

SPECIAL-STATUS WILDLIFE-BATS
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 Wildlife-Bats 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	Study Methods	4-1
4.1.1	Initial Reconnaissance	4-1
4.1.2	Focused Surveys	4-4
4.1.3	Long-Term Acoustic Monitoring.....	4-6
4.1.4	Analysis of Acoustic Data from Focused Surveys and LTAM	4-6
5.0	RESULTS	5-1
5.1	Initial Reconnaissance	5-1
5.2	Focused Surveys	5-2
5.2.1	Mist Netting	5-2
5.2.2	Acoustic Sampling	5-3
5.3	Long-term Acoustic Monitoring.....	5-4
5.4	Bat Roosts Located	5-6
6.0	DISCUSSION AND FINDINGS	6-1
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.	Study sites within the FERC Project Boundary, including long term acoustic monitoring and mist net sites.	3-2

List of Tables

Table No.	Description	Page No.
Table 4.1-1.	Special-status bat species known from or potentially occurring in the vicinity of the Project.	4-1
Table 4.1-2.	List of Project facilities inspected for roosts or sign of use by bats.	4-2
Table 5.1-1.	Observations of bat signs during reconnaissance and study efforts.	5-1
Table 5.2-1.	Mist net sampling results.	5-3
Table 5.2-2.	Active acoustic monitoring results.	5-3
Table 5.3-3.	Long term acoustic monitoring results at Don Pedro Hydroelectric Project bat study sites.	5-5
Table 6.0-1.	Species recorded by acoustic sampling, LTAM and mist netting efforts.	6-2

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
LTAM.....	long-term acoustic monitoring
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

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

SCE	State candidate for listing as endangered under CESA
SCT	State candidate for listing as threatened under CESA
SD1	Scoping Document 1
SD2	Scoping Document 2
SE	State Endangered Species under the CESA
SFP	State Fully Protected Species under CESA
SFPUC	San Francisco Public Utilities Commission
SHPO	State Historic Preservation Office
SJRA	San Joaquin River Agreement
SJRG	San Joaquin River Group Authority
SJTA	San Joaquin River Tributaries Authority
SPD	Study Plan Determination
SRA	State Recreation Area
SRMA	Special Recreation Management Area or Sierra Resource Management Area (as per use)
SRMP	Sierra Resource Management Plan
SRP	Special Run Pools
SSC	State species of special concern
ST	California Threatened Species under the CESA
STORET	Storage and Retrieval
SWAMP	Surface Water Ambient Monitoring Program
SWE	Snow-Water Equivalent
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TAF	thousand acre-feet
TCP	Traditional Cultural Properties
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TRT	Tuolumne River Trust
TRTAC	Tuolumne River Technical Advisory Committee
UC	University of California

USDA.....	U.S. Department of Agriculture
USDOC.....	U.S. Department of Commerce
USDOJ.....	U.S. Department of the Interior
USFS.....	U.S. Department of Agriculture, Forest Service
USFWS.....	U.S. Department of the Interior, Fish and Wildlife Service
USGS.....	U.S. Department of the Interior, Geological Survey
USR.....	Updated Study Report
UTM.....	Universal Transverse Mercator
VAMP.....	Vernalis Adaptive Management Plan
VELB.....	Valley Elderberry Longhorn Beetle
VRM.....	Visual Resource Management
WPT.....	Western Pond Turtle
WSA.....	Wilderness Study Area
WSIP.....	Water System Improvement Program
WWTP.....	Wastewater Treatment Plant
WY.....	water year
µS/cm.....	microSeimens per centimeter

1.0 INTRODUCTION

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..

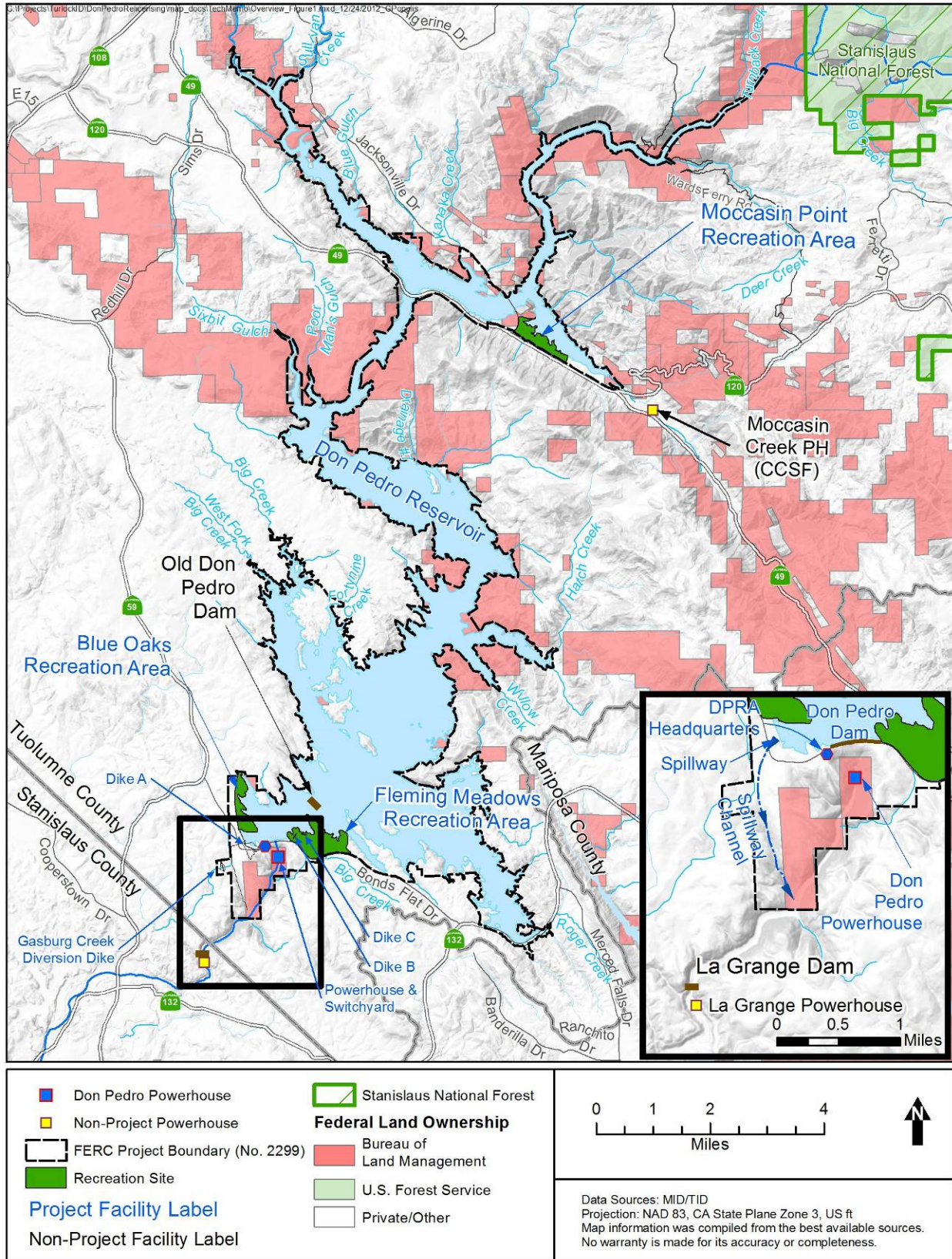


Figure 1.1-1. Don Pedro Project location.

