creek, and is a large, ponded area. Banks were gently sloping with dense overhanging vegetation that covered 30% of the banks. Emergent vegetation is abundant, but mainly consists of invasive Bermuda grass. Submergent vegetation covers approximately 60% of the water surface. Bank substrate was vegetated soil with some rock outcrops present. Some angular small cobble was present along shoreline. Upland habitat is foothill pine and blue oak.	Potential basking substrate includes multiple partially submerged logs, some areas of rock outcrops, and multiple areas of gently sloping banks. Aquatic refugia consist of high water surface coverage of Eurasian millfoil and <i>Azolla</i> , many areas of overhanging vegetation. Some areas of undercut bank potentially exist near rock outcrop shoreline areas.	Basking areas and aquatic refugia are abundant at this site. Large mats of algae and invasive submerged aquatic vegetation present. More than 50 bullfrogs and two red eared sliders observed within pond during survey. There is evidence of recreational shooting, and cattle grazing in the vicinity of the site.
Site F51 – Sewage Treatment Pond #1 near Jacksonville Road		
Survey site is located near Moccasin Point Recreation area near Jacksonville Road. Site is the larger of two sewage treatment ponds assessed in the area. Banks are moderately sloping around the entirety of the pond, with the exception of the northwest corner, which was gently sloping. Overhanging vegetation was not present, but floating duckweed covered 100% of the pond during survey. Bank substrate was compact gravel and soil with sparse patches of annual grass. Upland habitat is foothill pine, <i>Manzanita</i> and <i>Ceanothus</i> shrubs and tocolote thistle (<i>Centaurea</i>	Potential basking substrate includes gently sloping banks. Aquatic refugia consist of high water surface coverage of duckweed. No overhanging vegetation present.	Basking areas are minimal at this site. No platform used. Aquatic refugia are abundant. More than 10 bullfrogs were observed during the survey.

Site Name and Location/ General Characteristics of the Site	Potential WPT Habitat	Other Comments
<i>melitensis</i>).		
Site F52 – Sewage Treatment Pond #2 near Jacksonville Road		
Survey site is located near Moccasin Point Recreation area near Jacksonville Road. Site is the smaller of two sewage treatment ponds assessed in the area. Banks are moderately sloping around the entirety of the pond. Overhanging vegetation is not present. Bank substrate is compact artificial fill and concrete with sparse patches of annual grass. Upland habitat is foothill pine, <i>Manzanita</i> and <i>Ceanothus</i> shrubs, and tocolote thistle.	Potential basking substrate includes gently sloping banks. No aquatic or overhanging vegetation present.	Basking areas occur in moderate amounts due to the presence of moderately sloped artificial banks.
Site F90 – Cattle Pond Near Emergency Spillway		
Survey site is located on the northwestern slope in-between the emergency spillway and the dam spillway downstream of the Don Pedro Dam. Site is a cattle pond which usually dries by mid summer. Bank substrate consisted of soils with small gravel. Upland habitat consists of blue oak savannah with annual grasses.	Potential basking substrate includes abundant gently sloping banks and some woody debris (not submerged during survey). No aquatic or overhanging vegetation present.	Basking areas occur in moderate amounts at this site. Aquatic refugia and overhanging vegetation was not present. Several species of bird and black tailed deer were observed during the survey.
Site F80 – Pool in Emergency Spillway Channel		
Survey site is a large pool located within the emergency spillway channel. Banks were steep sloped to gently sloped throughout the area. Overhanging vegetation consisted of common patches of black willow and cattail. Bank substrate was soil with angular cobble and boulder with some emergent and upland grasses present. Upland habitat consists of blue oak savannah with annual grasses.	Potential basking substrate includes gently sloped and flat banks and mats of emergent vegetation. Aquatic refugia consists of sparse areas of overhanging billow and submerged vegetation. Some areas of undercut bank potentially exist near rock outcrop shoreline areas.	Basking areas and aquatic refugia are abundant at this site. No basking platform was used. Aquatic refugia and overhanging vegetation present. Area is heavily used for cattle grazing, and on three separate occasions cattle came to the pool area to drink.

Table 5.1-5. WPT basking survey observations at Don Pedro non-reservoir survey sites.

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
Site F43 – Big Arm Creek						
6/18/2012	09:30 to 12:00	726801	4183258	34/30	1: sex unknown/ adult/12.7 cm	Behavior: WPT swimming. WPT emerged head out of water three separate times during survey, possibly looking for a place to

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
						bask. <u>Comments:</u> Surveyors sat at differing vantage points along the shore. Turtle observations occurred 44 m from shore. No platform was used. Depth near shore was approximately 0.5 m during survey. Two red-eared slider individuals appeared several times while swimming in the same area as the WPT. More than 50 adult bullfrogs observed and were singing during the course of the survey.
Site F51 – Sewage Treatment Pond #1 near Jacksonville Road						
6/21/12	08:30 to 10:30	733639	4190472	28/27	None	<u>Comments:</u> Surveyors observed from a distance of 55 m. No platform was used. Depth near shore was approximately 0.5 m during survey. More than 10 bullfrogs seen in pond during survey.
Site F52 – Sewage Treatment Pond #2 near Jacksonville Road						
6/21/12	08:15 to 09:45	733637	4190469	28/22	None	<u>Comments:</u> On-site machinery for sewage treatment may preclude WPT at this site. Observer sat 43 m from pond. No platform was used. Depth near shore was approximately 0.5 m.
Site F90 – Cattle Pond near Emergency Spillway						
6/20/12	07:15 to 09:15	726892	417433	25/25	None	<u>Comments:</u> Surveyors observed from distance of 23.5 m. No platform used. Depth near shore was approximately 0.01m. At 7:20 a deer and fawn came to the water to drink but ran away before making it to the pond.
Site F80 – Pool in Emergency Spillway Channel						
6/20/12	09:30 to 11:30	726101	4175204	34/28	None	<u>Comments:</u> Surveyors observed from distance of 29 m. One observer sat at eastern facing slope while other observer sat at western facing slope. No platform was used. Depth near shore was approximately 1 m. 25 to 50 bullfrogs seen during survey. At 10:07 there was an unknown splash. At 10:10 one cow came to pool to drink. At 10:20 a garter snake jumped into

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
						the water and swam across from the west bank. At 10:30 two cattle came to pool to drink.

