DON PEDRO PROJECT
FERC NO. 2299

PRE-APPLICATION DOCUMENT

VOLUME I OF II



WATER & POWER
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Modesto Irrigation District

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ACRONYM LIST

ACEC.........................Area of Critical Environmental Concern
ac-ft ....Acre-feet
ACOE.........................U.S. Army Corps of Engineers
ADA...........................Americans with Disabilities Act
ALJ.............................Administrative Law Judge
APE............................Area of Potential Effect
BA ....Biological Assessment
BDCP ....Bay-Delta Conservation Plan
BLM...........................Bureau of Land Management
BLM-S ....Bureau of Land Management - Sensitive Specie
BMI............................Benthic macroinvertebrates
BMP ....Best Management Practices
BO..............................Biological Opinion
BOR ....Bureau of Reclamation
CalEPPC ....California Exotic Pest Plant Council
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
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
CDMG........................California Division of Mines and Geology
CDOF.........................California Department of Finance
CDSOD......................California Division of Safety of Dams
CDPH.........................California Department of Public Health
CDPR ....California Department of Parks and Recreation
CDWR........................California Department of Water Resources
CE ....California endangered specie
CEII............................Critical Energy Infrastructure Information

CESA ....California Endangered Species Act
CEQA..........................California Environmental Quality Act
CGS............................California Geological Survey
cfs...............................Cubic feet per second
CMAP ....California Monitoring and Assessment Program
CMARP......................Comprehensive Monitoring, Assessment, and Research Program
CMC...........................Criterion Maximum Concentrations
CNDDB......................California Natural Diversity Database
CNPS..........................California Native Plant Society
CORP ....California Outdoor Recreation Plan
CRLF..........................California red-legged frog
CRRF ....California Rivers Restoration Fund
CSAS..........................Central Sierra Audubon Society
CSBP..........................California Stream Bioassessment Procedure
CT ....California threatened specie
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
DLA ....Draft License Application
DPRA.........................Don Pedro Recreation Agency
DPS ....Distinct Population Segment
DTA ....Devine Tarbell & Associates, Inc.
EA ....Environmental Assessment
EC ....Electrical conductivity
EES ....EES Consulting, Inc.
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
FC...............................Federal candidate for listing under ESA
FE...............................Federally listed endangered specie under ESA
FERC..........................Federal Energy Regulatory Commission
FFS.............................Foothills Fault System
FL...............................Fork length
FLA............................Final License Application
FMU...........................Fire Management Unit
FOT............................Friends of the Tuolumne
FPC ....Federal Power Commission
FPD ....Federally proposed for delisting under ESA
FPE.............................Federally proposed for listing as endangered under ESA
FPT.............................Federally proposed for listing as threatened under ESA
FT...............................Federally-listed threatened specie under ESA
ft/mi...........................Feet per mile
FWCA........................Fish and Wildlife Coordination Act
FYLF..........................Foothill yellow-legged frog
GIS ....Geographic Information System
GLO ....General Land Office
GORP.........................Great Outdoor Recreation Plan
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
kW..............................Kilowatt
MCL...........................Maximum contaminant level
m ....Meters
M&I...........................municipal and industrial

MSCS.........................Multi-species Conservation Strategy
MID............................Modesto Irrigation District
mgd ....Million gallons per day
mg/kg ....Milligrams/kilogram
mg/L...........................Milligrams per liter
MOU ....Memorandum of Understanding
msl..............................Mean sea level
MVA ....Megavolt ampere
MVZ...........................Museum of Vertebrate Zoology
MW ....Megawatt
MWh ....Megawatt hour
mya.............................Million years ago
NAE ....National Academy of Engineering
NAHC ....Native American Heritage Commission
NAS............................National Academy of Sciences
NAWQA ....National Water Quality Assessment
NCCP ....Natural Community Conservation Plan
NEPA ....National Environmental Policy Act
ng/g ....Nanograms per gram
NGO...........................Non-governmental organization
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 ....National Park Service
NRCS ....National Resource Conservation Service
NRI.............................Nationwide Rivers Inventory
NTU ....Nephelometric turbidity unit
NWIS ....National Water Information System
NWI............................National Wetland Inventory
NWR ....National Wildlife Refuge

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 Accelerations
PHG............................Public Health Goal
PMF............................Probable Maximum Flood
POAOR......................Public Opinions and Attitudes in Outdoor Recreation
ppb..............................Parts per billion
ppm ....Parts per million
PSP.............................Proposed Study Plan
PTL ....Progress Tracking List
RA ....Recreation area
RBP ....Rapid Bioassessment Protocol
RM ....River Mile
RMP ....Resource Management Plan
RSP ....Revised Study Plan
RST ....Rotary screw trap
RTM...........................Real-Time Monitoring
RWQCB.....................Regional Water Quality Control Board
RWQCP ....Regional Water Quality Control Plan
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-listed endangered specie under CESA
SFP.............................State fully protected specie under CESA
SFPUC ....San Francisco Public Utilities Commission
SHPO ....State Historic Preservation Office

SJRA ....San Joaquin River Agreement

SJRGA ....San Joaquin River Group Authority

SNTEMP....................Stream network temperature

SR..............................California rare specie

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 specie of special concern

ST...............................California threatened specie

STORET ....Storage and Retrieval

SWAMP.....................Surface Water Ambient Monitoring Program

SWE ....SnowWater equivalent

SWRCB......................State Water Resources Control Board

TAC............................Technical Advisory Committee

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

μS/cm ....MicroSeimens per centimeter

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

USDOC ......................U.S. Department of Commerce

USDOI .......................U.S. Department of Interior

USFWS ......................U.S. Fish and Wildlife Service

USFS ..........................U.S. Forest Service

USR............................Updated Study Report

USGS .........................U.S. Geological Survey

VAMP ....Vernalis Adaptive Management Plan

VRM ....Visual Resource Management

VELB..........................Valley elderberry longhorn beetle
WPT............................Western pond turtle
WSA............................Wilderness Study Area
WSIP...........................Water System Improvement Program
WWTP ....Wastewater treatment plant
WY..............................Water year

FOREWORD

The current Federal Energy Regulatory Commission (FERC) license for the Don Pedro Project (Project) on the Tuolumne River in California expires on April 30, 2016. Federal law requires that a new license be obtained to continue the use of the Don Pedro powerhouse after that date. The Turlock Irrigation District (TID) and the Modesto Irrigation District (MID) (collectively, the Districts), the co-licensees of the Project, are declaring their intent to apply for a new Project license by filing with FERC the accompanying Notice of Intent (NOI) along with a Pre-Application Document (PAD). The Districts must subsequently file an application for a new license no later than April 30, 2014. The filing of the NOI and PAD formally begins the multi-year relicensing process. The NOI and PAD are also being made available to the public on the Districts' relicensing website www.donpedro-relicensing.com.

The multi-year relicensing process entails working closely and continuously with various parties who share an interest in the Project and the Tuolumne River. There will be different opinions as how to best meet the demands placed upon this resource and how the Project should be managed. The Districts desire to promote an environment which will encourage relicensing participants to work together to collectively develop solutions to these diverse and potentially conflicting interests in such a manner that the needs and concerns of all parties are factored into the final outcome.

The Project

The Don Pedro Project, situated at river mile (RM) 54.8 on the Tuolumne River, was completed in 1971. It consists of a 580-foot-high dam which creates a 2,030,000 acre-foot (ac-ft) reservoir covering approximately 13,000 acres in southwest Tuolumne County. A powerhouse with a generating capacity of 168 megawatts (MW) sits at the base of the dam. The dam and reservoir replaced the former, and much smaller, Don Pedro Dam located about 1.5 miles upstream. The City and County of San Francisco (CCSF), which operates hydro and water supply projects further upstream in the Tuolumne River watershed, contributed financially to the construction of the Project in order to be relieved of its flood control obligations and obtain a water banking privilege in the new reservoir. The banking arrangement allows CCSF to pre-release flows from its upstream facilities into the Don Pedro Reservoir so that at other times it can hold back an equivalent amount of water that otherwise would have had to be released to satisfy the Districts' senior water rights. Both the elimination of the flood control responsibility and the creation of the water bank provide CCSF with greater flexibility in its upstream water and power operations. The U.S. Army Corps of Engineers (ACOE) also contributed to the construction of the Project in order to create 340,000 ac-ft of seasonal flood control space.

The Don Pedro Reservoir, at its normal maximum elevation of 830 feet, contains 2,030,000 ac-ft of storage, approximately 1,720,000 ac-ft of which is usable storage. The long-term average annual natural runoff of the Tuolumne River at Don Pedro Dam is approximately 1.9 million ac-ft. The actual mean annual runoff, or flow into the reservoir, for the period 1975 to 2009, was 1.6 million ac-ft with the bulk of the difference being the out-of-basin diversions by CCSF for its municipal and industrial (M&I) water customers. However, the annual runoff of the Tuolumne River is subject to considerable variability. For example, during that same time period, the annual unimpaired runoff of the Tuolumne River has varied from 0.47 million ac-ft (1977) to 4.8 million ac-ft (1983). The current demand for Tuolumne River water during normal years is roughly 1.5 million ac-ft, divided among the Districts' needs for irrigation and M&I water (0.9 million ac-ft), CCSF's needs for M&I water (0.25 million ac-ft), and flows for anadromous fish in the lower Tuolumne (0.3 million ac-ft). Don Pedro storage provides protection against water shortages in individual and successive dry years such as occurred during the drought periods of 1976-1977 and 1987-1992. The Don Pedro Reservoir also plays an important role in flood control on the Tuolumne and San Joaquin rivers. Therefore, the water storage provided by Don Pedro is critical to meeting a number of uses. Satisfying the full range of water needs and uses over the short and long term, while dealing with the real time variations in hydrologic conditions, requires close attention by the Project operators. The Districts have consistently demonstrated their ability to successfully operate and maintain the Project.

The Districts

Both TID and MID were organized in 1887 to deliver Tuolumne River irrigation water to their respective service areas. The Districts agreed to share the Tuolumne River water based on the acreages in their service areas. Therefore, TID owns 68.46 percent and MID owns 31.54 percent of the Project. The Districts are authorized under California law to provide water supply and retail electric service. Over 200,000 acres of highly productive farmland are dependent upon the surface water provided by the Districts. The Districts also provide electric service to over 200,000 customers and treated drinking water that serves over 200,000 people.

The Tuolumne River watershed covers approximately 1,960 square miles upstream of its confluence with the San Joaquin River in the Central Valley of California and approximately 1,533 square miles at the Don Pedro Dam. The upper watershed is sparsely populated and is dominated by Yosemite National Park and Stanislaus National Forest lands. The precipitation patterns of the watershed vary considerably, with the uppermost reaches receiving in excess of 60 inches in the form of snow and rain annually and the lowermost less than 12 inches of rain. Along the lower Tuolumne River (RM 0 to 54) the total summertime precipitation is less than one inch. During the long hot summers, daily high temperatures occasionally exceed 100°F.

Historical Context

In the mid-1800s, the Tuolumne River area saw considerable gold mining, mainly placer-based along the lower Tuolumne. Extensive gold and aggregate mining occurred directly within the main river channel through the mid-1900s, and floodplain aggregate mining continues today. Controversy is not new to the Tuolumne River as it was the site of conflicts in the early days between the CCSF and those who wanted to preserve Hetch Hetchy Valley and between the Districts and CCSF over the CCSF's entrance into the watershed. Over time, the Districts and CCSF entered into a series of agreements to mutually conserve and develop the waters of the Tuolumne River which ultimately included the construction of the present Don Pedro Dam and Reservoir.

State and federal resource agencies along with environmental groups raised concerns over the conditions for anadromous fish in the lower Tuolumne River during the original licensing of the Project. A number of those concerns have remained controversial throughout the ensuing years. The main issue today revolves around the protection and enhancement of the anadromous fish species that utilize the lower Tuolumne River. These species are cyclic, but during the past several years these fish populations, like those on many rivers in the San Joaquin and

Sacramento river basins, have been in decline. The Districts recognize and take seriously their obligation to protect the anadromous fish populations that use the lower Tuolumne River below the Districts' La Grange Dam, a non-project dam built in 1893, located 2.3 miles downstream of Don Pedro Dam. At the same time, the Districts also recognize their responsibility to the communities that depend upon the Don Pedro Project for vital and reliable M&I, irrigation, and electrical services.

The Districts and CCSF continue to work closely with all parties that have an interest in the lower Tuolumne River and its fish. The fish, the flows, and the environmental conditions of the Tuolumne River have been researched and investigated continuously since the Don Pedro Project commenced operations 40 years ago. In fact, the lower Tuolumne River has probably been one of the most studied rivers in the nation. No less than 200 individual environmental studies have been completed with additional monitoring and studies in progress. The results of the first 20 years of studies (1972-1991) provided the background for a settlement agreement reached in 1995 between the Districts, CCSF, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), and four environmental groups. That agreement lead to greater downstream flows which were incorporated into the FERC license the following year (1996). It also formalized the role of the Tuolumne River Technical Advisory Committee.

Following the 1995 Settlement Agreement, the Districts began a new series of resource monitoring, in-river habitat improvements, and evaluation studies that continue today. Over 150 of the 200 separate resource evaluations have been performed since 1996. This constant research and study over the past 40 years provides a depth of data that is not normally found in the relicensing of other projects. The information available on the Don Pedro Project will be a valuable resource in the relicensing process.

Project Operations

Delivery of Project benefits—irrigation water, M&I water, water for the protection of aquatic life, recreation, production of renewable energy, and flood protection—requires careful and skillful management. Project operation involves the continuous assessment of known and unknown variables, hydrologic risk assessment, coordination with other water systems, balancing of demands with resources, and professional judgment. Future hydrologic conditions are largely unknown. Droughts and floods remain largely unpredictable. Future water demand is anticipated to increase and will require even more precise water management and complex operations. Fortunately, the tools available to support decision-making have improved since the original license was granted. Not only has there been the accumulation of more data, but technological advances have made information more readily available and sophisticated operating systems have allowed real-time monitoring and provided greater precision in Project operations.

Path Forward

The FERC relicensing of a major hydroelectric project, such as the Don Pedro Project, is a complex undertaking, and the outcomes set the stage for the future management and use of the water and power resources. The next three years will be devoted to working with all relicensing participants to develop a plan for the future operations of the Don Pedro Project. While three years may seem at first to be quite a long time, the FERC relicensing process is intense and task driven. While this is valuable from a process management perspective, the "big picture" can get lost as parties become entrained in individual issues. The "big picture" from the Districts' perspective is maintaining the intended purposes of the Project, while at the same time protecting the resources of the lower Tuolumne River.

We encourage relicensing participants to not lose sight of the over-arching task of developing a plan for future Project operations by making full use of the extensive information already available. The Districts are committed to finding workable solutions, and hope that relicensing participants will develop comprehensive approaches that address all the needs for the resources of the Tuolumne River.

The PAD

Filing the NOI and PAD formally begins the relicensing process. The Districts will be following the FERC's Integrated Licensing Process (ILP), supplemented by whatever effort it takes to find workable solutions to issues. To this end, the PAD is a fact-based catalogue of the extensive amount of literature, data, research, and studies that already exist on the Tuolumne River and the Project. Section 1.0 of the PAD provides a brief description of the contents of each section of the PAD. The PAD does not recommend any technical options or offer any conclusions about future Project operations. However, to advance the relicensing process, and as encouraged by the ILP regulations, the Districts have developed a preliminary assessment of resource concerns and Project effects on these resources. An initial set of proposed study plans can be found in Section 6.0.

Next Steps

A detailed schedule for the ILP may be found in Section 2.0 of the PAD and information about the ILP is available on the FERC website, www.ferc.gov. For more information on the Don Pedro Project, please refer to www.donpedro-relicensing.com.

1.0 INTRODUCTION

Under separate cover, the Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts), co-licensees of the Don Pedro Project (Project) (FERC No. 2299), has filed with the Federal Energy Regulatory Commission (FERC) a Notice of Intent (NOI) to seek a new license for their Project. The initial license for the Don Pedro Project was issued to the Districts by the Federal Power Commission (FPC), FERC's predecessor, with an effective date of May 1, 1966 for a term ending April 30, 2016. Ownership of the Project is shared by the Districts: 31.54 percent MID, 68.46 percent TID.

The Project is located in Tuolumne County, California, on the Tuolumne River. Approximately 78 percent of the 18,370 acres within the FERC Project Boundary[1] is located on private land owned by the Districts. The remaining lands, about 4,040 acres, are federal lands located within the Bureau of Land Management (BLM) Sierra Resource Management Area. All lands within the Project Boundary are managed by the Districts in accordance with the terms of the FERC license.

1.1 Background Information

The existing Don Pedro Project began commercial operation in 1971 and replaced and expanded the old Don Pedro Project, a much smaller water supply and power generation project which was constructed in 1923. The Project provides water storage for irrigation and municipal use, flood control, recreation, fish and wildlife, and power generation. The water storage provided by the Project plays an essential role in the economic livelihood of the Central Valley area served by TID and MID.

TID and MID are both public agencies with headquarters located in Turlock and Modesto, California, respectively. Both Districts are organized under the laws of the State of California to provide water and retail electric services. The Districts provide irrigation water to approximately 210,000 acres of Central Valley farmland, while also providing retail electric service to approximately 211,000 households and businesses (TID 2010; MID 2010) and treated water to the community of La Grange.

TID was established in June 1887 and was California's first publicly-owned irrigation district. TID provides irrigation water to 150,000 acres of land and serves approximately 100,000 electric customers in a 662-square-mile electric service area (TID 2010). MID was established in July 1887. MID provides irrigation water to almost 60,000 acres of land and serves approximately 111,000 electric customers in a 560-square-mile electric service area (MID 2010). MID also supplies treated water to the City of Modesto (population: 210,000).

The Districts jointly own, and TID operates, the four-unit, 168 megawatt (MW) Don Pedro power plant located at the Project. The original powerhouse was constructed with three 45.5 MW units; a fourth, slightly smaller 31.5 MW unit was added in 1989 (FERC 1995). One of the three original units is directly connected to MID's transmission system (MID 2010) and

[1] The FERC Project Boundary encompasses all Project facilities and features as well as all land needed for the operation and maintenance of the Project. The Project Boundary is shown in Exhibits J and K, Project Maps, of the existing FERC license for the Project, and in Appendix C of this PAD.

the other three units are connected to TID's transmission system. However, the Project switchyard is designed to permit flexibility in how the units are interconnected to the two transmission systems.

Don Pedro Dam is located at RM 54.8 on the Tuolumne River and the Project Boundary extends to roughly RM 79. The Don Pedro powerhouse and its electrical switchyard are located immediately downstream of the dam. The Don Pedro Reservoir is approximately 24 miles long at its normal maximum water level of 830 feet. The drainage area of the Tuolumne River at Don Pedro Dam encompasses approximately 1,533 square miles.

The Project includes the Don Pedro Reservoir with a gross storage capacity of 2,030,000 acre-feet (ac-ft), the Don Pedro Dam and its spillway, the Don Pedro powerhouse with an authorized capacity of 168 MW (FERC 1995), and the switchyard associated with the powerhouse. The Project also includes three developed recreation facilities: Fleming Meadows Recreation Area located just southeast of the main dam, Blue Oaks Recreation Area located just north of the emergency spillway portion of the dam, and Moccasin Point Recreation Area located near the upper end of the reservoir on the southwest side of what is called the Moccasin Arm of Don Pedro Reservoir.

In contrast to most FERC-licensed projects constructed in the '50s and '60s, the Don Pedro Project and its potential environmental effects have undergone continuous study and evaluation since its initial license was issued. The Districts, in cooperation with state and federal resource agencies and environmental groups, have conducted over 200 individual resource investigations since the Project began commercial operation in 1971. The first 20 years of study led in 1995 to the development of a FERC-mediated Settlement Agreement with resource agencies and non-governmental organizations (NGOs) whereby the Districts agreed to modify their operations to increase the flows released to the lower Tuolumne River for the benefit of fisheries, especially fall-run Chinook salmon.

The Don Pedro Project has also benefited from the involvement of the Tuolumne River Technical Advisory Committee (TAC), the role of which was formalized in the 1995 Settlement Agreement. The TAC is a continuation of the Technical Committee established by the 1986 amended fish study agreement among the Districts, California Department of Fish and Game (CDFG), and U.S. Fish and Wildlife (USFWS). Since the early 1990s to the present time, the TAC has been actively engaged in developing, reviewing, and participating in activities to improve and protect the fisheries of the lower Tuolumne River downstream of the Don Pedro Project. In addition to the Districts, the TAC consists of state and federal resource agencies, City and County of San Francisco (CCSF), and NGOs. In March 2005, the Districts submitted to FERC and interested parties a report containing the results of all the fisheries and resource evaluations conducted from 1995 to 2004 (Ten Year Summary Report). Annual studies and reports have been completed and filed since 2005. Most recently, in March 2010, the Districts filed with FERC and shared with the TAC eight additional monitoring studies conducted in 2009. This up-to-date record created by continuous environmental investigation and resource monitoring will be of tremendous benefit to all relicensing participants.

Another unique and important aspect of the Don Pedro Project is the role it plays in supporting the CCSF's water supply to over two million Bay Area customers. CCSF obtains over 85 percent of its water supply for the Bay Area from its Hetch Hetchy Water and Power System located on the Tuolumne River upstream of the Don Pedro Project. Under agreement with the Districts, and in return for CCSF financing a portion of the cost to build the new Don Pedro Project, CCSF, obtained the ability to "pre-release" water from its upstream facilities into a "water bank" in Don Pedro Reservoir, as further explained in Section 3.0 of this PAD. The cooperative relationship between the Districts and CCSF serves to optimize the water resources of the Tuolumne River to provide water storage for irrigation, municipal and industrial use, flood control, recreation, and fish and wildlife resources. The Districts and CCSF alike have been active and willing partners in efforts to improve and protect the anadromous fisheries in the lower Tuolumne River and they intend to continue this active involvement in the future.

1.2 Relicensing the Don Pedro Project

To prepare an application for a new license, the Districts intend to follow FERC's Integrated Licensing Process (ILP) as established in regulations found at Title 18 of the U.S. Code of Federal Regulations (18 CFR), Part 5. This Pre-Application Document (PAD) is a requirement of the ILP, and constitutes one of the initial activities in relicensing. The PAD is filed with FERC simultaneously with the Districts' Notice of Intent (NOI) to file a new license application. The Districts will distribute this PAD and the NOI to federal and state agencies, local governments, Indian tribes, members of the public, and those interested in the relicensing proceeding, collectively referred to as relicensing participants. The PAD provides FERC and relicensing participants with summaries of existing information related to the Project and the resources of the Tuolumne River. The contents of the PAD are specified in 18 CFR Section § 5.6(c) and (d).

The Districts exercised due diligence in acquiring information to be included in the PAD (see Appendix A to this PAD). The Districts contacted governmental agencies, Indian tribes and others potentially having relevant information; conducted extensive searches of publicly available databases and its own records; and broadly distributed a request for information designed specifically to identify existing, relevant, and available information related to the Project and any potential Project effects on resources.

In September 2010, the Districts conducted public information meetings to seek out additional sources of existing information; to familiarize interested parties with Project facilities, features and operations; and to review the Districts' relicensing plans and the overall relicensing schedule.

The data, studies, and information in this PAD provide FERC and relicensing participants the background information necessary to identify resource issues and related information needs; develop study requests and study plans; and to prepare documents analyzing the Districts' application for a new license (Final License Application [FLA]) which must be filed with FERC before April 30, 2014. The PAD is also a precursor to the environmental analysis section of the Districts' FLA and to FERC's scoping documents and environmental assessment conducted in accordance with the National Environmental Policy Act (NEPA). Filing the PAD concurrently with the NOI enables those that plan to participate in the relicensing to become familiar with the Project at the start of the proceeding.

The Districts have established a publicly accessible Internet website (www.donpedro-relicensing.com) as a means of making Project relicensing information readily available to relicensing participants.

This PAD follows the content requirements of 18 CFR § 5.6(c) and (d), with minor changes in form for enhanced readability. This PAD is organized into two volumes that contain information[2] required by 18 CFR § 5.6(c) and (d) for distribution to relicensing participants. This PAD is organized as follows:

- **Table of Contents** - A listing of each section and subsection, table, figure, map, photo and appendix included in the PAD.
- **Acronym List** - A list of terms, acronyms and abbreviations commonly used in the PAD.
- **Foreword** - An overview of the Districts, the Project, the PAD, and relicensing.
- **Section 1** - This introduction to the PAD.
- **Section 2** - A process plan and schedule for all relicensing activities through filing of the FLA, per 18 CFR § 5.6(d) (1).
- **Section 3** - A description of the existing Project facilities, operations, and ongoing resource management and protection measures (18 CFR § 5.6(d)(3(i)(D)) as well as any proposed new facilities and changes in Project operations, per 18 CFR § 5.6(d)(2).
- **Section 4** - General description of the river basins and subbasins where the Project is located, per 18 CFR § 5.6(d)(3)(xiii).
- **Section 5** - A description of the existing environment by resource area, per 18 CFR § 5.6(d)(3)(i)(A),(B), and (d)(3)(ii)-(xiii). A list of comprehensive plans on file with FERC (Qualifying Plans) and other resource management plans that apply to the Project and this relicensing proceeding, per 18 CFR § 5.18(d)(4)(iii), are identified.
- **Section 6** - A preliminary assessment of Project effects and known or potential environmental and recreation-related impacts, per 18 CFR § 5.6(d)(3)(i)(C) and (4)(i). Section 6 also contains a preliminary description of a number of studies proposed to be undertaken as part of the relicensing proceeding, per 18 CFR § 5.6(d)(4)(ii). These DRAFT study plans are intended to facilitate cooperative development of detailed study plans that will be included in the ILP's required Proposed and Revised Study Plan documents.
- **Section 7** - A list of sources of information cited in the PAD.

This PAD also contains the following appendices:

- APPENDIX A - PRE-PAD/NOI CORRESPONDENCE, COMMUNICATIONS, AND MEETINGS
- APPENDIX B - LIST OF RELICENSING PARTICIPANTS
- APPENDIX C - PROJECT BOUNDARY MAPS
- APPENDIX D - PROJECT DRAWINGS (CEII)
- APPENDIX E - DON PEDRO RECREATION AGENCY RULES AND REGULATIONS

[2] The Districts are not filing with the PAD any privileged or confidential information.

2.0 RELICENSING PROCESS PLAN, SCHEDULE, AND COMMUNICATIONS GUIDELINES

2.1 Description of Turlock Irrigation District and Modesto Irrigation District

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) are public agencies with headquarters located in Turlock and Modesto, California, respectively, organized under the laws of the State of California to provide water and retail electric services to their respective service territories. TID was established in June 1887 and was California's first publicly-owned irrigation district. TID provides irrigation water to 150,000 acres of land and serves approximately 100,000 electric customers in a 662-square-mile electric service area (TID 2010). MID was established in July 1887. MID provides irrigation water to almost 60,000 acres of land and serves approximately 111,000 electric customers in a 560-square-mile electric service area (MID 2010). MID also supplies treated municipal water to the City of Modesto (population 210,000) and the Districts jointly provide treated water to the community of La Grange.

The Don Pedro Project is jointly owned by the Districts, 31.54 percent MID and 68.46 percent TID. The Project provides water storage on the Tuolumne River that is critical to the economic and social welfare of the Central Valley region. In addition to generating renewable hydroelectric power, the Project provides a reliable water supply and water storage for irrigation; for municipal and industrial water users; for recreation use; for fish and wildlife both at and downstream of the Project; and for flood control.

2.2 Districts' Relicensing Goal

TID and MID enter into the Don Pedro Project relicensing proceeding with the expressed goal of obtaining a new license that maintains the Project's economic benefits, while helping to foster the Districts' relationships with the community, resource agencies, and others who have a direct interest in the river resource. The Districts desire to obtain a new license that allows the Project to continue to serve its intended purposes, while protecting and enhancing the environmental resources of the Tuolumne River.

2.3 Process Plan and Schedule

2.3.1 Relicensing Schedule

Federal Energy Regulatory Commission's (FERC) Integrated Licensing Process (ILP) regulations at Title 18 of the U.S. Code of Federal Regulations (18 CFR), Part 5 establish a schedule of activities and milestone dates to which the Districts, FERC, federal and state resource agencies, local governments, Native American tribes, members of the public, and all parties interested in the relicensing are responsible for meeting. Many milestone dates are contingent upon a previous activity (e.g., a party may file comments within 30 days of a FERC notice). However, some dates are fixed and are not dependent on the completion of a previous relicensing activity. These fixed milestones for the Project relicensing process are:

- **April 30, 2011** - This is the latest date the Districts may file their Notice of Intent (NOI) and Pre-Application Document (PAD), being five years prior to the date that the current FERC license expires. FERC regulations provide that when a filing date falls on a weekend or federal holiday, the filing data automatically becomes the next regular business day.
- **November 27, 2013** - The latest date the Districts may file with FERC and relicensing participants a Draft License Application (DLA) is 150 days prior to the filing of their application for a new license, or Final License Application (FLA).
- **April 30, 2014** - This date is two years before the current FERC license expires, and the latest date the Districts may file their FLA with FERC (18 CFR § 5.17).
- **April 30, 2016** - This is the date that the current FERC license for the Don Pedro Project expires.

Table 2.3.1-1 provides the major regulatory milestones and associated deadlines for the Don Pedro relicensing process. The Districts developed the table using the time frames set forth in 18 CFR Part 5, and based the table on an anticipated NOI and PAD filing date of February 10, 2011.

Table 2.3.1-1 Don Pedro Project process plan and schedule for the ILP.

18 CFR §	Lead	Activity	Time Frame	Date
§5.5	TID/MID	File NOI		2/10/2011
§5.6	TID/MID	File PAD		
§5.7	FERC	Initial Tribal Consultation Meeting (if necessary)	Within 30 days of filing PAD/NOI (up to day 30)	3/14/2011
§5.8	FERC	FERC Notices NOI/PAD and Issues Scoping Document 1 (SD1)	Within 60 days of filing PAD/NOI (up to day 60)	4/11/2011
(a)	FERC	FERC Issues Notice of Commencement of Proceeding and SD1	Within 60 days of filing PAD/NOI (up to day 60)	
(b)(2)	FERC	FERC Request to Initiate Informal Section 7 ESA Consultation	Within 60 days of filing PAD/NOI (up to day 60)	
(b)(3)(viii)	FERC/ Relicensing Participants	Public Scoping Meeting and Site Visit	Within 30 days of NOI/PAD Notice and issuance of SD1	5/18/2011[1] 5/19/2011[1]
§5.9	Relicensing Participants/ FERC staff	File Comments on PAD, SD1, and submit Study Requests	Within 60 days of NOI/PAD Notice and issuance of SD1	6/10/2011
§5.10	FERC	FERC Issues Scoping Document 2 (SD2) (if necessary)	Within 45 days of deadline for filing comments on SD1	7/25/2011
§5.11	TID/MID	File Proposed Study Plan (PSP) Document	Within 45 days of deadline for filing comments on SD1	7/25/2011
(e)	TID/MID/ Relicensing Participants	Initial Study Plan Meeting	Within 30 days of filing PSP	8/24/2011
§5.12	Relicensing Participants	File Comments on Proposed Study Plans	Within 90 days after PSP is filed	10/24/2011
§5.13(a)	TID/MID	File Revised Study Plan (RSP) Document	Within 30 days following the deadline for filing comments on PSP	11/23/2011
(b)	Relicensing Participants	File Comments on Revised Study Plan	Within 15 days following RSP	12/8/2011

18 CFR §	Lead	Activity	Time Frame	Date
(c)	FERC	FERC Issues Study Plan Determination	Within 30 days following filing of RSP	12/23/2011
§5.14(a)	Mandatory Conditioning Entities	File Notice to Pursue Dispute Resolution Process	Within 20 days of FERC Determination	1/12/2012
(d)	FERC	Convene Dispute Resolution Panel	Within 20 days of Notice of Dispute	2/1/2012
(i)	TID/MID	File comments on Notice of Dispute	Within 25 days of Notice of Dispute	2/7/2012
(k)	Dispute Resolution Panel	Deliver to FERC Director findings on Dispute[2]	Within 50 days of Notice of Dispute	3/3/2012
(l)	FERC Director	Written determination regarding Dispute	Within 70 days of Notice of Dispute	3/23/2012
§5.15	TID/MID	Conduct Field Studies		Jan-Oct 2012
(c)(1)	TID/MID	File Initial Study Report (ISR)	Based on Study Plan Determination	1/4/2013[3]
(c)(2)	TID/MID	Initial Study Report Meeting	Within 15 days of ISR	1/19/2013
(c)(3)	TID/MID	File Meeting Summary	Within 15 days of Study Report Meeting	2/3/2013
(c)(4)	Relicensing Participants/ FERC	File Disagreements/Disputes/ Modifications to Study; Propose new studies (if necessary)	Within 30 days of filing Meeting Summary	3/5/2013
(c)(5)	TID/MID	File Responses to comments	Within 30 days of comments	4/4/2013
(c)(6)	FERC	Dispute Resolution (if necessary)	Within 30 days of filing responses to disputes	5/4/2013
§5.15	TID/MID	Conduct Second Season Field Studies		Feb-Oct 2013
§5.15(c)(1) and §5.15(a)	TID/MID	File Draft License Application (DLA) and Updated Study Report (USR)	Not later than 150 days before final application is filed	11/27/2013
§5.15 (c)(2)	TID/MID	Updated Study Report Meeting	Within 15 days of USR	12/12/2013
(c)(3)	TID/MID/ Relicensing Participants	File Updated Study Report Meeting Summary	Within 15 days of Study Report Meeting	12/27/2013
(c)(4)	Relicensing Participants/ FERC	File Meeting Summary Disputes	Within 30 days of filing Meeting Summary	1/27/2014
§5.16(3)	Relicensing Participants/ FERC	Comments on Draft License Application, Additional Information Requests (AIRs) (if necessary)	Within 90 days of filing DLA	02/25/2014
§5.15(c)(5)	TID/MID	File Responses to Disputes (if necessary)	Within 30 days of disputes	2/26/2014
(c)(6)	FERC	Dispute Resolution (if necessary)	Within 30 days of filing responses to disputes	3/28/2013
§(5.17)	TID/MID	Final License Application (FLA) Filed		4/30/2014

[1] The Districts are requesting a date of May 18 and 19, 2011 for the Public Scoping Meeting and Site Visit to accommodate the availability of key District representatives.

[2] Dispute Resolution Panel shall hold a technical conference open to all dispute participants between February 7, 2012 and March 3, 2012.

[3] TID/MID request that the ISR date be extended to January 4, 2013.

Table 2.3.1-1 shows that FERC's site visit and National Environmental Policy Act (NEPA) scoping sessions would occur on May 18 and 19, 2011. This date is subject to confirmation and may be adjusted by FERC. The schedule shown is subject to minor adjustments throughout the relicensing proceeding. The Districts have posted the above schedule on the relicensing website and will update the schedule regularly.

2.3.2 Proposed Location and Dates of FERC Scoping Meeting and Site Visit

Section 5.6(d)(1) of 18 CFR requires an applicant to include in its PAD a proposal to FERC for dates and locations for FERC's scoping meeting and site visit. Based on the above process schedule, the scoping meetings and site visit are proposed to occur on May 18 and 19, 2011. The Districts propose the following:

- **Proposed Site Visit** - Wednesday, May 18, 2011.
- **Proposed Scoping Meetings** - Wednesday evening, May 18, 2011 at a place to be selected by FERC in Modesto, California at 7:00 p.m. and on Thursday, May 19, 2011 at 9:00 a.m. in Turlock, California.

2.3.3 Discretionary Activities

Table 2.3.1-1 provides a schedule of regulatory milestones established by the ILP relicensing schedule. However, beyond those regulations, the Districts may choose to undertake discretionary activities to facilitate the relicensing proceeding, such as holding additional meetings/workshops to collaboratively develop study proposals, review study results, and develop resource management plans and measures. The Districts will work cooperatively with relicensing participants to schedule such discretionary activities.

2.4 Relicensing Communications Guidelines

2.4.1 Objectives

The Communication Guidelines presented herein describe how the Districts plan to communicate with relicensing participants throughout the relicensing. The Districts encourage relicensing participants to voluntarily follow these Communication Guidelines. In order to enhance the communication process, it should be noted that:

- These guidelines do not apply to FERC or any documents, meetings, correspondence, or other actions for which FERC is responsible during the relicensing proceeding.
- These are guidelines - not requirements.
- In cooperation with relicensing participants, these Communication Guidelines may be revised as necessary during the relicensing process.

2.4.2 Participation in the Don Pedro Relicensing Process

2.4.2.1 Relicensing Participants

Participation in the relicensing is open to any governmental agency, Non-governmental organization (NGO), Native American tribe, or member of the public. The Districts assume that relicensing participants are authorized to speak on behalf of the agency, organization, or affiliation that he/she represents in the relicensing.

2.4.2.2 Pre-NOI/PAD Public Meetings

The Districts conducted a series of three public information sessions on September 14 and 15, 2010 to introduce relicensing participants to the Project and the upcoming relicensing process (see Appendix A). These meetings followed the mailed announcement of the meetings to a comprehensive list of potentially interested parties, inviting them to attend the information sessions. The mailing also included the Districts' request for any relevant information related to the Project for inclusion in the PAD.

2.4.2.3 Pre-NOI/PAD Agency Meetings

Staffs of the Districts met individually with resource agencies on August 30, 2010, National Marine Fisheries Service (NMFS); August 31, 2010, U.S. Fish and Wildlife Service (USFWS); and October 19, 2010, California Department of Fish and Game (CDFG) to initiate discussions related to the relicensing. Meetings with resource agencies following the initiation of relicensing will occur in accordance with the communication guidelines described herein.

2.4.2.4 Participation in the Project Relicensing

The ILP is a carefully structured process that requires timely participation by relicensing participants. The Districts strongly encourage all relicensing participants to participate from the beginning of the relicensing process. Late or delayed participation can result in disruptions to the relicensing process. For example, lack of participation in a meeting in which a decision item is placed on the agenda can result in a participant's concerns and ideas not being heard.

2.4.3 Relicensing Participant Contact List

The Districts have established, and will maintain, a Relicensing Participant Contact List (Contact List) of all relicensing participants who express to the Districts an interest in the relicensing and who have provided to the Districts an email address for contact. Appendix B to this PAD contains the initial Contact List.

Besides an email address, the Districts will request that each agency, tribe and NGO provide appropriate information (i.e., name, title, affiliation, mailing address, and telephone and fax numbers) for their designated contacts. The Districts assume that those designated contacts will keep the appropriate members of their agency, tribe or NGO advised of relicensing activities. Also, the Districts anticipate that each agency, tribe, and NGO will notify the Districts if contact information for its designated contact changes.

The relicensing process will extend for five years or longer. To keep the Contact List current, the Districts intend to periodically issue an email to all those on the list asking for each contact to confirm he or she wishes to remain on the Contact List. The Districts may assume that those who do not respond are no longer interested in the relicensing and may delete those individuals from the Contact List.

Because the Districts understand that many people are uncomfortable if their contact information is made available on the Internet, the Districts will not post participants' email addresses, phone numbers, or personal residence addresses on the relicensing website.

2.4.4 Relicensing Website

The Districts have established and will make reasonable efforts to timely update a publicly accessible Internet website. The website will serve as a convenient means of making information regarding the relicensing available to relicensing participants. Examples of information on the website include the initial FERC license for the Project, FERC filings, and FERC orders regarding the relicensing, and relicensing documents (e.g., NOI and PAD, and other documents such as the Proposed Study Plan (PSP), Revised Study Plan (RSP), and license application as they are developed).

The website will also provide a schedule of events and activities, including meeting dates, meeting agendas, and alerts to future anticipated filings or document distribution. The Districts' Project relicensing website can be accessed at www.donpedro-relicensing.com.

2.4.5 Relicensing Progress Tracking List

The Districts intend to maintain a Progress Tracking List (PTL) that will include the status of all items agreed to by the Districts and relicensing participants for the relicensing. The tracking list will include an item number, when the item was originated and by whom or at which meeting or workshop, a clear description of the item, when the action was intended to be completed, who the item was assigned to, the status of the item and the date it was completed. Closed items will be shaded in grey to indicate they have been completed. The Districts will keep the most current version of the PTL posted on the relicensing website. Open items will be reviewed as appropriate at each Districts-sponsored meeting.

2.4.6 Meetings

As noted above, these Communication Guidelines only apply to the Districts' sponsored meetings. The Districts anticipate that meetings sponsored by another party (e.g., FERC or a relicensing participant other than the Districts) will be organized, noticed, run by, and followed up on by that other party. The guidelines the Districts will follow for Districts-sponsored meetings are provided below.

2.4.6.1 Meeting Locations and Start Time

Meeting locations, including those for regularly scheduled meetings, and start times will be selected by the Districts. The Districts will make a good faith effort to canvass active relicensing participants in advance of establishing a meeting date and location. However, the Districts cannot promise that meeting conflicts will not occur. Meeting start times and locations will be posted on the relicensing website event calendar described below.

2.4.6.2 Event Calendar

An event calendar that includes scheduled meetings will be maintained on the relicensing website. The calendar will provide details, such as location, and a notice/agenda for the meeting. After a meeting has occurred, the calendar will provide the notice/agenda, the completed sign-in sheet, and any formal presentations made by the Districts at the meeting. It is the Districts' intent that the PTL suffice for a meeting summary, supplemented by participant-designated issues, interests, or positions specifically identified by a participant to be recorded and posted with the tracking list.

2.4.6.3 Meeting Notice/Agenda

The Districts will provide a notice for meetings that they conduct. The Districts will make a good faith effort to issue an e-mail to the Relicensing Participant Contact List giving those on the list early notice that the meeting has been scheduled.

It is the Districts' goal to issue to relicensing participants an email indicating that a meeting is scheduled and that an agenda, meeting details, and meeting materials are available on the website, all in advance of the meeting. If the notice/agenda changes, the Districts will make a good faith effort to issue an email to relicensing participants describing the change.

To the extent appropriate, standard items on each meeting agenda will include:

- Introductions
- Purpose of meeting
- Review of agenda
- Administrative items, if any
- Review of current PTL
- Status reports, if any
- Review of proposed major decisions and new action items
- Set date and agenda for next meeting

Also, those who plan to attend a Districts-sponsored meeting should understand that those at the meeting may re-organize the agenda or proceed through agenda items at a quicker or slower pace than anticipated when the agenda was developed.

2.4.6.4 Telephone Access to Meetings

The Districts believe that participation in a meeting in-person rather than by telephone is a more effective and desirable form of communication. However, to accommodate constrained schedules, to encourage participation, and to make meetings as accessible as possible to meeting participants, the Districts will attempt to arrange a telephone call-in line for a relicensing participant (if the meeting room has such capabilities) if requested by that relicensing participant at least three days in advance of the meeting. The quality of the phone connection is not guaranteed, nor is the relicensing participant ensured that all material reviewed at the meeting will be made available or forwarded to the person(s) calling in to the meeting. The Districts are not planning to conduct any video conferencing.

2.4.6.5 Meetings

The Districts are committed to conducting an open process with a free exchange of information and interests among all relicensing participants. The Districts will lead and facilitate Districts-sponsored relicensing meetings and will make a good faith effort to ensure that all meeting participants have adequate opportunity to express ideas, concerns, and opinions. The Districts request that all relicensing participants make a good faith effort to arrive at meetings on time, read background information provided before each meeting, and be prepared to discuss topics on the meeting agenda. The Districts will promote professionalism, courtesy, and respect at all meetings.

2.4.6.6 Meeting Action Items

Relicensing meetings may result in action items and/or decisions. To capture these meeting results, all such items and decisions will be placed on the PTL. While serving as a meeting summary, the PTL is not intended to be a transcript of the meeting, or detailed meeting notes. A relicensing participant that desires to have a specific concern or opinion recognized should specifically ask that such concern or opinion be acknowledged on the PTL or meeting summary.

The Districts will endeavor to update and post the PTL on the relicensing website in a timely fashion after each meeting.

The Districts do not intend to prepare any other summary of a meeting unless the Districts and relicensing participants mutually agree that a summary of a particular issue would be important in tracking that issue and agree on specific wording that will be included in the summary. The summary will be posted on the Event Calendar for that meeting.

2.4.6.7 Confidential Information

Some meetings and information prepared for or shared during a meeting under the ILP may be confidential. For example, information on Native American resources and locations of sensitive environmental and cultural resources are considered confidential material with restrictions on their distribution. Any relicensing participant providing confidential information under applicable law or regulations must identify the information as confidential in advance of disclosure.

2.5 Documents

FERC's regulations identify a number of documents that are required for inclusion in the ILP. The ILP regulations stipulate that either FERC, the applicant, or in some instances another party is responsible for producing these necessary documents.

2.5.1 FERC's Documents

For documents issued by FERC, FERC will distribute the documents in accordance with FERC's protocols. All documents issued or received by FERC will be posted and publicly available in the e-Library on FERC's website at www.ferc.gov. To register, a relicensing participant should go to FERC's website, click on "Documents and Filing," and then "eSubscription." FERC's website provides further instructions.

2.5.2 Non-Licensee Generated Documents

Any relicensing participant that creates, files with FERC or distributes a document including correspondence is responsible for the distribution of the document as may be required or appropriate. A relicensing participant should not assume that by using the "Reply All" function in a Districts-generated e-mail that all relicensing participants will receive her or his e-mail.

2.5.3 Documents Prepared by TID/MID

The Districts anticipate using FERC's e-Filing whenever possible for documents filed with FERC, and the Districts anticipate also distributing such documents by e-mail, Compact Disc (CD), or paper copy to relicensing participants, as appropriate. The distribution will also go to FERC's Service List after FERC establishes a formal Service List. Documents will also be uploaded to the relicensing website and an email distributed to the Contact List to notify relicensing participants. The Districts plan to use e-mail for distribution of informal documents it initiates, and will post on the relicensing website all public documents (e.g., letters addressed to the Districts) regarding the relicensing. Routine email communications will not be posted to the relicensing website; however, emails that are transmitting comments on draft or final documents will be posted.

2.5.4 Availability of Information in PAD

In accordance with 18 CFR 5.6(c)(2) and Section 5.2, the Districts will provide source documents on the existing environment and on known or potential resource impacts included in the PAD to anyone who requests the information and will make a good faith effort to provide the document within 20 days of receipt of request. The document may be provided electronically (e.g., by email or on CD) unless the requester asks for the information in hard copy. Except for agencies, the Districts may charge a reasonable cost for copying and postage for the requested material.

2.5.5 Periodic Reports to Meet FERC Requirements

2.5.5.1 Initial and Updated Study Reports

As required by 18 CFR § 5.15(c) and (f), the Districts will file with FERC an Initial Study Report (ISR) approximately one year after FERC's Study Plan Determination, and an Updated Study Report (USR) within two years of FERC's Study Plan Determination. The reports will describe overall progress in implementing the studies, status of schedule, and a summary of data collected to date. These are progress reports and may not contain final study results, but only progress to date on the study. The report will also include a discussion of any variance, if any, from the FERC-approved study plan and schedule and any modifications to ongoing studies. As provided in 18 CFR § 5.15(c) and (f), the Districts will hold a meeting within 15 days of filing the Initial and Updated Study Reports and file a meeting summary within 15 days of the meetings.

2.6 Interparty Communications

The Districts understand that all relicensing participants are at liberty to informally communicate with each other; however, all parties are encouraged to share relevant communications with all relicensing participants as appropriate. Telephone calls among relicensing participants will be treated informally, with no specific documentation.

3.0 PROJECT FACILITIES AND OPERATIONS

This section of the Pre-Application Document (PAD) provides details about the ownership, history, facilities, and operation of the Don Pedro Project (Project). The terms and conditions of the current Federal Energy Regulatory Commission (FERC) license are also described, as is the Districts' record of compliance with those terms and conditions.

3.1 Project Ownership

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) are public agencies with headquarters located in Turlock and Modesto, California, respectively. Both Districts are organized under the laws of the State of California to provide water supplies and retail electric services. Together, TID and MID own the Don Pedro Project (FERC No. 2299) located on the Tuolumne River in Tuolumne County, California. Ownership of the Project is shared by the Districts: 31.54 percent MID, 68.46 percent TID. The Districts provide irrigation water to approximately 210,000 acres of Central Valley farmland, while also providing retail electric service to approximately 211,000 households and businesses (TID 2010 and MID 2010).

TID was established in June 1887 and was California's first publicly-owned irrigation district. TID provides irrigation water to 150,000 acres of land and serves approximately 100,000 electric customers in a 662-square-mile electric service area (TID 2010). MID was established in July 1887. MID provides irrigation water to almost 60,000 acres of land and serves approximately 111,000 electric customers in a 560-square-mile electric service area (MID 2010). MID also supplies treated municipal water to the City of Modesto, and TID and MID provide treated drinking water to the community of La Grange.

On behalf of both Districts, TID operates the four-unit, 168 megawatt (MW) Don Pedro Project (FERC 1995). The original powerhouse was constructed with three 45.5 MW units; a fourth, slightly smaller 31.5 MW unit was added in 1989. One of the three original units is directly connected to MID's transmission system (MID 2010) and the other three units are connected to TID's transmission system. However, the Don Pedro Project switchyard is designed to permit flexibility in delivering Project generation to the two transmission systems. FERC issued the original license for the Project by order dated March 10, 1964, for a period of 50 years, with an effective date of May 1, 1966 (EES Consulting [EES] 2006). The current license expires on April 30, 2016.

3.2 Project Purpose

The Don Pedro Reservoir provides 2,030,000 acre-feet (ac-ft) of total water storage. The Project serves the following primary purposes and functions:

- Provide water storage for the beneficial use of irrigation of over 200,000 acres of prime farmland in California's Central Valley served by the Districts. Combined, the Districts supply, on average, approximately 900,000 ac-ft of irrigation water per year to their customers.
- Provide water storage for the beneficial use of municipal and industrial (M&I) customers. MID provides treated water to the City of Modesto (population: 210,000), and TID and

MID jointly provide treated water to the community of La Grange. The Districts provide up to a maximum of 67,500 ac-ft of water per year for M&I use. Consistent with the requirements of the Raker Act and agreements between the Districts and the City and County of San Francisco (CCSF), the Project provides a "water bank" of up to 570,000 ac-ft of storage that CCSF may use to help 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 2.4 million customers in the Bay Area.

- Provide storage for flood management on the Tuolumne and San Joaquin rivers. In cooperation with the U.S. Army Corps of Engineers (ACOE), the Don Pedro Project provides up to 340,000 ac-ft of storage for the purpose of flood control.

These four uses are critical functions of the Project. Other important uses supported by the water storage and water supply of the Project are recreation; power generation; and of special concern to the Districts, protection of the downstream anadromous fishery.

The potential effects of the Project on the downstream environment have undergone continuous evaluation and study since the Project began commercial operation. The Districts have worked closely with all parties interested in protecting and enhancing the fisheries in the lower Tuolumne River, especially related to the fall-run Chinook salmon population. Between 1972 and 1992, the Districts, in consultation with resource agencies, conducted numerous studies of the lower Tuolumne fisheries resource. In 1992, the Districts provided to FERC and interested parties a compilation of these studies in an eight-volume filing consisting of 28 individual environmental reports. These studies led to the development of a FERC-mediated Settlement Agreement with resource agencies and environmental groups in 1995 whereby the Districts agreed, among other things, to increase flows to the lower Tuolumne River for the purpose of enhancing and protecting the fall-run Chinook salmon population.

In accordance with that Agreement, the Districts continued to monitor the fall-run Chinook and steelhead populations and provided annual reports to all parties. The Tuolumne River Technical Advisory Committee (TAC), consisting of the Districts, City and County of San Francisco (CCSF), environment groups, California Department of Fish and Game (CDFG), and U.S. Fish and Wildlife Service (USFWS), was designated as being responsible for coordinating portions of the Agreement, reviewing the annual studies on the fall-run Chinook and steelhead fisheries, and advising the Districts on adjustment to fishery studies. Numerous aquatic resource monitoring and evaluation studies have been undertaken and reported since 1996 to the present time. In March 2005, the Districts prepared and filed a Ten Year Summary Report summarizing the environmental studies conducted from 1995 to 2004. Annual studies and reports have been filed each year since then.

In addition to providing increased flows to the lower Tuolumne River, the Agreement also provided funds for riparian habitat improvement, recreation, and support of a CDFG biologist. The Districts have continued to perform annual studies to monitor and investigate the fisheries of the lower Tuolumne River, and in March, 2006 filed a Ten Year Summary Report. In total, the Districts have performed and completed more than 150 studies of the lower Tuolumne River since 1992 (TID/MID 2010). The Districts continue to work with the Tuolumne River TAC to protect and monitor the fisheries of the lower Tuolumne River. Annual fishery monitoring studies are continuing. The most recent study results from monitoring conducted in 2009 were filed with FERC in March 2010. Environmental studies will continue to be performed and filed with FERC through the 2016 term of the current license.

3.3 Project Location

The Don Pedro Project is located at river mile (RM) 54.8 of the Tuolumne River, in western Tuolumne County. The Project lies about 40 miles east of the City of Modesto and 26 miles northeast of the City of Turlock (Figure 3.3-1). As discussed above, the Project is a multi-purpose water resource development situated in the foothills of the west slope of the Sierra Nevada. Current uses of Project water include storage for irrigation, municipal, and industrial purposes; protection of downstream fisheries; power generation; recreation; and flood control. The Project is located on land primarily owned jointly by the Districts. Approximately 4,040 acres within the Project Boundary are federal lands located within the Bureau of Land Management's (BLM) Sierra Resource Management Area. Much of the 4,040 acres of federal lands are located below the normal maximum water surface elevation of Don Pedro Reservoir (elevation 830 feet). Federal lands within the Project Boundary are designated as withdrawn lands for power purposes (BLM 2008) and are managed by the Districts for Project purposes authorized by FERC.

Don Pedro Dam is located on the mainstem of the Tuolumne River at RM 54.8, and the Project Boundary extends to roughly RM 79. The Don Pedro powerhouse and its electrical switchyard are located immediately downstream of the dam. The Don Pedro Reservoir is approximately 24 miles long at its normal maximum water level of 830 feet. The drainage area of the Tuolumne River at Don Pedro Dam is approximately 1,533 square miles (ACOE 1972).

The Project is also sometimes referred to as the New Don Pedro Project (and the Don Pedro Dam is sometimes referred to as the New Don Pedro Dam) because it displaced the original, smaller Don Pedro Dam and powerhouse, which was located approximately 1.5 miles upstream of the current dam (see Project History, Section 3.5.1).

3.4 Project Facilities

Construction of the Project began in 1967 and commercial operation commenced in 1971. The current Don Pedro Dam was built approximately 1.5 miles downstream of the original, and much smaller, Don Pedro Dam which had been in operation since 1923. The construction of the new Don Pedro Dam and associated facilities brought to resolution over 60 years of debate among parties over the control and management of the waters of the Tuolumne River (see Section 3.5.1).

The primary Project facilities include (1) Don Pedro Dam and Reservoir, with a gross storage capacity of 2,030,000 acre-feet (ac-ft), (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. The Project also includes three developed recreation areas and other small recreation facilities (restrooms and buoys) outside of the developed areas. The primary Project facilities, including the recreation areas, are described below. The Project reservoir and location of primary facilities, such as the dam, powerhouse, and recreation areas, are shown in Figure 3.4-1.

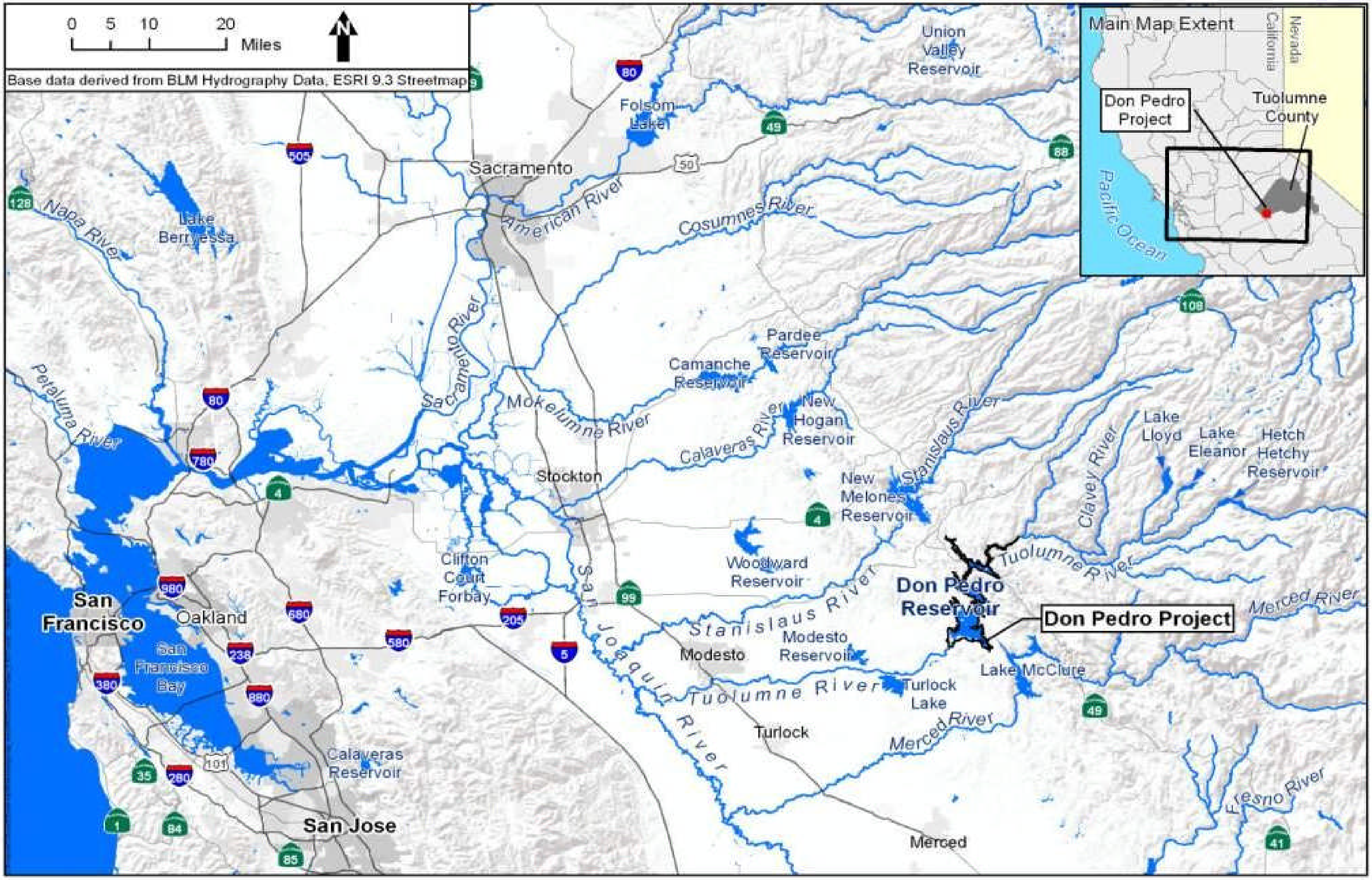

Figure 3.3-1 **Project vicinity map.**

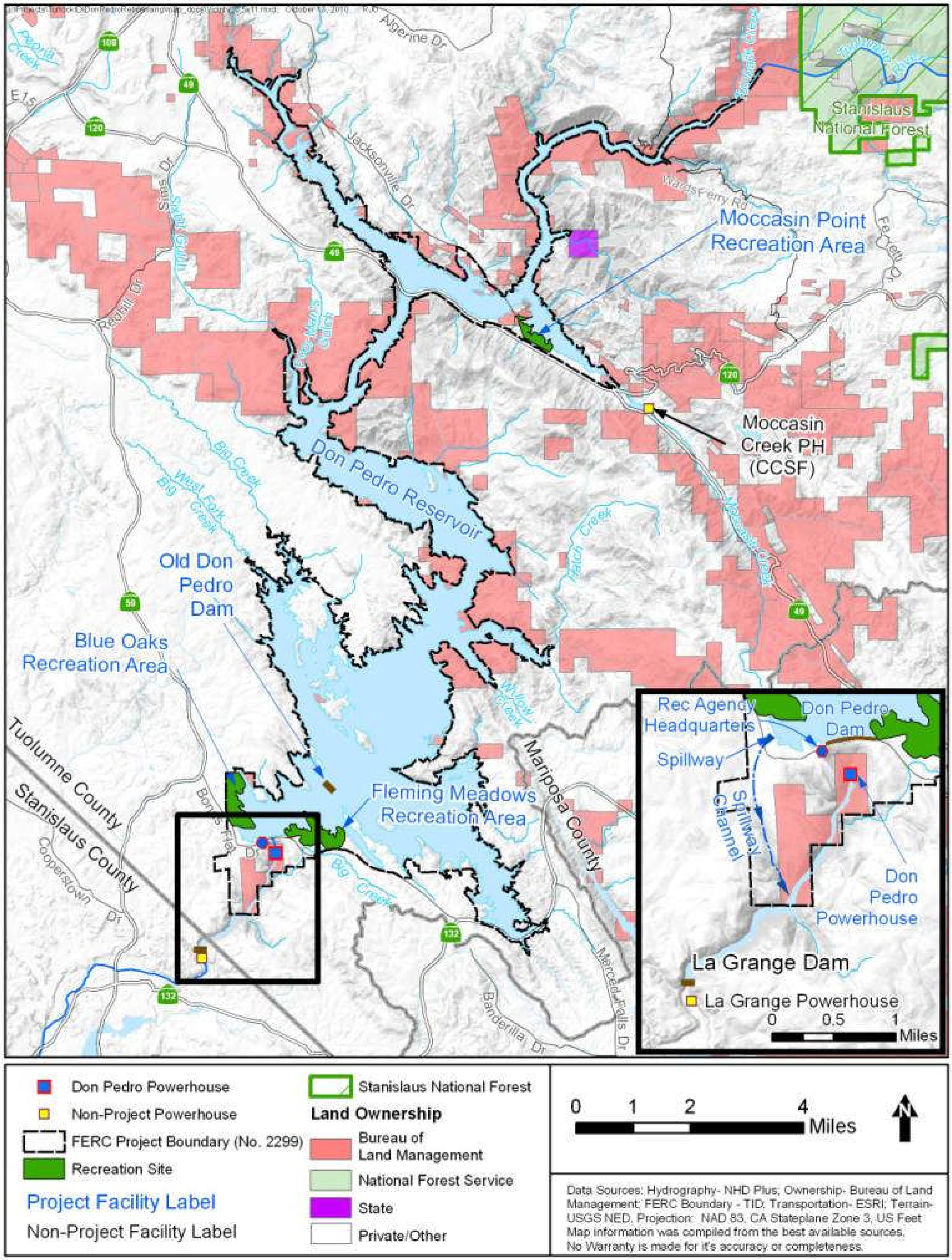

Figure 3.4-1 Detail of Don Pedro Project area and major facilities.

3.4.1 Don Pedro Dam and Reservoir

The primary Project feature is the Don Pedro Dam, a 1,900-foot-long and 580-foot-high zoned earth and rockfill structure (Figure 3.4.1-1). The top of the dam is at elevation 855 feet. The drainage area of the Tuolumne River upstream of the Don Pedro Dam is 1,533 square miles (ACOE 1972).

The Don Pedro Reservoir extends upstream for approximately 24 miles at the normal maximum water surface elevation of 830 feet. The surface area of the reservoir at the 830-foot elevation is approximately 12,960 acres and the gross storage capacity is 2,030,000 ac-ft (Figure 3.4.1-2). The Don Pedro Reservoir shoreline, including the numerous islands within the lake, is approximately 160 miles long.

3.4.2 Don Pedro Spillway

Don Pedro spillway is divided into two sections, one gated and one ungated, located immediately adjacent to one another in a saddle area west of the main dam (Figure 3.4.2-1). The gated spillway section is 135 feet long, with a permanent crest elevation of 800 feet, and includes three radial gates each 45 feet wide by 30 feet high. The ungated spillway is an ogee section 995 feet long with a crest elevation of 830 feet and a top of abutment elevation of 855 feet. The spillway capacity at a reservoir water level of 850 feet is 472,500 cubic feet per second (cfs) (TID et al. 2006). Flow releases over the ungated ogee-crest section of the spillway have occurred only once since Project construction, in early January 1997.

Flows at the spillway are released to Gasburg Creek, which in turn flows into Twin Gulch, then back into the Tuolumne River approximately 1.5 miles downstream of the main dam (Figure 3.4.2-2).

3.4.3 Outlet Works

The Project facilities include a set of outlet works located at the left (east) abutment of the main dam. The outlet works consist of three individual gate housings, each containing two 4-feet-by-5-feet slide gates (Figure 3.4.3-1). The outlet works are situated in a 3,500-foot-long concrete-lined tunnel that originally served as the water diversion tunnel during Project construction. The inlet to the tunnel has an invert elevation of 342 feet and the outlet, which is located approximately 400 feet downstream of the powerhouse, has an invert of 310 feet (Figure 3.4.3-2). At a reservoir water surface elevation of 830 feet, the total hydraulic capacity of the outlet works is 7,500 cfs.

3.4.4 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-foot 6-inch concrete-lined section to a 16-foot 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 (Figure 3.4.4-1). Flows from the power tunnel are delivered to the four-unit powerhouse and a hollow-jet control valve in the powerhouse.

Figure 3.4.1-1 Photograph of Don Pedro Dam - downstream slope.

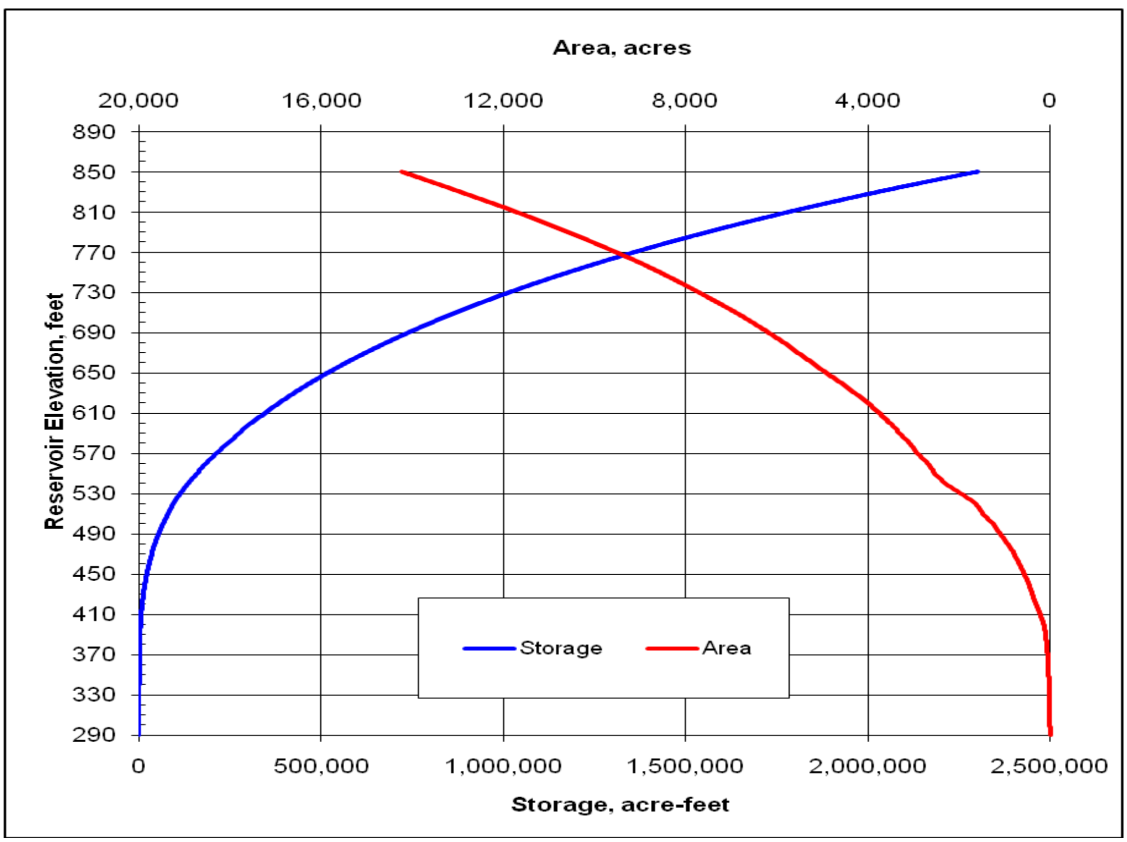

Figure 3.4.1-2 Don Pedro area-capacity curve.

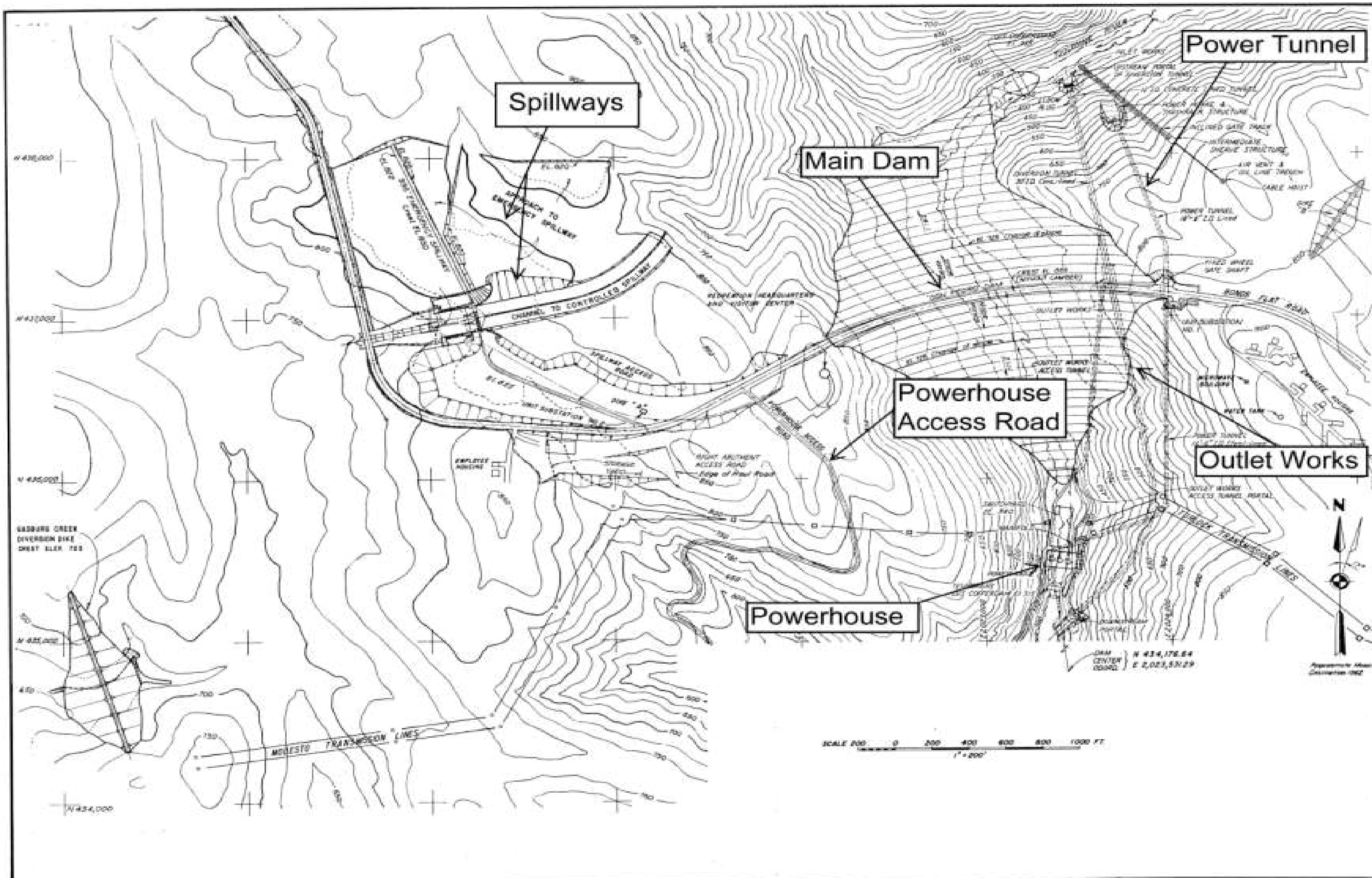

Figure 3.4.2-1 Don Pedro Project facilities.

Figure 3.4.2-2 Don Pedro spillway discharge channel.

Figure 3.4.3-1 Don Pedro Dam - gate operators for the low-level outlet works.

Figure 3.4.3-2 Don Pedro Dam - downstream exit from outlet works tunnel.

Figure 3.4.4-1 Don Pedro Dam - power tunnel gate housing.