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 Wildlife-Bats Study (TR-09) 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

The Districts' operation and maintenance (O&M) of the Project may affect special-status bats or their habitats. Project features or recreation facilities may provide suitable habitat for special-status bats, and associated use of these facilities may result in disturbance.

FERC's SPD approved, without modifications, the Districts' Special-Status Wildlife-Bats study plan, as provided in the Districts' RSP filing. The Districts carried out the Special-Status Wildlife-Bats study consistent with the study plan as approved by FERC.

2.0 STUDY GOALS AND OBJECTIVES

The goal of this study is to identify Project O&M and/or recreation activities that may adversely affect special-status bat species. The criteria to determine Project effects were as follows:

- A special-status bat species is found to occur (more than incidentally) within the Project Boundary.
- A specific Project O&M or recreation activity may have a reasonable possibility of having an adverse effect on the special-status bat species found.

3.0 STUDY AREA

The study area consisted of all lands and structures within the Project Boundary. Within this study area, locations for focused surveys and long-term acoustic monitoring were selected based on the results of a reconnaissance survey, which took into consideration habitat suitability, accessibility, and an objective of sampling a broad range of habitat types and localities within the Project Boundary. Study sites are presented in Figure 3.0-1.

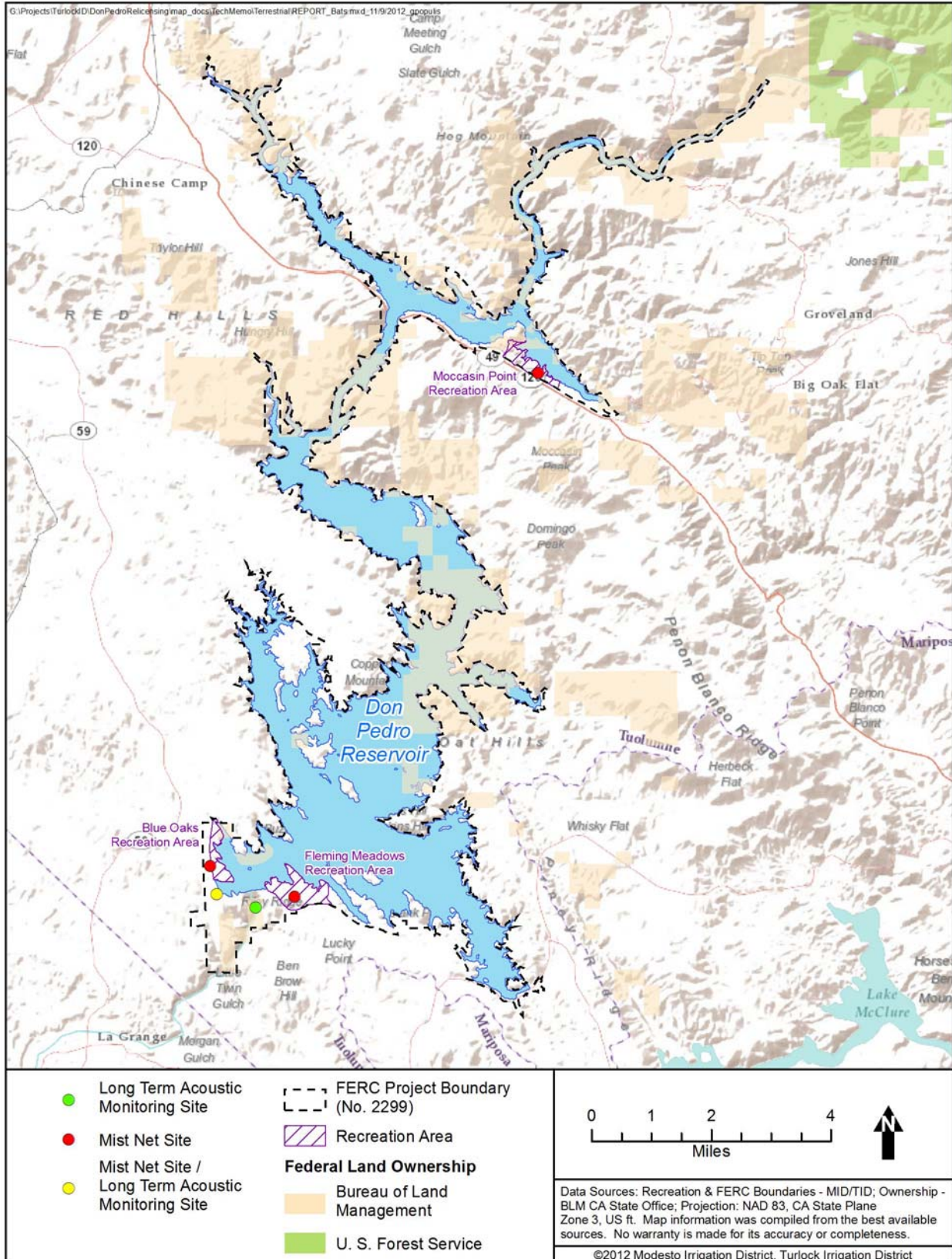


Figure 3.0-1. Study sites within the FERC Project Boundary, including long term acoustic monitoring and mist net sites.

4.0 METHODOLOGY

4.1 Study Methods

The study approach consisted of four steps: 1) initial reconnaissance; 2) focused surveys; 3); long-term acoustic monitoring (LTAM); and 4) analysis of acoustic data.

4.1.1 Initial Reconnaissance

Prior to field reconnaissance, special-status bats known or with the potential to occur in the vicinity of the Project were identified. Information regarding potentially occurring special-status bats in the vicinity of the Project was obtained from two sources: 1) California Department of Fish and Game’s (CDFG) California Wildlife Habitat Relationships (CWHR) program, which gave a general prediction of species that may occur based on available habitat (CDFG 2008); and 2) CDFG’s California Natural Diversity Database (CNDDDB), which provided information regarding known occurrences of special-status bats in the vicinity of the Project (CDFG 2012). Nine special-status bats were identified as known from or potentially occurring in the vicinity of the Project (Table 4.1-1).

Table 4.1-1. Special-status bat species known from or potentially occurring in the vicinity of the Project.