5.1.6 Reservoir WPT Basking Surveys

Areas of basking surveys on the Don Pedro Reservoir were chosen based on the presence of suitable basking habitat and their locations were diversified to represent each geographic area of the reservoir. There were eight survey sites total. Four of the eight survey sites occur in large, open bays, and the remaining four sites occur in narrower coves. Amounts of suitable basking habitat varied among all sites. No WPT were observed in sites that occurred in the large open bays, however, each of the four sites that are located in narrower coves had basking WPT present. Table 5.1-6 describes WPT habitat at all reservoir survey sites. Table 5.1-7 describes WPT reservoir basking survey results.

Table 5.1-6. Description of WPT basking habitat at Don Pedro reservoir survey sites.

Site Name and Location/ General Characteristics of the Site	Potential WPT Habitat	Other Comments
Site 40 – West Bay		
Survey site is located in West Bay, in the southwest arm of the reservoir. Survey observations occurred mostly on the eastern (west facing) bank. Banks are moderately sloping. Overhanging vegetation was not present. Bank substrate is soil with small angular cobble and sparse annual grass. Upland habitat is blue oak savannah with annual grasses.	Potential basking substrate includes gently sloping banks and sparse rock outcrops at the water line. Aquatic refugia and overhanging vegetation is not present at the site.	Basking areas and aquatic refugia are minimal at this site. Area is heavily used for recreational boating in the summer months.
Site 50 – Big Creek Arm		
Survey site is located in Big Creek Arm, in the western portion of the Reservoir. Survey observations occurred on the northern (south facing) shoreline. Banks are moderately to gently sloping. Overhanging vegetation is not present. Bank substrate is soil and sand with some angular cobble and moderate cover of woody debris. Upland habitat is blue oak savannah with annual grasses.	Potential basking substrate include moderately to gently sloping banks, and dense patches of downed woody debris. No overhanging vegetation present. Undercut bank may provide aquatic refugia in some areas of the shoreline.	Basking areas and aquatic refugia are moderate at this site. Area is heavily used for recreational boating in the summer months.
Site 83 – Poor Man’s Gulch		
Survey site is located in Poor Man’s Gulch, in a northwestern area of the Reservoir. Survey	Potential basking substrate includes large boulders at the water level. No overhanging vegetation present.	Basking areas and aquatic refugia are minimal at this site. However, several incidental sightings of WPT

Site Name and Location/ General Characteristics of the Site	Potential WPT Habitat	Other Comments
observations occurred on the western (east facing) slope of the narrow cove. Banks are moderately steep. Overhanging vegetation is not present. Bank substrate is angular boulder and cobble. Upland habitat is foothill pine and Ceanothus with annual grasses.	Undercut bank may provide aquatic refugia in some areas of the shoreline.	have occurred within Poor Man's Cove. The area is heavily used for recreational boating in the summer months. Site is located within the BLM Area of Critical Environmental Concern (ACEC).
Site 80 – Woods Creek Arm		
Survey site is located in Woods Creek Arm, in the northwestern corner of the Reservoir. Survey observations occurred in a small cove, with the entire shoreline in view. Overhanging vegetation minimal. An ephemeral inlet to the cove has some emergent vegetation. Bank substrate is soil and angular gravel. Upland habitat foothill pine and chamise chaparral.	Potential basking substrate includes few partially submerged logs, and moderately to gently sloping banks. No overhanging vegetation present. Some submerged and partially submerged logs provide aquatic refugia.	Basking areas and aquatic refugia are moderate at this site. Area is highly used for recreational boating in the summer months.
Site 27 – Moccasin Arm		
Survey site is located in Moccasin Arm, in a northeastern corner of the Reservoir. Survey observations occurred on the northern (south-facing) slope. Banks moderately sloped. Overhanging vegetation is not present. Bank substrate is soil with sparse areas of angular cobble. Upland habitat is mixed blue oak and foothill pine with annual grasses.	Potential basking substrate includes areas of gently sloping banks. No overhanging vegetation present. Undercut bank may provide aquatic refugia in some areas of the shoreline.	Basking areas and aquatic refugia are minimal at this site. Area is highly used for recreational boating in the summer months. Cattle have been seen grazing near the area.
Site 55 – Middle Bay		
Site is located in Middle Bay, in the center of Don Pedro Reservoir. Survey observations occurred on the northern (south facing) shoreline of a small cove. Banks are moderately to gently sloped. Bank substrate is soil with very sparse areas of large boulder. Upland habitat is blue oak savannah.	Potential basking substrate includes several logs (not submerged) and abundant areas of gently sloping bank. No overhanging vegetation present. Undercut bank may provide aquatic refugia in some areas of the shoreline.	Basking areas and aquatic refugia are moderate at this site. Area is highly used for recreational boating in the summer months.
Site 58 – Hatch Creek		
Site is located on the Reservoir near Hatch Creek, in the eastern portion of the Reservoir. Survey observations occurred on the northern (south facing) shoreline.	Potential basking substrate includes gently to moderately sloping banks. No overhanging vegetation present. Undercut bank may provide aquatic refugia in some areas of the	Basking areas and aquatic refugia are minimal at this site. Area is highly used for recreational boating in the summer months. Cattle have been seen grazing near the area.

Site Name and Location/ General Characteristics of the Site	Potential WPT Habitat	Other Comments
Banks are moderately to gently sloped. Bank substrate is soil with rounded and angular cobble. Upland habitat is blue oak savannah with annual grass.	shoreline.	
Site 63 – Rogers Creek Arm		
Site is located in Rogers Creek Arm, in the southern portion of the Reservoir. Survey observations occurred on the southwest (northeast facing) shoreline. Banks are moderately sloped. Bank substrate is soil with sparse patches of angular cobble. Upland habitat is blue oak savannah with annual grass.	Potential basking substrate includes moderately sloped banks. No overhanging vegetation present. Undercut bank may provide aquatic refugia in some areas of shoreline.	Basking areas and aquatic refugia are minimal at this site. Area is highly used for recreational boating in the summer months. Cattle have been seen grazing near the area.

Table 5.1-7. WPT basking survey observations at Don Pedro Reservoir survey sites.