3.4.5 Powerhouse

Located immediately downstream of the main dam, the Don Pedro powerhouse contains four turbine-generator units and a 72-inch hollow jet valve (Figure 3.4.5-1). The reinforced-concrete powerhouse is 171 feet long, 110 feet high, and 148 feet wide. It houses four Francis turbine-generator units with a nameplate capacity of 168 MW and a maximum output at optimum conditions of approximately 203 MW. Turbine ratings for Units 1, 2, and 3 are provided in Table 3.4.5-1. Combined hydraulic capacity of the four units under maximum head is approximately 5,500 cfs.

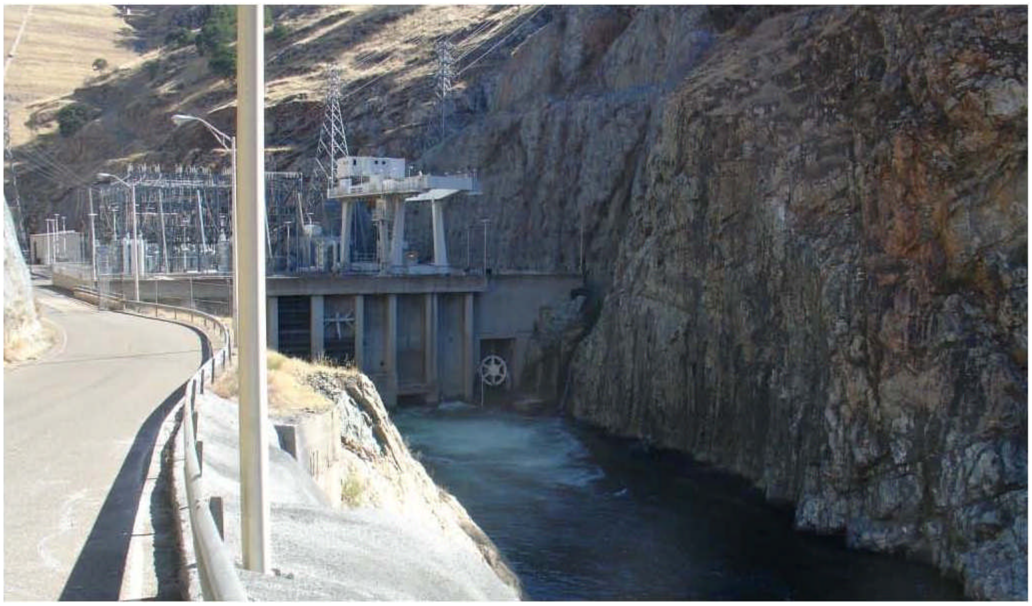

Figure 3.4.5-1 Don Pedro powerhouse and tailwater.

Table 3.4.5-1 Don Pedro Units 1, 2, and 3 turbine performance characteristics.

Net Head (ft)	Flow (cfs)	Turbine Power (Hp)	Turbine Power (MW)	Turbine Efficiency
530	545	24,000	17.90	73.5%
530	800	39,000	29.08	81.3%
530	1,000	51,300	38.26	85.6%
530	1,200	65,200	48.62	90.6%
530	1,350	75,000	55.93	92.7%
530[1]	1,510	85,000	63.39	93.9%
450	400	14,500	10.81	71.2%
450	600	24,650	18.38	80.7%
450	800	34,900	26.03	85.7%
450	1,000	45,550	33.97	89.5%
450	1,200	56,800	42.36	93.0%
450	1,400	67,150	50.07	94.2%
450	1,579	75,000	55.93	93.3%
450[1]	1,641	77,700	57.94	93.0%
375	400	12,350	9.21	72.8%
375	600	20,400	15.21	80.2%
375	800	29,100	21.70	85.8%
375	1,000	38,300	28.56	90.3%
375	1,200	47,300	35.27	92.9%
375	1,400	55,100	41.09	92.8%
375	1,460	56,800	42.36	91.7%

[1] Nameplate rating points.

The powerhouse also contains a 72-inch hollow jet valve located in the east end of the powerhouse with a centerline elevation at discharge of 299 feet. The hydraulic capacity of the hollow jet valve is 3,000 cfs. While turbine Units 1 through 3 discharge directly to the river channel, Unit 4 discharges to the outlet works tunnel approximately 250 feet upstream of the tunnel outlet. Water to Unit 4 is delivered through a bifurcation from the hollow jet valve pipe. With Unit 4 in operation, the hollow-jet valve capacity is reduced from 3,000 cfs to 800 cfs.

The powerhouse tailwater during turbine operation varies from a low of about 298 feet to a high of about 303 feet under normal operating conditions. The tailwater elevation at the outlet works tunnel is approximately 300 feet.

3.4.6 Switchyard

The Project switchyard is located atop the powerhouse at elevation 340 feet. The switchyard provides power delivery and electrical protection to the Districts' 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 megavolt amperes (MVA) and Unit 4 at 44 MVA.

3.4.7 Gasburg Creek Dike

Don Pedro Dam spillway discharges into Gasburg Creek. Gasburg Creek Dike is located near the downstream end of the spillway, and directs flows from Gasburg Creek into Twin Gulch where spillway discharges join the Tuolumne River approximately 1.5 miles downstream of the Don Pedro powerhouse. Gasburg Creek Dike consists of an impervious earth and rockfill dam approximately 75 feet in height, with a slide-gate controlled 18-inch-diameter conduit. The top of Gasburg Creek Dike is at elevation 725 feet.

3.4.8 Dikes A, B, and C

The Project includes three small embankments—Dikes A, B, and C—constructed in low saddles on the reservoir rim with top elevations of 855 feet. Dike A is located between the main dam and spillway. Dikes B and C are located east of the main dam.

3.4.9 Recreation facilities

In total, the Project has three developed recreation areas (see Figure 3.4-1 above) and primitive and semi-primitive lakeshore camping on much of the rest of its shores. 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.

3.4.9.1 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:

- 176 tent campsites
- 90 full hook-up campsites
- Boat launch facility
- Individual and group picnic areas
- Concessionaire facilities (one houseboat dock, one full-service marina, camp store, snack shack)
- Two-acre swimming lagoon and picnic area
- Restrooms and showers

3.4.9.2 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 hook-up campsites
- 2 full-hookup campsites
- 161 tent campsites
- Boat launch facility
- Concessionaire facilities (including houseboat repair yard)

The Blue Oaks hiking trails provide additional recreation opportunities.

3.4.9.3 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 hook-up campsites
- 50 tent campsites
- 28 overflow campsites
- One picnic area
- One boat launch ramp
- One concessionaire facility and full-service marina

The Moccasin Point hiking trails provide additional recreation opportunities.

3.4.9.4 Other Recreation Facilities

Outside of the three developed recreation areas there is boat-in access to much of the shoreline and to the islands within the reservoir for dispersed use, including day use and primitive camping. The Project includes five shoreline restrooms, one of which is at a semi-developed boat-in access location, and six floating restrooms. Buoys are maintained at various locations for regulatory purposes or security and safety reasons.

3.5 Uses of Project Water

The Don Pedro Project is an essential and critical resource for the people and communities served by the Districts and CCSF. It is also an important resource for local and regional flood control and for the protection and enhancement of downstream anadromous and resident fisheries.

The primary function of the Don Pedro Project is to provide water storage for irrigation of over 200,000 acres of high-value farmland served by the Districts. The Project also provides water for municipal and industrial purposes, fisheries protection and enhancement, power generation, recreation, and flood control. MID provides treated water to the City of Modesto with a population of over 210,000 people, and TID and MID provide treated water to the community of La Grange. Don Pedro Reservoir also provides valuable (water bank credits) to CCSF for the benefit of its over two million water customers in the Bay Area.

Use of water in the State of California is allocated through a complex water rights system with priority determined primarily by date of appropriation. The waters of the Tuolumne River have been the source of competing needs, uses, and claims dating back to the late 1800s. Because the history of these competing interests continues to be relevant to Project operations today, an historical perspective of the water use issues is valuable.

3.5.1 Historical Perspective of Tuolumne River Water Uses

In 1887, the California legislature authorized a new form of popularly-elected local government, the irrigation district, based on the idea that since irrigation would be a community benefit, its finance and governance should be community-based rather than be controlled by individual landowners or irrigators. In June of that year, TID became the first to organize under the new law, followed in July by MID. Three years later, in August 1890, the two pioneer districts signed an agreement to build a joint diversion dam, La Grange Dam, and to divide such flow as the Districts had rights to in proportion to the total acreage in each district. The agreement also provided an option to share future projects upstream from the dam on the same acreage formula, putting in place a partnership for the development of the river that has lasted for 120 years. La Grange Dam, however, was not the first dam to be built on the Tuolumne River. The first dam built on the Tuolumne River was Wheaton Dam constructed in 1871 by a small private company, the Tuolumne Water Co., near the present location of La Grange Dam (RM 52.2).

La Grange Dam was built of boulders set in concrete and faced with roughly dressed stones quarried nearby. Its sole purpose was to raise the elevation of the river behind it to the level necessary to divert water into the Districts' irrigation canals, and any water not diverted into the canals simply poured over the top of the dam. At 127 feet high and 90 feet thick at the base, it was the highest dam of its kind when it was completed in 1893.

The Districts' position as the only users of the Tuolumne River was challenged in 1901 when the city of San Francisco announced plans to dam Hetch Hetchy valley to create a new municipal water supply. At first the city's applications for rights-of-way over federal park and forest lands were rejected, but in 1907 Secretary of the Interior James Garfield granted a permit. The Garfield Permit recognized the Districts' senior water rights. The permit also required the city to sell surplus water to the Districts and to sell electricity to the Districts for irrigation and drainage pumping at cost.

In 1910, Garfield's successor reopened the controversy when he threatened to revoke the city's right to use Hetch Hetchy Valley. In response, the city then proposed a larger project capable of supplying up to 400 million gallons per day to San Francisco and other cities around the bay. As a bill authorizing the city's plan worked its way through Congress, the Districts negotiated terms with San Francisco. The Raker Act passed by Congress in 1913 recognized and protected the senior priority water diversions by TID and MID named in the previous Garfield Permit—a total of 2,350 cfs year-round and 4,000 cfs for 60 days each spring.

While the Hetch Hetchy project was being debated, the Districts were moving forward with plans for storage reservoirs because the natural flow at La Grange was insufficient to irrigate any substantial acreage after the snow-melt ended in early summer. Both Districts first built small foothill reservoirs along their main canals—Modesto Reservoir in 1911 and Turlock Lake in 1914—and in 1915, they agreed to cooperate on a larger dam above La Grange.

The construction agreement for the original Don Pedro Project signed in April 1919 allocated costs and benefits according to acreage, fixing TID's share of the Project, and subsequent projects on the river, at 68.46 percent and MID's share at 31.54 percent. When the original Don Pedro Dam was finished in 1923, the 284-foot-high arched dam was the highest in the world and had a maximum storage of 289,000 ac-ft, which expanded the Districts' irrigation season beyond just the spring runoff season.

The original Don Pedro Project also put the Districts in the power business. Because in the 1920s electric lines rarely extended into rural areas, there had long been an interest in having the Districts distribute the power produced at Don Pedro. TID built its own transmission line and began retail distribution in 1923, with a branch to supply MID until it could build its own line from the dam. Growth was rapid, and in 1928, the generation capacity of Don Pedro was doubled to 30 MW. Private utilities found it impossible to compete with the Districts' low rates and expanding network of distribution lines; and in 1931 TID took full control of electric service within its boundaries. MID did not take full control until 1940. The Districts' power development kept them solvent during the Depression while also helping to lower property tax rates to help cash-strapped residents.

To maintain a minimum power pool at Don Pedro and increase irrigation storage, the Districts added gates to the spillway. The nine-foot increase in reservoir elevation flooded federal land above the 1916 reservation of public lands, resulting in the issuance of a Federal Power Commission (FPC) minor part license for the original Don Pedro Project in 1930.

San Francisco and the Districts continued to discuss their respective needs and rights to the Tuolumne River. The Districts argued that their rights under state law exceeded the flow San Francisco was required to release to the Districts by the Raker Act. The Districts filed suit in 1933, but negotiations soon developed on a cooperative solution. The result was what became known as the First Agreement, a brief document that suspended litigation and committed the city and the Districts to continued cooperation that would "recognize the provisions of the Raker Act as applying to the Districts and to the city without waiving any of their rights." What that meant was that the Raker Act became the measure of the Districts' direct diversion entitlement vis a vis

CCSF, and they would receive the natural flow of the Tuolumne River up to 2,350 cfs (and 4,000 cfs in the spring), plus 66 cfs for an 1871 mining ditch right acquired during the construction of the original Don Pedro Dam. A major portion of the mining ditch right served the Waterford Irrigation District which was later annexed by MID.

To satisfy the needs of those depending on water to be provided by the Districts and CCSF, the cooperative program included discussions of building additional storage on the Tuolumne River, but planning was complicated by the efforts of the ACOE to construct a flood control reservoir at Jacksonville, just upstream of Don Pedro. That prompted the Second Agreement in 1943, which proclaimed that a dam on Cherry Creek in the upper watershed and a larger Don Pedro dam were part of a coordinated plan for developing the river. The next year the Districts and the CCSF took their case to Congress, and succeeded in stopping the federal dam and substituting a federal financial contribution to their projects to provide flood control.

In 1949 the Third Agreement spelled out the terms of the comprehensive plan. New Don Pedro would be built with a financial contribution by CCSF providing it with use of storage in the new reservoir. San Francisco's junior rights on the Tuolumne River would entitle it to relatively little or no water in dry years, which meant that it needed significant carry-over storage to turn those junior rights into a reliable water supply.

Rather than building additional small, uneconomical reservoirs on its upper watershed, New Don Pedro allowed CCFS to acquire storage on more favorable terms. New Don Pedro would be owned and operated exclusively by the Districts, so the Third Agreement introduced the concept of a "water bank"; CCSF would receive credit for inflow in excess of the Districts' daily Raker Act priorities, and could use those credits to offset the subsequent upstream diversion of water that would otherwise have had to flow to the Districts. In essence, the agreement allows CCSF to pre-release water from its upstream facilities into a water bank in the Don Pedro Reservoir so at other times it can hold back an equivalent amount of water that otherwise would have had to be released to satisfy the Districts' senior water rights. Once the water enters the Don Pedro Reservoir, it belongs to the Districts and the Districts have unrestricted entitlement to its use.

To pay for its water bank space, and to relieve its reservoirs of any federal flood control obligations, CCSF agreed to pay for a portion of the construction of a new dam capable of storing a total of 1.2 million ac-ft, including 290,000 ac-ft to replace the original Don Pedro Project, 340,000 ac-ft of flood control storage requested by ACOE, and 570,000 ac-ft for water bank storage. ACOE flood control space would be kept empty during the rainy season to absorb storm inflows. When not obligated for ACOE flood control space, CCSF could obtain water bank credits for up to 50 percent of the water stored in that space. All such water belongs to the Districts, and CCSF could not legally or physically divert the water from the reservoir. The Districts would provide the land for the project and pay for the new, and much larger, power plant. They also had the right to create additional storage for themselves by paying the marginal cost of a higher dam.

The Districts opted to increase New Don Pedro to its current maximum capacity of 2,030,000 ac-ft. As part of the licensing process for the new dam, the California Department of Fish and Game (CDFG) asked the FPC, predecessor agency to FERC, to require a set of scheduled minimum flows below La Grange Dam to protect fall-run Chinook salmon that spawned in the Tuolumne River. There was a general recognition that New Don Pedro was a necessary prerequisite for protection of the Tuolumne fall-run Chinook salmon since the existing dam, which had no downstream release requirement, would spill less and less water as CCSF increased its exports to the Bay Area. FPC also recognized that fishery releases, when combined with rising city diversions, could ultimately undermine the economic feasibility of the Project. To balance those factors, FPC's 1964 decision set normal year releases of 123,210 ac-ft for the first 20 years, and required the Districts to conduct studies that could be used to develop future fishery requirements.

The overall allocation of costs and benefits—the basic New Don Pedro bargain—had been defined by the Third Agreement but implementation still had details to be finalized. A case in point was the question of negative balances in the water bank. Reservoir operation models showed that CCSF had underestimated the amount of water bank space needed to guarantee its ultimate diversions to the Bay Area. CCSF drafted provisions that would allow it to create negative balances, which could effectively reverse the Raker Act priorities and shift the risk of dry year shortages to the Districts. In the end, the agreement prohibited water bank deficits without the prior approval of the Districts.

Another unsettled issue was the allocation of costs that were outside of the Third Agreement, primarily those related to the FPC license requirements for fishery and recreation. While the Districts were the sole licensees, CCSF, as a Project beneficiary, had an obligation to share in burdens imposed by the license. Since these were Project costs, a new formula divided them according to the Project's primary purpose, the acquisition of additional storage, which yielded a ratio of 51.7121 to CCSF and 48.2875 to the Districts.

The final question was what to do about the responsibility for fishery releases. The FPC anticipated that there would be enough surplus water over and above CCSF's exports and the Districts' needs to provide the releases for the first 20 years of the license, but if and when there was not a surplus, the Districts wanted to protect their full Raker Act entitlement—the benchmark for measuring their priority vis a vis CCSF since the First Agreement. The result, which became Article 8 of the Fourth Agreement, was a compromise. It made CCSF responsible for a 51.7121 percent share of any impairment of the Districts' Raker Act entitlement through an adjustment of water bank credits, provided that the Districts first sought relief from the FPC.

Article 37 of the Project license established minimum flow releases for the first 20 years of operation (1971-1991) and reserved FPC's authority to revise the minimum flow requirements after 20 years. Article 39 of the license required the Districts, in cooperation with CDFG, to study the Tuolumne River fishery and how it could feasibly be sustained. The Districts subsequently commenced 18 years of fishery studies.

In 1985, the Districts applied to FERC to amend their license to add a fourth generating unit. While the amendment proceeding was underway, the Districts, CDFG, and the U.S. Fish and Wildlife Service (USFWS) entered into an agreement to amend the approved fish study plan provided for in Article 39 of the license. Among other things, the agreement contemplated extending the existing study and maintaining the existing flows until 1998. In 1987, FERC granted the license amendment and included the revised study plan in the license. FERC added Article 58 to the license, making the Districts' amended fish study plan a condition of the license and requiring the Districts to file a report on the results, with recommendations for changes in the existing flow releases and ramping rates for the Project. In doing so, however, FERC found that it was beyond the scope of the amendment request to extend the ongoing study or minimum flows beyond the initial 20-year period provided for in the existing license. As a result, the requirement to revisit the Project's minimum flows after 20 years, and to provide the results of the ongoing fish study, remained intact.

In 1995, the Districts entered into a settlement agreement with CDFG, USFWS, CCSF, California Sports Fishing Protection Alliance, Friends of the Tuolumne, Tuolumne River Expeditions, and the Tuolumne River Preservation Trust. Pursuant to this agreement, in 1996, FERC amended Articles 37 and 58 of the license to implement new minimum flows and fishery monitoring studies. Before approving the license amendment, FERC completed formal consultation with the USFWS pursuant to Section 7 of the federal Endangered Species Act on two listed fish species, the Delta Smelt and Sacramento Splittail. FERC also prepared an EIS that examined the effects of various alternative flow regimes. As amended in 1996, Article 37 required a modified minimum flow regime to protect fishery resources in the Tuolumne River. This flow regime remains in effect today. This settlement agreement and its effects on Project operations are discussed below in Section 3.6.

3.5.2 Water Rights Owned by TID and MID

The State of California allocates water rights primarily by the appropriations doctrine, with some exceptions especially for riparian land owners. The Districts have a number of individual water rights on the Tuolumne River including certain appropriative water rights acquired in 1855, riparian water rights, additional pre-1914 appropriative water rights, and post-1914 appropriative water right licenses (License Numbers 11057 and 11058).

The Districts also have storage water rights in the original and existing Don Pedro Reservoir licensed by the State Water Resources Control Board (SWRCB). The water rights recognized under License Numbers 11057 and 11058 permit the use of water for irrigation, power generation, and recreation. The licenses also allow the storage, withdrawal from storage, diversion, and re-diversion of Tuolumne River water. Specifically, License Numbers 11057 and 11058 permits the Districts to store 1,046,800 ac-ft of water per year to be collected from November 1 to July 31 of the succeeding year, to divert and re-divert a maximum of 1,371,800 ac-ft per year, and withdraw 951,100 ac-ft of water per year.

3.5.3 Allocation, Management, and Use of Project Water

The actual use of the water provided by the Don Pedro Project varies from year to year depending on available water supply, amount of any carry-over storage, and water demand. As originally planned, the allocation of reservoir storage, for general planning purposes only, was as follows:

- Gross storage capacity = 2,030,000 ac-ft at elevation 830 feet
- Flood control storage = 340,000 ac-ft (varies seasonally)
- CCSF water bank capacity = 570,000 ac-ft
- Districts water storage = 1,120,000 ac-ft

Actual releases of water from Don Pedro Reservoir for the period following implementation of the 1995 settlement agreement have ranged from a low of roughly 950,000 ac-ft in 2008 to a high of about 3 million ac-ft in 2006. Water released from the Project are either diverted by TID or MID at La Grange Dam or are released at La Grange Dam to the lower Tuolumne River. Releases to the lower Tuolumne River consist of FERC-required minimum instream flows, Vernalis Adaptive Management Plan flows, flood control flows, and flood flows. Annual amounts of each use since 1997 are provided in Table 3.5.3-1.

Integrating the specific water and storage needs associated with the various purposes and uses of the Project is a complex operation. Day-to-day management of the Project inflows, storage, and outflows must consider and account for not only current obligations, needs, and requirements, but also future needs and probable, but uncertain, future inflows. Management of the Project must integrate the Districts' needs, CCSF water bank credits, flood control storage, and lower Tuolumne River flow requirements.

The Districts' service area needs relate to current and future irrigation demand and municipal water needs. The Districts also manage the accounting of the CCSF water bank in Don Pedro Reservoir. The water bank is an accounting mechanism put in place in exchange for CCSF's financial contribution to the Project construction. The CCSF financial contribution enabled the Project to be built with sufficient storage capacity to intercept water in wet years which come directly from CCSF's Hetch Hetchy system releases. Water in this "bank account" is the Districts' water to store and use in subsequent dry periods allowing CCSF to reduce releases of water that would otherwise be entitled to the Districts. This water bank account was a principal benefit to CCSF in return for its financial contribution to Project construction.

To the extent that CCSF has a credit balance in its water bank account, CCSF may intercept and divert waters of the Tuolumne River in amounts that will reduce the inflow into Don Pedro Reservoir to less than the Districts would otherwise be entitled. The amount of water by which the inflow is so reduced is charged to CCSF's water bank account.

Don Pedro Reservoir also was built to include 340,000 ac-ft of flood control storage space. The Districts manage flood control storage space in accordance with the ACOE's Flood Control Diagram for the Project. This is further discussed in Section 3.6.3 below.

3.5.4 State-Designated Beneficial Uses

The State of California through the State Water Resource Control Board (SWRCB) is required to designate beneficial uses of waters for water bodies in the state. The 1970 federal Clean Water Act (CWA) required the U.S. Environmental Protection Agency (EPA) to adopt water quality standards for the nation's surface waters and required that these standards be reviewed and revised, if necessary, at least every three years. In California, the SWRCB administers the CWA requirements and carries out its water quality protection authority through the application of specific Regional Water Quality Control Plans (RWQCP). In the case of the Project, this responsibility rests with the Central Valley Regional Water Quality Control Board (CVRWQCB), which must submit its plans to the SWRCB for review. The SWRCB reviews the plans, revises them as necessary, and approves the plans (Water Code § 13245).

Table 3.5.3-1 Don Pedro mean monthly instream flow, water deliveries to TID and MID, and total Project outflow, 1997-2009.

Month	Mean Monthly Flow (cfs)*													Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009			
USGS 11289650 - Tuolumne River Below La Grange Dam Near La Grange, CA (River in-stream flow only)																
Jan	13,070	2,114	1,247	324	325	177	184	223	187	4,456	353	171	165	1,769	13,070***	165
Feb	8,116	6,168	4,903	2,284	1,273	172	185	220	1,823	2,373	358	173	168	2,170	8,116***	168
Mar	2,443	5,407	3,285	4,602	615	165	182	1,098	3,875	4,234	357	172	169	2,046	5,407	165
Apr	1,457	5,392	2,034	1,548	558	665	685	1,010	4,524	7,436	487	533	372	2,054	7,436	372
May	953	3,621	1,697	1,164	706	419	477	412	4,868	7,847	385	680	687	1,840	7,847	385
Jun	269	4,433	284	340	54	97	234	127	3,809	4,657	127	95	149	1,129	4,657	54
Jul	290	2,845	287	421	89	88	243	108	1,913	834	114	93	107	572	2,845	88
Aug	287	1,019	259	603	110	86	236	106	773	584	110	99	102	336	1,019	86
Sep	285	1,423	294	473	112	68	250	110	328	412	89	97	106	311	1,423	68
Oct	465	628	424	412	189	202	297	209	464	449	141	174	In WY 2010	338	628	141
Nov	380	316	338	347	184	191	231	186	369	379	174	161		271	380	161
Dec	330	1,321	336	334	177	187	226	178	1,285	352	169	164		422	1,321	164
USGS 11289000 - Modesto Canal Near La Grange, CA																
Jan	6	117	66	237	72	40	76	87	83	143	9	27	31	76	237	6
Feb	168	56	47	72	142	67	58	44	204	135	113	45	29	91	204	29
Mar	642	121	301	231	213	434	328	355	260	142	348	346	219	303	642	121
Apr	601	250	630	586	607	720	325	720	450	249	483	575	474	513	720	249
May	872	310	697	659	773	724	605	653	665	716	682	656	573	660	872	310
Jun	701	655	769	733	802	791	801	751	695	802	763	646	716	740	802	646
Jul	962	787	781	915	905	891	894	825	1,043	846	803	748	791	861	1,043	748
Aug	813	869	927	878	767	707	825	704	827	824	781	793	721	803	927	704
Sep	550	482	566	474	567	583	525	461	604	594	411	506	474	523	604	411
Oct	347	344	334	293	387	358	380	270	299	304	321	301	In WY 2010	328	387	270
Nov	78	73	195	44	36	105	172	84	141	173	162	100		114	195	36
Dec	26	86	72	75	72	58	13	43	126	8	9	18		50	126	8
USGS 11289500 - Turlock Canal Near La Grange, CA																
Jan	387	69	506	0	91	27	6	25	316	299	164	4	82	152	506	0
Feb	599	326	313	0	8	6	323	302	339	529	257	101	151	250	599	0
Mar	1,457	454	623	603	595	1,023	637	1,035	872	644	1,113	1,132	601	830	1,457	454
Apr	1,222	699	1,304	1,135	1,110	1,249	771	1,272	1,184	529	1,082	866	1,013	1,034	1,304	529

Month	Mean Monthly Flow (cfs)*													Mean Monthly Flow (cfs)	Highest Mean Monthly Flow (cfs)	Lowest Mean Monthly Flow (cfs)
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009			
May	1,710	800	1,321	1,246	1,455	1,121	1,073	1,336	1,256	1,339	1,166	1,136	1,021	1,229	1,710	800
Jun	1,445	1,243	1,525	1,725	1,664	1,483	1,639	1,552	1,504	1,624	1,599	1,310	1,525	1,526	1,725	1,243
Jul	2,081	1,817	1,938	1,898	1,805	1,817	1,883	1,840	1,917	2,000	1,816	1,572	1,899	1,868	2,081	1,572
Aug	1,587	1,681	1,796	1,784	1,526	1,489	1,516	1,510	1,706	1,674	1,494	1,314	1,482	1,581	1,796	1,314
Sep	812	977	952	1,063	825	736	714	617	991	936	631	571	793	817	1,063	571
Oct	505	613	566	527	445	358	742	577	259	379	305	129	In WY 2010	450	742	129
Nov	30	0	59	24	4	22	1	1	3	8	35	2		16	59	0
Dec	109	0	301	173	12	94	36	12	27	1	45	149		80	301	0
USGS 11289651 - Combined Flow Tuolumne River + Modesto Canal + Turlock Canal (~ total Don Pedro Project outflow) *																
Jan	13,630	2,301	1,818	561	489	244	266	335	585	4,897	525	203	278	2,010	13,630	203
Feb	8,885	6,551	5,262	2,355	1,424	245	565	566	2,365	3,038	728	320	348	2,512	8,885	245
Mar	4,544	5,983	4,210	5,435	1,423	1,622	1,146	2,487	5,005	5,020	1,818	1,651	989	3,179	5,983	989
Apr	3,280	6,341	3,968	3,269	2,276	2,634	1,781	3,001	6,158	8,211	2,052	1,973	1,860	3,600	8,211	1,781
May	3,535	4,732	3,714	3,067	2,935	2,263	2,155	2,402	6,790	9,902	2,234	2,472	2,280	3,729	9,902	2,155
Jun	2,415	6,332	2,579	2,796	2,519	2,371	2,672	2,430	6,009	7,083	2,488	2,049	2,391	3,395	7,083	2,049
Jul	3,333	5,448	3,006	3,234	2,798	2,795	3,021	2,772	4,872	3,678	2,732	2,414	2,798	3,300	5,448	2,414
Aug	2,687	3,569	2,982	3,264	2,403	2,281	2,578	2,319	3,305	3,082	2,385	2,205	2,304	2,720	3,569	2,205
Sep	1,647	2,882	1,812	2,009	1,504	1,386	1,489	1,188	1,922	1,942	1,130	1,175	1,371	1,651	2,882	1,130
Oct	1,318	1,584	1,324	1,231	1,021	917	1,419	1,055	1,021	1,133	766	604	In WY 2010	1,116	1,584	604
Nov	489	389	592	415	224	318	404	270	513	559	371	263		401	592	224
Dec	466	1,407	709	582	261	339	275	233	1,437	361	223	330		552	1,437	223

*Values Calculated using USGS National Water Information System (NWIS) monthly statistics module: http://waterdata.usgs.gov/nwis/nwisman/?site_no=11289650 &agency_cd=USGS, http://waterdata.usgs.gov/nwis/nwisman/?site_no=11289000&agency_cd=USGS, http://waterdata.usgs.gov/nwis/nwisman/?site_no=11289500 &agency_cd=USGS, and http://waterdata.usgs.gov/nwis/nwisman/?site_no=11289651&agency_cd=USGS

** Some values rounded by USGS - sum of individual gage monthly mean flows may not precisely equal combined gage monthly mean flows.

***The flood of record occurred in January, 1997, with high reservoir releases continuing on into February, 1997. These values skew the January and February mean monthly flow averages for the 1997 to 2009 period. Without 1997 values, the mean monthly flow in January is 827 cfs and February is 1,675, compared to the values in the table 1,769 and 2,170 cfs, respectively.

State water quality standards "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses" [33 USC § 1313(C) (2) (A)]. Basin Plans provide standards through (1) a designation of existing and potential beneficial uses, (2) water quality objectives to protect those beneficial uses, and (3) programs of implementation needed to achieve those objectives. The regional boards are required to consider a number of items when establishing water quality standards, including past, present and probable future beneficial uses; environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto; water quality conditions that could reasonably be achieved through the coordinated control of all factors that affect water quality in the area; and economic considerations.

SWRCB's management goals are put forth in the *Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin Rivers*, the fourth edition of which was initially adopted in 1998 and most recently revised in 2007 (CVRWQCB 1998). The Basin Plan sets forth water quality goals for the Tuolumne River, which consist of designated existing and potential beneficial uses and water quality objectives.

The Tuolumne River falls within three Basin Plan Hydro Units: (1) Hydro Unit 536, which includes the source of the Tuolumne River to Don Pedro Reservoir; (2) Hydro Unit 536.32, which includes Don Pedro Reservoir; and (3) Hydro Unit 535, which includes the Tuolumne River from Don Pedro Dam to the confluence with the San Joaquin River. The designated beneficial uses in these three Hydro Units are provided in Table 3.5.4-1.

3.6 Current Project Operations

3.6.1 General Project Operations

The Don Pedro Project is operated and managed as a multi-purpose water resource project providing water storage for irrigation, municipal and industrial, flood control, recreation, power generation, and fisheries protection and enhancement purposes. The original purpose of the Project is to provide storage for irrigation water for 210,000 acres of high-value Central Valley farmland located east of the San Joaquin River primarily in Stanislaus County. In general, Project operations follow a relatively consistent annual cycle of water management for flood control; capturing runoff from snowmelt and seasonal rainfall; delivery of water to meet irrigation, municipal, and industrial needs; providing recreation opportunity; and providing scheduled releases for the benefit of anadromous fish in the lower Tuolumne River. The water resource is treated as a high-value resource by the Districts and CCSF and its use is carefully measured, managed, and accounted for in order to meet the needs of all resource users. Operations are conducted in accordance with all FERC license terms.

Table 3.5.4-1 Designated beneficial uses of the Tuolumne River from the Basin Plan.

Designated Beneficial Use Description from Basin Plan, Section II		Designated Beneficial Use by HU from Basin Plan, Table II-1			
		Use	Source to Don Pedro Reservoir HU 536	Don Pedro Reservoir HU 536.32	Don Pedro Dam to San Joaquin River HU 535
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.	MUNICIPAL AND DOMESTIC SUPPLY	Existing	Potential	Potential
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.	IRRIGATION	Existing	-----	Existing
		STOCK WATERING	Existing	-----	Existing
Industrial Process Supply (PRO)	Uses of water for industrial activities that depend primarily on water quality.	PROCESS	-----	-----	-----
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressuration.	SERVICE SUPPLY	-----	-----	-----
		POWER	Existing	Existing	-----
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.	CONTACT	Existing	Existing	Existing
		CANOEING AND RAFTING[1]	Existing	-----	Existing
Non-Contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beach-combing, camping, boating, tide-pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.	OTHER NON-CONTACT	Existing	Existing	Existing
Warm Freshwater Habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	WARM[2]	Existing	Existing	Existing
Cold Freshwater Habitat (COLD)	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	COLD[2]	Existing	Existing	Existing

Designated Beneficial Use Description from Basin Plan, Section II		Designated Beneficial Use by HU from Basin Plan, Table II-1			
		Use	Source to Don Pedro Reservoir	Don Pedro Reservoir	Don Pedro Dam to San Joaquin River
			HU 536	HU 536.32	HU 535
Migration of Aquatic Organisms (MGR)	Uses of water that supports habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.	WARM[3]	-----	-----	-----
		COLD[4]	-----	-----	Existing
Spawning (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.	WARM[3]	-----	-----	Existing
		COLD[4]	-----	-----	Existing
Wildlife Habitat (WILD)	Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation or enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, or invertebrates), or wildlife water and food sources.	WILDLIFE HABITAT	Existing	Existing	Existing

1 Show for streams and rivers only with the implication that certain flows are required for this beneficial use.

2 Resident does not include anadromous. Any hydrologic unit with both WARM and COLD beneficial use designations is considered COLD water bodies by the SWRCB for the application of water quality objectives.

3 Striped bass, sturgeon, and shad.

4 Salmon and steelhead.

Source: CVRWQCB 1998.

A primary consideration for operations each year is the anticipated water availability in the Tuolumne River watershed and its likely seasonal inflow pattern. The Districts continually track reservoir inflow and outflow to provide the best understanding of overall water availability and predicted inflow to the reservoir. The Districts consider multiple data sources when evaluating water availability in the watershed, including weather forecasts, the precipitation to date, available snowcourse data from higher elevation areas, and the California Department of Water Resources (CDWR) Bulletin 120 forecasts of reservoir inflow. Bulletin 120 forecasts are published monthly, beginning in the first week of February and generally ending the first week of May (in some years, a supplemental June Bulletin 120 has been published).

As a general matter, the Project is operated to capture spring snowmelt and rain runoff, to provide water downstream for the remainder of the year, to carry over storage for future water years, and to guard against water shortages in dry years and successive dry years. Project operations must consider potential water availability over the course of multiple years, such that even in drier years the reservoir can retain water supply to meet downstream needs. In a typical year, Don Pedro Reservoir storage peaks in mid-summer around early July after the end of the snowmelt season. Reservoir water surface elevations are generally maintained as high as possible for summer recreation, but they are steadily drawn down as fall approaches. In average to wet years, late fall, winter and early spring reservoir levels are generally held at the required flood control level; peaking in late spring and early summer, and then declining throughout the summer into the fall. In dry years, reservoir levels can be substantially lower. Only small day-to-day fluctuation occur in reservoir levels during periods where there is not a large inflow to the reservoir (such as significant storm events), and annual reservoir level fluctuations are typically in the range of 30 to 80 vertical feet between maximum and minimum storage (USGS Data, Gage 11287500, 1994-2009). Figure 3.6.1-1 shows the reservoir level exceedance curve since the Project began operations.

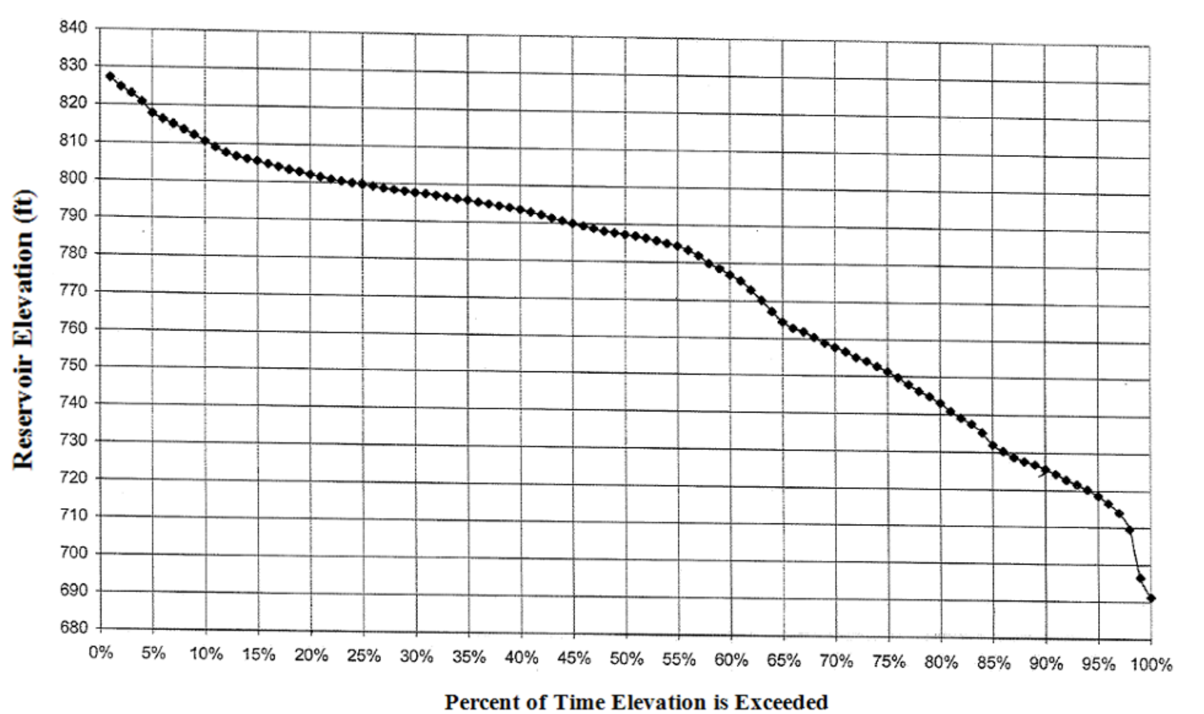

Figure 3.6.1-1 Don Pedro reservoir level exceedance curve after reservoir filling.

Project operators communicate daily with the CCSF Hetch Hetchy Water and Power Division. That CCSF division maintains and operates the upstream facilities of Hetch Hetchy, Cherry, and Eleanor reservoirs which control the inflow to the Don Pedro Reservoir. The presence of these reservoirs and the out-of-basin diversions upstream of the Project means that water availability and inflow to the Project do not follow the natural patterns of streamflow on an annual, seasonal, or daily basis.

3.6.2 Assurance of Public and Employee Safety

Safety is the Districts' first and foremost operational consideration. The Districts operate the Project in a safe manner and provide employees with all necessary training and equipment to operate the Project safely. The Districts cooperate fully with FERC during inspections of Project facilities such as the annual FERC inspections, five-year Part 12 Dam Safety Inspections, and Environmental and Public Use Inspections, and in other similar safety-related areas such as the development and provision of the appropriate Emergency Action Plans and Public Safety Plans.

3.6.3 Flood Control Benefits

The ACOE participated financially in the building of the Don Pedro Dam in exchange for the Districts setting aside 340,000 ac-ft of flood control storage space. This space occurs between elevations 801.9 and 830.0 feet and is kept vacant from October 7 through April 27 of the next year. The maximum reservoir level to date at Don Pedro has been 831.4 feet which occurred on January 2, 1997.

Reservoir flood control allows for winter and spring capture of both rain and snowmelt floods, and is part of the ACOE system for flood control operations including the other so-called "rim reservoirs" that surround the rim of California's Central Valley. Don Pedro Reservoir's flood control storage requirements increase from zero on September 8 to the maximum reservation of 340,000 ac-ft by October 7. The flood control storage is maintained at 340,000 ac-ft through April 27 after which, unless additional reserved space is indicated by snowmelt parameters, it can decrease uniformly to zero by June 3. Figure 3.6.3-1 graphically depicts the flood control rule curve for the Project.

In addition to flood control space needs within the reservoir, downstream flow restrictions also affect Project operations from a flood management perspective. The primary downstream flow guideline cited in the 1972 ACOE Flood Control Manual is that flow in the Tuolumne River at Modesto (as measured at the 9th Street Bridge) should generally not exceed 9,000 cfs. Flows in excess of 9,000 cfs have the potential to cause significant damage to property in this area of the Tuolumne River.

Although flood control operations and flood control space in Don Pedro Reservoir can be generally described in this simplified manner, storage space for the maximum allowable storage targets can only be determined real-time for the Project. Inflow forecasts are constantly updated. Project operations and management for flood control purposes requires the development of a

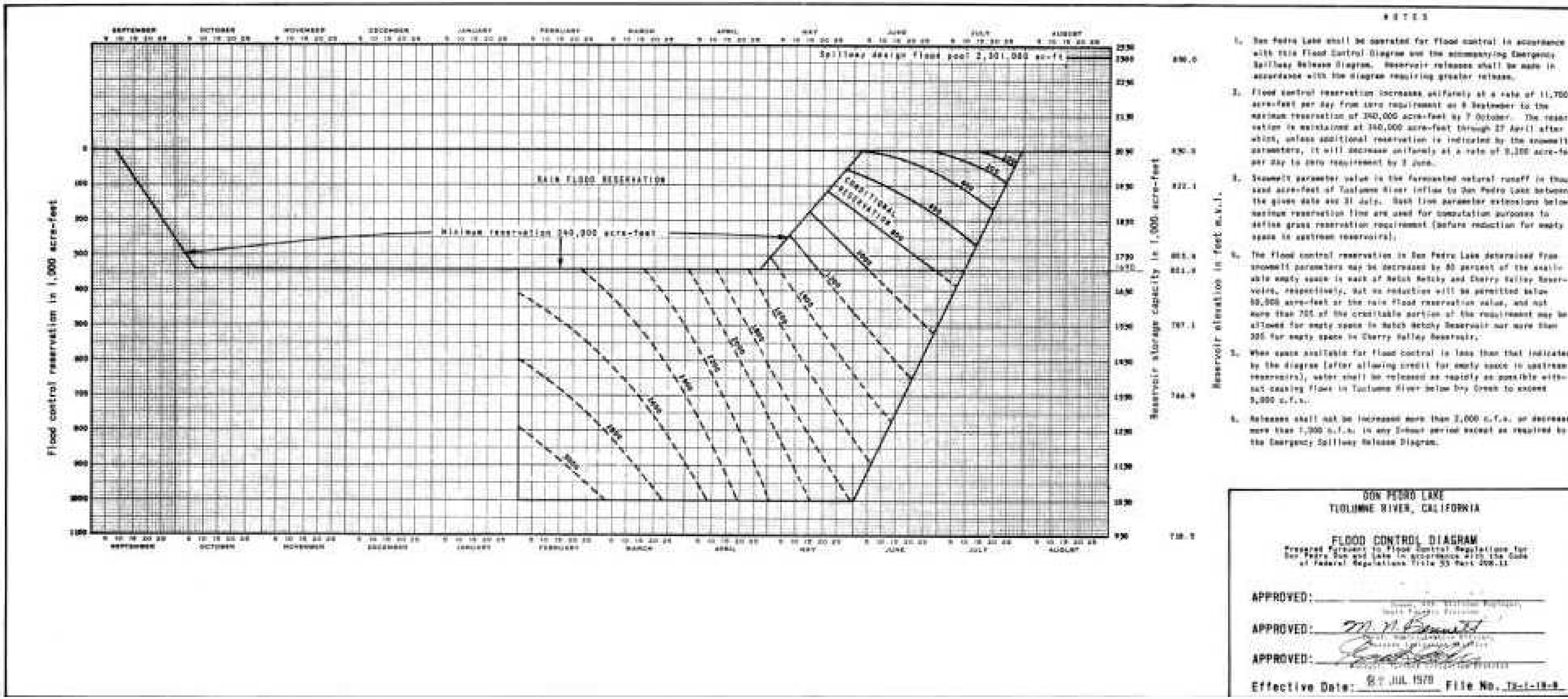

Figure 3.6.3-1 Don Pedro Reservoir flood control rule curve.

Long-term (up to six months) forecast of the potential inflow into Don Pedro under various runoff scenarios. Flood control management may require the early release of water from Don Pedro so as to maintain flows at Modesto below the 9,000 cfs level. In short, if there is a large volume of water that is expected to be intercepted by Don Pedro either in the short or long term that may result in higher releases than 9,000 cfs, then pre-flood releases may be made to reduce the risk of having to release more at a later time.

To perform this task, the Districts review, on a continuous basis, the current status and future forecasts of the Tuolumne River reservoir system. This includes reservoir status, generation or release capability, planned outages, current hydrologic conditions, short- and long-term weather forecasts, lower Tuolumne River requirements, and any other issues that could possibly affect operations and maintaining the flow requirement at Modesto. The Districts continuously update their canal flow requirements (long and short term) and communicate with federal and state agencies that operate reservoirs within the San Joaquin River system. The Districts are in contact with the California State Department of Water Resources (CDWR) and the federal National Weather Service regarding weather forecasts or forecasted rainfall and/or runoff. The Districts are in frequent contact with the ACOE. The Districts use a number of models and programs for the calculation of estimated inflows to Don Pedro and future release requirements. These models range in time step from annual, monthly, weekly, daily, and finally, hourly or real-time. These models develop statistical operational probability curves for forecasts of potential operations, and finally, operational plans to be followed.

For day-to-day and hour-to-hour operations, the Districts will develop a total release schedule for Don Pedro and the bifurcation of these releases to the TID and MID canals and the river. Flows to the Districts are for the beneficial use of irrigation and M&I requirements either currently or in the future. On occasion, pre-flood flows can be directed through the Districts' canal systems to flow to their respective lower reservoirs (Turlock Lake and Modesto Reservoir) and finally to the lower canal systems spilling back to the river. This is done at times to better manage fisheries. This ability is very limited and conditional on the time of year and hydrologic or meteorological conditions.

Between La Grange Dam and 9th Street in Modesto, the single largest contributor of local flow to the Tuolumne River is Dry Creek. The Dry Creek watershed has its headwaters in the foothills just northeast of Don Pedro. It is a flashy watershed; once the soil is saturated, any rainfall results in a rapid response in runoff. Significant flows, on the order of 6,000 cfs or higher, can occur any time there is significant rainfall between Modesto and the upper end of the Dry Creek watershed. Because these flows from Dry Creek come in above the Modesto 9th Street river gage, the flows must be taken into account when making releases from Don Pedro and La Grange to the lower river.

3.6.4 Irrigation, Municipal, and Industrial Water Supply

The primary function of the Don Pedro Project is to store water for the beneficial use of irrigation, municipal, and industrial water supply. Both TID and MID have obligations to supply both water and retail electric service to their respective service areas. The Don Pedro Project also provides water storage (in the form of water bank credits) for CCSF which enables it to reliably meet the water needs of its over two million customers in the Bay Area.

For irrigation purposes, the TID service area encompasses 307 square miles of the Central Valley. TID provides full-service irrigation water to about 150,000 acres of farmland. MID's irrigation service area is 156 square miles with 60,000 acres of irrigated land. The approximate crop distributions can change from year to year, but representative percentages are as follows:

- Fruit and nut orchards 35%
- Grains 43%
- Pasture 7%
- Alfalfa 7%
- Other 8%

The farmland served by the Districts is characterized by rich soils with long growing seasons; however, irrigation water is required due to natural summer precipitation levels being near zero. Water delivery from Don Pedro Reservoir to serve the Districts' irrigation systems and irrigation customers occur primarily from March through October. However, it is not unusual for irrigation-related water releases to occur from Don Pedro year-round, depending on winter moisture conditions, storage needs in Turlock Lake and/or Modesto Reservoir, and early-or-late season temperatures. MID also provides treated water to the City of Modesto for M&I purposes. Water deliveries to the city for M&I purposes vary from year to year. Facilities are designed to deliver up to a maximum of 67,200 ac-ft per year. The Districts also provide a small amount of domestic water to the community of La Grange. Releases from Don Pedro occur year-round to meet these needs.

Average annual water releases to meet the Districts' needs from the Project from 1997 to 2009 have been approximately 900,000 ac-ft. Actual water deliveries are provided in Table 3.5.3-1 above.

3.6.5 Renewable Power Generation

The Don Pedro powerhouse contains four turbine-generator units with a nameplate capacity of 168 MW and a maximum output capability under optimum conditions of 203 MW. Both TID and MID provide retail electric service to their residential, commercial, and industrial utility customers. TID serves 14 communities in three counties over a service territory of 662 square miles with approximately 100,000 electric accounts. MID serves seven communities in two counties over a service territory of 560 square miles with about 111,000 electric accounts.

Electric power at the Don Pedro Project is normally generated by flows released for other purposes. Irrigation, municipal, and industrial water deliveries are scheduled daily and released through the powerhouse. Scheduling of these releases is adjusted when possible to release flows with a preference for on-peak rather than off-peak hours. Flows released at Don Pedro are diverted from the Tuolumne River at La Grange Dam, a non-project dam located downstream of Don Pedro Dam, into the TID or MID irrigation canals.

Power generation, therefore, varies depending on irrigation, municipal, and industrial water needs. Releases at Don Pedro Dam are also made to deliver flows to La Grange Dam for release to the Tuolumne River below La Grange Dam. These releases are made in accordance with the schedule adopted as part of the 1995 settlement agreement and the subsequent 1996 FERC order (see Section 3.8 below).

TID owns 68.46 percent of the Project generation and MID 31.54 percent. The Project switchyard is designed to allow flexibility of unit operation and for meeting individual TID and/or MID electric demand. Average annual generation for the period 2002 to 2009 was 532,518 MWh. Monthly generation over this period is provided in Table 3.6.5-1.

Table 3.6.5-1 Monthly project generation for 2002 through 2009 at Don Pedro powerhouse.

Month	Monthly Total Generation (MWh)								Average Generation (MWh)
	2002	2003	2004	2005	2006	2007	2008	2009	
January	5,032	5,238	7,312	12,139	112,593	12,791	3,106	4,874	20,385
February	3,978	11,286	11,886	49,082	73,011	15,324	5,562	5,324	21,932
March	38,413	25,664	63,492	98,891	126,853	45,392	37,552	21,984	57,280
April	62,461	40,137	72,896	138,310	111,728	48,764	43,615	41,266	69,897
May	55,005	52,617	58,855	144,933	132,292	54,935	59,258	56,034	76,741
June	55,147	65,954	59,829	138,499	125,973	58,186	46,767	56,546	75,863
July	67,472	77,019	69,991	123,984	98,559	65,554	55,777	68,058	78,302
August	53,704	62,432	55,092	85,902	81,853	54,556	47,928	53,213	61,835
September	29,320	32,816	25,654	44,670	46,826	23,629	23,105	28,653	31,834
October	19,031	33,397	23,238	22,421	26,913	15,799	11,726	18,329	21,357
November	5,857	8,177	4,306	9,995	11,898	7,093	4,578	7,873	7,472
December	6,914	6,082	4,096	35,906	8,418	3,841	6,116	5,594	9,621
Total	**402,333**	**420,820**	**456,646**	**904,732**	**956,915**	**405,863**	**345,090**	**367,748**	**532,518**

3.6.6 Recreation Benefits

The recreation facilities included at the Project are operated by the Don Pedro Recreation Agency (DPRA), an agency that is operationally a department within TID and sponsored by the Districts and CCSF. DPRA is responsible for managing the use of all Project lands.

As part of its responsibilities, DPRA manages, operates, and maintains the developed recreation facilities and lake-surface facilities. DPRA also manages the campsite reservation system, entry-gate administration, and maintenance of all associated facilities (drinking water plant, filtration plant, wastewater treatment plants, and solid waste disposal). DPRA maintains a headquarters building overlooking Don Pedro Dam, just off Bonds Flat Road.

The DPRA has 16 full-time and up to 35 seasonal employees (May to September). DPRA also manages enforcement. Rangers hold First Responder medical, wildland firefighting, and law enforcement certifications. DPRA manages entry points, operation and maintenance of facilities including oversight of concessionaires licensed to provide services on the reservoir. DPRA activities also include some non-recreational management issues such as debris management at the upstream end of the reservoir with collection, corralling, and wintertime disposal of woody debris that collects in the area where the Tuolumne River flows into the reservoir. Concessionaire areas within the Project are operated by Forever Resorts, LLC.

Recreation activities at the Don Pedro Reservoir include individual and group activities, organized and spontaneous events for both reserved and at-the-gate participants. Motorized and non-motorized boating, houseboating, camping and RV camping, waterskiing and wakeboarding, jet-skiing, fishing (including scheduled bass tournaments), swimming, and hiking are all recreation opportunities available at Don Pedro.

Typical annual use for the Project exceeds 407,000 visitor days (10-year average, 1999-2008), primarily comprised of use by local area residents from nearby counties (47 percent of use in 2008), and use by Bay Area residents (31.5 percent in 2008).

Dispersed use of the majority of the undeveloped Don Pedro Project shoreline is permitted, including both daytime and overnight use. Use of some shoreline areas is restricted due to conditions such as on-shore hazards or potential for nuisance activity to adjacent property owners. Boat launching is only permitted at the designated launch ramps found in each of the three developed recreation areas.

There is one semi-developed area within the reservoir with boat-in access only, at the area of the reservoir referred to as Wreck Bay, at the west end of the Upper Bay. This semi-developed area includes tables and one of the shoreline restrooms. DPRA maintains shoreline restrooms at five locations in addition to those at the developed recreation areas, and floating restrooms on anchored platforms at six locations throughout the reservoir. Floating restrooms are located in areas with significant recreation but no shoreline or developed services, including popular coves or areas of interest such as the Hatch Creek Arm where a water ski slalom course has been established.

In addition to some small amount of boat travel from Project-related recreation, the Wards Ferry Bridge area at the upstream end of the reservoir is also the site of some non-Project-related recreation. Although this spot is undeveloped, recreational whitewater boaters who run the most-downstream whitewater reach of the Wild and Scenic Tuolumne River remove their boats from the water just upstream of this bridge. DPRA maintains a restroom (one of the five shoreline restroom facilities) at this location on the shoulder of Wards Ferry Road above the reservoir, to avoid improper waste disposal near this portion of the reservoir.

Buoys are displayed for safety and regulatory purposes. Appropriate buoys or floating booms are deployed where known underwater obstacles or hazards are present. Different buoys are used for recreational installations, such as the Hatch Creek Arm deployments, which outline a water-ski slalom course for use by recreational boaters.

3.6.7 Fish and Wildlife Benefits

3.6.7.1 Project Reservoir

Don Pedro Reservoir, with a surface area of approximately 12,900 acres, supports both game and non-game fish and wildlife resources. Fishing is a primary recreation activity at the Project for both warm and cold water species. Several bass tournaments are supported by the DPRA each year, but most fishing is carried out by individuals by boat. Bank fishing is also permitted, but is more common in areas adjacent to the developed recreation sites. Historical Project operations and stocking by DPRA and CDFG have supported robust fish populations.

The Districts maintain, and DPRA implements, a detailed and extensive land use policy consisting of rules and regulations governing uses of Project lands and waters (see Appendix E of the PAD). The land use rules and regulations prohibit any placement of developed improvement along the Don Pedro shoreline and prohibit all vehicular access across Project lands. The end result of the Districts' land use policies is to maintain well over 90 percent of the Don Pedro shoreline in its natural state. This benefits both wildlife and botanical resources.

3.6.7.2 Project Releases to Benefit Lower Tuolumne River Fisheries

The Districts have actively participated in the study, monitoring, protection and enhancement of the fall-run Chinook salmon in the lower Tuolumne River throughout the past 40 years. Operations have been modified to improve conditions for fall-run Chinook. In 1995, the Districts entered into a settlement agreement with the CDFG, USFWS, CCSF, and four non-governmental organizations (NGOs) that provided for increasing releases from Don Pedro Dam to improve conditions in the lower Tuolumne River for fall-run Chinook salmon. The Districts agreed that certain flows released at Don Pedro would not be diverted at La Grange Dam, resulting in greater flows to the lower Tuolumne River. FERC issued an order on July 31, 1996 amending the Don Pedro license to incorporate the lower Tuolumne River minimum flow provisions contained in the settlement agreement. The revised flows were to vary from 50 to 300 cfs depending on water year hydrology and time of year. The water year classifications are re-calculated each year to maintain approximately the same frequency distribution of water year types. Table 3.6.7-1 contains the current version of these classifications. The settlement agreement and license order also specified certain pulse flows, the amount of which also varies with water year type. The downstream flow schedule provided for by the Settlement Agreement and subsequent FERC Order is shown in Table 3.6.7-2. FERC-required minimum instream flows are determined and adjusted as described in the Don Pedro Project Fish Flow Procedure.

3.6.7.3 Vernalis Adaptive Management Plan

The Districts are members of the San Joaquin River Group Authority (SJRGA). Discussions among SJRGA and others led to the San Joaquin River Agreement (SJRA), which contained flow objectives for the San Joaquin River for fisheries management, referred to as the Vernalis Adaptive Management Plan (VAMP). The VAMP is an experimental plan that has been in place since 1999 and will continue through 2011.

Under the San Joaquin River Agreement, the Districts have provided their share of water to the lower Tuolumne River to support meeting a pulse flow in the San Joaquin River of up to 110,000 ac-ft of supplemental water for a 31-day period during April and May as measured in the lower San Joaquin River at Vernalis.

The VAMP target flow is determined by estimating the mean flow that would occur at Vernalis during the VAMP target flow period without the VAMP, which is referred to as the "existing flow", and then estimating the Supplemental Flow from Table 3.6.7-3 below.

Table 3.6.7-1 Current water year classification table.

Water Year Classification	Cumulative Occurrences			Settlement Agreement		60-20-20 Index (x 1000)													
						1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Critical Water Year and Below	0.0%	-	6.4%	<	1500	1,441	1,441	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Median Critical Water Year	6.4%	-<	14.4%	>=	1500	1,441	1,441	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476	1,476
Intermediate Critical Dry Water Year	14.4%	-<	20.5%	>=	2000	1,964	1,964	1,964	1,964	1,964	1,964	2,002	2,002	2,002	2,002	1,973	1,973	1,973	2,002
Median Dry	20.5%	-<	31.3%	>=	2200	2,159	2,183	2,183	2,183	2,183	2,183	2,187	2,187	2,187	2,187	2,183	2,183	2,183	2,183
Intermediate Dry-Below Normal	31.3%	-<	40.4%	>=	2400	2,441	2,442	2,442	2,442	2,442	2,441	2,441	2,403	2,441	2,441	2,403	2,403	2,403	2,403
Median Below Normal	40.4%	-<	50.7%	>=	2700	2,720	2,720	2,720	2,763	2,720	2,720	2,720	2,698	2,720	2,720	2,720	2,698	2,720	2,720
Intermediate Below Normal-Above Normal*	50.7%	-<	66.2%	>=	3100	3,139	3,183	3,183	3,225	3,183	3,183	3,139	3,139	3,139	3,183	3,139	3,139	3,080	3,139
Median Above Normal	68.2%	-<	71.3%	>=	3100	3,689	3,740	3,740	3,689	3,689	3,689	3,669	3,669	3,689	3,689	3,689	3,689	3,669	3,669
Intermediate Above Normal-Wet	71.3%	-<	86.7%	>=	3100	3,903	4,028	4,028	3,903	3,903	3,903	3,898	3,898	3,903	4,028	3,903	3,903	3,903	3,898
Median Wet/Maximum	86.7%	-<	100.0%	>=	3100	4,593	4,653	4,653	4,653	4,653	4,653	4,593	4,593	4,653	4,730	4,730	4,730	4,730	4,730

*Maximum index value for fish flow year is not to go above value shown in this row.

**The index in the 1995 Settlement Agreement was based on Water Years 1906-1995.

Table 3.6.7-2 Schedule of flow releases at La Grange Dam to the lower Tuolumne River by water year type contained in FERC's 1996 order.

Schedule	Units	# of Days	Critical and Below	Median Critical[1]	Interm. CD	Median Dry	Interm. D-BN	Median Below Normal	Interm. BN-AN[1]	Median Above Normal	Interm. AN-W	Median Wet/Max
Occurrence	%		6.4%	8.0%	6.1%	10.8%	9.1%	10.3%	15.5%	5.1%	15.4%	13.3%
October 1-15	cfs	15	100	100	150	150	180	200	300	300	300	300
	ac-ft		2,975	2,975	4,463	4,463	5,355	5,950	8,926	8,926	8,926	8,926
Attraction Pulse	ac-ft		none	none	none	none	1,676	1,736	5,950	5,950	5,950	5,950
October 16- May 31	cfs	228	150	150	150	150	180	175	300	300	300	300
	ac-ft		67,835	67,835	67,835	67,835	81,402	79,140	135,669	135,669	135,669	135,669
Outmigration Pulse Flow	ac-ft		11,091	20,091	32,619	37,060	35,920	60,027	89,882	89,882	89,882	89,882
June 1-Sept 30	cfs	122	50	50	50	75	75	75	250	250	250	250
	ac-ft		12,099	12,099	12,099	18,149	18,149	18,149	60,496	60,496	60,496	60,496
Volume (total)	ac-ft	365	94,000	103,000	117,016	127,507	142,502	165,002	300,923	300,923	300,923	300,923

[1] Between a Median Critical Water Year and an Intermediate Below Normal-Above Normal Water Year, the precise volume of flow to be released by the Districts each fish flow year is to be determined using accepted methods of interpolation between index values.

Source: FERC 1996.

Table 3.6.7-3 VAMP flow and Delta export target flow rates

Forecasted Existing Flow (cfs)	SJRGA Supplemental Water Target Flow (cfs)	VAMP Target Flow (cfs)	Delta Export Target Rate (cfs)
Less than 2,000[1]	2,000		1,500
2,000 to 3,199	3,200	3,200	1,500
3,200 to 4,449	4,450	4,450	1,500
4,450 to 5,699	5,700	5,700	2,250
5,700 to 7,000	7,000	7,000	1,500 or 3,000
Greater than 7,000	N/A	Provide stable flow to extent possible	1,500, 2,250 or 3,000[2]

1 If the Existing Flow is less than 2,000 cfs, then the SJRGA is required to provide supplemental water to achieve a target flow of 2,000 cfs with the USBR responsible for obtaining water to fulfill the requirement of existing federal Biological Opinions.

2 Suggested rates.

Once the VAMP Target Flow is determined, then the difference between the VAMP Target Flow and the existing flow is calculated to determine the Supplemental Flow. This Supplemental Flow is allocated based on Table 3.6.7-4 for each of the tributaries.

Table 3.6.7-4 VAMP supplemental water division agreement.

Priority in Descending Order	First 50,000 (ac-ft)	Next 23,000 (ac-ft)	Next 23,000 (ac-ft)	Next 23,000 (ac-ft)	Totals (ac-ft)
Merced ID	25,000	11,500	8,500	10,000	55,000
Oakdale ID/South San Joaquin ID	10,000	4,600	3,400	4,000	22,000
Exchange Contractors	5,000	2,300	1,700	2,000	11,000
MID/TID	10,000	4,600	3,400	4,000	22,000

3.6.8 Historical Reservoir Operations

Satisfying the full range of water uses and needs of Project beneficiaries described above in Sections 3.6.2 through 3.6.7 requires a proactive and highly coordinated approach to Project reservoir management and administration. While assuring Project and employee safety, the Districts manage the Don Pedro Project to provide flood control, irrigation water supply, municipal and industrial water supply, power generation, fisheries protection, recreation, and other uses. The resulting daily operations of the Project in delivering these benefits since 1997 are shown in Figures 3.6.8-1 through 3.6.8-13. The designated water year type is also provided for each year.

3.7 Proposed Project Operations, Upgrades or Changes in Project Operations to Increase Generation

The Districts have evaluated the potential for upgrading the 40-year-old Units 1, 2, and 3. At this time, the Districts believe it is likely that an upgrade to the turbines will be proposed in the Final License Application (FLA). The maximum flow increase through each unit would be approximately 400 cfs.

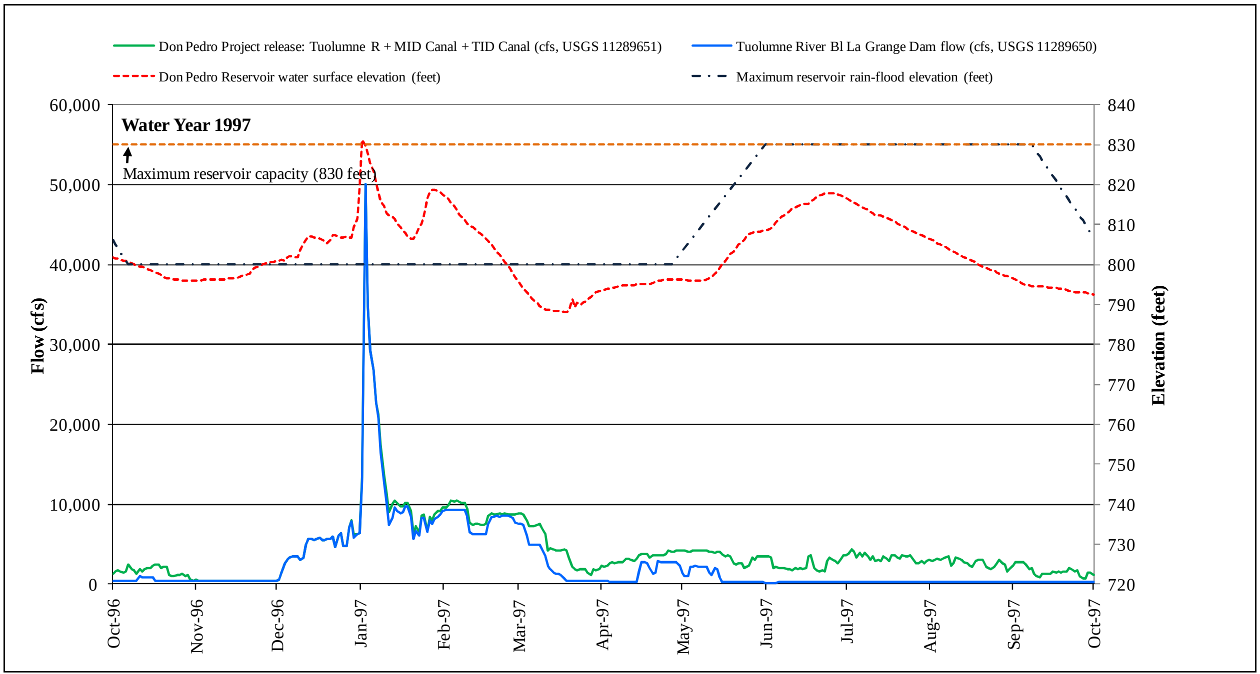

Figure 3.6.8-1 Reservoir water levels and flow releases in WY 1997 (Interm AN-W).

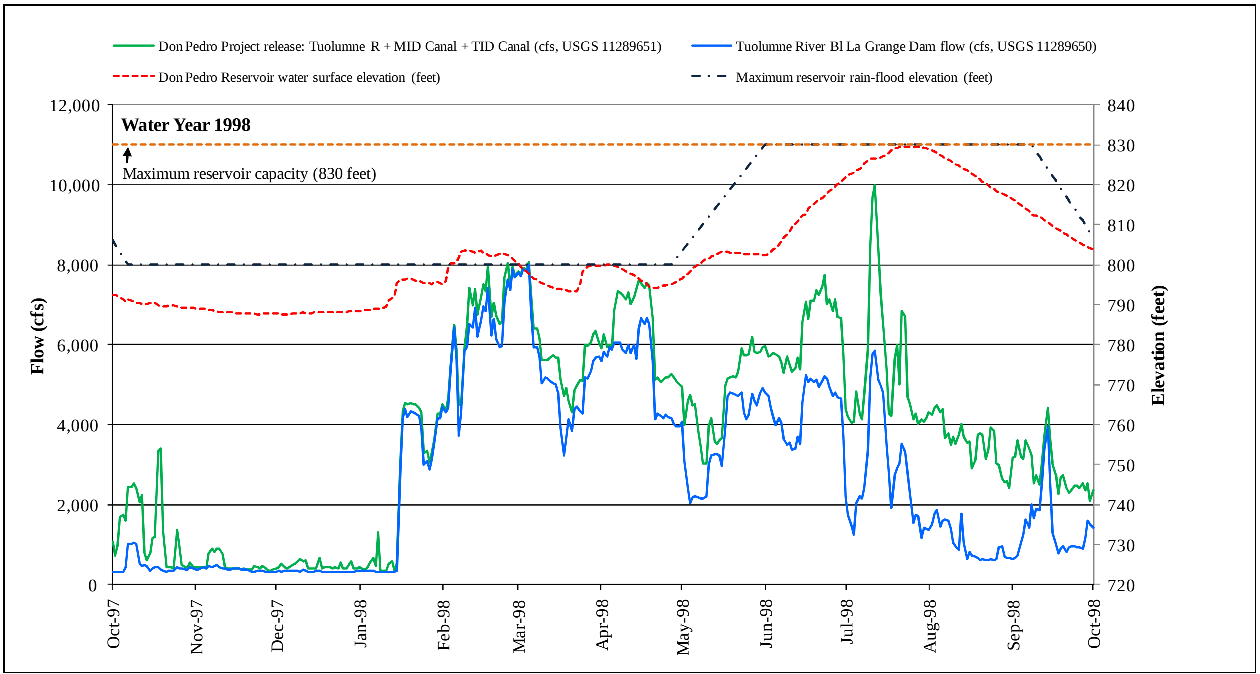

Figure 3.6.8-2 Reservoir water levels and flow releases in WY 1998 (Median Wet/Max).

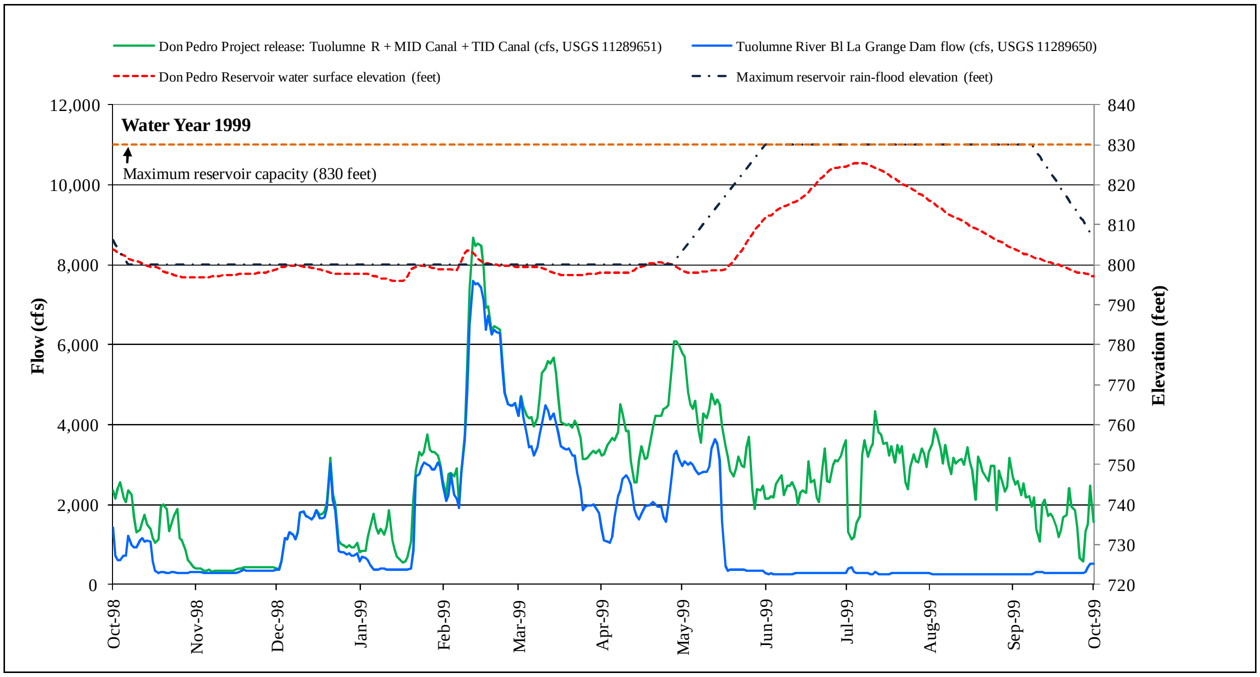

Figure 3.6.8-3 Reservoir water levels and flow releases in WY 1999 (Interm BN-AN).

