DON PEDRO HYDROELECTRIC PROJECT
FERC NO. 2299

FINAL LICENSE APPLICATION

EXHIBIT A – DON PEDRO PROJECT DESCRIPTION



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

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

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

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

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

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

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

SHPO .....State Historic Preservation Officer

SJRA .....San Joaquin River Agreement

SJRGA .....San Joaquin River Group Authority

SJTA .....San Joaquin River Tributaries Authority

SM.....Standard Method

SMUD.....Sacramento Municipal Utility District

SPAWN.....spawning, reproduction and/or early development

SPD .....Study Plan Determination

SRA.....State Recreation Area

SRMA .....Special Recreation Management Area or Sierra Resource Management Area (as per use)

SRMP.....Sierra Resource Management Plan

SRP .....Special Run Pools

SSC .....State species of special concern

ST.....California Threatened Species under the CESA

STORET .....Storage and Retrieval

SWAMP.....Surface Water Ambient Monitoring Program

SWE .....Snow-Water Equivalent

SWP .....State Water Project

SWRCB.....State Water Resources Control Board

TAC.....Technical Advisory Committee

TAF .....thousand acre-feet

TCP .....Traditional Cultural Properties

TCWC.....Tuolumne County Water Company

TDS .....Total Dissolved Solids

TID.....Turlock Irrigation District

TMDL .....Total Maximum Daily Load

TOC.....Total Organic Carbon

TRT.....Tuolumne River Trust

TRTAC .....Tuolumne River Technical Advisory Committee

UC.....University of California

USBR .....U.S. Bureau of Reclamation

USDA.....U.S. Department of Agriculture

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

EXHIBIT A – DON PEDRO PROJECT DESCRIPTION

The following excerpt from the Code of Federal Regulations (CFR) at 18 CFR § 4.51(c) describes the required content of this Exhibit.

Exhibit A is a description of the project. This exhibit need not include information on project works maintained and operated by the U.S. Army Corps of Engineers, the Bureau of Reclamation, or any other department or agency of the United States, except for any project works that are proposed to be altered or modified. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The description for each development must contain:

(1) The physical composition, dimensions, and general configuration of any dams, spillways, penstocks, powerhouses, tailraces, or other structures, whether existing or proposed, to be included as part of the project;

(2) The normal maximum surface area and normal maximum surface elevation (mean sea level), gross storage capacity, and usable storage capacity of any impoundments to be included as part of the project;

(3) The number, type, and rated capacity of any turbines or generators, whether existing or proposed, to be included as part of the project;

(4) The number, length, voltage, and interconnections of any primary transmission lines, whether existing or proposed, to be included as part of the project (see 16 U.S.C. 796(11));

(5) The specifications of any additional mechanical, electrical, and transmission equipment appurtenant to the project; and

(6) All lands of the United States that are enclosed within the project boundary described under paragraph (h) of this section (Exhibit G), identified and tabulated by legal subdivisions of a public land survey of the affected area or, in the absence of a public land survey, by the best available legal description. The tabulation must show the total acreage of the lands of the United States within the project boundary.

PREFACE

The Don Pedro Project provides water storage for irrigation and municipal and industrial (M&I) use, flood control, hydroelectric generation, recreation, and natural resource protection (hereinafter, the "Don Pedro Project"). Exhibit A contains a description of all the components and facilities that make up the Don Pedro Project. The Don Pedro Project was originally conceived as a water supply project. The Don Pedro Project was constructed for the following primary purposes: (1) to provide water supply for the co-licensees, Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts), for irrigation of over 200,000 acres (ac) of Central Valley farmland and for M&I use, (2) to provide flood control benefits along the Tuolumne and San Joaquin rivers, and (3) to provide a water banking arrangement for the benefit of the City and County of San Francisco (CCSF) and its 2.6 million Bay Area water customers. The original license was issued in 1966. In 1995, the Districts entered into an agreement with a number of parties which resulted in greater flows to the lower Tuolumne River for the protection of aquatic resources.

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

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

1.0 DON PEDRO PROJECT LOCATION

The Don Pedro Project is located on the Tuolumne River in western Tuolumne County, California, along the western slope of the Sierra Nevada. The Don Pedro Project Boundary extends from river mile (RM) 53.2 to approximately RM 80.8 of the Tuolumne River. The Tuolumne River is a tributary to the San Joaquin River, which eventually flows into the Sacramento-San Joaquin River Delta, thence to San Francisco Bay. The Don Pedro Project lies

about 40 miles east of the City of Modesto and 26 miles northeast of the City of Turlock. A portion of the Project occupies lands of the United States, administered by the United States Department of Interior (USDOI) Bureau of Land Management (BLM) as part of the Sierra Resource Management Area. All other lands within the Project Boundary are owned jointly by the Turlock Irrigation District (TID) and the Modesto Irrigation District (MID), co-licensees of the Project (collectively, the Districts).

The Don Pedro powerhouse and its electrical switchyard are located immediately downstream of the Don Pedro Dam at RM 54.6. The reservoir formed by the dam has a normal maximum water surface elevation[1] of 830 feet (ft) above mean sea level. The Project Boundary at the upper end of the reservoir extends to a water surface elevation of 845 ft at RM 80.8. The maximum water surface elevation resulting from the spillway design flood is estimated to be 852 ft. The top of the dam and dikes containing the reservoir is elevation 855 ft. The drainage area of the Tuolumne River at Don Pedro Dam is approximately 1,533 square miles (mi^2) (ACOE 1972).

The Don Pedro Project was formerly referred to as the New Don Pedro Project (and the Don Pedro Dam was formerly referred to as the New Don Pedro Dam) because it displaced the smaller, original Don Pedro Dam and powerhouse, which were built in 1923 and located approximately 1.5 miles upstream of the current dam. The old Don Pedro Dam remains in place.

Figure 1.0-1 provides a general location map of the Don Pedro Project within the larger San Joaquin River watershed and Figure 1.0-2 provides a more detailed view of the vicinity and facilities.

[1] All elevations provided in the Final License Application are referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