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/ Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
Site 40 – West Bay						
6/19/12	09:05 to 11:05	726656	4176912	28/24.8	None	<u>Comments:</u> No platform used due to the high probability of vandalism. Survey occurred by boat 34.5 meters from shore. Depth near shore was approximately 1.5 m.
Site 50 – Big Creek Arm						
6/25/12	10:20 to 12:20	727481	4182493	22/24	None	<u>Comments:</u> Platform used. Reservoir down several feet since deployment on 6/18/12. Platform was mostly out of water during survey. Surveyors observed from distance of 137 m. Depth near shore was approximately 3 m.
Site 83 – Poor Man’s Gulch						
6/28/12	08:32 to 09:20	727999	4188442	35/24	1:Male/ adult (11.45 cm)	<u>Behavior:</u> WPT observed basking on large boulder 16 cm above water level at 8:40 am. At 09:05, turtle jumped into reservoir after slowly moving down rock. At 09:07 the same WPT went back onto the same rock and began basking again. <u>Comments:</u> Platform used in survey. Reservoir down several feet since deployment on 6/19/12. Platform was mostly out of water during survey, located 30 m from the WPT. Surveyors observed from distance of 130 m. Depth near shore was

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
						approximately 3 m.
Site 80 – Woods Creek Arm						
6/27/12	07:15 to 08:55	727689	4195369	32/24	1: Male/ adult (16.5 cm) 1 unknown/ adult (12.7 cm)	<u>Behavior:</u> Both turtles basking on same partially submerged log. Believed to be basking at start of survey. After 15 minutes observer went to get closer photographs and the WPTs jumped in. <u>Comments:</u> Platform not utilized by WPT. Reservoir down several feet since deployment on 6/19/12. Platform mostly out of water during survey. Platform was located approximately 30 meters from observers. WPT seen basking from a distance of approximately 60 m. Depth near shore was approximately 1.5 m.
Site 27 – Moccasin Arm						
6/27/12	09:40 to 11:40	735681	4189678	35/25	1: Male / adult (15.25 cm)	<u>Behavior:</u> WPT swimming in the vicinity of the observers. Individual's head emerged at 10:50 and 11:10. <u>Comments:</u> Platform deployed on 6/19/12 was missing at time of survey. WPT seen from a distance of 3 m. Depth near shore was approximately 3 m. One WPT carcass found on shore after survey, carapace 13 cm.
Site 55 – Middle Bay						
6/27/12	07:30 to 09:30	731492	4186272	17/24	None	<u>Comments:</u> Platform used in study. Reservoir down several feet since deployment on 6/18/12. Platform partially out of water during survey. Surveyors observed from distance of 79 m. Depth near shore was approximately 0.25 m.
Site 58 – Hatch Creek						
6/26/12	9:59 to 11:59	4181331	734263	29/24	1: Male/ adult (16.5 cm)	<u>Behavior:</u> WPT swimming in the vicinity of the observers. Emerged head from water briefly in area located between observers and platform at 10:30, 11:09, 11:19, 11:26 and 11:31. <u>Comments:</u> Platform not utilized by WPT. Reservoir down several feet since deployment on 6/18/12. Platform partially out of water during survey. Surveyors observed from

Date	Time	Location		Air/Water Temp. (°C)	WPT Sex/Lifestage/Length	Turtle Behavior and Other Survey Comments
		UTM E	UTM N			
						distance of 4.6 m. Depth near shore was approximately 3 m. Bullfrog seen basking on boulder outcrop at shoreline behind observers during survey.
Site 63 – Rogers Creek Arm						
6/15/12	07:35 to 09:35	4173724	733660	19/18	None	<u>Comments:</u> Platform used in study. Reservoir down several feet since deployment on 6/19/12. Platform partially out of water during survey. Surveyors observed from distance of 134 m. Depth near shore was approximately 2 m.

5.1.7 Incidental Observations of WPT

Incidental observations of WPT occurred in a wide range of aquatic habitats around the Project. No FYLF were observed. Results of WPT incidentals are summarized in Table 5.1-8. The locations of these observations are depicted in Attachment A, Part 3.

Table 5.1-8. Incidental observations of WPT recorded during performance of relicensing studies.

Date	No., Lifestage, Gender (Length)	Location Description	UTM E/UTM N 10S	Description of Habitat and Turtle Behavior	Time Observed
4/17/12	5, adults, unknown (unknown)	Big Creek	726590/4183330	Pond with partially submerged logs and overhanging vegetation. Turtles observed basking on partially submerged logs in pond.	10:00
5/21/12	1, adult, unknown, (unknown)	Six Bit Gulch	727470/4189033	No vegetation present. Deep water gulch with some undercut boulder substrate. WPT basking on rock outcrop at water level, in the shade.	17:20
4/24/12	1, adult, male, (14 cm)	Six Bit Gulch	727586/4188968	No vegetation present. Deep water gulch with some undercut boulder substrate. WPT basking on rock on the eastern slope of the gulch.	18:45
5/18/12	1, adult, unknown, (18 cm)	Poor Man's Gulch	727914/4188390	No vegetation present. Narrow, deep water gulch with steep talus and boulder outcrop	14:10

Date	No., Lifestage, Gender (Length)	Location Description	UTM E/UTM N 10S	Description of Habitat and Turtle Behavior	Time Observed
				shoreline. WPT swimming westerly near shoreline.	
4/24/12	1, adult, unknown, (14 cm)	Poor Man's Gulch	728092/4188341	No vegetation present. Narrow, deep water gulch with steep talus and boulder outcrop shoreline. WPT basking on a steep facing rock at water line.	16:45
6/18/12	1, juvenile, unknown , (5 cm)	Woods Creek	725589/4197598	Some emergent vegetation present. Narrow, shallow stream with gently sloping banks upstream of reservoir. WPT basking at edge of creek.	11:00
6/18/12	1, Deceased adult, unknown, (14 cm)	Woods Creek	726020/4197257	Emergent vegetation present. Narrow, shallow stream with gently sloping banks upstream of reservoir. WPT carcass located at edge of stream.	Unreported
4/18/12	1, adult, Male, (16.5 cm)	Woods Creek	726256/4197083	Emergent vegetation present. Narrow, shallow stream with gently sloping banks upstream of reservoir. WPT basking at edge of stream, upstream of Don Pedro Reservoir.	14:18
6/27/12	1. deceased adult, unknown,(13 cm)	Moccasin Arm	735690/4189698	Sparse areas of annual grass present. Carcass found on moderately sloped bank with soil substrate above water line on Don Pedro Reservoir.	Unreported
5/20/12	1, adult, unknown,(18 cm)	Upper Bay west of Gardiner Falls	732385/4185908	Sparse areas of annual grass present. Shoreline exposed to heavy wakes from recreational boating. WPT basking on boulder at water line near shore and jumped in as boat approached shore.	13:20

Date	No., Lifestage, Gender (Length)	Location Description	UTM E/UTM N 10S	Description of Habitat and Turtle Behavior	Time Observed
3/28/12	1, adult, unknown, (unknown)	Don Pedro spillway/Tuolumne River downstream of Project.	726614/4173758	Vegetation presence unknown. Pool in spillway estimated to be 3 m deep. WPT observed basking then swimming.	Unreported