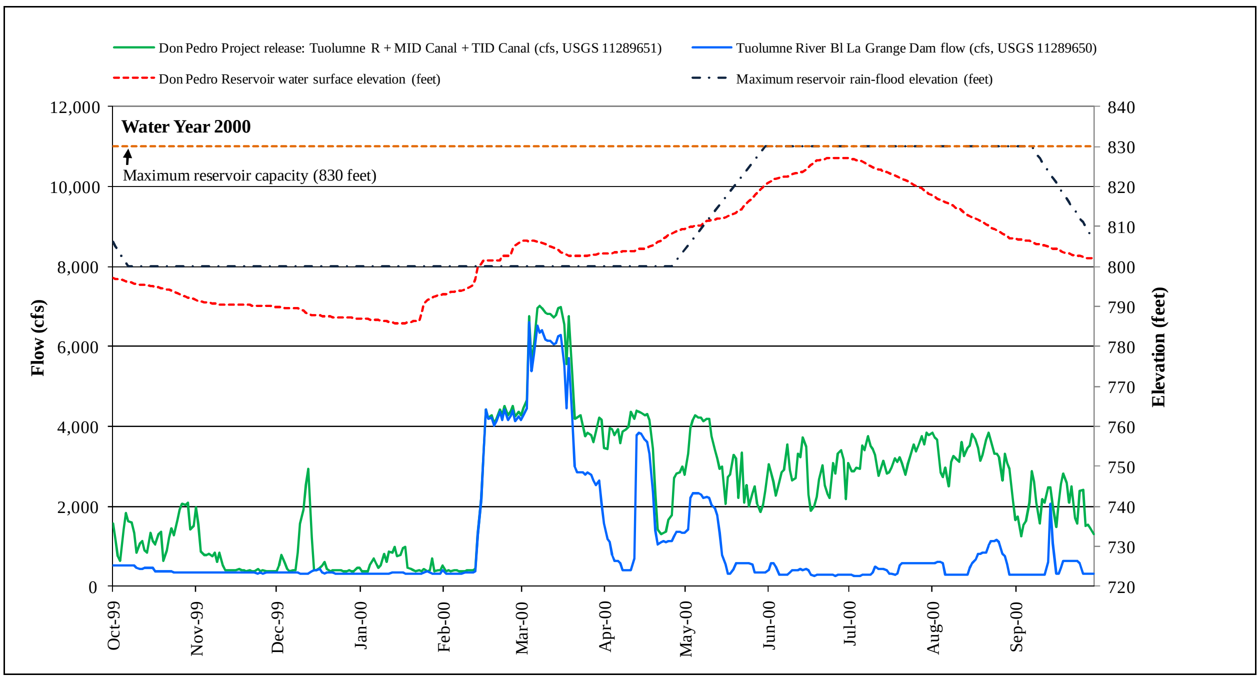

Figure 3.6.8-4 Reservoir water levels and flow releases in WY 2000 (Interm BN-AN).

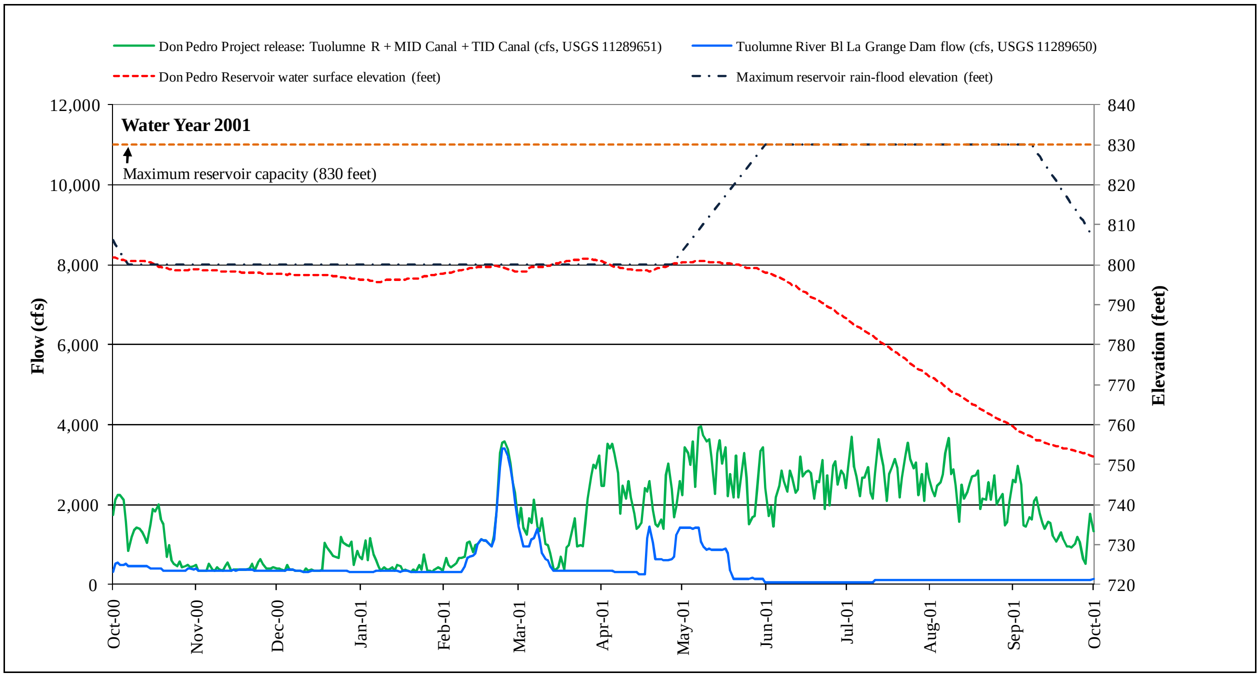

Figure 3.6.8-5 Reservoir water levels and flow releases in WY 2001 (Median Dry).

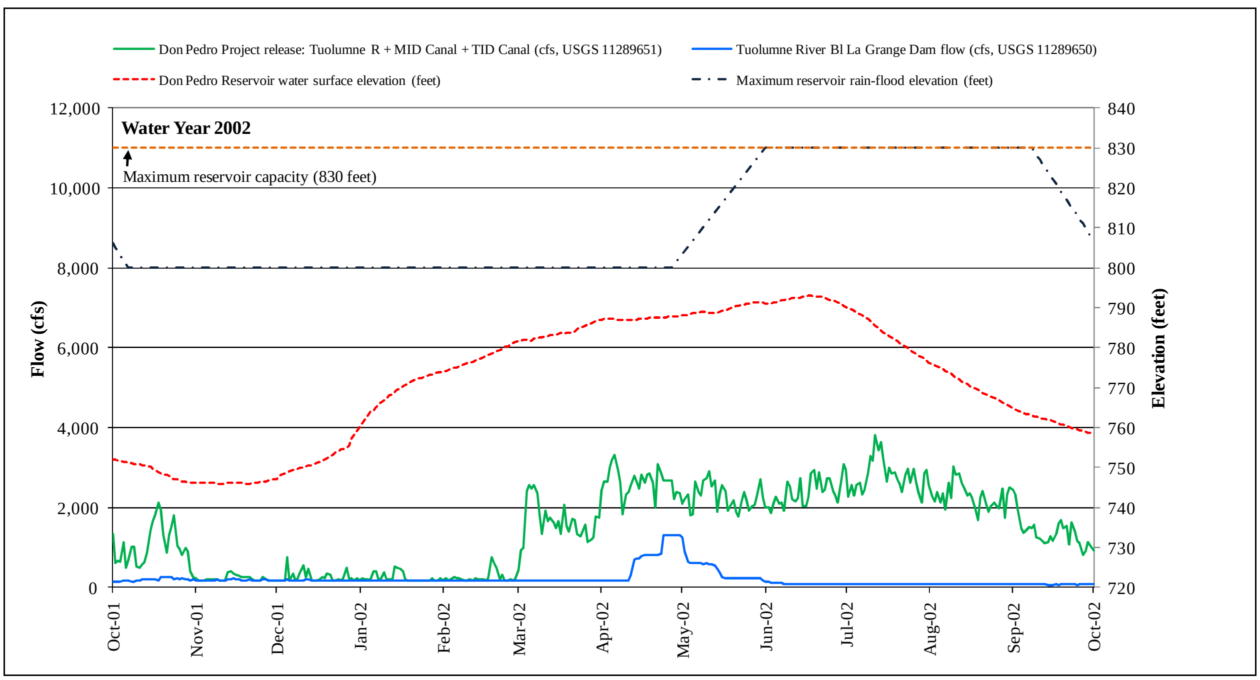

Figure 3.6.8-6 Reservoir water levels and flow releases in WY 2002 (Median Dry).

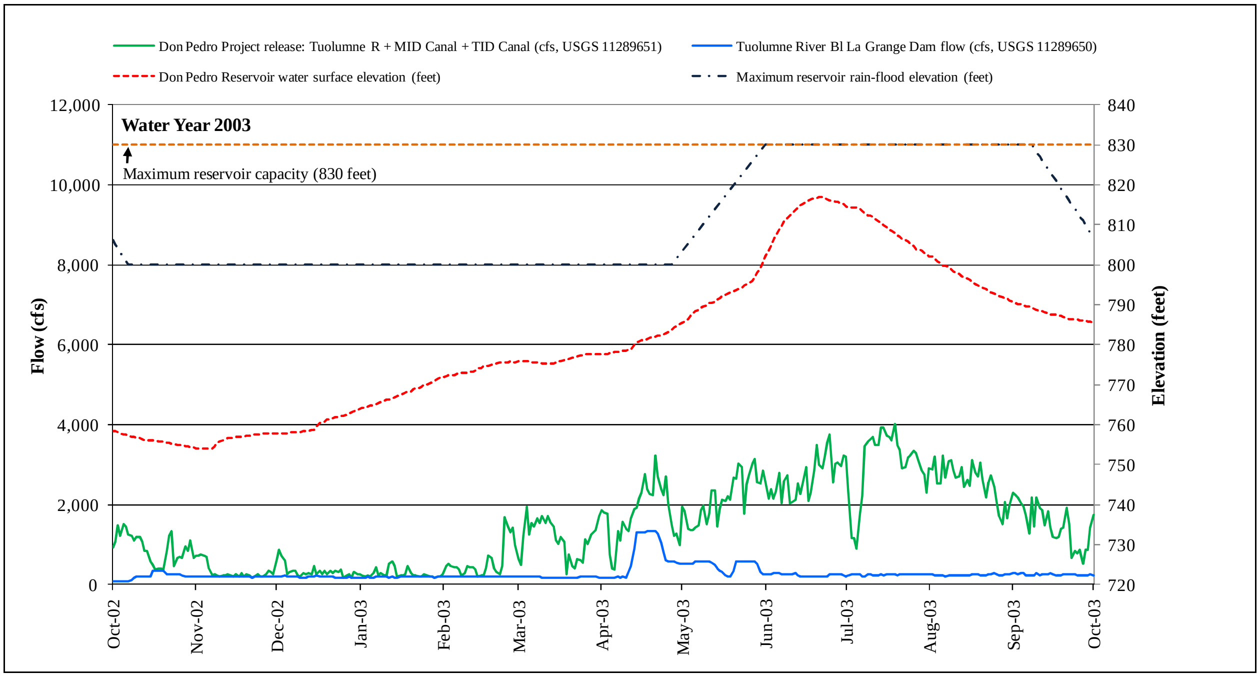

Figure 3.6.8-7 Reservoir water levels and flow releases in WY 2003 (Median Below Normal).

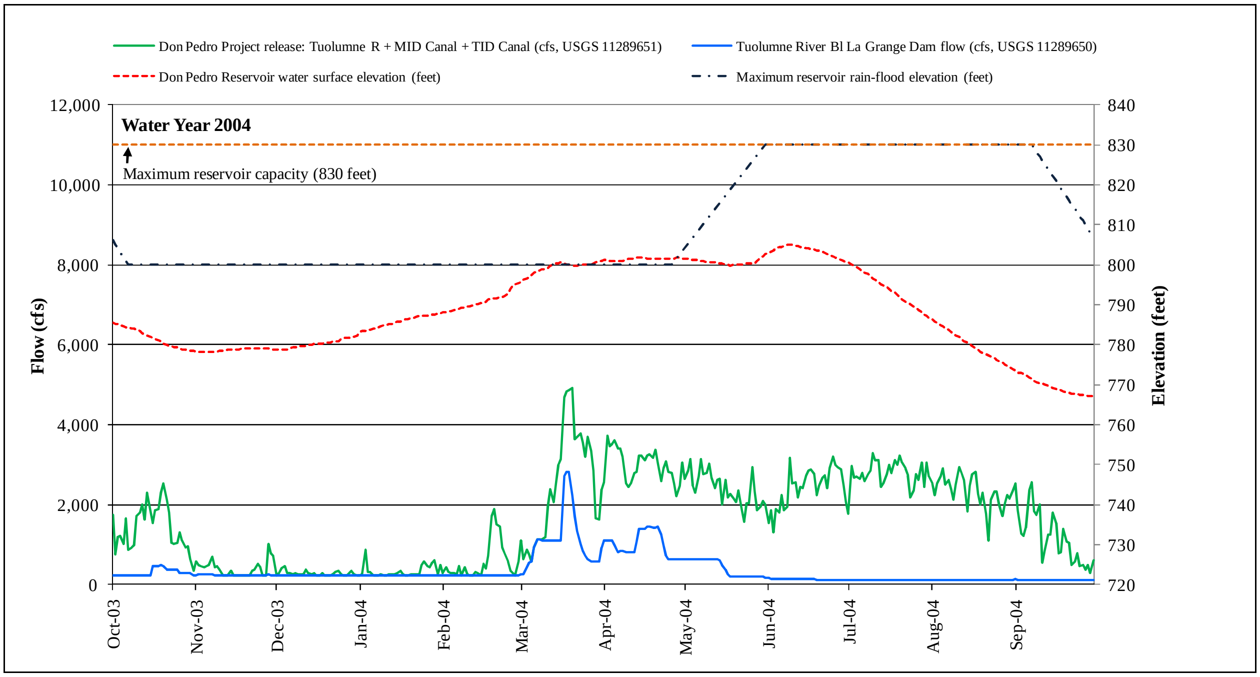

Figure 3.6.8-8 Reservoir water levels and flow releases in WY 2004 (Median Dry).

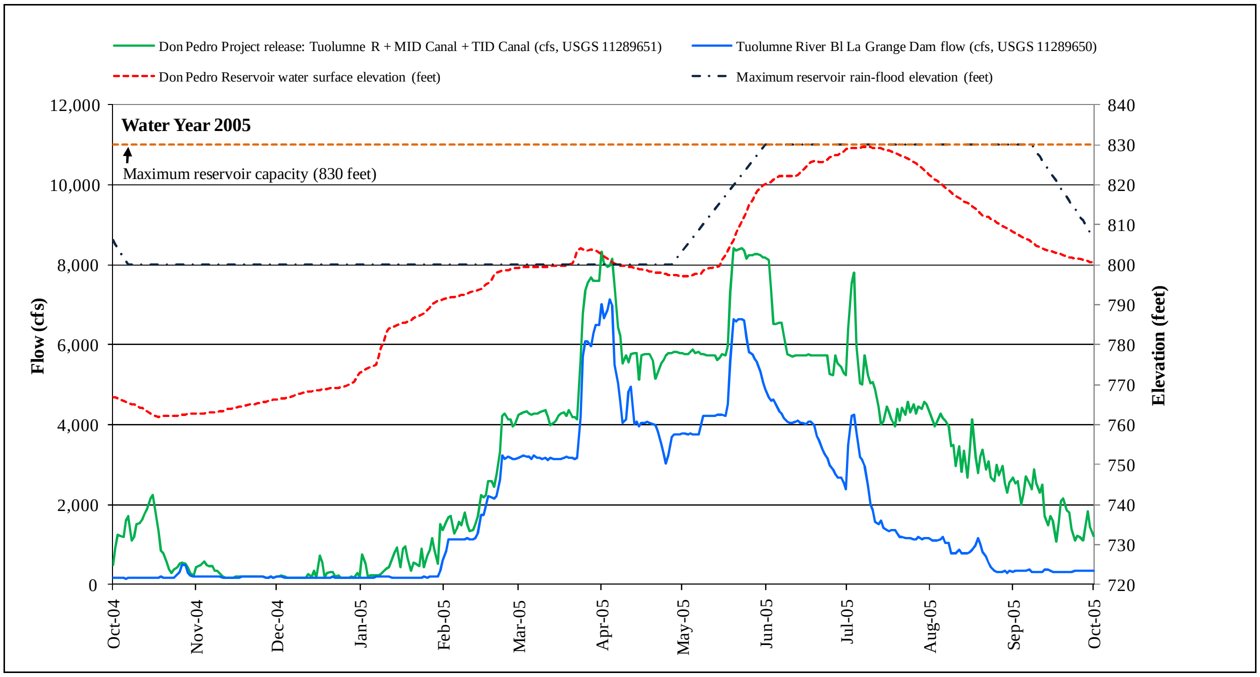

Figure 3.6.8-9 Reservoir water levels and flow releases in WY 2005 (Median Wet/Max).

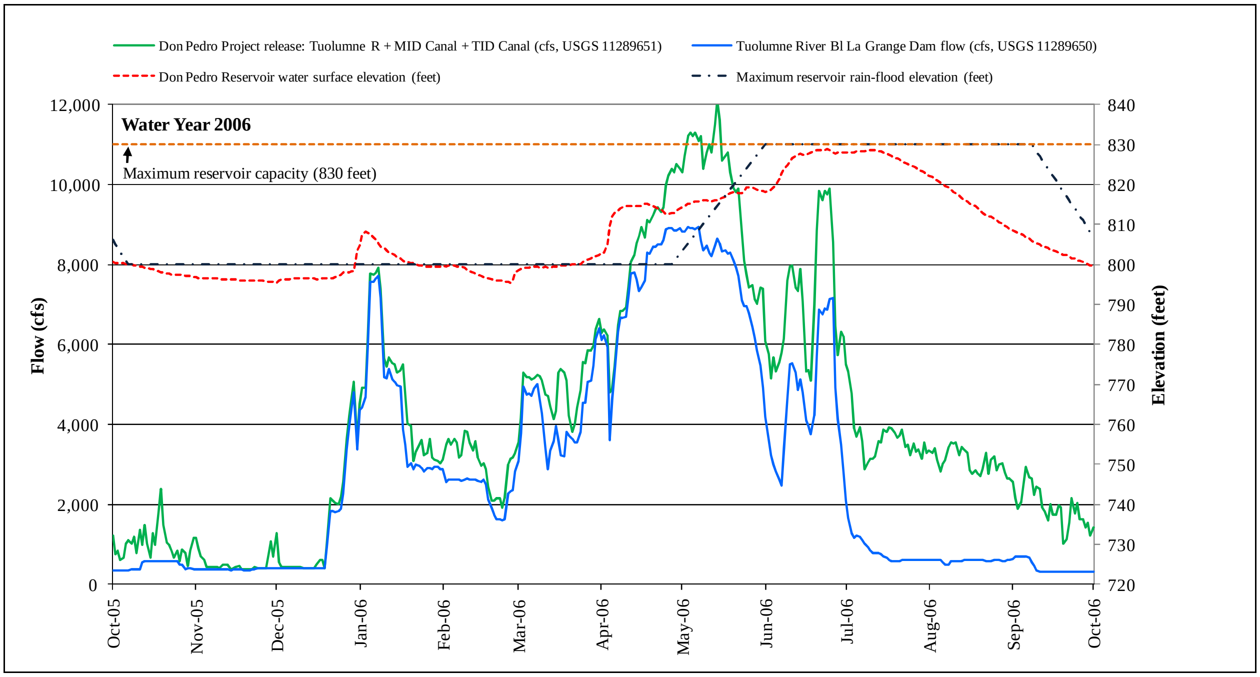

Figure 3.6.8-10 Reservoir water levels and flow releases in WY 2006 (Median Wet/Max).

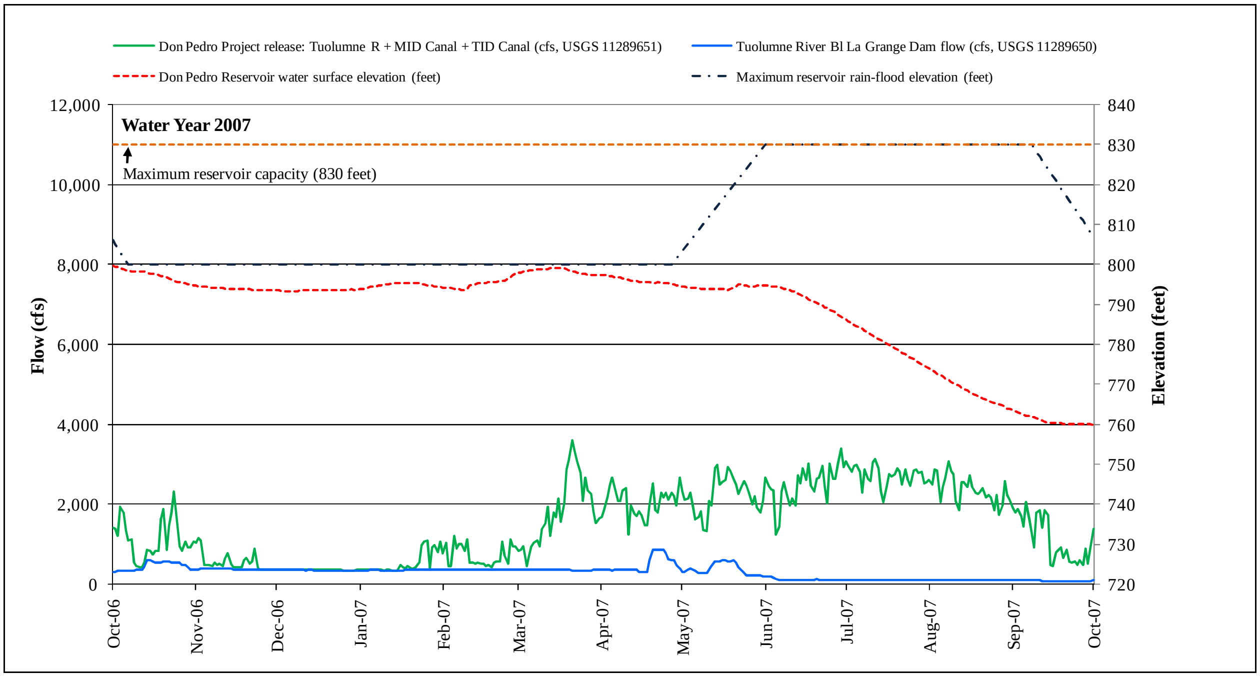

Figure 3.6.8-11 Reservoir water levels and flow releases in WY 2007 (Median Critical).

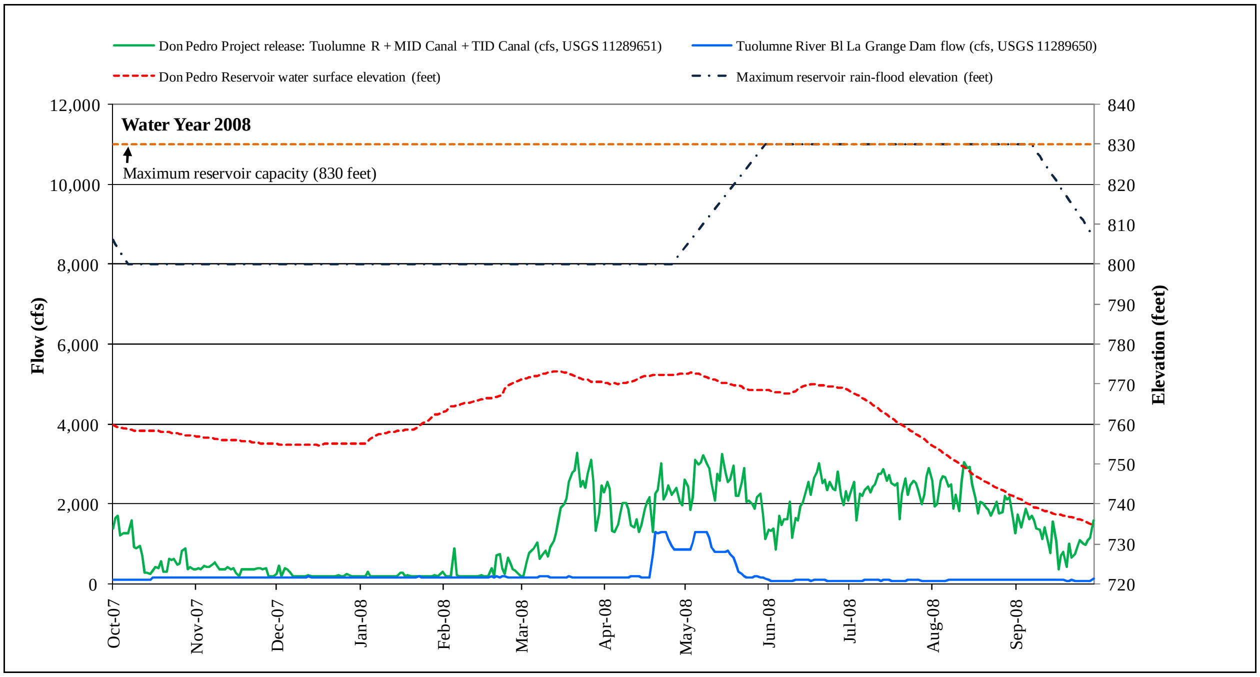

Figure 3.6.8-12 Reservoir water levels and flow releases in WY 2008 (Interm Critical Dry).

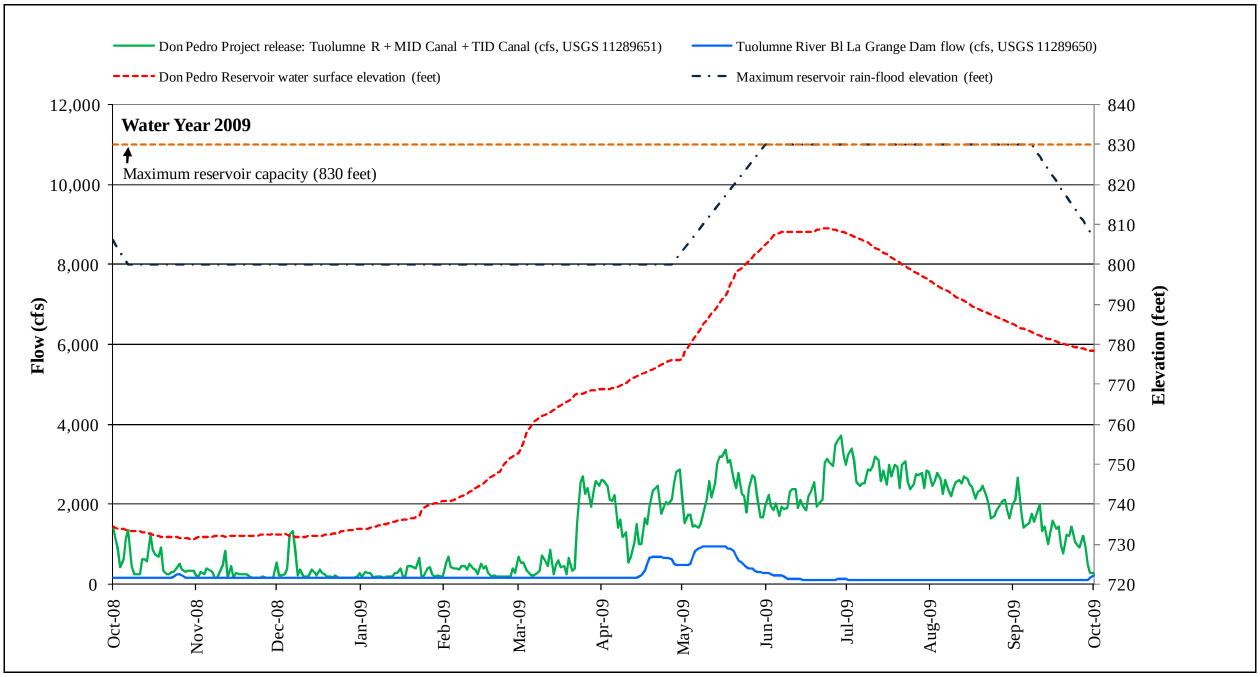

Figure 3.6.8-13 Reservoir water levels and flow releases in WY 2009 (Median BN).

These potential changes in facilities would be entirely contained within the current footprint of the existing Project powerhouse and switchyard. No other changes to current Project operations are currently being proposed by the Districts.

The Districts reserve the right to consider additional generation enhancements to the Project or changes to Project operations as the relicensing process proceeds.

3.8 Current FERC License Articles

This section describes the current FERC license terms most relevant to relicensing and a brief history of license additions, modifications, and compliance. The initial license order was issued by FERC on March 10, 1964 (FERC 1964); however, filings with FERC followed the original license order and, according to the license text, the license would not become active until accepted by the Districts (EES 2006; FPC 1964.) The Districts did not formally accept the license until May 1, 1966. The current license expires on April 30, 2016 (EES 2006).

The license is composed of two basic types of license articles: the Standard Form L-2 articles (Articles 1 through 33), and the Project-specific articles (Articles 34 through 58). Since issuance, several articles of the license have been deleted, modified, or added to the license. Articles 6 and 12 were Standard Form L-2 license articles deleted in the FPC March 10, 1964 issuing order. Article 7 was deleted slightly later on May 10, 1964 in the FPC order denying rehearing and Article 46 was deleted from the license on April 29, 1993. Articles 49 and 50 were added to the license in 1980; Articles 51 through 58 were added to the license in February of 1987 with the order approving the addition of a fourth unit to the Don Pedro powerhouse.

The current license has 54 active articles. Table 3.8-1 provides a table of the general subject matter of the active license articles for the Don Pedro Project. Some license articles are considered expired or out of date, often because the article was added to the license at a certain point in time and the activity specified within them has occurred or been completed.

The text of the license terms and conditions deemed most relevant to relicensing are provided below.

Article 10. The Licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain and operate, or arrange for the construction, maintenance and operation of such facilities and comply with such reasonable modifications of the project structures and operation as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing and upon findings based on substantial evidence that such facilities and modifications are necessary and desirable, reasonably consistent with the primary purpose of the project and consistent with the provisions of the Act.

Article 11. Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities at its own expense, the Licensee shall permit the United States or its designated agency to use, free of cost, such of Licensee's lands and interests in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the Licensee shall modify the project operation as may be prescribed by the Commission reasonably consistent with the primary purpose of the project, in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the Licensee of any obligation under license.

Article 13. So far as consistent with proper operation of the project, the licensee shall allow the public free access to a reasonable extent, to project waters and adjacent project lands owned by the Licensee for the purpose of full public utilization of such lands and waters for navigation and recreational purposes, including fishing and hunting, and shall allow to a reasonable extent for such purposes the construction of access roads, wharves, landings, and other facilities on its lands the occupancy of which may in appropriate circumstances be subject to payment of rent to the Licensee in a reasonable amount; Provided that the Licensee may reserve from public access, such portions of the project water adjacent lands, and project facilities as may be necessary for the protection of life, health, and property, and Provided further that the Licensee's consent to the construction of access roads, wharves, landings and other facilities shall not, without its express agreement, place upon the Licensee any obligation to construct or maintain such facilities. These facilities are in addition to the facilities that the Licensee may construct and maintain as required by the Licensee.

Table 3.8-1 Subject matter of the active license articles for the Don Pedro Project.

Article #	Topic	Article # (con't.)	Topic
1	General	31	Abandonment of Project
2	FERC approval of changes to exhibits, maps, articles	32	Occupancy of lands of the United Stated after license expiration
3	FERC approval of changes to Project works	33	Applicability of Federal Power Act terms and conditions
4	FERC inspection and supervision	34	Commencement of construction
5	Operations related to storage and use of water	35	Project Boundary Maps and Land Ownership
6	(*deleted March 1964 - cost determination*)	36	Reservoir clearing
7	(*deleted May 1964 - rate of return*)	37	Fish flows (revised in 1996 and in 2009)
8	FERC instruction to install additional capacity	38	Flood control (revised in 1999)
9	Coordination with others if ordered by FERC	39	Fish studies
10	Construction of fish and wildlife protective devices by the Districts	40	FERC orders on operations changes related to water temperature
11	Construction of fish and wildlife protective devices by U.S.	41	Free passage of water through original Don Pedro Dam
12	(*deleted March 1964 - Recreation facilities*)	42	Gravel and sediment management
13	Public access to Project waters and permitting of roads, docks, piers, etc.	43	Flood control agreement.
14	Prevention of erosion and siltation	44	Transmission lines
15	Lease of Project lands	45	Recreation facilities plan
16	Filing of maps to show FERC Project Boundary	46	(*deleted 1993 - Lands*)
17	Approval of facilities by U.S. land management agency	47	Annual charges and installed capacity (revised in 1987, 1989, and 1995)
18	Public safety related to location of transmission and telephone lines, etc.	48	Storage allocation agreement with CCSF
19	Avoidance of inductive interference	49	Cultural resources (*added 1980*)
20	Clearing of transmission line rights-of-way on U.S.-owned lands	50	Granting permission for use of Project lands (*added 1980*)
21	Clearing of reservoir margins	51	Construction erosion and dust control plan (*added 1987*)
22	Fire prevention	52	Woody debris removal plan (*added 1987*)
23	Use of water for fire prevention, sanitary and domestic needs on U.S.-owned lands	53	Wards Ferry Bridge restroom facilities (*added 1987*)
24	Construction liability	54	Addition of fourth generating unit (*added 1987*)
25	Permits for use of U.S.-owned lands for transportation and communication	55	Filing of drawings for fourth generating unit (*added 1987*)
26	Takeover of Project roads	56	The Districts' approval and filing of cofferdam and excavation drawings (*added 1987*)
27	Ownership of Project property	57	Filing of revised Exhibit Drawings (*added 1987*)
28	Gaging and stream gaging	58	Chinook monitoring program (*added 1987, revised in 1996, 1999, and 2009*)
29	Surrender of license due to non-compliance		
30	Headwater benefits		

Article 28. For the purpose of determining the stage and flow of the stream or streams from which water is diverted for the operation of the project works, the amount of water held in and withdrawn from storage, and the effective head on the turbines, the Licensee shall install and thereafter maintain such gages and stream-gaging stations as the Commission may deem necessary and best adapted to the requirements; and shall provide for the required readings of such gages and for the adequate rating of such stations. The Licensee shall also install and maintain standard meters adequate for the determination of the amount of electric energy generated by said project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission and may be altered from time to time if necessary to secure adequate determinations, but such alteration shall not be made except with the approval of the Commission or upon the specific direction of the Commission. The installation of gages, the ratings of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Engineer of the United States Geological Survey having charge of stream-gaging operations in the region of said project, and the Licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision or cooperation for such periods as may be mutually agreed upon. The Licensee shall keep accurate and sufficient record of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such from as the Commission may prescribe.

Article 37. *Amended by 76 FERC 61,117,7/31/96*

The Licensees shall maintain minimum streamflows in the Tuolumne River at La Grange bridge (RM 50.5) for fish purposes in accordance with the table and schedules set forth below or with such schedules as may be agreed to among the Licensees, the CDFG and the USFWS. Any such schedules shall be available for public review at the licensee's offices. These flows may be temporarily modified if required by operating emergencies beyond the control of the Licensees.

Water Year Classification*	Cumulative Occurrence	Freq.	60-20-20 Index (1906-1995)
Critical Water Year and below	〈6.4	6.4	1500 TAF
Median Critical Water Yr.	6.4 - 14.4	8.0	1500
Inter. C-D Water Year	14.4 - <20.5	6.1	2000
Median Dry	20.5 - <31.3	10.8	2200
Intermediate D-BN	31.1 - <40.4	9.1	2400
Median Below Normal	40.4 -<50.7	10.3	2700
Intermediate BN-AN	50.7 -<66.2	15.5	3100
Median Above Normal	66.2 - <71.3	5.1	3100
Intermediate AN-W	71.3 - <86.7	15.4	3100
Median Wet/Maximum	86.7 - 100	13.2	3100

*The fish flow year is defined as April 15 through April 14 of the following year. The water year is defined as October 1 through September 30.

The water year classification shall be determined using the California State Water Resources Control Board's San Joaquin Basin 60-20-20 Water Supply Index and the California Department of Water Resources' (Water Resources Department) April 1 San Joaquin Valley unimpaired runoff forecast. The 60-20-20 index numbers used each year shall be updated to incorporate subsequent water years pursuant to standard Water Resources Department procedures so as to maintain approximately the same frequency distribution of water-year types. The volume of annual flow shall be periodically readjusted upon agreement among the Licensees, CDFG, and USFWS after April 1 of each year as more current unimpaired flow information becomes available.

Between a Median Critical Water Year and an Intermediate Below Normal-Above Normal Water Year, the precise volume of flow to be released by the Licensees each fish flow year is to be determined using accepted methods of interpolation between index values given above.

Schedule Occurrence	Days	Critical & below 6.4%	Median Critical 8.0%	Interim . CD 6.1%	Median Dry 10.8%	Interm . D-BN 9.1%	Median Below Normal 10.3%	Interm . BN-AN 15.5%	Median Above Normal 5.1%	Interm AN-W 15.4%	Median Wet-Max 13.3%
October 1-15	15	100 cfs 2,975 ac-ft	100 cfs 2,975 ac-ft	150 cfs 4,463 ac-ft	150 cfs 4,463 ac-ft	180 cfs 5,355 ac-ft	200 cfs 5,950 ac-ft	300 cfs 8,926 ac-ft	300 cfs 8,926 ac-ft	300cfs 8,926 ac-ft	300 cfs 8,926 ac-ft
Attraction Pulse		none	none	none	none	1,676 ac-ft	1,736 ac-ft	5,950 ac-ft	5,950 ac-ft	5,950 ac-ft	5,950 ac-ft
October 16-May 31	228	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	150 cfs 67,835 ac-ft	180 cfs 81,402 ac-ft	175 cfs 79,140 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft	300 cfs 135,669 ac-ft
Out-migration Pulse Flow		11,091 ac-ft	20,091 ac-ft	32,619 ac-ft	37,060 ac-ft	35,920 ac-ft	60,027 ac-ft	89,882 ac-ft	89,882 ac-ft	89,882 ac-ft	89,882 ac-ft
June 1-Sept. 30	122	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	50 cfs 12,099 ac-ft	75 cfs 18,149 ac-ft	75 cfs 18,149 ac-ft	75 cfs 18,149 ac-ft	250 cfs 60,496 ac-ft	250 cfs 60,496 ac-ft	250 cfs 60,496 ac-ft	250 cfs 60,496 ac-ft
Volume (ac-ft.)	365	94,000	103,000	117,016	127,507	142,502	165,002	300,923	300,923	300,923	300,923

If, as provided for under Article 37 as amended above, the Licensees, the CDFG, and the USFWS agree to a minimum flow release schedule differing from the schedule set forth in Article 37, the Licensees shall notify the Commission of the revised flow schedule within 30 days of the date of the agreement to change the flow schedule. If the project flow releases are temporarily modified as required by operating emergencies beyond the control of the Licensees, as provided under Article 37, the Licensees shall notify the Commission of the flow modifications within 30 days of the date of the temporary flow release change.

FERC further amended this article in 128 FERC 61,035 issued on July 16, 2009 as follows:

(G) Article 37 of the license for the Don Pedro Project, issued March 10, 1964, and amended July 31, 1996 (Ordering Paragraphs (D) and (E), Turlock and Modesto Irrigation District, 76 FERC 61,117) is amended to add the National Marine Fisheries Service as an agency to be consulted on any changes to the minimum flow release schedule for the project.

Article 38. *Amended by 89 FERC 62,247, 12/23/99: (Amended December 23, 1999)*

(a) Flows below La Grange bridge may be altered by the licensees at any time in connection with the operation of the Project for flood control purposes or other emergencies provided that if such flood control operations are required, flows shall be made to meet the requirements of the U.S. Army Corps of Engineer's (Corps) approved Water Control Plan, Water (Flood) Control

Diagram, and the Emergency Spillway Release Diagram or an approved deviation from these documents. The licensees shall take reasonable measures to ensure that releases from the project do not cause the flow in the Tuolumne River at the Modesto gage below Dry Creek to exceed 9,000 cubic feet per second unless otherwise agreed to by the Corps. After flood control criteria within the reservoir have been met, the licensees shall reduce the releases from the project as soon as it is reasonably practicable to do so.

(b) Subject to the provisions of paragraph (a) so long as fluctuation do not result in reduction of flows below those in the applicable schedule prescribed in article 37, or such higher minimum daily flows as may be established in the 45-day period of November 5 to December 20 (or such other 45 day period between October 15 through December 31, as may be specified on two weeks prior notice by the California Department of Fish and Game, fluctuations may be made at any time); *Provided*:

(1) Fluctuations shall be controlled as closely as possible during such 45-day period so as not to cause a daily increase of river height in excess of 10 inches; *Provided*, however, for a period of not to exceed two hours per day, the increase may exceed 10 inches but not more than a total of 18 inches.

(2) From the end of such 45-day period until March 31 reduction in river height shall not exceed 4 inches below the average height established in the 45-day period, excluding heights reached as a consequence of the daily fluctuation in excess of 10 inches provided in paragraph (b)(1) and those resulting under paragraph (a).

(B) In the report required by Article 58, the licensees shall describe any implemented flood control measures or other efforts to change the flood way or flood control operational guidelines for this project during the reporting period.

Article 39. *Order Modifying Opinion No,420 and Denying Applications for Rehearing, issued May 6, 1964. Substitute the following for original Article 39 language:*

The Licensees in cooperation with the California Department of Fish and Game and the Department of the Interior shall make necessary studies aimed at assuring continuation and maintenance of the fishery of the Tuolumne River in the most economical and feasible manner. Such studies shall be completed prior to the end of the 20-year period for which minimum stream flows have been provided in Article 28.

The Licensees shall develop in cooperation with the California Department of Fish and Game and the Department of the Interior a program for making such studies and for financing their cost. The program shall be submitted for Commission approval within one year from the effective date of this license.

Article 40. In the event water temperatures during the critical months of the spawning season are too high for successful salmon spawning, the Licensees and the California Department of Fish and Game shall confer to determine whether project operations may be adjusted to assist in correcting the situation. If no agreement can be reached, the Commission, upon request and after notice and opportunity for hearing, may order such adjustment as it finds to be necessary and desirable, reasonably consistent with the primary purpose of the project.

Article 43. The Licensees shall, prior to commencement of construction of the New Don Pedro project works, enter into an agreement with the Secretary of the Army or his designated representative providing for the operation of the project for flood control in accordance with rules and regulations prescribed by the Secretary of the Army. A conformed copy of the agreement shall be filed with the Commission for its information and records prior to commencement of construction of the project works.

Article 45. The Licensees shall construct, maintain and operate or shall arrange for the construction, maintenance and operation of such recreational facilities including modification thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities and utilities, as may be prescribed thereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or interested State agencies, after notice and opportunity for hearing and upon findings based upon substantial evidence that such facilities are necessary and desirable, and reasonably consistent with the primary purposes of the project. The Licensees shall within one year from the date of issuance of the license, file with the Commission for approval of their proposed recreational use plan for the project. The plan shall be prepared after consultation with appropriate Federal, State, and local agencies, and shall include recreational improvements which may be provided by others in addition to the improvements the Licenses plan to provide.

Article 46. *Deleted by Order Deleting Article 46, 4-29-93.*

Article 47. The licensees shall pay to the United States the following annual charges:

(*Revised by errata notice dated 8/28/89 - Installed capacity changed to 222,800 hp.*)

Amended to read: (a) For the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations, in effect from time to time. The authorized installed capacity for that purpose is 222,800 horsepower. (b) For the purpose of recompensing the United States for the use and enjoyment of 4,801.86 acres of its lands, exclusive of transmission line right-of-way, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations, in effect from time to time.

Revised September 20, 1995 -72 FERC 62,252 - Order amended Article 47.

Amended to read: (a) For the purpose of reimbursing the United States for the cost of administration of Part 1 of the Act, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations, in effect from time to time. From July 1, 1989, the authorized installed capacity for that purpose is 168,015 kW.

Article 49. *Added by Order 11 FERC 62,147, 5-27-80.*

Prior to the commencement of any construction at the project, the Licensees shall consult and cooperate with the California State Historic Preservation Officer (SHPO) to determine the need for and extent of any archaeological or historical resource surveys and any mitigative measures that may be necessary. The Licensees shall, if needed, provide funds in a reasonable amount for such activities. If any previously unrecorded archaeological or historic sites are discovered during the course of construction, construction activity in the vicinity shall be halted, a qualified archaeologist shall be consulted to determine the significance of the sites, and the Licensees shall consult with the SHPO to develop a mitigation plan for the protection of significant archaeological or historical resources.

Article 50. *Added to the License with TID and MID acceptance September 24, 1980.*

Standard License Article allowing licensee to grant permission for certain types of use of project lands.

No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

Article 51. *Order 38 FERC 61,097 issued 2/2/87.*

Licensees after consultation with ACOE, USFWS, CVRWQCB and CDFG, shall prepare and file with the Commission within one year of this order, a plan to control erosion and dust and to minimize the quantity of sediment or other potential water pollutants resulting from construction and operation of the project, including spoil disposal areas. Plan shall include functional design drawings and map locations of control measures, and implementation schedule monitoring and maintenance programs for project construction and operation and provisions for periodic review and revisions. Documentation of consultation shall be included in the filing. [May begin ground disturbing activities 90 days after filing the plan unless the Director says otherwise.]

Article 52. *Order 38 FERC 61,097 issued 2/2/87.*

Within 1 year, after consultation and coordination with the Sierra Club, the Tuolumne Preservation Trust, Friends of the River, Audubon, CalTrout, Stanislaus League of Voters; Tuolumne River Expeditions and other appropriate authority, establish a plan for removal of logs and debris from the reservoir. Include an implementation schedule, monitoring and notification procedures and evidence of consultation

Article 54. *Order 38 FERC 61,097 issued 2/2/87.*

The licensees shall commence construction of the fourth generating unit of the project within two years from the issuance date of the license and shall complete its construction within five years from the issuance date of the license.

Article 58. *Order 38 FERC 61,097 issued 2/2/87.*

Revised by Order 76 FERC 61,117, Amending License issued July 31, 1996.

The Licensees after consultation with the CDFG and the USFWS shall implement a program to monitor Chinook salmon populations and habitat in the Tuolumne River. The monitoring program shall conform to the monitoring schedule set forth below and shall include: (1) Spawning escapement estimates; (2) Quality and Condition of Spawning Habitat; (3) Relative fry Density/Female Spawners; (4) Fry Distribution and Survival; (5) Juvenile Distribution and Temperature Relationships; and (6) Smolt Survival.

The monitoring frequencies and methods shall be agreeable among the Licensees and the consulted agencies. Any disagreements regarding the conduct of these studies not resolved among the licensees and consulted entities shall be filed with the Commission for determination.

The above monitoring information is to be documented in annual reports which will be filed with the Commission by April 1 of each year and be available for public review. The results of any fishery studies already completed and not yet filed with the Commission shall be filed by the Licensees by April 1, 2005.

The Licensees shall include in the annual reports filed with the Commission April 1 of each year pursuant to Article 58 a description of the non-flow mitigative measures implemented in the previous year and planned for implementation in the coming year.

The Licensees shall include in the results of fishery studies to be filed with the Commission by April 1, 2005, all results and a discussion of the results of all monitoring studies related to the effects of flow release fluctuations on the salmon resources in the lower Tuolumne River. The filing shall also identify all non-flow mitigative measures implemented to date, and the results of all monitoring studies related to the nonflow mitigative measures.

Based on the information provided in the Licensees' study results to be filed by April 1, 2005, the Commission will determine whether to require further monitoring studies and changes in project structures and operations to protect fishery resources in the Tuolumne River, after notice and opportunity for hearing.

FERC included additional information to be provided in the article 58 Report in the order amending Article 38 issued December 23, 1999 as follows:

In the report required by Article 58, the licensees shall describe any implemented flood control measures or other efforts to change the floodway or flood control operational guidelines for this project during the reporting period.

FERC further amended this article in 128 FERC 61,035 issued on July 16, 2009 as follows:

Article 58 of the license for the Don Pedro Project, issued March 10, 1964, and amended July 31, 1996 (Ordering Paragraphs (F) and (G), Turlock and Modesto Irrigation District, 76 FERC 61, 117) is amended to add the National Marine Fisheries Service as an agency to be consulted on monitoring Chinook salmon populations and habitat in the Tuolumne River.

3.9 Compliance with License Terms

The Districts have consistently executed their obligations and responsibilities under the current license. Many of the FERC license articles required the Districts to undertake extensive environmental studies, often under challenging deadlines. The Districts met every one of these requirements and schedules. The Districts maintain complete Project records of its operations and compliance. TID and MID proactively cooperated with other river managers and users, including the ACOE, CCSF, BLM, CDFG, USFWS, and NGOs. The Districts have been in full compliance with the terms of its FERC license throughout the initial license term.

3.10 Project Boundary

Appendix C of this PAD contains maps of the current Project Boundary of the Don Pedro Project.

3.11 Project Drawings

Appendix D to this PAD provides a set of Project drawings showing details of Project facilities. The list of the drawings is included below.

- L-02 General Project Layout
- L-03A Rockfill Dam, Details
- L-03B Dikes A, B and C; Plans Sections
- L-04 Diversion Tunnel
- L-05 Inlet Works
- L-05A Outlet Works
- L-06 Power Tunnel, Plan and Profile
- L-06A Power Tunnel, Intake and Gate Shaft
- L-07 Spillway
- L-08 Powerhouse, Service Area and Longitudinal Section
- L-09 Powerhouse, Generator Floor and Transverse Section
- L-10 Powerhouse, Turbine and Valve Floors
- L-11 Electrical, Powerhouse Main Single Line Diagram
- L-13 Electrical, Switchyard Layout

3.12 Approved Operating Plans

As specified in the existing license articles or directed by FERC, the Districts currently maintain other plans related to the Project operations as follows:

- Don Pedro Project Public Safety Plan
- Don Pedro Emergency Action Plan
- Don Pedro Project Recreation Plan
- Woody Debris Management Plan

Copies of these plans may be obtained by contacting the Districts' headquarters.

3.13 Current Net Investment

The Districts combined net book value of the Project is approximately $74.5 million.

4.0 GENERAL DESCRIPTION OF RIVER BASIN

The 150-mile-long Tuolumne River begins at the confluence of the Dana Fork and the Lyell Fork in the Tuolumne Meadows area of Yosemite National Park. After traversing nearly 8,600 feet of elevation drop, the Tuolumne River flows into the San Joaquin River in the Central Valley region of California. The Tuolumne's route initially passes through high mountain valleys and deeply incised canyons, then through the foothills of the Sierra Mountains, thence out into and through the eastern side of the low-lying Central Valley. The 1,960-square-mile watershed can be subdivided into three river reaches—the upper Tuolumne River above roughly river mile (RM) 80, the foothills reach between RM 54 and 80, and the valley reach from the mouth to RM 54. Figure 4-1 shows the Tuolumne River and its primary subbasins.

4.1 Tuolumne River Watershed

4.1.1 Upper Tuolumne River

The upper Tuolumne River watershed, the subbasin above about RM 80, covers approximately 1,300 square miles of drainage area and contains all the major tributaries of the Tuolumne River, including the North Fork, South Fork, Middle Tuolumne, Clavey River, Cherry Creek, and Eleanor Creek. The upper Tuolumne River extends from the confluence of the Dana and Lyell Forks to just below the confluence of the North Fork at approximate elevation 850 feet. The average gradient of the river is roughly 110 feet/mile (ft/mi), but local gradients vary greatly. The Upper Tuolumne is dominated by federal land ownership, primarily the Stanislaus National Forest and Yosemite National Park. The Tuolumne River from approximately RM 80 to its source is a designated National Wild and Scenic River, except for an 8-mile stretch at Hetch Hetchy Reservoir. Land development in the upper Tuolumne River subbasin is largely limited to small communities (e.g., Groveland and Smith Station) and dispersed individual residences and small tracts of non-irrigated farmland. Flows in the upper Tuolumne River are regulated and controlled by the City and County of San Francisco's (CCSF) Hetch Hetchy Water and Power system, including Hetch Hetchy Reservoir, Lake Eleanor and Cherry Lake, and CCSF's extensive infrastructure of water transmission and water power facilities.

4.1.2 Foothills Reach of the Tuolumne River

The foothills reach of the Tuolumne River can be considered to extend from RM 54 to RM 80. Because this reach is dominated by the Districts' Don Pedro Project, it is referenced herein as the "Project area" for purpose of this watershed description. This portion of the watershed includes no major tributaries. Woods Creek and Moccasin Creek are small tributaries that flow into Don Pedro Reservoir. Moccasin Creek contains Moccasin Reservoir, a 505 acre-feet (ac-ft) water supply reservoir owned by CCSF, which feeds CCSF's Foothill Tunnel. A California Department of Fish and Game (CDFG) hatchery is located below Moccasin Dam but above Don Pedro Reservoir.

The Project area reach extends from about elevation 300 feet to about elevation 850 feet, or from the tailwater of Don Pedro powerhouse to about 20 feet above the Don Pedro Reservoir normal maximum reservoir elevation of 830 feet. This subbasin area is about 230 square miles and is dominated by federal lands administered by the Bureau of Land Management (BLM), but also small communities, dispersed farmland tracts, and the Don Pedro Project and its facilities.

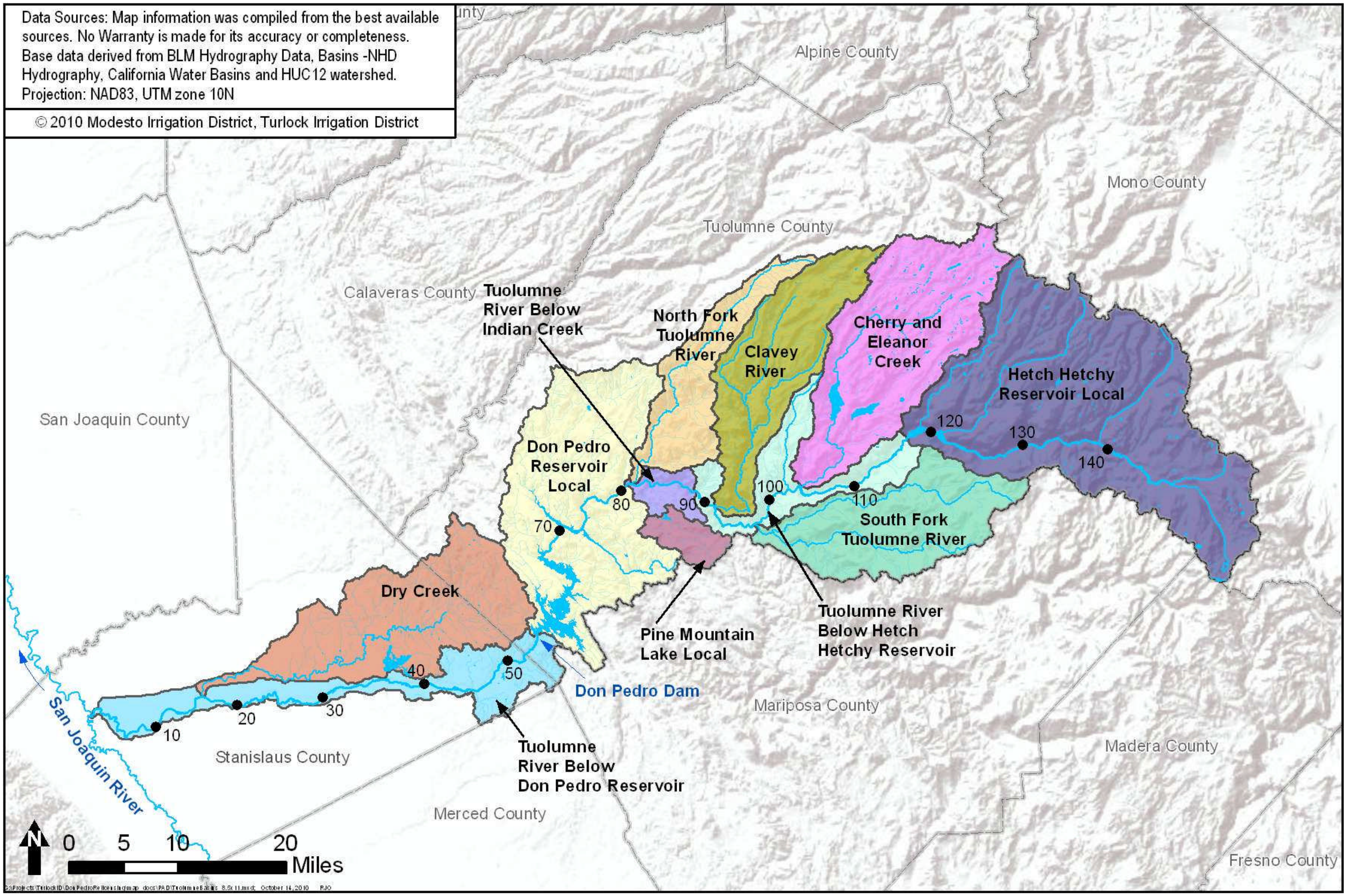

Figure 4-1 **Subbasins of the Tuolumne River watershed.**

4.1.3 Lower Tuolumne River

The lower Tuolumne River watershed, the subbasin from RM 0 to 54, covers approximately 430 square miles of drainage area, and contains one major tributary, Dry Creek. Other contributions come from Peaslee Creek as well as McDonald Creek (via Turlock Lake) primarily during and after storm events. In this reach, the Tuolumne River extends from about elevation 35 feet at the confluence with the San Joaquin River to elevation 300 feet at the tailrace of the Don Pedro powerhouse. The lower Tuolumne River watershed is long and narrow and is dominated by irrigated farmland and the urban/suburban areas associated with the City of Modesto, Waterford, and Ceres. Flows in the lower Tuolumne River are significantly controlled by La Grange Dam, a 127-foot-high diversion dam constructed in 1893 and jointly owned by the Districts, which divert flows from the Tuolumne River for irrigation, municipal, and industrial water supply purposes.

4.2 Geography and Topography of the River Basin

4.2.1 Upper Tuolumne River

The mainstem Tuolumne River forms at an elevation just above 8,600 feet (NPS 2010a) in the Tuolumne Meadows area of Yosemite National Park, within Tuolumne County, where rugged, granitic peaks form the perimeter of the high alpine meadow. At this point, the 8-mile-long Dana Fork and the 13-mile-long Lyell Fork converge (NPS 2010b) draining the south-facing slopes of the mountains near Tioga Pass and the north-facing slopes of the Cathedral Range in Yosemite's central-eastern area. This vast, high portion of the central Sierra Nevada bears the marks of Pleistocene and Holocene glaciations (Clark 1995) and retains some glaciers, including the largest on Mt. Lyell, to the present day (NPS 2010b.)

From Tuolumne Meadows, the Tuolumne River winds and plunges generally westward through a number of waterfalls, including Tuolumne, California, Le Conte and Waterwheel falls (DeLorme 2003), before entering the Grand Canyon of the Tuolumne, the steep-sided canyon chiseled in Sierra batholith granite. The Tuolumne River then enters the Hetch Hetchy Reservoir, owned by the CCSF, still within the bounds of Yosemite National Park.

From upstream of Tuolumne Meadows in Yosemite National Park to about RM 80, a total of 83 miles of the Tuolumne River is designated as a National Wild and Scenic River (NPS 2010b.)

The topography of the upper Tuolumne River basin is uniformly steep with shallow soils and much exposed rock. The high peaks of Mount Lyell, Mount Dana, and Johnson Peak rim the upper watershed. The Tuolumne River passes alternately through mountain meadows, narrow, deeply incised canyons, and the Hetch Hetchy Reservoir as it travels through the Upper Tuolumne region from elevation 8,600 to 850 feet.

4.2.2 Project Area

Don Pedro Reservoir is a large reservoir with an unusual stairstep/H-shape and two distinct morphological sections. The narrow, upstream portion of the reservoir from the Wards Ferry Bridge to the central portion of the reservoir referred to as Upper Bay occupies the steep-sided, rocky and winding Tuolumne River canyon. The downstream portion of the reservoir from

Upper Bay to the Don Pedro Dam fills the gentler-sloped canyon where the Tuolumne River emerges into the low Sierra foothills and then into the wider Tuolumne River valley. The foothills area in this portion of the watershed is dominated by gently rolling grasslands and farmland. Precipitation and runoff characteristics in this area are dramatically different than that of the Upper Tuolumne (see Section 4.3 below).

4.2.3 Lower Tuolumne River

The Tuolumne River exits the Don Pedro Reservoir and enters the lower Tuolumne River area. This area of the watershed transitions from gently rolling hills near its easterly reaches to uniformly flat floodplain and terrace topography in the downstream direction. Soils are deep and fertile and irrigated agriculture and urban land use dominates the landscape.

The Tuolumne River downstream of La Grange Dam flows 52 river miles to its confluence with the San Joaquin River. The Tuolumne River leaves its steep and confined bedrock valley and enters the eastern Central Valley downstream of La Grange Dam near La Grange Regional Park, where hillslope gradients in the vicinity of the river corridor are typically less than five percent. From this point to the confluence with the San Joaquin River, the modern Tuolumne River corridor lies in an alluvial valley. Within the alluvial valley, the river can be divided into two geomorphic reaches defined by channel slope and bed composition: a gravel-bedded reach that extends from La Grange Dam (RM 52) to Geer Road Bridge (RM 24); and a sand-bedded reach that extends from Geer Road Bridge to the confluence with the San Joaquin River (McBain & Trush 2000). The gravel- and sand-bedded zones have been further subdivided into seven reaches based on present and historical land uses, the extent and influence of urbanization, valley confinement from natural and anthropogenic causes, channel substrate and slope, and salmonid use (McBain & Trush 2000). The major reaches are:

- Reach 1 (RM 0-10.5): Lower sand-bedded reach,
- Reach 2 (RM 10.5-19.3): Urban sand-bedded reach,
- Reach 3 (RM 19.3-24.0): Upper sand-bedded reach,
- Reach 4 (RM 24.0-34.2): In-channel gravel mining reach,
- Reach 5 (RM 34.2-40.3): Gravel mining reach,
- Reach 6 (RM 40.3-45.5): Dredger tailing reach, and
- Reach 7 (RM 45.5-52.1): Dominant salmon spawning reach.

Large-scale anthropogenic changes have occurred to the lower Tuolumne River corridor since the California Gold Rush in 1848. Gold mining, grazing, and agriculture encroached on the lower Tuolumne River channel before the first aerial photographs were taken by the Soil Conservation Service in 1937. Excavation of bed material for gold and aggregate to depths below the river thalweg eliminated active floodplains and terraces and created large in- and off-channel pits. Agricultural and urban encroachment in combination with reduction in coarse sediment supply and high flows has resulted in a relatively static channel within a narrow floodway confined by dikes and agricultural fields.

Although the tailing piles are primarily the legacy of gold mining abandoned in the early 20th century, gravel and aggregate mining continued alongside the river for a number of miles, particularly upstream of the town of Waterford around RM 34 (Tuolumne River TAC 2000). Downstream of Waterford, the Tuolumne River continues an increasingly-sinuous path across the agricultural lands of the Central Valley, through the City of Modesto. The Tuolumne River finds its confluence with the San Joaquin River approximately 15 river miles beyond Modesto, along the axis of California's Central Valley.

4.3 Climate and Hydrology

The Tuolumne River watershed covers a total of approximately 1,960 square miles and encompasses a wide range of climates and hydrologic conditions, from the snowy high Sierra Mountains to the mild, Mediterranean climate and hot summers of California's Central Valley. Precipitation varies substantially from year to year, as winter storms are driven by large-scale atmospheric disturbances originating in the Aleutian Island area of Alaska (ACOE 1972). Larger streams are primarily snowmelt-driven, as rivers carry snowmelt runoff from the high Sierra down across the Central Valley, and normally receive only a relatively small proportion of their flows from rain-driven tributaries in the lower elevations. Small- to moderate-size drainages in the region are often ephemeral or intermittent, going dry or having only subterranean flow in most years during California's parched summer and early-fall seasons.

4.3.1 Climate

The climate of the Tuolumne River basin varies considerably over the river's 150-mile-long journey. Its western portion in the low-lying Central Valley is semi-arid and the high-peaks region at its eastern edge in the Sierra Mountains is wet.

The Tuolumne River area in the Sierra Nevada foothills where the Project is located has what is often described as a Mediterranean-type climate: cool, wet winters with snow only rarely and hot, dry summers. From the foothills westward into the Central Valley, winter precipitation occurs mostly in the form of rain from the months of December through April. In the higher elevations of the Tuolumne River watershed, precipitation consists largely of snow in the winter with significant accumulation in the higher elevations from December through April, and seasonal snowmelt typically April through July. At these higher elevations, the occasional rain-on-snow events may cause large amounts of runoff in a short period of time during winter months. Annual precipitation in the Tuolumne River watershed ranges from 12 inches in the Central Valley to over 60 inches in the high mountain areas. Table 4.3.1-1 demonstrates the range of temperatures and precipitation in the basin.

4.3.2 Hydrology

The hydrologic characteristics of the Tuolumne River and its tributaries vary significantly from its headwaters to its terminus at the San Joaquin River. As indicated by the climate data, the Tuolumne River spans two distinct hydrologic regimes: the snowmelt-driven system of the Sierra Nevada, present at the high elevations; and the rain-driven streams present at lower elevations.

Table 4.3.1-1 Monthly climatological data for the Tuolumne River area.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Downstream of Don Pedro Project												
MODESTO, CALIFORNIA (WRCC Station No. 045738)												
Period of Record : 1/ 1/1931 to 12/31/2005, Approx. Elevation: 90 ft												
Avg. High (°F)	54°	61°	67°	73°	81°	88°	94°	92°	88°	78°	64°	54°
Avg. Low (°F)	38°	41°	44°	47°	52°	56°	60°	59°	56°	50°	42°	38°
Mean (°F)	46°	51°	55°	60°	66°	72°	77°	75°	72°	64°	53°	46°
Avg. Rainfall (in)	2.4	2.1	2.0	1.1	0.5	0.1	0	0	0.2	0.6	1.3	2.1
Avg. snowfall (in)	0	0	0	0	0	0	0	0	0	0	0	0
Near Don Pedro Project Area												
SONORA Ranger Station, CALIFORNIA (WRCC Station No. 048353)												
Period of Record : 1/11/1931 to 12/31/2005, Approx. Elevation: 1,750 ft												
Avg. High (°F)	55°	58°	62°	68°	77°	87°	95°	94°	88°	77°	64°	56°
Avg. Low (°F)	33°	35°	38°	41°	47°	52°	58°	57°	53°	45°	37°	33°
Mean (°F)	44°	47°	50°	55°	62°	69°	77°	75°	70°	61°	51°	45°
Avg. Precip. (in)	6.1	5.7	4.8	2.7	1.2	0.3	0.1	0.1	0.5	1.7	3.6	5.5
Avg. snowfall (in)	1.6	0.8	0.4	0.2	0	0	0	0	0	0	0	0.5
Upper Tuolumne River Basin												
HETCH HETCHY, CALIFORNIA (WRCC Station No. 043939)												
Period of Record : 1/ 7/1931 to 12/31/2005, Approx. Elevation: 3,780 ft												
Avg. High (°F)	48°	52°	57°	63°	70°	78°	86°	86°	81°	71°	58°	49°
Avg. Low (°F)	29°	30°	33°	37°	43°	50°	56°	55°	51°	42°	34°	30°
Mean (°F)	38°	41°	45°	50°	57°	64°	71°	71°	66°	57°	46°	39°
Avg. Precip. (in)	6.0	5.7	5.2	3.3	1.9	0.8	0.2	0.2	0.7	2.0	4.2	5.9
Avg. snowfall (in)	15.2	12.9	14.7	6.3	0.3	0	0	0	0	0.1	2.7	11.7
High-Sierra Nevada Climate (north of Tuolumne River watershed)												
TWIN LAKES, CALIFORNIA (WRCC Station No. 049105)												
Period of Record : 7/ 1/1948 to 8/31/2000, Approx. Elevation: 8,000 feet												
Avg. High (°F)	38°	40°	41°	47°	54°	63°	71°	70°	65°	56°	45°	39°
Avg. Low (°F)	16°	16°	18°	22°	29°	36°	43°	42°	39°	31°	23°	18°
Mean (°F)	27°	28°	30°	34°	42°	49°	57°	56°	52°	44°	34°	29°
Avg. Precip. (in)	9.0	7.3	6.7	3.9	2.5	1.1	0.7	0.7	1.2	2.6	6.1	7.8
Avg. snowfall (in)	79.5	73.3	75.9	36.6	14.5	2.3	0	0.2	1.1	10.3	40.9	66.4

Source: Western Regional Climate Center - http://www.wrcc.dri.edu/summary/climsmnca.html.

4.3.2.1 Upper Tuolumne River

East of the Don Pedro Reservoir, especially in areas above approximately 5,000 feet where snow accumulation is significant, the upper Tuolumne River and its tributaries are snowmelt-dominated, often high-gradient streams with substantial cascades in a primarily granitic area (NPS 2010b). Smaller streams in this system may have extremely low flows in summer due to the granitic landscape; for example, the Middle Fork Tuolumne River typically has flows in the August through October period in the range of 0 to 3 cfs (historical data from USGS Gage No. 11282000). In areas with deeper soil profiles or small springs (found occasionally throughout the Sierra Nevada), interflow or subterranean flow may continue to feed streams in some areas. In these upper elevations, approximately 75 percent of the runoff occurs between April and July, with only 20 percent or less occurring in the winter months from December through March, and as little as five percent occurring from August through November (ACOE 1972).

In the middle elevations of the watershed, from 1,000 to 5,000 feet, more of the precipitation occurs as rainfall than at the high locations, and these areas can have multiple rain-on-snow periods each year that reduce the accumulated snowpack. Several reservoirs are located in this middle-elevation band in the Tuolumne River watershed upstream of the Project, including CCSF's Cherry Lake (elevation 4,700 feet), Lake Eleanor (elevation 4,660 feet), and Hetch Hetchy Reservoir (elevation 3,800 feet) (CCSF 2006). A greater proportion of runoff in these elevations occurs during the December through March period due to winter rainstorms, with much of the remaining snowmelt runoff from higher elevations occurring in April through July (ACOE 1972). The lower the elevation of a given stream, the greater the proportion of runoff that occurs in the winter months following rainstorms.

4.3.2.2 Project Area

Although the Don Pedro Reservoir is located at a significantly lower elevation where snowfall is less common, the mainstem Tuolumne River derives much of its flow from those higher elevations where significant snow accumulates. Some smaller tributaries that are almost exclusively rain-driven flow directly into Don Pedro Reservoir, but these streams generally provide only minimal inflow to the reservoir. The average annual full natural flow of the Tuolumne River upstream of Don Pedro Dam is approximately 1.8 to 1.9 million ac-ft (California Data Exchange Center [CDEC] 2010). Annual amounts can vary widely. Since 1970, the least annual runoff was 395,000 ac-ft (1977) and the greatest was 4,632,000 ac-ft (1983). Due in large part to CCSF's out-of-basin diversions upstream of the Project, the total releases from the Don Pedro Project have averaged approximately 1.6 million ac-ft annually (WY 1975 to 2009). It should also be noted that the pattern of inflow to Don Pedro Reservoir is highly regulated, and water derived from spring snowmelt is often released from upstream reservoirs over a longer period than would occur naturally.

One of the purposes of the Don Pedro Project is flood control. The Project area and, even more so, the lower Tuolumne River are subject to rain-floods and rain-on-snow floods, which are most likely to occur in winter and early spring, as well as snowmelt-floods which are most likely in spring through early summer. Consequently, the flood control manual for the Project (ACOE 1972) requires the maintenance of flood space of at least 340,000 ac-ft for a long period of the year—from early October through April—and conditional flood space depending on the anticipated snowmelt runoff during May and possibly June and July.