Bat Species	Special Status ¹	Suitable Habitat	Occurrence in Project Vicinity
Pallid bat <i>Antrozous pallidus</i>	BLM-S SSC	Roosts in caves, crevices, and buildings; feeds in a variety of open habitats (8,000 feet).	Five CNDDDB ² occurrences: (1) west of Sullivan Creek; (2) Jamestown Mine site near Sonora; (3) Tuolumne River 2.5 miles east southeast of Jacksonville; (4) near intersection of Highway 120 and Jacksonville Road; and (5) southeast of Moccasin, adjacent to Highway 49.
Townsend’s big-eared bat <i>Corynorhinus townsendii</i>	BLM-S SSC	Roosts in buildings, mines, tunnels, and caves; feeds along habitat edges (0 to 10,365 feet).	CNDDDB occurrence at mine on Quartz Mountain, 2.1 miles south of Jamestown
Spotted bat <i>Euderma maculatum</i>	BLM-S SSC	Arid deserts, grasslands, and mixed conifer forests (0 to 9,800 feet).	CNDDDB occurrence 2.2 miles southeast of Standard; intersection of Woodham-Carne Road and Yosemite Road.
Western mastiff bat <i>Eumops perotis</i>	BLM-S SSC	Open areas with abundant roost locations provided by crevices in rock outcrops and buildings at lower elevations, but as high as 8,700 feet.	Six CNDDDB occurrences: (1) one mile southwest of Yosemite Junction, mouth of Highway 120; (2) ¼ mile northeast of Yosemite Junction; (3) ½ mile southeast of New Melones Lake; (4) mapped at Tuolumne (Town) ³ ; (5) southeast of Moccasin adjacent to Highway 49; and (6) near intersection of Highway 120 and Jacksonville Road.

Bat Species	Special Status ¹	Suitable Habitat	Occurrence in Project Vicinity
Western red bat <i>Lasiurus blossevillii</i>	SSC	Generally associated with edge habitats adjacent to streams, open fields, orchards and occasionally in urban areas. Roosts in tree foliage, and forages in open areas over land or water (sea level up through mixed conifer forests).	CNDDDB occurrence southeast of Moccasin, adjacent to Highway 49.
Western small-footed myotis <i>Myotis ciliolabrum</i>	BLM-S	Roosts in caves, buildings, mines, crevices, and under bridges; feeds over streams, ponds, and springs (0 to 8,800 feet).	Potentially occurs within suitable habitat
Long-eared myotis <i>Myotis evotis</i>	BLM-S	Roosts in buildings, crevices, and snags; feeds along habitat edges, in open habitats, and over water (0 to 8,800 feet at least).	Potentially occurs within suitable habitat
Fringed myotis <i>Myotis thysanodes</i>	BLM-S	Roosts in buildings, mines, caves, snags, and crevices; feeds in open habitats and over water (4,300 to 7,200 feet).	Potentially occurs within suitable habitat
Yuma myotis <i>Myotis yumanensis</i>	BLM-S	Roosts in buildings, mines, caves, and crevices; feeds over water (0 to 10,800 feet), but uncommon to rare above 8,400 feet.	Two CNDDDB occurrences: (1) bridge adjacent to Highway 49; and (2) bridge near intersection of Highway 120 and Jacksonville Road.

¹ BLM-S = Bureau of Land Management Sensitive Species (CDFG 2011).

SSC = California Department of Fish and Game Species of Special Concern (CDFG 2011).

² CNDDDB: California Natural Diversity Database.

³ The CNDDDB only provided "Tuolumne (Town)" as the location of this occurrence, and indicated that more information was needed.

Project facilities and recreation areas within the study area were inspected on February 9 and 10, 2012 (Table 4.1-2). The Districts do not operate or maintain bridges, overpasses, or related structures; as a result, these structures were not considered during study efforts. At each site evaluated, possible bat foraging opportunities and flight corridors were noted, and a visual inspection of structures was performed. The visual inspection consisted of examining the interior and exterior of Project facilities (e.g., powerhouses, storage buildings, public restrooms at campgrounds and boat launches, kiosks, etc.) for active bat roosts and/or signs of past use, including guano and urine staining. Active roosts were identified as maternity, day and/or night roost, or winter hibernacula, defined below. Observed bat activity was documented on standardized data sheets, and the location recorded with a Global Positioning System (GPS). The information collected during the initial reconnaissance was used to prioritize locations for focused bat surveys.

Table 4.1-2. List of Project facilities inspected for roosts or sign of use by bats.

Project Feature	Project Facility
Don Pedro Powerhouse	Crane Structure
	Generator Den B
	Access Tunnel
Don Pedro Dam	Fixed Wheel Gate Building
	Don Pedro Dam Spillway

Project Feature	Project Facility
Fleming Meadows Recreation Area	Campground Restroom/Shower Facilities
	Group Picnic Areas
	Maintenance Building
	Swim Beach Filtration Building
	Snack Bar/Restroom/ Shower Facilities
	Trading Post
	Boat Launch Restroom
	Trailer Loop Restrooms
Moccasin Point Recreation Area	Campground Restrooms/Shower Facilities
	Boat Launch Restrooms
Blue Oaks Recreation Area	Campground Restrooms/Shower Facilities
	Group Picnic Facilities
	Storage Facility

The following types of bat roosts were considered during the assessment:

- **Maternity Roosts** - A maternity roost is a feature that provides protection from the elements and predators and the correct thermal environment for reproduction. Maternity roosts tend to be warm because breeding females need to maintain a high metabolism for lactation. Juvenile bats also need to keep warm to maintain a metabolic rate that allows for rapid growth. According to Tuttle and Taylor (1998), maternity roost thermal requirements are species-dependent, but generally remain between 70°F and 90°F; however, Townsend’s big-eared bat (*Corynorhinus townsendii*) nursery roosts have been discovered in sites where ambient temperatures are as low as 60°F. Species that form large colonies can be found raising young in mines with ambient temperatures as low as 56°F, but prefer 66°F or higher.
- **Day Roosts** - A day roost is a feature where bats spend the non-active period of the day resting, or in torpor, depending on weather conditions. Day roosts provide shelter from the elements and safety from predators.
- **Night Roosts** - A night roost is a feature used by bats to rest between foraging bouts, allow digestion of prey, escape from predators, shelter from the weather, and possibly, social purposes. Night roosts are typically sites or structures that retain heat to aid bats in maintaining the higher metabolism necessary for digestion.
- **Winter Hibernacula** – Winter hibernacula are areas used by bats during the colder winter months. At this time, bats enter torpor, receiving nourishment from fat storage gained during summer months. Many species will awaken for brief periods of time to stretch, but will then resume torpor. Other species, such as Townsend’s big-eared bat, may hibernate for short periods of time and resume feeding behavior during warmer winter spells (Tuttle and Taylor 1998). Airflow and temperature are key determinants in use of structures, such as tunnels and adits, as hibernacula. Temperatures within these roost sites are generally below 53°F, at the onset of hibernation, and remain between 34°F and 50°F by midwinter. Structures that have a varying temperature regime allow bats to find suitable temperatures during warm or cold winters (Tuttle and Taylor 1998).