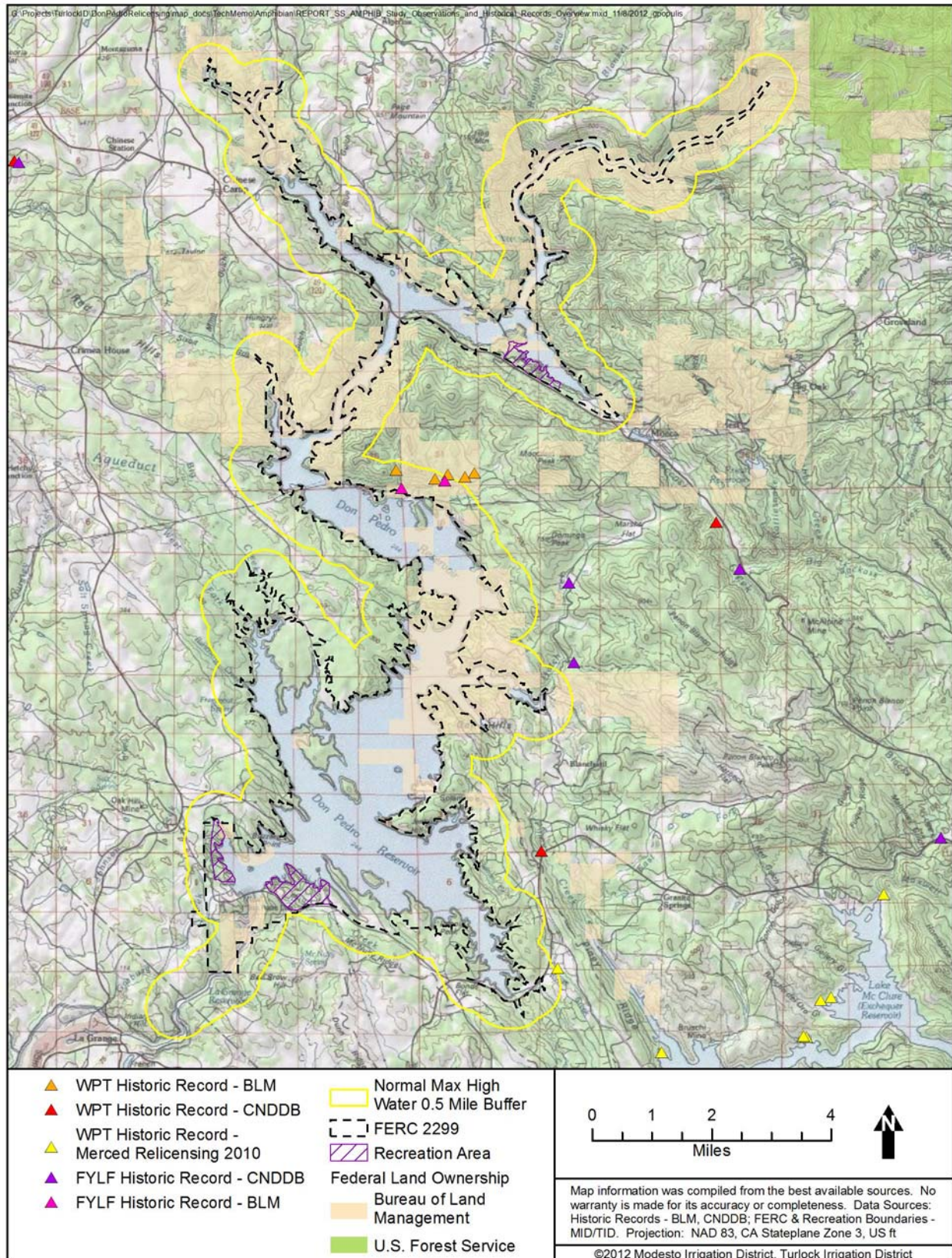


Figure 5.1-1. Historical records of WPT and FYLF in the study area and surrounding vicinity.

5.2 Foothill Yellow-Legged Frog

Figure 3.0-1 provides an overview of the entire study area, indicating all areas where field work was performed including the locations of survey sites. Attachment A provides a more detailed view of the study area and indicates areas where field work was performed. Table 5.2-1 provides summaries of FYLF field habitat assessments within the study area. Table 5.3-1 provides summaries of exotic incidental species observations recorded during the performance of this study.

5.2.1 Foothill Yellow-legged Frog Life History Information

FYLF is a stream-adapted species usually associated with streams with backwater habitats and coarse substrates (Seltenrich and Pool 2001) that occur between about 600 to 5,000 feet in elevation (Moyle 1973, Seltenrich and Pool 2002, ECORP Consulting, Inc. 2005). Populations of FYLF persist on at least some portions of most drainages with known historical occurrences (NatureServe 2009). FYLF populations may require both mainstem and tributary habitats for long-term persistence. Streams too small to provide breeding habitat for this species may be critical as seasonal habitats, such as in winter and during the hottest part of the summer (VanWagner 1996). There is also evidence that habitat use by young-of-the-year, sub-adult, and adult frogs differs by age-class and can change seasonally (Randall 1997). Breeding tends to occur in spring or early summer. Eggs are laid in areas of shallow, slow moving, waters near the shore. FYLF are infrequent in habitats where introduced fish and bullfrogs are present (Jennings and Hayes 1994).

5.2.2 Foothill Yellow-Legged Frog Historic Occurrences

Based on a CNDDDB records search and data provided by Peggy Cranston of the BLM (2012), two historic occurrences of FYLF are known from the study area.

- Drainage #8, Tuolumne County: Unknown date, identified as FYLF by BLM data, upstream of Drainage #8, 0.4 mi northeast of Don Pedro Reservoir.
- Drainage #8, Tuolumne County: Unknown date, identified as FYLF by BLM data, 0.1 mi northeast of Don Pedro Reservoir.

Additionally, FYLF are known to occur well upstream of the Project in Moccasin Creek and Mountain Pass Creek (Figure 5.1-1).

5.2.3 Foothill Yellow-Legged Frog Creek Habitat Assessments

FYLF habitat assessments were conducted in the following areas: Tuolumne River upstream of areas regularly inundated by Don Pedro Reservoir, and the following tributaries: West Fork Big Creek, Big Creek, Six-Bit Gulch, Poor Man's Gulch, Woods Creek, Slate Creek, Sullivan Creek, Blue Gulch, Smarts Gulch, Kanaka Creek, Rough and Ready Creek, Tuolumne River, Deer Creek, Moccasin Creek, Drainage #8, Hatch Creek, Willow Creek, Fleming Creek, and Rogers Creek. Access to Hatch Creek was denied by private landowners. Potentially suitable habitat

areas were found to be accessible on the Tuolumne River Arm as far north as Mile 76 at Rough and Ready Creek. Table 5.2-1 describes FYLF habitat at all accessible sites.