4.3.2.3 Lower Tuolumne River

At Don Pedro Dam, water flows from the powerhouse or outlet works into the reach of the Tuolumne River impounded by the La Grange Dam, an irrigation diversion dam owned by TID and MID. From the La Grange impoundment, water is either diverted into MID's canal system to the north of the Tuolumne River and into TID's canal system to the south of the Tuolumne River, or released into the lower Tuolumne River downstream of La Grange Dam.

Downstream of the Project, the Tuolumne River becomes a lower gradient stream on its journey to the San Joaquin River. In this low-elevation area, the vast majority (around 75 percent) of local runoff occurs during winter rainstorms between December and March. Also contributing to flows within this region are natural inflows from Dry Creek and Peaslee Creek, as well as urban and agricultural runoff and operational spills from irrigation canals. Some of the streamflow in this area, however, is derived from groundwater inflow, and the lower Tuolumne River is generally considered to be a gaining stream (California Department of Water Resources [CDWR] 2002). This groundwater contribution to the lower Tuolumne has not been well quantified.

Section 5.2.1 addresses hydrology in and around the Project in greater detail, including flow statistics for stream gages relevant to the Project.

4.4 Water Use

4.4.1 Upper Tuolumne River

CCSF diverts water from the upper Tuolumne River for storage and use outside of the Tuolumne River basin. CCSF filed for water rights on the Tuolumne River as early as 1901; however, these water rights are subject to the Districts' prior rights (see Section 3.4.1). The CCSF's Hetch Hetchy Water and Power system in the upper Tuolumne River consists of three storage reservoirs (O'Shaughnessy, Cherry, and Eleanor), water transmission facilities, powerhouses, and power transmission lines. The Hetch Hetchy system provides about 85 percent of the CCSF's drinking water to 2.4 million Bay Area residents and produces about 1,700,000 MWh of hydroelectric energy in an average year. The maximum rate of diversion from of the upper Tuolumne River to the San Francisco Bay Area by CCSF is about 300 mgd, or about 465 cfs. The average annual use is about 250,000 ac-ft.

Another user of water in the upper Tuolumne River is CDFG, which operates the Moccasin Fish Hatchery below CCSF's Moccasin Pond. Water flow to the hatchery is estimated to be about 15 mgd (23 cfs), or about 11,000 ac-ft per year (pers. comm. Bruce McGurk, June 16, 2010).

4.4.2 Project Area

The primary water use in the Project area is storage in Don Pedro Reservoir for use downstream for irrigation and M&I purposes. Water storage varies from year to year depending on annual runoff and carry-over storage. The Districts hold water rights to store water at Don Pedro and are licensed by State Water Resources Control Board (SWRCB) under License Numbers 11057 and 11058 to store 1,046,800 ac-ft per year to be collected from November 1 of each year to July 31 of the succeeding year. The maximum amount to be diverted under the same license is 1,371,800 ac-ft per year and the maximum withdrawal shall not exceed 951,100 ac-ft per year. (SWRCB 1980a,b)

The other major water use in the Project area is water-based recreation at Don Pedro Reservoir. Annual use of the various recreation opportunities and sites operated and maintained at Don Pedro exceeds 400,000 visitor-days per year.

4.4.3 Lower Tuolumne River

Primary water uses in the lower Tuolumne River subbasin include irrigation, M&I, recreation, and protection and enhancement of anadromous fisheries. Historic annual average consumptive water use by TID and MID is approximately 900,000 ac-ft. In addition, fish flows released by the Districts at La Grange Dam vary from 94,000 to 301,000 ac-ft per year depending on water year type. The number of riparian water users and their consumptive use of Tuolumne River is unknown.

4.4.4 Designated Beneficial Uses of Tuolumne River Water

Beneficial use designations for the Project reservoir and the rest of the Tuolumne River are established in Central Valley Regional Water Quality Control Board's (CVRWQCB) Water Quality Control Plan (Basin Plan) for the Sacramento and San Joaquin Rivers, the fourth edition of which was initially adopted in 1998 and most recently revised in 2007 (CVRWQCB 1998). The CVRWQCB identifies beneficial uses for the Tuolumne River water in three specific areas—from the source to Don Pedro Reservoir, at Don Pedro Reservoir, and from Don Pedro Dam to the San Joaquin River. Table 4.4.4-1 provides the beneficial uses as specified by CVRWQCB for these three areas.

Table 4.4.4-1 Beneficial uses of Tuolumne River water.

Stream Reach	Designated Beneficial Uses E = existing beneficial use, P = potential beneficial use
Upper Tuolumne River	Municipal & Domestic Supply (MUN, E); Irrigation, Stock Watering (AGR, E); Power (POW, E); Contact recreation, Canoeing & Rafting[1] (REC-1, E); Other non-contact recreation (REC-2, E); Warm and Cold Freshwater Habitat (WARM, E; COLD, E); Wildlife Habitat (WILD, E)
Project Area	Municipal & Domestic Supply (MUN, P); Power (POW, E); Contact recreation (REC-1, E); Other non-contact recreation (REC-2, E); Warm and Cold Freshwater Habitat[2] (WARM, E; COLD, E); Wildlife Habitat (WILD, E)
Lower Tuolumne River	Municipal & Domestic Supply (MUN, P); Irrigation, Stock Watering (AGR, E); Contact recreation, Canoeing & Rafting[1] (REC-1, E); Other non-contact recreation (REC-2, E); Warm and Cold Freshwater Habitat[2] (WARM, E; COLD, E); Cold-water migration (MIGR COLD[4], E); Warm and Cold Spawning (SPWN WARM[3] and SPWN COLD[4], E); Wildlife Habitat (WILD, E)

1 Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.
2 Resident does not include anadromous. Any segments with COLD and WARM beneficial use designations will be considered COLD water bodies for the application of water quality objectives.
3 Striped bass, sturgeon, and shad.
4 Salmon and steelhead.
Source: CVRWQCB 1998.

4.5 Tributary Information

The Tuolumne River originates in the high Sierra in Yosemite National Park. The Tuolumne River has several major tributaries upstream of the Don Pedro Project, and very few tributaries downstream of the Project. Table 4.5-1 provides a list of the larger tributaries to the Tuolumne River from upstream to downstream and any known water regulating facilities on these tributaries.

Table 4.5-1 Major tributaries and secondary tributaries to the Tuolumne River.

Major Tributaries	Major Secondary Tributaries[1]	Dams, Lakes or Diversion Dams on Stream[2]
Upper Tuolumne River		
Lyell Fork	Rafferty Creek Ireland Creek Kuna Creek Maclure Creek	None known
Dana Fork	Parker Pass Creek	None known
Cathedral Creek	----	None known
Return Creek	Regulation Creek Matterhorn Creek Spiller Creek	None known
On Tuolumne River mainstem: Hetch Hetchy Reservoir	Immediate tributaries to Hetch Hetchy: Falls Creek TilTill Creek Rancheria Creek	CCSF's O'Shaugnessy Dam - forms Hetch Hetchy Reservoir (360,400 ac-ft)
South Fork Tuolumne	Middle Fork Tuolumne Big Creek Crane Creek	None known
Cherry Creek	Granite Creek Eleanor Creek West Fork Cherry Creek North Fork Cherry Creek	CCSF's Cherry Creek Dam - forms Lake Lloyd (274,300 ac-ft) CCSF's Eleanor Dam - forms Lake Eleanor (26,110 ac-ft)
Jawbone Creek	----	None known
Clavey River	Bear Spring Creek Cottonwood Creek Reed Creek Hull Creek Trout Creek Bourland Creek Reynolds Creek Rock Creek Bell Creek	None known
Indian Springs Creek	----	None known
Big Creek	----	Pine Mountain Lake (7,700 ac-ft, privately owned)
North Fork	Hunter Creek Duckwal Creek	None known
Turnback Creek	----	None known
Project Area (Major Immediate Tributaries to Project Reservoir, counter-clockwise from south abutment of dam)		
South Side of Reservoir / South of Mainstem Tuolumne River		
Hatch Creek	First Creek Second Creek	None known
Moccasin Creek	----	Moccasin Creek tunnel (creek is diverted under CCSF's Moccasin Afterbay during all but largest storms and is usually tributary only to Don Pedro Project[3])
Grizzly Creek	----	None known
North Side of Reservoir / North of Mainstem Tuolumne River		
Rough and Ready Creek	----	None known
Sullivan Creek	----	Phoenix Reservoir (612 ac-ft, privately owned)
Woods Creek	----	None known

Major Tributaries	Major Secondary Tributaries[1]	Dams, Lakes or Diversion Dams on Stream[2]
Big Creek	----	None known
West Fork Creek	----	None known
Lower Tuolumne River		
Twin Gulch	Gasburg Creek	Receives spillway water from Don Pedro Project which flows into La Grange Dam impoundment[4]
Dry Creek	----	None known

Notes:

1 USDOI, U.S. Geological Survey (USGS) 1:24,000 Scale Topographical maps.

2 USGS 1999.

3 CCSF 2006; Pers. Comm. B. McGurk, CCSF Hetch Hetchy Water and Power (HHWP) to J. Garza, HDR, Sept 2010.

4 Don Pedro Project Exhibit J and K Drawings.

Within the Project area, there are several tributaries that flow directly into the Don Pedro Reservoir. Because of the relatively low elevation, most of the streams contributing flow to the reservoir are ephemeral and rain-driven; in the late summer and fall, they contribute only a trickle of water, if any, to the reservoir. Regardless of season, though, each of these tributary streams has a relatively small immediate watershed and thus contributes comparatively little water when compared with the mainstem.

Downstream of Don Pedro Reservoir, there are very few tributaries to the Tuolumne River. The only major tributary is Dry Creek, which joins the mainstem Tuolumne River from the north at the City of Modesto. Dry Creek is not gaged by the USGS; but during storm events the Districts consider inflows from Dry Creek and other sources to the lower Tuolumne River in accordance with flood control guidelines at the 9th Street Bridge in Modesto. In addition to Dry Creek and the smaller Peaslee and McDonald creeks, the mainstem Tuolumne River gains flow from groundwater, local runoff, and agricultural return flows between the Project and the confluence with the San Joaquin River.

4.6 Land Use

4.6.1 Land Use

Lands within the Tuolumne basin have a number of uses and a variety of ownership types. Upstream of the Project, lands are primarily federally owned; surrounding the Project, the lands are a mix of federally owned lands managed by the BLM and private lands; and downstream of the Don Pedro Project, lands are almost exclusively privately owned. Additional details and information on land use in the Tuolumne River watershed and vicinity of the Project are included in Section 5.11, Land Use.

Upstream of the Project Boundary, the Tuolumne River is designated as a National Wild and Scenic River. Lands in this portion of the watershed are primarily publicly owned and managed by the National Park Service (NPS), in Yosemite National Park, or by the U.S. Forest Service (USFS), in Stanislaus National Forest. Much of the land immediately upstream of the Project is managed by the BLM, including lands adjacent to the Tuolumne River. Lands managed by federal agencies are administered under the agencies' resource management plans, including the

NPS's Yosemite General Management Plan (NPS 2000); the Stanislaus National Forest Land and Resource Management Plan (USFS 1997); and the BLM's Sierra Resource Management Plan (SRMP) (BLM 2008).

Only a short reach of the upper Tuolumne River immediately north of the town of Groveland flows through private lands before the river reaches Don Pedro Reservoir. Surrounding the Project, lands are a mix of publicly owned lands administered by the BLM and private property.

All of the lands within the Project Boundary are either owned by the Districts or are federal lands managed by the Districts. These lands are subject to the Districts' land use policies contained in the DPRA's Rules and Regulations (Appendix E of this PAD). These regulations strictly limit the use of Project lands outside the developed recreation areas.

Downstream of the Project, in the Central Valley area of the Tuolumne River watershed, land is primarily privately owned and used for agriculture, grazing and rural residential purposes, or for denser residential, municipal and industrial purposes in the communities such as Waterford and Modesto (Stanislaus County 2006). A small portion of the land downstream of the Project is under state management: Turlock Lake State Recreation Area is a small state park spanning from the southern bank of the Tuolumne River to the north shore of Turlock Lake (State of California 2005).

4.6.2 Socioeconomics

The Project is located entirely within Tuolumne County, California, toward the southern end of California's historical gold mining Mother Lode. Mining initially shaped the economy and settlement of the region, and the subsequent development of irrigation and power resources from Tuolumne River water laid the groundwork for the cities, communities and continued widespread agricultural use seen in the area today. Water from the Tuolumne River has been used in both Stanislaus and Merced counties since the early 1900s to support the regional agricultural economy and generate hydroelectric power to serve the local area. The Project continues to be a significant regional asset for the entire service areas of MID and TID which together provide power to over 200,000 electric accounts, irrigation for more than 200,000 acres, and high-quality water to the City of Modesto (MID 2010; TID 2010).

Don Pedro Reservoir sits at the northern gateway to Yosemite National Park, via State Route 120. The Project's recreational facilities also provide substantial economic opportunities for Tuolumne County, which has a population of around 60,000 (DOF 2010). The reservoir serves as a popular destination for recreational enthusiasts from across California, with more than 400,000 visitor-days annually (10-year average [DPRA 2009]). The facilities provide a recreational complement to the small destination towns and popular getaway spots of Sonora, Jamestown, and Twain Harte to the northeast and Groveland to the east.

Additional information about socioeconomics in the area of the Project and demographics in the surrounding counties and communities is included in Section 5.9.

4.7 Basin Dams

There are several dams in the Tuolumne River watershed (the mainstem Tuolumne River and its tributaries) other than the Don Pedro Dam, some of which are used for storage purposes and some of which are primarily diversion dams. Table 4.7-1 lists the owners of the known dams and diversion facilities in the Tuolumne River basin, generally from upstream to downstream, including the associated capacities where known. Table 4.7-2 provides information on known hydropower facilities in the Tuolumne River basin, including both small-hydro and conventional hydroelectric generation facilities.

Table 4.7-1 Owners and capacities of known dams or diversion facilities and their associated reservoirs in the Tuolumne River basin.

Owner	FERC Project No.	Stream	Dam or Diversion Dam	Reservoir or Impoundment Name (date completed)	Capacity (ac-ft)
CCSF	None	Tuolumne River	O'Shaughnessy Dam / diversion to Mountain Tunnel	Hetch Hetchy Reservoir (1923)	360,360 (USGS 1999)
CCSF	None	Eleanor Creek	Eleanor Dam	Lake Eleanor (1918)	26,146 (USGS 1999)
CCSF	None	Cherry Creek	Cherry Dam	Lake Lloyd (sometimes called Cherry Lake, 1960)	274,2520 (USGS 1999)
CCSF	None	Tuolumne River	Early Intake (facility used only for emergency diversions from Cherry Creek)	n/a (1924)	<100
CCSF	None	Off-stream	Priest Dam	Priest Forebay (1923)	1,500
CCSF	None	Off-stream (Moccasin Creek and all local runoff diverted under or around impoundment)	Moccasin Dam	Moccasin Afterbay	Approx. 500
Private	None	Big Creek	Pine Mountain Dam	Pine Mountain Lake (1969)	7,700 (USGS 1999)
Private	None	Sullivan Creek (receives diversion from SF Stanislaus)	Phoenix Dam	Phoenix Lake (1880)	612 (USGS 1999)
TID MID	2299	Tuolumne River	Don Pedro Dam	Don Pedro Reservoir	2,033,000
TID MID	None	Tuolumne River	La Grange Dam	La Grange Dam Reservoir	Unknown
MID	None	Off-stream	Modesto Reservoir Dam	Modesto Reservoir (1911)	28,000
TID	None	Off-stream	Turlock Lake Dam	Turlock Lake (1914)	48,000
TID	None	Off-stream	Dawson Dam	Dawson Lake	Unknown

Source: USGS 1999; CCSF 2006.

Table 4.7-2 Hydropower generation facilities in the Tuolumne River watershed.

Owner	FERC Project No.	Powerhouse	Location / Description
CCSF	None	Robert C. Kirkwood Powerplant	124 MW; Completed 1967; water diverted from Hetch Hetchy Reservoir to powerhouse via Canyon Tunnel (CCSF 2006)
CCSF	None	Dion R Holm Powerplant	169 MW; Completed 1960; water diverted from Lake Lloyd via Cherry Power Tunnel (CCSF 2006)
CCSF	None	Moccasin Powerhouse (off-stream)	110 MW; water diverted to powerhouse via CCSF Mountain Tunnel by way of Priest Forebay (CCSF 2006)
MID TID	2299	Don Pedro Powerhouse	Immediately downstream of Don Pedro Dam; 4 units, authorized capacity 168 MW.
TID	None	La Grange Powerhouse	4.5 MW Powerhouse; water source is TID Upper Main Canal.
TID	4450	Dawson Power Plant (off-stream)	5.5 MW; Small hydro located on TID Upper Main Canal between La Grange diversion dam and Turlock Lake
TID	3261	Turlock Lake (off-stream)	3.3 MW; Small hydro located at the outflow of the District’s Turlock Lake
MID	290	Stone Drop (off stream)	230 kW; small hydro located on the MID main canal just below Modesto Reservoir
TID	1000	Hickman (off stream)	1,100 kW; Completed 1979, located on the TID Main Canal

6.0 POTENTIAL PROJECT EFFECTS AND RESOURCE ISSUES

6.1 Preliminary Assessment of Project Effects on Resources and Study Needs

Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) have undertaken an initial, preliminary assessment of the operation and maintenance (O&M) activities of the Don Pedro Project (Project) and their potential to cause adverse impacts to the resources identified in Section 5.0 of this Pre-Application Document (PAD). As discussed throughout this PAD, the Districts, as well as others, have conducted numerous studies of environmental resources and collected substantial Project-related data over the last 40 years, especially on issues related to aquatic resources in the lower Tuolumne River below La Grange Dam.

In essence, the environmental effects of the Don Pedro Project have been the subject of continuous study since it began commercial operation in 1971. Additionally, Project operations related to downstream flows were significantly revised as recently as 1996 based on the studies conducted and consultation with resource agencies, environmental groups, and the Federal Energy Regulatory Commission (FERC). Most of the resource studies were undertaken in accordance with FERC requirements and/or the 1995 settlement agreement between the Districts, City and County of San Francisco (CCSF), resource agencies, and non-governmental organizations (NGOs). A number of aquatic resource studies, primarily focused on fall-run Chinook salmon and steelhead, are continuing to be conducted annually with reports provided to the Tuolumne River Technical Advisory Committee (TAC) and filed with FERC. Most recently, the Districts filed (in March 2010) the results of eight studies conducted in 2009. This PAD has identified, summarized, and/or reported on over 200 studies and investigations relevant to the Tuolumne River and the Don Pedro Project.

Based on the information summarized in Sections 3.0, 4.0, and 5.0 of this PAD, the Districts performed a preliminary assessment of the Project's current and ongoing operations and maintenance activities and their potential to affect environmental resources. Effects on resources were considered in the context of the potential for direct, indirect, or cumulative impacts using the following definitional guidelines:

- A direct effect is that which occurs due to an action in the same place and at the same time as the action and either displays, or is reasonably expected to display, a direct cause:effect relationship.
- An indirect effect of an action is that which occurs at a distance from the action, or some time after the action, and where there is no direct cause:effect relationship.
- A cumulative effect is that which occurs as a result of incremental effects of an action when added to other past, present, or reasonably foreseeable future actions. A cumulative effect can result from individually minor, but collectively significant actions, taking place over a period of time.[3]

Direct, indirect, and cumulative effects can be either adverse or beneficial to a resource.

[3] Guidance on defining cumulative effects and analysis can be found in "Considering Cumulative Effects Under the National Environmental Policy Act", Council on Environmental Quality, 1997.

The preliminary assessment of the potential for the Project to adversely effect resources considered a range of general resource issues and whether sufficient data and information are available to adequately investigate the extent of the Project's impact on a particular resource. To address areas where existing data were deemed to not be adequate, an initial list of studies to be undertaken during relicensing was identified and a number of draft Study Plans were prepared.

The sections below provide a summary of the Districts' preliminary evaluation of resource issues and potential Project effects. In making a preliminary determination of the potential of a Project effect on a resource, the Districts applied the premise that some reasonable evidence must exist of the Project having an adverse effect on a particular resource to warrant a study. This approach is consistent with FERC's Integrated Licensing Process (ILP) section 5.9(b)(5) and relevant court decisions (e.g., City of Centralia vs FERC; D.C. Court of Appeals; June 9, 2000).

6.1.1 Geology and Soils

6.1.1.1 Erosion

Project operations and maintenance activities that may affect soils, specifically soil loss, would include shoreline erosion, recreation activity, and routine maintenance activities. As indicated in Section 5.1, the Project shoreline primarily consists of rock, rubble, and boulder- and cobble-sized material resistant to erosional forces. Where soils predominate, slopes are relatively flat and minor erosion along the shoreline occurs. There is no evidence that Project operations result in a significant loss of soils, or that shoreline erosion is adversely affecting resources except possibly cultural resources. The Districts' land use rules and regulations, including the prohibition on boat docks, piers, bulkheads, or other constructions on the reservoir shoreline substantially reduces the potential for soil loss.

The overwhelming majority of recreation activities occur at designated and well-managed sites at the Project. Any significant erosion or soil movement caused by recreation activities at these sites is quickly addressed by the Don Pedro Recreation Agency (DPRA). Developed recreation sites constitute less than 10 percent of the shoreline. Access roads are well maintained and any repairs to roads or recreation areas follow Best Management Practices (BMP) for erosion control.

Trail use has the potential for direct effects on soil loss and erosion. Such erosion may result in indirect effects on plants or special status species (see Section 6.1.5 below). The Don Pedro Recreation Agency (DPRA) regularly maintains its trail system and this minimizes the potential for adverse effects.

The Districts' land use policy related to Project lands outside the three developed recreation areas is to prohibit shoreline development of any kind. Adjacent landowners are permitted to access the shoreline across Project lands by foot. Boat access is limited to kayaks, canoes, or boats able to be transported by hand. This land use policy has the effect of minimizing disturbance to shorelines and, relatedly, to shoreline soils and vegetation. This policy minimizes the potential for adverse effects on soil loss or erosion in general. Therefore, no further study is warranted at this time.

6.1.1.2 Geomorphology

The Don Pedro Reservoir captures bed-load and coarse grained sediment carried by the Tuolumne River. The Tuolumne River watershed above Don Pedro Reservoir is largely undeveloped with over 75 percent of the area in federal ownership. A substantial portion is designated as a Wilderness Area. The lack of development and the presence of significant federal land management may be factors that limit the amount of erosion (i.e., sediment sources) occurring upstream of Don Pedro. There is no evidence to suggest that the reservoir has lost any substantial storage. No deltas are in evidence at any of the river or stream inlets. Additionally, major reservoirs upstream on the mainstem (Hetch Hetchy), Cherry Creek, and Eleanor Creek serve as intervening sediment capture sites.

The geomorphology of the lower Tuolumne River has been the subject of study (see Section 5.3). The Project's sediment storage and flood management role affect the geomorphology of the lower Tuolumne River. These Project effects would contribute to the cumulative impacts to the geomorphology of the lower Tuolumne River. Large-scale anthropogenic changes have occurred in the lower Tuolumne River corridor starting with the California Gold Rush in 1848 and continuing through the 20th century due to in-channel and floodplain gold dredging and aggregate mining, as well as agricultural and urban encroachment on the floodplain.

Overall, the Project may contribute to cumulative effects as a result of sediment storage and in carrying out its role within the U.S. Army Corps of Engineers (ACOE) flood management of the Tuolumne and San Joaquin rivers. Available information and studies are adequate to evaluate cumulative impacts.

6.1.2 Water Resources

6.1.2.1 Water Quantity

The primary purposes of the Don Pedro Project are to provide water storage for the benefit of irrigation, municipal use, industrial use, and flood control. The Project also provides municipal water benefits for CCSF, which purchased these benefits in the form of water bank credits in the Don Pedro Reservoir for the purpose of releasing to the Districts' flows required by the Raker Act. Other significant uses of the Project are recreation, power generation, and water for fishery protection and enhancement. The Project storage is adequate to provide some carry-over storage in wetter-than-normal water years to offset depletions in dry water years; however, the ability to do so is limited. Flows from the Project are released in accordance with various operating schedules and guide curves, primarily dictated by ACOE flood control guidelines (from October through May); irrigation and municipal water deliveries year-round, primarily March through October; and year-round water releases at La Grange Dam to the lower Tuolumne for fisheries purposes. River flows upstream of Don Pedro are affected by CCSF's operation of its Hetch Hetchy water and power system in accordance with the Raker Act and related agreements.

Direct adverse Project effects on water quantity are limited to water lost to evaporation at the reservoir. However, this adverse effect to water quantity is offset by the Project benefits of flood control, and by providing scheduled deliveries for irrigation, municipal water, and fisheries.

Power generation is also a direct benefit of these scheduled flows. Sufficient information exists to describe all direct Project effects on water quantity.

The Project contributes to cumulative effects on the quantity of water in the lower Tuolumne River, in combination with flow alteration and out-of-basin export by Hetch Hetchy facilities, use of Don Pedro flood control storage in conjunction with the ACOE guidelines, diversions that occur downstream of Don Pedro at the non-Project La Grange Dam, and river withdrawals below La Grange Dam by riparian water users. Sufficient information exists to describe these cumulative effects.

The Project does affect the timing of releases to the lower Tuolumne River. The Districts are developing an operations model for the Project that simulates Project operation and releases using historical hydrology. This model and its inflow hydrology will be sufficient to evaluate Project operations for relicensing purposes. This model will be made available to relicensing participants.

6.1.2.2 Water Quality

Based on available water quality data, the Project is in compliance with the current Basin Plan objectives and associated water quality standards. However, available data are generally over five years old; therefore, additional data are planned to be collected as part of Project relicensing to confirm this preliminary assessment. A draft Water Quality Study Plan is provided as Attachment 6-1 to this section.

Project releases may contribute to cumulative effects on water quality downstream of La Grange Dam as a result of the timing of releases to meet Project purposes. Direct effects on water quality of the lower Tuolumne are the result of diversions at La Grange Dam, runoff from surrounding agricultural lands, Dry Creek water quality, and historic gold mining and aggregate mining in the river. Sufficient data exist to describe these effects.

The Project has direct, indirect, and cumulative effects on water temperature. Potential effects include warming of surface waters and cooling of deeper waters. Existing data show that Don Pedro becomes thermally stratified each spring and maintains this stratification into the fall. The California Department of Fish and Game (CDFG) have collected reservoir temperature profiles since 2004, and the Districts and CDFG have collected temperature data in the lower Tuolumne River since 1988. Based on a FERC Order dated July 19, 2009, a study is currently underway of downstream river temperature regime and is scheduled to be completed in 2011. The Districts have recently begun collecting temperature data on their powerhouse releases. Therefore, sufficient data will exist to characterize and analyze Project effects on water temperature.

6.1.3 Aquatic Resources

6.1.3.1 Fish Resources

The Don Pedro Project potentially affects both reservoir and river fisheries. Reservoir fisheries can be affected by reservoir level changes due to water releases and reservoir water temperatures and stratification. Existing information on reservoir fishery was presented in Section 5.3. CDFG manages the Don Pedro Reservoir fishery as a put-and-grow resource with substantial stocking and appropriate fishing regulations. A number of recreational fishing tournaments take place each year at Don Pedro. All the available evidence indicates that the reservoir fishery is viable and robust. There are no data or other evidence to suggest that Project operations or maintenance activities are having an adverse effect on the reservoir fishery. The reservoir temperature stratification enables the presence of both a viable warm-water and cold-water fishery within the same waterbody. Therefore, there is no evidence to suggest that Project operations are having an adverse effect on reservoir fisheries or aquatic resources.

Project operations contribute to cumulative effects to the fisheries resources of the lower Tuolumne River, along with CCSF operations of the Hetch Hetchy system, historic mining practices, introduction of non-native species, diversions at La Grange Dam, accretion flow, irrigation return flows, and riparian water users' withdrawals. Of particular interest are potential effects on fall-run Chinook salmon and Central Valley steelhead. Data and studies on the fisheries of the lower Tuolumne River have been ongoing for 40 years and sufficient data exist to evaluate Project effects. Annual fisheries studies are continuing, including fall-run Chinook salmon, fry and smolt monitoring, snorkel surveys, BMI surveys, temperature data collection, and sediment data collection. In March 2010, the Districts filed the results of the 2009 studies with FERC. These included the results of spawning surveys, seine surveys, rotary screw trap operations, snorkel surveys, and BMI monitoring. In addition, in July 2009, FERC ordered the Districts to undertake an IFIM study and to develop a water temperature model for portions of the lower Tuolumne River. Subsequently, the Districts developed detailed study plans, consulted with interested parties, obtained FERC approval of these study plans, and have initiated these studies. Both studies are scheduled for completion in 2011 (Water Temperature Model) and 2012 (IFIM).

The Districts believe that the record of available research and studies on downstream fisheries, supplemented by the two additional studies currently underway, provides sufficient data to perform an assessment of the Project's cumulative effects. Furthermore, an extensive record related to anadromous fish in the lower Tuolumne River was developed during the 2009 "Proceeding on Interim Conditions" ordered by FERC by its Order dated July 16, 2009 and presided over by an Administrative law judge (ALJ). The ALJ submitted a Final Report on her findings on November 20, 2009 (FERC docket 2299-053 and -065). All of the parties' filings in this proceeding are available on FERC's E-Library at www.FERC.gov.

6.1.3.2 Amphibians, Aquatic Turtles, and Benthic Macroinvertebrates

Ground-disturbing activities, recreation foot traffic, vegetation management, and reservoir level changes are Project activities that could affect habitat for amphibians, aquatic turtles, and reptiles, including special-status species. Foothill yellow-legged frog (FYLF) and western pond turtle (WPT) may occur in the Red Hills area adjacent to and abutting the Project and east of the Project near Moccasin Peak and First Creek; therefore, existing information should be supplemented by a study of specific Project areas of suitable habitat that are subject to disturbance by Project activities. A draft study plan is provided as Attachment 6-2 to this section.

Project effects on benthic macroinvertebrates would be limited to the potential for cumulative impacts downstream of La Grange Dam when combined with mining activities, irrigation return flows and runoff, and diversions at La Grange Dam. Project cumulative effects would be limited to those associated with Project flows and temperature effects. Sufficient data collection has occurred to evaluate the potential for cumulative effects to benthic macroinvertebrates. The Districts propose to undertake a study to integrate all available BMI data, standardize the historical data differences in field and laboratory methods, and analyze the data using contemporary metrics.

6.1.3.3 Aquatic Invasive Species

Project activities that have a potential to affect the spread of invasive aquatic species would primarily be from the use of watercraft on Don Pedro Reservoir. If watercrafts are contaminated with aquatic invasive species, such as zebra mussels, before they are launched into the reservoir, the invasive species could become established. The Districts, through the DPRA, participate with CDFG and recreation facility operators at Lake McCure and New Melones to perform scheduled spot checks of boats for invasive mussel species and provide educational materials to boat owners regarding the spread of mussels. No invasive species infestations have been reported or observed at Don Pedro. No additional studies appear to be warranted.

6.1.4 Wildlife Resources

Project activities that have a potential to affect special-status wildlife include ground-disturbing activities, vegetation clearing, recreation, and changes in water surface elevations. Project operations and maintenance (O&M) requires very little ground-disturbing activities. The overwhelming majority of Project roads are paved. Vegetation clearing for Project O&M is also minor, generally including limited clearing at Don Pedro Dam and powerhouse, along Project roads, and in Project recreation areas. Recreation activity at the Project and in dispersed recreation use areas around the reservoir have the potential to affect special-status wildlife, with a higher probability of affect during bird nesting periods. Changes in water surface elevations (e.g., gradual drawdown of the reservoir over the summer and fall periods) could affect wildlife species dependent on riparian habitat.

Existing information is adequate to address potential effects on most special-status wildlife species. However, additional information is needed to evaluate potential Project effects on special-status bats. An initial study plan is provided in Attachment 6-3 to this section.

Project activities do not have a potential to significantly affect CDFG harvest or game wildlife species. The Project does not include any canals in which deer could be entrapped. The Project does not include any transmission line right-of-ways, penstocks, or major roads that could disrupt the migration of deer or other wildlife, or cause electrocution of birds. It is possible that the Project reservoir when initially created caused deer herds to alter migratory routes, but after 40 years alternate routes are now well established. Based on the Districts' preliminary assessment, there is no evidence to suggest that Project O&M activities affect harvest or game wildlife at the Bureau of Land Management's (BLM) Red Hills Area of Critical Environmental Concern (ACEC).

6.1.5 Botanical Resources

Project O&M activities that have a potential to affect special-status plants are ground-disturbing activities, vegetation clearing, and recreation. In addition, special-status plants could be affected by the application of herbicides.

Based on a query of the California Natural Diversity Data Base (CNDDB) (CDFG 2008) and the results of queries of the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database (CNPS 2008), 41 special-status plants are known to, or may, occur in the Project area. Of these, 13 are listed by the BLM.

While existing information is useful in developing a target list of special-status species and identifying their flowering periods and habitat, it is not completely adequate to address the issue. Information needed to address the issue is the specific location of special-status plant populations in relation to Project facilities and specific Project O&M activities or recreation activities that have a potential to affect the population. A special-status plant assessment during the appropriate blooming seasons, at areas directly affected by Project activities will provide additional information. To address this data gap, a draft Study Plan is provided in Attachment 6-4 to this section.

Project O&M activities that have a reasonable potential to spread noxious weeds[4] and invasive plants include movement of Project vehicles which may act as a vector to move weeds into new areas. Wind may also disperse weed seed into or out of the Project area.

A total of 29 noxious weeds are known to occur, or have the potential to occur, within the Project area. Of these species, 22 are listed by the California Department of Food and Agriculture (CDFA), while the other seven are considered nuisance species by the BLM.

While existing information is useful in developing a target list of noxious weeds and invasive species and identifying their flowering periods and habitat, it is not completely adequate to address the issue. Information needed to address the issue is the specific location of noxious weeds and invasive plants in relation to Project facilities, and the specific O&M activities and recreation activities in the vicinity of each population that has a potential to affect the population. A noxious weeds and invasive plants study during the appropriate blooming seasons would provide the necessary information. The location of noxious weed and invasive plant populations can be gathered during other studies related to ESA, CESA, and special-status plants.

6.1.6 Riparian, Wetlands, and Littoral Habitats

Project-caused changes in reservoir water levels have been occurring for 40 years and the existing riparian vegetation communities reflect this operation. Project-dispersed recreation could result in effects on wetlands. However, the Districts' preliminary assessment of direct or indirect project effects on riparian, wetland, and littoral habitats has indicated no evidence of adverse effects on these existing resources.

[4] For the purpose of relicensing, noxious weeds include those plants listed as A, B, and C on CDFA's List of Noxious Weeds, and and those considered nuisance species by the BLM.

The Project may contribute to cumulative effects on riparian and wetland resources downstream of La Grange Dam during flood control operations. The operation of the non-Project La Grange Dam controls flows in the lower Tuolumne River during periods of normal river flows. Operation of the Project in accordance with ACOE flood management guidelines controls flow during high-flow periods.

Existing information is adequate to describe these cumulative effects.

6.1.7 Threatened, Endangered, and Fully Protected Wildlife Species

Since ESA- and CESA-listed fishes only occur in the Tuolumne River downstream of La Grange Dam, and since La Grange Dam controls releases downstream of the dam, the potential Project effect is cumulative. Potential effects on ESA- and CESA-listed anadromous fishes could include cumulative effects on various life stages and habitat due to river flows and temperature. La Grange Dam controls all flows in the lower Tuolumne River of less than 5,500 cubic feet per second (cfs). Flows greater than 5,500 cfs only occur when the Project is operating in flood control mode. Both of these potential effects either have been, or are currently, the subject of extensive site-specific studies. Therefore, no additional information is needed to evaluate these effects.

The Project does not impede the upstream passage of migratory fish. Anadromous fish do not reach Don Pedro Dam as they are blocked from upstream migration at La Grange Dam. Therefore, the Project has no effect on the upstream migration of fall-run Chinook salmon or Central Valley steelhead. Currently, spring-run Chinook do not occur within the San Joaquin River basin.

Project ground-disturbing activities, recreation, foot traffic, vegetation clearing, and reservoir level changes could directly affect suitable habitats for California tiger salamander (CTS), which includes vernal pools, seasonal ponds, and excavated stock ponds in grassland or oak savanna. Section 5.5.2 describes the characteristics of potential habitat for CTS and the life history of CTS. The California Natural Diversity Database (CNDDB) includes five records of this species in the general Project vicinity. While the existing information is useful, an assessment of potential habitat for CTS in the Project area should be performed. A draft study plan is provided in Attachment 6-5 to this section.

The historical range of the California red-legged frog (CRLF) includes the west slope foothills of the Sierra Nevada Range, although only about six populations are known to be extant in the Sierra Nevada region, most of which contain few adults (Shaffer et al. 2004; USFWS 2006). The results of the USFWS search of the Project Boundary quads indicated that this species may occur within the Project Boundary quads. The nearest known occurrence is at Piney Creek, where CRLF was last documented in 1984 at locations ranging from 0.96 miles east to 1.06 miles east of the Project Boundary (Basey, pers. comm. 2010; Jennings, pers. comm. 2010). The Districts have not found any existing information that indicates CRLF presence within the Project Boundary or Project area; however, based on the species elevational range (below 5,000 feet), the Districts acknowledge that the absence of records for the Project area does not preclude the possibility that CRLF is present. However, the robust population of basses and sunfish in Don Pedro Reservoir may be indicative of unsuitable habitat for CRLF. Potential affects to CRLF are similar to those potential affects to CTS. A description of habitat characteristics and life history are described in Section 5.5.2. In order to supplement existing information, an assessment of potential habitat for CRLF in the Project area should be performed. A draft study plan is provided in Attachment 6-6 to this section.

Additional information is also needed to evaluate potential Project effects on the ESA-listed Valley Elderberry Longhorn Beetle (VELB). An initial study plan is provided in Attachment 6-7 to this section.

6.1.8 Effect of the Project on ESA- and CESA-Listed Botanical Species

Project O&M activities that have the potential to affect ESA- and CESA-listed plant species are the same activities as described for special-status plants in Section 6.1.5.

Based on a query of the CNDDB (CDFG 2010) and the results of queries of the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database (CNPS 2008), 10 ESA- and CESA-listed plans occur or have the potential to occur in the Project area. This information is useful in developing a target list of ESA- and CESA-listed plant species and identifying their flowering periods and habitat.

While existing information is useful in developing a target list of threatened and endangered plants, it is not completely adequate to address the issue. Information needed to address this issue is the specific location of threatened or endangered plants in relation to Project O&M activities and recreation activities that have a potential to affect such plants. An assessment of ESA- and CESA-listed plants will be performed in conjunction with a survey of special-status plants. A draft study plan is provided in Attachment 6-8 to this section.

6.1.9 Recreational Resources

6.1.9.1 Effect of the Project on River Boating and General River Recreation Opportunities

The Project has the potential to contribute to cumulative effects on recreation in the lower Tuolumne River. These effects are flow-dependent types of fishing (e.g., by boat or wading) and non-motorized boating downstream of the La Grange Dam. These effects would be limited to flood control releases.

6.1.9.2 Effect of the Project on Opportunities for Recreation at Don Pedro Reservoir

The Project operates and maintains three developed recreation areas that provide opportunities for camping, picnicking, power boating, swimming, shoreline fishing, boat fishing, water skiing, and houseboating. The existing Project provides substantial recreation opportunities at its reservoir. The DPRA collects visitor use data. This information is adequate to establish any capacity- and therefore demand-related concerns.

6.1.9.3 Effect of Project on Recreation due to Level of Use and/or Quality of Project Recreation Facilities, including Americans with Disabilities Act Accessibility and Condition and Capacity of Recreation Facilities

DPRA maintains three recreation areas at Don Pedro. Maintenance includes routine upkeep (e.g., replacement of damaged facilities, and painting), and periodic replacement of facilities as needed. Recreation demand for water-related recreation resources is expected to increase over the term of the next license. The existing facilities may not meet the demand for the resource; and the increased use of the recreation facilities may require rehabilitation and upgrade to ensure the facilities meet the needs and experience of visitors. DPRA conducts recreation facility condition, use impact, and Americans with Disabilities Act (ADA) accessibility evaluations routinely. These evaluations are a primary source of information to address this issue. However, the Districts anticipate that additional information will be needed to address this issue. Additional information needed would be an assessment of the condition of the existing recreation facilities and their accessibility. A study plan will be included in the Districts' Proposed Study Plan (PSP), scheduled to be issued on or about July 25, 2011 (see PAD Section 2.0).

6.1.9.4 Effect of the Project on BLM's Road Systems, Including Off-Highway Vehicle Access

The Districts are not aware that any Project roads connect to public roads administered by the BLM. Existing information is adequate to address this issue.

6.1.9.5 Effect of Project on Recreation due to Changes (i.e., Increases) in Amount of Water Diverted for Power Generation under the New License

Any changes in Project operations have the potential to affect the water levels in Don Pedro Reservoir. The Districts believe that there is sufficient existing information to adequately address this issue. The Districts plan to include in their application for a new license an assessment regarding whether its proposed resource management measures will affect resources, including any changes in water releases for power generation.

6.1.9.6 Effect of the Project on Public Safety (i.e., Exposure of Boating Hazards) if the Water Level in Don Pedro is at a Lower Elevation under the New License than it was under the Existing License

Any changes in Project operations have the potential to affect the water levels in Don Pedro Reservoir. Changes in operations could result in lower water level elevations, which could result in the exposure of boating hazards that are not exposed when the reservoir water levels are at a higher elevation. However, until the specific changes that would be included in the new license are identified or at least bracketed, an effects analysis cannot be performed.

DPRA's current program is to place buoys and signs where necessary at the locations of boating hazards throughout the year, and especially as the water level drops. The Districts would expect to continue this program under the new license. It is anticipated that this would adequately mitigate boating hazards.

6.1.9.7 Effect of the Project on Recreation / Fishing Access Downstream at La Grange Dam

The Project does not include any Project facilities downstream of the Don Pedro powerhouse. In addition, the Project does not include any areas downstream of La Grange Dam. Flows in that section of the stream are controlled at La Grange Dam. For these reasons, the Project does not affect recreation access downstream of La Grange Dam.

6.1.10 Socioeconomic Resources

Project activities that could affect community services are related to fires, patrolling, and emergency response. These are mostly related to recreation use. Potential effects range from the need for law enforcement patrolling and response, to emergency services response. The Districts are unaware of any undue Project effect on community services related to the Project. There have been no recorded Project-related wildfires. Law enforcement in the Project area is described in Section 5.6.3. Further, the Districts are unaware of any emergency response events related to the Project.

Use of Project water affects socioeconomic conditions in the Districts' service areas, the greater Central Valley, CCSF, and areas served by the 26 Bay Area wholesale water agencies that rely on consumptive water deliveries from CCSF. Future operating scenarios that affect the availability of water to existing uses may have severe impacts on domestic, municipal, commercial, and industrial water users in those areas, as well as the economies of the Central Valley and San Francisco Bay Area. The proper scope of any socioeconomic study will depend on the specifics of any proposed alterations to existing uses.

6.1.11 Aesthetic Resources

Project facilities and features may clash with the surrounding viewshed leading to impacts on visual quality. However, since the Project has been in operation for nearly 40 years and most Project facilities and features are readily viewable to the general public, unless the public is at one of the Project recreation areas or on the Project reservoir, it is likely that the aesthetic effect is minor. The Districts are unaware of any complaints regarding construction debris or garbage. Existing information is adequate to address potential impacts.

6.1.12 Cultural Resources

Project activities such as ground disturbance, water surface fluctuation, and recreation have a potential to affect cultural resources. Also, cultural sites that may normally be inundated may be subject to disturbance when the Project reservoir is drawn down. Routine Project O&M could potentially directly affect cultural sites through ground disturbance, such as by foot traffic, grading of a road, or other physical disturbances. Recreation activities can lead to disturbance of intact cultural deposits, increased erosion, or deterioration of sites, and unauthorized artifact collection, as well as more severe vandalism and looting if the sites are in proximity to the recreation areas. Over time, wind, rain, and other climatic conditions can slowly deteriorate a site, particularly historical surface features like shelters, bridges, and canals. Because weathering to a site occurs independently of the Project, this form of erosion is not considered a Project-related effect.

While existing information is useful, additional information regarding cultural resources is needed. Also, this information will be useful for developing a Historic Properties Management Plan (HPMP) in consultation with the State Historic Preservation Office (SHPO), BLM, and tribes for inclusion in the new license. A draft study plan is included in Attachment 6-9 to this section.

6.1.13 Potential Project Effects on Traditional/Tribal Spiritual Areas and Other Traditional Uses in the FERC Project Boundary and Adjacent Locations

A Traditional Cultural Property (TCP) is a place that is associated with cultural practices or beliefs of a living community that are (a) rooted in that community's history, and (b) important in maintaining the continuing cultural identity of the community. As with other cultural resources, Project activities such as ground disturbance and recreation have potential to affect TCPs. The effect may be direct (e.g., result of ground-disturbing activities), indirect (e.g., public access to Project areas) or cumulative (e.g., caused by a Project activity in combination with other past, present, and reasonably foreseeable future projects).

While existing information is useful, additional consultation with potentially affected tribes is needed to address this issue. Also, this information will be useful to develop a HPMP in consultation with SHPO, BLM, and tribes for inclusion in the new license. A draft study plan is included in Attachment 6-10 to this section.

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Dept 390/#133742
February 8, 2011

APPENDICES

APPENDIX A

PRE-PAD/NOI CORRESPONDENCE, COMMUNICATIONS, AND MEETINGS

APPENDIX A
DON PEDRO CONSULTATION RECORD LOG

Date	From	To	Subject
7/28/2010	TID-MID	Initial Relicensing Info Mtg Mailing List	Notice of IRIM and Request for Information
8/4/2010	Rose Staples, HDR|DTA	TID-MID	Advisory of IRIM/RFI Mailing on 07/28/2010
9/5/2010	Mark Jennings, RR	Shannon Mason, HDR|DTA	Transmittal of 1990 Field Notes regarding Piney Creek
9/9/2010	John Devine, HDR|DTA	Larry Thompson, NMFS	Request for Information for PAD
9/9/2010	John Devine, HDR|DTA	Deborah Giglio, USFWS	Request for Information for PAD
9/9/2010	John Devine, HDR|DTA	Robert Hughes, CDFG	Request for Information for PAD
9/14/2010	Jennie Garza, HDR|DTA	Dr Bruce McGurk, CCSF	Log of Telephone Call regarding Moccasin Creek Tunnel
09/14-15/2010	TID-MID	IRIM Meeting Participants	Relicensing Informational Presentation
09/2010	TID-MID	Interested Visitors to Relicensing Website	Posting on Website of Frequently Asked Questions
09/24/2010	Shannon Mason, HDR/DTA	Harold Basey	Log of Telephone Call regarding CRLF in Piney Creek
10/18/2010	Jessie Raeder, TRT	R Nees/G Dias/J Devine/C Loy	Response to Request for PAD data
10/20/2010	M Kathleen Wood, USFWS	John Devine, HDR|DTA	Response to Request for PAD data
10/21/2010	Carin Loy, HDR|DTA	Robert Hughes, CDFG	Follow-up to Request for Info for PAD
10/21/2010	Carin Loy, HDR|DTA	Larry Thompson, NMFS	Follow-up to Request for Info for PAD
10/21/2010	Carin Loy, HDR|DTA	Deborah Giglio, USFWS	Follow-up to Request for Info for PAD
10/22/2010	Rose Staples, HDR|DTA	Julie Means/Annie Manji, CDFG	Request for Introductory Meeting regarding Relicensing
10/22/2010	Rose Staples, HDR|DTA	Larry Thompson/Richard Wantuck, NMFS	Request for Introductory Meeting regarding Relicensing
10/22/2010	Rose Staples, HDR|DTA	Michelle Workman/Deborah Giglio, USFWS	Request for Introductory Meeting regarding Relicensing
10/25/2010	Carin Loy, HDR|DTA	John Devine/Rose Staples, HDR|DTA	Advisory of receipt of CDs from Tuolumne River Trust
10/25/2010	Larry Thompson, NMFS	Carin Loy, HDR|DTA	Response to Follow-Up to Request for PAD Info
10/25/2010	Annie Manji, CDFG	Rose Staples, HDR|DTA	Response to 10/22/2010 Req for Intro Mtg Re Relicensing
10/26/2010	Shannon Mason, HDR/DTA	Steven Holdeman, USFS	Log of Telephone Call regarding RTE/S-S Amphibians
10/26/2010	Robert Nees, TID	John Devine, HDR|DTA	Summary of 08/30/2010 Meeting with NMFS
10/26/2010	Robert Nees, TID	John Devine, HDR|DTA	Summary of 08/31/2010 Meeting with USFWS
10/26/2010	Robert Nees, TID	John Devine, HDR|DTA	Summary of 10/19/2010 Meeting with CDFG
10/28/2010	John Devine, HDR|DTA	Deborah Giglio/Michelle Workman, USFWS	Request for Introductory Meeting regarding Relicensing
10/28/2010	John Devine, HDR|DTA	Larry Thompson/Richard Wantuck, NMFS	Request for Introductory Meeting regarding Relicensing
10/28/2010	Carin Loy, HDR|DTA	Robert Hughes, CDFG	Communications regarding PAD Info Available
10/29/2010	John Devine, HDR|DTA	Richard Wantuck, NMFS	Response to Request for PAD data
11/16/2010	Julie Means, CDFG	Rose Staples, HDR|DTA	Review of Draft PAD 7.0 Reference Section
12/20/2010	John Devine, HDR|DTA	Jessie Raeder, Tuolumne River Trust	Response to TRT October 18, 2010 Letter
01/03/2011	Jennie Garza, HDR|DTA	Dr Bruce McGurk, CCSF	Log of Telephone Call regarding Moccasin Fish Hatchery
01/28/2011	Daniel McDaniel, NGM	James Lynch, HDR|DTA	Request to add CDWA to Relicensing Mailing List
2/1/2011	John Devine, HDR|DTA	Interested Relicensing Parties	Advisory of PAD draft upload to website/Possiblity of 02/25 or 03/01/2011 Initial Relicensing Meeting

TID WATER & POWER
Serving Central California since 1887

MID Modesto Irrigation District
Water and Power

July 28, 2010

Subject: **Don Pedro Hydroelectric Project**
Notice of Initial Information Meeting and Request for Information Pertinent to the Relicensing of the Don Pedro Project

Dear Interested Party:

The Don Pedro Hydroelectric Project located on the Tuolumne River is owned jointly by the Turlock Irrigation District and the Modesto Irrigation District. The Project received its initial authorization for construction and operation from the Federal Energy Regulatory Commission (FERC) in 1964. This initial license expires in April, 2016, and the Districts intend to obtain a new license from FERC to continue to operate and manage the Project.

Initial Information Meeting

The process to obtain a new license (generally referred to as "relicensing") is involved and lengthy. The formal process will begin in early February, 2011, and the Districts must file their complete application for a new license with FERC in April, 2014. The Districts anticipate receiving a new license on or before April, 2016. For the purpose of describing this entire process, the Districts will hold initial information meetings about the relicensing process and the overall relicensing schedule.

For the convenience of the public, multiple information meetings are scheduled. These meetings will each cover the same subjects, so attendance at any one of the meetings will be sufficient to gain an understanding of relicensing. Meeting dates and locations are provided below:

DATE:	**Tuesday, September 14, 2010**
TIME:	7 p.m. to 9 p.m.
WHERE:	Turlock Irrigation District, Board Room 333 East Canal Drive, Turlock
DATE:	**Wednesday, September 15, 2010**
TIME:	10 a.m. to Noon
WHERE:	Modesto Irrigation District Office 1231 11th Street, Modesto
DATE:	**Wednesday, September 15, 2010**
TIME:	7 p.m. to 9 p.m.
WHERE:	Modesto Irrigation District Office 1231 11th Street, Modesto

To enable the public to stay informed of activities and developments related to relicensing, the Districts have created a website that contains relevant and useful information about the Don Pedro Project and the relicensing process. We encourage everyone to visit the website at www.donpedro-relicensing.com.

Request for Information

As part of the Districts' internal activities to prepare for the relicensing of the Don Pedro Project, the Districts are initiating a comprehensive search for any information that may already exist that might at all be relevant to the upcoming relicensing. The information obtained from stakeholders through this search and request will be collected, compiled, assessed for relevancy, and summarized as part of the development of the Districts' Pre-Application Document (PAD) as required by the applicable FERC regulations. The Districts respectfully request that you identify any information you are aware of that fulfills any of the following criteria:

(1) Information related to environmental (fish, wildlife, botanical, water quality), socioeconomic, and cultural resources found within or adjacent to the Don Pedro Project area.

(2) Information in the form of published/unpublished reports, historical documents, and previous studies that you deem relevant to the relicensing of the Don Pedro Project.

(3) Information collected and/or studies conducted that were not affiliated with or funded by either TID or MID.

(4) Information on resources of the Tuolumne River that you believe might be of interest or value to relicensing. We are asking all individuals, organizations, and agencies to identify any and all information, data, and/or reports that may in any way be related to the operation and management of the Project, its facilities, and the affected environment.

If you are aware of such available information, we ask that within 45 days from the date of this letter, you identify any such information and let us know how we may best acquire a copy of the information.

If you have any questions about the upcoming meetings or relicensing in general, please contact either:

Michelle Reimers
Public Information Division Manager
Turlock Irrigation District
P.O. Box 949
Turlock CA 95381
(209) 883-8530
mareimers@tid.org

Melissa Williams
Public Affairs Specialist
Modesto Irrigation District
P.O. Box 4060
Modesto CA 95352
(209) 526-7390
melissaw@mid.org

If you believe you may have existing information which might be relevant or useful for relicensing, we ask that you contact either of the Districts' Project Managers via email or phone as provided below. We look forward to seeing you at the upcoming information meetings; and once again, we encourage you to visit the Don Pedro relicensing website at www.donpedro-relicensing.com.

Thank you for your cooperation.

Sincerely,

Robert M. Nees
Project Manager
Turlock Irrigation District
P.O. Box 949
Turlock CA 95381
(209-883-8214)
rmnees@tid.org

Greg Dias
Project Manager
Modesto Irrigation District
P O Box 4060
Modesto CA 95352
(209-526-7566)
gregd@mid.org

From: Staples, Rose
Sent: Wednesday, August 04, 2010 5:51 PM
To: Barton, Jeff; Bill Johnson; Cox, Regina; Devine, John; Dias, Greg; Garza, Jennie; Nees, Robert; Staples, Rose; Tim O'Laughlin; Warren, Joy
Subject: Confirmation of Mailing - Notice of Initial Information Meetings and Request for Information Letter
Attachments: InfoMtgsNotice-RFI_Final_100728_withSignatures.pdf; Don Pedro Initial Stakeholder Address List July 28-29 2010.pdf

For reference, the attached letter was mailed, via FIRST CLASS, from HDR|DTA Portland, Maine office on Wednesday, July 28-Thursday, July 29, 2010 to the attached stakeholder list, totaling 231 recipients. Any returned undeliverable envelopes will be noted and efforts made to locate a more current contact and/or address for the recipient. Once all returns are processed, an updated stakeholder list will be distributed to the Relicensing Team. Thank you.

Rose Staples CPS
Executive Assistant
HDR|DTA
970 Baxter Boulevard | Portland ME | 04103
Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742
Email rose.staples@hdrinc.com

Don Pedro Initial Relicensing Information Meetings/Request for Information
Mailing List

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Adam	Robin	Assemblywoman Cathleen Galgiani, District Deputy	Merced	CA
Aguilar	Margarita	City of Livingston, Council Member	Livingston	CA
Aldaco	Jose	City of Waterford, Council Member	Waterford	CA
Alves	Ed	City of Escalon, Council Member	Escalon	CA
Anderson	Craig	NOAA National Marine Fisheries Service	Sacramento	CA
Avecilla	Michael	CA Correctional Peace Officers Assoc.	Copperopolis	CA
Balzarini	Matthew	Mountain House Community Services District, Board Member	Mountain House	CA
Bass	Liz	Tuolumne County, Supervisor	Sonora	CA
Bawanan	Ramon	City of Hughson, Mayor	Hughson	CA
Bays	Don	L. B. Bass Club	Los Banos	CA
Beekman	Matt	City of Hughson, Council Member	Hughson	CA
Benitez	Sandra	City of Riverbank, Council Member	Riverbank	CA
Berryhill	Bill	State of California, Assemblyman	Sacramento	CA
Berryhill	Tom	State of California, Assemblyman	Sacramento	CA
Bestolarides	Steve	San Joaquin County, Supervisor	Stockton	CA
Beuttler	John	California Sportfishing Protection Alliance	Berkeley	CA
Bickle	David	Christian Bass League	Turlock	CA
Birch	Cheryl	Senator Dave Cogdill, District Deputy	Ripon	CA
Boucher	Allison	Friends of the Tuolumne	Bend	OR
Boucher	David	Friends of the Tuolumne	Bend	OR
Brennan	Michael	City of Oakdale, Council Member	Oakdale	CA
Brochini	Anthony	Southern Sierra Miwuk Nation, Chairperson	Mariposa	CA
Bryan	Bernie	E & J Gallo Winery	Modesto	CA
Bublak	Amy	City of Turlock, Council Member	Turlock	CA
Campo	Becky	City of Patterson, Mayor	Patterson	CA
Cannella	Anthony	City of Ceres, Mayor	Ceres	CA
Carlin	Michael	San Francisco Public Utilities Commission	San Francisco	CA
Carvajal	Amanda	Merced County Farm Bureau, Executive Director	Merced	CA

Last Name	First Name	Agency/Organization/Affiliation	City	ST
Caseri	Gary	Stanislaus County, Ag Commissioner	Modesto	CA
Charles	Cindy	Golden West Women Flyfishers	San Francisco	CA
Chiesa	Vito	Stanislaus County, Supervisor	Modesto	CA
Cogdill	Dave	State of California, Senator	Sacramento	CA
Compton	Leon	City of Ripon, City Administrator	Ripon	CA
Cox	Stanley R	Tuolumne Band of Me-Wuk Indians, Cultural Resources	Tuolumne	CA
Cranston	Peggy	USDOI, Bureau of Land Management, Region 4	El Dorado Hills	CA
Crowder	Thom	City of Hughson, Council Member	Hughson	CA
Cuellar	Sam	City of Patterson, Council Member	Patterson	CA
Day	Kevin	Tuolumne Band of Me-Wuk Indians, Tribal Chair	Tuolumne	CA
Day	Murray	City of Waterford, Council Member	Waterford	CA
DeMartini	Jim	Stanislaus County, Supervisor	Modesto	CA
Demers	Michel	North Fork Rancheria, Tribal Administrator	North Fork	CA
Denham	Jeff	State of California, Senator	Sacramento	CA
Deschenes	Charles	City of Waterford, Administrator	Waterford	CA
Donabed	Joseph	City of Hughson, City Manager	Hughson	CA
Donaldson	Milford W	California Department of Parks and Recreation - Office of Historic Preservation - State Historic Preservation Officer	Sacramento	CA
Douglas	Bill / Melodie	Modesto AmBassAdors	Modesto	CA
Dunlap	Jay	Wasco Bass Club	Bakersfield	CA
Dunlop	Tom	City of Oakdale, Council Member	Oakdale	CA
Durossette	Bret	City of Ceres, Council Member	Ceres	CA
Eblen	John / Marcia	The Scuttlebutt Newsletter	Manteca	CA
Edmondson	Steve	NOAA National Marine Fisheries Service	Santa Rosa	CA
Eicher	Jim	USDOI, Bureau of Land Management, Region 4	El Dorado Hills	CA
Eisenmann	Marty	U.S. Army Corps of Engineers	Sacramento	CA
Erickson	Matthew	City of Waterford, Public Works Director	Waterford	CA
Espinoza	Rodrigo	City of Livingston, Council Member	Livingston	CA
Etchebarne	Mitch	Stanislaus County Farm Bureau, Past President	Modesto	CA
Farinha	Dominic	City of Patterson, Council Member	Patterson	CA
Fielder	Danny	City of Riverbank, Council Member	Riverbank	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Fink	Judy	North Fork Mono Rancheria	North Fork	CA
Ford	Kirk	Stanislaus County, Planning & Community Development Dtr	Modesto	CA
Fox	Danny	City of Escalon, Council Member	Escalon	CA
Franklin	Al	USDOI, Bureau of Land Management, Region 4	El Dorado Hills	CA
Fuller	Reba	Spokesperson, Central Sierra Me-Wuk Cultural & Historic	Tuolumne	CA
Furman	Donn	City & County of San Francisco	San Francisco	CA
Galgiani	Cathleen	State of California, Assemblywoman	Sacramento	CA
Gantenbein	Julie	Natural Heritage Institute California Rivers Restoration Fund	San Francisco	CA
Gay	Charlie	City of Ripon, Council Member	Ripon	CA
Giglio	Deborah	U.S. Fish and Wildlife Service	Sacramento	CA
Goeken	Charlie	City of Waterford, Mayor	Waterford	CA
Gonsalves	Joey	Stanislaus County Farm Bureau, Secretary	Modesto	CA
Goode	Ron	North Fork Mono Tribe	Clovis	CA
Goubert	Janine	Stanislaus County Farm Bureau, President	Modesto	CA
Gray	John	Tuolumne County, Supervisor	Sonora	CA
Greer	David	City of Modesto, Council Member	Modesto	CA
Grover	Jeff	Stanislaus County, Supervisor	Modesto	CA
Gutierrez	Monica	NOAA National Marine Fisheries Service	Sacramento	CA
Hallam	Steve	City of Oakdale, City Manager	Oakdale	CA
Hammond	Emmaline	Chuckchansi Tribe	Oakhurst	CA
Hanson	Toni	City of Oakdale, Council Member	Oakdale	CA
Harringfeld	Sonya	Stanislaus County, Environmental Resources Director	Modesto	CA
Harrington	Jeff	Taft Bass	Bakersfield	CA
Harris	Vincent	Future Pro Tour	Sacramento	CA
Haskin	Gary	City of Escalon, Council Member	Escalon	CA
Hastreiter	James L.	FERC (Portland, Oregon office)	Portland	OR
Hawn	Brad	City of Modesto, Council Member	Modesto	CA
Helmar	Vicki	Tuolumne County, Ag Commissioner	Sonora	CA
Hersh-Burdick	Rachael	U.S. Army Corps of Engineers	Sacramento	CA
Hesling	Henry	City of Escalon, Interim City Manager	Escalon	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Heyne	Tim	California Department of Fish and Game	La Grange	CA
Hill	Phil	Jigs Bait and Tackle	La Grange	CA
Hobbs	Jeff	Mid Valley Bass	Fresno	CA
Holmer	Richard	City of Riverbank, City Manager	Riverbank	CA
Howze	Ted	City of Turlock, Council Member	Turlock	CA
Huang	William	Spiegel & McDiarmid	Washington	DC
Hughes	Robert	California Department of Fish and Game	Rancho Cordova	CA
Humphreys	Doug	City of Hughson, Council Member	Hughson	CA
Hunter	Michelle	Senator Jeff Denham, District Deputy	Merced	CA
Huntzinger	Mike	Lake Don Pedro Waterski Club	Fremont	CA
Hutcheson	Bill	U. S. Angler's Choice, Tourn. Trails	Brentwood	CA
Hutcheson	Bill	Won Bass	San Clemente	CA
Irwin	Rodney	Modesto Elks Lodge #1282	Hughson	CA
Jackson	Farrell	City of Oakdale, Mayor	Oakdale	CA
Jackson	Mary	City of Turlock, Council Member	Turlock	CA
James	Jim	Sonora Bass Anglers	Tuolumne	CA
James	Les	Southern Sierra Miwuk Nation, Spiritual Leader	Mariposa	CA
Jennings	William	California Sportfishing Protection Alliance	Stockton	CA
Jensen	Art	Bay Area Water Supply & Conservation Agency	San Mateo	CA
Johannis	John	U.S. Army Corps of Engineers	Sacramento	CA
Johnson	Brian	CalTrout	Berkeley	CA
Johnson	Jay	Southern Sierra Miwuk Nation, Spiritual Leader	Mariposa	CA
Kanz	Russ	State Water Resources Control Board	Sacramento	CA
Kelsey	Deidre	Merced County, Supervisor	Merced	CA
Kempton	Kathryn	NOAA National Marine Fisheries Service	Long Beach	CA
Kilger	Brad	City of Ceres, City Manager	Ceres	CA
King Tingle	Bernice	Mountain House Community Services District, Board Member	Mountain House	CA
Kornhauser	Bob	100% Bass	San Leandro	CA
Krause	Ken	City of Waterford, Council Member	Waterford	CA
Krebbs	Gary	City of Ripon, Council Member	Ripon	CA
Kulak	Stanley	West Coast Fishing Tournaments	Lakehead	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Lagarbo	Allen	March of Dimes	Modesto	CA
Lahti	Derald	Stanislaus Fly Fishers	Modesto	CA
Lake Don Pedro staff	Attn:	Forever Resorts, LLC	Scottsdale	AZ
Lamb	Jim	Mountain House Community Services District, Board Member	Mountain House	CA
Lashkiff	Stephanie	Lake Don Pedro Waterski Club	Discovery Bay	CA
Laugero	Jeff	City of Escalon, Council Member	Escalon	CA
Lazar	John	City of Turlock, Mayor	Turlock	CA
Leach	Joseph	City of Oakdale, Public Works	Oakdale	CA
Leogrande	Tom	California Bass Champs	Greenbrae	CA
Levin	Ellen	San Francisco Public Utilities Commission	San Francisco	CA
Lopez	Dave	City of Modesto, Council Member	Modesto	CA
Lopez	Manual	San Joaquin County, Administrator	Stockton	CA
Machado	Matt	Stanislaus County, Public Works Director	Modesto	CA
Madueno	Virginia	City of Riverbank, Mayor	Riverbank	CA
Maffei	Paolo	Tuolumne County, Supervisor	Sonora	CA
Manley	Ben	City of Hughson, Council Member	Hughson	CA
Mansor	Robert	Poe Mans	La Grange	CA
Marsh	Garrad	City of Modesto, Council Member	Modesto	CA
Mathiesen	Lloyd	Chicken Ranch Rancheria of Me-Wuk, Chairperson	Jamestown	CA
Matteson	Larry	President, Mocassin Point Houseboat Owners Association	Morgan Hill	CA
McDevitt	Ray	Hanson Bridgett	San Francisco	CA
Melilli	David	City of Riverbank, Public Works Director	Riverbank	CA
Monteith	Dick	Stanislaus County, Supervisor	Modesto	CA
Morgan	Katherine	City of Oakdale, Council Member	Oakdale	CA
Muratore	Joe	City of Modesto, Council Member	Modesto	CA
Murken	Walt	City of Escalon, Mayor	Escalon	CA
Murrison	Teri	Tuolumne County, Supervisor	Sonora	CA
Myers	Larry	Native American Heritage Commission	Sacramento	CA
Nateras	Martha	City of Livingston, Council Member	Livingston	CA
Nelson	Mike	Merced County, Supervisor	Merced	CA
Nutt	Eldon "Red"	City of Ripon, Council Member	Ripon	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Nydam	Garret	Mid Valley Ag Services	Hughson	CA
Nyhoff	Greg	City of Modesto, City Manager	Modesto	CA
O'Banion	Jerry	Merced County, Supervisor	Merced	CA
O'Brien	William	Stanislaus County, Supervisor	Modesto	CA
Ochoa	Guillermo	City of Ceres, Council Member	Ceres	CA
O'Hara	Kerry	US Department of Interior, USFWS	Sacramento	CA
Olsen	Kristen	City of Modesto, Council Member	Modesto	CA
Ornellas	Leroy	San Joaquin County, Supervisor	Stockton	CA
Orvis	Tom	Stanislaus County Farm Bureau, Governmental Affairs Dtr	Modesto	CA
Pedrozo	John	Merced County, Supervisor	Merced	CA
Peluso	Danny	Angler's Choice	Waterford	CA
Peluso	Danny	U. S. Angler's Choice	Brentwood	CA
Peterson	Ron	Stanislaus County Farm Bureau, 1st Vice President	Modesto	CA
Phelan	Bob	Assemblyman Tom Berryhill, District Deputy	Modesto	CA
Pinhey	Nick	City of Modesto, Utility Planning & Projects	Modesto	CA
Planas	Lorrie	Chukchansi Tribe; Choinumni/Mono	Clovis	CA
Pland	Richard	Tuolumne County, Supervisor	Sonora	CA
Powell	Melissa	Chicken Ranch Rancheria of Me-Wuk, Cultural Resources Coordinator	Jamestown	CA
Prock	Ray	Stanislaus County Farm Bureau, 2nd Vice President	Modesto	CA
Puccini	Stephen	California Department of Fish and Game	Sacramento	CA
Ramirez	Tim	San Francisco Public Utilities Commission	San Francisco	CA
Rea	Maria	NOAA National Marine Fisheries Service	Sacramento	CA
Richardson	Kevin	U.S. Army Corps of Engineers	Sacramento	CA
Ridenour	Jim	City of Modesto, Mayor	Modesto	CA
Roberts	Delores	North Fork Rancheria, Chairperson	North Fork	CA
Robinson	Rick	Stanislaus County, CEO	Modesto	CA
Roos-Collins	Richard	Natural Heritage Institute	San Francisco	CA
Ruhstaller	Larry	San Joaquin County, Supervisor	Stockton	CA
Rusconi	Phil	Kerman Bass Club	Fresno	CA
Sanchez	John	Badge Packers	Modesto	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Sanders	Jeff	Cal-Fire, Groveland Battalion	San Andreas	CA
Schaaf	George	California Landscape Contractors Assoc.	Modesto	CA
Schultz	Jack	Kokanee Power	Merced	CA
Sensibaugh	Paul	Mountain House Community Services District, General Mgr	Mountain House	CA
Shareghi	Nader	Mountain House Community Services District, Public Works Dtr	Mountain House	CA
Shelton	Dejeune	City of Patterson, Council Member	Patterson	CA
Shutes	Chris	California Sportfishing Protection Alliance	Berkeley	CA
Single	Jeffrey	California Department of Fish and Game, Central Region	Fresno	CA
Slay	Ronn	California Natural Resources Foundation	Atwater	CA
Smith	Anette	City of Patterson, Council Member	Patterson	CA
Spycher	Kurt	City of Turlock, Council Member	Turlock	CA
Stephens	Debbie	Bethel Assembly of God	Oakdale	CA
Stewart	Marvin W.	Fresno Bass Club	Fresno	CA
Stork	Ron	Friends of the River	Sacramento	CA
Su	Andy	Mountain House Community Services District, Board Member	Mountain House	CA
Sutherland	Craig	American Bass	Redondo Beach	CA
Tull	Steve	Modesto AmBassAdors	Modesto	CA
Tuolumne River Expeditions	Attn:	All-Outdoors California Whitewater Rafting	Lotus	CA
Tuolumne River trips	Attn:	Zephyr Whitewater Expeditions	Columbia	CA
Tuolumne River trips	Attn:	Mariah Wilderness Expeditions	Coloma	CA
Tuolumne River trips	Attn:	Beyond Limits Adventures, Inc.	Riverbank	CA
Tuolumne River trips	Attn:	O.A.R.S.	Angels Camp	CA
Turner	Dennis	City of Modesto, Public Works Director	Modesto	CA
Uecker	Dean	City of Ripon, Council Member	Ripon	CA
Ulm	Rich	City of Modesto, Deputy Director Engineering&Transportation	Modesto	CA
Van Klaveren	Dan	Stanislaus County Farm Bureau, Treasurer	Modesto	CA
Van Winkle	Mike	City of Waterford, Council Member	Waterford	CA
Varela	Daniel	City of Livingston, Mayor	Livingston	CA
Vierra	Chris	City of Ceres, Council Member	Ceres	CA
Villapudua	Carlos	San Joaquin County, Supervisor	Stockton	CA
Vogel	Ken	San Joaquin County, Supervisor	Stockton	CA

Last Name	*First Name*	*Agency/Organization/Affiliation*	*City*	*ST*
Wade	Michael	California Farm Water Coalition, Executive Director	Sacramento	CA
Walsh	Hubert	Merced County, Supervisor	Merced	CA
Warne	Richard	City of Livingston, City Manager	Livingston	CA
Wasden	Roy	City of Turlock, City Manager	Turlock	CA
Wesselman	Eric	Tuolumne River Preservation Trust	San Francisco	CA
White	Dave	City of Riverbank, Council Member	Riverbank	CA
White	Jesse James	City of Riverbank, Council Member	Riverbank	CA
Whitemyer	Brian	City of Patterson, Interim City Manager	Patterson	CA
Whitney	Landon	Assemblyman Bill Berryhill, District Deputy	Stockton	CA
Willis	Ben	CBF	Lodi	CA
Wilson	Diana	Northern California Bass Federation	Modesto	CA
Winn	Chuck	City of Ripon, Mayor	Ripon	CA
Wited	Randy	Kings River Bass Club	Reedley	CA
Woodward	Ray	Sierra Bass Club	Clovis	CA
Workman	Michelle	U.S. Fish and Wildlife Service	Stockton	CA
Zipser	Wayne	Stanislaus County Farm Bureau, Executive Director	Modesto	CA
		Riverbank Bass Anglers	Oakdale	CA
		Lake Don Pedro Marina, LLC	La Grange	CA
		Lake Don Pedro Owner's Association	La Grange	CA
		Moccasin Point Marina, LLC	Jamestown	CA
		Tuolumne River Alliance of Property Owners	Waterford	CA

From: RanaResources@aol.com
Sent: Sunday, September 05, 2010 11:09 AM
To: Mason, Shannon
Subject: Re: Jordan Creek sighting
Attachments: Piney Creek.pdf

#15,057
September 05, 2010

Hi Shannon:

Attached you will find my old field notes for the October 27, 1990 visit to Piney Creek that was conducted by myself and Dr. Marc P. Hayes.