4.1.2 Focused Surveys

Based on the results of the initial reconnaissance survey, four sites were selected for focused surveys. Focused surveys used acoustic sampling and mist net sampling to detect bat use at each site. Each site was sampled once between August 6 and 9, 2012 and again between October 1 and 4, 2012. Focused survey sites consisted of:

- **Fleming Meadows Recreation Area: Swimming Lagoon/Snack Bar adjacent to Camping Area “D”** – Three mist nets were set in, near or adjacent to the swimming lagoon at Camping Area “D” at the Fleming Meadows Campground. This site was selected based on nearby structures showing pronounced signs of bat occupancy. The Swimming Lagoon Filtration Building, located directly adjacent to the swimming lagoon, exhibited major staining on all exterior walls, coupled with direct access to the interior of the structure, via open, non-screened vents high on the walls. A mist net was set up in the direct flight-path between the Filtration Building and the swimming lagoon, in an effort to trap individuals traveling between them. On the opposite side of the swimming lagoon, the large, combination snack bar/restroom/shower facility also contained evidence of bat use (guano and staining present on the exterior of the building). The snack bar also had many vents built into the structure. These vents were screened to prevent access by wildlife; however, many of the screens were damaged and likely allow bats to access the interior. During the first trapping event, a mist net was set up in the direct flight-path between this structure and the swimming lagoon. A third mist net was set up over the water of the swimming lagoon, in an attempt to capture foraging bats. During the second trapping event, a mist net was set in the same space between the Filtration Building and swimming lagoon, and two additional nets were set up on the far side of the swimming lagoon, directly adjacent to the water.
- **Don Pedro Dam: Don Pedro Dam Spillway** – The spillway below Don Pedro Dam was selected because of the many roosting options within the fractured rock of adjacent cliffs and the spillway structure itself. Within the spillway channel, immediately below the spillway structure, a small pool provided a location for bat species to forage and a central feature around which to set up mist nets. During the initial trapping event, one mist net was set on the gravel access road directly between the spillway structure and the pool, in a direct flight-path between the two. A second mist net was set on a rocky bench immediately adjacent to the pool itself. This net was set as close to the pool as possible in an effort to capture bats foraging over the water. During the second trapping event, nets were set in similar locations, with the addition of one net running parallel to the access road.
- **Blue Oaks Recreation Area: Restroom/Shower Facility and Outbuilding in Camping Area “A”** – This site was selected as a trapping location for the two reasons: 1) proximity of Restroom BCS-22, which showed evidence of bat occupancy in the form of guano present inside the facility, and 2) a small outbuilding, which contained a large amount of guano and staining on its interior walls. During the first sampling event, one mist net was set adjacent to the restroom facility, in an effort to trap bats roosting in the restroom. A second net was set nearer to the outbuilding. During the second sampling event, one mist net was set on each side of the outbuilding to better facilitate the capture of individuals to and from the structure between foraging bouts.

- **Moccasin Point Recreation Area: Restroom /Shower Facility in Camping Area “C”** – Mist nets were set around Restroom/Shower Facility MCS-47. As with all facilities at Moccasin Point Recreation Area, the restroom showed little sign of bat occupancy, but the adjacent habitat – oak (*Quercus* sp.) woodland – was such that roosting opportunities were likely, and several small draws throughout the campground provided potential flight corridors. Due to the location of the restroom facility at this site, mist nets were set in an “L” pattern during the first trapping event to increase the chance of capturing individuals utilizing the restroom. During the second trapping event, nets were set further uphill, away from the restroom facility in a small draw. Nets were set in the direct flight-path down the draw, with the hopes of capturing individuals using it as a corridor between roost and foraging areas.

Anabat SD1 (Anabat) bat detector systems were used to conduct acoustic sampling at focused survey sites. Acoustic sampling was conducted during peak bat activity, beginning at dusk and continuing until activity ceased or midnight, whichever occurred first, to record ultrasonic echolocation calls of bats in flight. Anabat detectors were programmed to automatically record echolocation calls and save them to a Compact Flash (CF) card for later analysis. If a bat roost was adjacent to a mist net site, Anabat units were oriented so that bats entering or exiting the roost were recorded. If no known roosts were present, units were placed in adjacent foraging habitat or flight corridors.

Mist net sampling at focused survey sites for bats used Avinet, Inc. nets measuring 19.7, 29.5, and 39.4 feet (ft) wide. Nets were constructed with 1.5-inch mesh, contained four shelves, and measured 8.5 ft in height. Two 12-ft-long poles guyed with rope were used to support each net.

One night was required to complete one mist net survey at each location. Mist net surveys began with the assembly of nets at least one hour before sunset. Depending on available space, between one and three nets were used at each site. Nets were set in close proximity to Project structures, over or immediately adjacent to water and in flight corridors between potential roosting structures and foraging habitat. Nets were opened about 15 minutes after sunset and remained open until bat activity ceased or at midnight, whichever occurred first. Nets were checked every 15 minutes for captured bats. Overall, 19 mist nets were open for a total of 254 hours.

Captured bats were handled in accordance with CDFG Scientific Collecting Permits/Letter Permits guidelines. The handling guidelines are intended to prevent the spread of White-nose Syndrome and followed the U.S. Fish and Wildlife Service (USFWS)– Version 01.25.2011 White-Nose Syndrome Decontamination Protocol - Supporting Decontamination Documentation for Researchers (WNS Decontamination Supplement 2 of 2) (USFWS 2011).

Each bat captured was identified to species via comparison of physical features (e.g., forearm length, ear length, tragus shape, calcar keel, weight, and fur color) to those presented in the key, Bats of the Northwestern United States (Bat Conservation International 2008). For each captured bat, the length of the forearm and ear were measured with a fractional dial caliper, and the bat was weighed, using a 100 gram Pesola scale. Additionally, the study team determined the sex, breeding status (reproductive or non-reproductive), and age (adult or juvenile) each individual.

4.1.3 Long-Term Acoustic Monitoring

For LTAM, locations were selected in areas that allowed for secure deployment of Anabat equipment for the study duration, while monitoring habitat types representative of the Project. LTAM began in early March 2012 and continued through October 31, 2012, in order to capture spring migration, young rearing, peak bat activity, and fall migration. Two LTAM sites were selected:

- **Don Pedro Dam** - This LTAM site was located at the base of the Don Pedro Dam. This site was selected due to its proximity to a large, gated access tunnel at the base of the dam, as well as the fractured, craggy nature of the surrounding cliffs. Verbal accounts from Districts' employees provided information regarding sightings of bats coming and going from the tunnel.
- **Don Pedro Dam Spillway** - This LTAM site was installed in the spillway below Don Pedro Dam, the same site that was also selected as a mist netting site, due to the potential roosting opportunities provided by the featured, fractured cliff bands that comprise the sides of the spillway channel, the concrete spillway structure, and the existence of a small body of water.