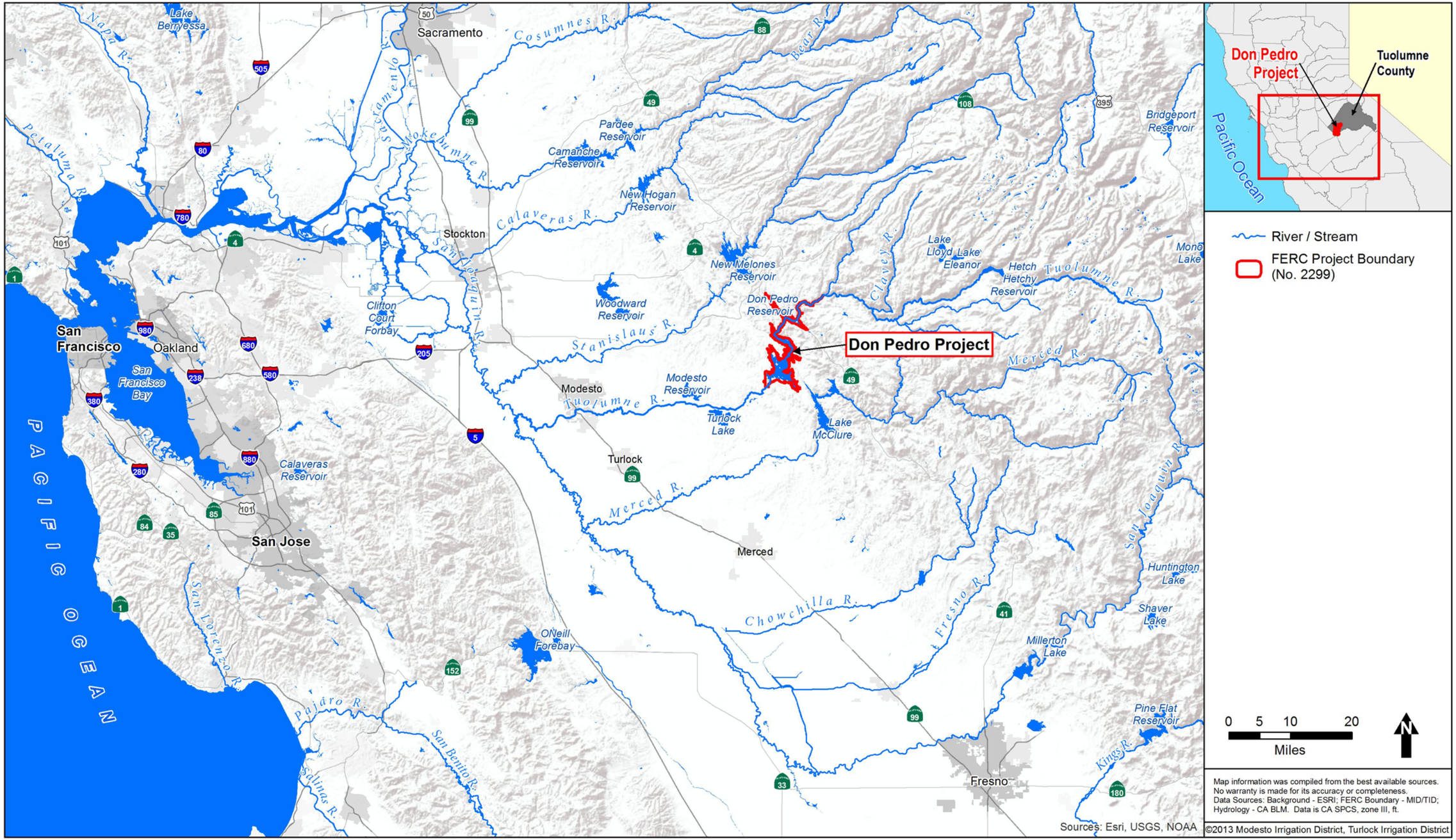

Figure 1.0-1. General map of the San Joaquin River basin showing the location of Don Pedro Project.

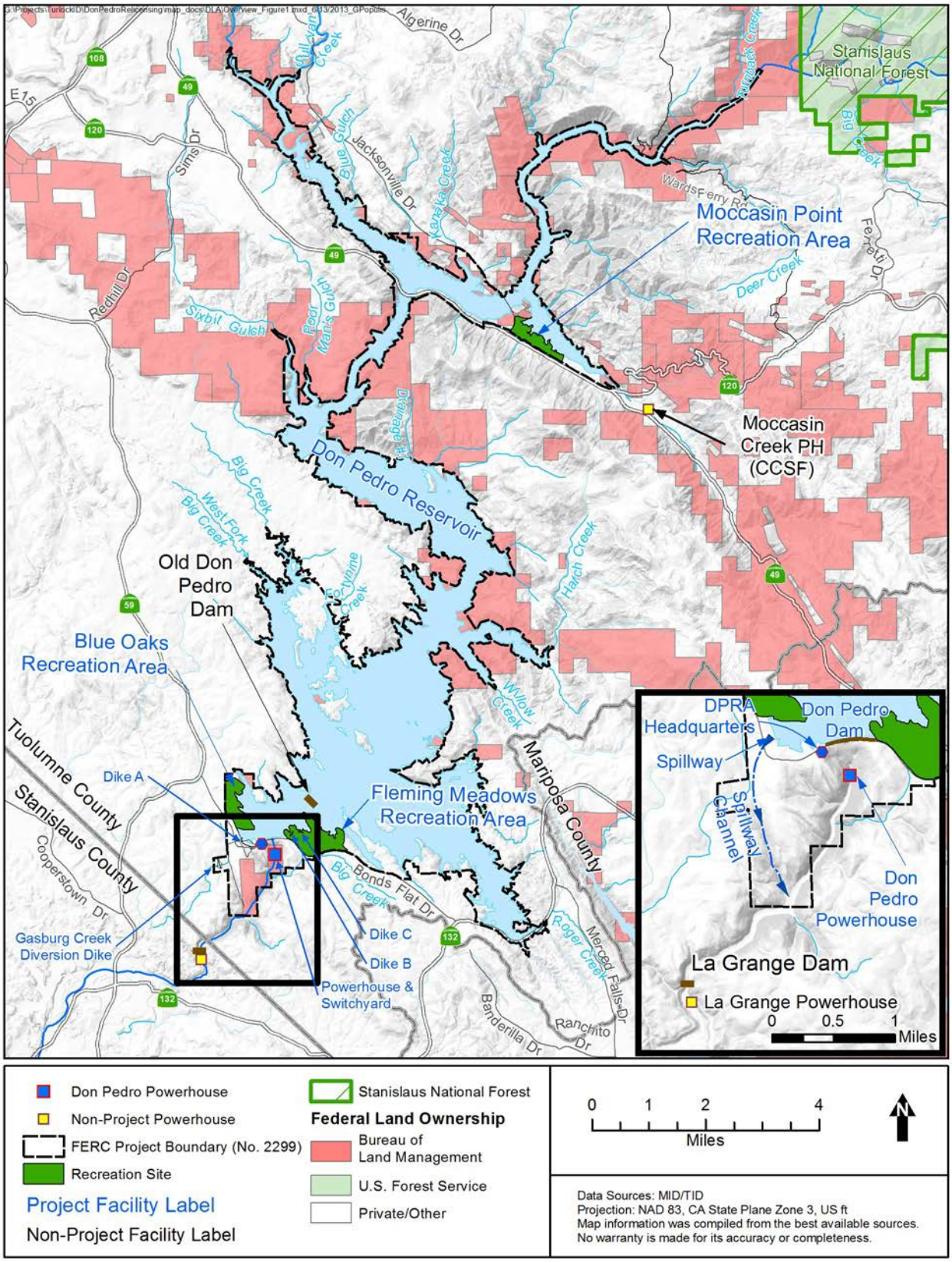

Figure 1.0-2. Don Pedro Project site location map.

2.0 DON PEDRO PROJECT FACILITIES

On March 10, 1964, the Federal Power Commission, predecessor agency to the Federal Energy Regulatory Commission (FERC), granted the Districts an initial license authorizing the construction and operation of the new Don Pedro Dam and power plant. This initial license has a term that expires on April 30, 2016. Construction began in 1967 and commercial operation commenced in 1971. The current Don Pedro Dam was built approximately 1.5 mi downstream of the original Don Pedro Dam which had been in operation since 1923.

The primary Don Pedro Project facilities include: (1) Don Pedro Dam and Reservoir, (2) controlled and uncontrolled spillways on the right (west) abutment of the main dam, (3) controlled outlet works located in the diversion tunnel in the left (east) abutment of the main dam, (4) the power intake and tunnel, also in the left abutment, (5) the Don Pedro powerhouse, (6) the Project switchyard located at the powerhouse, and (7) four dikes—the Gasburg Creek Dike and Dikes A, B, and C. Three developed recreation areas are located within the Project Boundary, as are numerous other small recreation facilities (restrooms and buoys) outside of the developed areas. The Don Pedro Project facilities are described in detail below and summarized in Table 2.0-1.

Table 2.0-1. Description of Don Pedro Project facilities and features.