As for the Jordan Creek sighting, it is actually a museum specimen that was on display at Modesto Junior College in Modesto. According to my records, the specimen was collected in Jordan Creek during October 1967 by Ken Amos "above the first bridge; 2 miles north of Greeley Hill Road" (at 2,600 feet).
It is an adult female.

This record was originally listed in Harold Basey's old unpublished California red-legged frog report to the California Department of Fish and Game.
Marc Hayes and I verified the specimen during our visit to Modesto Junior College back in 1990. As I recall, it was a freeze dried specimen in a display with other native species. There was no museum data attached and we asked the curator and Harold for the above particulars.

One more person to ask about these records are Bob Hanson (currently the editor of Herpetological Review). I know that he also visited both Piney Creek and Jordan Creek back in the 1980s. Dan Holland also looked at Piney Creek, but none of us have a current e-mail address for Dan.

Good luck with finishing up your report.

Sincerely,

Mark R. Jennings</HTML>

September 9, 2010

Larry Thompson
National Marine Fisheries Service
650 Capitol Mall Suite 8-300
Sacramento CA 95814

Subject: Don Pedro Project Relicensing
Request for Information for Pre-Application Document

Dear Mr. Thompson:

The Don Pedro Project located on the Tuolumne River is owned jointly by the Turlock and Modesto irrigation districts. The Project is subject to licensing by the Federal Energy Regulatory Commission, or FERC, and is designated as FERC Project No 2299. The Project's current license expires April 30, 2016, and the Districts' are planning to commence the proceeding to obtain a new license circa February, 2011. The Districts' will be using FERC's Integrated Licensing Process (ILP) to relicense the Don Pedro Project. Under the ILP, the relicensing process is formally begun with the Districts' filing with FERC and stakeholders its Notice of Intent (NOI) and a Pre-Application Document (PAD).

In accordance with Section 5.6 (b)(2) of FERC's ILP regulations, the Districts' must exercise due diligence in determining what information exists that may be relevant to defining potential issues in relicensing and describing potential project effects (including cumulative effects). To this end, the Districts had forward to Craig Anderson, Steve Edmondson, Monica Gutierrez, Kathryn Kempton, and Maria Rea on July 28, 2010, a request for any and all information that the National Marine Fisheries Service (NMFS) might have in its possession, or have knowledge of, that may be relevant to relicensing.

To meet the due diligence requirements of FERC's regulations, by this letter the Districts are requesting that NMFS provide to the licensees certain resource-specific information, as described below, for possible inclusion in the PAD.

[1] Any and all information, data, analyses, memos, and/or reports related to scale and otolith evaluations of Chinook salmon and steelhead on the Tuolumne River, including results of all otolith samples from O.mykiss that have been analyzed for anadromy.

[2] Any and all information, data, memos, and/or reports on genetics of fish resources of the Tuolumne River, both published and unpublished.

[3] Any and all information, data, analyses, and/or reports related to the NMFS' steelhead report card on the Tuolumne River.

[4] Any and all recent (last five years) results of monitoring, conducted by federal or state resource agencies, of habitat restoration projects.

[5] Any and all information, data, analyses, and/or reports related to temperatures on the Tuolumne River from Don Pedro Dam to the confluence with the San Joaquin River, including thermographs and meteorological station data up through 2010.

Please let us know of the availability of the requested information within **25 days** of this letter and we will work with NMFS to arrange for obtaining the information.

On behalf of the Districts, we appreciate your help in making sure the PAD is as complete as it can be for the benefit of all stakeholders. We look forward to working closely with NMFS through the entire relicensing process of the Don Pedro Project.

Sincerely,

John Devine

John J Devine P.E.
Project Manager
HDR|DTA
207-775-4495
John.Devine@hdrinc.com

cc: Rick Wontauk, NMFS, 777 Sonoma Avenue Room 325, Santa Rosa CA 55404
Jeff McClain, NMFS, 650 Capital Mall Suite 8-300, Sacramento CA 95814
Robert Nees, TID, P O Box 949, Turlock CA 95381
Greg Dias, MID, P O Box 4060, Modesto CA 95352

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September 9, 2010

Deborah Giglio
U.S. Fish and Wildlife Service
2800 Cottage Way W-2605
Sacramento CA 95825

Subject: Don Pedro Project Relicensing
Request for Information for Pre-Application Document

Dear Ms. Giglio:

The Don Pedro Project located on the Tuolumne River is owned jointly by the Turlock and Modesto irrigation districts. The Project is subject to licensing by the Federal Energy Regulatory Commission, or FERC, and is designated as FERC Project No 2299. The Project's current license expires April 30, 2016, and the Districts' are planning to commence the proceeding to obtain a new license circa February, 2011. The Districts' will be using FERC's Integrated Licensing Process (ILP) to relicense the Don Pedro Project. Under the ILP, the relicensing process is formally begun with the Districts' filing with FERC and stakeholders its Notice of Intent (NOI) and a Pre-Application Document (PAD).

In accordance with Section 5.6 (b)(2) of FERC's ILP regulations, the Districts' must exercise due diligence in determining what information exists that may be relevant to defining potential issues in relicensing and describing potential project effects (including cumulative effects). To this end, the Districts had forward to you, Kerry O'Hara, and Michelle Workman on July 28, 2010, a request for any and all information that the U.S. Fish and Wildlife Service (USFWS) might have in its possession, or have knowledge of, that may be relevant to relicensing.

To meet the due diligence requirements of FERC's regulations, by this letter the Districts are requesting that USFWS provide to the licensees certain resource-specific information, as described below, for possible inclusion in the PAD.

[1] Any and all recent (last five years) results of monitoring, conducted by federal or state resource agencies, of habitat restoration projects.

[2] Any and all information, data, memos, and/or reports on genetics of fish resources of the Tuolumne River, both published and unpublished.

[3] Any and all information, data, analyses, and/or reports related to temperatures on the Tuolumne River from Don Pedro Dam to the confluence with the San Joaquin River, including thermographs and meteorological station data up through 2010.

[4] Any and all information, data, analyses, and/or reports related to the USFWS' steelhead report card on the Tuolumne River.

[5] Any and all information, data, analyses, memos, and/or reports related to scale and otolith evaluations of Chinook salmon and steelhead on the Tuolumne River, including results of all otolith samples from O.mykiss that have been analyzed for anadromy.

Please let us know of the availability of the requested information within **25 days** of this letter and we will work with USFWS to arrange for obtaining the information.

On behalf of the Districts, we appreciate your help in making sure the PAD is as complete as it can be for the benefit of all stakeholders. We look forward to working closely with USFWS through the entire relicensing process of the Don Pedro Project.

Sincerely,

John Devine

John J Devine P.E.
Project Manager
HDR|DTA
207-775-4495
John.Devine@hdrinc.com

cc: Robert Nees, TID, P O Box 949, Turlock CA 95381
cc: Greg Dias, MID, P O Box 4060, Modesto CA 95352

September 9, 2010

Robert Hughes
California Department of Fish and Game
1701 Nimbus Road
Rancho Cordova CA 95742

Subject: Don Pedro Project Relicensing
Request for Information for Pre-Application Document

Dear Mr. Hughes:

The Don Pedro Project located on the Tuolumne River is owned jointly by the Turlock and Modesto irrigation districts. The Project is subject to licensing by the Federal Energy Regulatory Commission, or FERC, and is designated as FERC Project No 2299. The Project's current license expires April 30, 2016, and the Districts' are planning to commence the proceeding to obtain a new license circa February, 2011. The Districts' will be using FERC's Integrated Licensing Process (ILP) to relicense the Don Pedro Project. Under the ILP, the relicensing process is formally begun with the Districts' filing with FERC and stakeholders its Notice of Intent (NOI) and a Pre-Application Document (PAD).

In accordance with Section 5.6 (b)(2) of FERC's ILP regulations, the Districts' must exercise due diligence in determining what information exists that may be relevant to defining potential issues in relicensing and describing potential project effects (including cumulative effects). To this end, the Districts had forward to you, Tim Heyne, Stephen Puccini, and Jeffrey Single on July 28, 2010, a request for any and all information that the California Department of Fish and Game (CDFG) might have in its possession, or have knowledge of, that may be relevant to relicensing.

To meet the due diligence requirements of FERC's regulations, by this letter the Districts are requesting that CDFG provide to the licensees certain resource-specific information, as described below, for possible inclusion in the PAD.

[1] Any and all information, data, analyses, memos, and/or reports related to scale and otolith evaluations of Chinook salmon and steelhead on the Tuolumne River, including results of all otolith samples from O.mykiss that have been analyzed for anadromy.

[2] Any and all information, data, memos, and/or reports on genetics of fish resources of the Tuolumne River, both published and unpublished.

[3] Any and all information, data, analyses, and/or reports related to CDFG's steelhead report card on the Tuolumne River.

[4] Any and all recent (last five years) results of monitoring, conducted by federal or state resource agencies, of habitat restoration projects.

[5] Any and all information, data, analyses, and/or reports related to temperatures on the Tuolumne River from Don Pedro Dam to the confluence with the San Joaquin River, including thermographs and meteorological station data up through 2010.

Please let us know of the availability of the requested information within **25 days** of this letter and we will work with CDFG to arrange for obtaining the information.

On behalf of the Districts, we appreciate your help in making sure the PAD is as complete as it can be for the benefit of all stakeholders. We look forward to working closely with CDFG through the entire relicensing process of the Don Pedro Project.

Sincerely,

John Devine

John J Devine P.E.
Project Manager
HDR|DTA
207-775-4495
John.Devine@hdrinc.com

cc: Tom Heyne, CDFG, P O Box 10, La Grange CA 95329
Jeff Single, CDFG, 1234 E Shaw Avenue, Fresno CA 93710
Robert Nees, TID, P O Box 949, Turlock CA 95381
Greg Dias, MID, P O Box 4060, Modesto CA 95352

Sacramento Office:
2379 Gateway Oaks Drive
Suite 200
Sacramento, CA 95833
916-564-4214
916-564-4203 (fax)

Telephone Log

Date:	September 14, 2010
Contact Person:	Dr. Bruce McGurk
Organization:	City & County of San Francisco, Hetch Hetchy Water & Power
Phone Number:	(209) 989-2124

Brief Details of Discussion:

Discussed Moccasin Creek tunnel: tunnel size approx. 10' in diameter, capacity unknown, passes full flow of Moccasin Creek to Don Pedro Reservoir in all but largest of storms. Most recent exceedance of tunnel capacity was in January 2006 storms. Discussed Moccasin Afterbay operations related to high inflows and filtration exemption. Discussed nature of inflow from seasonal / ephemeral tributaries around Don Pedro and in foothills area – most have small amount of water through much of year but go dry in summer / fall period.

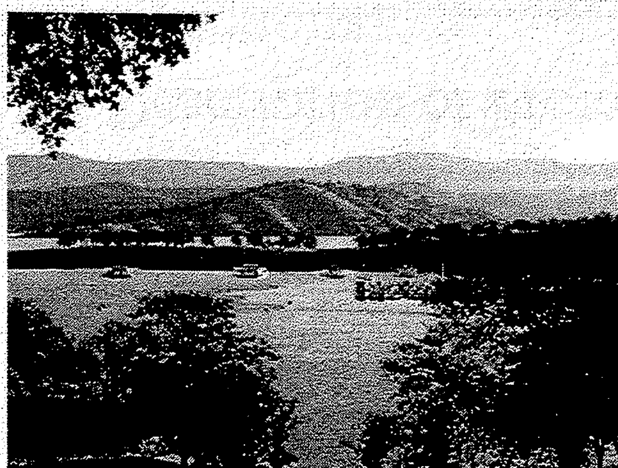
Follow-Up Actions:

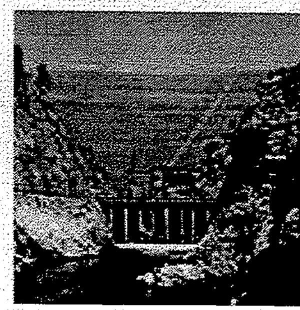
	NOTES
☐ **Notify** ____________ ☐ **Contact Core Team ASAP** ☐ **Tickle for** ____________ ☐ **Return Call** X **Other (See Notes)**	Include information on Moccasin Creek in PAD

Employee's Name	Jennie Garza, Hydrologist

Don Pedro Project Relicensing

MODESTO IRRIGATION DISTRICT | TURLOCK IRRIGATION DISTRICT





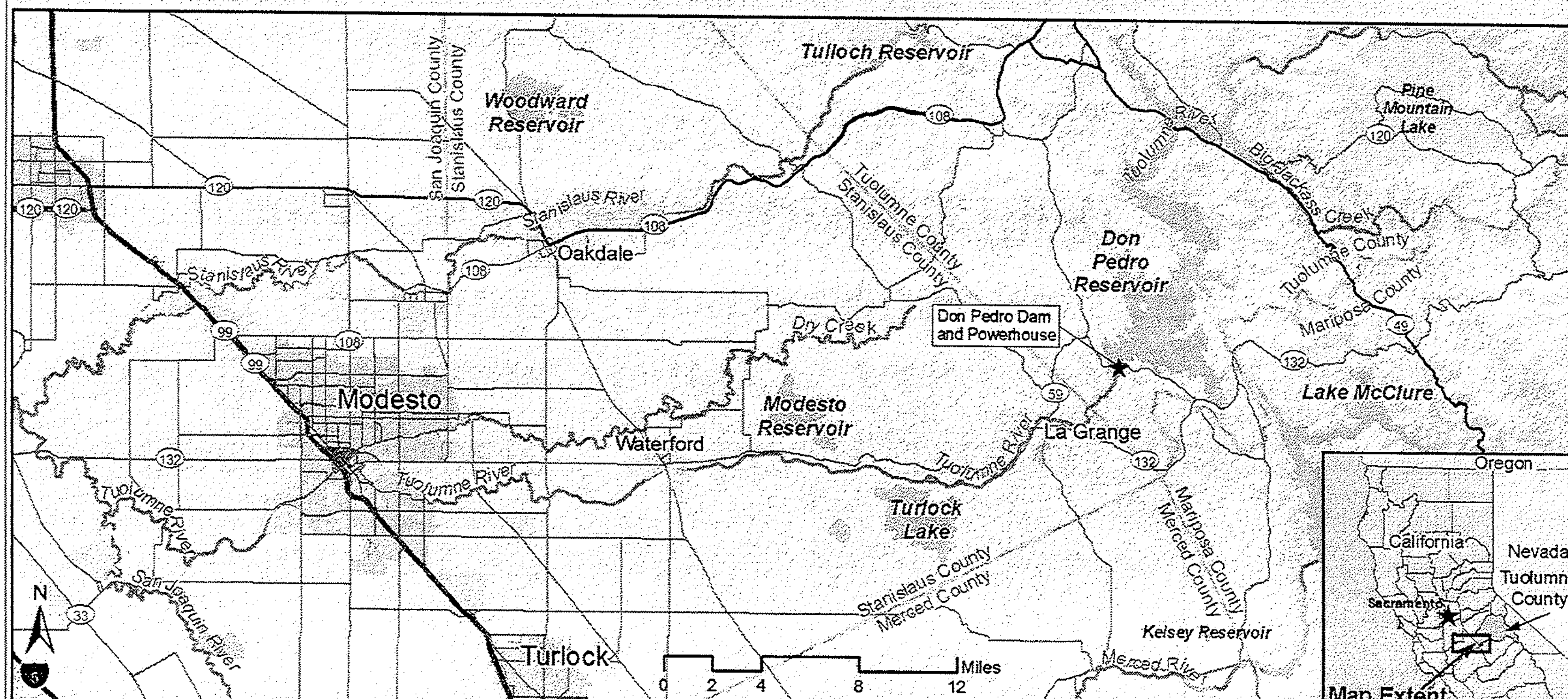
FERC PROJECT NO. 2299

Presentation Overview

- The Don Pedro Project
  - Federal License
  - Description of Project
  - Functions
- The Licensees
- The Relicensing Process
  - Purpose
  - Steps
  - Schedule
- Contact Information and Website

Don Pedro Project Location

- Located on the Tuolumne River 40 miles east of Modesto
  - Don Pedro Dam is located at River Mile 54.5

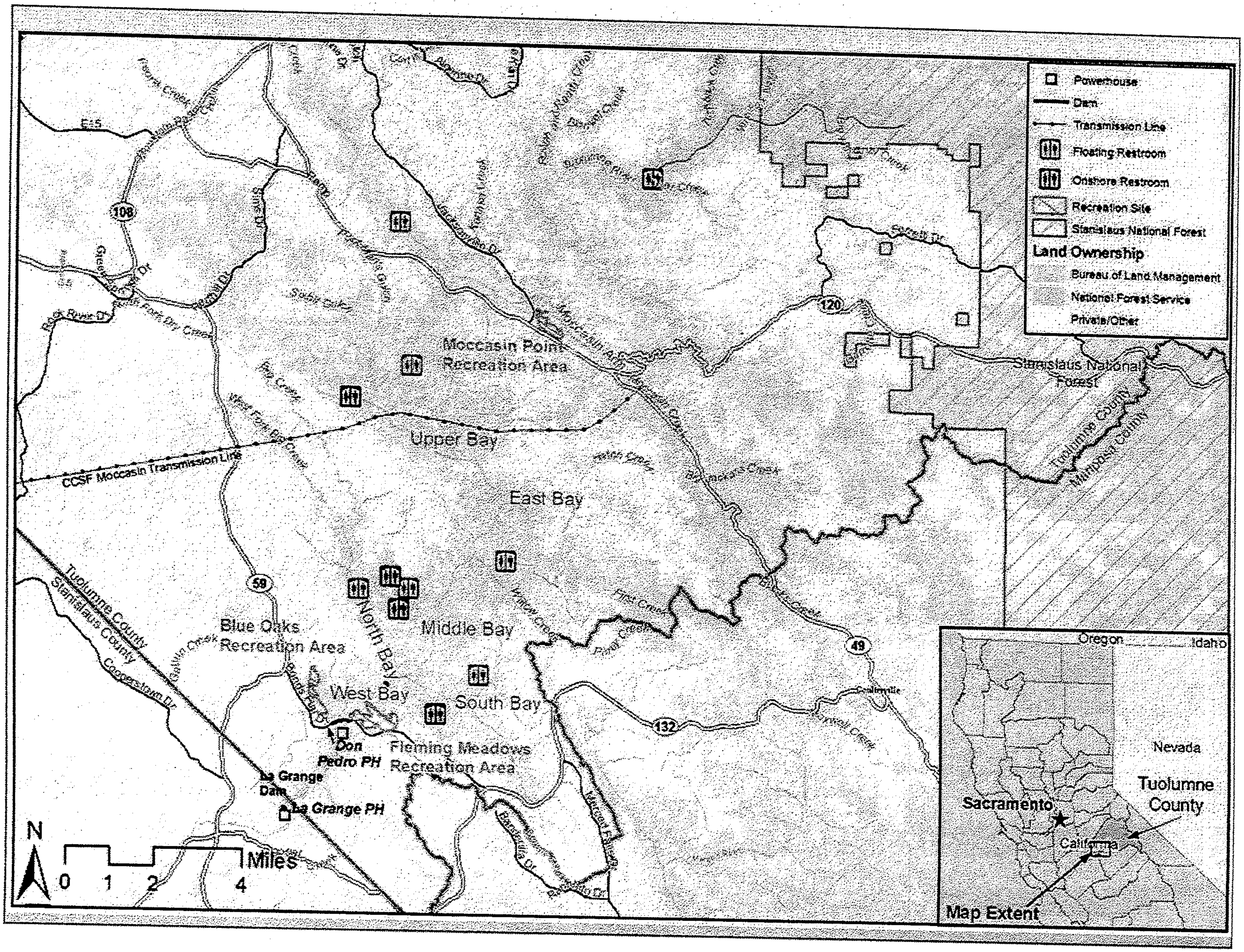


Don Pedro Project
Federal License

- Project operates under a federal license issued by the Federal Energy Regulatory Commission (FERC) because of powerhouse facility
- Congress has empowered FERC to regulate hydroelectric generation facilities
- Original license issued:
  - Effective date of April 30, 1966
  - Term of 50 years
  - Expires on April 30, 2016
- Project must obtain a new license through a process generally referred to as "relicensing"

The Don Pedro Project

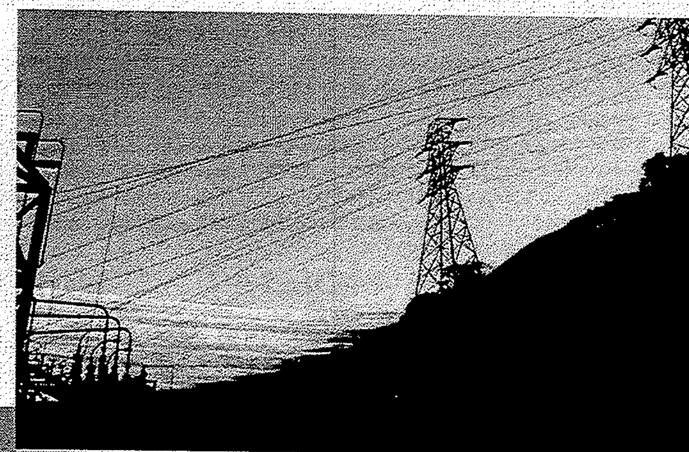
- Don Pedro Dam and Reservoir
- Don Pedro Powerhouse
- Recreation facilities
  - Blue Oaks Recreation Area
  - Fleming Meadows Recreation Area
  - Moccasin Point Recreation Area



Powerhouse
Dam
Transmission Line
Floating Restroom
Onshore Restroom
Recreation Site
Stanislaus National Forest
Land Ownership
Bureau of Land Management
National Forest Service
Private/Other
Moccasin Point
Recreation Area
Upper Bay
East Bay
CCSF Moccasin Transmission Line
Middle Bay
North Bay
Blue Oaks
Recreation Area
West Bay
South Bay
Fleming Meadows
Recreation Area
Don
Pedro PH
La Grange
Dam
La Grange PH
Stanislaus National
Forest
Tuolumne County
Mariposa County
Stanislaus County
108
120
59
49
132
N
0 1 2 4
Miles
Oregon
Idaho
Nevada
Sacramento
Tuolumne
County
California
Map Extent

Functions of the Project

- Power Generation
- Water Storage & Use
  - Irrigation
  - Municipal & Industrial
- Recreation
  - Houseboating
  - Recreational boating
  - Fishing
  - Camping
  - Hiking and swimming
- Flood Control



The Licensees

Modesto Irrigation District

- Established in 1887
- Serves 7 communities in 2 counties
- Treats drinking water for City of Modesto
- Electric Service Area: 560 square-miles
- Electric Accounts: 111,000
- Irrigation Service Area: 156 square-miles
- Irrigated acres: 58,000

Turlock Irrigation District

- Established in 1887
- Serves 14 communities in 3 counties
- Electric Service Area: 662 square-miles
- Electric Accounts: 100,000
- Irrigation Service Area: 307 square-miles
- Irrigated acres: 150,000

Purpose of FERC Relicensing

- Obtain new license for operation of Project
  - New License term can range from 30-50 years
- Include interested parties in process
- Examines uses of Project
  - Power generation
  - Other uses of multi-purpose project (irrigation and municipal water supply, recreation, flood control)
  - Natural resource management
    - Major issue: water releases for instream purposes below the dam
      - Species of concern: Steelhead & Fall-run Chinook

Scope of Relicensing

- Congress passed the Federal Power Act (FPA) in 1920. Several amendments have since occurred.
- FERC is mandated by Congress to issue licenses authorizing projects which are:

  "best adapted to a comprehensive plan for improving or developing a waterway for the...benefit of interstate commerce,... waterpower,... protection, mitigation, and enhancement of fish and wildlife..., and other beneficial public uses, including irrigation, flood control, water supply and recreational purposes..."

FERC Relicensing Process

- Integrated Licensing Process (ILP)
- Multi-year process leading up to License Application
- Participants include
  - Federal, State and Local Governmental Agencies
  - Non-Governmental Organizations (NGOs)
  - Public Citizens
  - Tribal Groups

Steps During Relicensing

- Compile relevant information about Project
- Identify known and potential resource effects
  - Operation and Maintenance of Project
  - Natural Resources
- Conduct studies
- Evaluate impacts
- Determine project operation for next license term (30 to 50 years)

Why It is Called the "Integrated" Licensing Process

- Comprehensive approach
- Integrates FERC's National Environmental Policy Act (NEPA) and Federal Power Act (FPA) responsibilities
- Integrates other related processes
    - Endangered Species Act
    - National Historic Preservation Act
    - Clean Water Act (by State Water Resources Control Board)
    - Magnuson-Stevens Act (fisheries act)

Relicensing Process Schedule

- **2010** – Information from interested parties
  - Available and relevant information for relicensing
- **February 2011** –
  Notice of Intent and Pre-Application Document (PAD) Filed
  - General informational document
  - Followed by 120 day comment period
- **June through December 2011** –
  Study Plan Development
  - Feedback and revision period
- **2012 and 2013** – Executions of Studies
- **Early 2014** – License Application Filed

Public Involvement Opportunities

2010 This meeting; Relicensing Website

2011 Circa Early May:

- Public Scoping Meeting and Site Visit

Circa Mid-July and Early December:

- Comment on Proposed Studies

2012/2013 Study Report Meetings; Draft License Application (DLA)

- Comment on Draft License Application (Circa November 2013)

2014 Circa June:

- Comment on Final License Application

2016 New License Issued

Questions?

- **Contact Information**
  - FERC
    - Website: http://www.ferc.gov/
    - Don Pedro Project Relicensing: james.hastreiter@ferc.gov
  - Modesto Irrigation District – Public Relations
    - Melissa Williams: melissaw@mid.org
  - Turlock Irrigation District – Public Relations
    - Michelle Reimers: mareimers@tid.org
- **Relicensing website:**
  - http://www.donpedro-relicensing.com/

Don Pedro Project
Initial Relicensing Information Meeting
September 14, 2010
Turlock CA

Participant				
Last Name	First Name	Representing	City	State
Roseman	Jesse	Tuolumne River Trust	Modesto	CA
Wesselman	Eric	Tuolumne River Trust	San Francisco	CA
Aud	John			
Cargill	Keith & Renee	TID	Turlock	CA
Hashimoto	Casey	TID	Turlock	CA
Lieberbach	Debbie	TID	Turlock	CA

Don Pedro Project
Initial Relicensing Information Meeting
September 15, 2010 - 10:00 a.m.
Modesto CA

Participant				
Last Name	First Name	Representing	City	State
Boucher	Dave & Allison	Tuolumne River Conservancy	Bend	OR
Geer	Dave	Modesto City Council	Modesto	CA
Godwin	Art	Merced ID		
Ipizappy	Balvino	Trust	Modesto	CA
Jackman	Jerry	SAM	Modesto	CA
Jackson	Zac	USFWS	Stockton	CA
Jensen	Laura	The Nature Conservancy	Sacramento	CA
Kanz	Russ	SWRCB	Sacramento	CA
Kinney	Teresa	Rep Cardoza		
Lein	Joseph		Modesto	CA
Lyons	Bill	Mapes Ranch	Modesto	CA
McDaniel	Dan	Central Delta Water Agency		
Orvis	Tom	SCFB	Modesto	CA
Pinhey	Nick	City of Modesto	Modesto	CA
Raeder	Jessie	Tuolumne River Trust	San Francisco	CA
Roseman	Jesse	Tuolumne River Trust	Modesto	CA
Slay	Ronn	California Natural Resources Foundation / American Indian Council	Atwater	CA
Sly	Judy	Modesto Bee	Modesto	CA
Weber	M	The Nature Conservancy	Sacramento	CA
Wesselman	Eric	Tuolumne River Trust	San Francisco	CA
Workman	Michelle	USFSW	Stockton	CA
Zipser	Wayne	Farm Bureau	Modesto	CA
Barton	Jeff	TID	Turlock	CA
Fernandes	Charlie	TID		
Hall	Trisha	TID	Turlock	CA
Kelly	Bryon	MID		
Lucas	Mitzi	TID	Turlock	CA
Macedo	Ron	TID		
Nees	Robert	TID	Turlock	CA
Reimers	Michelle	TID		
Smart	Herb	TID	Turlock	CA

Don Pedro Project
Initial Relicensing Information Meeting
September 15, 2010 - 7 p.m.
Modesto CA

Participant Last Name	First Name	Representing	City	State
Marko	Paul	Citizen		
Buckley	John	Central Sierra Environmental Resources Center	Twain Harte	CA
Charles	Cindy	Golden West Women's Flyfishers / Northern California Federation of Flyfishers		
Freeman	John	Assemblyman Bill Berryhill	Stockston	CA
Gorman	Elaine	Sierra Club		
Holden	James	Citizen	Modesto	CA
Holland	John	Modesto Bee	Modesto	CA
Horn	Timi	Tuolumne River Trust / Riverdale Homeowners	Modesto	CA
Hughes	Noah	Citizen	Modesto	CA
Koepelo	Patrick	Tuolumne River Trust	Sonora	CA
Mills	John	TUD	Columbia	CA
Roseman	Jesse	Tuolumne River Trust		
Slinkard	David	Tuolumne River Trust / Riverdale Homeowners	Modesto	CA
Boyd	Steve	TID		
Nees	Robert	TID		
Paris	Bill	O'Laughlin & Paris / MID	Chico	CA

Frequently Asked Questions
Regarding the Relicensing of the Don Pedro Project

Q. Who holds the existing license for the Don Pedro Project?

A. The license is held jointly by the Turlock and Modesto irrigation districts (TID and MID).

Q. Why is a license necessary?

A. Federal law requires that all non-federal hydroelectric projects which use the nation's waterways receive a license from the federal government.

Q. Who is responsible for granting licenses?

A. Congress has designated the Federal Energy Regulatory Commission (FERC) as the agency responsible for issuing licenses for the construction and operation of hydroelectric projects.

Q. What does a license do?

A. A license sets the term and conditions for operating a hydroelectric project. Typically, it covers requirements governing such aspects as safety, downstream river flows, recreation, natural resource protection, and related matters.

Q. How long does a license last?

A. FERC, at its discretion, can issue licenses for a period between 30 to 50 years.

Q. How long is the current Don Pedro Project license?

A. The current license was issued in 1966 for a 50-year period ending in 2016.

Q. What does relicensing involve?

A. It is a multi-year public process that begins with a comprehensive review of the existing project and identification of known or suspected impacts which is then followed by a series of studies designed to provide greater knowledge and understanding of those factors. This information is ultimately used by FERC along with recommendations from federal and state resource agencies, conservation groups, and other interested parties to develop the term and conditions for a new license that will best balance the various needs and interests of the public and environment.

Q. **Is it possible to increase the size of the Don Pedro Project through the relicensing process?**

A. Yes; however, due to the downstream boundaries of the wild and scenic rivers corridor immediately above the Don Pedro Reservoir, it is unlikely that the reservoir would be enlarged. However, improvements to the powerhouse may allow for increased generating capacity.

Q. How much will it cost to relicense the Don Pedro Project?

A. It is difficult to say what the final cost will be because it depends upon a number of variables. However, based upon the relicensing of other similar projects, the relicensing process itself is likely to cost between $10 and $15 million. This does not include any cost for future infrastructure improvements and resource enhancement and protection measures that might be required by a new license.

Q. Who will pay for the relicensing?

A. The cost of relicensing will be paid by the electrical and water customers of TID and MID as part of the cost of maintaining service to these customers.

Q. Who owns the water in the Don Pedro Reservoir and how is it used?

A. TID and MID own the water stored in Don Pedro. It is used to maintain downstream flows and meet irrigation and municipal and industrial needs within the respective service areas.

Q. Will TID and MID lose any of their water rights as a result of the relicensing process?

A. No, water rights are a matter of state law and do not fall under federal jurisdiction. However, in some relicensings, additional instream flow releases are included as a condition of the new license as a mitigation measure for project impacts. Such a condition does not technically impact the state water right but does impact the use of the right.

Q. Does the City and County of San Francisco have any role in the relicensing of the Don Pedro Project?

A. The City and County of San Francisco does not have any ownership interest in the project, nor is it a licensee. However, due to long-standing contractual and operational arrangements with TID and MID, San Francisco is an interested stakeholder and is expected to be an active participant in the relicensing process.

Q. Who else is expected to participate in the relicensing process?

A. Resource agencies such as the U.S. Bureau of Land Management, National Marine Fisheries Service, U.S. Fish and Wildlife, California Department of Fish and Game, California State Water Resources Control Board, and various environmental and special interest groups are all expected to have major interest in the process. Local Native American tribes, adjacent property owners, recreation users, and other interested parties are also likely to follow the process.

Q. How long does the process take to get a new license?

A. The relicensing process normally takes 5 to 6 years, but can take longer depending on the issues involved. The formal process for relicensing Don Pedro is expected to start in February 2011. It is anticipated that a new license will be issued by April 2016.

Q. How can I stay involved in the process?

A. The easiest way to stay involved is to monitor the Don Pedro Project relicensing web site (www.donpedro-relicensing.com) which will provide all the latest information on the status of the relicensing process and how interested parties may participate.

Q. Will a new license result in increased costs to water and power users?

A. Any increased operating costs would be shared by those benefiting from the relicensed project.

Q. Is there any chance that the Don Pedro Project will not receive a new license?

A. It is highly unlikely. TID and MID have been very good FERC licensees and therefore have proven their ability to operate Don Pedro within the guidelines established by FERC.

Sacramento Office:
2379 Gateway Oaks Drive
Suite 200
Sacramento, CA 95833
916-564-4214
916-564-4203 (fax)

Telephone Log

Date:	September 24, 2010
Contact Person:	Harold Basey
Organization:	Retired instructor Modesto Junior College; former contractor for USFS
Phone Number:	

Brief Details of Discussion:

Basey observed CRLF in Piney Creek a quarter-mile upstream of Hwy 132, just outside the one mile radius of assessment (see highlighted area in attached maps). The frogs were found within a pool of 5 – 6' depth. Bullfrogs were abundant at the locale. Gut content analysis of the bullfrogs revealed a diet of millipedes. Photographs of the frogs may be seen in his book. After the pool lost volume, possibly due to upstream activities, Basey no longer observed CRLF at the site, which is located on private property. Basey was interviewed by Hayes and Jennings in 1989 for *Amphibian and Reptile Species of Special Concern in California*, which published his sighting as a dot on the species map. Hayes surveyed the stream in 1990 without success. Basey feels that the utility companies have not sufficiently mitigated for reservoir impacts to CRLF habitat in the Sierra foothills, and recommended in his internal USFS report that they support a captive breeding program for the species.

Follow-Up Actions:

	NOTES
☐ **Notify** ______________ ☐ **Contact Core Team ASAP** ☐ **Tickle for** ______________ ☐ **Return Call** ☐ **Other (See Notes)**	

Employee's Name	Shannon Mason

Loy, Carin

From:	Jessie Raeder [jessie@tuolumne.org]
Sent:	Monday, October 18, 2010 7:33 PM
To:	rmnees@tid.org; gregd@mid.org; Devine, John; Loy, Carin
Cc:	eric@tuolumne.org; 'Patrick Koepele'; blancapaloma@msn.com; mmartin@sti.net; kelly@friendsoftheriver.org; cindy@ccharles.net; jhatch@caltrout.org; 'John Buckley'
Subject:	Existing information relevant to Don Pedro relicensing - from the Tuolumne River Relicensing Work Group
Attachments:	Existing information relevant to Don Pedro relicensing - from TRRWG.pdf

Dear Mr. Nees, Mr. Dias, Mr. Devine, and Ms. Loy,

Please find attached a letter from the Tuolumne River Relicensing Work Group in response to the Districts' request for information relevant to the Don Pedro Project relicensing. I am also mailing a hard copy of this letter to each of you, along with a CD that contains most of the documents which we reference in the letter.

If you have any questions regarding this document, they can be addressed to me as the Coordinator of the Work Group. I can be reached at the contact information below.

Best regards,

Jessie Raeder, Coordinator
Tuolumne River Relicensing Work Group

Jessie Raeder
Relicensing Coordinator
Tuolumne River Trust
111 New Montgomery, #205
San Francisco, CA 94105
(415) 882-7252 ext. 301
jessie@tuolumne.org
www.tuolumne.org

October 18, 2010

Re: Response to Pre-Application Document Request for Information
For Don Pedro Project Relicensing FERC Order # 2299

Dear Mr. Nees and Mr. Dias,

Members of the Tuolumne River Relicensing Work Group have prepared this letter in response to the Request for Information regarding the Don Pedro Project Relicensing sent by the Turlock and Modesto Irrigation Districts.

This response has two main parts:

1. **Existing Information**
2. **Information Needs and Outstanding Questions**

---------- PART 1: Existing Information ----------

We submit the materials referenced below as existing information relevant to the Don Pedro Project Relicensing for inclusion in the Pre-Application Document (PAD). For many of the documents listed below, we have included a note with some preliminary explanation of our reasoning for inclusion, and we welcome questions for clarification. Along with this letter, we are including a CD which contains almost ever document referenced below. The few documents that we were not able to include on the accompanying CD are noted in the text.

We have organized the documents we are submitting as relating to the following categories:

A. Legal Baseline
B. Environmental Resources
C. Socioeconomic Resources
D. Water Quality Issues
E. Potential for Water Savings
F. Delta Flow

Note: The Tuolumne River and the Don Pedro Project have been extensively studied over the past several decades and have been the subject of numerous proceedings, including the 1995 Settlement Agreement between the Irrigation Districts, San Francisco PUC, Federal and State agencies, and conservation organizations. Much time, energy, and money has been expended in completing these studies and processes, and we believe that we should capture the information previously developed for the upcoming relicensing process. Therefore, we would like previous reports, studies, articles, and other documents submitted to the Federal Energy Regulatory Commission (FERC) for the Don Pedro Project (P-2299) to be included in the record for the Pre-Application Document for the relicensing proceeding. While many of the documents identified in our list below are part of this existing record, it was not possible, given the timeframe to respond, to capture all of the documents. We have attempted to identify what we feel are the most important from that record.

A. <u>Legal Baseline</u>

1. **United States of America Federal Power Commission, Opinion No. 420, Issued March 10, 1964. Opinion and Order Issue License for New Don Pedro Project No. 2299.**
   - Establishes Districts' responsibility to protect the fishery through their acceptance of the license.

2. **United States Court of Appeals Ninth Circuit State of California. May 18, 1965. Turlock Irrigation District, California, and Modesto Irrigation District, California, United States of America on the relation of Stewart L. Udall, Petitioners, V. Federal Power Commission, Respondent.**
   - The court in this case upheld the right of FERC to condition the license for Project 2299 to require the Districts to release water into the lower Tuolumne River for the benefit of salmon downstream of the project, citing the comprehensive planning clause of Section 10(a)(1) of the Federal Power Act.

3. **Environmental Defense. 2004. Memorandum: Hetch Hetchy Water and Power Issues. Prepared by Somach, Simmons & Dunn. Sacramento, CA.**
   - Legal and historical analysis of Tuolumne Water Rights.

4. **National Marine Fisheries Service. 2006. Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Federal Register [Docket 051216341–5341–01. 05 January 2006] Vol 71. No. 3. pp. 834-862.**
   - The final listing of Steelhead trout as a Threatened species under the Federal Endangered Species Act.

5. **National Marine Fisheries Service, 2005. Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in California Federal Register [Docket No. 041123329-5202-02 September 2005] Vol. 70, No. 170. pp. 52488-52586.**
   - Designates the Tuolumne River as critical habitat for the Central Valley Steelhead DPS.
   - In addition to these two previous documents, we ask that you include all of the most current Endangered Species listing documents that relate to the Lower Tuolumne in the PAD.

B. <u>Environmental Resources</u>

1. **Yoshiyama, R.M., E.R. Gerstung, F.W. Fisher, and P.B. Moyle 2001. Historical and Present Distribution of Chinook Salmon in the Central Valley Drainage of California. 176 p.**
   - Provides a historical analysis of the historical distribution of Chinook salmon and steelhead in the Central Valley. Documents that Fall-run Chinook salmon,

Spring-run Chinook salmon, and Steelhead trout all existed in the Tuolumne River up to Preston Falls, near the boundary of Yosemite National Park, as well as the lower reaches of major tributaries, including the North Fork of the Tuolumne, the Clavey River, Cherry Creek, and the South Fork of the Tuolumne River. Also provides an estimate that approximately 52 miles of stream became inaccessible with the construction of impassible dams on the river, which represents a 50% reduction in habitat available to anadromous salmonids, most of which was prime spawning habitat.

2. **Lindley, S., R.S. Schick, E. Mora, P.B. Adams, J.J. Anderson, S. Greene, C. Hanson, B.P. May, D.R. McEwan, R.B. MacFarlane, C. Swanson, and J.G. Williams. 2007. Framework for Assessing Viability of Threatened and Endangered Chinook Salmon and Steelhead in the Sacramento-San Joaquin Basin. San Francisco Estuary and Watershed Science. 26 p.**
   - This paper presents a framework for evaluating the viability of salmonid populations and ESUs, based on simple criteria and rules that have modest data requirements. The paper applies the methodology to Central Valley Spring-run Chinook Salmon, Sacramento River Winter-run Chinook salmon, and Central Valley Steelhead. This is the methodology applied by Mesick (2008) in his assessment of Tuolumne River Fall-run Chinook salmon, in which he found that the population is at high-risk of extinction.

3. **National Marine Fisheries Service. 2009. Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead. NMFS, Sacramento. 273 p.**
   - Identifies recovery strategies for the Threatened Central Valley steelhead, which inhabit the Tuolumne River. Establishes as one of the requirements for delisting Central Valley Steelhead that two populations within the Southern Sierra Diversity Group, which includes the Tuolumne, Stanislaus, and Merced Rivers, must be at low risk of extinction. The Recovery Plan further establishes the following criteria for a given population:
     - The effective population size must be > 500 or the population size must be > 2,500
     - The population growth rate must show that a decline is not apparent or probable
     - There must be no apparent or minimal risk of a catastrophic disturbance occurring
     - Hatchery influence must be low, as determined by levels corresponding to different amounts, durations and sources of hatchery strays
   - Identifies the following significant stressors on the population:
     - Limited habitat availability in each watershed and in the mainstem San Joaquin River for spawning and juvenile rearing;
     - La Grange and Don Pedro dams blocking access to habitat historically used by Tuolumne River steelhead;
     - Inadequate summer flow on the Tuolumne River

- Identifies the following recovery strategies for steelhead, including:
  - Evaluate and, if feasible, develop and implement a fish passage program for La Grange and Don Pedro dams. Any reintroduction actions should be a phased approach and consider the following elements:
    - Conduct feasibility studies
    - Conduct habitat evaluations
    - Conduct 3-5 year pilot testing program
    - Implement long term fish passage program
  - Manage cold water pools behind La Grange and Don Pedro dams to provide suitable water temperatures for all downstream life stages

- This is currently a Non-Qualifying Comprehensive Plan and Agreement that has not been adopted by National Marine Fisheries Service. It is anticipated that it will become a final document in late Fall 2010 and be submitted to FERC as a Qualifying Comprehensive Plan for California Central Valley rivers. Section 10(a) of the FPA requires FERC to consider the extent to which a project is consistent with Federal and State comprehensive plans for improving, developing, or conserving a waterway affected by the project. This plan will be included in FERC's Revised List of Comprehensive Plans, when it has been specifically filed by NMFS.

4. **U. S. Fish and Wildlife Service. 2008. Flow-overbank Inundation Relationship for Potential Fall-Run Chinook Salmon and Steelhead/Rainbow Trout Juvenile Outmigration Habitat in the Tuolumne River. 15 p.**
   - This study demonstrates that the initiation of overbank flow occurs between 1,100 cfs and 3,100 cfs. The paper also documents that the greatest rate of increase in overbank area inundated occurred between 1,000 to 3,100 cfs. The rate of increase in area, however, decreases as discharge rises, as may be expected with an increase in the slope of the floodplain as distance from the channel increases. As this decrease in rate of inundation appears relatively steady, a second inflection point, that might indicate a strong point of diminishing returns from further increases in discharge, is not seen. This would seem to indicate that the entire historic floodplain area was not yet inundated at 8,400 cfs.

5. **Statement of National Marine Fisheries Service, U.S. Fish and Wildlife Service, California Department of Fish and Game, and Conservation Groups Regarding Report to the Commission by Administrative Law Judge Charlotte J. Hardnett in Don Pedro Project Rehearing. 2009.**

6. **Rich, A.A. 2007. Impacts of water temperature on fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) in the San Joaquin River system. A. Rich and Associates. Fisheries and Ecological Consultants. San Anselmo, CA. Prepared for the California Department of Fish and Game as expert opinion and testimony to the California Regional Water Quality Control Board, Central Valley Region. Sacramento, CA.**
   - Identifies the following water temperature requirements for Chinook salmon and steelhead.

Chinook Salmon
Adult Migration and Spawning: 44 °F (6.7 °C) to <59 °F (<15 °C)
Egg and Alevin Incubation/Fry Emergence: 42.5 °F (5.8 °C) to < 55 °F (13 °C)
Fry and Juvenile Life Stage: (depends upon how young the fish is):
Fry in their first few weeks out of the gravel: 50-55 °F (10 -12.8 °C)
Juveniles: 55-60 °F (12.8-15.6 °C)
Parr-Smolt Transformation: < 56 °F (<13.3 °C)
Steelhead
Adult Migration and Spawning: 44 to <52 °F (6.7 to < 11.1 °C)
Egg and Alevin Incubation/Fry Emergence: 46 °F to < 54 F (7.8 - 13 °C)
Fry and Juvenile Life Stage (depends upon how young the fish is):
Fry in their first few weeks out of the gravel: 50-55 °F (10-12.8 °C)
Juveniles: < 59 F (<15 °C)
Parr-Smolt Transformation: < 55 °F (<12.8 °C)

7. **Mesick, C., McLain, J., Marston, D and T. Heyne. 2008. Limiting Factor Analyses & Recommended Studies for Fall-run Chinook Salmon and Rainbow Trout in the Tuolumne River. US Fish and Wildlife, National Marine Fisheries Service, California Department of Fish and Game.**
   - The limiting factor analyses suggest that Chinook salmon recruitment, which is the total number of adults in the escapement and harvested in the sport and commercial fisheries in the ocean, is highly correlated with the production of smolt outmigrants in the Tuolumne River and that winter and spring flows are highly correlated with the number of smolts produced. Other evidence from rotary screw trap studies indicate that many more fry are produced in the Tuolumne River than can be supported with the existing minimum instream flow schedules, and so, producing more fry by restoring spawning habitat is unlikely to increase adult recruitment. Stock-recruitment relationships based on the long-term escapement and harvest data suggest that the rearing habitat is saturated with juvenile fish when at least 500 adults return to spawn. Low spawner abundances (< 500 fish) have occurred as a result of extended periods of drought when juvenile survival is reduced as a result of low winter and spring flows and not as a result of high rates of ocean harvest. And other factors, such as cyclic changes in ocean productivity, Delta export rates, and Microcystis blooms do not explain the trends in the Tuolumne River population. Based on these results, the Model for Chinook salmon focuses on winter and spring flows in the Tuolumne River as key factors controlling the production of adult Chinook salmon. The Model for Central Valley steelhead also includes winter and spring flows in addition to summer flows and water temperatures as key controlling factors.

8. **Mesick, C. 2008. The Moderate to High Risk of Extinction for the Natural Fall-Run Chinook Salmon Population in the Lower Tuolumne River due to Insufficient Instream Flow Releases. US Fish and Wildlife Service. Stockton, CA.**
   - The analysis indicates that the Tuolumne River fall-run Chinook salmon (*Oncorhynchus tshawytscha)* population of naturally produced fish is at a

moderate to high risk of extinction because the instream flow releases are too low. Populations with a high risk of extinction (greater than 20 percent chance of extinction within 20 years) have a total escapement that is less than 250 spawners in three consecutive years (mean of 83 fish per year), a precipitous decline in escapement, a catastrophe defined as an order of magnitude decline within one generation occurring within the last 10 years, and a high hatchery influence. Populations with a low risk of extinction (less than 5 percent chance of extinction in 100 years) have a minimum total escapement of 2,500 spawners in three consecutive years (mean of 833 fish per year), no apparent decline in escapement, no catastrophic declines occurring within the last 10 years, and a low hatchery influence. Populations with a moderate risk of extinction are those at intermediate levels to the low and high risk criteria (e.g., total escapement in three consecutive years between 250 and 2,500 spawners.

- ➢ The Tuolumne River fall-run Chinook salmon population is at a moderate to high risk of extinction based on the criteria by Lindley and others (2007) because the total escapement of naturally produced fish was about 755 spawners from 2005 to 2007 (i.e., moderate risk), there was a precipitous decline in escapement (i.e., high risk), and there was a catastrophic decline in escapement over a generation between 2000-2002 and 2003-2005 (i.e., high risk).

9. **Marston, D., D., T. Heyne, A. Hubbard, W. Getz, L. Rachowicz, M. Daugherty, A. Dotan, I. Mlaker, and R. Starfield. 2008. San Joaquin River Fall-run Chinook Salmon Population Model Peer Review: Response to Peer Review Comments. California Department of Fish and Game.**
    - ➢ Presents responses to comments on the 2005 DFG San Joaquin Salmon Population Model. Presents a new analysis and updated version of the 2005 Model in light of the comments. The updated model primarily addresses statistical criticisms and continues to allow the empirically defined data relationships to drive model outcomes. The updated model indicates that the central finding of CDFG's 2005 report still stands: the spring outflow in the SJR system is the primary factor controlling the production of juvenile thence adult fall-run Chinook salmon.

10. **Gordus, A. 2009. Direct testimony of Andrew G. Gordus, Ph. D. on behalf of the California Department of Fish and Game. Before the U.S. Federal Energy Regulatory Commission Office of Administrative Law Judges.**
    - ➢ This testimony and accompanying Exhibit 7 pertain primarily to water temperature conditions in the Tuolumne River. The testimony provides a review of U.S. Environmental Protection Agency temperature thresholds for Pacific migratory salmonids and life stages. The testimony and Exhibit 7 report that the overall mean maximum weekly temperature for the Tuolumne River was above the maximum threshold (18°C) for most weeks across all years. The area of impaired water temperature of the river during this same period ranged from two to 49 miles (4% to 94%) of the river's length. The overall mean maximum weekly temperatures across years were above the maximum threshold (13°C) for weeks 40 through 46 for the Tuolumne River. The Chinook salmon

smoltification period in the Tuolumne River occurs from approximately March 15th through June 15th. The overall mean maximum water temperature across all years is above the maximum threshold (15°C) for 11 of the 14 weeks on the Tuolumne River. Overall impaired habitat is approximately 7 to 52 (13% to 100%) miles of the river's length during below normal and dry water (precipitation) years and most notably during weeks 20 through 24. Chinook salmon smolt outmigration occurs from approximately March 15th through June 15th. Habitat temperature requirements for smolt migration are similar to what is required for successful smoltification and discussed above. Similar to the conditions described above, the second half of the migration season has water temperatures above this threshold. The steelhead summer rearing season occurs from approximately June 15th through September 15th. For the Tuolumne River, the entire rearing season maximum mean temperatures were above the threshold (18°C) the entire season for three of the nine years analyzed. Temperatures were met during wet years, indicating higher flows improved water temperatures during the summer months. During years of impairment, the area of impaired river during this life stage ranged from one to eight miles (10% to 80%) of the Tuolumne River's length that is available for rainbow trout and steelhead. Exhibit 19 to the Gordus testimony provides a visual summary of the percent of habitat impaired for different life stages of salmon and steelhead in different years from 1998-2006.

11. **Gordus, A. 2009. Exhibit number 7 to direct testimony of Andrew G. Gordus, Ph. D. on behalf of the California Department of Fish and Game. Before the U.S. Federal Energy Regulatory Commission Office of Administrative Law Judges.**
    - Charts which show thermal impairment on Tuolumne River.

12. **Gordus, A. 2009. Exhibit number 19 to direct testimony of Andrew G. Gordus, Ph. D. on behalf of the California Department of Fish and Game. Before the U.S. Federal Energy Regulatory Commission Office of Administrative Law Judges.**
    - **Provides a visual summary of the percent of habitat impaired for different life stages of salmon and steelhead in different years from 1998-2006.**

13. **Myrick, C.A., and J. J. Cech. Bay-Delta Modeling Forum Technical Publication 01-1: Temperature Effects on Chinook Salmon and Steelhead: A Review Focusing on California's Central Valley Populations. Published electronically by the Bay-Delta Modeling Forum.**
    - Evaluates optimal temperatures, as well as upper and lower lethal limits of water temperatures for the different life stages of Chinook salmon and steelhead.

14. **Busby, P., T.C. Wainwright, G.J. Bryant, L.J. Lierheimer, R.S. Waples, F.W. Waknitz, and I.V. Lagomarsino. 1996. Status review of West Coast Steelhead from Washington, Idaho, Oregon, and California. National Marine Fisheries Service, NOAA Technical Memorandum NMFS-NWFSC-27. 275 p.**
    - This is a review of the population condition of fifteen evolutionarily significant units (ESUs) of steelhead trout (O. mykiss) and related findings as to the risk of

extinction. The report finds that the Central Valley ESU of steelhead, which occupies the Tuolumne River, is at risk of extinction.

15. **Low, A., ed. 2005. Central Valley Salmon and Steelhead Monitoring Programs: Existing Program Summary. California Department of Fish and Game.**

16. **McEwan, D.,and T.A. Jackson. 1996. Steelhead Restoration and Management Plan for California. Department of Fish and Game. Sacramento, CA. 234 p.**
    - Section 10(a) of the FPA requires FERC to consider the extent to which a project is consistent with Federal and State comprehensive plans for improving, developing, or conserving a waterway affected by the project. This plan is included in FERC's Revised List of Comprehensive Plans, dated April 2008, that has been specifically filed for the State of California and United States government agencies.

17. **US Fish and Wildlife Service. 1995. Working Paper on Restoration Needs – Habitat Restoration Actions to Double Natural Production of Anadromous Fish in the Central Valley of California. Volume 3. Prepared Anadromous Fish Restoration Program Core Group.**

18. **Moyle, P.B., R.M. Yoshiyama, R.A. Knapp. 1996. Status of Fish and Fisheries, Chapter 33. In: Sierra Nevada Ecosystem Project: Final Report to Congress, Vol. II, Assessments and Scientific Basis for Management Options. Davis: University of California, Centers for Water and Wildland Resources. 21 p.**

19. **United States Fish and Wildlife Service. 2001. Final Restoration Plan for the Anadromous Fish Restoration Program – A Plan to Increase Natural Production of Anadromous Fish in the Central Valley of California. Prepared for the Secretary of the Interior by the United States Fish and Wildlife Service with assistance from the Anadromous Fish Restoration Program Core Group under authority of the Central Valley Project Improvement Act. 146 p.**
    - Section 10(a) of the FPA requires FERC to consider the extent to which a project is consistent with Federal and State comprehensive plans for improving, developing, or conserving a waterway affected by the project. This plan is included in FERC's *Revised List of Comprehensive Plans,* dated April 2008, that has been specifically filed for the State of California.

20. **McEwan, D. 2001. Central Valley Steelhead. 43 pages.**
    - This is a scientific review of the status of Central Valley steelhead populations. It reviews the status, life histories, ecology, and populations of steelhead trout. It suggests alternatives and ways of recovering steelhead populations, including reintroduction of steelhead above foothill limiting dams.

21. **Nielsen, J.L. 1997. Molecular Genetic Diversity and Stock Structure in Rainbow trout from the Clavey River. Report Submitted to USDA FS Region 5 and California Department of Fish and Game. 37 p.**

- This study genetically documents the present of a disjunct population of rainbow trout (*O. mykiss*) in the Clavey River, tributary to the Tuolumne River, using mitochondrial DNA sequence and nuclear microsatellite polymorphism data. Mitochondrial DNA showed a close genetic affinity between the Clavey River rainbow trout and coastal *O. mykiss* populations (MYS1, MYS3, and MYS12). The microsatellite data depicted a putative wild rainbow trout population, but independent of steelhead trout. In this **preliminary** study, the authors concluded that the Clavey River rainbow trout is unique in its relationship to the California golden trout and <u>contemporary</u> anadromous steelhead populations along the coast of California. They conclude from these preliminary data that it represents a probable endemic freshwater trout population with polyphyletic (redband and coastal) origins that have been separated from both golden and steelhead populations throughout recent history. Recovery and restoration of steelhead trout in the upper, original habitat of the Tuolumne River should include an evaluation of this extant population and its genetic and ecological relationships to recovery efforts.

22. **Clark, G.H. 1929. Division of Fish and Game of California Fish Bulleting NO. 17 Sacramento-San Joaquin Salmon (*Oncorhynchus tschawytscha*) Fishery of California. Bureau of Commercial Fisheries.**
    - This is the first scientific investigation of Chinook salmon in the Sacramento-San Joaquin Rivers by the California Department of Fish and Game. The paper describes early investigations, history, and statistics of the fishery, artificial propagation, legislation, water supply, prices, and the causes of depletion, with suggested remedies. The paper includes an estimate of historical as contrasted with the extent of the grounds in pre-1927 days, including a discussion of the Tuolumne River. It includes evaluations of age, age of maturity and age classes in relation to sex and runs.

23. **Hatton S.R., and G.E. Clark. 1942. A second progress report on the Central Valley fisheries investigations. California Department of Fish and Game Vol. 28, No.2. pp. 116-123.**
    - This scientific report documented the presence of 122,000 adult Chinook salmon in the Tuolumne River in 1940 and 27,000 adult Chinook salmon in 1941and constituted the majority of fall run of Chinook salmon in the San Joaquin River system.

24. **Temperature Water Quality Standards for the Protection of Anadromous Fish in the Stanislaus River, Merced River, Stanislaus River (sic), Tuolumne River and the San Joaquin River, Feb 28, 2007 Report. Department of Fish and Game, Region 4, Fresno. Report to Regional Water Quality Control Board by W.E. Loudermilk.**
    - This letter and accompanying supporting data provides documentation of the current temperature conditions and impairment in the San Joaquin River, which has impeded salmonid migration. The letter reports on elevated temperatures that exceed threshold values for salmon and steelhead in the Tuolumne, Stanislaus, Merced, and San Joaquin Rivers. It was presented in testimony to the California

Regional Water Quality Control Board in their Annual Basin Plan review for Section 303(d) of the Clean Water Act in 2007.

25. **San Joaquin River Fall-run Chinook Salmon Population Model. Department of Fish and Game. 2005.**
    - This is the 2005 Model by CDFG which was revised in 2008 (see Item 9 above). It presents an analysis of how flows affect fall run Chinook salmon populations. It finds that the spring outflows in the SJR system are the primary factor controlling the production of juvenile thence adult fall-run Chinook salmon. Through this modeling exercise, the California Department of Fish and Game found that non-flow parameters (e.g. ocean harvest, Delta exports) have little, or no, relationship to fall-run Chinook salmon population abundance in the San Joaquin basin and that spring flow magnitude, duration, and frequency all had significant influence upon San Joaquin River fall-run Chinook salmon abundance.

26. **Central Valley Salmon and Steelhead Restoration and Enhancement Plan. 1990. Compiled by: Forrest L. Reynolds, Fish and Wildlife Manager, Robert L. Reavis, Associate Fishery Biologist and Jim Schuler, Fisheries Management Supervisor, Under Direction of: Robert R. Rawstron, Chief. California Department of Fish and Game.**
    - Section 10(a) of the FPA requires FERC to consider the extent to which a project is consistent with Federal and State comprehensive plans for improving, developing, or conserving a waterway affected by the project. This plan is included in FERC's Revised List of Comprehensive Plans, dated April 2008, that has been specifically filed for the State of California and United States government agencies.

27. **Garza, J. C., and D. E. Pearse. 2009. Population genetic structure of *Oncorhynchus mykiss* in the California Central Valley. Final report for California Department of Fish and Game Contract # PO485303. Santa Cruz, CA.**
    - This study focused on 17 initial "population" samples, comprised of fish sampled from the Kings, Tuolumne, Stanislaus, Calaveras, American, Yuba, Feather, Butte, Deer, Battle and McCloud River sub-basins. Additional analyses were conducted with data from the same microsatellite markers in rainbow trout hatchery stocks and steelhead from coastal and California Central Valley populations. These analyses looked at whether specific fish are, or are descended, from hatchery strains used in local stocking efforts, as well as providing biogeographic context for the Central Valley regional results. In general, although structure was found, all naturally-spawned populations within the Central Valley basin were closely related, regardless of whether they were sampled above or below a known barrier to anadromy. This is due to some combination of preimpoundment historic shared ancestry, downstream migration and, possibly, limited, anthropogenic, upstream migration. However, lower genetic diversity in above-barrier populations indicates a lack of substantial genetic input upstream and highlights lower effective population sizes for above-barrier populations.

28. **Nielsen J.L., S.A. Pavey, T. Wiacek, and I. Williams, U.S. Geological Survey, Alaska Science Center. 2005. Genetics of Central Valley O. mykiss populations: drainage and watershed scale analyses. San Francisco Estuary and Watershed Science.**
    - This study found for the Tuolumne River that significant differences in allelic frequencies were found for rainbow trout samples collected at two locations above and below impassable dams in the Tuolumne River. This suggests some degree of genetic separation between upper and lower rainbow trout populations around dams and barriers within these rivers, however, the potential artifact of hatchery stocking of rainbow trout above such barriers cannot be ruled out as a potential contributing factor in these relationships. A clustering pattern of fish from non-adjacent rivers was hard to explain: The clustering of rainbow trout populations from the upper portions of the Tuolumne, Stanislaus, American, and Yuba rivers (35% bootstrap support) could be due to two alternative factors: (1) shared ancestry among native, ancestral populations not influenced by hatchery steelhead or other anadromous populations downstream from the four dams found on these rivers; or (2) the influence of introduced rainbow trout from hatchery populations that have been stocked extensively in reservoirs throughout California. The authors recommend genetic monitoring to identify which of these hypotheses might be true.

29. **Jackson, T. 2007. California Steelhead Fishing Report-Restoration Card: A Report to the Legislature. Department of Fish and Game.**
    - This is a summary report to the Legislature on the results of Steelhead report card returns by the Department of Fish and Game. It gives information on the status and trends of large rainbow trout (possibly steelhead) in the Tuolumne River, as reported by recreation fishers by river system in California.

30. **Lindley, S., R.S. Schick, A. Agrawal, M. Goslin, T.E. Pearson, E. Mora, J.J. Anderson, B. May, S. Greene, C. Hanson, A. Low, D. McEwan, R.B. MacFarlane, C. Swanson, and J.G. Williams. 2006. Historical Population Structure of Central Valley Steelhead and its Alteration by Dams. San Francisco Estuary and Watershed Science.**

    Prepared for the National Marine Fisheries Service Central Valley Technical Recovery Team under ESA regulations, this scientific report is a review of the historical and current population structure of the Central Valley Steelhead. It describes the historical structure of the Central Valley steelhead evolutionarily significant unit using a multi-phase modeling approach. In the first phase of the study, it identifies stream reaches possibly suitable for steelhead spawning and rearing using a habitat model based on environmental envelopes (stream discharge, gradient, and temperature) that take a digital elevation model and climate data as inputs. It identified 151 patches of potentially suitable habitat with more than 10 km of stream habitat, with a total of 25,500 km of suitable habitat in the Central Valley. The authors then measured the distances among habitat patches, and clustered together patches within 35 km of each other into 81 distinct habitat patches. It identified approximately 324 linear km of historic steelhead habitat in the Tuolumne River watershed. Presently, impassable dams block access to 80% of historically available habitat, and block access to all historical spawning habitat for about 38% of the historical populations of steelhead.

31. **Restoring Central Valley Streams: A Plan for Action. Department of Fish and Game, 1993.**
    - Section 10(a) of the FPA requires FERC to consider the extent to which a project is consistent with Federal and State comprehensive plans for improving, developing, or conserving a waterway affected by the project. This plan is included in FERC's Revised List of Comprehensive Plans, dated April 2008, that has been specifically filed for the State of California and United States government agencies.

32. **Schink R.S., A.L. Edsall, and S.T. Lindley. 2005. Historical and current distribution of Pacific Salmonids in the Central Valley, CA. NOAA Technical Memorandum, NOAA Fisheries, Santa Cruz. NOAA-TM-NMFS-SWFSCC-369. 30 p.**
    - This report is based upon Yoshiyama et al. (2001) which explored source data, and interviewed surviving descendants of Central Valley inhabitants to provide a narrative description of the historical distribution of Central Valley salmonids. However, while the narratives were specific to watersheds, the data lacked an explicit spatial component. Hence, the authors undertook a GIS-based effort to translate the narrative structure of Yoshiyama et al. (2001) into GIS-ready data layers. The report describes methods to display the cartographic results, and to provide a guide to the accompanying data. It identified 52 km of historical spring-run Chinook salmon spawning habitat and 45 km of fall-run Chinook salmon spawning habitats

33. **Zimmerman CE, Edwards GW, Perry K. 2009 Maternal origin and migratory history of steelhead and rainbow trout captured in rivers of the Central Valley, California. Trans. Am. Fish. Soc 138:280-291.**
    - This study documents the presence of steelhead trout in the Tuolumne River with an analysis of otolith microchemistry as strontium:calcium ratio analyses. The authors recommend: Further work is needed to better assess the contribution of steelhead and rainbow trout to the anadromous population of O. mykiss in streams throughout the Central Valley. Tagging studies of smolts and pedigree studies such as those described by Seamons et al. (2004) and suggested by Hendry et al. (2004) could provide an opportunity to address the relationship of steelhead and rainbow trout and the role of environmental variables in controlling life history.

34. **California Department of Water Resources. 1997. Final Report of the Flood Emergency Action Team. Sacramento, CA. (NOTE: Not Provided on CD - available at http://www.water.ca.gov/historicaldocs/irwm/feat-1997/featindex.html - accessed Oct. 18, 2010).**
    - Recommends increasing the flood corridor along the lower Tuolumne River to 20,000 cfs at Dry Creek.

35. **McBain, S. and B. Trush. 2000. Habitat Restoration Plan for the Lower Tuolumne River Corridor. Prepared for the Tuolumne River Technical Advisory Committee with assistance from the U.S. Fish and Wildlife Service, Anadromous Fish Restoration Program.**
    - ➢ Recommends habitat restoration actions for specific reaches of the lower Tuolumne River. Describes the benefits of periodic high flows to maintain a dynamic geomorphic and biologic environment in the Tuolumne River. Describes benefits of high flows to riparian vegetation and riparian-obligate species. Recommends increasing the flood corridor along the lower Tuolumne River to be capable of conveying up to 15,000 cfs above Dry Creek and 20,000 cfs below Dry Creek.

36. **Federal Energy Regulatory Commission. 1996. Final Environmental Impact Statement: Reservoir Release Requirements for Fish and the New Don Pedro Project, California. FERC Project No. 2299-024. Washington, D.C. (NOTE: Not provided on CD.)**
    - ➢ Provides an overview and historical background of the 1995 Settlement Agreement, the FERC's preferred alternative, and an evaluation of the range of flow modifications and nonflow mitigation proposed as part of the Settlement Agreement process.

C. Socioeconomic Resources

1. **Southwick Associates. 2007. Sportfishing in America: An Economic Engine and Conservation Powerhouse. Produced for the American Sportfishing Association with funding from the Multistate Conservation Grant Program.**
    - ➢ This is a general economic study of the amount of money spent and generated in California freshwater recreational fishing.

2. **Alkire C. 2008. The Value of Recreational Fishing in California Direct Financial Impacts January 2008. Published by California Trout, San Francisco, CA. 32 p.**
    - ➢ This is a focused study on the value of recreational fishing in California. The economic effects of recreational fishing can be measured by (1) expenditures related to fishing, and (2) subsequent direct and indirect economic impacts. The most recent national survey shows that anglers spend over $2 billion a year in California on recreational fishing trips and related equipment. A review of the limited studies of fishing in regions within the State published over the last ten years indicate that spending in northern and central California communities ranges from $2 million to $421 million annually. Economic impact multipliers are applied to some of these estimates and show there are substantial total impacts in fishing destination communities. Furthermore, restoration of fish habitat that could result in increased fish populations and recreational fishing is estimated to provide an increase of $600,000 per year for every additional 2,000 fish caught.

3. **Gallo, D.E. 2002. The economic impact on Stanislaus County of public land acquisitions and conservation easements on floodplain lands along the lower**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:

OCT 20 2010
REceived 10-22-2010 RJ

John J. Devine P.E.
Project Manager
HDR|DTA
970 Baxter Boulevard
Portland, Maine 04103

Subject: Response to Request for Pre-Application Document Data for Don Pedro Hydroelectric Project, FERC # 2299, Tuolumne County, California

Dear Mr. Devine:

Thank you for your interest in working together to make sure the Pre-Application Document (PAD) for the Don Pedro Hydroelectric Project (FERC # 2299) is as complete as it can be. In your letter of September 9, 2010, you requested the U. S. Fish and Wildlife Service provide specific information to you.

The majority of the information you requested can be found on the Federal Energy Regulatory Commission (FERC) web page at http://www.ferc.gov/docs-filing/eLibrary.asp. Please refer to the attached exhibit list, to guide you in your selection of information and data available on FERC's web page. We strongly recommend that you view these documents to acquire the information and data that you will need in your analysis.

To assist you in accessing the information on FERC's web page, documents containing the information that you have expressed interest in are enumerated as follows:

- Exhibit FWS-1 through Exhibit FWS-30, filed on October 6, 2009 (FERC Accession Numbers 20091129-0163 through 20091129-0192)
- Exhibit FWS-31 through Exhibit FWS-106 (except Exhibits FWS-42 and FWS-70) (FERC Accession Numbers 20091129-0212 through 20091129-0283).
- Exhibit FWS-42, filed on December 4, 2009 (FERC Accession Number 20091129-0223)
- Exhibit FWS-70, filed on October 6, 2009 (FERC Accession 20091129-0315)

For your convenience, FWS-45 McCain, M.E. 1992 is included as an attachment to this letter.

Data up through 2010 has not been summarized, tabulated, or reported, but we will work diligently to provide you with this information as it becomes available to us. You may want to consider contacting the California Department of Fish and Game's La Grange Field Office, for recent data on temperature monitoring.

We look forward to working with you, and with both Turlock and Modesto Irrigation Districts, in developing a complete and robust PAD. If you have any questions, please contact Alison Willy or Deborah Giglio-Willoughby at 916-414-6600.

Sincerely,

M Kathleen Wood

M. Kathleen Wood
Assistant Field Supervisor

Attachments

cc:
Michelle Workman, USFWS, Stockton, California
CDFG, La Grange Field Office, La Grange, California
Robert Ness, TID, Turlock, California
Greg Dias, MID, Modesto, California

FHR

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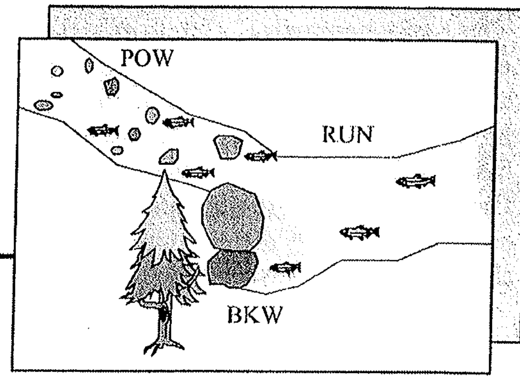

R-5 Fish Habitat Relationship Technical Bulletin
Number 7 April 1992

Comparison of Habitat Use and Availability for Juvenile Fall Chinook Salmon in A Tributary of the Smith River, CA

by Michael E. McCain,
Six Rivers National Forest

Abstract

Habitat use and availability for two cohorts (1987-88) of juvenile chinook salmon were monitored from emergence to emigration. Their distribution was observed among several habitat types at regular intervals in the lower seven kilometers of Hurdygurdy Creek, a tributary to the South Fork Smith River in Del Norte County, California. Stream habitat was quantified on the scale of pools, riffles, runs, and edgewaters. Seasonal shifts in observed habitat utilization were from backwater-edgewater in spring to pool habitat in summer. Habitat availability was described as total surface area and was dominated by riffles, runs, and pools. Backwater-edgewater habitat comprised at most two percent of the total stream area. Habitat availability changed seasonally, with some edgewater units drying up by mid-summer. The length of time juvenile chinook were observed in the study reach differed between years. Storms in May-June 1988 may have influenced the availability of early spring refuge habitat. During both years, total observed juvenile chinook abundance for the 32 units sampled increased rapidly during emergence in spring, peaking on May 8, 1987 and May 17, 1988, then decreased sharply through early June of both years. Comparison of habitat use and availability indicated that newly emerged juvenile chinook salmon preferred scarce backwater-edgewater habitat, while individuals remaining through the summer preferred more abundant pool habitat.