During LTAM, Anabat detectors were programmed using delayed start mode, which allowed them to switch from sleep to standby one hour before sunset and switch back to sleep one hour after sunrise. While in sleep mode, the detector was shut off in order to preserve battery power and reduce the amount of unrelated data (e.g., rustling leaves and ultrasonic noise from insects) saved to the CF card. While in standby, the detectors continuously monitored for bat calls. Once a bat call was detected, it triggered the Anabat to record and save the call to the CF card. All calls were saved as an individual Anabat call file, with the date and time of the recording as the file name.

In order to ensure that all equipment functioned properly, an equipment inspection was performed and all data were downloaded at the LTAM sites on March 20, 2012, two weeks after initial deployment. A second check was conducted four weeks after initial deployment, on April 2, 2012; no malfunctions were documented. All remaining visits occurred at four week intervals, at which time data were downloaded and saved to folders that corresponded to the site location, monitoring period, and recording date.

4.1.4 Analysis of Acoustic Data from Focused Surveys and LTAM

Analysis of all acoustic data collected was performed with AnaloookW (Analoook) software (version 3.8, March 8, 2011). Analoook allows users to view and analyze real time or prerecorded Anabat call files. Files are displayed as a sonogram, with time on the X-axis and frequency on the Y-axis. This display allows identification of call characteristics, such as maximum and minimum frequency, characteristic frequency and call duration. Other call characteristics displayed include shape and the presence of harmonics, which are useful in the identification of some species. In order to analyze large batches of files, users can program Analoook's scan feature to identify individual call files from a specific species. Once identified by the program, all call files from a batch can be separated and viewed on a species-by-species basis.

All Anabat call files were run through species-specific scans, tailored to identify call sequences from special-status bats that are known or have the potential to occur in the study area. The species-specific scans identified each file that possessed specific call characteristics for a species of interest. The identified files were saved to a separate folder that corresponded to the site and month in which the call was recorded. After all scans were completed, they were reviewed for the presence of valid call sequences.¹ Additionally, a species-specific filter was applied to each call sequence during scan reviews. The filter allowed the study team to identify call characteristics by highlighting them.

After the scans were reviewed, call files were placed into one of three categories: known, unknown and unconfirmed bat species. The known category contained call files with definitive species identification. The unknown category contained call files with species that could not be identified. The unconfirmed category was for call files which contained species-specific characteristics, but indefinite species identification.

Similarities in call characteristics make it difficult to identify eight species of bats present in California using acoustic analysis. The eight species include Yuma myotis (*Myotis yumanensis*), Western small-footed myotis (*Myotis ciliolabrum*), pallid bat (*Antrozous pallidus*), California myotis (*Myotis californicus*), long-legged myotis (*Myotis volans*), little brown myotis (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*), and silver-haired bat (*Lasionycteris noctivagans*).

For acoustic analysis, the above eight species fall into one of three groups. The first group is known as 50 kilohertz (kHz) *Myotis* and contains California myotis and Yuma myotis. The second group is known as 40 kHz *Myotis* and contains Western small-footed myotis, long-legged myotis, and little brown bat. The third group is known as 25 kHz bats and contains pallid bat, big brown bat, and silver-haired bat. Call characteristics of the species in the 40 and 50 kHz groups are nearly identical, and grouping them is a widely accepted practice for analysis of bat calls. All three species in the third group may be identified to species, if specific call characteristics are present. The specific call characteristics include: 1) social calls for pallid bat (less steep pulses, sweeping from 30 to 10 kHz and generally in triplicate); 2) calls exceeding 65 kHz, which are representative of big brown bat; and 3) the presence of flat calls ≥ 26 kHz, which are diagnostic of silver-haired bat. If the specific call characteristics described above were absent from the call sequence, the call files were placed in the 25 kHz group.

¹ A valid call sequence must contain more than five pulses and display call characteristics specific to a species of interest.

5.0 RESULTS

5.1 Initial Reconnaissance

Initial reconnaissance for focused survey and LTAM sites occurred on February 9 and 10, 2012. During reconnaissance, Project facilities and recreation sites throughout the study area were evaluated each for evidence of bat use. Table 5.1-1 lists all facilities inspected and outlines observations of use. While not part of the initial reconnaissance survey, additional observations of bat use, specifically the presence of bats on or within structures, were noted during mist net surveys; these observations are also included in Table 5.1-1.

Table 5.1-1. Observations of bat signs during reconnaissance and study efforts.

Facility	Observations
DON PEDRO POWERHOUSE, DAMS, AND ASSOCIATED STRUCTURES	
Don Pedro Powerhouse	Generally closed inhibiting bat access, one piece of guano and minor staining found in Generator Den B.
Fixed Wheel Gate Building	2 bats (<i>Myotis</i> sp. ¹) observed behind plaque on front of structure, no sign of roosting on structure.
Don Pedro Dam Spillway	No signs of bat use were observed on the spillway structure. However bats were observed within the vent structures of the spillway during focused surveys.
DON PEDRO RECREATION AREA VISITOR CENTER	
Don Pedro Recreation Area Visitor Center Building	Guano and staining on exterior of Visitor Center, and Visitor Center employees reported bats roosting on exterior of building near doors.
FLEMING MEADOWS RECREATION AREA BUILDINGS AND FEATURES	
Fleming Meadows Campground A Loop Restrooms and Structures	
Restroom A1	Guano present on outside sink and interior walls. Guano and staining present in fair amounts.
Restroom A2	Some guano on walls, partition between men's and women's sides open, providing easy access.
Restroom A3	Guano present on walls and floor, staining present on walls/roof, entrance and eaves.
Restroom A4	Staining present on interior walls.
Restroom A5	Partition between men's and woman's side open, and provides access for bats to interior of walls, however, no sign noted.
Group Picnic Area	Guano on walls, access to middle partition open. No sign of occupancy within pavilion.
Fleming Meadows Campground B Loop Restrooms and Structures	
Restroom B1	Guano on interior walls, large in size
Maintenance Building	Guano on exterior, few small holes in siding, possible staining on outside of structure.
Fleming Meadows Campground D Loop Restrooms and Structures	
Restroom D1	Small amount of guano, large in size.
Restroom D2	Minor guano and staining, partition between men's and women's side open, providing easy access.
Swim Beach Filtration Building	Major exterior staining, vent access. All sides of building exhibit sign of bat occupancy.
Snack Bar	Access points screened, but many screens damaged. Minor staining on walls. Many bird nests present on structure.
Dressing Rooms	Open access to sub walls, staining on shower units, and small amount of guano present.
Trading Post	Minor staining on all sides. Guano and staining on walls under decking.