Table 5.2-1. Results of FYLF habitat assessments.

Stream Reach Location Stream and Substrate Characteristics	Vegetation/Cover Characteristics	Other Comments
West Fork Big Creek		
<u>General Description:</u> Site is 928 m long with average width of 5.8 m. Ephemeral, low gradient stream comprised of mostly riffle (50%), with occasional run, pool, cascade/pool, step-pool and pocket water habitat. Boulder/grass margins present. Substrate is characterized by mostly bedrock, with silt/clay, gravel/pebble, cobble and boulder. Substrate embedding is low.	Margin and emergent vegetation consists of forbs. Overhanging vegetation is sparse and consists of willow. Submerged vegetation covers 20% of surveyed area and consists of algae. Riparian canopy is sparse and consists of willow, oak, and foothill pine.	Ponded areas may retain water year round. Bullfrogs and juvenile fish are common in the stream.
Big Creek		
<u>General Description:</u> Site is 489 m long with stream width average of 7 m. Ephemeral, moderate gradient stream comprised mostly of riffle (40%), with occasional run, pool, cascade/pool, step-pool, and pocket water habitat. Angular boulder/grass margins present. Substrate is characterized by mostly bedrock (40%) with boulder, cobble and gravel/pebble. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of forbs. No overhanging vegetation present. Submerged vegetation covers 20% of area and consists of algae. Riparian canopy is not present.	Bullfrogs, western toad, domestic horses and cattle are common in and near the stream.
Six-Bit Gulch		
<u>General Description:</u> Site is 1015 m long with stream width average of 6 m. Ephemeral, moderate gradient stream comprised mostly of riffle (60%), with occasional pool, run, glide, cascade/pool, step-pool and pocket water habitat. Bedrock/boulder margins present. Substrate is characterized by mostly boulder (50%) with bedrock, with cobble, bedrock and gravel/pebble. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of forbs. No overhanging vegetation present. Submerged vegetation covers 20% of the area and consists of algae. Riparian canopy is not present.	Bullfrogs common. Sacramento sucker, green sunfish, California roach, largemouth bass, mosquito fish present (BLM 1980).

Stream Reach Location Stream and Substrate Characteristics	Vegetation/Cover Characteristics	Other Comments
Poor Man's Gulch		
<u>General Description:</u> Site is 1069 m long with stream width average of 19 m. Perennial, moderate gradient stream comprised mostly of pool (40%), with riffle, cascade/pool, pocket water, and step-pool habitat. Bedrock/boulder margins present. Substrate is characterized by mostly bedrock (40%) with boulder and cobble. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of forbs. Overhanging vegetation is sparse and consists of forbs. Submerged vegetation covers 70% of the area and consists of algae (some <i>Didymo</i>) and sedge. Riparian canopy is not present in the assessment area.	Bullfrogs common. Green sunfish and California roach present (BLM 1980).
Woods Creek		
<u>General Description:</u> Site is 1123 m long with stream width average of 12 m. Perennial, low gradient stream comprised mostly of riffle (30%) with run, pool, cascade/pool, step-pool and pocket water habitat. Rock outcrop/vegetated margins present. Substrate is characterized by mostly cobble (40%) with boulder, bedrock, gravel/pebble and sand. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of forbs. Overhanging vegetation is sparse and consists of forbs. Submerged vegetation covers 10% of the area and consists of algae and rooted aquatic vegetation (mostly cattail). Riparian canopy is not present in the assessment area.	Bullfrog, crayfish, WPT common. California roach present (BLM 1980).
Slate Creek		
<u>General Description:</u> Site is 178 m long with stream width average of 2 m. Moderate gradient stream comprised mostly of riffle (30%), with run, step-pool, pool, cascade/pool and pocket water habitat. It is unknown if stream is intermittent. Rock outcrop/vegetated margins present. Substrate is characterized by mostly cobble (40%) with boulder, bedrock, gravel/pebble and sand. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of willows and forbs. Overhanging vegetation is sparse and consisted of willows. Submerged vegetation covers 10% of the area and consists of algae and rooted aquatic vegetation (mostly small forbs). Riparian canopy is sparse and consists of willow, alder and oak.	Crayfish abundant.
Sullivan Creek		
<u>General Description:</u> Site is 758 m long with stream width average of 39.5m. Moderate gradient stream comprised mostly of riffle (40%) with pool, run, cascade/pool, and pocket water habitat. Moderately vegetated boulder/cobble/rock outcrop margin present. Substrate is characterized by mostly cobble and bedrock (30% each) and boulder, gravel/pebble and sand. Substrate embedding is moderate.	Margin and emergent vegetation is abundant and consists of forbs and willows. Overhanging vegetation is sparse and consists of willows. Submerged vegetation covers 10% of area and consists of algae and rooted aquatic vegetation (willow). Riparian canopy is sparse upstream and not present downstream.	Sierra treefrog, bullfrog, crayfish common. Green sunfish and California roach present (BLM 1980).

Stream Reach Location Stream and Substrate Characteristics	Vegetation/Cover Characteristics	Other Comments
Blue Gulch		
<u>General Description:</u> Site is 103 m long with stream width average of 9 m. Ephemeral intermittent, high gradient stream comprised mostly of pool and cascade/pool (25% each) with riffle, run, glide, step-pool and pocket water habitat. Sparsely vegetated silt/boulder margin present. Substrate is characterized by mostly bedrock (50%) and boulder, cobble, gravel/pebble and silt/clay. Substrate embedding is moderate.	Margin and emergent vegetation is abundant and consists of forbs, willows and oaks. Overhanging vegetation consists of willows and oaks and is abundant. Submerged vegetation covers 10% of area and consists of algae. Riparian canopy is dense upstream and not present downstream.	Some ponded areas likely retain water year round. Bullfrog common.
Smarts Gulch		
<u>General Description:</u> Site is 113 m long with stream width average of 3.25 m. Intermittent high gradient stream comprised mostly of glide (30%), cascade/pool, step-pool, riffle, run, pool, and pocket water habitat. Densely vegetated bedrock/boulder margin present. Substrate is characterized by mostly bedrock/boulder (40% each) and silt/clay. Substrate embedding is low.	Margin and emergent vegetation is abundant and consisted of forbs and willow. Overhanging vegetation is abundant and consists of willows. No submerged vegetation present. Riparian canopy is sparse and consists of buckeye (dominant), alder, oak, and willow.	Crayfish, sierra tree frog, and bullfrog common.
Kanaka Creek		
<u>General Description:</u> Site is 411 m long with stream width average of 11.38 m. Intermittent moderate gradient stream comprised mostly of riffle (40%) with pool, cascade/pool, step-pool and pocket water habitat. Boulder vegetated margin present. Substrate is characterized by mostly boulder (40%), cobble, bedrock, and gravel/pebble. Substrate embedding moderate.	Margin and emergent vegetation is abundant and consists of forbs and willow. Overhanging vegetation is moderate and consists of willow. Submerged vegetation covers 20% of area and consists of algae. Riparian canopy is sparse and consists of black willow.	During habitat assessment, portions of stream had very little water.
Rough and Ready Creek		
<u>General Description:</u> Site is 319.8 m long with stream width average of 8 m. Perennial, moderate gradient stream comprised mostly of riffle (30%), pool, run, glide, cascade/pool, step-pool and pocket water habitat. Steep talus/moderately sloped vegetated margin present. Substrate is characterized by mostly boulder (30%), cobble, bedrock. Substrate embedding is low.	Margin and emergent vegetation is sparse and consists of forbs. Overhanging vegetation is sparse and consisted of willow and buckeye. Submerged vegetation is not present. Riparian canopy is sparse and consists of willow (dominant) and buckeye.	