USDA
Forest Service
Pacific Southwest Region

Introduction

This paper summarizes a study of habitat preference by juvenile fall chinook salmon in a reach of Hurdygurdy Creek, in the Smith River drainage, a coastal river system in the Siskiyou Mountains of Northern California. Both temporal and spatial aspects of habitat use and availability are considered in terms of changes in habitat distribution in relation to ontogeny, population density, and hydrologic fluxes on seasonal and year-to-year time scales. Habitat preference exhibited by juvenile chinook salmon is discussed as it is defined by Johnson (1980) and Alldredge and Ratti (1986), where it is assumed that preference is implied by comparing habitat use to habitat availability. The relationships between habitat use and fish density, i.e. the degree that habitat suitability is density dependent, is discussed with reference to the Fretwell-Lucas Theory of habitat distribution. The management implications of these points are discussed, specifically in applying ecological theory to fish habitat management and the utility of anadromous fish as biological indicators of land use effects.

Background

Fall chinook salmon of the Smith River exhibit a life cycle and ontogeny typical of this anadromous species. Spawning occurs throughout the mainstems and lower reaches of major tributaries in fall and winter. Larval hatching and emergence from the gravel occurs from late winter through early spring, with embryo development rate determined by water temperature. Juveniles rear for a variable period in their natal streams then migrate toward the estuary and seaward during smoltification. The fish grow and mature in the ocean for approximately two to six years, then return to their natal streams to spawn.

For salmon, certain habitats are of utmost importance in completing specific life stages. The range of tolerance a species has for any given environmental variable changes during growth and development, with larval life stage requirements often having the narrowest limits (May, 1974). The suitability of habitats utilized may vary from tolerable to optimal. Environmental changes can affect habitat suitability over several time scales: weekly, seasonally, and yearly. Large storm events can impact habitat on a large scale (pool-riffle ratio, reach gradient) and can change habitat suitability for several years (Lisle, 1981).

Selective use of habitat by a fish is an illustration of an organism attempting to meet its habitat requirements. Habitat selection infers that fish actively seek a preferred set of conditions that exist in a larger set or wider range of tolerable limits. Habitat preference drives the act of selection and has been quantified by comparing habitat use to availability (Johnson, 1980; Alldredge and Ratti, 1986) Preference is expressed when habitat is used disproportionately to its availability. In this study, I assume the degree of habitat preference exhibited by juvenile chinook salmon to be a potential indicator of which habitats are critically necessary in its life history.

In this study, habitat was quantified on the reach scale. Naturally occurring pools, riffles, and runs were recognized as habitat units. This allows fish habitat use and distribution to be viewed with regard to fluvial processes, channel morphology, and structural elements. Pool-riffle or step-pool sequence development is a fundamental stream channel process (Yang 1971). This process in concert with localized flow obstructions and disturbances (e.g. log jams, bedrock outcrops, slides, and boulders) results in a meandering channel with complex form, hydraulics, and topography where discrete channel units or habitat types can be recognized (Beschta and Platts, 1986; Hankin and Reeves, 1988).

This fundamental characteristic of stream channels and its relationship to fish ecology was recognized by Bisson et al. (1981) who applied it in developing a system of naming habitat for the purpose of describing habitat use in small streams in western Washington. Beginning in 1984, Lynn Decker, Dave Fuller, and Tom Lisle of the US Forest Service at PSW Arcata tested this system's utility in studying fish habitat relationships in Hurdygurdy Creek. After some expansion, this system was successfully applied, yielding a basin wide habitat inventory of Hurdygurdy Creek. The inventory work resulted in a new view of the stream, and questions on relationships of the abundance and distribution of habitat to fishes began emerging, one of which was: what is the level of use and availability of various types of pools, riffles, and runs pertaining to juvenile chinook salmon during their residence in Hurdygurdy Creek? My study is an attempt to address this question.

Methods

I recorded habitat use and preference by two cohorts (1987 and 1988) of juvenile chinook salmon from emergence to outmigration by monitoring habitat area and observing their distribution with regard to habitat strata at regular intervals. As a sampling framework, I used a stream habitat stratification scheme where eight habitat types were delineated followed criteria set up by Bisson et al. (1981), and McCain et al. (1990), and are as follows: Low Gradient Riffle (LGR), High Gradient Riffle (HGR), Edgewater (EDG), Run (RUN), Backwater Pool (BKW) (also termed alcove or eddy), Lateral Scour Pool (LSP), Channel Confluence Pool (CCP), and Mid Channel Pool (MCP) (Figure 1).

Randomly selected units were mapped to measure their surface area. All measurements were made to the nearest 0.1 meter. Due to fluctuating stream discharge and subsequent changes in habitat area, mean width of each unit was monitored throughout the study. Habitat

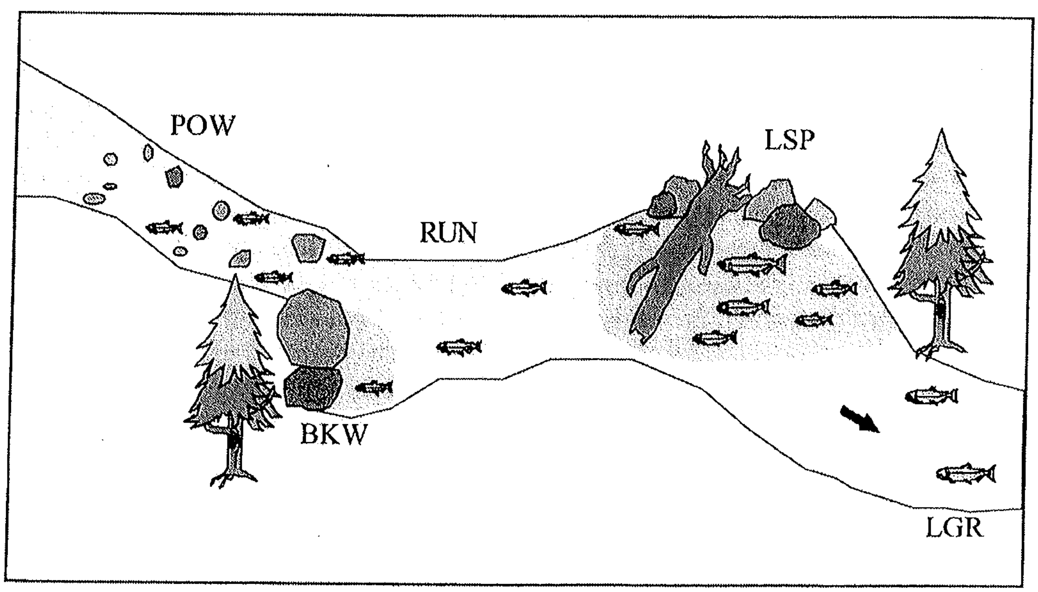

Figure 1. Fish distribution among habitat types.

units were randomly selected from an initial habitat inventory (McCain et al., 1990), where units of each type were identified and numbered sequentially, from the stream mouth proceeding upstream, and selected with the use of a random number generator.

Paired divers using underwater direct observation techniques modified from Edmundson et al. (1968), Griffith (1983), and Hankin and Reeves (1988) counted juvenile chinook salmon in each habitat unit every three to six weeks from April 16, 1987 to December 1, 1988. Divers used pencils and Plexiglas slates to tally observed numbers of juvenile chinook salmon in each unit. The divers moved slowly, making no abrupt movements while in the water to minimize the frightening of fish (Edmundson et al. 1968).

The habitat units were observed in the same order each visit, starting at the downstream-most unit and proceeding upstream. Observations took place primarily between 1000 and 1600 hours DST. Five to eight units were observed per day, with each set of 32 total observations spanning approximately six days. Cross validation of visual fish counts by comparing observed numbers to those obtained by removal methods, namely electrofishing and poisoning, was not performed. This study required monitoring specific units repeatedly over time to detect changes in fish distribution within the units. Removal methods would have the potential to affect the temporal and spatial distribution of fish not only at the sampling site, but also downstream throughout the study reach.

The fish counts and habitat area estimates for each discrete observation period were used to calculate an index of fish density in each habitat unit for each observation period. The density index is assumed to indicate the relative degree of habitat use. For each observation period, a hypothesis was tested: observed juvenile chinook salmon density, or habitat use, is similar throughout the eight habitat types. The hypothesis was tested using non-parametric Kruskal-Wallis ANOVA of ranks from Minitab statistical software. For each habitat type, the average rank and associated z-value were calculated, where:

$$z_i = \frac{\text{Average rank} - \dfrac{(N+1)}{2}}{\sqrt{\dfrac{(N+1)(N/n_i-1)}{12}}}$$

$n_i = 4$ = number of units sampled in each habitat strata

$N = 32$ = total number of habitat units sampled.

Under H_o, z_i is approximately normal with mean 0 and variance 1. For each period, the group of z-values illustrates the relative degree of average use of each habitat type by juvenile chinook salmon at that time. Habitat availability for the reach of study was derived from the initial inventory of the entire lower seven km of stream. Total area for each strata was converted to percent of total reach area. Relative differences between habitat availability percentages were then compared to the relative differences in each set of time specific mean density indexes and utilization z-values to allow interpretation of the relative degree of habitat preference. For example, a relatively high habitat use index compared to a low habitat type availability percentage indicates a potential preference by fish for that habitat type.

Results

Habitat Use

Observations of rearing juvenile chinook in Hurdygurdy Creek indicate that temporal shifts in habitat utilization occurred as a shift from backwater-edgewater habitat types to pool habitat. The length of time juvenile chinook were observed in the study reach differed between years. The 1987 cohort was observed in some of the selected units from emergence in April through November 21, while those of 1988 were observed in the units only through late August. During both years, overall observed juvenile chinook abundance for the total 32 units sampled increased rapidly during emergence in spring, peaking on May 8, 1987 and May 17, 1988, then decreased sharply through early June (Figure 1.).

The highest mean observed habitat use by juvenile chinook salmon during May, 1987 and 1988, occurred in backwater habitat where newly emerged fish were feeding in small aggregations of 20 to 40. Use was significantly higher in these habitats than in the remaining units, as illustrated by the relative high z-values in Table 1 (H=20.03 and 21.68, with P=0.01 and 0.00 respectively for 1987 and 1988). Each value of the H statistic indicates a very high deviation from a hypothetical expected habitat use profile (where all z-values = 0), and is comparable to a chi-square value at k-1 (7) degrees of freedom. Backwater habitat units selected for the study were characterized by slow shallow water and were relatively homogeneous in depth and velocity. Three of the four backwater units selected were associated with instream boulder enhancement structures. During May, newly emerged chinook were also observed in lower abundances in pool habitat feeding in groups of 10 to 50 in margin and pool tail areas, behind large bedrock obstructions, and under rootwads and overhanging banks. By late June, observed habitat use had sharply decreased in backwater habitat with the highest use shifting to pools, where fish were actively drift feeding near the surface in open deep areas devoid of cover. Z-values (Table 1) indicate summer use was highest in lateral scour, channel confluence, and mid channel pools. However, H statistics and alpha levels in Table 1 imply that the degree of and pool utilization in July and August was more significant in 1987 than in 1988. For example, P = 0 for both habitat type and zone at August 25, 1987; whereas P = 0.19 and 0.12 respectively for habitat type and zone for August 27, 1988.

Habitat Availability

Habitat availability for main channel habitats remained at a fairly constant ratio throughout the study. Habitat types associated with stream margin fluctuated most, with two edgewater units drying out by late summer of both years. Margin zones which extended as wide shallow areas also decreased in size as summer progressed. Pool habitat units with steep side slopes had a nearly constant surface area through time.

Discussion

In the Smith River, habitat primarily used by juvenile chinook salmon for early rearing is characterized by slow velocity and cover (e.g. rootwads, boulder deflectors, and overhangs). These areas may serve as a refuge from predation and high spring flows during emergence, and also may provide abundant prey items of appropriate size. Backwater habitat comprises only one percent of the total surface area of the study reach, a condition that may be limiting emergent survival and early rearing success.

1987											
% Total Area	4/16	5/8	5/29	6/21	7/14	8/3	8/25	9/15	10/8	10/30	11/21
LGR 30	-2.05	-2.88	-2.19	-2.05	-1.65	-1.82	-1.82	-1.71	-1.60	-1.25	-0.57
HGR 20	-1.94	-2.05	-1.71	-1.48	-1.31	-1.82	-1.82	-1.71	-1.60	-1.25	-0.57
EDG 1	-0.91	0.60	-1.05	-1.31	-2.17	-1.82	-1.82	-1.71	-1.60	-1.25	-0.57
RUN 23	0.11	-1.03	-0.88	-0.57	-0.17	0.14	-0.03	0.00	-0.40	-0.28	0.40
BKW 1	$\boxed{2.56}$	$\boxed{2.45}$	0.71	-0.74	-1.31	-1.00	-0.88	-0.40	-0.60	-1.25	-0.57
LSP 9	0.06	1.25	1.20	$\boxed{2.39}$	1.99	1.48	1.42	1.20	1.57	1.88	$\boxed{1.37}$
CCP 6	0.74	0.74	1.88	1.99	$\boxed{2.45}$	2.34	2.28	$\boxed{2.17}$	1.99	1.37	0.23
MCP 11	1.42	0.91	2.05	1.77	2.17	$\boxed{2.51}$	$\boxed{2.68}$	$\boxed{2.17}$	$\boxed{2.22}$	$\boxed{2.05}$	0.28
H stat.	15.73	20.03	17.42	19.89	23.96	24.92	25.14	20.30	20.77	19.48	7.58
p	0.03	0.01	0.01	0.01	0	0	0	0	0	0.01	0.37

1988					
% Total Area	4/2	5/17	6/20	7/20	8/27
LGR 30	-0.46	-2.62	-2.62	-1.71	-0.91
HGR 20	-0.46	-2.62	-1.94	-1.71	-0.91
EDG 1	-0.46	0.91	-1.14	-1.71	-0.91
RUN 23	$\boxed{1.25}$	0.68	-0.34	0.34	-0.14
BKW 1	-0.46	$\boxed{2.96}$	$\boxed{2.85}$	0.34	0.09
LSP 9	0.48	0.63	1.31	$\boxed{1.99}$	0.03
CCP 6	0.54	0.11	0.74	1.42	$\boxed{1.74}$
MCP 11	-0.46	-0.06	1.14	1.03	1.03
H stat.	8.31	21.68	21.22	16.52	9.97
p	0.31	0	0	0.02	0.19

Table 1.
Z-values for 1987 and 1988 cohort of chinook salmon. Boxed numbers are the highest Z-values for each observation period.

In the study reach, large woody debris (LWD) is a primary element in forming potentially critical early rearing backwater habitat, with boulder habitat improvement structures often placed in the channel to serve as 'LWD substitutes'. Extensive removal of debris jams along with salvage of standing potential LWD after wildfire, windstorms, and disease outbreaks in the past century has resulted in a possible long-term deficit in the LWD budget of many forest watersheds throughout the West (R. Ruediger and J. Sedell, pers. comm.). If abundance and distribution of backwater habitat in forest streams is largely determined by the amount and distribution of LWD in the channel, then addressing the problems of sources and recruitment of LWD are therefore key in managing watersheds for productive stream habitat. Pool habitat used by juvenile chinook salmon in later stages of rearing is much more abundant than edge- and backwater types (approximately 25 percent of the study reach surface area). This may imply that availability of pools is not likely to be limiting the juvenile chinook population in Hurdygurdy Creek.

Comparison of the relative differences in degree of habitat use, indicated by each time specific set of z-values, to the differences in habitat availability indicate potential habitat preferences. A relatively high degree of preference for backwater habitat was exhibited in spring--high use of a limited habitat.

The difference in duration of stream residency between 1987 and 1988 could be reflective of the difference in streamflow and water year. Flows in May and June, 1988, as opposed to 1987, may have been high enough to severely limit the amount of early rearing habitat in many of the available pools and literally may have flushed out much of the 1988 cohort. A greater fraction were observed in BKW during May, 1988 than the previous spring. Backwater pools may have been the only habitat suitable for the rearing juvenile chinook salmon during the high flows of May, 1988. Mason (1976) and Peterson (1982) demonstrated the influence of storm flows on habitat availability which may limit the total population.

Fretwell and Lucas (1970) discussed relationships between habitat suitability and population density for birds. Their theory argues that distribution and habitat suitability not only reflects the environmental requirements of a species, but is also density dependent. The theory predicts that the distribution of an organism at low population levels will be linked to relative optimum habitats and, as the population increases in these most suitable habitats, their relative suitability decreases, with formerly less suitable habitats becoming equally suitable. As this process continues, all available habitats ultimately become equally suitable with the organism being dispersed evenly throughout them.

If the Fretwell-Lucas theory is accurate, and habitat suitability is partially density dependent, then year-to-year population variability could mask the relationships between an organism and physical habitat parameters. The theory applied to fish populations implies that habitat suitability not only changes seasonally through ontogenetically related shifts in food and habitat requirements but also annually from inherent population variability. Going a step further to the community level, habitat suitability for each species of a fish community could change as a result of ontogenetic shifts, intraspecific competition, population density, and through interspecific interactions with other populations undergoing the same fluxes and processes. Expanding on the Fretwell-Lucas theory to encompass fish community dynamics could lead to valid but complex assumptions to use in stream ecology research, as well as in fisheries management.

Conclusions

Studies have shown that year class strength in fishes can be determined early in life (May, 1974; Reimers, 1971), with a short period of very high mortality existing in the larval/parr stage. Given the low overall survival rate of salmonids from egg to adult, an improvement in early rearing conditions could potentially improve year class strength. However, the relative importance of early rearing habitat to year class strength can fluctuate from year to year, with natal streams being only one of many environments that Smith River fall chinook salmon utilize. Overriding limiting factors associated with riverine, estuarine, and/or ocean phases of its life cycle can mask any one-to-one relationship between early rearing habitat quality and adult spawning escapement. Therefore, creating more elements which characterize early rearing habitat may benefit newly emerged chinook during their first month of stream rearing, with the effects of habitat improvements on the population as a whole highly variable from year to year.

From my work in Hurdygurdy Creek, I can roughly predict that about five percent of the 1987 and 1988 chinook salmon age 0 cohorts remained in this natal stream to rear at least through summer (Figure 2). Study of the freshwater vs. ocean growth history of several cohorts of returning spawners is necessary to qualify any stable pattern as to how the extended natal stream rearing fraction contributes to the population.

In applying the results of this kind of work toward any management guidelines, such as maintaining chinook salmon populations through the maintenance and improvement of rearing habitat, we must also strongly consider the biological parameters, as well as large-scale environmental pertubations (floods and drought), which can control fish population abundance and shape demographics. The amount of variation observed in this study of overall fish abundance between 1987 and 1988 suggests that benefits of habitat manipulations, such as creating backwaters, are highly variable from year to year.

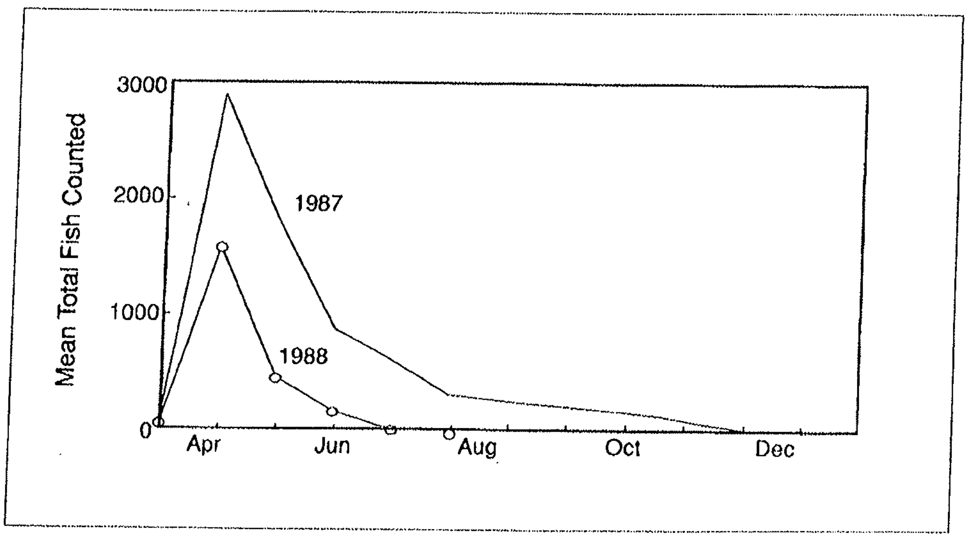

Figure 2. Mean total fish counted for each observation period for 1987 and 1988.

The links between LWD and early rearing habitat must be considered when designing habitat management programs and setting goals in terms of desired future conditions. Based on what is known of historical LWD levels in forest streams, along with knowledge on the few remaining pristine stream systems, a long term habitat management program should target LWD as a primary structural component and facilitate and enhance its recruitment and accumulation to a functional level.

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FHR Currents...Purpose

The Fish Habitat Relationship (FHR) Program of R-5 USFS has been established to research and develop information on fish ecology and to coordinate effective applications of this knowledge in managing and protecting our fisheries. By relating life stage requirements of specific species to physical habitat parameters, we are aiming at our main objective: developing a methodology to manage fisheries through the management of habitat.

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U.S. FISH AND WILDLIFE SERVICE

EXHIBIT LIST FOR TRIAL FACT-FINDING PROCESS

Exhibit No. FWS-1-National Marine Fisheries Service and U.S. Fish and Wildlife Service Interim Measure Elements

Exhibit No. FWS-2-Direct Testimony of Michelle Workman

Exhibit No. FWS-3-Curriculum Vitae of Michelle Workman

Exhibit No. FWS-4-Direct Testimony of Dr. Carl Mesick

Exhibit No. FWS-5-Curriculum Vitae of Dr. Carl Mesick

Exhibit No. FWS-6-Direct Testimony of Dr. Mark Gard

Exhibit No. FWS-7-Curriculum Vitae of Dr. Mark Gard

Exhibit No. FWS-8-Allan, J.D. 1995. Stream ecology: structure and function of running waters. Chapman & Hall, London. 388 pp.

Exhibit No. FWS-9-Barnhart RA. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Southwest)—steelhead. USFWS Biol Rep 82(11.60). US Army Corps of Engineers, TR EL–82–4. 21 p.

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Exhibit No. FWS-40-Kondolf, G.M. and M.G. Wolman. 1993. The sizes of salmonid spawning gravels. Water Resources Research 29:2275-2285.

Exhibit No. FWS-41-Large, A.R.G. and G. Petts. 1996. Rehabilitation of River Margins. *In* G. Petts and P. Calow editors. River restoration: selected extracts from the Rivers handbook. Blackwell Science Ltd., Oxford. Pages 106-123.

Exhibit No. FWS-42-Leitritz E, and Lewis RC. 1976. Trout and salmon culture (hatchery methods). California Fishery Bulletin. 164. University of California.

Exhibit No. FWS-43-Lindley, S.T., R.S. Schick, E. Mora, P.B. Adams, J.J. Anderson, S. Greene, C. Hanson, B.P. May, D.R. McEwan, R.B. MacFarlane, C. Swanson, and J.G. Williams. 2007. Framework for assessing viability of threatened and endangered salmon and steelhead in the Sacramento- San Joaquin Basin. *San Francisco Estuary and Watershed Science* Volume 5, Issue 1 [February 2007], article 4. Available at: http://repositories.cdlib.org/jmie/sfews/vol5/iss1/art4

Exhibit No. FWS-44-MacFarlane, R.B. and E.C. Norton. 2002. Physiological ecology of juvenile Chinook salmon (Oncorhynchus tshawhytscha) at the southern end of their distribution, the San Francisco Estuary and Gulf of Farallones, California. Fisheries Bulletin 100: 244-257.

Exhibit No. FWS-45-McCain, M.E. 1992. Comparison of habitat use and availability for juvenile fall-run Chinook salmon in a tributary of the Smith River, California, FHR Currents. No. 7. USDA Forest Service, Region 5.

Exhibit No. FWS-46-McCullough, D. A. 1999. A review and synthesis of effects of alterations to the water temperature regime on freshwater life stages of salmonids, with special reference to Chinook salmon. Report No EPA 910-R-99-010. EPA, Region 10, Seattle, WA.

Exhibit No. FWS-47-McEwan, D.R. 2001. Central Valley Steelhead. IN: Contributions to the Biology of Central Valley Salmonids. Fish Bulletin 179. R. Brown, ed.

Exhibit No. FWS-48-McEwan, D.R. and T.A. Jackson. 1996. Steelhead Restoration and Management Plan for California. California Department of Fish and Game.

Exhibit No. FWS-49--McHugh, P. and P. Budy. 2004. Patterns of spawning habitat selection and suitability for two populations of spring chinook salmon, with an evaluation of generic verses site-specific suitability criteria. Transactions of the American Fisheries Society 133: 89-97.

Exhibit No. FWS-50-Mesick, C.F. 2009. The High Risk of Extinction for the Natural Fall-Run Chinook Salmon Population in the Lower Tuolumne River due to Insufficient Instream Flow Releases. Report prepared for the U.S. Fish and Wildlife Service, Sacramento, CA. Manuscript to be submitted to a peer reviewed journal by October 2009.

Exhibit No. FWS-51 -Mesick, C.F., D. Marston, and T. Heyne. 2009a. Estimating the total number of coded-wire-tagged adult fall-run Chinook salmon (*Oncorhynchus tshawytscha*) in California's Central Valley rivers. El Dorado, CA. Manuscript submitted to the California Fish and Game Scientific Journal, October 2009. **Appendix:** Excel file database: CV Summary August 2009 Fall-Run Surveys Final.xls.

Exhibit No. FWS-52-Mesick, C.F., D. Marston, and T. Heyne. 2009b. Estimating recruitment for fall-run Chinook salmon populations in the Stanislaus, Tuolumne, and Merced rivers. El Dorado, CA. Manuscript submitted to the California Fish and Game Scientific Journal, October 2009.

Exhibit No. FWS-53--Milhous, R.T., M.A. Updike and D.M. Schneider. 1989. Physical habitat simulation system reference manual - version II. Instream Flow Information Paper No. 26. U. S. Fish and Wildlife Service Biological Report 89(16).

Exhibit No. FWS-54--Moyle, P.B., P.K. Crain, and K. Whitener. 2007. Patterns in the use of a restored California floodplain by native and alien fishes. San Francisco Estuary and Watershed Science. 5(3): 1-27.

Exhibit No. FWS-55-Moyle, P.B. 2002. Inland Fishes of California. UC Press. Berkeley. 502pp.

Exhibit No. FWS-56-Nicholas, J.W. and D.G. Hankin. 1989. Chinook salmon populations in Oregon coastal river basins: descriptions of life histories and assessment of recent trends in run strengths. Report EM-8402. Oregon Dept. of Fish and Wildlife, Research and Development Section, Corvallis.

Exhibit No. FWS-57-Nichols, K., and J. S. Foott. 2002. Health monitoring of hatchery and natural fall-run Chinook salmon juveniles in the San Joaquin River and tributaries, April – June 2001. FY 2001 Investigation Report by the U. S. Fish and Wildlife Service, California-Nevada Fish Health Center, Anderson, California.

Exhibit No. FWS-58-Nielsen J.L., Lisle T.E., Ozaki V. 1994. Thermally stratified pools and their use by steelhead in northern California streams. Trans Am Fish Soc 123:613–26.

Exhibit No. FWS-59-Pagliughi, S.W. 2008. Lower Mokelumne River Reach Specific Thermal Tolerance Criteria by Life Stage for Fall-Run Chinook Salmon and Winter-Run Steelhead. East Bay Municipal Utility District Unpublished Report. 81pp.

Exhibit No. FWS-60–Palmer, M.L. and C.L. Sonke. 2008. Outmigration trapping of juvenile salmonids in the Lower Tuolumne River, Final report, December 2008. Submitted to Turlock Irrigation District and Modesto Irrigation District by Fishbio, Chico, CA.

Exhibit No. FWS-61–Parasiewicz, P. 1999. A hybrid model – assessment of physical habitat conditions combining various modeling tools. In: Proceedings of the Third International Symposium on Ecohydraulics, Salt Lake City, Utah

Exhibit No. FWS-62-Pascual, M.A., T.P. Quinn, and H.Fuss. 1995. Factors Affecting the Homing of Fall Chinook Salmon from Columbia River Hatcheries. Transactions of the American Fisheries Society 124:308-320.

Exhibit No. FWS-63–Quinn, T.P. 2005. The behavior and ecology of Pacific salmon and trout. University of Washington Press, Seattle.

Exhibit No. FWS-64-Quinn, T.P. and K. Fresh. 1984. Homing and Straying in Chinook Salmon Oncorhynchus tshawytscha from Cowlitz River Hatchery, Washington Can. J. Fish. Aquat. Sci., Vol. 41:1078-1082.

Exhibit No. FWS-65-Reiser, D. W., and T.C. Bjornn. 1979. Habitat requirements of anadromous salmonids. U.S. Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR. General Tech. Report PNW-96. 54pp.

Exhibit No. FWS-66-Reiser, D. W. and R.G. White. 1988. Effects of two sediment size-classes on survival of steelhead and Chinook salmon eggs. North Amer. J. Fish. Manage. 8:432-437.

Exhibit No. FWS-67-Rich AA. 2000. Reporters Hearing Transcript of "Water temperature requirements for chinook salmon and steelhead trout. Rebuttal Testimony submitted to the State Water Resources Control Board, Yuba River hearings, 1 May 2000 (Exhibit S–DFG– 39). 12 p.

Exhibit No. FWS-68–San Joaquin River Group Authority. 2007. 2006 annual technical report on implementation and monitoring of the San Joaquin River Agreement and the Vernalis Adaptive Management Plan. Prepared for the California State Water Resources Control Board in compliance with D-1641. January.

Exhibit No. FWS-69-Shapovalov and Taft. 1954. The Life Histories of the Steelhead Rainbow Trout (Salmo gairdneri gairdneri) and Silver Salmon (Oncorhynchus kisutch) with Special Reference to Waddell Creek, California, and Recommendations Regarding their Management. State of California Department of Fish and Game Fish Bulletin No. 98. 375 pp.

Exhibit No. FWS-70-Shumway, D. L., C. E. Warren, and P. Duodoroff. 1964. Influence of oxygen concentration and water movement on the growth of steelhead trout and coho salmon embryos. Transactions of the American Fisheries Society 93:342–356.

Exhibit No. FWS-71-Silver, J., C. E. Warren, and P. Duodoroff. 1963. Dissolved oxygen requirements of developing steelhead and chinook salmon embryos at different water velocities. Transactions of the American Fisheries Society 92:327–343.

Exhibit No. FWS-72–Sommer, T.R, W.C. Harrell and M.L. Nobriga. 2005. Habitat use and stranding risk of juvenile Chinook salmon on a seasonal floodplain. North American Journal of Fisheries Management 25: 1493-1504.

Exhibit No. FWS-73-Sommer, T.R., M.L. Nobriga, W.C. Harrell, W. Batham, and W.J. Kimmerer. 2001. Floodplain rearing of juvenile chinook salmon: evidence of enhanced growth and survival. Can. J. Fish. Aquat. Sci. 58: 325–333.

Exhibit No. FWS-74–Thielke, J. 1985. A logistic regression approach for developing suitability-of-use functions for fish habitat. Pages 32-38 in F.W. Olson, R.G. White, and R.H. Hamre, editors. Proceedings of the symposium on small hydropower and fisheries. American Fisheries Society, Western Division and Bioengineering Section, Bethesda, Maryland.

Exhibit No. FWS-75-Tiffan, K.E., R.D. Garland and D.W. Rondorf. 2002. Quantifying flow-dependent changes in subyearling fall Chinook salmon rearing habitat using two-dimensional spatially explicit modeling. North American Journal of Fisheries Management 22: 713-726.

Exhibit No. FWS-76–Turlock Irrigation District and Modesto Irrigation District. 1992. Report of Turlock Irrigation District and Modest Irrigation District pursuant to article 39 of the license for the Don Pedro Project, Appendix 6, Attachment B (in Vol. IV).

Exhibit No. FWS-77–Turlock Irrigation District and Modesto Irrigation District. 2005. 2005 Ten Year Summary Report pursuant to Paragraph (G) of the 1996 FERC Order issued July 31, 1996. Report to Federal Energy Regulatory Commission for FERC Project No. 2299-024.

Exhibit No. FWS-78–U. S. Fish and Wildlife Service. 1995. The relationship between instream flow and physical habitat availability for Chinook salmon in the lower Tuolumne River, California. U. S. Fish and Wildlife Service, Sacramento, California.

Exhibit No. FWS-79-U.S. Fish and Wildlife Service. 1995. Working Paper on restoration needs: habitat restoration actions to double natural production of anadromous fish in the Central Valley of California. Volumes 1, 2, & 3. May 9, 1995. Prepared for the U.S. Fish and Wildlife Services under the direction of the Anadromous Fish Restoration Program Core Group. Stockton, CA.

Exhibit No. FWS-80–U.S. Fish and Wildlife Service. 2000. Effects of the January 1997 flood on flow-habitat relationships for steelhead and fall-run Chinook salmon spawning in the lower American River. U.S. Fish and Wildlife Service, Sacramento, CA.

Exhibit No. FWS-81-U.S. Fish and Wildlife Service. 2001. Final Restoration Plan for the Anadromous Fish Restoration Program. A plan to increase natural production of anadromous fish in the Central Valley of California. Prepared for the Secretary of the Interior by the USFWS under authority of the CVPIA.

Exhibit No. FWS-82-U. S. Fish and Wildlife Service. 2008a. Flow-overbank inundation relationship for potential fall-run Chinook salmon and steelhead/rainbow trout juvenile outmigration habitat in the Tuolumne River. U. S. Fish and Wildlife Service, Sacramento, California.

Exhibit No. FWS-83–U. S. Fish and Wildlife Service. 2008b. Draft report: Flow-habitat relationships for spring and fall-run Chinook salmon and steelhead/rainbow trout spawning in the Yuba River. U. S. Fish and Wildlife Service, Sacramento, California.

Exhibit No. FWS-84–U. S. Fish and Wildlife Service. 2008c. Draft report: Flow-habitat relationships for juvenile spring/fall-run Chinook salmon and steelhead/rainbow trout rearing in the Yuba River. U. S. Fish and Wildlife Service, Sacramento, California.

Exhibit No. FWS-85–U. S. Fish and Wildlife Service. 2009a. Overbank inundation area for Lower Tuolumne River at 3,100 cfs from RM 25.1 to 52. U. S. Fish and Wildlife Service, Sacramento, California.

Exhibit No. FWS-86-U.S. Fish and Wildlife Service. 2009b. Draft Rotary Screw Trap Protocol for Estimating the Production of Juvenile Chinook Salmon. USFWS. Comprehensive Assessment and Monitoring Program. 42pp.

Exhibit No. FWS-87--Unwin, M.J. and T.P. Quinn. 1993. Homing and Straying Patterns of Chinook Salmon (Oncorhynchus tshawytscha) from a New Zealand Hatchery: Spatial Distribution of Strays and Effects of Release Date. Can. J. Fish. Aquat. Sci. 50: 11 68-1 175.

Exhibit No. FWS-88--Ward, P. D., and T. R. McReynolds. 2001. Butte and Big Chico Creeks spring-run Chinook salmon, *Oncorhynchus tshawytscha*, life history investigation, 1998-2000. California Department of Fish and Game, Inland Fisheries Administrative Report.

Exhibit No. FWS-89--Ward, P.D., T.R. McReynolds, and C.E. Garman. 2002. Butte and Big Chico Creeks spring-run Chinook salmon, *Oncorhynchus tshawytscha*, life history investigation, 2000-2001. California Department of Fish and Game, Inland Fisheries Administrative Report No. 2001-2.

Exhibit No. FWS-90-Williams, J.G. 2006. Central Valley Salmon. A perspective on Chinook and Steelhead in the Central Valley of California. San Francisco Watershed and Estuary Science. Vol. 4. Issue 3. Article 2. 398pp.

Exhibit No. FWS-91-Workman, M.L. 2004. Lower Mokelumne River Upstream Fish Migration Monitoring Conducted at Woodbridge Irrigation District Dam. August 2003 through July 2004. Unpublished report prepared for East Bay Municipal Utility District.

Exhibit No. FWS-92-Workman, M.L., C. E. Hunter, M. S. Saldate and J. L. Shillam. 2007. Downstream Fish Migration Monitoring at Woodbridge Irrigation District Dam. Lower Mokelumne River, December 2006 through July 2007. Unpublished report prepared for the East Bay Municipal Utility District. 33pp.

Exhibit No. FWS-93-Workman, M.L. 2008. Lower Mokelumne River Fall Run Chinook Salmon Prespawning Mortality Summary Report 2003-2007. Unpublished Report prepared for the East Bay Municipal Utility District. 7pp.

Exhibit No. FWS-94-Electronic Message from Dr. Alan Hubbard, August 29, 2009.

Loy, Carin

From:	Loy, Carin
Sent:	Thursday, October 21, 2010 8:54 PM
To:	rwhughes@dfg.ca.gov
Subject:	Don Pedro Relicensing: Checking In
Attachments:	Hughes_CDFG_100910.pdf
AMServiceURLStr:	https://slingshot.hdrinc.com/CFSS/control?view=services/FTService

Dear Robert Hughes,

In September, on behalf of Modesto Irrigation District and Turlock Irrigation District, we sent you a letter asking if you had any information or knew of any information that should be reviewed and/or included in the Don Pedro Pre-Application Document for the relicensing (attached). Have you had a chance to look it over and consider our request? Is there anything we can do to facilitate getting any information from you? We are in the midst of writing now, and we would be happy to collect information from your office, for example, if that would be helpful.

Thank you very much,

Carin Loy
Senior Scientist
HDR|DTA
2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833
Office: 916.564.4214 | Direct: 916.679.8737
Email: carin.loy@hdrinc.com

Loy, Carin

From: Loy, Carin
Sent: Thursday, October 21, 2010 8:54 PM
To: Larry.Thompson@noaa.gov
Subject: Don Pedro Relicensing--Checking In
Attachments: Thompson_NMFS_100910.pdf

Dear Larry Thompson,

In September, on behalf of Modesto Irrigation District and Turlock Irrigation District, we sent you a letter asking if you had any information or knew of any information that should be reviewed and/or included in the Don Pedro Pre-Application Document for the relicensing (attached). Have you had a chance to look it over and consider our request? Is there anything we can do to facilitate getting any information from you? We are in the midst of writing now, and we would be happy to collect information from your office, for example, if that would be helpful.

Thank you very much,

Carin Loy
Senior Scientist
HDR|DTA
2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833
Office: 916.564.4214 | Direct: 916.679.8737
Email: carin.loy@hdrinc.com

Loy, Carin

From:	Loy, Carin
Sent:	Thursday, October 21, 2010 8:53 PM
To:	deborah_giglio@fws.gov
Subject:	Don Pedro Relicensing--Checking In
Attachments:	Giglio_USFWS-100910.pdf
AMServiceURLStr:	https://slingshot.hdrinc.com/CFSS/control?view=services/FTService

Dear Deborah Giglio,

In September, on behalf of Modesto Irrigation District and Turlock Irrigation District, we sent you a letter asking if you had any information or knew of any information that should be reviewed and/or included in the Don Pedro Pre-Application Document for the relicensing (attached). Have you had a chance to look it over and consider our request? Is there anything we can do to facilitate getting any information from you? We are in the midst of writing now, and we would be happy to collect information from your office, for example, if that would be helpful.

Thank you very much,

Carin Loy
Senior Scientist
HDR|DTA
2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833
Office: 916.564.4214 | Direct: 916.679.8737
Email: carin.loy@hdrinc.com

Staples, Rose

From: Staples, Rose
Sent: Friday, October 22, 2010 6:10 PM
To: 'JMEANS@dfg.ca.gov'; 'amanji@dfg.ca.gov'
Cc: Devine, John
Subject: TID-MID Don Pedro Relicensing

I am contacting you on behalf of John Devine, with HDR|DTA. John had wanted to call you directly this week, but he is away from the office for a couple of days with a medical issue.

As you may already know, John is assisting TID and MID with the FERC relicensing of their Don Pedro Project. His schedule was just confirmed for him to be in Turlock for a meeting on November 2nd—and he would like to take the opportunity to introduce himself to you and to talk about the relicensing. John is available on November 3rd, 4th, and 5th—and was wondering if you had an hour or so on your schedule to meet with him during that time. If so, could you coordinate date and times of your availability with me. Thank you.

Rose Staples CPS
Executive Assistant
HDR|DTA
970 Baxter Boulevard | Portland ME | 04103
Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742
Email rose.staples@hdrinc.com

Staples, Rose

From: Staples, Rose
Sent: Friday, October 22, 2010 6:08 PM
To: 'larry.thompson@noaa.gov'; 'richard.wantuck@noaa.gov'
Cc: Devine, John
Subject: TID-MID Don Pedro relicensing

I am contacting you on behalf of John Devine, with HDR|DTA. John had wanted to call you directly this week, but he is away from the office for a couple of days with a medical issue.

As you may already know, John is assisting TID and MID with the FERC relicensing of their Don Pedro Project. His schedule was just confirmed for him to be in Turlock for a meeting on November 2nd—and he would like to take the opportunity to introduce himself to you and to talk about the relicensing. John is available on November 3rd, 4th, and 5th—and was wondering if you had an hour or so on your schedule to meet with him during that time. If so, could you coordinate date and times of your availability with me. Thank you.

Rose Staples CPS
Executive Assistant
HDR|DTA
970 Baxter Boulevard | Portland ME | 04103
Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742
Email rose.staples@hdrinc.com

Staples, Rose

From: Staples, Rose
Sent: Friday, October 22, 2010 6:11 PM
To: 'michelle-workman@fws.gov'; 'deborah.giglio@fws.gov'
Cc: Devine, John
Subject: TID-MID Don Pedro Relicensing

I am contacting you on behalf of John Devine, with HDR|DTA. John had wanted to call you directly this week, but he is away from the office for a couple of days with a medical issue.

As you may already know, John is assisting TID and MID with the FERC relicensing of their Don Pedro Project. His schedule was just confirmed for him to be in Turlock for a meeting on November 2nd—and he would like to take the opportunity to introduce himself to you and to talk about the relicensing. John is available on November 3rd, 4th, and 5th—and was wondering if you had an hour or so on your schedule to meet with him during that time. If so, could you coordinate date and times of your availability with me. Thank you.

Rose Staples CPS
Executive Assistant
HDR|DTA
970 Baxter Boulevard | Portland ME | 04103
Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742
Email rose.staples@hdrinc.com

Staples, Rose

From: Loy, Carin
Sent: Monday, October 25, 2010 9:03 PM
To: Devine, John; Staples, Rose
Subject: Don Pedro: I received a package from Tuolumne River Trust today

Hi Rose and John,
I received a package from the Tuolumne River Trust today. It contains two CDs with information, as well as a copy of their letter.

Would you like me to upload the information from the disc onto SharePoint and/or forward one or both of the discs to you?

Thanks,

Carin Loy
Senior Scientist
HDR|DTA
2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833
Office: 916.564.4214 | Direct: 916.679.8737
Email: carin.loy@hdrinc.com

Staples, Rose

From: Loy, Carin
Sent: Monday, October 25, 2010 4:24 PM
To: Devine, John
Cc: Staples, Rose
Subject: FW: Don Pedro Relicensing--Checking In

Carin Loy
HDR|DTA
Direct: 916.679.8737
Email: carin.loy@hdrinc.com

-----Original Message-----
From: Larry Thompson [mailto:Larry.Thompson@noaa.gov]
Sent: Monday, October 25, 2010 1:22 PM
To: Loy, Carin
Cc: Richard Wantuck
Subject: Re: Don Pedro Relicensing--Checking In

Hi Carin,

A reply to John Devine of HDR/DTA is in draft. I will send another email when the NMFS response is completed and mailed.

Thanks,

Larry

Loy, Carin wrote:
> Dear Larry Thompson,
>
> In September, on behalf of Modesto Irrigation District and Turlock
> Irrigation District, we sent you a letter asking if you had any
> information or knew of any information that should be reviewed and/or
> included in the Don Pedro Pre-Application Document for the relicensing
> (attached). Have you had a chance to look it over and consider our
> request? Is there anything we can do to facilitate getting any
> information from you? We are in the midst of writing now, and we
> would be happy to collect information from your office, for example,
> if that would be helpful.
>
>
>
> Thank you very much,
>
>
>
> **Carin* Loy*
>
> Senior Scientist
>
> ***HDR|**DTA*

>
> 2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833
>
> Office: 916.564.4214 | Direct: 916.679.8737
>
> Email: carin.loy@hdrinc.com
>
>
>
> NOTICE: This message is intended only for the use of the individual
> or entity to which it is addressed, and may contain confidential
> and/or privileged information. If you are not the intended recipient,
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>
>

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Larry Thompson
NOAA National Marine Fisheries Service
650 Capitol Mall, Suite 8-300
Sacramento, CA 95814-4708
Office: 916.930.3613
Fax: 916.930.3629

Staples, Rose

From: Annie Manji [amanji@dfg.ca.gov]
Sent: Monday, October 25, 2010 2:14 PM
To: Julie Means; Staples, Rose
Cc: Devine, John
Subject: Re: TID-MID Don Pedro Relicensing

This sounds like a good idea - I am potentially traveling on the 3rd and 4th (still up in the air) so the 5th would be best for me at this point. Also since Julie and I are in different locations (me up in Redding which is quite a distance from the Project) I am assuming I would be calling in.

Annie Manji
Statewide FERC Coordinator
California Department of Fish and Game
601 Locust Street
Redding, CA 96001
(530) 225-2315
(916) 508-7203 (cell)
amanji@dfg.ca.gov

>>> "Staples, Rose" <Rose.Staples@hdrinc.com> 10/22/2010 3:09 PM >>>
I am contacting you on behalf of John Devine, with HDR|DTA. John had wanted to call you directly this week, but he is away from the office for a couple of days with a medical issue.

As you may already know, John is assisting TID and MID with the FERC relicensing of their Don Pedro Project. His schedule was just confirmed for him to be in Turlock for a meeting on November 2nd-and he would like to take the opportunity to introduce himself to you and to talk about the relicensing. John is available on November 3rd, 4th, and 5th-and was wondering if you had an hour or so on your schedule to meet with him during that time. If so, could you coordinate date and times of your availability with me. Thank you.

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Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742 Email rose.staples@hdrinc.com

Sacramento Office:
2379 Gateway Oaks Drive
Suite 200
Sacramento, CA 95833
916-564-4214
916-564-4203 (fax)

Telephone Log

Date:	October 26, 2010
Contact Person:	Steven J Holdeman
Organization:	Forest Aquatic Biologist, Stanislaus National Forest
Phone Number:	209.532.3671x311

Brief Details of Discussion:

Holdeman was queried on records of threatened, endangered, and special-status amphibians and turtles. He e-mailed Shannon Mason an unofficial shapefile of all aquatic species surveys conducted in the Stanislaus National Forest.

Follow-Up Actions:

	NOTES
☐ **Notify** ________________ ☐ **Contact Core Team ASAP** ☐ **Tickle for** ________________ ☐ **Return Call** ☐ **Other (See Notes)**	

Employee's Name	Shannon Mason

Staples, Rose

From: Devine, John
Sent: Tuesday, October 26, 2010 11:48 AM
To: Staples, Rose
Subject: FW: NMFS Meeting of August 30, 2010

-----Original Message-----
From: Robert M. Nees [mailto:rmnees@tid.org]
Sent: Friday, September 17, 2010 2:44 PM
To: Devine, John
Subject: NMFS Meeting of August 30, 2010

Management representatives of the San Francisco Public Utilities Commission, Modesto Irrigation District, and the Turlock Irrigation District met with representatives of the National Marine Fisheries Service on August 30, 2010 at the NMFS offices in Sacramento to discuss the upcoming relicensing of the Don Pedro Project on the Tuolumne River. Among the topics discussed were the public relicensing orientation meetings scheduled for September, the Project proponents' desire to work cooperatively with agency to find mutually agreeable solutions to issues; announcement of the creation of a relicensing website; and the selection of John Devine of HDR as the District's lead consultant for the relicensing effort.

Those in attendance from NMFS included:

Jeff McLain
Larry Thompson
Rick Wantuck
Steve Edmondson
Rhonda Reed

Those in attendance from CCSF and Districts included:

Steven Ritchie, AGM Water Enterprise, SFPUC Tim Ramirez, Manager Land and Natural Resources Division, SFPUC Greg Dias, Project Manager, MID Joy Warren, Regulatory Administrator, MID Jeff Barton, AGM Civil Engineering, TID Robert Nees, Director of Water Resources and Regulatory Affairs, TID

Staples, Rose

From: Devine, John
Sent: Tuesday, October 26, 2010 11:47 AM
To: Staples, Rose
Subject: FW: FWS Meeting of August 31, 2010

For Communications Appendix

-----Original Message-----
From: Robert M. Nees [mailto:rmnees@tid.org]
Sent: Friday, September 17, 2010 2:51 PM
To: Devine, John
Subject: FWS Meeting of August 31, 2010

Management representatives of the San Francisco Public Utilities Commission, Modesto Irrigation District, and the Turlock Irrigation District met with Deborah Giglio of the US Fish and Wildlife Service on August 31, 2010 at the FWS offices in Sacramento to discuss the upcoming relicensing of the Don Pedro Project on the Tuolumne River. Among the topics discussed were the public relicensing orientation meetings scheduled for September, the Project proponents' desire to work cooperatively with the agency to find mutually agreeable solutions to issues; announcement of the creation of a relicensing website; and the selection of John Devine of HDR as the District's lead consultant for the relicensing effort.

Those in attendance from CCSF and Districts included:

Steven Ritchie, AGM Water Enterprise, SFPUC Tim Ramirez, Manager Land and Natural Resources Division, SFPUC Greg Dias, Project Manager, MID Joy Warren, Regulatory Administrator, MID Robert Nees, Director of Water Resources and Regulatory Affairs, TID

Staples, Rose

From: Devine, John
Sent: Tuesday, October 26, 2010 11:46 AM
To: Staples, Rose
Subject: FW: CDFG Meeting of October 19, 2010

For Communications appendix

-----Original Message-----
From: Robert M. Nees [mailto:rmnees@tid.org]
Sent: Tuesday, October 19, 2010 7:50 PM
To: Devine, John
Subject: CDFG Meeting of October 19, 2010

Management representatives of the San Francisco Public Utilities Commission, Modesto Irrigation District, and the Turlock Irrigation District met with Dr. Jeffrey Single, manager of Region 4 of the California Department of Fish and Game on October 19, at the CDFG offices in Fresno to discuss the upcoming relicensing of the Don Pedro Project on the Tuolumne River. Attending from CDFG along with Dr. Single were Dean Marston, Julie Means, and Annie Manji (by phone). Among the topics discussed were the preparation of the Pre Application Document; the Project proponents' desire to work cooperatively with the agency to find mutually agreeable solutions to issues; availability of a relicensing website; and the selection of John Devine of HDR as the District's lead consultant for the relicensing effort.

Those in attendance from CCSF and Districts included:

Tim Ramirez, Manager Land and Natural Resources Division, SFPUC (by phone) Greg Dias, Project Manager, MID Joy Warren, Regulatory Administrator, MID Robert Nees, Director of Water Resources and Regulatory Affairs, TID

Staples, Rose

From: Devine, John
Sent: Thursday, October 28, 2010 8:53 AM
To: deborah_giglio@fws.gov; michelle_workman@fws.gov
Cc: Staples, Rose
Subject: Potential Meeting

Good morning Deborah and Michelle,

TID and MID, co-licensees of the Don Pedro Project, has retained HDR to assist them through the relicensing process, and me as their Project Manager. I am travelling to CA next week to visit with the Districts, and was hoping that I might also get a chance to introduce myself to each of you. Would you possibly be available any time Wednesday through Friday next week? I know this is very short notice, but if you might be available for even 30 minutes, I would appreciate the chance to meet with you, individually or together, to hear about each of your backgrounds, your familiarity with relicensing and the ILP, and what you hope we can all accomplish in this relicensing process.

I look forward to meeting you.

John Devine, P.E.
Senior Vice President
HDR|DTA
970 Baxter Blvd, Suite 301| Portland, ME | 04103
Office: 207.775.4495 | Fax: 207.775.1742
Cell: 207-776-2206
Durango, CO: 970-385-4995

Staples, Rose

From: Devine, John
Sent: Thursday, October 28, 2010 9:18 AM
To: Larry Thompson (larry.thompson@noaa.gov); richard.wantuck@noaa.gov
Cc: Staples, Rose
Subject: Possible Meeting

Larry and Richard,

Just a note to follow-up on Rose's email last week to see if you might be available to meet with me next week either Wednesday, Thursday or Friday. I know this is very short notice, but if you were available even for 30 minutes, I would just like to introduce myself and hear a little about your backgrounds, your experiences with relicensing and the ILP, and your thoughts about what we can hope to accomplish in the forthcoming Don Pedro relicensing.

I look forward to meeting you both.

John Devine, P.E.
Senior Vice President
HDR|DTA
970 Baxter Blvd, Suite 301| Portland, ME | 04103
Office: 207.775.4495 | Fax: 207.775.1742
Cell: 207-776-2206
Durango, CO: 970-385-4995

Staples, Rose

From: Loy, Carin
Sent: Thursday, October 28, 2010 1:12 PM
To: Bob Hughes
Cc: Julie Means; Tim Heyne; Devine, John; Staples, Rose
Subject: RE: Don Pedro Relicensing: Checking In

Dear Bob Hughes,
Thank you very much for getting back to me. We have been in touch with Tim Heyne and Sarah McCulloch regarding CDFG's temperature data and reservoir temperature profiles and they have been/are very good to work with.

Regards,

Carin Loy
HDR|DTA
Direct: 916.679.8737
Email: carin.loy@hdrinc.com

-----Original Message-----
From: Bob Hughes [mailto:RWHUGHES@dfg.ca.gov]
Sent: Thursday, October 28, 2010 3:53 AM
To: Loy, Carin
Cc: Julie Means; Tim Heyne
Subject: Re: Don Pedro Relicensing: Checking In

I do not have any PAD-type information for the lower Tuolumne River. However, I passed your letter along to staff in the Department's Region 4 office. I understand that the licensees are coordinating with Region 4 staff to identify pertinent information not already in the licensee's possession.

Robert W. Hughes, P.E.
Senior Hydraulic Engineer
California Department of Fish and Game
Office Phone: (916) 445-3362
Mobile Phone: (916) 591-2016

>>> "Loy, Carin" <Carin.Loy@hdrinc.com> 10/21/2010 8:53 PM >>>
Dear Robert Hughes,

In September, on behalf of Modesto Irrigation District and Turlock Irrigation District, we sent you a letter asking if you had any information or knew of any information that should be reviewed and/or included in the Don Pedro Pre-Application Document for the relicensing (attached). Have you had a chance to look it over and consider our request? Is there anything we can do to facilitate getting any information from you? We are in the midst of writing now, and we would be happy to collect information from your office, for example, if that would be helpful.

Thank you very much,

Carin Loy
Senior Scientist
HDR|DTA
2379 Gateway Oaks Drive, Suite 200 | Sacramento, CA | 95833

Office: 916.564.4214 | Direct: 916.679.8737
Email: carin.loy@hdrinc.com

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, California 95404-4731

October 29, 2010

In response refer to:
SWR/F/SWR3:WF

John Devine P.E.
Project Manager
HDR/DTA
970 Baxter Boulevard
Portland, Maine 04103-5337

Subject: Response of NOAA's National Marine Fisheries Service to HDR/DTA's request for information for Pre-Application Document, FERC Hydroelectric Project No. 2299

Dear Mr. Devine:

NOAA's National Marine Fisheries Service (NMFS) has reviewed your request of September 9, 2010, for information that could be included by Turlock and Modesto Irrigation districts (Licensees) in the Pre-Application Document (PAD) for FERC Hydroelectric Project No. 2299.

The regulations (18 CFR5.6(b)(1)) describe the purpose of the PAD:

> *The pre-application document provides the Commission and the entities identified in paragraph (a) of this section with existing information relevant to the project proposal that is in the potential applicant's possession or that the potential applicant can obtain with the exercise of due diligence.*

NMFS notes the PAD is to provide the existing information *relevant to the project proposal* that is in the potential applicant's possession -- or that the potential applicant can obtain with the exercise of due diligence. This text does not limit PAD information to information *the Licensee determines* (with the exercise of due diligence) may be relevant to defining potential issues with or to describing potential effects of the project.

The regulations indicate the PAD must contain:

> *"A description of any known or potential adverse impacts and issues associated with the construction, operation or maintenance of the proposed project, including continuing and cumulative impacts;"*(18CFR5.6(d)(3)(C))

This regulation does not allow the Licensees latitude in determining the contents of the PAD, which is to contain "any known or potential adverse impacts and issues". NMFS notes that several potential adverse impacts and issues were identified in the record of the "Proceeding on Interim Conditions" presided over by an Administrative Law Judge (ALJ) in 2009. As you recall, FERC ordered this proceeding to develop a factual record and assist the parties in evaluating possible interim solutions to benefit Central Valley fall-run Chinook salmon and Central Valley steelhead in the Tuolumne River. NMFS and other parties filed abundant information that, by regulation, should be included in the PAD for this licensing proceeding. NMFS recommends this information be collected and included in the PAD (compact disks containing the filings would be a practical way of including the information in the PAD).

Much of the information filed in the "Proceeding on Interim Conditions" would fulfill the requests made of NMFS in your letter of September 9, 2010:

> *[1] Any and all information, data, analyses, memos, and/or reports related to scale and otolith evaluations of Chinook salmon and steelhead on the Tuolumne River, including results of all otolith samples from O. mykiss that have been analyzed for anadromy.*

NMFS provided written testimony regarding otolith studies conducted on samples of *Oncorhynchus mykiss* collected in the Tuolumne River. Please refer to Exhibit NMF-32 for a copy of a publication by Zimmerman *et al.* (2009), which reports detection of anadromous *O. mykiss* (steelhead) progeny in every Central Valley stream examined by the authors, including in the lower Tuolumne River. The authors describe that simply documenting the occurrence of steelhead progeny is significant, and NMFS agrees.

> *[2] Any and all information, data, memos, and/or reports on genetics of fish resources of the Tuolumne River, both published and unpublished.*

NMFS provides two reports herein (Enclosures A and B) produced in part by its Southwest Science Center that pertain to the genetics:

1) Garza, J.C., and D.E. Pearse. 2008. Population genetic structure of *Oncorhynchus mykiss* in the California Central Valley. Final report for California Department of Fish and Game, Contract # PO485303. University of California, Santa Cruz and NOAA Southwest Fisheries Science Center. 54 pp.

2) Garza, J.C., Blankenship, S.M., Lemaire, C., and G. Charrier. 20083. Genetic population structure of Chinook salmon (*Oncorhynchus tshawytscha*) in California's Central Valley. Draft Final Report for CalFed Project "Comprehensive Evaluation of Population Structure and Diversity for Central Valley Chinook Salmon". Institute of Marine Sciences, University of California at Santa Cruz and NOAA Southwest Fisheries Science Center. 82 pp.

> *[3] Any and all information, data, analyses, and/or reports related to the NMFS' steelhead report card on the Tuolumne River.*

The California Department of Fish and Game's Steelhead Fishing Report and Restoration Card are used to gather steelhead angling data for monitoring catch. For Tuolumne River information, NMFS suggests you contact the California Department of Fish and Game, Fisheries Branch, 830 S Street, Sacramento, California 95811, phone 916-327-8840.

[4] Any and all recent (last five years) results of monitoring, conducted by federal or state resource agencies, of habitat restoration projects.

Regarding monitoring data of habitat restoration projects in the Tuolumne River conducted by state resource agencies, NMFS suggests you contact the California Department of Fish and Game's Central Regional Office (1234 East Shaw Avenue, Fresno, California 93710, phone (559) 243-4005 extension 151). Dean Marston or Tim Heyne is likely contacts with knowledge of such information.

Regarding monitoring of habitat restoration projects in the Tuolumne River conducted by federal resource agencies, NMFS suggests you contact Ramon Martin, Anadromous Fish Restoration Program, U.S. Fish and Wildlife Service, Stockton, California. The Program maintains a web site: http://www.fws.gov/stockton/afrp/ with links to restoration projects specific to the lower Tuolumne River.

[5] Any and all information, data, analyses, and/or reports related to temperatures on the Tuolumne River from Don Pedro Dam to the confluence with the San Joaquin River, including thermographs and meteorological station data up through 2010.

For data, analyses, and/or reports related to lower Tuolumne River temperatures, we suggest you contact the California Department of Fish and Game's Central Regional Office (1234 East Shaw Avenue, Fresno, California 93710, phone (559) 243-4005 extension 151). Andrew Gordus or Dean Marston is likely contacts with knowledge of such information. As stated above, a great deal of information was filed in the FERC-ordered ALJ proceeding regarding impacts to fall-run Chinook salmon and steelhead in the Tuolumne River. For example, Dr. Andrew Gordus provided written and oral testimony regarding lower Tuolumne River temperatures, much of it based on analysis of nine years (1998-2006) of temperature probe measurements at numerous locations in the lower Tuolumne. We suggest you review Exhibit DFG-4 filed in the ALJ Proceeding, along with related documents cited therein and/or filed by the California Department of Fish and Game. NMFS understands temperature probes deployed in the Tuolumne by the Department remain in the river and are collecting additional data, but you would need to request the data from the Department. It may be that temperature data has also been collected in the Tuolumne River upstream of Don Pedro Dam, which would assist NMFS and other stakeholders in evaluating the present suitability of this historic anadromous habitat. Such data would also inform decisions regarding potential fish passage measures and options. NMFS, therefore, recommends you obtain any available upper Tuolumne temperature information and include it in the PAD.

If you have questions about NMFS' response, please contact Mr. Larry Thompson, NMFS Fishery Biologist, at 916/930-3613.

Sincerely,

Richard L. Wantuck
Hydropower Program Supervisor
Habitat Conservation Division

Enclosures

cc: Maria Rea, Howard Brown, Brian Ellrott, Larry Thompson, NMFS, Sacramento, CA
Alison Willy, USFWS, CA

From: Julie Means [JMEANS@dfg.ca.gov]
Sent: Tuesday, November 16, 2010 5:42 PM
To: Staples, Rose
Cc: Dean Marston; Tim Heyne; Devine, John
Subject: Re: Don Pedro Draft PAD 7.0 Reference Section

Thanks for the information.

Our fisheries staff will review the list to determine if we have any additional data in our files that would be responsive to your information request, and if any is identified, we will contact you to determine the best format for transmitting the information to you.

Julie Means
Senior Environmental Scientist
California Department of Fish and Game-Central Region FERC, Water Rights, Stream Alteration, Suction Dredge and Education Programs
1234 East Shaw Avenue
Fresno, California 93710
Office: (559)243-4014 ext 240

>>> "Staples, Rose" <Rose.Staples@hdrinc.com> 11/9/2010 3:42 PM >>>
John Devine asked that I forward to you a copy of the 7.0 Reference Section currently under development for the Don Pedro PAD.

Rose Staples CPS
Executive Assistant
HDR|DTA
970 Baxter Boulevard | Portland ME | 04103
Office: 207-775-4495 | Direct: 207-239-3857 | Fax: 207-775-1742 Email
rose.staples@hdrinc.com

From: Devine, John
Sent: Monday, December 20, 2010 4:50 PM
To: Jessie Raeder
Cc: Robert M. Nees; Greg Dias; Staples, Rose
Subject: Response to TRT Letter of Oct 18, 2010
Attachments: RaederJessie_101220.pdf

Jesse,

Please find attached our response to the TRT's October 18, 2010 letter. A hard copy will follow. Thank you for your considerable interest in the relicensing of the Don Pedro Project. I look forward to working with you and all the members of your relicensing work group.

John Devine, P.E.
Senior Vice President
HDR|DTA
970 Baxter Blvd, Suite 301| Portland, ME | 04103
Office: 207.775.4495 | Fax: 207.775.1742
Cell: 207-776-2206
Durango, CO: 970-385-4995

December 20, 2010

Jessie Raeder
Tuolumne River Trust
c/o Tuolumne River Relicensing Work Group Coordinator
111 New Montgomery Street, Suite 205
San Francisco CA 94105

RE: Response to Request for Information related to preparation of the Pre-Application Document (PAD) for the relicensing of the Don Pedro Project (FERC Project No. 2299)

Dear Mr. Raeder:

In your October 18, 2010 letter regarding the Pre-Application Document (PAD) for the Don Pedro Project, you asked that specific information be included within the PAD or provided separately. The Districts reviewed the request and compared it to the information being compiled for the PAD. The following paragraphs include a discussion regarding the status of the information requested. In some instances, the information will be included in the PAD. If not, the Districts have made an effort to indicate where the information is available. In many instances, the information is already posted on the TID and MID websites located at: www.tid.org and www.mid.org.

(1) A variety of water use and sales-related information was requested, including: water use information (both agricultural and M&I), water pricing, crops grown, anticipated changes in service areas, existing and/or plans for water transfers, as well as groundwater information.

- The PAD will provide general information related to how water is used within the Districts as a source of water supply for a variety of agricultural, urban, and industrial uses.

- At this time, the Districts have taken no action to expand service areas, or enter into water transfers or water sales.

- Current water pricing structures and costs are available on both the TID and MID websites.

- The Districts occupy portions of Stanislaus and Merced counties. The Districts do not have ready access to information on water supplied by others. As a result, the requested information related to residential, municipal, and industrial water use with Stanislaus County should be obtained by contacting local water purveyors directly.

- Both the Turlock and Modesto groundwater sub-basins have groundwater management plans prepared and adopted by local agencies. The plans also provide information on water use within the sub-basins, as well as land use patterns, etc. The plans are available on the TID and MID websites.

(2) A variety of information regarding power generation, electricity sales, contracts, and other issues was requested.

- The Project was designed and is operated to provide water for beneficial uses by the Districts' irrigation, municipal, and industrial customers. Power generation occurs in concert with releases made to satisfy these uses. The PAD will contain a summary of Don Pedro Project power operations, including ownership information. More detailed information regarding power operations for each District can be found in their respective Annual Reports, located on the TID and MID websites.

(3) A variety of information regarding potential water savings and water conservation programs was requested.

- The Districts have a variety of ongoing programs designed to encourage growers to utilize surface water; preserving groundwater for dry year supplies; providing water use information to growers; educating growers on irrigation practices and methods designed to maximize water use efficiency; and funding community irrigation system improvements through low-interest loans and improvement district management.

- Approximately 90 percent of the canals within both Districts have been lined for many years. The majority of the remaining unlined areas are located in upland areas underlain with hard clay soils with very low infiltration rates.

- Information requested regarding residential, municipal and industrial water use efficiency and conservation may be available through the various counties, cities, or urban water agencies.

(4) The October 18, 2010 letter requested the Districts develop and release a water balance model for the Tuolumne River Watershed, and that the model be available at the same time as the PAD.

- A model is being developed for use during relicensing and will be made available to the public as part of the relicensing process.

(5) Information was requested regarding the City and County of San Francisco's (CCSF) water system, how it interacts with TID/MID system facilities, and how it might affect habitat upstream of Don Pedro Reservoir. Information was also requested regarding existing information about potential water savings from the CCSF and its wholesale customers.

- The PAD will provide information regarding the various projects within the Tuolumne River watershed, as it relates to the hydrology, water use and diversions within the watershed. A general description of CCSF's interests in Don Pedro Reservoir will also be provided in the PAD.

- Questions and information requested regarding the impacts of the CCSF's Tuolumne River facilities, and/or potential water savings by CCSF and/or its customers should be directed to CCSF.

(6) Information and studies conducted regarding the proposed Red Mountain Bar Pumped Storage Project was requested to be included in the PAD.

- The Red Mountain Bar Pumped Storage Project is in the early planning stages. If the project is ultimately pursued, it will be the subject of its own FERC licensing process. As a result, information regarding the project will not be included within the Don Pedro Project PAD.

(7) Information was requested regarding tail water returns to the Lower Tuolumne River, especially sources which are using water that originates from TID/MID. Information was also requested regarding undesirable or exotic plants within the lower Tuolumne River.

- The PAD will provide a summary of the water uses served by Don Pedro Reservoir and flows to the lower Tuolumne River. Site-specific agricultural practices on lands served by the District are beyond the scope of relicensing and will not be detailed in the PAD.

- The PAD will provide a summary of information the Districts were able to locate related to environmental resources, habitat, and species found within the Project area and generally within the Tuolumne watershed.

We have also reviewed the list of source information you believe to be relevant to the relicensing process. Many of these sources are cited in the PAD. Of those not mentioned, many are available directly on-line or through FERC. Including your October 18, 2010 letter in the PAD as part of our Consultation Appendix will serve to alert relicensing participants to the existence and content of all the source information you believe is relevant.

We appreciate your interest in the relicensing of the Don Pedro Project and I look forward to working with you.

Sincerely,

John Devine

John J Devine, P.E.
Project Manager

cc: Robert Nees, Turlock Irrigation District
Greg Dias, Modesto Irrigation District

Sacramento Office:
2379 Gateway Oaks Drive
Suite 200
Sacramento, CA 95833
916-564-4214
916-564-4203 (fax)

Conversation Log

Date:	January 3, 2011
Contact Person:	Dr. Bruce McGurk
Organization:	City & County of San Francisco, Hetch Hetchy Water & Power
Phone Number:	(209) 989-2124

Brief Details of Discussion:

B. McGurk returned J. Garza's call, left voicemail message with information about Moccasin Fish Hatchery water supply: CCSF HHWP rule of thumb is that 30 cfs goes to fish hatchery; generally somewhere between 20 and 30 cfs depending on the season. This nominal figure of 30 cfs agrees with the figures taken off of a weekly meter read.

Follow-Up Actions:

	NOTES
☐ **Notify** ______________ ☐ **Contact Core Team ASAP** ☐ **Tickle for** ______________ ☐ **Return Call** X **Other (See Notes)**	For reference

Employee's Name	Jennie Garza, Hydrologist

NOMELLINI, GRILLI & MCDANIEL
PROFESSIONAL LAW CORPORATIONS
235 EAST WEBER AVENUE
POST OFFICE BOX 1461
STOCKTON, CALIFORNIA 95201-1461
TELEPHONE (209) 465-5883
FAX: (209) 465-3956

DANTE JOHN NOMELLINI
DAVID L. GRILLI
DANIEL A. McDANIEL
DANTE JOHN NOMELLINI, JR.

DANTE JOHN NOMELLINI
PROFESSIONAL LAW CORPORATION
DAVID L. GRILLI
PROFESSIONAL LAW CORPORATION
DANIEL A. McDANIEL
PROFESSIONAL LAW CORPORATION

January 28, 2011

Via Facsimile No. (916) 564-4203
and First Class Mail

James Lynch
Don Pedro Relicensing Coordinator
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833

Dear Mr. Lynch:

Pursuant to the Don Pedro Relicensing website this is to advise that the Central Delta Water Agency will be participating in the Don Pedro Relicensing process. Please add the Central Delta Water Agency as a participant to all mailing lists, list serves, and the like.

My contact information is as follows:

Daniel A. McDaniel
Nomellini, Grilli & McDaniel
Professional Law Corporations
235 E. Weber Avenue (95202)
P.O. Box 1461
Stockton, CA 95201-1461
Tel: (209) 465-5883
Fax: (209) 465-3956
Email: damplc@pacbell.net

Thank you for your cooperation in this matter.