Facility	Observations
Fleming Meadows Campground H Loop Restrooms and Structures	
Restroom H1	Minor staining.
Restroom H2	No sign of bat occupancy.
Fleming Meadows Boat Launch Restroom	
Boat Launch Restroom	Multiple holes providing access to middle partition, some guano present.
MOCCASIN POINT RECREATION AREA BUILDINGS AND STRUCTURES	
Moccasin Point Campground B Loop Restrooms and Structures	
Restroom B1 (MCS-43)	Middle partition open to access, no sign of bat occupancy.
Restroom B2 (MC-44)	No sign of bat occupancy.
Restroom B3 (MC-45)	No sign of bat occupancy.
Moccasin Point Campground C Loop Restrooms and Structures	
Restroom C1 (MCS-47)	No sign of bat occupancy.
Restroom C2 (MC-46)	One piece of guano present on the exterior wall.
Moccasin Point Boat Launch Restroom	
Moccasin Point Boat Launch Restroom (MC-42)	Pronounced staining on walls above sinks and stalls on men's side of the restroom.
BLUE OAKS RECREATION AREA BUILDINGS AND STRUCTURES	
Blue Oaks Campground Area A Loop Restrooms and Structures	
Restroom A1 (BC-21)	>10 pieces of guano on walls, possible staining.
Restroom A2 (BCS-22)	Some guano present.
Group Picnic Restroom	<10 pieces of guano in restrooms.
Group Picnic Pavilion	Minimal guano, appears to be old.
Nearby Storage Facility	Definite staining present.
Small Structure near Restroom A2	Significant staining on interior, guano on walls.
Blue Oaks Campground Area B Loop Restrooms and Structures	
Restroom B1	Guano on sink in men's side, some staining above sink. Guano present on floors and Jerusalem cricket (<i>Stenopelmatus</i> sp.) parts in sink.
Restroom B2	Entry holes into middle partition, ~5 pieces of guano.
Restroom B3 (BC-23)	<10 pieces of guano.
Blue Oaks Campground Area C Loop Restrooms and Structures	
Restroom C1 (BCS-26)	>50 pieces of guano.
Restroom C2 (BC-27)	Some guano, ~20 pieces. Staining present.
Restroom C3 (BC-28)	Guano and staining above sink.
Blue Oaks Campground Area D Loop Restrooms and Structures	
Restroom D1	Significant amounts of guano in and around sinks and on walls. >100 pieces in both men's and woman's sides. Jerusalem cricket parts present in sinks (possible indication of pallid bat [<i>Antrozous pallidus</i>] roosting).
Restroom D2	Some guano present, small amounts of staining on walls.

[†] *Myotis* sp. – A bat belonging to the genus *Myotis*, but not identified to species.

5.2 Focused Surveys

5.2.1 Mist Netting

Seven bats were captured at three of the four mist net sampling sites. Of those, six were keyed to the species level and were either pallid bat (in Blue Oaks Campground) or Yuma myotis (at the Don Pedro Dam Spillway). The remaining bat, captured at the Fleming Meadows Swimming Lagoon, escaped before all data could be taken but was identified as a member of the *Myotis* genus (Table 5.2-1).

Table 5.2-1. Mist net sampling results.

Survey Location	Date	Species and Number of Individuals		
		Pallid bat (<i>Antrozous pallidus</i>)	<i>Myotis</i> ¹ species	Yuma myotis (<i>Myotis yumanensis</i>)
Fleming Meadows Swimming Lagoon Area	8/6/2012	--	1	--
	10/1/2012	--	--	--
Don Pedro Dam Spillwfullbearday	8/7/2012	--	--	--
	10/2/2012	--	--	1
Blue Oaks Campground A Loop	8/8/2012	2	--	--
	10/3/2012	3	--	--
Moccasin Campground C Loop	8/9/2012	--	--	--
	10/4/2012	--	--	--

¹ Individual identified to genus level, but escaped before a full identification could be made.

5.2.2 Acoustic Sampling

Active acoustic sampling was conducted in conjunction with mist net surveys between August 6 and August 9, and again between October 1 and 4, 2012. Table 5.2-2 displays acoustic data collected at both mist net sites. Based on acoustic sampling, eight bat species or groups were identified in the Project area: 25 kHz species, 40 kHz *Myotis*, 50 kHz *Myotis*, Western mastiff bat (*Eumops perotis*), Western red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), and canyon bat (*Parastrellus hesperus*).

Table 5.2-2. Active acoustic monitoring results.

Survey Location	Date	Species Recorded								
		25 kHz Species	40 kHz Myotis	50 kHz Myotis	ANPA	EUPE	LABL	LACI	MYEV	PAHE
Fleming Meadows Swimming Lagoon Area	8/6/2012	X	X	X	X	--	X	X	--	X
	10/1/2012	X	--	X	--	--	--	X	--	X
Don Pedro Dam Spillway	8/7/2012	X	--	--	--	--	--	--	--	X
	10/2/2012	X	--	X	--	X	--	X	--	X
Blue Oaks Campground A Loop	8/8/2012	--	X	X	X	--	--	X	--	X
	10/3/2012	--	X	X	X	--	--	--	--	--
Moccasin Campground C Loop	8/9/2012	--	X	X	--	--	--	--	--	--
	10/4/2012	X	X	X	--	--	--	X	X	X

Key:

“X” indicates that the species was recorded.

25 kHz species are a group of bats that echolocate in the 25 kHz range and are difficult to differentiate because of similarities in call structure. This group includes big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and pallid bat (*Antrozous pallidus*). However, these three species may be identified individually, if species-specific call characteristics are present (e.g., social calls for pallid bat, calls exceeding 65 kHz for big brown bats, the presence of flat calls, ≥ 26 kHz, for silver-haired bat).

40 kHz *Myotis* are bats that echolocate in the 40 kHz range and are difficult to identify because of similarities in call structure. This group includes Western small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), and long-legged myotis (*Myotis volans*).

50 kHz *Myotis* are bats that echolocate in the 50 kHz range and are difficult to identify because of similarities in call structure. This group includes Yuma myotis (*Myotis yumanensis*) and California myotis (*Myotis californicus*).

ANPA – pallid bat

EUPE – Western mastiff bat (*Eumops perotis*)

LABL – Western red bat (*Lasiurus blossevillii*)

LACI – hoary bat (*Lasiurus cinereus*)

MYEV – Western long-eared myotis (*Myotis evotis*)

PAHE – canyon bat (*Parastrellus hesperus*)

5.3 Long-term Acoustic Monitoring

Two Anabat detectors were deployed on March 3, 2012 at the Don Pedro Powerhouse and below the Don Pedro Dam spillway. Nine species and three species groups were documented (Table 5.3-3).

Table 5.3-3. Long term acoustic monitoring results at Don Pedro Hydroelectric Project bat study sites.