DON PEDRO DAM AND RESERVOIR	
River Mile of dam axis	54.8
Construction Period	1967–1971
Placed in Service	1971
Don Pedro Dam	--
Hazard Classification	High
Type	Zoned embankment with a core and rockfill shells
Maximum Height	Approximately 580 ft
Crest	--
Elevation	El. 855 ft (without camber)
Width	40 ft
Length	1,900 ft
Base	--
Elevation	El. 275 ft
Width	3,000 ft
Slope	--
Upstream Face (Horizontal to Vertical)	Slope varies until El. 725 ft, then 2.4H:1V
Downstream Face (Horizontal to Vertical)	Slope varies until El. 725 ft, then 2.1H:1V
Don Pedro Dam Gated Spillway	--
Type	3 Radial Gates
Crest	--
Elevation	El. 800 ft
Length	135 ft
Control	Three bays each with 45-ft wide by 30-ft high radial gates
Hoist Type	Cable
Maximum Discharge	172,500 cfs at water surface elev. 850 ft (total spillway discharge)

DON PEDRO DAM AND RESERVOIR	
Don Pedro Dam Ungated Spillway	
Type	Ogee crest
Crest	--
Elevation	El. 830 ft
Length	995 ft
Control	--
Hoist Type	--
Maximum Discharge	300,000 cfs at water surface elev. 850 ft (resulting in total spillway capacity of 472,500 cfs at water surface elev. 850 ft)
Don Pedro Outlet Works	--
Number, Size, & Control	One tunnel leading to three individual service gates (4-ft by 5-ft slide gates).
Invert Elevation at the Intake	El. 342 ft
Invert Elevation at the Outlet	El. 300 ft (+/-)
Maximum Capacity	7,500 cfs at water surface elev. of 830 ft
Don Pedro Reservoir (under current license)	--
Project Boundary Upstream Water Surface Elevation	El. 845 ft
Normal Maximum Water Surface Elevation	El. 830 ft
Normal Minimum Operating Pool	El. 600 ft
Drainage Area	1,533 mi^2
Gross Storage at elev. 830 ft	2,030,000 AF
Usable Storage at elev. 830 ft	1,721,000 AF
Surface Area at Normal Maximum Water Surface Elevation	12,960 ac
Length (approximate)	26 mi
Width (maximum)	10 mi
Maximum Depth	550 ft
Shoreline Length	160 mi, including islands
DON PEDRO POWERHOUSE	
Don Pedro Powerhouse	--
Location	Immediately downstream of Don Pedro Dam, RM 54.6
Placed in Service (Began Commercial Operation)	September 19, 1971
Plant Operation	Automatic
Normal Type of Operation	"Water first" operation (see Exhibit B)
Structure	--
Type	Outdoor, reinforced concrete
Construction Period	1968–1971
Turbine	--
Number of Units	Four
Type	Vertical Francis
Manufacturer	3 Mitsubishi; 1 Toshiba.
Maximum Output[1]	3@ 85,000 hp; 1@ 54,000 hp
Nameplate Output	3@ 77,700 hp at 450 ft gross head; 1@ 42,000 hp at 425 ft gross head
Maximum Gross Head	3@ 531 ft; 1@ 500 ft
Speed	3@ 277 RPM; 1@ 450 RPM
Nameplate Rated Flow	3@ 1,641 cfs at 450 ft gross head; 1@ 924 cfs at 425 ft gross head
Distributor Centerline Elevation	3@ 299.0 ft; 1@ 330.0 ft

DON PEDRO DAM AND RESERVOIR	
Generator	--
Type	3 phase synchronous generator
Manufacturer	Toshiba
Nameplate Output	3@ 47,900 kVA; 1@ 38,200 kVA
Nameplate Capability	3@ 45,500 kW; 1@ 34,380 kW
Power Factor	3@ 0.95; 1@ 0.90
Voltage	13,800 Volts
Speed	3@ 277 rmp; 1@ 450 rpm
Governor	--
Type	Hydraulic power control unit
Manufacturer	3 Woodward; 1 Toshiba

[1] hp = horsepower

2.1 Don Pedro Dam

The Don Pedro Dam is a 1,900 ft long and 580 ft high zoned earth and rockfill structure. The top of the dam is at elevation 855 ft. The drainage area of the Tuolumne River upstream of the Don Pedro Dam is 1,533 mi^2 (ACOE 1972). The dam has a top width of 40 ft and a bottom width of approximately 3,000 ft. The downstream slope is grass-covered and the upstream slope has riprap protection extending to elevation 585 ft. A secured access road is provided along the top of the dam for use by Districts' personnel. The downstream slope is shown in Figure 2.1-1.

Figure 2.1-1. Photograph of Don Pedro Dam - downstream slope.

2.2 Don Pedro Reservoir

The Don Pedro Reservoir extends for approximately 24 miles at the normal maximum water surface elevation of 830 ft and 26 miles at the upstream Project Boundary water elevation of 845 ft. The surface area of the reservoir at the 830 ft elevation is approximately 12,960 acres (ac) and the gross storage capacity is 2,030,000 acre-feet (AF). The Don Pedro Reservoir shoreline, including the numerous islands within the lake (at normal maximum water surface elevation), is approximately 160 mile long. Under the current license, the minimum operating pool elevation is 600 ft. Water storage below this elevation is approximately 309,000 AF. The old Don Pedro Dam, which was displaced by the construction of the new Don Pedro Dam, is located approximately 1.5 miles upstream of new Don Pedro Dam at approximately RM 56.4. The normal maximum water level of the old Don Pedro Dam was approximately at elevation 606 ft. The old Don Pedro Dam remains in place with its twelve sluice gates open. The permanent spillway crest of the old Don Pedro Dam was at approximate elevation 597 ft and was topped by nine-foot-high gates, which were removed when the new Don Pedro Dam was constructed.

2.3 Don Pedro Spillway

The Don Pedro spillway includes gated and ungated sections, located adjacent to one another in a saddle area west of, and separated from, the main dam. The gated spillway section is 135 ft long, with a permanent crest elevation of 800 ft, and includes three radial gates each 45-feet-wide by 30-ft-high. The radial gates are operated by motor-driven steel cables. A travel way is provided over the gated spillway along a top deck at elevation 855 ft. Gate trunnions are located at elevation 810 ft. The ungated spillway is an ogee crest section 995 ft long with a permanent crest elevation of 830 ft and a top of abutment elevation of 855 ft. The total spillway capacity at a reservoir water level of 850 ft is 472,500 cubic feet per second (cfs) (TID/MID 2006). Flow over the ungated ogee crest section of the spillway has occurred only once since Don Pedro Project construction, during the New Year's 1997 flood. Flows over the spillway are released into a normally dry gulch named Twin Gulch, which discharges into the Tuolumne River approximately 1.5 miles downstream of the main dam. The spillway sections are founded on bedrock. The spillway channel runs into Twin Gulch, which primarily consists of bedrock and large boulders. The gated spillway structure is shown in Figure 2.3-1.

Figure 2.3-1. Don Pedro spillway gate structure viewed from downstream.

2.4 Outlet Works

Low level outlet works are located at the left (east) abutment of the main dam. The outlet works consist of three individual service gate housings, each containing 4-foot-wide by 5-foot-high slide gates. The outlet works are situated in a 3,500-foot-long concrete lined tunnel, a portion of which originally served as the water diversion tunnel during original construction. The original water diversion tunnel had an inlet elevation centerline of 315 ft. At the completion of construction, the original inlet for the diversion tunnel was fitted with a concrete plug and a new 12 ft diameter inlet was constructed with an inlet invert of 342 ft. The diversion tunnel downstream of the new inlet was fitted with the three bonnetted slide gates (Figure 2.4-1). The invert of the three slide gates is at approximate elevation 310 ft. The inlet to the outlet works is provided with a maintenance gate which travels on an inclined gate track. The outlet works tunnel daylights back to the Tuolumne River approximately 400 ft downstream of the powerhouse (Figure 2.4-2). The invert of the outlet works at the river discharge is approximately at elevation 300 ft. At a reservoir water surface elevation of 830 ft, the hydraulic capacity of the three gates constituting the outlet works is 7,500 cfs.

Figure 2.4-1. Don Pedro Dam - gate operators for the low level outlet works slide gates.

Figure 2.4-2. Don Pedro Dam - low level outlet works tunnel discharge.