Very truly yours,

NOMELLINI, GRILLI & McDANIEL
PROFESSIONAL LAW CORPORATIONS

DANIEL A. McDANIEL

DAM:kk

Staples, Rose

From: Devine, John
Sent: Tuesday, February 01, 2011 9:06 PM
To: Julie Means; rkanz@waterboards.ca.gov; deborah_giglio@fws.gov; Larry Thompson; Richard Wantuck; JEicher@ca.blm.gov; Allison Boucher; Jessie Raeder; cspa@psln.com; mmartin@sti.net; kelly@friendsoftheriver.org; cindy@ccharles.net; jhatch@caltrout.org; 'John Buckley'; eric@tuolumne.org; rrcollins@n-h-i.org; jgantenbein@n-h-i.org; donn.w.furman@sfgov.org; tramirez@sfwater.org; elevin@sfwater.org
Cc: Robert M. Nees; Greg Dias; Staples, Rose; Loy, Carin; Bill Johnston; Joy Warren; Godwin, Arthur F
Subject: Don Pedro Project

Please be advised that we have uploaded a **DRAFT** PAD for the Don Pedro Project onto the website www.donpedro-relicensing.com. We wanted to notify all of you so you have a chance to begin the process of reviewing the PAD. The DRAFT PAD may undergo minor modification as the Districts final review takes place, but any changes should not materially change the content of this uploaded version. Just to be clear, we are not asking for you to comment on this draft PAD. We are just trying to give folks a bit of a head start. The Districts plan to file their NOI and PAD within the next two weeks. After entering the website, click on DOCUMENTS, then scroll down to the draft PAD.

With that in mind, I also wanted to canvass all of you about the potential to have an initial relicensing meeting on February 25. If that date does not work, would either Feb 28 or March 1 work. This meeting would have the following purposes:

[1] Review the relicensing process with a focus on the first year of activities with the goal of setting up a schedule through 2011.
[2] Discuss organizational issues , such as points of contact, communications (with a focus on Section 2 of the PAD), advisability of organizing relicensing participants around resource work groups, and hear your thoughts about how we can bring efficiency to the process.
[3] Receive and discuss any of your initial comments on the PAD.
[4] Discuss your goals for the relicensing.

As you can see, this initial meeting would be more organizational than anything, but we are certainly open to expanding the meeting topics, if that is of interest to this group. I have found that bringing a group of active relicensing participants together early in the process to iron out organizational details can substantially help the entire flow of relicensing. The first year of the process is challenging for all parties, so anything we can do to bring some coordination and efficiency to the process is a plus.

The meeting would be held at HDR|DTA's office in Sacramento, starting at 9:30 AM and possibly extending through lunch which we are willing to provide.

I look forward to working with all of you over the next several years.

John Devine, P.E.
Project Manager
HDR|DTA
970 Baxter Blvd, Suite 301| Portland, ME | 04103
Office: 207.775.4495 | Fax: 207.775.1742
Cell: 207-776-2206
Durango, CO: 970-385-4995

APPENDIX B

LIST OF RELICENSING PARTICIPANTS

APPENDIX B
DON PEDRO RELICENSING PARTICIPANT CONTACT LIST

Name	Agency / Organization	City	State
James Holden		Modesto	CA
John Aud			
Joseph Lein			
Noah Hughes		Modesto	CA
Paul Marko			
Teresa Kinney			
Bob Kornhauser	100% Bass	San Leandro	CA
	All-Outdoors California Whitewater Rafting	Lotus	CA
Craig Sutherland	American Bass	Redondo Beach	CA
	American Rivers	Nevada City	CA
Danny Peluso	Angler's Choice	Waterford	CA
John Sanchez	Badge Packers	Modesto	CA
Art Jensen	Bay Area Water Supply & Conservation Agency	San Mateo	CA
Debbie Stephens	Bethel Assembly of God	Oakdale	CA
	Beyond Limits Adventures, Inc.	Riverbank	CA
Michael Avecilla	CA Correctional Peace Officers Association	Copperopolis	CA
Bill Berryhill	California Assembly	Sacramento	CA
Cathleen Galgiani	California Assembly	Sacramento	CA
Kristin Olsen	California Assembly	Sacramento	CA
Tom Leogrande	California Bass Champs	Greenbrae	CA
Michael Wade	California Farm Water Coalition	Sacramento	CA
George Schaaf	California Landscape Contractors Association	Modesto	CA
Ronn Slay	California Natural Resources Foundation	Atwater	CA
Anthony Cannella	California Senate	Sacramento	CA
Tom Berryhill	California Senate	Sacramento	CA
Chris Shutes	California Sportfishing Protection Alliance	Berkeley	CA
William Jennings	California Sportfishing Protection Alliance	Stockton	CA
Brian Johnson	CalTrout	Berkeley	CA
Ben Willis	CBF	Lodi	CA
	CDBW	Sacramento	CA
	CDFFP	Fresno	CA
Anne Manji	CDFG	Sacramento	CA
Jeffrey Single	CDFG	Fresno	CA
Julie Means	CDFG	Fresno	CA
Robert Hughes	CDFG	Rancho Cordova	CA
Stephen Puccini	CDFG	Sacramento	CA
Tim Heyne	CDFG	La Grange	CA
	CDT	Stockton	CA
Dan McDaniel	CDWA	Stockton	CA
	CDWR	Sacramento	CA
John Buckley	Central Sierra Environmental Resource Center	Twain Harte	CA
Reba Fuller, Spokesperson	Central Sierra Me-Wuk	Tuolumne	CA
	Chicken Ranch Rancheria of Me-Wuk	North Fork	CA
Melissa Powell, Cultural Resources	Chicken Ranch Rancheria of Me-Wuk	Jamestown	CA
David Bickle	Christian Bass League	Turlock	CA
Lorrie Planas	Chuckchansi Tribe Choinumni/Mono	Clovis	CA
City Manager	City of Ceres	Ceres	CA
City Manager	City of Escalon	Escalon	CA
City Manager	City of Hughson	Hughson	CA
City Manager	City of Modesto	Modesto	CA
Nick Pinhey	City of Modesto	Modesto	CA
City Manager	City of Oakdale	Oakdale	CA

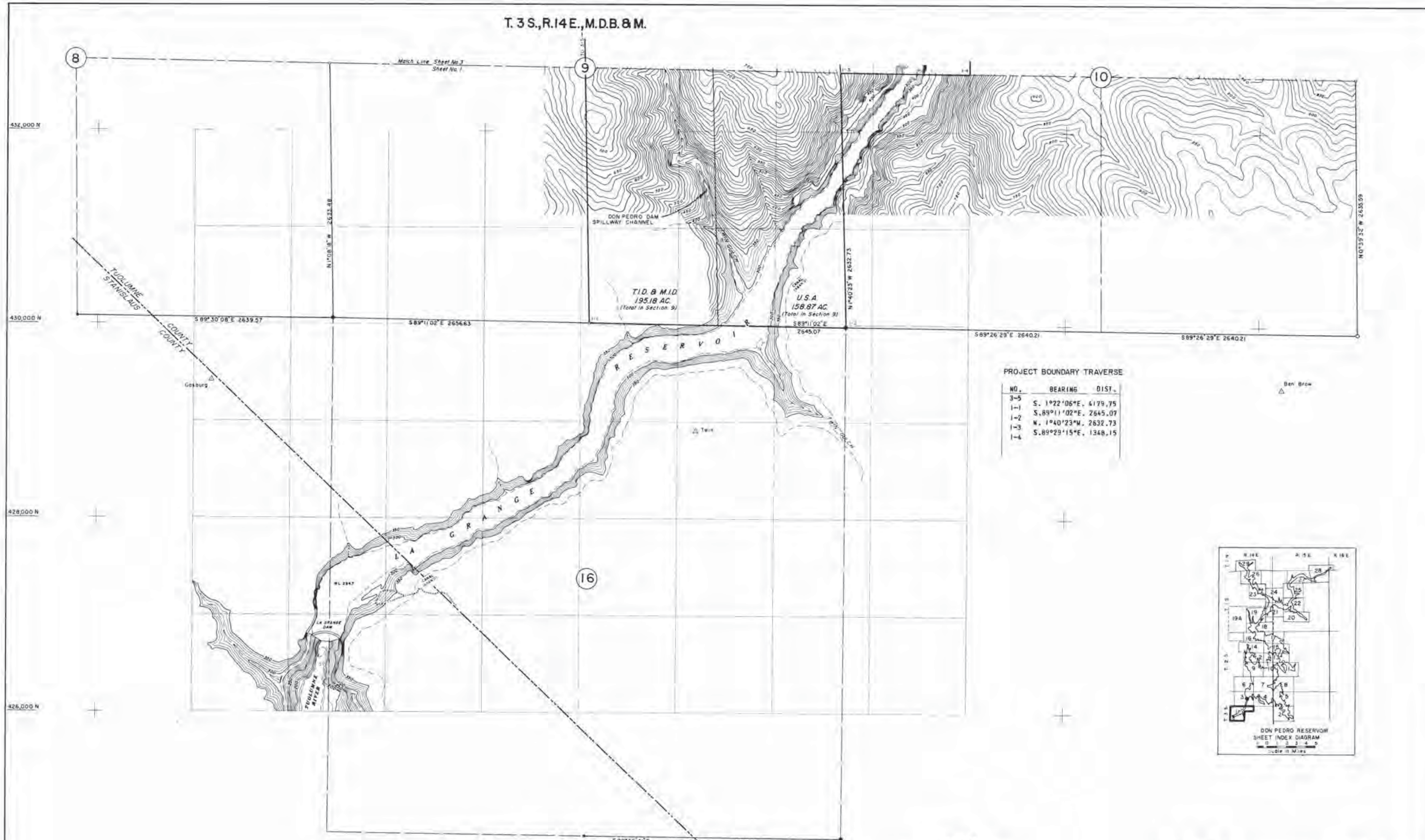
Name	Agency / Organization	City	State
City Manager	City of Patterson	Patterson	CA
City Manager	City of Ripon	Ripon	CA
City Manager	City of Riverbank	Riverbank	CA
City Manager	City of Turlock	Turlock	CA
City Manager	City of Waterford	Waterford	CA
Bill Lyons	CWRMP Citizens Plan Review Committee Chair; Mapes	Modesto	CA
	Delhi County Water District	Delhi	CA
	Denair Community Services District	Denair	CA
	E & J Gallo Winery	Modesto	CA
	Environmental Defense Fund	San Francisco	CA
	Federation of Fly Fishers	Meadow Vista	CA
Regional Director	FEMA	San Francisco	CA
James Hastreiter	FERC	Portland	OR
	Forever Resorts, LLC	Scottsdale	AZ
Marvin W Stewart	Fresno Bass Club	Fresno	CA
Kelly Catlett	Friends of the River		
Ron Stork	Friends of the River	Sacramento	CA
Vincent Harris	Future Pro Tour	Sacramento	CA
Cindy Charles	Golden West Women Flyfishers	San Francisco	CA
Ray McDevitt	Hanson Bridgett	San Francisco	CA
	Hilmar County Water District	Hilmar	CA
Camille Calimlim	House Water & Power Sub Committee		
Kiel Weaver	House Water & Power Sub Committee		
Phil Hill	Jigs Bait and Tackle	La Grange	CA
Phil Rusconi	Kerman Bass Club	Fresno	CA
	Keyes Community Services District	Keyes	CA
Randy Wited	Kings River Bass Club	Reedley	CA
	Kokanee Power	Merced	CA
Don Bays	L B Bass Club	Los Banos	CA
	Lake Don Pedro Marina LLC	La Grange	CA
	Lake Don Pedro Owner's Association	La Grange	CA
Mike Huntzinger	Lake Don Pedro Waterski Club	Fremont	CA
Stephanie Lashkiff	Lake Don Pedro Waterski Club	Discovery Bay	CA
Allen Lagarbo	March of Dimes	Modesto	CA
	Mariah Wilderness Expeditions	Coloma	CA
	Merced County	Merced	CA
	Merced County Farm Bureau	Merced	CA
Garret Nydam	Mid Valley Agriculture Services	Hughson	CA
Jeff Hobbs	Mid Valley Bass	Fresno	CA
Larry Matteson	Mocassin Point Houseboat Owners Association	Morgan Hill	CA
	Moccasin Point Marina, LLC	Jamestown	CA
Bill/Melodie Douglas	Modesto AmBassAdors	Modesto	CA
Steve Tull	Modesto AmBassAdors	Modesto	CA
John Holland	Modesto Bee	Modesto	CA
Judy Sly	Modesto Bee	Modesto	CA
Rodney Irwin	Modesto Elks Lodge 1282	Hughson	CA
Bernice King Tingle	Mountain House Community Services District	Mountain House	CA
Larry Myers	Native American Heritage Commission	Sacramento	CA
Richard Roos-Collins	Natural Heritage Institute	San Francisco	CA
Craig Anderson	NOAA NMFS	Sacramento	CA
Jeff McLain	NOAA NMFS		
Kathryn Kempton	NOAA NMFS	Long Beach	CA
Larry Thompson	NOAA NMFS		
Maria Rea	NOAA NMFS	Sacramento	CA

Name	Agency / Organization	City	State
Monica Gutierrez	NOAA NMFS	Sacramento	CA
Rhonda Reed	NOAA NMFS		
Rick Wantuck	NOAA NMFS		
Steve Edmonson	NOAA NMFS	Santa Rosa	CA
Judy Fink, Tribal Chairperson	North Fork Mono Rancheria	North Fork	CA
Ron Goode, Chairperson	North Fork Mono Tribe	Clovis	CA
Delores Roberts, Chairperson	North Fork Rancheria	North Fork	CA
Diana Wilson	Northern California Bass Federation	Modesto	CA
	NPS		
	O.A.R.S.	Angels Camp	CA
Milford Wayne Donaldson	Office of Historic Preservation	Sacramento	CA
Robert Mansor	Poe Mans	La Grange	CA
	Protect Our Waters	Modesto	CA
	Protect Our Waters	Sacramento	CA
	Riverbank Bass Anglers	Oakdale	CA
Jerry Jackman	SAM	Modesto	CA
Manual Lopez	San Joaquin County	Stockton	CA
	San Joaquin Raptor/Wildlife Rescue Center	Merced	CA
Kellie Donnelly	Senate Energy Committee		
Tanya Trujillo	Senate Energy Committee		
Donn W Furman	SFPUC	San Francisco	CA
Ellen Levin	SFPUC	San Francisco	CA
Michael Carlin	SFPUC	Sacramento	CA
Steve Ritchie	SFPUC	San Francisco	CA
Tim Ramirez	SFPUC	Sacramento	CA
William Sears	SFPUC	Sacramento	CA
Ray Woodward	Sierra Bass Club	Clovis	CA
	Sierra Club	Sacramento	CA
	Sierra Club	Modesto	CA
Jim James	Sonora Bass Anglers	Tuolumne	CA
Les James, Spiritual Leader	Southern Sierra Miwuk Nation	Mariposa	CA
William Huang	Spiegel & McDiarmid	Washington	DC
Rick Robinson	Stanislaus County	Modesto	CA
Tom Orvis	Stanislaus County Farm Bureau	Modesto	CA
Wayne Zipser	Stanislaus County Farm Bureau	Modesto	CA
	Stanislaus County Library	Turlock	CA
	Stanislaus County Library	Modesto	CA
Derald Lahti	Stanislaus Fly Fishers	Modesto	CA
Russ Kanz	SWRCB	Sacramento	CA
Jeff Harrington	Taft Bass	Bakersfield	CA
	The Honorable Barbara Boxer	Washington	DC
	The Honorable Dennis Cardoza	Washington	DC
	The Honorable Diane Feinstein	Washington	DC
	The Honorable Jeff Denham	Washington	DC
	The Honorable Jim Costa	Washington	DC
	The Merced Sun-Star	Merced	CA
John/Marcia Eblen	The Scuttlebutt Newsletter	Manteca	CA
	The Turlock Journal	Turlock	CA
	The Union Democrat	Sonora	CA
Laura Jensen	TNC	Sacramento	CA
M Weber	TNC	Sacramento	CA
Balvino Ipizappy	Trust	Modesto	CA
	TUD	Sonora	CA
Kevin Day, Chairperson	Tuolumne Band of Me-Wuk Indians	Tuolumne	CA

Name	Agency / Organization	City	State
	Tuolumne County	Sonora	CA
	Tuolumne County Library	Sonora	CA
	Tuolumne River Alliance of Property Owners	Waterford	CA
Allison & Dave Boucher	Tuolumne River Conservancy	Bend	OR
Eric Wesselman	Tuolumne River Trust	San Francisco	CA
Jessie Raeder	Tuolumne River Trust	San Francisco	CA
Patrick Koepele	Tuolumne River Trust	Sonora	CA
David S Linkard	Tuolumne River Trust & Riverdale Homeowners	Modesto	CA
Tini Horn	Tuolumne River Trust & Riverdale Homeowners	Modesto	CA
Bill Hutcheson	U S Angler's Choice	Brentwood	CA
Danny Peluso	US Angler's Choice	Brentwood	CA
Regional Office	US BIA	Sacramento	CA
James Eicher	US BLM, Region 4	El Dorado Hills	CA
Don Glaser, Regional Director	US BOR	Sacramento	CA
Regional Director	US EPA	San Francisco	CA
Marty Eisenmann	USCOE	Sacramento	CA
Deb Giglio	USFWS	Sacramento	CA
Kerry O'Hara	USFWS	Sacramento	CA
Michelle Workman	USFWS	Stockton	CA
Zac Jackson	USFWS	Stockton	CA
	USGS	Sacramento	CA
	Wasco Bass Club	Bakersfield	CA
Stanley Kulak	West Coast Fishing Tournaments	Lakehead	CA
Bill Hutcheson	Won Bass	San Clemente	CA
	Zephyr Whitewater Expeditions	Columbia	CA

APPENDIX C

PROJECT BOUNDARY MAPS



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
3-5	S. 1°22'06"E.	4179.75
1-1	S.89°11'02"E.	2645.07
1-2	N. 1°40'23"W.	2632.73
1-3	S.89°29'15"E.	1348.15
1-4		

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL, INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000

Contour interval 10 Feet
Datum is Mean Sea Level
COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

2,014,000 E
2,016,000 E
2,018,000 E
2,020,000 E
2,022,000 E
2,024,000 E

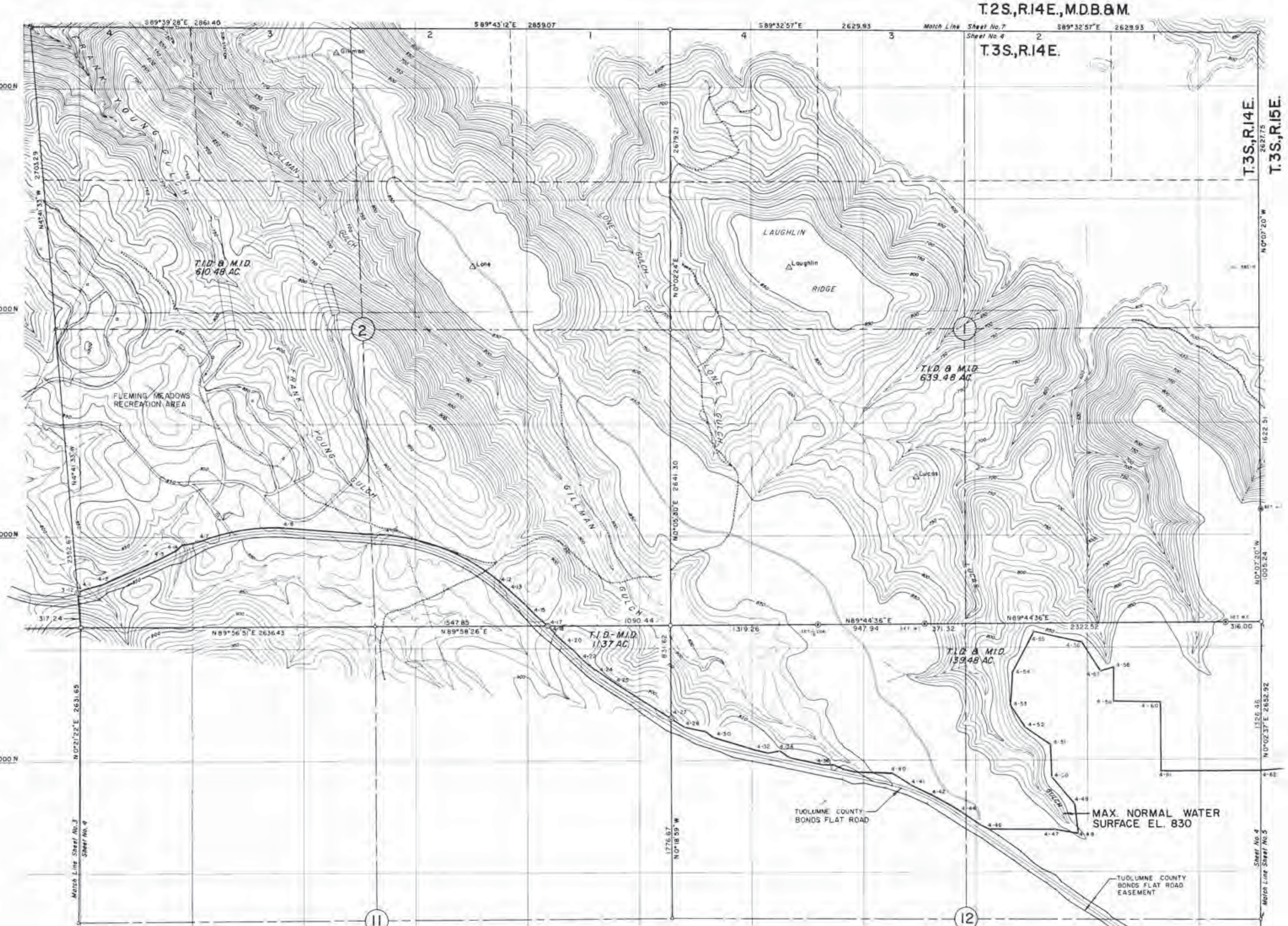
EXHIBIT K SHEET 1

PROJECT NO. 2299 CALIFORNIA
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
DON PEDRO RESERVOIR
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

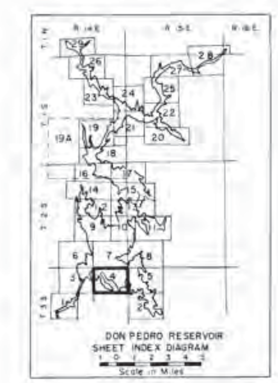
2299-85

2299-85



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
3-12	N.67°56'08"E.	52.79	4-28	S.77°40'00"E.	198.12
4-1	N.76°13'35"E.	193.43	4-29	S.54°44'07"E.	99.16
4-2	N.66°00'00"E.	550.00	4-30	S.73°24'18"E.	293.13
4-3	N.62°11'10"E.	150.33	4-31	S.72°07'22"E.	100.50
4-4	N.46°20'45"E.	74.33	4-32	S.77°50'00"E.	100.00
4-5	N.79°21'43"E.	135.32	4-33	N.80°21'55"E.	107.70
4-6	N.74°30'07"E.	51.42	4-34	S.56°01'55"E.	107.70
4-7	NON-TANGENT CURVE △=23°52'24" RT. R=1840.00 L=766.67 CHORD N.81°39'17"E. 761.14		4-35	S.77°50'00"E.	300.00
			4-36	S.89°08'36"E.	101.98
			4-37	S.66°31'25"E.	101.98
			4-38	S.77°50'00"E.	100.00
4-8	S.86°10'04"E.	800.25	4-39	S.87°11'11"E.	332.45
4-9	S.88°49'24"E.	100.94	4-40	S.57°51'03"E.	188.48
4-10	S.80°42'13"E.	102.47	4-41	S.65°51'01"E.	204.68
4-11	NON-TANGENT CURVE △=31°49'52" RT. R=1840.00 L=1022.22 CHORD S.65°59'32"E. 1009.12		4-42	S.60°52'55"E.	204.34
			4-43	S.58°57'18"E.	102.09
			4-44	S.55°00'00"E.	200.00
			4-45	S.63°31'51"E.	101.12
4-12	S.51°16'53"E.	102.47	4-46	S.89°52'53"E.	589.34
4-13	S.46°50'01"E.	200.05	4-47	S.78°58'00"E.	208.87
4-14	S.43°58'15"E.	100.12	4-48	N. 7°17'00"W.	268.16
4-15	S.46°50'00"E.	100.00	4-49	N.40°12'00"W.	312.93
4-16	S.49°41'45"E.	76.03	4-50	N. 2°10'00"W.	291.21
4-17	S.49°41'45"E.	24.10	4-51	N.55°32'00"W.	266.84
4-18	S.43°58'15"E.	100.12	4-52	N.34°05'00"W.	246.29
4-19	S.46°50'00"E.	100.00	4-53	N. 4°37'00"E.	285.93
4-20	S.49°41'45"E.	100.12	4-54	N.26°38'00"E.	408.31
4-21	S.43°58'15"E.	100.12	4-55	S.77°37'00"E.	447.42
4-22	S.47°35'14"E.	98.46	4-56	S.32°29'15"E.	297.68
4-23	S.56°28'44"E.	98.00	4-57	N.74°54'00"E.	123.19
4-24	S.55°20'34"E.	195.15	4-58	S. 0°00'40"E.	306.49
4-25	S.56°14'04"E.	200.06	4-59	N.89°59'10"E.	420.00
4-26	S.57°30'56"E.	364.05	4-60	S. 0°00'40"E.	622.29
4-27	S.57°30'56"E.	133.28	4-61	N.89°59'10"E.	897.98
4-28			4-62		



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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH DAY OF AUGUST 1974

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
R. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R.E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

PROJECT BOUNDARY
FOUND CORNER
FOUND CORNER, SET PIPE
PROPORTIONED CORNER, SET PIPE
MONUMENT SET ON PROJECT BOUNDARY
PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K　SHEET 4

PROJECT NO. 2299　CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

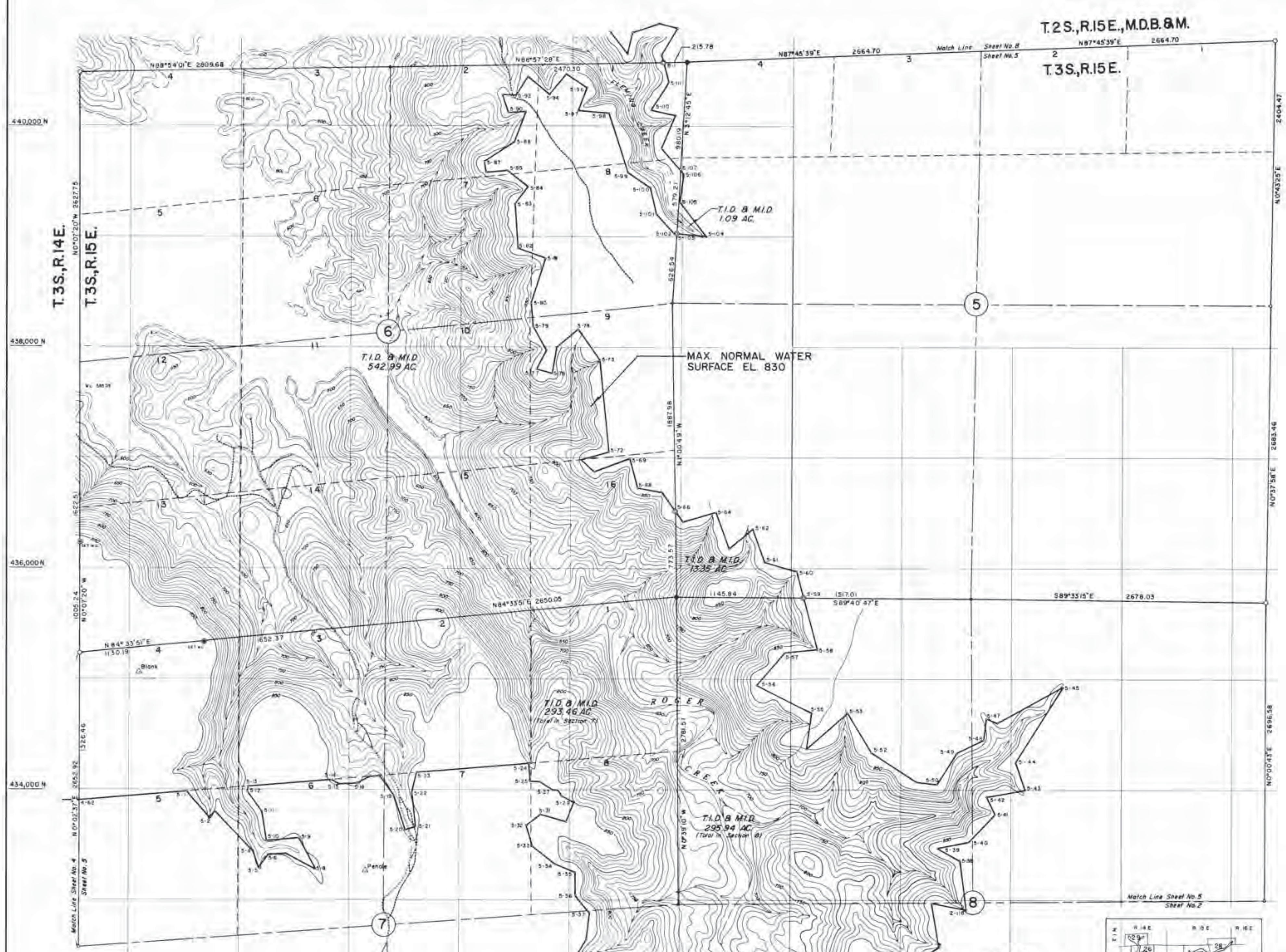
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-88

2299-88

4



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
4-62	N.85°15'04"E.	983.09
5-1	S.41°43'00"E.	318.87
5-2	N.39°30'00"E.	73.88
5-3	S.43°37'00"E.	498.65
5-4	S.19°02'00"E.	150.22
5-5	N.38°36'00"E.	145.87
5-6	N.86°19'00"E.	155.32
5-7	S.62°31'00"E.	305.49
5-8	N.28°11'00"W.	317.65
5-9	S.85°57'00"W.	296.74
5-10	N. 8°29'00"W.	270.97
5-11	N.37°28'45"W.	226.78
5-12	N.14°42'00"E.	41.55
5-13	N.85°15'04"E.	759.26
5-14	S.60°21'00"E.	68.82
5-15	N.89°20'00"E.	170.01
5-16	N.62°50'15"E.	133.74
5-17	N.85°15'04"E.	82.35
5-18	S.36°06'30"E.	225.84
5-19	S.18°47'00"E.	322.55
5-20	N.71°12'00"E.	99.30
5-21	N. 6°51'00"W.	302.15
5-22	N.13°27'00"E.	189.16
5-23	N.85°15'23"E.	1016.39
5-24	S. 3°32'03"E.	155.65
5-25	S.86°26'11"E.	90.30
5-26	S.56°16'19"E.	144.06
5-27	NON-TANGENT CURVE △ =94°39'57" RT. R=60.00 L=99.13 CHORD S.57°19'58"E.	88.24
5-28	S.61°44'19"E.	132.57
5-29	S.21°59'21"W.	190.44
5-30	N.72°30'26"W.	239.66
5-31	S.52°09'06"W.	161.44
5-32	S.16°07'38"E.	198.15
5-33	S.51°51'42"E.	271.45
5-34	S.68°05'51"E.	191.12
5-35	S. 0°32'42"E.	210.32
5-36	S.39°27'30"E.	198.10
5-37		
2-118	N. 7°40'00"W.	450.02
5-38	N.61°13'00"W.	230.49
5-39	N.78°34'00"E.	287.70
5-40	N.43°57'00"E.	345.63
5-41	N.25°51'00"W.	178.90
5-42	N.80°31'00"E.	351.81
5-43	N.19°19'00"W.	269.14
5-44	N.32°29'00"E.	802.55
5-45	S.61°42'00"W.	676.95
5-46	N.69°07'00"W.	103.82
5-47	S. 7°45'00"W.	192.76
5-48	S.63°15'00"W.	273.25
5-49	S.32°36'00"W.	335.93
5-50	N.83°23'00"W.	182.21
5-51	N.56°36'00"W.	495.90
5-52	N.31°36'00"W.	412.14
5-53		

NO.	BEARING	DIST.
5-53	S.48°46'00"W.	496.04
5-54	N. 7°54'00"E.	327.11
5-55	N.62°50'00"W.	556.36
5-56	N.40°50'00"E.	389.94
5-57	N.83°46'00"E.	294.74
5-58	N.15°14'00"W.	479.00
5-59	N.15°14'00"W.	247.39
5-60	N.73°55'00"W.	302.97
5-61	N.20°18'00"W.	319.88
5-62	S.49°43'00"W.	275.29
5-63	N.19°56'00"W.	343.54
5-64	S.74°29'15"W.	310.38
5-65	N.34°54'00"W.	116.06
5-66	N.34°54'00"W.	214.34
5-67	N.80°37'00"W.	227.00
5-68	N.14°36'00"W.	273.84
5-69	S.69°33'00"W.	340.47
5-70	N.49°44'00"W.	162.48
5-71	N.72°48'00"E.	263.80
5-72	N. 5°42'00"W.	826.08
5-73	N.35°18'00"W.	344.33
5-74	S.50°36'00"W.	253.65
5-75	S.10°13'00"W.	236.76
5-76	N.75°12'00"W.	144.81
5-77	N.28°34'00"E.	192.42
5-78	N.28°44'00"W.	247.49
5-79	N. 6°12'00"W.	213.24
5-80	N.17°46'00"E.	429.47
5-81	N.71°14'00"W.	267.22
5-82	N. 4°15'00"W.	404.12
5-83	N.38°06'00"E.	194.45
5-84	N.51°23'00"W.	241.91
5-85	S.85°44'00"W.	188.52
5-86	N. 9°22'00"W.	98.31
5-87	N.56°54'00"E.	318.69
5-88	N.21°09'00"E.	293.79
5-89	S.87°50'00"W.	158.11
5-90	N.20°33'00"W.	170.88
5-91	S.86°52'00"E.	128.19
5-92	N.29°34'00"E.	196.60
5-93	S.50°19'00"E.	252.11
5-94	N.40°39'00"E.	242.53
5-95	S.55°54'00"E.	231.87
5-96	S.21°07'00"W.	216.54
5-97	S.85°39'00"E.	276.80
5-98	S.17°52'00"E.	567.34
5-99	S.55°32'00"E.	247.42
5-100	S.13°03'00"E.	239.18
5-101	S.42°06'00"E.	240.02
5-102	S.84°35'00"E.	27.43
5-103	S.84°35'00"E.	268.90
5-104	N.37°20'00"W.	392.40
5-105	N. 7°48'15"E.	257.32
5-106	N.41°15'00"W.	48.86
5-107	N.41°15'00"W.	265.06
5-108	N.23°36'00"E.	319.74
5-109	N.77°17'00"W.	231.68
5-110	N.32°37'45"E.	300.42
5-111	N.15°40'00"W.	185.32
8-1		

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John B. Duff
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L.S. 2244, CALIFORNIA

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TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R.E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

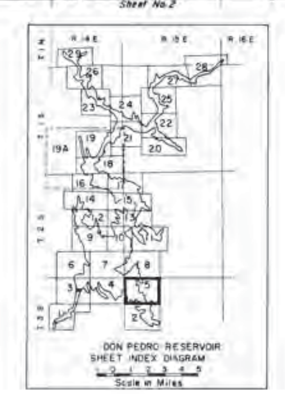


EXHIBIT K SHEET 5

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

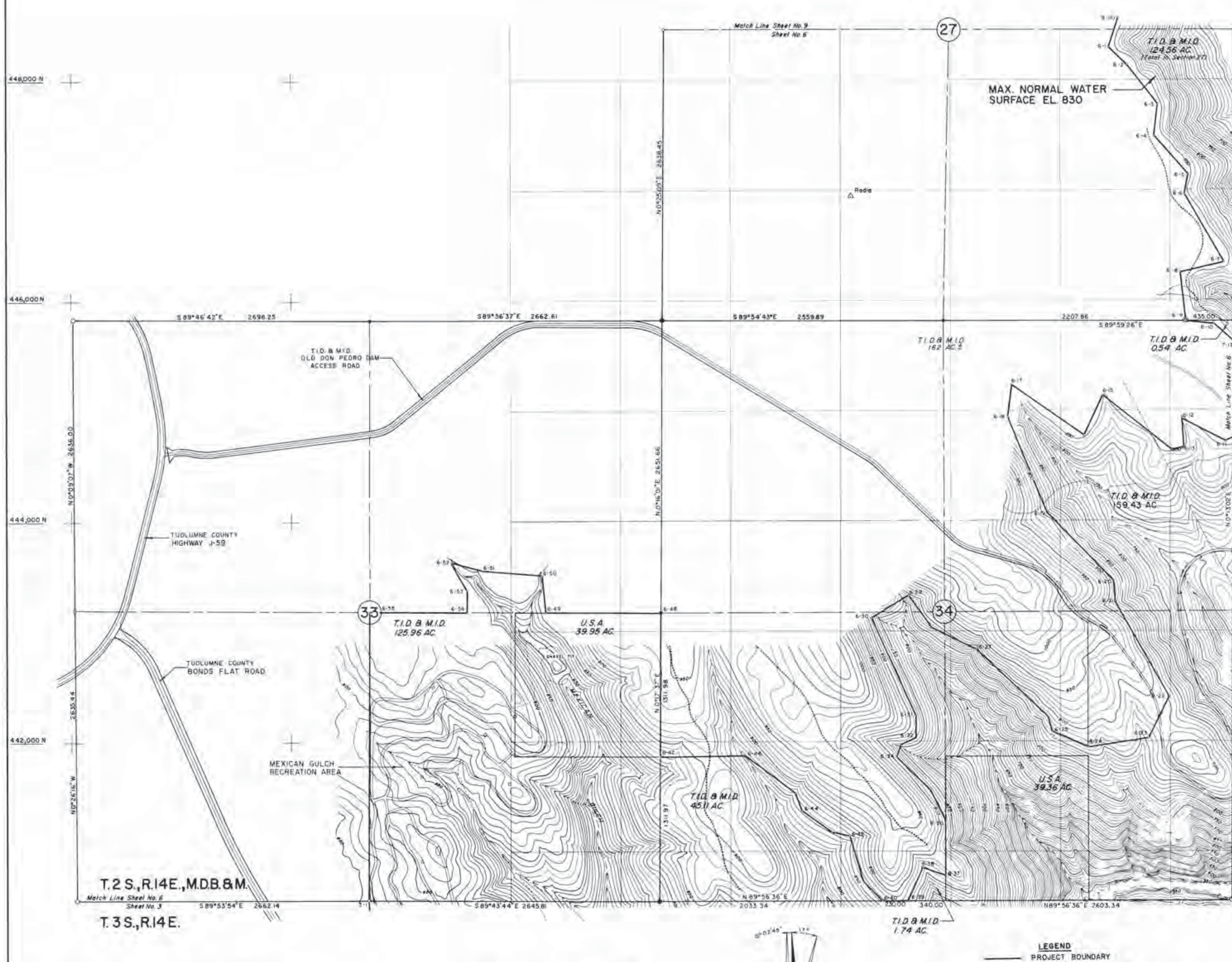
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

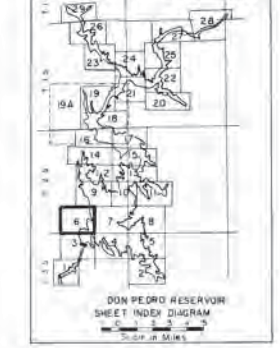
2299-89

2299-89

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
9-110	S.18°54'00"W.	274.81	6-28	N.35°12'00"W.	357.35
6-1	S.45°21'00"E.	236.18	6-29	S.58°41'00"W.	394.45
6-2	S.38°28'00"E.	446.97	6-30	S.24°29'00"E.	972.44
6-3	S. 5°51'00"W.	294.53	6-31	S. 0°17'00"W.	201.00
6-4	S.41°19'00"E.	472.62	6-32	S.65°39'00"W.	150.37
6-5	S.11°26'00"W.	176.50	6-33	S.16°39'00"W.	122.12
6-6	S.30°09'00"E.	714.71	6-34	S.46°04'00"E.	420.21
6-7	S.76°36'00"W.	410.15	6-35	S.25°52'00"E.	312.37
6-8	S. 6°44'00"E.	440.90	6-36	S. 0°11'31"E.	504.00
6-9	S.83°59'00"E.	249.68	6-37	N.69°35'00"W.	219.47
6-10	S.48°33'00"E.	248.12	6-38	S.23°31'00"W.	334.70
7-13			6-39	S.89°56'36"W.	230.00
7-18	S.65°28'00"W.	79.81	6-40	N.44°34'00"W.	248.61
6-11	N.62°38'00"W.	443.68	6-41	N.17°27'00"W.	440.25
6-12	S. 3°34'00"E.	257.50	6-42	N.79°27'00"W.	163.77
6-13	S.78°23'00"W.	109.24	6-43	N.53°53'00"W.	334.23
6-14	N.51°39'00"W.	805.87	6-44	N.20°17'00"W.	167.37
6-15	S.25°02'00"W.	403.98	6-45	N.53°16'00"W.	570.20
6-16	N.54°52'00"W.	800.97	6-46	S.89°05'58"W.	774.24
6-17	S. 6°49'00"W.	295.08	6-47	N. 0°17'37"E.	1311.98
6-18	S.22°22'00"E.	946.16	6-48	N.89°41'32"W.	1050.00
6-19	S.44°21'00"E.	862.73	6-49	N. 5°22'00"W.	338.06
6-20	S. 3°26'00"E.	183.33	6-50	N.85°18'45"W.	546.88
6-21	S.29°40'00"E.	1000.00	6-51	N.75°16'00"W.	294.65
6-22	S.26°53'11"W.	418.32	6-52	S.29°58'00"E.	294.31
6-23	S.81°30'00"W.	554.05	6-53	SOUTH	197.72
6-24	N.66°55'00"W.	354.33	6-54	N.89°41'32"W.	890.19
6-25	N.16°10'00"W.	143.68	6-55	S. 0°05'51"W.	2625.67
6-26	N.47°07'00"W.	896.52	3-1		
6-27	N.64°07'00"W.	453.51			
6-28					





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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 6

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-90

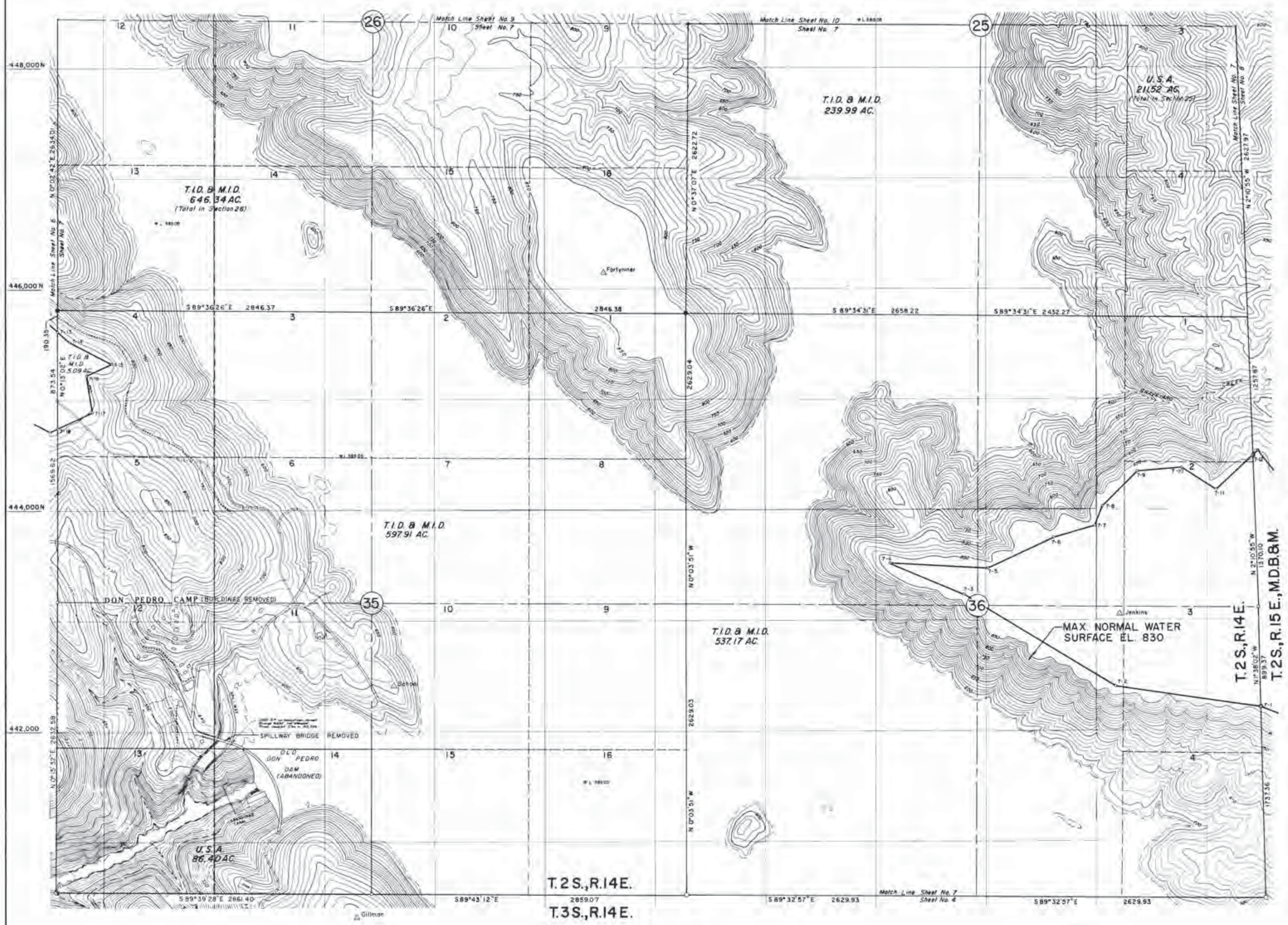
Trim Line

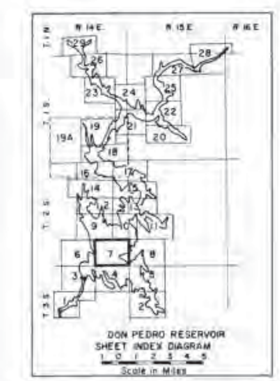
2299-90

6

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
7-1	N.81°39'00"W.	1333.51	7-7	N.21°01'00"E.	189.61
7-2	N.58°54'00"W.	1601.12	7-8	N.45°22'00"E.	446.90
7-3	N.67°29'00"W.	728.54	7-9	N.85°07'00"E.	399.45
7-4	S.86°59'00"E.	892.24	7-10	S.57°37'00"E.	375.35
7-5	N.64°48'00"E.	655.35	7-11	N.46°49'00"E.	449.23
7-6	N.74°17'00"E.	387.50	7-12		
7-7			7-13	S.48°33'00"E.	140.12
			7-14	S.61°44'00"E.	434.89
			7-15	S.66°18'00"W.	251.20
			7-16	S. 9°40'00"E.	333.73
			7-17	S.65°28'00"W.	348.89
			7-18		





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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH DAY OF AUGUST 1974

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 7

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

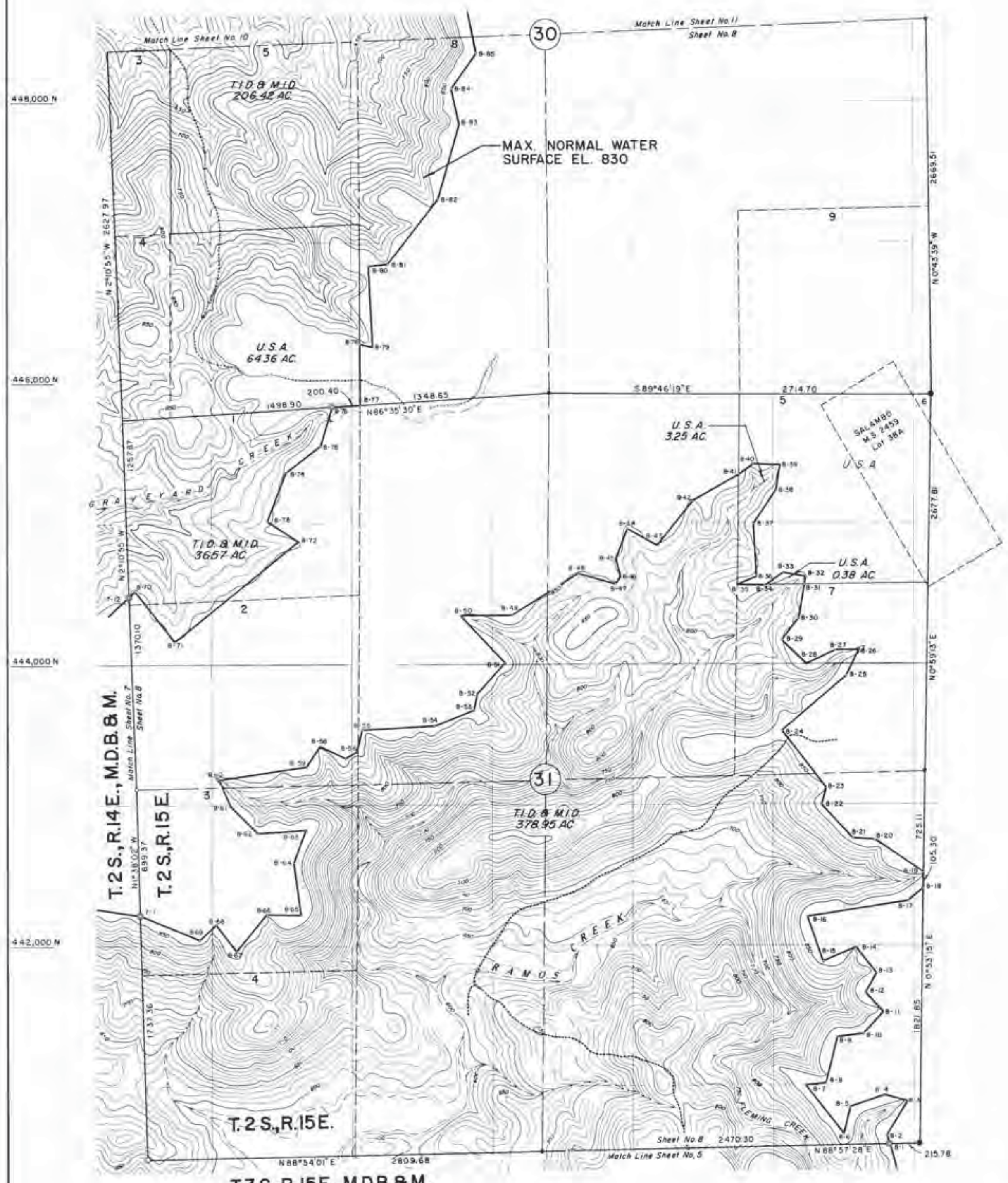
DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-91

2299 — 91

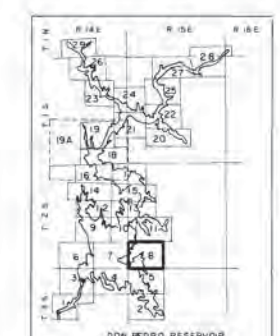


T.3S., R.15E., M.D.B. & M.

2,038,000 E | 2,040,000 E | 2,042,000 E

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
8-1	N.15°40'00"W.	70.17	8-44	S.21°02'00"W.	222.85
8-2	N.32°16'00"E.	279.10	8-45	S.12°58'00"E.	129.29
8-3	N.74°36'00"W.	173.22	8-46	S.35°44'00"W.	70.21
8-4	S.70°08'00"W.	253.06	8-47	N.73°39'00"W.	269.92
8-5	S.14°49'00"W.	195.50	8-48	S.58°06'00"W.	561.91
8-6	N.37°52'00"W.	438.27	8-49	N.89°32'00"W.	365.01
8-7	N.82°35'00"E.	147.23	8-50	S.42°43'00"E.	459.99
8-8	N.13°52'00"E.	333.73	8-51	S.41°43'00"W.	296.06
8-9	N.82°26'00"E.	189.65	8-52	S.11°07'00"W.	114.14
8-10	N.41°16'00"E.	206.21	8-53	S.68°23'00"W.	301.20
8-11	N.41°56'00"W.	185.53	8-54	S.86°27'00"W.	516.99
8-12	N.28°47'00"E.	162.01	8-55	S.14°59'00"W.	162.52
8-13	N.39°03'00"W.	231.77	8-56	S.61°17'00"W.	83.24
8-14	S.67°06'00"W.	251.85	8-57	N.64°28'00"W.	199.49
8-15	N.19°49'00"W.	339.10	8-58	S.34°33'00"W.	183.35
8-16	N.80°56'00"E.	716.96	8-59	S.81°59'30"W.	632.16
8-17	N.53°29'00"E.	147.92	8-60	S.23°19'00"E.	204.71
8-18	N. 0°53'15"E.	105.30	8-61	S.46°02'00"E.	273.68
8-19	N.54°29'00"W.	419.59	8-62	N.87°10'00"E.	343.42
8-20	N.87°06'00"W.	158.20	8-63	S.21°30'00"W.	248.28
8-21	N.43°08'00"W.	324.74	8-64	S. 8°01'00"E.	372.65
8-22	N.14°35'00"E.	127.08	8-65	N.89°02'00"W.	238.03
8-23	N.37°58'00"W.	513.69	8-66	S.39°20'00"W.	336.11
8-24	N.49°45'00"E.	606.69	8-67	N.38°55'00"W.	240.35
8-25	N.25°26'00"E.	204.86	8-68	S.47°31'00"W.	161.38
8-26	S.88°19'00"W.	170.07	8-69	N.67°55'15"W.	452.80
8-27	S.64°59'00"W.	231.74	7-1		
8-28	N.45°20'00"W.	241.83	7-12	N.46°49'00"E.	65.09
8-29	N.37°50'30"E.	198.82	8-70	S.37°33'00"E.	457.83
8-30	N. 9°56'00"E.	242.10	8-71	N.51°15'00"E.	1129.61
8-31	N. 9°56'00"E.	59.42	8-72	N.57°20'00"W.	264.91
8-32	N.81°28'00"W.	161.80	8-73	N.21°50'00"E.	379.19
8-33	S.56°55'00"W.	155.62	8-74	N.52°39'00"E.	308.21
8-34	S.89°30'30"W.	196.00	8-75	N.15°47'00"E.	286.30
8-35	N.67°15'00"E.	148.97	8-76	N.86°35'30"E.	200.40
8-36	N. 3°28'00"W.	379.70	8-77	N. 0°14'36"W.	437.00
8-37	N.33°38'00"E.	287.06	8-78	S.77°05'00"E.	95.00
8-38	N. 9°08'00"E.	176.24	8-79	N. 2°20'00"W.	580.40
8-39	N.87°01'45"W.	192.27	8-80	N.85°40'00"E.	132.38
8-40	S.55°45'00"W.	118.93	8-81	N.37°55'00"E.	584.30
8-41	S.60°19'00"W.	382.08	8-82	N.16°06'00"E.	566.20
8-42	S.38°04'00"W.	405.02	8-83	N.13°12'00"W.	249.60
8-43	N.61°21'00"W.	233.60	8-84	N.35°36'00"E.	303.87
8-44			8-85		



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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K — SHEET 8

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

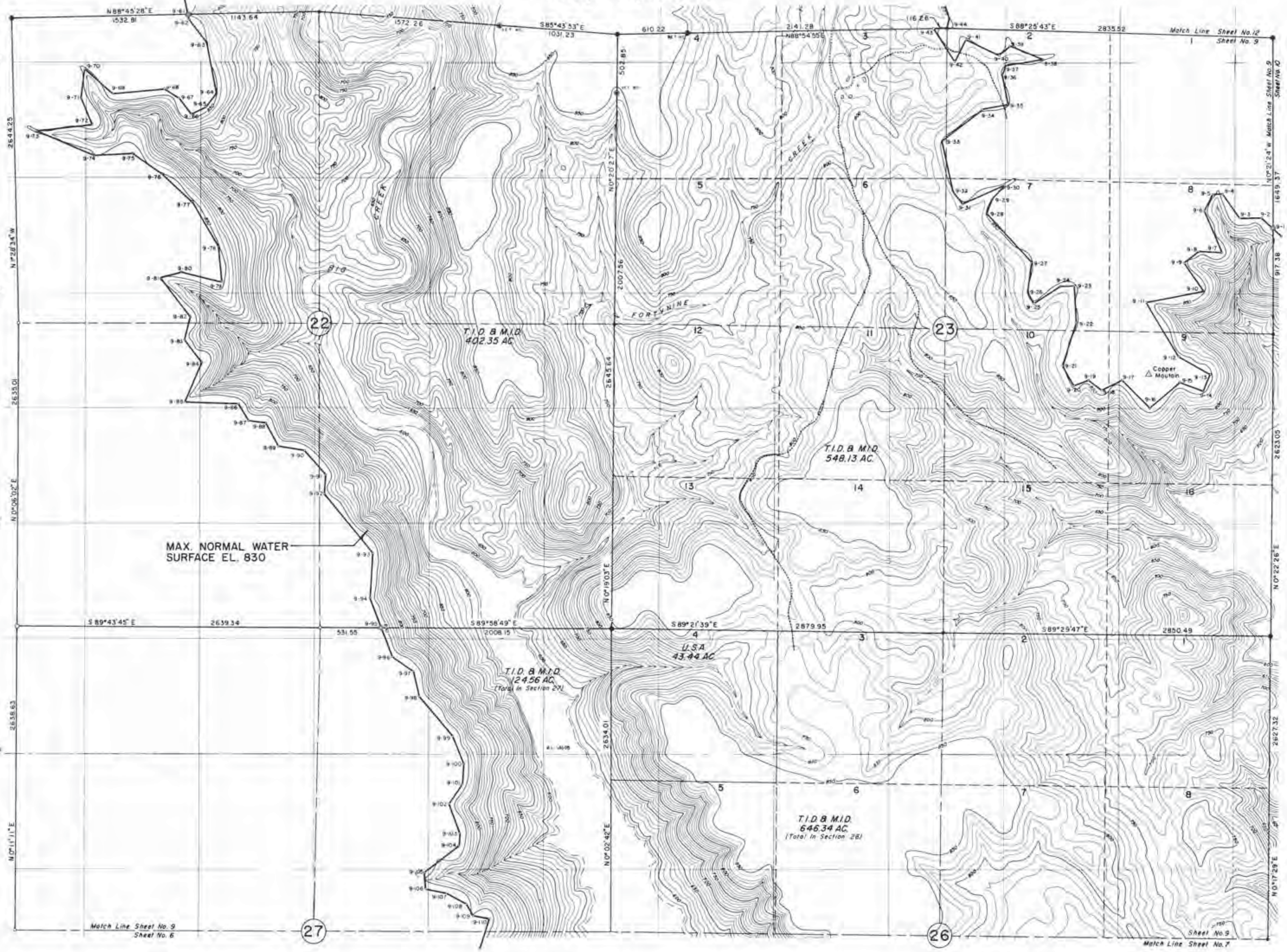
2299-92

Trim Line

8

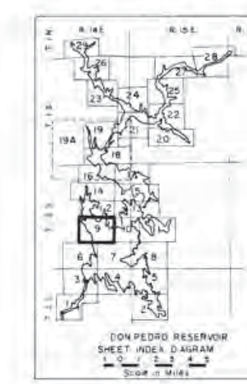
2299-92

T. 2 S., R.14 E., M.D.B.& M.



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
9-1	N.47°37'00"W.	134.60	9-56	NOT USED	
9-2	S.88°47'00"W.	188.04	9-57		
9-3	N.35°59'00"W.	257.03	9-58		
9-4	N.86°11'00"W.	90.20	9-59		
9-5	S.26°06'00"W.	165.92	9-60		
9-6	S.22°57'00"E.	397.47	9-61	S.12°08'00"E.	38.92
9-7	N.86°15'00"W.	198.43	9-62	S.38°21'00"E.	256.28
9-8	S.52°39'00"W.	164.81	9-63	S.10°53'00"E.	445.00
9-9	S.34°39'00"E.	299.03	9-64	S.35°05'00"W.	147.87
9-10	S.79°11'00"W.	506.00	9-65	S.64°17'00"W.	149.83
9-11	S.31°01'00"E.	553.08	9-66	N.35°55'00"W.	179.03
9-12	S.60°49'00"E.	313.82	9-67	N.59°34'00"W.	146.12
9-13	S.23°40'00"W.	159.41	9-68	S.84°55'00"W.	450.78
9-14	N.69°38'00"W.	215.47	9-69	N.48°52'00"W.	325.30
9-15	S.48°45'00"W.	345.81	9-70	S. 7°24'00"W.	256.14
9-16	N.44°53'00"W.	344.36	9-71	S.21°40'00"E.	251.80
9-17	S.62°54'00"W.	193.20	9-72	S.83°36'00"W.	485.02
9-18	N.52°54'00"W.	149.20	9-73	S.67°28'00"E.	540.23
9-19	S.66°51'00"W.	134.85	9-74	N.87°49'00"E.	341.25
9-20	N.29°29'00"W.	211.36	9-75	S.54°50'00"E.	310.74
9-21	N.18°04'00"E.	387.07	9-76	S.48°12'00"E.	354.11
9-22	N. 3°23'00"W.	322.56	9-77	S.29°58'00"E.	460.54
9-23	S.86°17'00"W.	123.26	9-78	S. 6°00'00"E.	296.62
9-24	S.56°29'00"W.	273.47	9-79	N.77°05'00"W.	362.17
9-25	N.29°26'00"W.	115.97	9-80	S.73°13'00"W.	186.97
9-26	N. 7°46'00"E.	261.35	9-81	S.37°48'00"E.	422.65
9-27	N.42°54'00"W.	578.80	9-82	S.13°54'00"W.	203.97
9-28	N.20°53'00"E.	140.22	9-83	S.36°55'00"E.	251.40
9-29	N.42°09'00"E.	156.46	9-84	S.23°20'00"W.	373.57
9-30	S.65°35'00"W.	394.27	9-85	S.87°47'00"E.	464.35
9-31	N.38°11'00"W.	148.84	9-86	S.31°34'00"E.	164.30
9-32	N.12°22'00"W.	439.18	9-87	S.82°14'00"E.	155.43
9-33	N.52°09'00"E.	443.27	9-88	S.28°53'00"E.	231.85
9-34	N.78°38'00"E.	228.48	9-89	S.81°02'00"E.	230.82
9-35	N.12°14'00"W.	254.79	9-90	S.41°56'00"E.	278.29
9-36	N.21°13'00"E.	91.18	9-91	S. 4°04'00"W.	169.43
9-37	N.80°29'00"E.	333.40	9-92	S.39°26'00"E.	664.27
9-38	N.68°52'00"W.	316.26	9-93	S. 4°08'00"W.	389.01
9-39	S.48°24'00"W.	119.00	9-94	S.21°40'00"E.	286.40
9-40	N.65°27'00"W.	317.72	9-95	S.21°40'00"E.	263.45
9-41	S.27°18'00"W.	211.55	9-96	S.55°36'00"E.	223.01
9-42	N.32°58'00"W.	341.01	9-97	S.12°38'00"E.	226.54
9-43	N.88°54'55"E.	116.26	9-98	S.41°01'00"E.	447.97
9-44			9-99	S.21°16'00"E.	261.84
9-45	NOT USED		9-100	S. 2°18'00"W.	174.14
9-46			9-101	S.35°08'00"W.	210.30
9-47			9-102	S.20°50'00"E.	272.83
9-48			9-103	S. 5°12'00"W.	110.45
9-49			9-104	S.53°06'00"W.	371.40
9-50			9-105	S. 3°52'00"E.	148.34
9-51			9-106	S.76°38'00"E.	186.04
9-52			9-107	S.62°38'00"E.	191.43
9-53			9-108	S.32°24'00"E.	123.17
9-54			9-109	S.79°00'00"E.	146.70
9-55			9-110		



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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

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TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R. E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'

400 0 400 800 1200 1600 2000

Contour interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 9

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

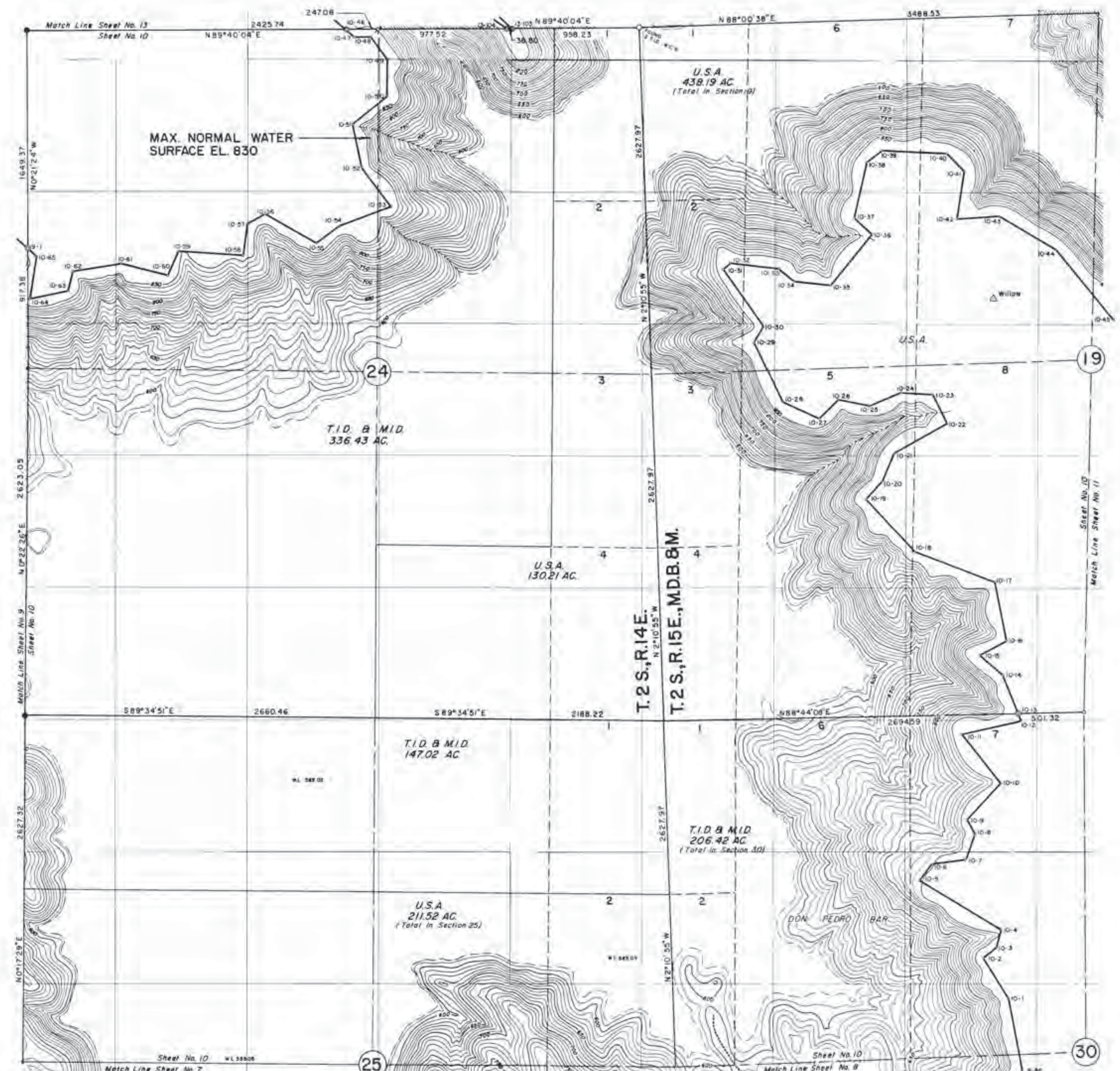
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-93

9

2299-93

TRIM LINE



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
8-85	N.10°59'00"W.	551.10	10-33	S.51°44'00"E.	156.65
10-1	N.31°19'00"W.	367.53	10-34	S.83°11'00"E.	269.90
10-2	N.51°20'00"E.	128.06	10-35	N.39°04'00"E.	499.77
10-3	N.13°56'00"E.	132.91	10-36	N.47°41'00"W.	181.22
10-4	N.58°16'00"W.	724.30	10-37	N.12°17'00"E.	427.79
10-5	N.36°15'00"E.	148.81	10-38	N.50°32'00"E.	154.16
10-6	N.82°13'00"E.	258.38	10-39	S.87°12'00"E.	491.59
10-7	N.20°33'00"E.	205.06	10-40	S.43°44'00"E.	192.38
10-8	N.27°11'00"W.	124.78	10-41	S. 8°51'00"W.	364.33
10-9	N.42°43'00"E.	372.94	10-42	N.85°39'00"E.	329.95
10-10	N.38°31'00"W.	475.39	10-43	S.58°55'00"E.	499.75
10-11	N.76°41'00"E.	460.37	10-44	S.39°24'00"E.	688.47
10-12	N.21°25'00"W.	59.07	10-45		
10-13	N.21°25'00"W.	310.00	10-46	S.50°02'00"E.	83.00
10-14	N.50°07'00"W.	236.26	10-47	N.87°51'00"E.	123.65
10-15	N.60°39'00"E.	230.59	10-48	S.34°57'00"E.	226.93
10-16	N.11°02'00"W.	444.21	10-49	S. 1°50'00"W.	280.14
10-17	N.69°07'00"W.	650.76	10-50	S.51°19'00"W.	327.96
10-18	N.43°13'00"W.	547.56	10-51	S.11°35'00"E.	333.79
10-19	N.42°46'00"E.	181.16	10-52	S.37°22'22"E.	372.41
10-20	N.23°12'00"E.	228.47	10-53	S.69°01'00"W.	418.79
10-21	N.60°24'00"E.	465.75	10-54	S.53°30'00"W.	220.20
10-22	N.26°21'00"W.	247.76	10-55	N.60°08'00"W.	449.75
10-23	N.87°37'00"W.	240.21	10-56	S.61°27'00"W.	154.83
10-24	S.67°38'00"W.	262.77	10-57	S. 6°41'00"W.	240.63
10-25	N.78°36'00"W.	242.79	10-58	N.86°45'00"W.	494.79
10-26	S.45°00'00"W.	200.82	10-59	S.22°40'00"W.	197.23
10-27	N.65°58'00"W.	304.41	10-60	N.75°31'00"W.	367.70
10-28	N.25°15'00"W.	506.35	10-61	S.80°38'00"W.	368.91
10-29	N.30°54'00"E.	142.17	10-62	S.13°51'00"W.	154.50
10-30	N.35°25'00"W.	531.37	10-63	S.78°23'00"W.	298.76
10-31	N.49°29'00"E.	72.35	10-64	N. 9°39'00"E.	319.67
10-32	S.83°34'00"E.	366.30	10-65	N.47°37'00"W.	98.28
10-33			9-1		

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244 CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'
400 0 400 800 1200 1600 2000

Contour interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3.