Stream Reach Location Stream and Substrate Characteristics	Vegetation/Cover Characteristics	Other Comments
Deer Creek		
<u>General Description:</u> Site is 240 m long with stream width average of 2 m. Ephemeral, high gradient stream comprised mostly of pool (40%) with riffle, cascade/pool, step-pool, and pocket water habitat. Margin is steep bedrock and sparsely vegetated. Substrate is mostly bedrock (90%) with cobble and boulder. Substrate embedding is low.	Margin and emergent vegetation is sparse and consists of woody shrubs. Overhanging vegetation is sparse and consists of willow. Submerged vegetation is not present. Riparian canopy consists of willow and buckeye and is abundant upstream.	Some ponded areas likely retain water year round. Bullfrogs common. Green sunfish present (BLM 1980).
Moccasin Creek		
<u>General Description:</u> Site is 1240 m long with stream width average of 11.6 m. Perennial low gradient stream comprised mostly of riffle (80%), run, glide, and pocket water habitat. Margin is gently sloped vegetated cobble and steep talus. Substrate is mostly boulder/cobble (40% each) with gravel/pebble and bedrock. Substrate embedding is low.	Margin and emergent vegetation is abundant and consists of forbs and willows. Overhanging vegetation is abundant upstream and consisted of willow and buckeye. Submerged vegetation covers 10% of area and consists of algae. Riparian canopy coverage is 10% and consist of willows (dominant) and buckeye.	Bullfrogs common. California roach and rainbow trout present (BLM 1980). Dredger pilings present as evidence of historical dredger mining present.
Drainage #8		
<u>General Description:</u> Site is 320 m long with stream width average of 5.5 m. Ephemeral, low gradient stream comprised mostly of riffle (30%), pool, run, cascade/pool, step-pool, pocket water and glide habitat. Margin is moderately sloped vegetated boulder/bedrock. Substrate is mostly bedrock (60%) with gravel/pebble, cobble and boulder. Substrate embedding is moderate.	Margin and emergent vegetation is abundant and consists of woody shrubs and forbs. Overhanging vegetation consists of willow (dominant) sedge and poison oak. Submerged vegetation covers 30% of the area and consists of algae (<i>Didymo</i>). Riparian canopy coverage is 10% and consists of willows.	Bullfrogs present and cattle grazing common. California roach and bluegill present (BLM 1980).
Willow Creek		
<u>General Description:</u> Site is 138 m long with stream width average of 4 m. Ephemeral, moderate gradient stream comprised mostly of pool (40%), riffle, run, pocket water, glide, cascade/pool and step-pool habitat. Margin is moderately sloped vegetated bedrock. Substrate is mostly bedrock (60%) with boulder, cobble and gravel/pebble. Substrate embedding is low.	Margin and emergent vegetation is moderate and consists of forbs. Overhanging vegetation is sparse and consists of willow. Submerged vegetation covers 60% of the area and consists of algae. Riparian canopy coverage is 10% and consists of willows.	Some ponded areas likely retain water year round. Bullfrogs common.
Fleming Creek		

Stream Reach Location Stream and Substrate Characteristics	Vegetation/Cover Characteristics	Other Comments
<u>General Description:</u> Site is 432 m long with stream width average of 10 m. Ephemeral, moderate gradient stream comprised mostly of riffle (30%), pool, cascade, pool, step-pool, pocket water, run and glide habitat. Margin is moderately sloped, vegetated silt. Substrate is mostly bedrock (50%) with gravel/pebble, silt/clay, cobble and boulder. Substrate embedding is moderate.	Margin and emergent vegetation is abundant and consists of annual grasses. Overhanging vegetation not present. Submerged vegetation covers 30% of the area and consists of annual grasses. Riparian canopy coverage is 10% and consists of oak.	Bullfrogs and crayfish presence, and cattle grazing common.
Rogers Creek		
<u>General Description:</u> Site is 1240 m long with stream width average of 3 m. Ephemeral low gradient stream comprised mostly of riffle (80%) and pool habitat. Margin is gently sloped vegetated silt. Substrate is mostly silt/clay (90%), cobble and boulder. Substrate embedding is moderate.	Margin and emergent vegetation is abundant and consists of annual grasses. Overhanging vegetation not present. Submerged vegetation not present. Riparian canopy not present.	Bullfrogs common.

5.2.4 Foothill Yellow-Legged Frog Visual Encounter Surveys

Surveys for FYLF were performed at five streams from 6/18/12 – 6/21/12. Accordingly, surveys were focused on detecting FYLF larvae, adults and juveniles. Survey results are summarized in Table 5.2-2. No FYLF were detected in surveys at any of the sites. Suitable habitat was scarce. Bullfrogs (adult, sub-adult, and larval forms), bass and trout were also observed at other locations throughout the Project. No FYLF were observed during VES. Fish and bullfrogs were detected at all FYLF VES sites. Two age classes of bullfrog larvae were found. WPT and crayfish species were found as well during VES.

Table 5.2-2. Summary of 2012 FYLF VES results.