2.5 Power Intake and Tunnel

Flows are delivered from the reservoir to the powerhouse via a 2,960-foot-long power tunnel located in the left (east) abutment of the main dam. The tunnel transitions from an 18-ft 6-in concrete lined section to a 16-ft steel lined section. Emergency closure can be provided by a 21-foot-high by 12-foot-wide fixed-wheel gate that is operated from a chamber at the top of the gate shaft located at the left dam abutment (Figure 2.5-1). Flows from the power tunnel are delivered to the four unit powerhouse and a hollow jet bypass control valve in the powerhouse. The inlet to the power tunnel is fitted with trash racks and a hydraulically operated bulkhead gate for tunnel dewatering or emergency closure. The power tunnel invert is at elevation 534 ft, 66 ft below the minimum power pool elevation of 600 ft.

Figure 2.5-1. Don Pedro Dam - power tunnel shaft and gate housing.

2.6 Don Pedro Powerhouse, Turbines, and Generators

Located immediately downstream of the main dam, the reinforced concrete outdoor-type powerhouse contains four turbine generator units and a 72-in hollow jet valve (Figure 2.6-1). The powerhouse is 171 ft long, 110 ft high and 148 ft wide. It houses four Francis-type turbines direct connected to electrical generators. Unit performance characteristics are provided in Table 2.6-1 and Table 2.6-2. The current FERC-authorized capacity is 168 megawatt (MW). Combined hydraulic capacity of the four units under the maximum gross operating head of 530 ft is approximately 5,500 cfs. Each of the three original turbines and generators have a rotational speed of 277 revolutions per minute (rpm) and are rated at 77,700 horsepower (hp) and 48 megavolt-amperes (MVA), respectively, at 450 ft of net head. Unit 4 was installed in 1989 after

FERC approved the Districts' amendment to add the fourth unit in February 1987 (38 FERC 61,097). At maximum head, the powerhouse has an output capability of 203 MW at full gate flow supplied to each of the four units.

The powerhouse also contains a 72-in hollow jet valve located in the east end of the powerhouse with a centerline elevation at discharge of 305 ft. The maximum hydraulic capacity of the hollow jet valve is 3,000 cfs. While turbines 1, 2, and 3 discharge directly to the river channel, Unit 4 discharges to the outlet works tunnel approximately 250 ft upstream of the tunnel outlet. Water to Unit 4 is delivered through a bifurcation from the hollow jet valve piping. With Unit 4 in operation, the hollow jet valve capacity is reduced from 3,000 cfs to 800 cfs.

Access to the powerhouse is via a secured gate located off the Visitor Center parking area. The road provides access directly onto the top deck of the powerhouse at elevation 340 ft. A 4-ft high parapet wall surrounds the top deck. A two-hook gantry crane sits atop the deck and provides equipment and materials delivery to the powerhouse and maintenance services. The generator floor in the powerhouse is at elevation 323 ft and the turbine floor is at elevation 308 ft.

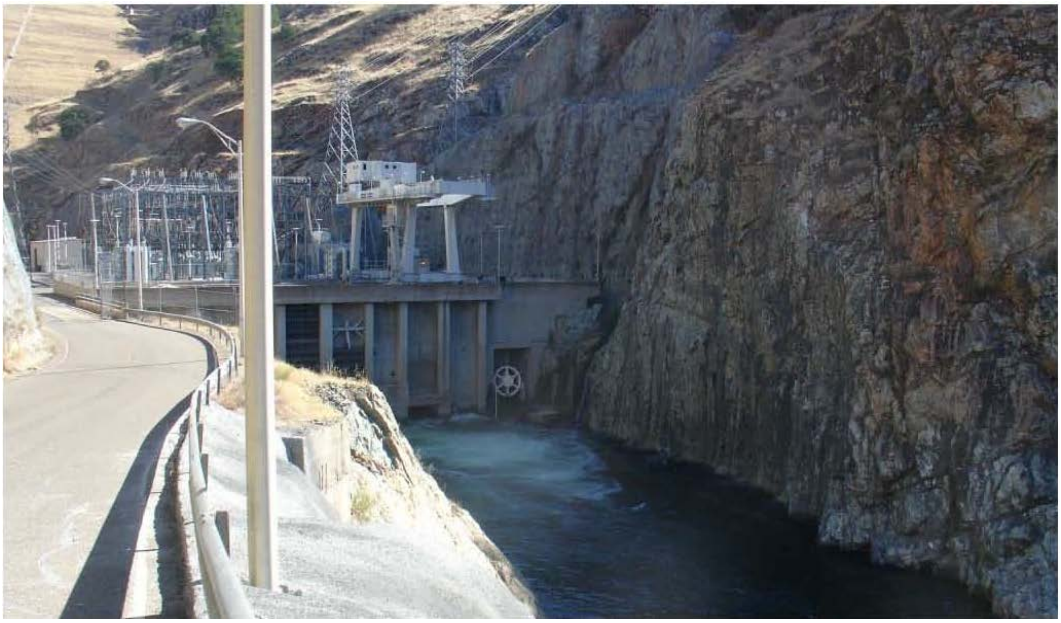

Figure 2.6-1. Don Pedro powerhouse and hollow jet valve viewed from tailwater.

Table 2.6-1. Don Pedro Units 1, 2, and 3 performance characteristics.[1]

Net Head (ft)	Flow (cfs)	Turbine Output (hp)[2]	Generator Output (MW)	Turbine Efficiency
530	545	24,000	17.2	73.5%
530	800	39,000	28.2	81.3%
530	1,000	51,300	37.5	85.6%
530	1,200	65,200	47.6	90.6%
530	1,350	75,000	54.8	92.7%
530	1,510	85,000	62.1	93.9%
450	400	14,500	10.4	71.2%
450	600	24,650	17.8	80.7%
450	800	34,900	25.5	85.7%

Net Head (ft)	Flow (cfs)	Turbine Output (hp)[2]	Generator Output (MW)	Turbine Efficiency
450	1,000	45,550	33.3	89.5%
450	1,200	56,800	41.5	93.0%
450	1,400	67,150	49.1	94.2%
450	1,579	75,000	54.8	93.3%
450[3]	1,641[3]	77,700	56.8	93.0%
375	400	12,350	8.8	72.8%
375	600	20,400	14.6	80.2%
375	800	29,100	21.1	85.8%
375	1,000	38,300	27.7	90.3%
375	1,200	47,300	34.2	92.9%
375	1,400	55,100	39.9	92.8%
375	1,460	56,800	41.1	91.7%

[1] Units can operate at lower flows than indicated in the table
[2] hp = horsepower
[3] Head at nameplate rating.

Table 2.6-2. Don Pedro Unit 4 performance characteristics.[1]

Net Head (ft)	Flow (cfs)	Turbine Output (hp)[2]	Generator Output (MW)	Turbine Efficiency
500	210	6,793	4.43	57.0%
500	485	22,707	16.3	82.5%
500	725	36,618	26.5	89.0%
500	940	50,678	36.7	95.0%
500	1000	53,629	38.8	94.5%
425	185	4,908	3.20	55.0%
425	440	17,404	12.5	82.0%
425	650	27,592	20.0	88.0%
425	850	38,132	27.8	93.0%
425	1010	45,797	33.4	94.0%
425	1155	50,700	37.0	91.0%
275	310	5,080	3.3	52.5%
275	475	10,082	7.0	68.0%
275	625	14,728	10.5	75.5%
275	770	19,587	14.1	81.5%
275	890	22,640	16.4	81.5%

[1] Units can operate at lower flows than indicated in the table
[2] hp = horsepower

2.7 Tailrace

The powerhouse and hollow jet valve discharge directly to the Tuolumne River. Tailwater elevation during turbine operation varies from a low of about 300 ft to a high of about 304 ft under normal operating conditions. The tailwater elevation at the outlet works tunnel is also at approximately 300 ft under low flow conditions.