Survey Location	Month	Species											
		25 kHz Species	40 kHz <i>Myotis</i>	50 kHz <i>Myotis</i>	ANPA	COTO	EUMA	EUPE	LABL	LACI	MYEV	PAHE	TABR
Don Pedro Dam Powerhouse	March	--	--	X	--	--	--	--	X	--	--	X	--
	April	X	X	X	X	X	X	--	X	X	X	X	X
	May	X	X	X	X	X	--	--	X	X	X	X	X
	June	X	X	X	X	X	--	--	X	--	--	X	--
	July	X	X	X	X	X	X	--	X	--	X	X	X
	August	X	X	X	X	X	--	--	X	X	X	X	X
	September	X	X	X	X	X	X	--	X	--	X	X	X
	October	X	X	X	X	X	X	X	X	--	X	X	X
Don Pedro Dam Spillway	March	--	--	X	X	X	--	--	X	X	--	X	--
	April	X	--	X	X	X	--	--	X	X	X	X	X
	May	X	--	X	X	X	X	X	X	X	X	X	X
	June	X	X	X	X	X	X	P	X	X	--	X	X
	July	X	X	X	X	X	--	X	X	X	--	X	X
	August	X	--	X	X	X	X	--	X	X	--	X	X
	September	X	--	X	X	X	X	--	X	X	--	X	X
	October	X	--	X	X	X	X	X	X	X	X	X	X

Key:

“X” indicates that the species was recorded.

“P” indicates that a recorded call is suggestive of a species, but due to clutter, presence of other species, or fragmentation, identification is not absolute.

25 kHz species are a group of bats that echolocate in the 25 kHz range and are difficult to differentiate because of similarities in call structure. This group includes big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and pallid bat (*Antrozous pallidus*). However, these three species may be identified individually, if species-specific call characteristics are present (e.g., social calls for pallid bat, calls exceeding 65 kHz for big brown bats, the presence of flat calls, ≥ 26 kHz, for silver-haired bat).

40 kHz *Myotis* are bats that echolocate in the 40 kHz range and are difficult to identify because of similarities in call structure. This group includes Western small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), and long-legged myotis (*Myotis volans*).

50 kHz *Myotis* are bats that echolocate in the 50 kHz range and are difficult to identify because of similarities in call structure. This group includes Yuma myotis (*Myotis yumanensis*) and California myotis (*Myotis californicus*).

ANPA – pallid bat

COTO – Townsend’s big-eared bat (*Corynorhinus townsendii*)EUMA – spotted bat (*Euderma maculatum*)EUPE – mastiff bat (*Eumops perotis*)LABL – Western red bat (*Lasiurus blossevillii*)LACI – hoary bat (*Lasiurus cinereus*)MYEV – Western long-eared myotis (*Myotis evotis*)PAHE – canyon bat (*Parastrellus hesperus*)TABR – Brazilian free-tailed bat (*Tadarida brasiliensis*)

Acoustic data collected during this study allowed the identification of bat species present in the study area between March 3, 2012 and October 31, 2012. Overall, 50 kHz *Myotis* species, Western red bat and Canyon bat were the most often recorded species at both LTAM sites. Pallid bat and Townsend's big-eared bat (*Corynorhinus townsendii*) were the second most often recorded species at both sites, and were absent only during the month of March. The 25 kHz species were not recorded during two of the eight months of monitoring. The remaining six recorded species varied in presence at each site.

5.4 Bat Roosts Located

Project Facilities used as a Night Roost

A total of 32 structures were identified as night roosts, based on the presence of varying amounts of guano and/or staining, ranging from a few pieces of guano to over 100, and staining over small or large areas of wall. Of the 32 structures used as night roosts, 22 were restrooms located in campgrounds or at boat launches: Fleming Meadows Recreation Area (nine restrooms), Moccasin Point Recreation Area (two restrooms), and Blue Oaks Recreation Area (eleven restrooms). The remaining night roost locations were located at the Don Pedro Powerhouse, Don Pedro Dam Spillway, Don Pedro Recreation Area Visitor Center, the maintenance building in the B Loop Campground at Fleming Meadows, the Swim Beach Filtration Building, dressing rooms, and Trading Post in the D Loop Campground at Fleming Meadows, the Group Picnic Pavilion and nearby storage facility, and the small outbuilding in the A Loop Campground at Blue Oaks.

Of the species documented in the Project area, only pallid bat were observed roosting at Blue Oaks Campground and the Swim Beach Filtration Building. For the remaining sites where evidence of night roosts was found, the study team was unable to identify the species using the roosts. However, all of the species documented in the Project area are likely candidates since they have been reported to utilize structures similar to those found in the Project.

Project Facilities used as a Day Roost

A single day roost was confirmed at the Fixed Wheel Gate building near Don Pedro Dam. This day roost contained two *Myotis* behind a plaque affixed to the building. There were no other signs of roosting at the structure. The Fixed Wheel Gate provides emergency closure for the power tunnel but is not otherwise used or affected by Project O&M.

Employees at the Don Pedro Recreation Area Visitor Center reported pallid bats roosting on the exterior of the building. While bats are occasionally found roosting on a buildings exterior during the day, this behavior is atypical, and the building exterior did not show signs of bat use. The study scientist believes that this report of pallid bats roosting on the exterior of the Don Pedro Recreation Area Visitor Center represents a rare and isolated occurrence.

Another site likely utilized as a day roost is the tunnel adjacent to the Don Pedro Powerhouse. Project operations staff reported bats coming and going from this tunnel on a regular basis. Additionally, a LTAM unit placed at the mouth of the tunnel confirmed that the tunnel and surrounding areas are used by bats. Of the species documented by acoustic monitoring at this site, the most likely to roost in the tunnel include: Townsend's big-eared bat, canyon bat, Brazilian free-tailed bat (*Tadarida brasiliensis*), and bats from the 25, 40, and 50 kHz species

groups.² The tunnel does not fill and no Project O&M is conducted that could affect bats using the area.

Project Facilities used as a Maternity Roost

No maternity roosts were identified during this study. However, all three pallid bats captured at Blue Oaks Recreation Area during the October trapping effort, were observed to be sexually mature (scrotal). The presence of reproductive individuals suggests that maternity roosts are present within, or adjacent to, the study area. It is likely that the same roosts that serve as day roosts may also serve as maternity roosts.

Project Facilities used as Winter Hibernacula

No winter hibernacula were identified during this study. However, the Project is located at an elevation and latitude of mild winters that may allow some species of bats to remain present year round. The presence of two *Myotis* sp. at the Fixed Wheel Gate Building in February suggests that bats do overwinter in the Project vicinity, and may use Project structures as winter roosts. Species accounts from the Western Bat Working Group (WBWG) do not include information on *Myotis* winter hibernacula, but do indicate that California *Myotis* remain active throughout the winter months (WBWG 2005a). These bats could hibernate for short periods of time, or not at all, and emerge to forage and drink. The two *Myotis* observed at the Fixed Wheel Gate Building were located behind a plaque, rather than within a structure typical of hibernation roosts (e.g., cave, mine, or within a buildings interior). In addition to bats from the genus *Myotis*, pallid bats may also overwinter in the Project area. According to the WBWG (2005b) pallid bats may not migrate long distances between summer and winter sites, and in coastal California, some individuals may move between a primary roost and alternate winter roost. Of the remaining species documented in the study area, only Western mastiff bat may remain locally year round and are known to be periodically active all winter long (WBWG 2005c).