Site	Survey Date	Water Temperature (°C)			FYL F	American Bullfrog ¹	Sierra Newt	Crayfish	Comments
		Edge	Main	Pool					
Six Bit Gulch	6/21/12	19	19	19	None	L: 1-25 J: 51-100	None	None	Flow was estimated at 5 cfs. Survey length 1081 m. Adult aquatic garter snake observed, bobcat seen at end of survey. Multiple willow thickets throughout site.
Poor Man's Gulch	6/20/12	19	19	19	None	A: 1-25 J: 51-100	None	None	Flow was estimated at 4 cfs. Survey length 896 m. The pool closest to the upstream end of the survey goes underground. Spicebush and willow thickets throughout the site.
Woods Creek	6/18/12	24	25	25	None	A: 1-25 S: 51-100 J: 1-25	None	Approximately 50 seen during survey	Flow was estimated at 3 cfs. Survey length 960 m. 1 WPT carcass, 1 WPT juvenile, multiple crayfish observed. Mats of algae in water. Abundant amounts of emergent forbs.

Site	Survey Date	Water Temperature (°C)			FYL F	American Bullfrog ¹	Sierra Newt	Crayfish	Comments
		Edge	Main	Pool					
Moccasin Creek	6/22/12	12	11	N/A	None	None	None	None	Flow was estimated at 15 cfs. Survey length 946 m. No incidental wildlife observed. Local fisherman mentioned rainbow and brown trout in the stream.
Unnamed Tributary #1 at Gardiner Falls	6/19/12	19	19	19	None	None	None	None	Flow was estimated at 2 cfs. Survey length 302 m. Bullfrogs have been observed during habitat assessment of the site. Survey ended early due to inaccessibility.

¹ A = adult, S = sub-adult, J = juvenile, L = larvae.

5.3 Incidental Observations of WPT and FYLF Predators

Incidental observations of WPT and FYLF predators were collected during field efforts. Bullfrogs were the most commonly observed species, and were documented throughout the study area. Bullfrog is a non-native species that is known to be a significant predator of juvenile WPT and FYLF (Ashton et al. 1997). Table 5.3-1 describes information collected during relicensing studies relevant to amphibian and reptile studies.

Table 5.3-1. Incidental observations of exotic amphibious species during relicensing studies

Date	Species	Location Description	UTM E/UTM N 10S	Comment
3/28/12	Bullfrog	Downstream of Project	726701/4173661	Incidental observation.
4/3/12	Bullfrog	Sewage Treatment Ponds downstream of Project	726120/4176024	Incidental observation.
4/5/12	Bullfrog	Spillway below Don Pedro Dam	726050/4175527	Incidental observation.
4/25/12	Bullfrog	Drainage near Ramos Creek	732962/4178306	Incidental observation.

Date	Species	Location Description	UTM E/UTM N 10S	Comment
5/22/12	Bullfrog	Wreck Bay Camping Area, Don Pedro Reservoir	727242/4187178	Incidental observation.
5/31/12	Bullfrog	Railroad Canyon, Don Pedro Reservoir	730105/4189556	Incidental observation.
6/25/12	Bullfrog	Cattle pond, 49er Bay area	729313/4181967	Incidental observation.
6/28/12	Bullfrog	Poor Man's Gulch	728003/4188829	Greater than 100 tadpoles seen along tributary, first and second year stages.
6/21/12	Bullfrog	Six Bit Gulch	727541/4189536	Fewer than 25 first year tadpoles, up to 100 2nd year tadpoles seen in gulch during FYLF VES survey.
6/20/12	Bullfrog	Poor Man's Gulch	728001/4188838	Fewer than 25 first year tadpoles, up to 100 2 nd year tadpoles seen during FYLF VES survey.
6/18/12	Bullfrog	Woods Creek	726254/4197112	Fewer than 25 first year tadpoles, up to 25 2 nd year tadpoles, up to 100 adults seen during FYLF VES survey.
2/8/12	Bullfrog	Rogers Creek	734512/4172943	One young of year seen during FYLF habitat assessment surveys.
6/18/12	Crayfish	Woods Creek	726254/4197112	Several crayfish seen during FYLF VES survey.
4/18/12	Crayfish	Sullivan Creek	727435/4197330	Crayfish carcass seen during FYLF habitat assessment survey.
4/2/12	Crayfish	Smarts Gulch	726922/4196711	Crayfish carcass seen during FYLF habitat assessment survey.

6.0 DISCUSSION AND FINDINGS

FERC's Scoping Document 2 identified the following topic potentially affecting special-status amphibians and reptiles:

- Effects of Project operation, including water level fluctuations, ground-disturbing activities, and maintenance on special-status wildlife species and habitat.

Project O&M includes normal operations within the currently licensed surface water 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. Recreational boating is continual during the warmer months. Additionally, the Districts have granted four grazing permits within a limited area of the Project Boundary, on a total of 559 acres.

6.1 Western Pond Turtle

6.1.1 Observed and Reported Occurrence of Western Pond Turtle in the Study Area

A total of 19 live WPT were reported in the course of various relicensing studies. Six WPT were detected at five basking survey sites and 15 WPT (13 live, two dead) were observed incidentally at 11 locations. Of the 11 locations where WPT were incidentally observed, five were within Don Pedro Reservoir, one was noted in the Don Pedro spillway channel, and three were noted in creeks upstream of the Project. Two incidental observations of deceased WPT occurred, one on the banks of the Reservoir, and one in a tributary upstream of Don Pedro Reservoir.

The five Don Pedro Reservoir sites where WPT were observed West Fork Big Creek (Site F43), Big Creek (incidental), Six-Bit Gulch (incidental), Poor Man's Gulch (Site 83 and incidental) and Woods Creek (Site 80 and incidental). A juvenile WPT was observed basking in Woods Creek. All of these sites contain American bullfrog (*Lithobates catesbeiana*), which is a significant predator on WPT juveniles (Ashton et al. 1997).

No WPT nest site locations were observed during relicensing studies.

6.1.2 Habitat Suitability in Study Area

Although Don Pedro Reservoir does support WPT, the majority of the Reservoir does not represent favorable habitat for WPT. Don Pedro Reservoir is characterized by deep, open water and steep banks, a scarcity of basking areas except for backwater areas associated with major tributaries, abundant introduced predatory fish, and American bullfrog occurrences. These conditions are considered suitable for adult and sub-adult WPT; however, they are less suited for hatchling WPT (approximately 2.5 cm in length) and growing juveniles until they attain size and shell hardness sufficient to escape predation (Ashton et al. 1997). Suitable habitats for juvenile WPT consist of vegetated shallow water which is limited in extent at Don Pedro Reservoir and

primarily associated with the mouths of tributaries. Because of vulnerability to predation by introduced predatory fish and bullfrogs, WPT population recruitment at Don Pedro Reservoir appears low.