2.8 Switchyard

The Project switchyard is located atop the powerhouse at elevation 340 ft. The switchyard provides power delivery and electrical protection to the TID and MID transmission systems. The switchyard includes isolated phase buses, circuit breakers, and four transformers that raise the

13.8 kilovolt (kV) generator voltage to 69 kV transmission voltage. Transformers 1 through 3 are rated at 55 MVA and Unit 4 at 44 MVA. While Units 1, 2, and 4 are directly connected to TID's system and Unit 3 to the MID system, the switchyard has been configured to allow interconnection across the systems when needed. This system, when operating in an interconnected fashion, acts as a pathway for electricity flows across the two systems, providing system benefits to both districts. Recognizing this pathway, the Districts on May 4, 2010 filed a request with FERC to amend the Don Pedro license to remove certain transmission lines from their license. FERC granted the amendment on November 11, 2010 (133 FERC ¶62,136).

2.9 Gasburg Creek Dike

The spillway structures for Don Pedro Dam discharge into Twin Gulch, a small intermittent drainage which discharges back into the Tuolumne River. To prevent spillway discharges into Twin Gulch from entering the adjacent Gasburg Creek drainage, the Districts constructed the Gasburg Creek Dike. The dike is located in a low saddle that separates Twin Gulch drainage from Gasburg Creek drainage, approximately midway down the Twin Gulch waterway. The 75-foot-high Gasburg Creek Dike consists of an earth and rock fill dam with an impervious core. The dike is equipped with a slide-gate controlled 18-in diameter outlet conduit. The top of Gasburg Creek Dike is at elevation 725 ft.

2.10 Dikes A, B, and C

There are three small reservoir rim embankments along the reservoir, Dikes A, B, and C. These embankments are constructed in low saddles on the reservoir rim with top elevations of 855 ft. Dike A is located between the main dam and the spillway. Dikes B and C are located east of the main dam.

2.11 Station Service

Station service power is provided by primary and secondary station service power transformers. The primary unit is a 69kV/12kV step-down transformer that feeds a 12kV line. The 12kV line feeds three secondary 12kV/480kV step-down transformers. The first two secondary transformers service the spillway motor control centers. The third services the powerhouse. There is a 45 kVA diesel generator that serves as an emergency backup for station service power. There is also a portable propane power unit that can power the gate hoists for the radial gates in an emergency.

3.0 EXISTING AND PROPOSED RECREATION FACILITIES

The Project has three developed recreation areas, and primitive and semi-primitive lakeshore camping occurs on limited sections of the rest of the shoreline (Figure 3.0-1). The Project provides both floating and shoreline restrooms in addition to those at the developed recreation areas. Facilities also include hazard marking, regulatory buoy lines, and other open water-based features including houseboat marinas and a marked water ski slalom course. The recreation facilities included at the Project are operated by the Don Pedro Recreation Agency (DPRA). The DPRA, which is operationally a department within TID, is sponsored and governed by agreement between the Districts and CCSF. Table 3.0-1 lists the facilities.

Table 3.0-1. Summary of recreation facilities and other on-site amenities at Don Pedro Project's developed recreation areas.[1]

Amenities	Moccasin Point Recreation Area	Blue Oaks Recreation Area	Fleming Meadows Recreation Area
Don Pedro Project Recreation Facilities			
Camping Units - Total	96	195	267
With Water and Electric Hookups	18	34	90
Vehicle Parking Spaces with Striped Spaces	256	185	943
ADA Vehicle Parking Spaces	5	3	23
Square Yards of Parking Area without Marked Spaces	513	7,500	52,986
Picnic Areas - Total	2	1	2
Group Picnic Sites	1	1	1
Boat Launch Ramp	1	1	1
Fish Cleaning Stations	1	1	1
Toilet Buildings	8	11	14
Toilet Buildings with Hot Showers	3	5	5
Concession Store	Yes	No	Yes
Swimming Lagoon	No	No	Yes
Marina	Yes	No	Yes
Amphitheatre	No	No	Yes
Houseboat Mooring	Yes	No	Yes
Boat Rentals	Yes	No	Yes
Houseboat Rentals	Yes	No	Yes
Boat Repair Yard	No	Yes	No
Gas and Oil	Yes	No	Yes
Sewage Dump Station	Yes	Yes	Yes

[1] Adapted from RR- 01 Study Report (TID/MID 2013).

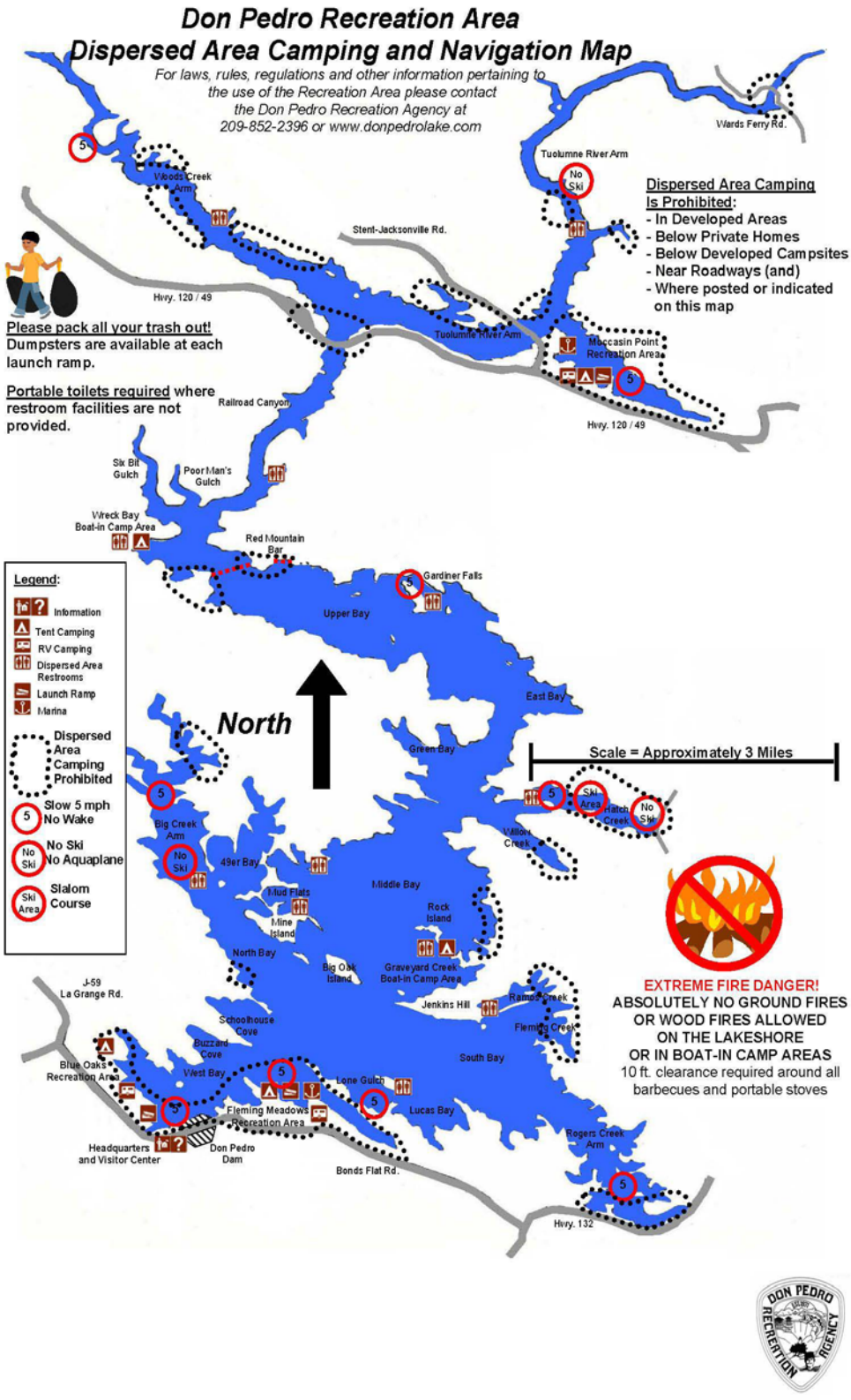

Figure 3.0-1. Location of Don Pedro Project developed recreation facilities.