² Silver-haired bat (*Lasiorycteris noctivagans*), a 25 kHz species, is the only exception, since it roosts exclusively in trees.

6.0 DISCUSSION AND FINDINGS

Focused surveys and LTAM were used to determine presence and distribution of special-status bats in the Don Pedro Project area. Focused surveys and acoustic recordings documented the presence of ten species of bats in the Don Pedro Project area, as well as bats from the three acoustic groups (Table 6.0-1). Of the ten identified species, seven are considered special-status by the BLM or CDFG. These seven special-status species include pallid bat (a BLM Sensitive-species or BLM-S and CDFG Species of Special Concern or SSC), Townsend's big-eared bat (BLM-S and SSC), spotted bat (*Euderma maculatum*) (BLM-S and SSC), Western mastiff bat (BLM-S and SSC), Western red bat (SSC), long-eared myotis (BLM-S), and Yuma myotis (BLM-S). Furthermore, of these seven special-status bat species, only long-eared myotis had not been previously reported in the vicinity of the Project (see Table 4.1-1 for historic occurrences of special-status bat species in the vicinity of the Project).

With respect to distribution of the seven special-status species documented within the Project area, pallid bat was documented at four of the five survey locations (both LTAM and focused survey sites) selected for this study: Fleming Meadows Recreation Area Swimming Lagoon, Don Pedro Dam Spillway, Blue Oaks Recreation Area and Don Pedro Powerhouse. Western red bat was found to occur at the second greatest number of sites (Fleming Meadows Recreation Area Swimming Lagoon, Don Pedro Dam Spillway, and Don Pedro Powerhouse). Long-eared myotis was also found to occur at three of the five survey sites: Don Pedro Dam Spillway, Moccasin Recreation Area and Don Pedro Powerhouse. Both Townsend's big-eared bat and Western mastiff bat were documented at two of the five survey sites: Don Pedro Dam Spillway and Don Pedro Powerhouse. Spotted bat and Yuma myotis were documented at Don Pedro Powerhouse and Don Pedro Dam Spillway, respectively.

Table 6.0-1. Species recorded by acoustic sampling, LTAM and mist netting efforts.

Location	Land Ownership ¹	Species												
		25 kHz Species	40 kHz <i>Myotis</i>	50 kHz <i>Myotis</i>	ANPA _{2,3}	COTO _{2,3}	EUMA _{2,3}	EUPE _{2,3}	LABL ₂	LACI	MYEV ₃	MYYU ₃	PAHE	TABR
Fleming Meadows Recreation Area Swimming Lagoon	MID/TID	X	X	X	X	--	--	--	X	X	--	--	X	--
Don Pedro Dam Spillway	MID/TID	X	X	X	X	X	--	X	X	X	X	X	X	X
Blue Oaks Recreation Area Campground A	MID/TID	--	X	X	X	--	--	--	--	X	--	--	X	--
Moccasin Recreation Area Campground C	MID/TID	X	X	X	--	--	--	--	--	X	X	--	X	--
Don Pedro Powerhouse	BLM	X	X	X	X	X	X	X	X	X	X	--	X	X

Key:

“X” indicates that the species was recorded.

25 kHz species are a group of bats that echolocate in the 25 kHz range and are difficult to differentiate because of similarities in call structure. This group includes big brown bat (*Epitescus fuscus*), silver-haired bat (*Lasionycteris noctovagens*), and pallid bat (*Antrozous pallidus*). However, these three species may be identified individually, if species-specific call characteristics are present (e.g. social calls for pallid bat, calls exceeding 65 kHz for big brown bat, the presence of flat calls ≥ 26 kHz, for silver-haired bat).

40 kHz *Myotis* are bats that echolocate in the 40 kHz range and are difficult to identify because of similarities in call structure. This group includes Western small-footed bat (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), and hairy-winged myotis (*Myotis volans*).

50 kHz *Myotis* are bats that echolocate in the 50 kHz range and are difficult to identify because of similarities in call structure. This group includes Yuma myotis (*Myotis yumanensis*), and California myotis (*Myotis californicus*).

ANPA – pallid bat

COTO – Townsend’s big-eared bat (*Corynorhinus townsendii*)

EUMA – spotted bat (*Euderma maculatum*)

EUPE – Western mastiff bat (*Eumops perotis*)

LABL – Western red bat (*Lasiurus blossevillii*)

LACI – hoary bat (*Lasiurus cinereus*)

MYEV – long-eared myotis (*Myotis evotis*)

MYYU – Yuma myotis

PAHE – canyon bat (*Parastrellus hesperus*)

TABR – Brazilian free-tailed bat (*Tadarida brasiliensis*)

¹ BLM: USDOJ Bureau of Land Management administered lands; MID: lands under ownership of Modesto Irrigation District; TID: lands under ownership of Turlock Irrigation District

² SSC: CDFG Species of Special Concern (CDFG 2011)

³ BLM-S = Bureau of Land Management Sensitive Species (CDFG 2011)

FERC's Scoping Document 2 identified the following issues potentially affecting special-status bats:

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

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

Of these components of Project O&M, the use of Project facilities and disturbance associated with Project recreation has the potential to affect special-status bats. Bats are sensitive to various disturbances and can be affected by human activities, including the presence of humans at roost sites, modification of roosting and foraging habitat, and pesticide applications. These disturbances may directly or indirectly result in mortality, or abandonment of roosts. In the case of maternity roosts, disturbances can lead to abandonment and loss of juveniles. Since most species of bats roost communally, disturbances to roosts have the potential to affect anywhere from one to thousands of individuals.

No maternity roosts or winter hibernacula were identified at Project facilities or recreation sites by this study. Based on observed use patterns, roosts or winter hibernacula are likely within the study area or Project vicinity, but not in areas affected by Project O&M. As a result, Project O&M is unlikely to affect these sites. Two Project facilities are likely used as day roosts: the Fixed Wheel Gate building and the tunnel adjacent to Don Pedro Powerhouse. Neither are affected by normal Project O&M.

A total of 32 night roosts were identified, many adjacent to Project campgrounds and likely subject to indirect disturbance related to recreational use. Evidence of roosting at campground facilities persisted throughout the 2012 bat study, suggesting that disturbance to night roosts in general is limited, and the disturbance associated with recreation use of most areas is unlikely to result in abandonment by bats. However, the small cinderblock structure near the A2 restroom in the Blue Oak campground, used by pallid bat as a night roost, was found to have substantial evidence of human activity (burn marks on the interior walls of the structure along with broken glass on the floor) within the structure. Although this structure was used as a pallid bat night roost for the study duration, the direct nature of the disturbance to this structure suggests that continued or future disturbance or use could lead to a reduction of use or abandonment of this night roost.

7.0 STUDY VARIANCES AND MODIFICATIONS

The study was conducted consistent with the FERC-approved Special-Status Wildlife – Bats Study Plan (Study TR-09). No variances occurred.

8.0 REFERENCES

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