6.1.3 Effects of Project O&M

Water level changes resulting from Project O&M may affect WPT nesting habitat in Don Pedro Reservoir. Don Pedro Reservoir is primarily operated as a storage reservoir; following peak storage the water level is gradually drawn down until its lowest elevation is reached in mid-winter. Figure 6.1-1 describes the change in water surface elevation after May 1 for Don Pedro Reservoir during the period of record during the principal months when WPT exhibit nesting behavior. Young turtles will remain in the nest for approximately 1 year, making nests within the fluctuation zone subject to flooding. The average increase of in water surface elevation from May 1 through July 31 during the period of record is 16.9 feet, suggesting some potential for nests below the normal water surface elevation to be flooded if eggs are laid prior to the peak water surface elevation. Eggs laid early in the season may be at higher risk of inundation than those laid in July, which are more likely to be situated in areas that will not be subsequently inundated. Field and laboratory observations (Holland 1991, Feldman 1982) indicate that exposure to water during incubation results in lower survival to hatching or complete WPT nest failure. However, WPT select sites with at least some vegetation (low grasses and forbs), and therefore likely avoid areas subject to the most frequent inundation (Holt 1988). While individual nests may be impacted if they are located in the fluctuation zone, a population effect from impacts on nesting habitat is unlikely because WPT are present on and around the reservoir during existing operations.

Interactions between recreational users of Don Pedro Reservoir and WPT likely occur. Much of the area from Railroad Canyon south is open to shoreline camping, and recreational boating occurs across all of Don Pedro Reservoir. WPT are relatively sensitive to disturbance, which may affect the frequency and duration of basking or foraging behavior. Interruption of basking may lead to a delay in the maturation and deposition of eggs, decreasing hatching success or overwinter behavior (Holland 1991b). However, no direct impacts from recreational activities were observed during surveys.

The Districts have granted four grazing permits on a total of 559 acres within the Project Boundary. The District's permits require that no grazing is to occur below 830 feet, the currently licensed maximum water surface elevation for Don Pedro Reservoir, and therefore permitting grazing does not affect WPT basking or habitat use. However, WPT nesting, which can occur in upland areas above the maximum water surface elevation, may be reduced or precluded by animal use within grazing permit areas.

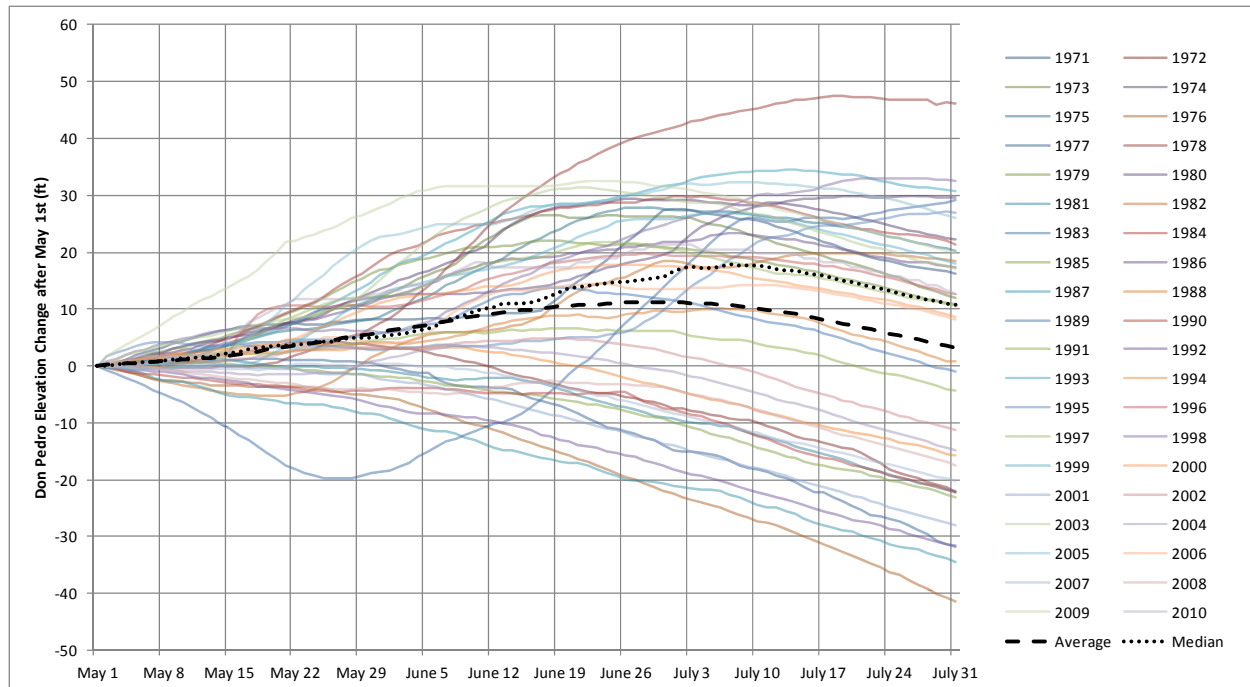


Figure 6.1-1. Reservoir water surface elevation change during principal western pond turtle egg-laying period, May – July during 1971 – 2010.

6.2 Foothill Yellow-Legged Frog

6.2.1 Observed and Reported Occurrences of Foothill Yellow-legged Frog in the Study Area and Vicinity

There were no detections of FYLF during the performance of this study. BLM records document two historical FYLF records within the study area. The nearest known extant populations occur at the confluence of Moccasin Creek and Big Jackass Creek, approximately 3.7 miles from Don Pedro Reservoir (P. Cranston., per. comm., 2012).

6.2.2 Habitat Suitability in Study Area

Suitable habitats for FYLF are primarily associated with perennial streams and intermittent streams with perennial pools (Seltenrich and Pool 2002). FYLF are infrequent in habitats where introduced fish and bullfrogs are present (Jennings and Hayes 1994). Don Pedro Reservoir is characterized by perennial, deep, slow-moving water and steep, poorly vegetated banks; a variety of introduced predatory fish are present, and American bullfrog tadpoles and post-metamorphic life stages have also been observed at several locations. As a result, Don Pedro Reservoir is not believed to represent potential habitat for FYLF. Additionally, no tributaries to Don Pedro Reservoir were found to support FYLF or suitable habitat for FYLF within the study area.

6.2.3 Effects of Project O&M

Because FYLF are not present in Don Pedro Reservoir and habitat suitability is poor within the study area as a whole, Project O&M is unlikely to affect FYLF populations.

7.0 STUDY VARIANCES AND MODIFICATIONS

The study was conducted consistent with the FERC-approved Special Status Amphibians and Aquatic Reptiles Study Plan (Study TR-06); no variances occurred.

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