3.1 Existing Recreation Facilities

3.1.1 Fleming Meadows Recreation Area

Fleming Meadows Recreation Area is the largest of the Project's developed recreation areas, and lies just east of the main dam at the southwestern portion of the Don Pedro Reservoir referred to as West Bay. The recreation area includes the following facilities and amenities:

- 267 campsites,
- 90 full hookup campsites,
- one boat launch facility,
- individual and group picnic areas,
- concessionaire facilities (one houseboat dock, one full-service marina, camp store, snack shack),
- swimming lagoon and picnic area, and
- restrooms and showers.

3.1.2 Blue Oaks Recreation Area

The Blue Oaks Recreation Area is located west of the main dam also in the West Bay area. Recreation amenities include:

- 34 partial hookup campsites,
- 195 tent campsites,
- one boat launch facility, and
- houseboat repair yard.

3.1.3 Moccasin Point Recreation Area

The Moccasin Point Recreation Area is situated near the upstream end of the reservoir on the southeast trending Moccasin Arm of the reservoir. This recreation area's facilities and amenities include:

- 18 full hookup campsites,
- 96 tent campsites,
- two picnic areas,
- one boat launch ramp, and
- one concessionaire facility and full-service marina.

The Moccasin Point hiking trails provide additional recreation opportunities.

3.1.4 Boat-in and Dispersed Recreation Areas

In addition to the three developed recreation areas, DPRA operates and maintains one remote, boat-in camping area (Wreck Bay), which consists of six campsites each with a picnic table. DPRA also operates and maintains 15 developed toilet-only facilities, of which 10 are floating toilets and five are dispersed shoreline toilets. The 10 floating toilets are located in the following general locations: Big Creek arm, Gardiner Falls cove, Hatch Creek arm, Middle Bay, Railroad Canyon, Rogers Creek arm, Tuolumne River arm, and Woods Creek arm. Dispersed toilet buildings are located at Graveyard Creek, Lucas Bay, and Mud Flats. The dispersed toilet buildings do not have any roads or parking associated with the facilities.

3.2 Proposed Recreation Facilities

3.2.1 Ward's Ferry Whitewater Boating Take-Out Facility

Portions of the Tuolumne River upstream of the FERC Project Boundary were designated by Congress as a Wild & Scenic River by PL98-425 on September 28, 1984. The 18-mile reach of the Tuolumne River starting at the Lumsden Campground to the Ward's Ferry Bridge is a popular whitewater boating trip. The last 2.4 miles of this trip, from about RM 80.8 to Ward's Ferry Bridge at RM 78.4, are within the FERC Project Boundary. The Ward's Ferry Bridge serves as the exit point for the whitewater trip. On average, approximately 3,000 boaters using commercial rafting companies make this trip annually. Exiting the river at the Ward's Ferry Bridge site is currently a slow, inefficient process for large rafts that raises public safety and road transportation concerns. The Districts were asked to perform a feasibility assessment of potential improvements to the current Ward's Ferry whitewater boating take-out. The feasibility study indicated that improvements to public safety and river-egress efficiency were achievable by building an access road along river-right from the Ward's Ferry Bridge extending upstream for approximately 1,000 feet.

As a provider and supporter of recreation opportunities associated with the Don Pedro Project, the Districts are proposing to work in partnership with the BLM, USFS, and the boating community to improve river-egress facilities at Ward's Ferry. For its part the Districts would construct the river-right access road and turn-around, essentially a boat-landing and path of egress, to improve efficiency and safety. The capital cost of this take-out improvement is estimated to be approximately $1.1 million in 2014 dollars. The Districts would recoup this cost through a fee of $10/boater collected by the commercial rafters and reimbursed annually to the Districts. With a fee of $10/boater, it will take the Districts over 35 years to recover its cost, not including the cost of financing. As part of this multi-agency partnership, the Districts propose that maintenance of the river-right access road and take-out would be the responsibility of the two federal agencies, USFS and BLM. Preliminary drawings of the proposed take-out are provided as Figures 3.2-1 through 3.2-4 of this exhibit.

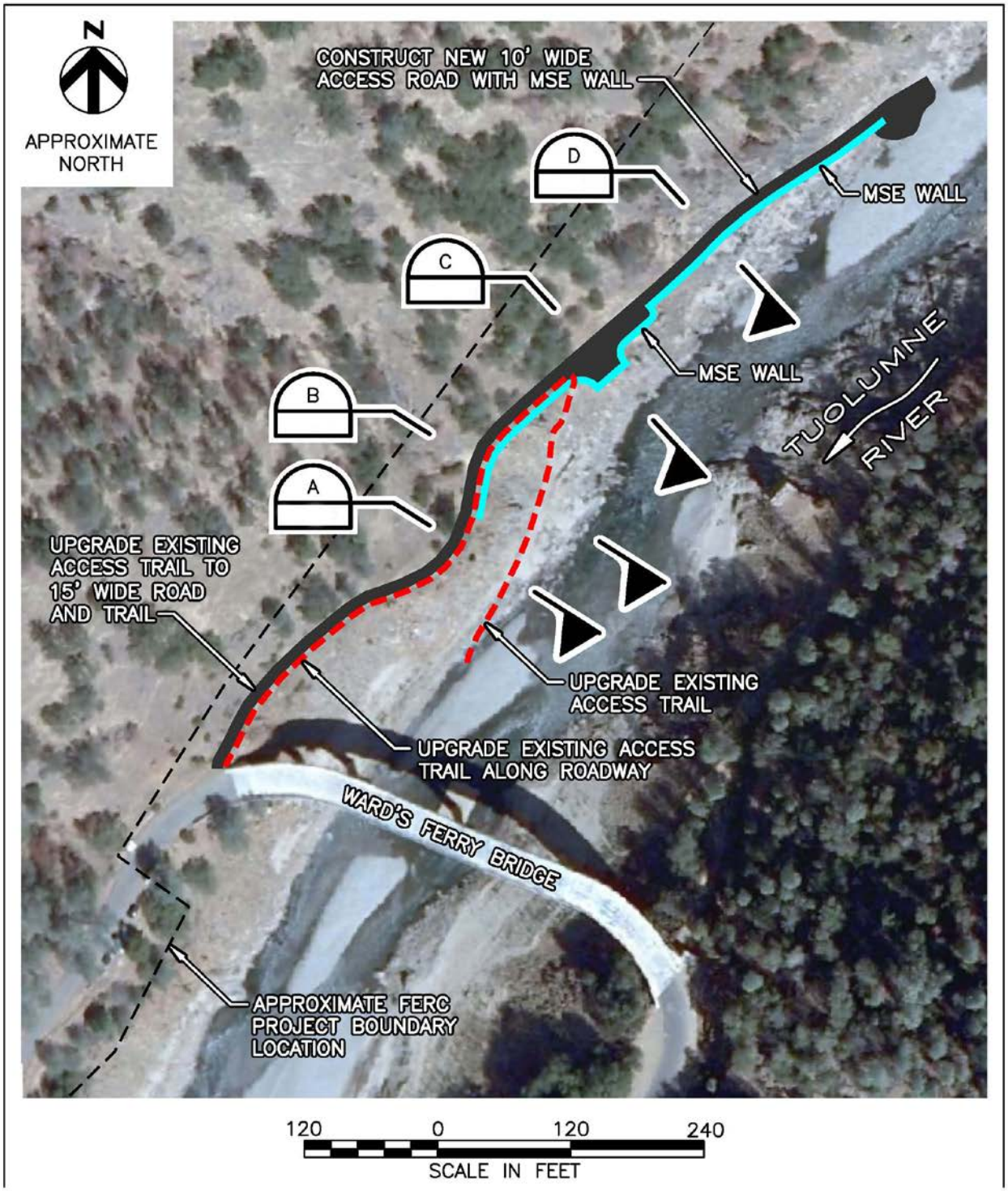

Figure 3.2-1. Ward's Ferry bridge whitewater boating take-out improvements – plan view.

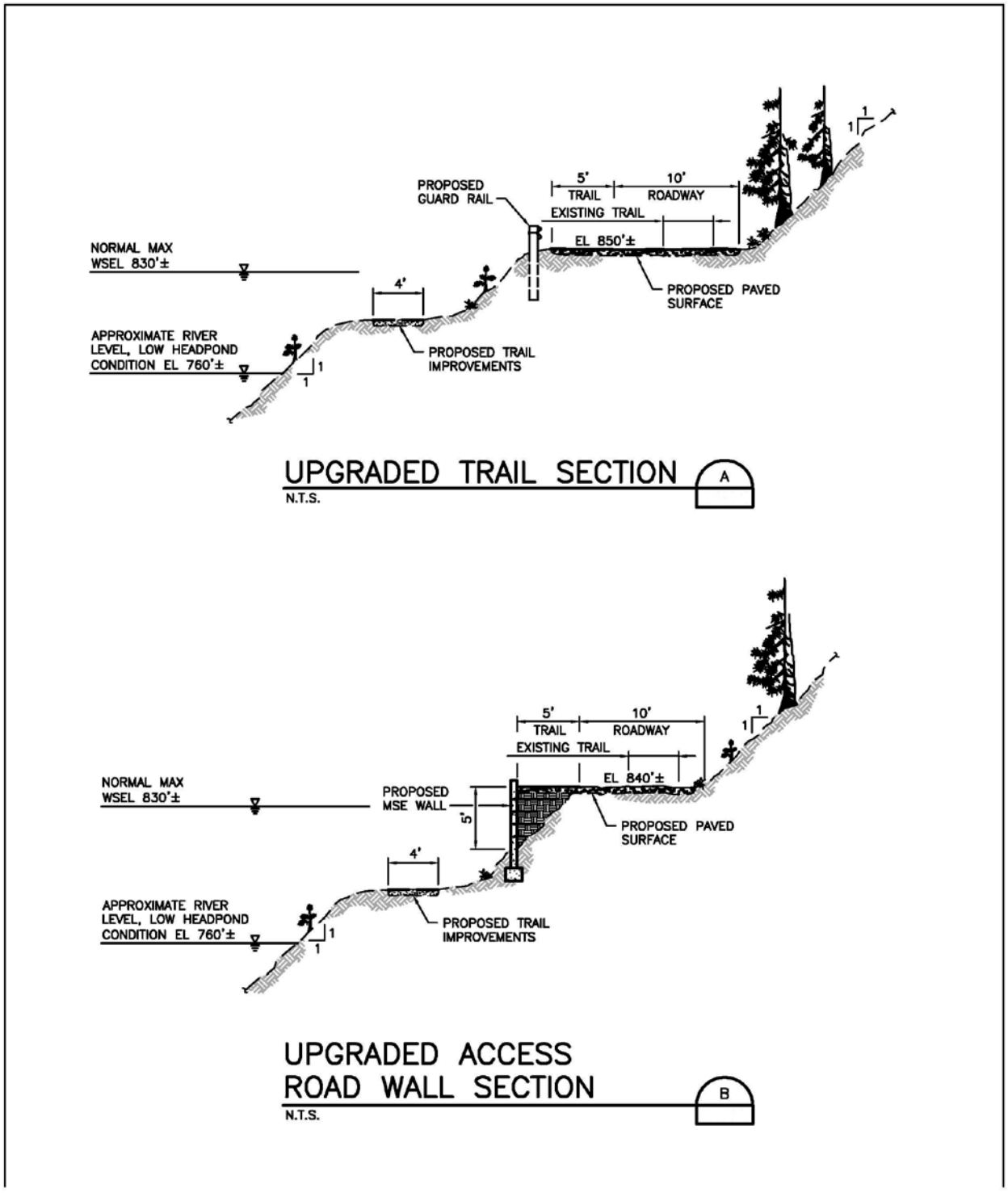

Figure 3.2-2. Ward's Ferry bridge whitewater boating take-out improvements -- sections.

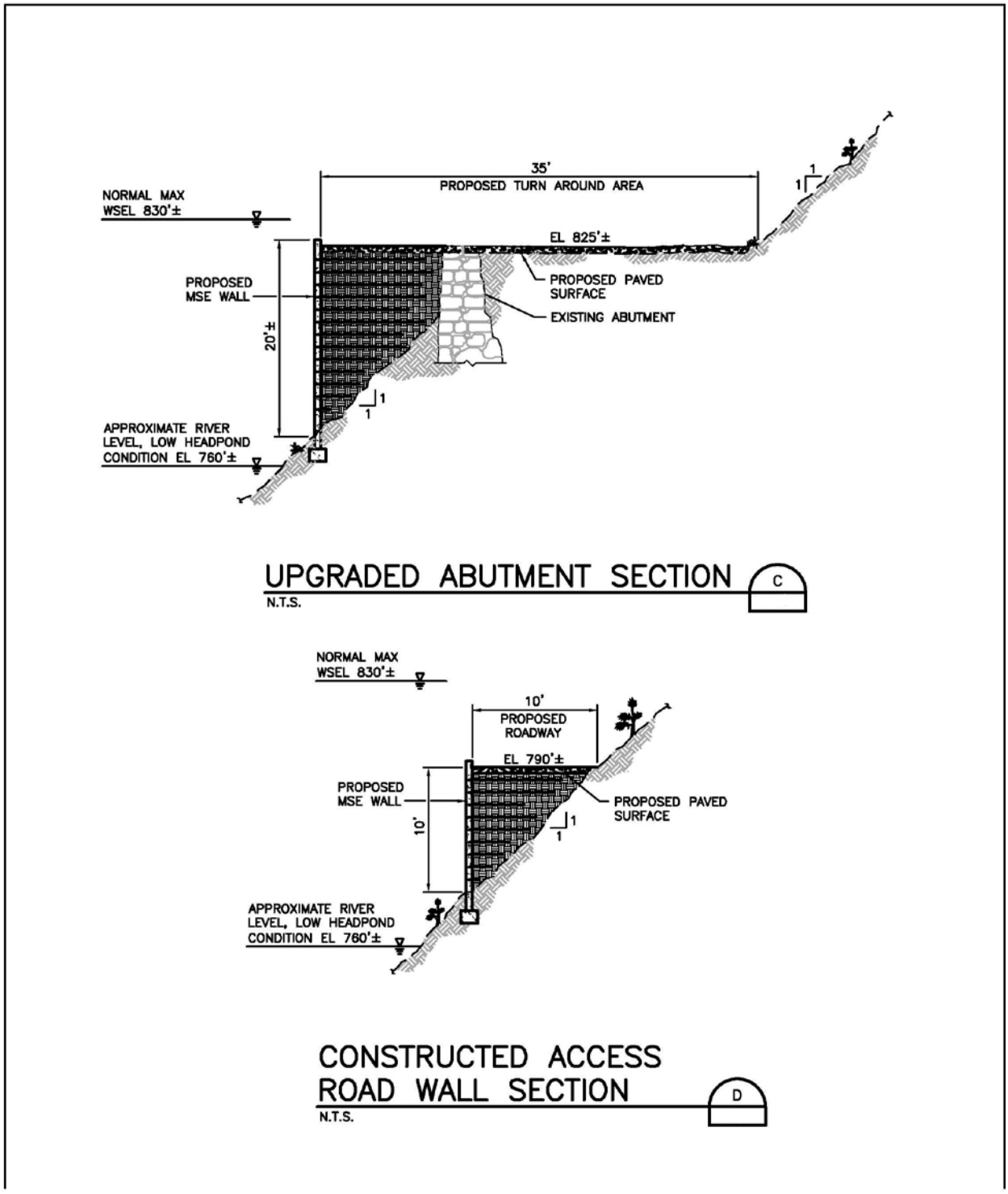

Figure 3.2-3. Ward's Ferry bridge whitewater boating take-out improvements -- sections.

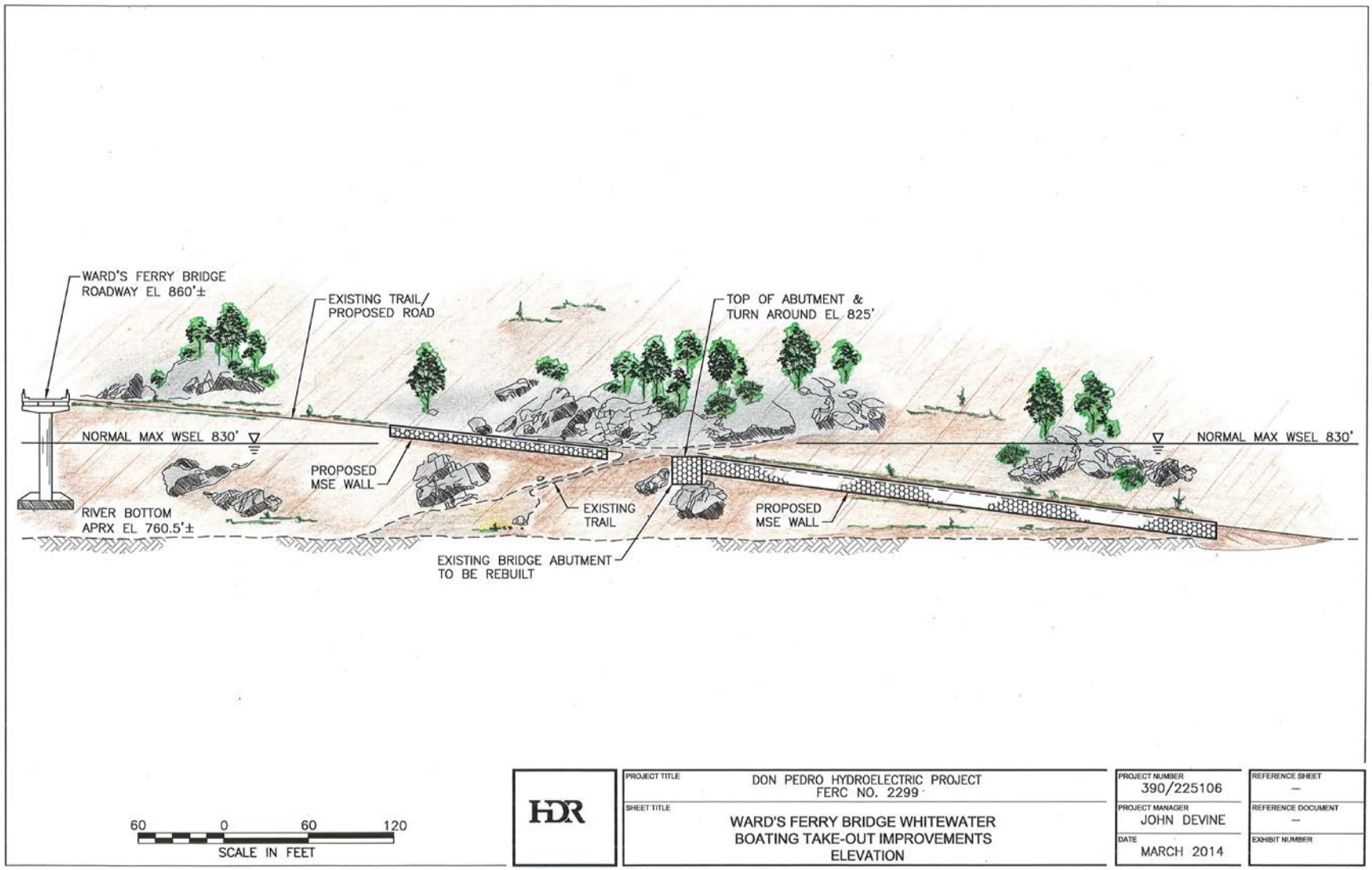

Figure 3.2-4. Ward's Ferry bridge whitewater boating take-out improvements – elevation view.

4.0 DESCRIPTION OF LANDS WITHIN THE PROJECT BOUNDARY

The existing FERC Project Boundary consists of lands necessary for the safe operation and maintenance of the Don Pedro Project and other purposes, such as recreation, shoreline control, and protection of environmental resources. The Tuolumne River watershed covers approximately 1,960 mi^2 upstream of its confluence with the San Joaquin River in the Central Valley of California and approximately 1,533 mi^2 at the Don Pedro Dam. The upper watershed is sparsely populated and is dominated by Yosemite National Park and Stanislaus National Forest lands.

Of the approximately 18,370 acres of land within the Project Boundary, 13,568 acres are owned jointly by the Districts, and the remaining 4,802 acres are federal lands located within the BLM Sierra Resource Management Area. Much of the 4,802 acres of federal lands are located below the normal maximum water surface elevation (830 ft) of Don Pedro Reservoir. Federal lands within the Project Boundary are designated as withdrawn lands for power purposes (BLM 2008) and are managed by the Districts as authorized under the FERC license.

As noted above, the existing recreation facilities are operated by the DPRA. DPRA is responsible for managing the use of all lands within the Project Boundary. The Districts maintain, and DPRA implements, a detailed and extensive land use policy consisting of rules and regulations governing uses of the lands and waters within the Project Boundary. The land use rules and regulations prohibit the construction or installation of any land improvements or water access along the Don Pedro shoreline and prohibit motorized off-road vehicle use within the Project Boundary. The end result of the Districts' land use policies is that well over 90 percent of the Don Pedro shoreline is maintained in its natural state. This benefits both wildlife and botanical resources.

As mentioned in Section 3 of this exhibit, Congress designated portions of the upper Tuolumne River as Wild & Scenic by PL98-425 on September 28, 1984. In May 1988, the USFS issued the Tuolumne Wild and Scenic River Management Plan (USFS 1988). Among other things, in Chapter 8 of that plan, the USFS identified what it considered to be the river corridor for the wild and scenic reach Congress had designated. The management plan generally identified the corridor as encompassing lands within one-quarter mile of the wild and scenic river. Chapter 8 also identifies specific parcels of land that were considered to be within the corridor and provided five maps showing the corridor boundary. The lands within the Tuolumne Wild and Scenic Management Plan (USFS 1988) overlap the 1966 licensed FERC Project Boundary. Specifically, the USFS identifies in the management plan that the lands and waters of T1N R16E,Section 31: S1/2N1/2, N1/2S1/2 are classified as "wild". However, a portion of the area designated as "wild" are Project lands. The more proper designation of the wild and scenic corridor in this area would be: Section 31: SE1/4N1/2, NE1/4S1/2.

Congress was clear in PL98-425 that prior authorized uses were not to be affected in any way by the wild and scenic designation. In relevant part, PL98-425 states: *"Nothing in this section is intended or shall be construed to affect any rights, obligations, privileges, or benefits granted under any prior authority of law including chapter 4 of December 19, 1913, commonly referred*

to as the Raker Act and including any agreement or administrative ruling entered into or made effective ***before the enactment of this paragraph****."* (emphasis added).

5.0 LITERATURE CITED

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