2,034,000 E | 2,036,000 E | 2,038,000 E | 2,040,000 E

EXHIBIT K — SHEET 10

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

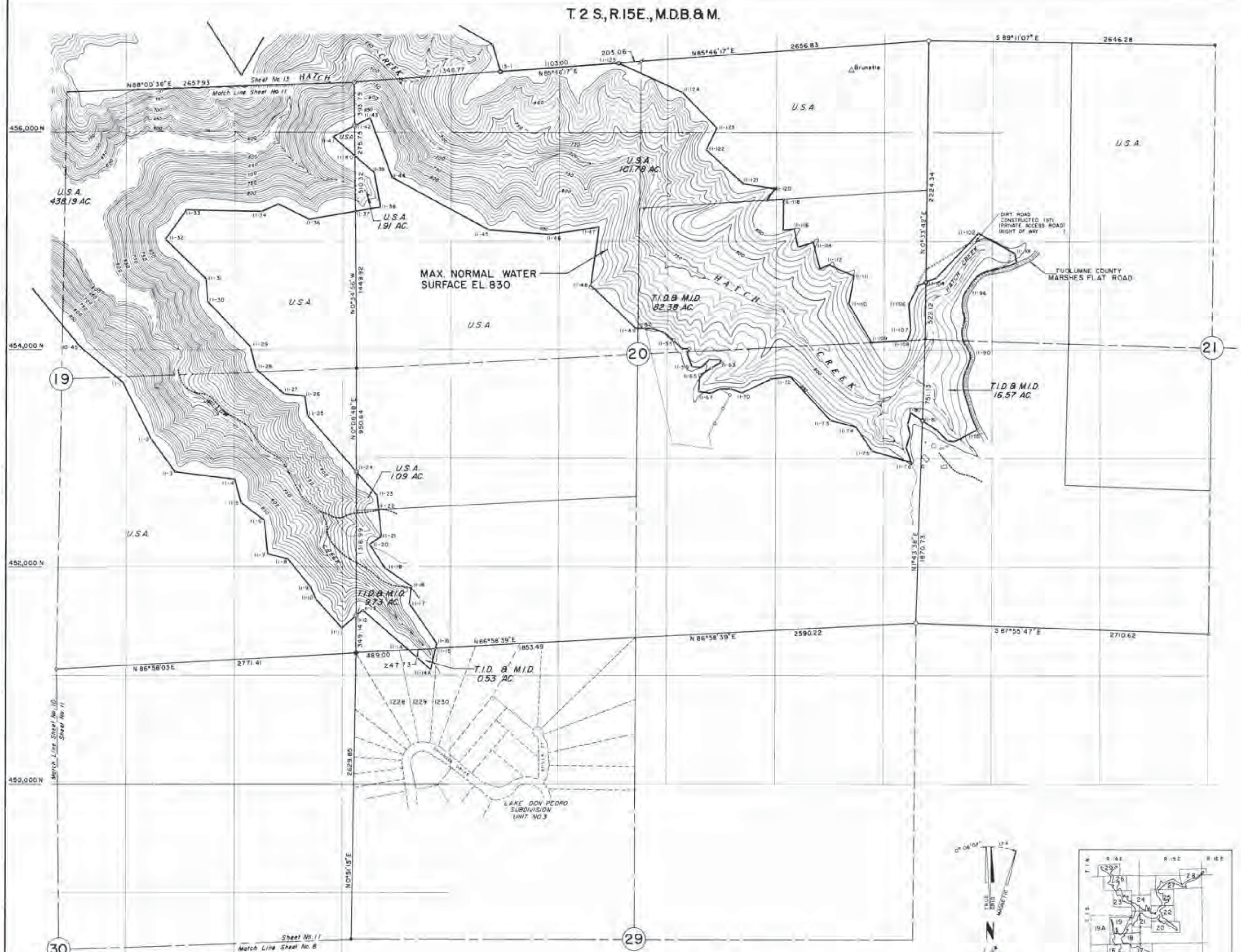
DON PEDRO RESERVOIR

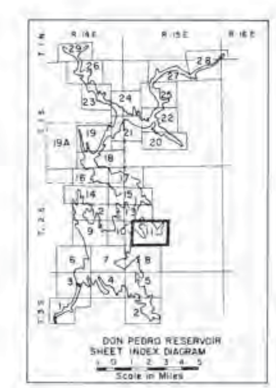
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-94

2299-94

10





PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
10-45	S.50°31'00"E.	514.33
11-1	S.26°22'00"E.	592.52
11-2	S.36°24'00"E.	369.01
11-3	S.83°00'00"E.	558.16
11-4	S.14°47'00"E.	223.39
11-5	S.52°52'00"E.	268.40
11-6	S. 6°01'00"E.	305.68
11-7	S.73°42'00"E.	195.88
11-8	S.39°39'00"E.	325.98
11-9	S.22°09'00"E.	122.00
11-10	S.42°24'00"E.	357.46
11-11	N.49°59'00"E.	173.63
11-12	N.49°59'00"E.	78.35
11-13	S.48°50'00"E.	567.77
11-14	S.48°50'00"E.	269.19
11-14A	N.13°14'00"E.	195.45
11-15	N.13°14'00"E.	44.93
11-16	N.34°28'00"W.	448.79
11-17	N. 8°04'00"E.	162.46
11-18	N.55°20'00"W.	291.82
11-19	N.33°06'00"W.	270.99
11-20	N.57°11'00"E.	127.32
11-21	N. 6°12'00"W.	246.11
11-22	N. 6°12'00"W.	133.11
11-23	N.41°10'00"W.	286.49
11-24	N.41°10'00"W.	695.06
11-25	N. 7°08'00"W.	177.37
11-26	N.83°46'00"W.	184.09
11-27	N.49°15'00"W.	352.40
11-28	N.14°43'00"W.	204.71
11-29	N.43°11'00"W.	577.29
11-30	N. 3°15'00"W.	211.34
11-31	N.46°32'00"W.	527.69
11-32	N.35°33'00"E.	340.49
11-33	S.88°07'00"E.	700.38
11-34	N.65°12'00"E.	159.73
11-35	S.64°41'00"E.	313.17
11-36	N.80°40'00"E.	439.00
11-37	N.80°40'00"E.	232.90
11-38	N. 9°40'00"W.	321.57
11-39	N.49°20'00"W.	238.64
11-40	N.49°20'00"W.	267.68
11-41	N.63°10'00"E.	224.41
11-42	N.63°10'00"E.	158.86
11-43	S.20°14'00"E.	584.04
11-44	S.61°47'00"E.	1013.36
11-45	S.85°55'00"E.	575.46
11-46	N.81°19'00"E.	445.23
11-47	S. 7°34'00"W.	546.73
11-48	S.47°00'00"E.	569.16
11-49	S.86°55'22"E.	30.72
11-50	S.86°55'22"E.	61.28
11-51	S.86°55'22"E.	56.89
11-52	S.72°22'32"E.	125.27
11-53	S.54°01'35"E.	65.60
11-54	S.50°43'15"E.	47.08
11-55	S.42°59'34"E.	100.53
11-56	S.88°28'51"E.	76.07
11-57	S.20°30'09"W.	56.65
11-58	S.20°39'28"E.	123.57
11-59	S.84°39'12"E.	88.48
11-60	N.43°09'32"E.	104.28
11-61	S.87°03'00"E.	96.89
11-62	S.24°36'20"E.	22.74
11-63	S.58°06'35"W.	104.28
11-64	S.59°06'35"W.	124.03
11-65	S. 3°22'50"W.	151.58
11-66	S.83°56'00"E.	114.11
11-67	N.66°51'00"E.	93.28
11-68	N.88°49'00"E.	92.83
11-69		

NO.	BEARING	DIST.
11-69	S.68°29'00"E.	111.79
11-70	N.63°31'00"E.	296.06
11-71	N.84°57'00"E.	181.71
11-72	S.42°52'00"E.	549.80
11-73	S.75°17'00"E.	244.01
11-74	S.33°27'00"E.	261.27
11-75	S.74°36'00"E.	371.74
11-76	N.18°26'00"W.	136.28
11-77	N.17°28'00"E.	122.36
11-78	N.13°44'00"W.	99.54
11-79	N.13°57'00"E.	114.43
11-80	S.57°10'00"E.	131.86
11-81	S.57°10'00"E.	160.14
11-82	S.43°16'00"E.	145.58
11-83	S.87°56'00"E.	82.26
11-84	N.64°09'35"E.	237.51
11-85	NON-TANGENT CURVE Δ=10°30'45" RT. R=920.00 L=168.80 CHORD N.22°24'22"W.	168.56
11-86	N.17°09'00"W.	179.56
11-87	TANGENT CURVE Δ=36°54'00" RT. R=345.00 L=222.19	
11-88	N.19°45'00"E.	114.17
11-89	TANGENT CURVE Δ=52°00'00" LT. R=80.00 L=72.61	
11-90	N.32°15'00"W.	61.98
11-91	TANGENT CURVE Δ=47°50'00" RT. R=220.00 L=183.67	
11-92	N.15°35'00"E.	30.51
11-93	TANGENT CURVE Δ=32°50'00" LT. R=170.00 L=97.42	
11-94	N.17°15'00"W.	8.70
11-95	TANGENT CURVE Δ=52°30'00" RT. R=245.00 L=224.49	
11-96	N.35°15'00"E.	91.53
11-97	TANGENT CURVE Δ=42°50'00" RT. R=245.00 L=183.16	
11-98	N.78°05'00"E.	112.82
11-99	TANGENT CURVE Δ=13°26'00" LT. R=680.00 L=159.43	
11-100	N.16°27'00"W.	82.55
11-101	N.60°35'00"W.	386.87
11-102	S.43°43'00"W.	570.07
11-103	S.66°11'00"W.	97.89
11-104	S.66°11'00"W.	70.45
11-105	S.26°57'00"W.	198.57
11-106	S. 4°10'00"E.	233.62
11-107	S.18°23'00"W.	97.14
11-108	S.86°59'54"W.	331.07
11-109	N.31°19'00"W.	405.57
11-110	N.10°43'00"E.	263.59
11-111	N.66°02'00"W.	256.07
11-112	S.65°58'00"W.	90.87
11-113	N.13°32'00"W.	252.00
11-114	S.72°10'00"W.	150.22
11-115	N.11°46'00"W.	171.61
11-116	S.83°29'00"W.	103.96
11-117	N. 0°30'48"E.	287.72
11-118	S.86°23'02"W.	153.71
11-119	N.33°18'00"E.	131.35
11-120	N.81°29'00"W.	297.27
11-121	N.46°47'00"W.	455.60
11-122	N.27°23'00"E.	217.36
11-123	N.44°34'00"W.	458.96
11-124	N.65°21'00"W.	646.65
11-125		

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

2,042,000 E
2,044,000 E
2,046,000 E
2,048,000 E
2,050,000 E

EXHIBIT K SHEET 11

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

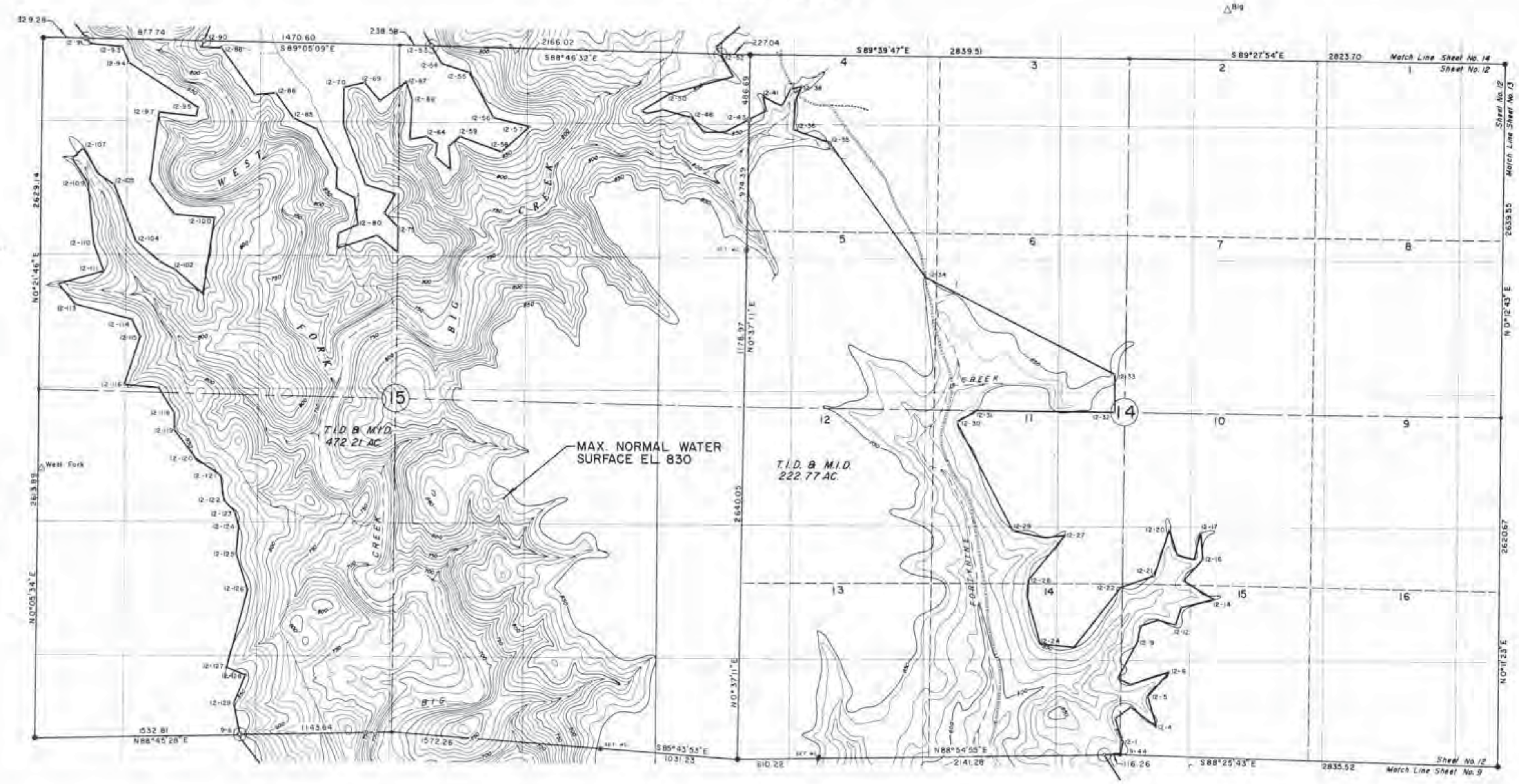
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-95

2299-95

T. 2 S., R. 14 E., M.D.B. & M.



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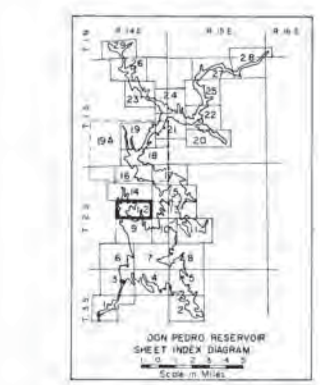
RICHARD E. PENNEY, PRESIDENT



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
9-44	N.11°36'00"E.	91.76
12-1	N.16°52'00"W.	190.00
12-2	N.52°59'00"E.	147.80
12-3	S.51°18'00"E.	238.32
12-4	N.16°13'00"W.	229.12
12-5	N.41°32'00"E.	245.81
12-6	S.72°17'00"W.	305.50
12-7	N.64°22'00"W.	110.92
12-8	N.28°11'00"E.	317.65
12-9	N.10°04'00"E.	108.67
12-10	N.71°49'00"E.	141.04
12-11	S.76°29'00"E.	132.67
12-12	N.19°44'00"E.	139.18
12-13	N.75°20'00"E.	244.98
12-14	N.58°52'00"W.	262.85
12-15	N.42°03'00"E.	219.49
12-16	N. 4°28'00"W.	205.62
12-17	S.14°10'00"W.	212.46
12-18	N.74°59'00"W.	127.35
12-19	N.18°21'00"W.	206.50
12-20	S.17°30'00"W.	365.92
12-21	S.70°08'00"W.	264.77
12-22	S.37°47'00"W.	568.07
12-23	N.86°10'00"W.	254.57
12-24	N.15°07'00"W.	387.40
12-25	N. 4°56'00"E.	116.43
12-26		

NO.	BEARING	DIST.
12-26	N.39°38'00"E.	431.10
12-27	S.83°10'00"W.	168.19
12-28	N.77°46'00"W.	231.25
12-29	N.27°46'00"W.	921.01
12-30	N.59°18'00"E.	170.11
12-31	S.89°34'10"E.	1037.57
12-32	NORTH	288.88
12-33	N.62°55'00"W.	1600.00
12-34	N.36°29'27"W.	1230.96
12-35	N.69°55'00"W.	285.36
12-36	N. 2°08'00"E.	214.15
12-37	N.26°08'00"E.	118.07
12-38	S.76°48'00"W.	83.20
12-39	S.28°08'00"W.	146.29
12-40	N.64°26'00"W.	155.21
12-41	S.11°57'00"E.	106.30
12-42	S.62°11'00"W.	141.01
12-43	S.62°11'00"W.	206.11
12-44	S.89°14'00"W.	150.01
12-45	N.43°08'00"W.	152.11
12-46	N.74°58'00"W.	223.65
12-47	S.76°54'00"W.	119.10
12-48	N.63°26'00"W.	42.49
12-49	N.58°37'00"E.	255.37
12-50	N.75°08'00"E.	467.30
12-51	N.31°28'00"W.	200.09
12-52		

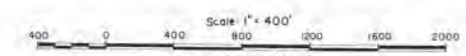
NO.	BEARING	DIST.
12-53	S.29°59'00"E.	150.13
12-54	S.73°06'00"E.	223.65
12-55	S.28°27'00"E.	382.13
12-56	S.76°37'00"E.	276.40
12-57	S.47°17'00"W.	283.07
12-58	N.69°58'00"W.	329.95
12-59	S.50°23'00"W.	112.93
12-60	S. 4°56'00"E.	174.65
12-61	N.50°26'00"W.	149.16
12-62	N. 6°01'00"E.	95.52
12-63	N.55°59'00"W.	96.52
12-64	S.80°00'00"W.	120.84
12-65	N. 2°42'00"E.	297.33
12-66	N.20°57'00"W.	137.06
12-67	S.53°56'00"W.	241.22
12-68	N.39°26'00"W.	174.77
12-69	S.77°02'00"W.	155.98
12-70	S. 1°03'00"W.	274.05
12-71	S.20°10'00"E.	469.81
12-72	S.71°57'00"E.	238.76
12-73	S.25°03'00"W.	167.76
12-74	S.42°46'00"E.	131.98
12-75	S. 0°14'56"W.	193.00
12-76	N.49°43'00"W.	196.31
12-77	S.72°02'00"W.	314.34
12-78	N. 3°40'00"E.	109.22
12-79		

NO.	BEARING	DIST.
12-79	N.65°30'00"E.	161.55
12-80	N. 8°38'00"W.	206.34
12-81	N.62°14'00"W.	150.30
12-82	N. 1°38'00"E.	140.06
12-83	N.27°01'00"W.	336.76
12-84	N.66°29'00"W.	193.02
12-85	N.34°57'00"W.	226.93
12-86	S.86°47'00"W.	160.25
12-87	N.35°35'00"W.	427.91
12-88	N.86°42'00"W.	156.26
12-89	N.20°42'00"E.	45.37
12-90		
12-91	S.38°49'00"E.	45.60
12-92	S.84°38'00"E.	235.03
12-93	S.24°27'00"E.	132.91
12-94	S.57°00'00"E.	618.81
12-95	S.21°10'00"W.	66.48
12-96	N.83°23'00"W.	268.79
12-97	S. 7°24'00"W.	520.33
12-98	S.36°12'00"E.	309.82
12-99	S.85°52'00"E.	305.79
12-100	S. 8°00'00"W.	581.67
12-101	N.49°57'00"W.	276.25
12-102	N.61°56'00"W.	136.00
12-103	N.49°00'00"W.	233.21
12-104	N.21°26'00"W.	459.79
12-105		

NO.	BEARING	DIST.
12-105	N.58°45'00"W.	136.86
12-106	N.31°00'00"W.	225.18
12-107	S.46°29'00"W.	108.93
12-108	S.32°45'00"E.	219.97
12-109	S. 5°37'00"E.	459.21
12-110	S.21°38'00"E.	206.49
12-111	S.72°57'00"W.	354.59
12-112	S.40°04'00"E.	197.31
12-113	S.75°26'00"E.	441.19
12-114	S.25°10'00"E.	145.84
12-115	S.18°01'00"W.	378.58
12-116	S.83°47'00"E.	258.52
12-117	S.32°54'00"E.	222.73
12-118	S. 1°23'00"E.	124.04
12-119	S.35°40'00"E.	265.86
12-120	S.57°04'00"E.	229.94
12-121	S. 7°14'00"E.	190.52
12-122	S.43°23'00"E.	125.21
12-123	S.17°21'00"E.	100.58
12-124	S. 5°03'00"W.	214.83
12-125	S.18°34'00"E.	279.55
12-126	S.14°45'00"W.	600.81
12-127	S.68°45'00"E.	154.48
12-128	S.23°18'00"W.	235.18
12-129	S.12°08'00"E.	232.14
9-61		

LEGEND
- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'



Contour interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

2,022,000 E
2,024,000 E
2,026,000 E
2,028,000 E
2,030,000 E
2,032,000 E

EXHIBIT K | SHEET 12

PROJECT NO. 2299 | CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

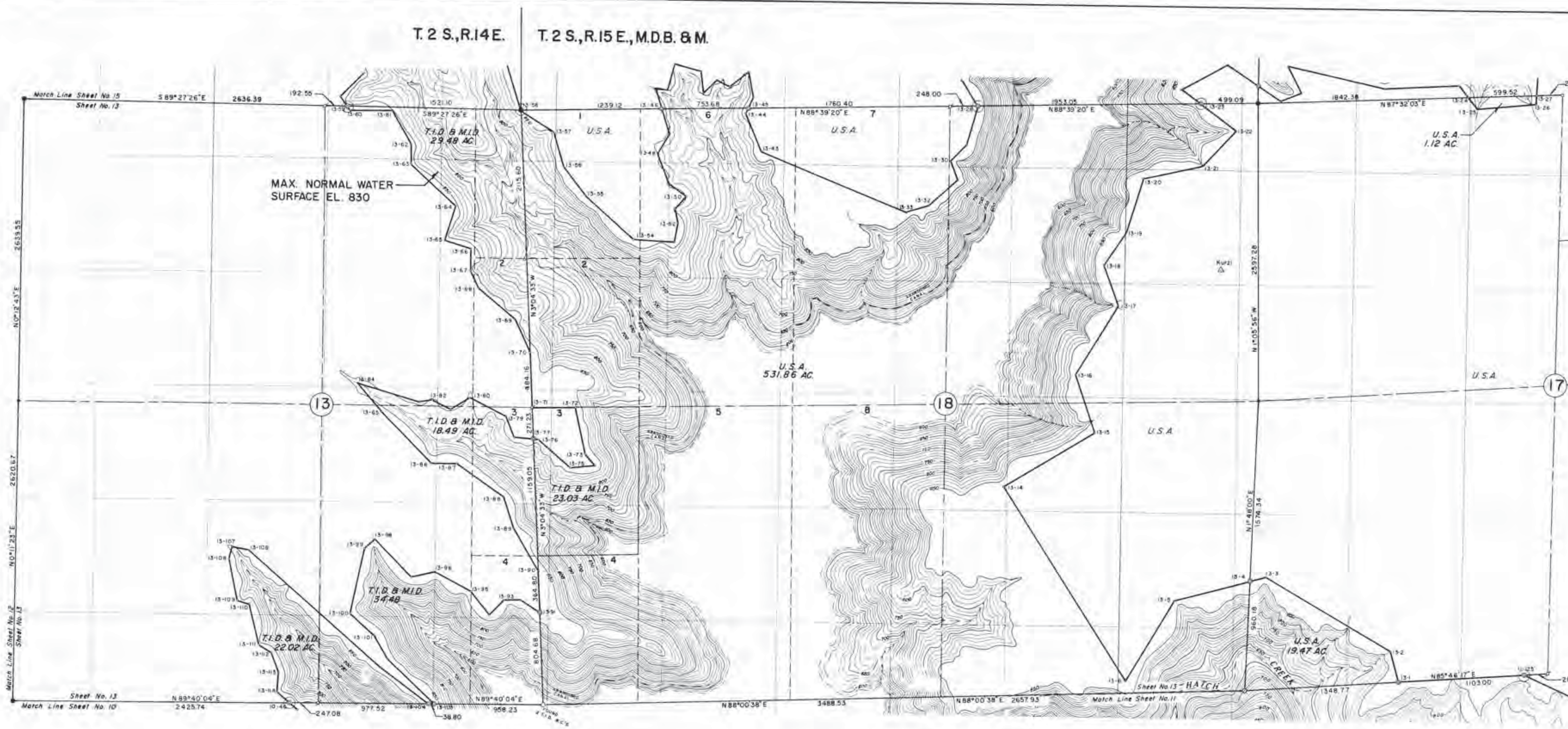
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-96

2299-96

12



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.
11-125	S.85°46'17"W.	1103.00	13-32	S.71°44'00"W.	207.45	13-66	S. 1°13'00"W.	190.07	13-91	N.57°02'00"W.	205.38
13-1	N.15°56'00"W.	266.89	13-33	N.68°17'21"W.	1378.74	13-67	S.26°16'00"E.	167.25	13-92	S.88°46'00"W.	140.03
13-2	N.59°42'00"W.	1274.15	13-43	N.22°58'00"W.	356.24	13-68	S.50°09'00"E.	418.16	13-93	S.45°13'00"W.	181.73
13-3	S.74°31'00"W.	146.91	13-44	N.25°06'00"E.	53.33	13-69	S.25°13'00"E.	326.07	13-94	N.38°53'00"W.	255.38
13-4	S.74°31'00"W.	684.28	13-45			13-70	S. 3°04'33"E.	484.16	13-95	N.62°07'00"W.	361.71
13-5	S.29°57'00"W.	817.15	13-46	S.17°33'00"E.	231.39	13-71	N.88°38'37"E.	385.40	13-96	S.76°40'00"W.	216.84
13-6	N.33°12'48"W.	2008.06	13-47	S.29°55'00"W.	198.46	13-72	S.12°01'00"E.	416.83	13-97	N.44°18'00"W.	459.65
13-14	N.58°41'00"E.	927.14	13-48	S.71°55'00"E.	281.33	13-73	S.42°15'00"E.	132.38	13-98	S.47°55'00"W.	125.32
13-15	N.18°26'00"W.	543.91	13-49	S.54°45'00"E.	183.67	13-74	S.83°34'00"W.	214.35	13-99	S.11°20'00"W.	585.41
13-16	N.30°53'00"E.	701.43	13-50	S.41°48'00"W.	139.52	13-75	N.49°05'00"W.	377.14	13-100	S.48°56'00"E.	289.18
13-17	N.20°17'00"W.	375.44	13-51	S. 9°57'00"E.	133.00	13-76	N.86°47'00"W.	48.61	13-101	S.30°18'00"E.	230.19
13-18	N.33°09'00"E.	351.14	13-52	S. 9°24'00"W.	165.22	13-77	N.86°47'00"W.	165.73	13-102	S.46°35'00"E.	567.46
13-19	N.16°21'00"E.	486.68	13-53	N.86°29'00"W.	358.68	13-78	N.23°14'00"W.	200.24	13-103	S.89°40'04"W.	38.80
13-20	N.77°13'00"E.	524.00	13-54	N.48°34'00"W.	569.61	13-79	N.63°09'00"W.	354.20	13-104	N.53°43'00"W.	532.69
13-21	N.43°29'00"E.	425.83	13-55	N.39°31'00"W.	311.13	13-80	S.56°28'00"W.	195.53	13-105	N.49°11'00"W.	1549.87
13-22	N.53°42'00"W.	390.86	13-56	N.16°12'00"W.	315.53	13-81	N.63°51'00"W.	186.05	13-106	N.80°32'00"W.	152.07
13-23			13-57	N.57°49'00"W.	350.35	13-82	S.82°41'00"W.	109.90	13-107	S.12°15'00"W.	108.47
13-24	S.39°08'00"E.	124.22	13-58			13-83	N.74°42'00"W.	568.16	13-108	S.11°58'00"E.	376.18
13-25	N.84°36'00"E.	520.31	13-59	S.36°20'00"E.	39.75	13-84	S.41°01'00"E.	326.06	13-109	S.72°33'00"E.	110.06
13-26	N. 2°00'00"E.	73.22	13-60	N.89°41'00"E.	373.03	13-85	S.45°39'00"E.	620.89	13-110	S.13°39'00"E.	360.17
13-27			13-61	S.30°54'00"E.	331.07	13-86	S.89°14'00"E.	225.02	13-111	S.59°25'00"E.	127.77
13-28	S.14°48'00"W.	358.34	13-62	SOUTH	180.00	13-87	S.54°44'00"E.	505.80	13-112	S.21°17'00"E.	184.59
13-29	S.44°48'00"W.	197.28	13-63	S.48°05'00"E.	538.89	13-88	S.18°45'00"E.	286.19	13-113	S. 2°41'00"W.	171.19
13-30	S.22°11'00"E.	169.54	13-64	S.17°24'00"W.	314.38	13-89	S.30°38'00"E.	435.22	13-114	S.50°02'00"E.	148.51
13-31	S.47°40'00"W.	334.12	13-65	S.73°09'00"E.	241.41	13-90	S. 3°04'33"E.	364.80	10-46		
13-32			13-66			13-91					

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

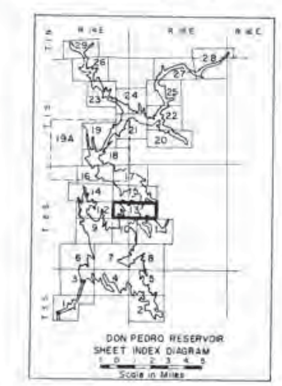


EXHIBIT K — SHEET 13

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

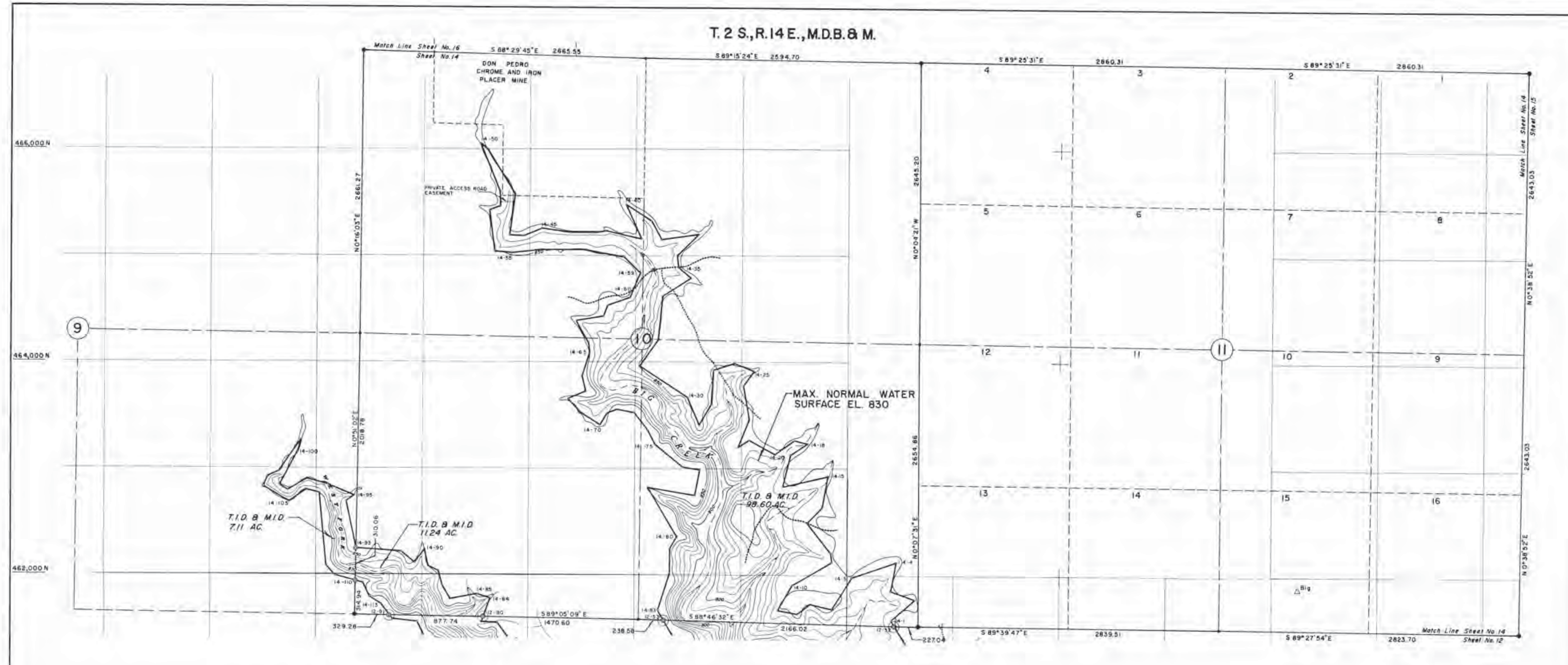
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2,034,000 E
2,036,000 E
2,038,000 E
2,040,000 E
2,042,000 E

2299-97

2299-9

13



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
12-52	N.31°28'00"W.	56.65
14-1	N.48°49'00"E.	297.64
14-2	N.69°56'00"W.	244.86
14-3	N.11°06'00"E.	275.15
14-4	S.70°31'00"W.	446.59
14-5	S.32°06'00"W.	348.21
14-6	N.77°21'00"W.	210.10
14-7	S.52°31'00"W.	151.21
14-8	N.80°03'00"W.	190.87
14-9	N.30°34'00"E.	275.26
14-10	N.60°12'00"E.	428.66
14-11	N. 7°36'00"W.	90.80
14-12	N.38°24'00"W.	357.15
14-13	N.45°12'00"E.	202.94
14-14	N. 9°22'00"E.	301.01
14-15	S.76°54'00"W.	432.26
14-16	N.13°19'00"E.	312.41
14-17	N.57°08'00"E.	191.57
14-18	N.78°20'00"W.	128.51
14-19	S.55°09'00"W.	220.54
14-20	N.62°04'00"W.	279.59
14-21	S.58°03'00"W.	128.47
14-22	N.22°32'00"E.	279.31
14-23	N. 9°54'00"W.	325.85
14-24	N.36°12'00"E.	171.01
14-25	N.68°48'00"W.	196.29
14-26	S.72°46'00"W.	212.55
14-27	S. 2°30'00"W.	321.31
14-28	S.30°47'00"W.	224.66
14-29		
14-29	N.24°05'00"W.	279.32
14-30	N.56°12'00"W.	539.17
14-31	N.35°27'00"E.	306.89
14-32	N. 5°06'00"E.	404.60
14-33	N.56°54'00"E.	318.69
14-34	N.49°02'00"W.	150.99
14-35	N. 4°51'00"W.	118.42
14-36	N.46°01'00"E.	279.49
14-37	S.83°25'00"W.	357.36
14-38	N.30°02'00"W.	191.76
14-39	N.57°02'00"W.	288.47
14-40	S.24°15'00"E.	355.38
14-41	N.77°19'00"W.	337.22
14-42	S.79°25'00"W.	108.85
14-43	WEST	234.00
14-44	N.82°21'00"W.	270.41
14-45	S.69°22'00"W.	190.19
14-46	N.87°48'00"W.	130.10
14-47	N. 8°03'00"E.	392.87
14-48	N.31°49'00"W.	498.94
14-49	N.48°53'00"W.	83.63
14-50	S.21°52'00"E.	485.97
14-51	S. 3°19'00"E.	138.23
14-52	S.69°04'00"W.	109.12
14-53	S. 6°56'00"E.	397.91
14-54	S.84°22'00"E.	162.79
14-55	N.83°09'00"E.	285.04
14-56	S.89°52'00"E.	413.00
14-57	S.79°51'00"E.	368.77
14-58		
14-58	S.47°50'00"E.	214.52
14-59	S.23°15'00"W.	255.79
14-60	S.70°11'00"W.	224.27
14-61	S.20°51'00"W.	112.36
14-62	S.81°33'00"W.	258.60
14-63	S.29°39'00"E.	232.44
14-64	S. 6°17'00"E.	100.60
14-65	S.17°43'00"W.	226.75
14-66	S.14°40'00"E.	154.02
14-67	S.86°44'00"W.	187.24
14-68	S.44°02'00"E.	168.32
14-69	S.57°10'00"E.	221.35
14-70	N.31°33'00"E.	127.92
14-71	N.64°14'00"E.	96.61
14-72	S.80°03'00"E.	173.61
14-73	S.37°09'00"E.	207.00
14-74	S.27°46'00"E.	150.30
14-75	S.50°36'00"E.	340.33
14-76	S.81°07'00"E.	161.94
14-77	S. 9°25'00"W.	244.30
14-78	N.81°06'00"W.	452.45
14-79	S.30°49'00"E.	536.79
14-80	S.31°11'00"W.	133.26
14-81	S. 0°15'00"E.	231.00
14-82	S.17°10'00"W.	359.01
14-83	S.29°59'00"E.	111.96
12-53		
12-90	N.20°42'00"E.	195.15
14-84	N.74°14'00"W.	124.77
14-85		
14-85	S.78°34'00"W.	262.21
14-86	N.28°16'00"W.	149.88
14-87	N.17°24'00"W.	140.43
14-88	N.85°28'00"W.	113.22
14-89	N.11°02'00"W.	161.99
14-90	S.36°08'00"W.	156.01
14-91	N.49°01'00"W.	161.57
14-92	N.86°18'00"W.	429.46
14-93	N.12°02'00"W.	453.23
14-94	N.56°52'00"E.	85.98
14-95	N.66°06'00"W.	269.07
14-96	N.74°48'00"W.	202.07
14-97	S.58°34'00"W.	210.95
14-98	N.54°03'00"W.	98.81
14-99	N.29°37'00"E.	343.95
14-100	N.16°26'00"E.	127.20
14-101	S.34°48'00"W.	359.24
14-102	S.64°14'00"W.	126.55
14-103	S.21°42'00"W.	100.09
14-104	S.58°41'00"E.	280.92
14-105	N.55°36'00"E.	203.59
14-106	S.75°04'00"E.	124.19
14-107	S. 5°37'00"E.	685.28
14-108	S.43°03'00"E.	124.52
14-109	S.74°31'00"E.	195.97
14-110	S.74°31'00"E.	73.82
14-111	S.25°17'00"E.	140.46
14-112	S.57°24'00"E.	131.76
14-113	S.38°49'00"E.	131.50
12-91		

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

2,020,000 E
2,022,000 E
2,024,000 E
2,026,000 E
2,028,000 E
2,030,000 E

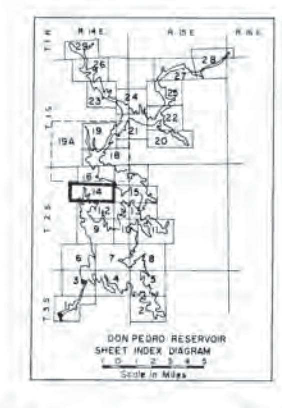


EXHIBIT K SHEET 14

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

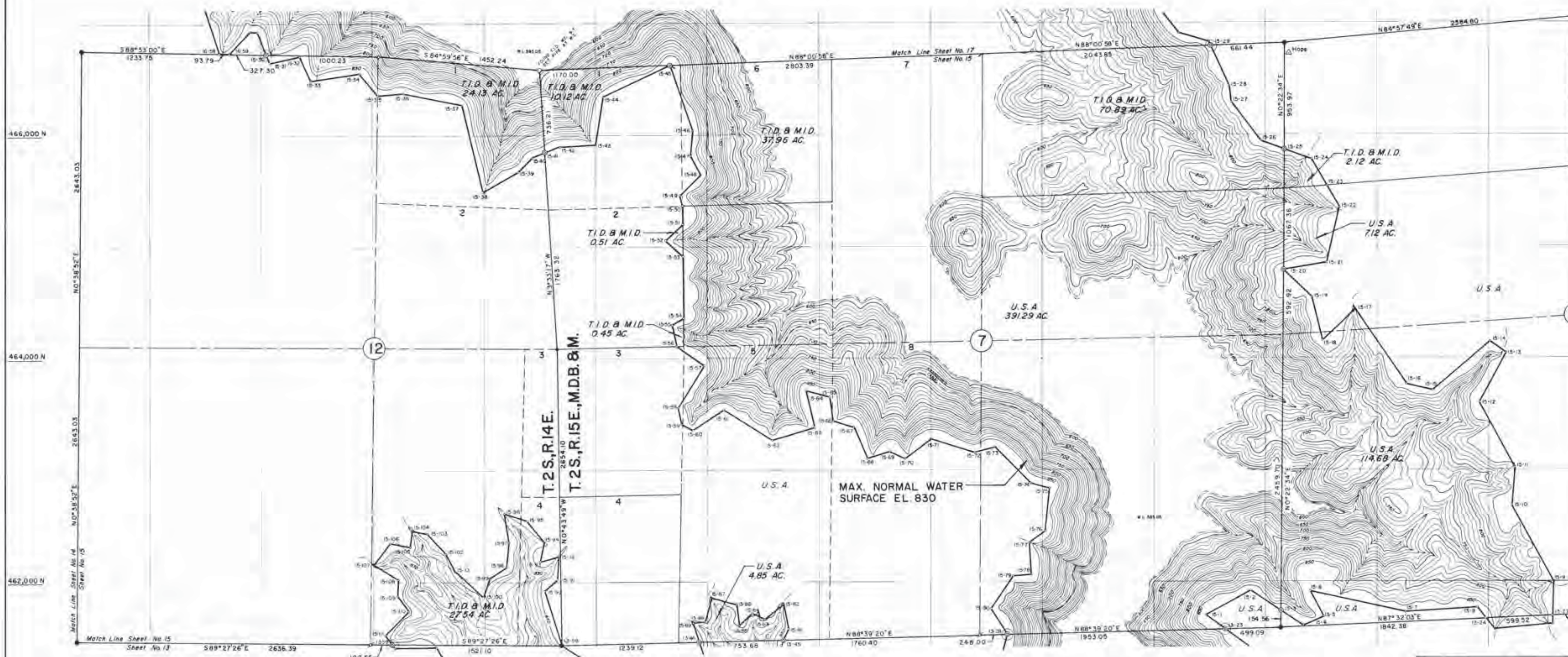
DON PEDRO PROJECT

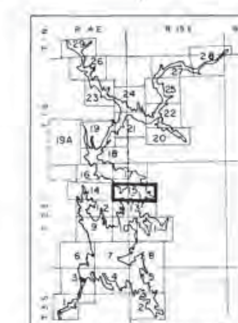
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-98

2299-98





PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.
13-23	N.53°42'00"W.	212.17	15-28	N.24°48'00"W.	390.47	15-58	S.12°09'00"E.	161.62	15-85	N. 6°50'00"W.	193.37
15-1	N.61°42'00"E.	457.71	15-29			15-59	S.64°07'00"E.	112.26	15-86	N.75°21'00"W.	229.45
15-2	S.56°39'00"E.	320.78	15-30	S.22°01'00"E.	83.29	15-60	N.56°12'00"E.	323.59	15-87	S.16°35'00"W.	224.32
15-3	S.56°39'00"E.	243.08	15-31	N.76°50'00"E.	276.19	15-61	S.58°02'00"E.	517.49	15-88	S.87°12'00"W.	102.12
15-4	N.67°07'00"E.	195.39	15-32	S.23°02'00"E.	245.54	15-62	N.72°51'00"E.	396.65	15-89	S.17°33'00"E.	179.75
15-5	N.27°45'00"W.	259.89	15-33	N.81°15'00"E.	441.13	15-63	N.13°16'00"W.	340.07	13-46		
15-6	S.77°34'00"E.	873.47	15-34	S.39°56'00"E.	253.40	15-64	S.74°38'00"E.	218.83	13-58	N.17°39'00"W.	512.58
15-7	N.86°43'00"E.	647.06	15-35	N.86°10'00"E.	227.21	15-65	S. 8°35'00"E.	714.40	15-90	N.51°10'00"E.	151.49
15-8	S.39°08'00"E.	124.57	15-36	S.78°39'00"E.	538.16	15-66	S.71°28'00"E.	191.95	15-91	N. 4°06'00"E.	209.54
13-24			15-37	S.13°31'00"E.	800.16	15-67	S.24°13'00"E.	304.81	15-92	S.75°20'00"W.	177.79
13-27	N. 2°00'00"E.	300.01	15-38	N.60°25'00"E.	364.54	15-68	N.71°50'00"E.	208.40	15-93	N.13°04'00"E.	172.47
15-9	N.29°03'00"W.	782.62	15-39	N.43°39'00"E.	179.66	15-69	S.64°28'00"E.	148.50	15-94	N.37°37'00"W.	247.42
15-10	N. 4°11'00"E.	342.91	15-40	N.68°31'00"E.	123.74	15-70	N.53°29'00"E.	297.41	15-95	N.71°59'00"W.	219.78
15-11	N.28°27'00"W.	667.60	15-41	N.68°31'00"E.	143.85	15-71	S.72°03'00"E.	412.06	15-96	S. 8°52'00"E.	272.26
15-12	N.28°52'00"E.	501.28	15-42	N.87°52'00"E.	321.22	15-72	N.75°01'00"E.	189.45	15-97	S. 5°26'00"W.	210.95
15-13	N.54°53'00"W.	177.28	15-43	N. 8°44'00"E.	441.08	15-73	S.44°49'00"E.	448.31	15-98	S.56°34'00"W.	183.33
15-14	S.49°44'00"W.	676.18	15-44	N.65°28'00"E.	661.54	15-74	S.73°05'00"E.	178.73	15-99	S.19°34'00"W.	176.17
15-15	N.77°14'00"W.	239.93	15-45	S.18°58'00"E.	622.34	15-75	S. 6°33'00"W.	385.52	15-100	N.47°38'00"W.	338.35
15-16	N.34°00'00"W.	815.42	15-46	S. 4°41'00"W.	220.86	15-76	S.53°12'00"W.	168.60	15-101	N.25°59'00"W.	178.00
15-17	S.46°17'00"W.	408.10	15-47	S.27°06'00"E.	190.97	15-77	S. 2°59'00"E.	288.39	15-102	N.42°49'00"W.	241.30
15-18	N.14°06'00"W.	402.12	15-48	S.44°32'00"W.	259.50	15-78	S.86°29'00"W.	163.31	15-103	N.78°32'00"W.	140.81
15-19	N.45°41'00"W.	355.21	15-49	S.14°15'00"E.	95.70	15-79	S.34°10'00"W.	352.73	15-104	S. 8°28'00"W.	142.56
15-20	N.80°40'00"E.	394.91	15-50	S. 0°40'15"E.	168.13	15-80	S.32°54'00"E.	273.40	15-105	N.78°48'00"W.	180.44
15-21	N.13°21'00"E.	504.38	15-51	S.46°37'00"W.	209.89	13-28			15-106	S.37°14'00"W.	251.21
15-22	N.30°29'00"W.	219.88	15-52	S.47°31'00"E.	211.40	13-45	N.25°06'00"E.	104.59	15-107	S.59°11'00"E.	253.82
15-23	N.30°29'00"W.	275.96	15-53	S. 0°40'15"E.	552.11	15-81	N.11°45'00"W.	225.74	15-108	S. 3°08'00"W.	146.22
15-24	N.71°00'00"W.	261.67	15-54	S.59°29'00"W.	122.32	15-82	S.51°20'00"W.	211.30	15-109	S.36°56'00"E.	166.40
15-25	N.71°00'00"W.	213.67	15-55	S.12°51'00"E.	195.95	15-83	N.63°38'00"W.	126.12	15-110	S.45°25'00"W.	296.29
15-26	N.36°58'00"W.	450.60	15-56	S.54°32'00"E.	296.40	15-84	S.45°15'00"W.	164.85	15-111	S.36°20'00"E.	110.46
15-27	N. 6°59'00"W.	148.10	15-57	S.32°21'00"W.	439.18	15-85			13-59		
15-28			15-58								

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R. E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 15

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

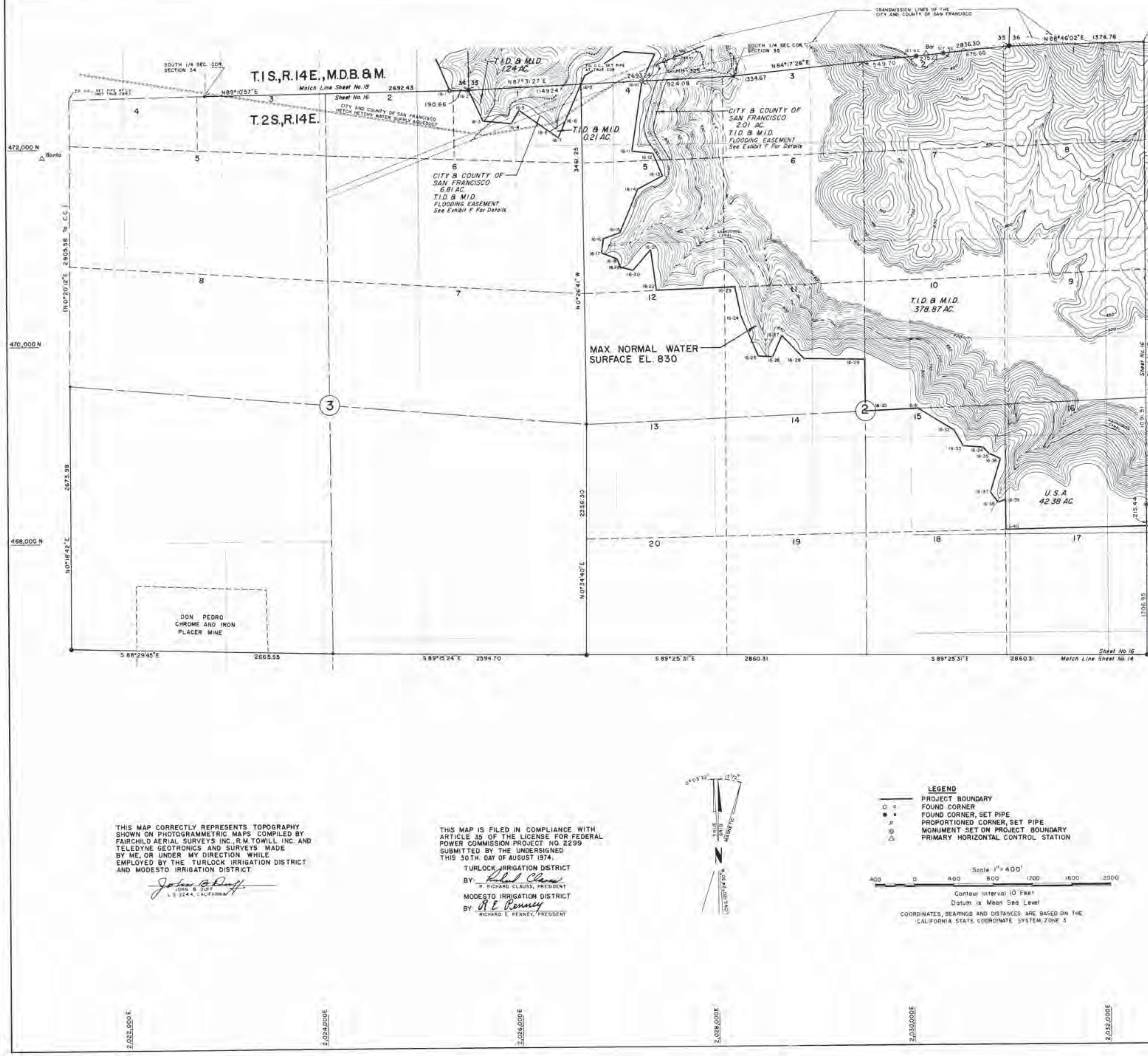
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-99

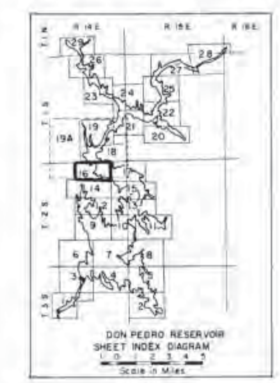
2299-99

15



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
16-1			16-21		
16-2	N.89°10'57"E.	190.66	16-22	S. 7°53'00"E.	421.95
16-3	S.24°07'00"E.	347.53	16-23	N.88°00'06"E.	800.94
16-4	S.84°47'00"E.	289.46	16-24	S.11°26'00"E.	300.68
16-5	N.29°58'00"E.	154.63	16-25	S.22°33'00"E.	441.03
16-6	S.54°52'00"E.	379.92	16-26	S.86°27'00"E.	145.28
16-7	S.54°52'00"E.	106.68	16-27	N.24°04'00"E.	235.18
16-8	N.24°14'00"E.	178.18	16-28	S.43°36'00"E.	325.50
16-9	N.24°14'00"E.	413.16	16-29	S.88°45'00"E.	624.46
16-10			16-30	S. 0°04'05"W.	529.63
16-11	S. 9°13'00"W.	718.28	16-31	N.87°47'17"E.	540.24
16-12	S.83°36'00"E.	215.34	16-32	S.58°48'00"E.	422.09
16-13	S.22°47'00"E.	250.54	16-33	S.29°42'00"E.	187.66
16-14	S.62°32'00"W.	286.25	16-34	S.85°40'00"E.	198.57
16-15	S.22°22'00"W.	483.39	16-35	S.42°39'00"E.	103.32
16-16	S.71°03'00"W.	178.68	16-36	S.66°44'00"E.	116.47
16-17	S. 7°50'00"W.	139.30	16-37	S.16°35'00"W.	353.73
16-18	S.68°16'00"E.	170.10	16-38	S.36°57'00"E.	131.40
16-19	S.19°37'00"E.	92.36	16-39	N.71°10'00"E.	88.18
16-20	S.75°33'00"E.	136.31	16-40	S. 0°06'58"W.	303.42
16-21	N.40°34'00"E.	276.57	16-41	N.89°10'47"E.	1431.34



THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
R. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 16

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

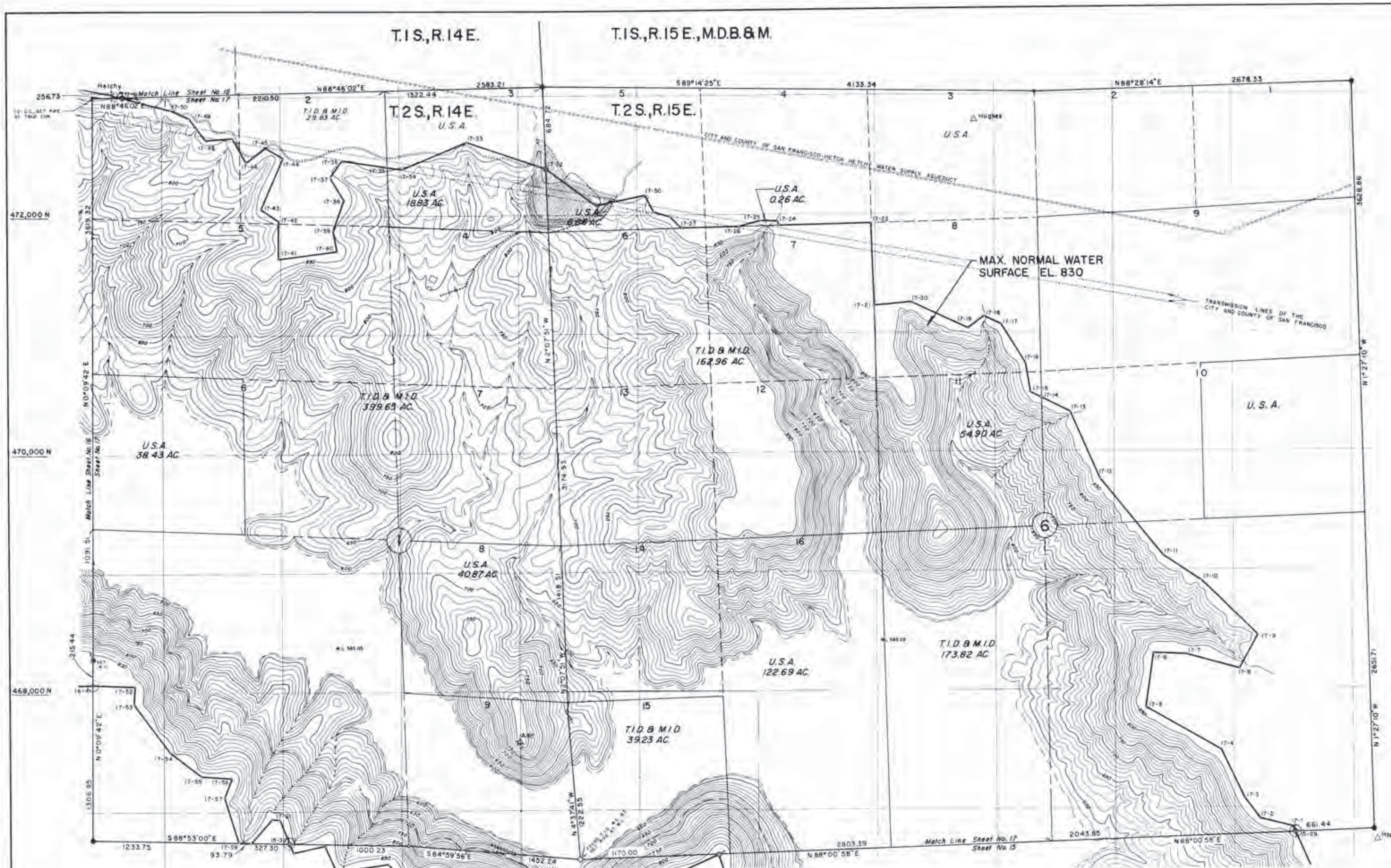
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

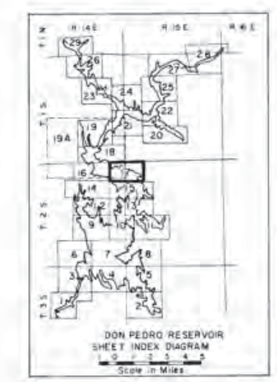
2299-100

Trim Line

16

2299 – 100





PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
15-29 – 17-1	N.24°48'00"W.	45.77
17-1 – 17-2	N.75°04'00"W.	279.44
17-2 – 17-3	N.37°58'00"W.	219.44
17-3 – 17-4	N.25°29'00"W.	450.87
17-4 – 17-5	N.60°20'00"W.	727.34
17-5 – 17-6	N. 8°28'00"E.	454.96
17-6 – 17-7	S.88°07'00"E.	274.15
17-7 – 17-8	S.74°57'00"E.	465.98
17-8 – 17-9	N.28°58'00"E.	320.04
17-9 – 17-10	N.45°59'00"W.	657.71
17-10 – 17-11	N.55°37'00"W.	391.37
17-11 – 17-12	N.38°51'00"W.	825.70
17-12 – 17-13	N.24°05'00"W.	619.97
17-13 – 17-14	N.63°32'00"W.	279.64
17-14 – 17-15	N.63°32'00"W.	99.20
17-15 – 17-16	N.10°12'00"W.	242.84
17-16 – 17-17	N.32°02'00"W.	384.57
17-17 – 17-18	N.61°49'00"W.	158.82
17-18 – 17-19	S.50°45'00"W.	169.14
17-19 – 17-20	N.64°55'00"W.	537.73
17-20 – 17-21	S.85°47'00"W.	314.00
17-21 – 17-22	N. 1°31'58"W.	689.81
17-22 – 17-23	S.88°29'00"W.	773.72
17-23 – 17-24	N. 6°01'00"W.	38.14
17-24 – 17-25	N.86°54'00"W.	148.22
17-25 – 17-26	S.73°17'00"W.	190.53
17-26 – 17-27	S.88°29'00"W.	482.62
17-27 – 17-28	N.43°59'00"W.	139.82
17-28 – 17-29	N.74°23'00"W.	141.21
17-29 – 17-30	N.29°57'00"W.	150.09
17-30 – 17-31	S.79°18'00"W.	425.84
17-31 – 17-32	N.53°00'00"W.	525.16
17-32 – 17-33	N.71°20'00"W.	699.88
17-33 – 17-34	S.67°48'00"W.	582.28
17-34 – 17-35	N.82°03'00"W.	129.62
17-35 – 17-36	N.82°03'00"W.	383.32
17-36 – 17-37	S.35°21'00"W.	172.86
17-37 – 17-38	S.31°27'00"E.	220.38
17-38 – 17-39	S.19°45'00"W.	275.19
17-39 – 17-40	S.10°06'00"E.	176.74
17-40 – 17-41	S.82°54'00"W.	493.78
17-41 – 17-42	N. 0°11'00"E.	323.00
17-42 – 17-43	N.57°08'00"W.	175.03
17-43 – 17-44	N.23°18'00"E.	470.34
17-44 – 17-45	N.59°13'00"W.	164.12
17-45 – 17-46	S.54°04'00"W.	206.23
17-46 – 17-47	N.29°16'00"W.	237.29
17-47 – 17-48	S.85°02'00"W.	228.89
17-48 – 17-49	N.36°38'00"W.	238.00
17-49 – 17-50	N.66°23'00"W.	164.79
17-50 – 17-51	N.76°15'00"W.	417.37
16-41 – 17-52	S.88°18'57"E.	352.93
17-52 – 17-53	S. 0°40'00"W.	153.10
17-53 – 17-54	S.36°25'00"E.	502.02
17-54 – 17-55	S.52°06'00"E.	332.05
17-55 – 17-56	S.87°47'00"E.	258.19
17-56 – 17-57	S.21°19'00"W.	176.04
17-57 – 17-58	S.17°56'00"E.	405.28
17-58 – 17-59	S.88°53'00"E.	93.79
17-59 – 17-60	N.42°26'00"E.	267.47
17-60 – 17-61	S.86°32'00"E.	66.11
17-61 – 15-30	S.22°01'00"E.	215.50

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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 17

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

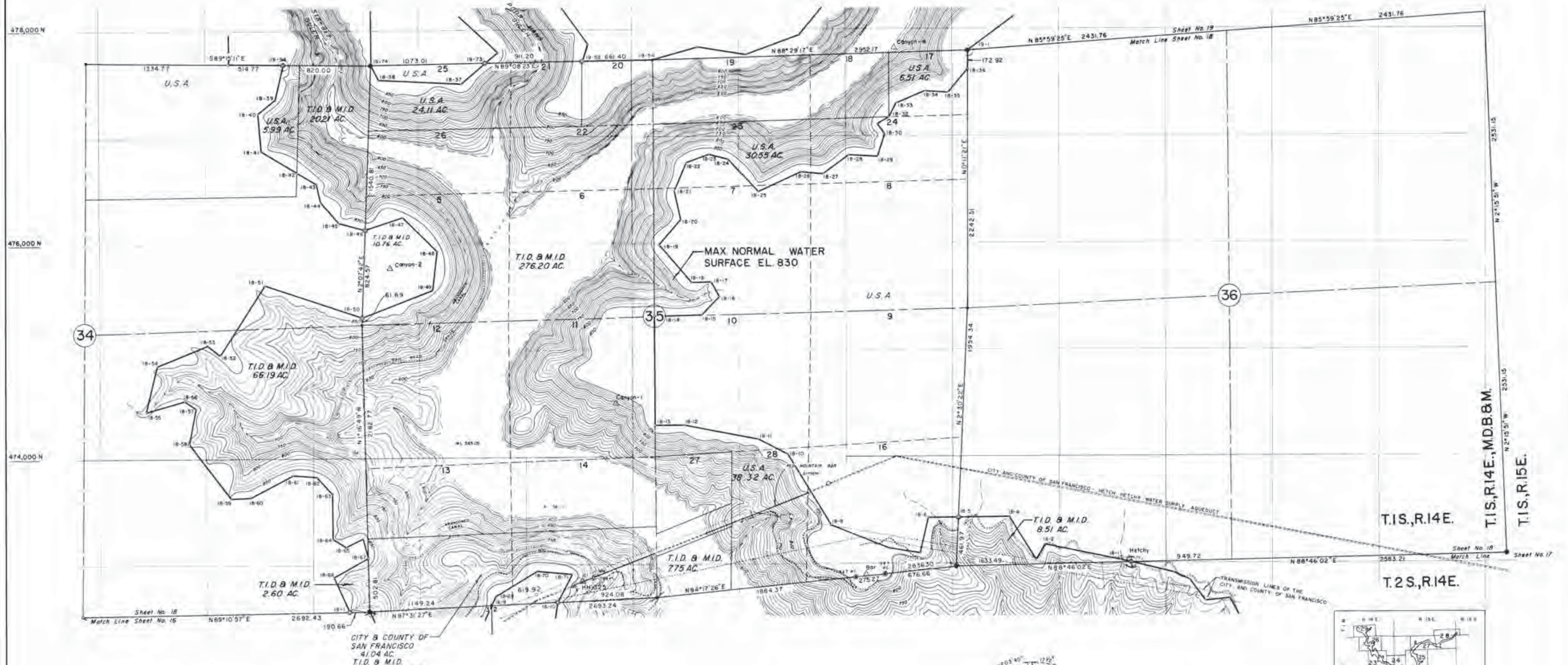
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2,034,000 E 2,036,000 E 2,038,000 E 2,040,000 E 2,042,000 E

2299-101

2299-101

17



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.
17-51	N.76°15'00"W.	112.82	18-26	S.84°14'00"E.	209.06	18-48	S. 6°08'00"W.	365.24
18-1	N.78°17'00"W.	713.88	18-27	N.53°50'00"E.	294.82	18-49	S.68°24'00"W.	711.08
18-2	S.30°58'00"W.	169.10	18-28	S.87°27'00"E.	269.27	18-50	N.71°41'00"W.	966.81
18-3	N.31°14'00"W.	472.48	18-29	N.18°26'00"E.	218.20	18-51	S.32°43'00"W.	771.42
18-4	S.89°28'00"W.	472.34	18-30	N.37°09'00"W.	118.09	18-52	N.51°42'00"W.	151.65
18-5	S.89°28'00"W.	285.69	18-31	N.60°01'00"E.	135.76	18-53	S.67°23'00"W.	512.38
18-6	S.13°37'00"W.	335.44	18-32	N.26°01'00"E.	140.52	18-54	S.14°23'00"W.	434.63
18-7	N.81°32'00"W.	285.11	18-33	N.67°31'00"E.	305.29	18-55	N.75°07'00"E.	377.67
18-8	N.68°08'13"W.	593.75	18-34	S.86°06'00"E.	205.48	18-56	S.55°27'00"E.	128.71
18-9	N.31°46'00"W.	784.51	18-35	N.40°40'00"E.	290.84	18-57	S.11°21'00"W.	335.55
18-10	N.64°01'00"W.	310.35	18-36	N. 0°11'21"E.	172.92	18-58	S.37°20'00"E.	646.42
18-11	N.78°29'00"W.	706.22	19-1			18-59	N.86°47'00"E.	178.28
18-12	S.88°36'00"W.	265.72	19-73	S.50°02'00"W.	300.77	18-60	N.62°55'00"E.	448.13
18-13	N. 0°10'26"W.	1014.63	18-37	N.87°02'00"W.	777.10	18-61	S.86°26'00"E.	225.44
18-14	N.88°42'46"E.	442.03	18-38	N.25°51'00"W.	152.09	18-62	S.42°09'00"E.	213.10
18-15	N.42°43'00"E.	242.91	19-74			18-63	S. 0°57'00"E.	421.06
18-16	N.29°42'00"W.	151.32	19-94	S.13°26'00"W.	338.85	18-64	S.57°52'00"E.	142.89
18-17	S.88°09'00"W.	186.10	18-39	S.50°12'00"W.	210.88	18-65	N.64°36'00"E.	177.13
18-18	N.40°14'00"W.	467.60	18-40	S. 4°46'00"E.	349.21	18-66	S.16°10'00"E.	183.91
18-19	N.41°51'00"E.	308.77	18-41	S.59°15'00"E.	388.45	18-67	S.60°32'00"W.	372.49
18-20	N.12°36'00"W.	279.73	18-42	S.59°15'00"E.	211.97	18-68	S.24°13'00"E.	353.25
18-21	N.22°47'00"E.	291.77	18-43	S.13°04'00"E.	172.47	16-1		
18-22	N.71°24'00"E.	222.63	18-44	S.40°40'00"E.	262.38	16-9	N.24°14'00"E.	100.00
18-23	S.76°52'00"E.	184.84	18-45	S.75°35'00"E.	256.52	18-69	N.58°28'00"E.	454.33
18-24	S.42°22'00"E.	414.09	18-46	N.71°07'00"E.	370.49	18-70	S.85°03'00"E.	324.25
18-25	N.65°35'00"E.	442.60	18-47	S.45°00'00"E.	451.13	18-71	S.25°43'00"W.	304.18
18-26			18-48			16-10		

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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

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TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- △ PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000
Contour interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

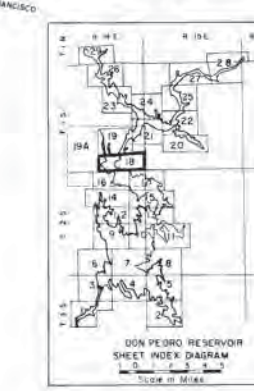


EXHIBIT K SHEET 18

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

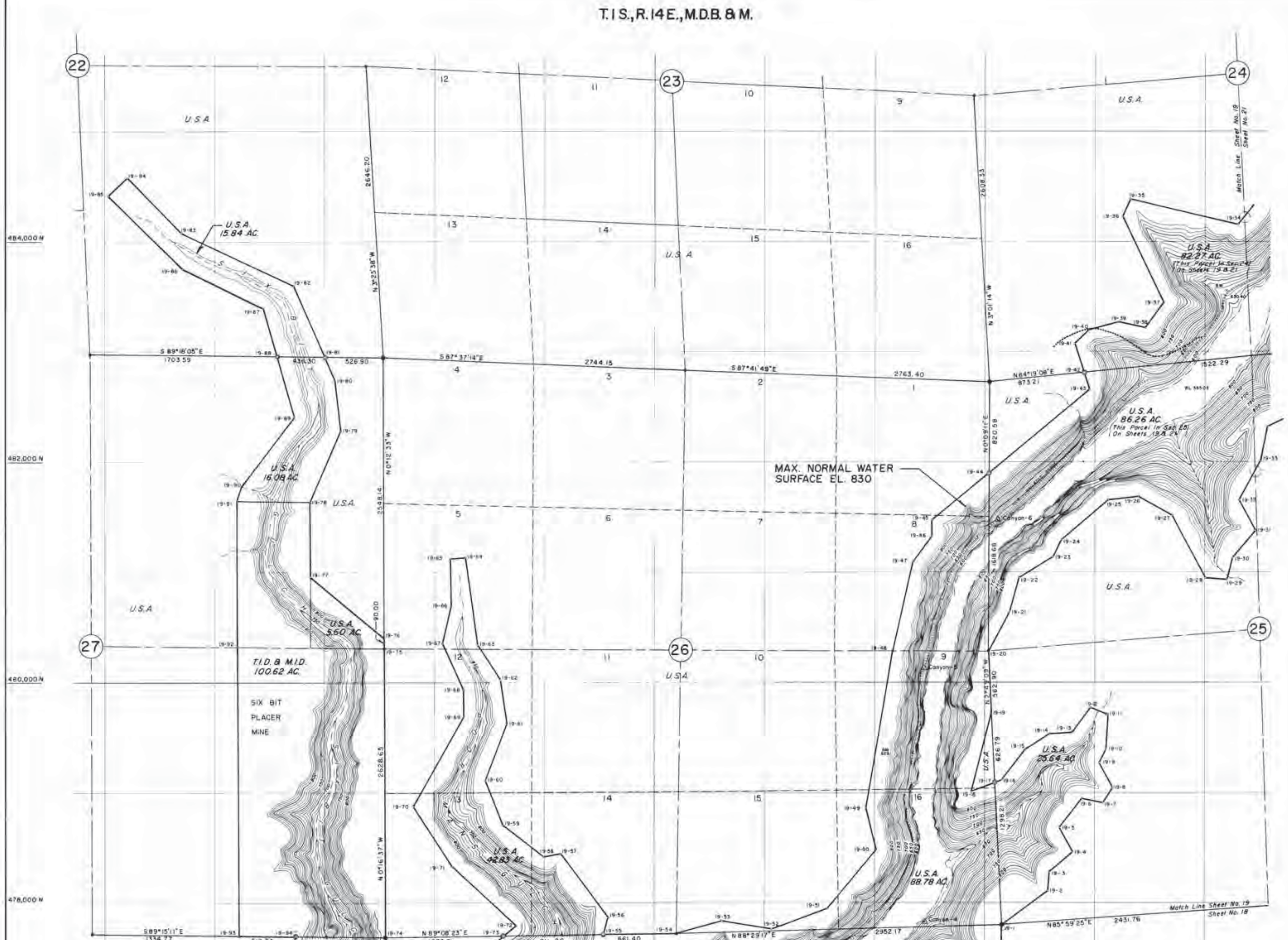
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-102

2299 — 102

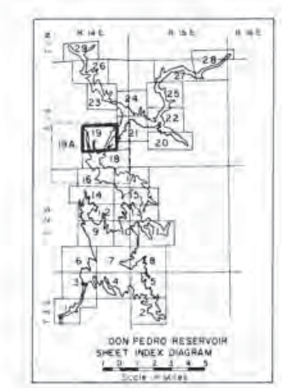
18

T.1 S., R.14 E., M.D.B.& M.



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
19-1	N.53°31'00"E.	526.85
19-2	N. 4°27'00"E.	171.71
19-3	N.49°09'11"E.	282.86
19-4	N.29°43'00"W.	252.20
19-5	N.38°27'00"E.	334.53
19-6	S.79°24'00"E.	190.25
19-7	N.33°00'00"E.	159.77
19-8	N.26°52'00"W.	756.70
19-9	N.26°45'00"E.	135.51
19-10	N. 3°04'00"E.	317.46
19-11	N.68°08'00"W.	169.17
19-12	S.36°50'00"W.	283.60
19-13	S.86°39'00"W.	205.35
19-14	S.55°47'00"W.	268.49
19-15	S.38°29'00"W.	342.33
19-16	S.69°31'00"W.	71.17
19-17	S.69°31'00"W.	224.64
19-18	N.14°18'00"E.	727.18
19-19	N. 2°49'09"W.	562.90
19-20	N.28°53'00"E.	408.61
19-21	N.15°17'00"E.	322.20
19-22	N.58°49'00"E.	361.14
19-23	N.26°00'00"E.	180.24
19-24	N.49°53'00"E.	555.69
19-25	N.83°13'00"E.	270.90
19-26	S.60°35'00"E.	360.45
19-27	S.27°57'00"E.	844.18
19-28	S.87°37'00"E.	192.17
19-29	N.13°58'00"E.	198.88
19-30	N.40°25'00"E.	327.02
19-31	N.28°02'00"W.	312.71
19-32	N.28°40'00"E.	402.32
19-33		
19-34	N.76°38'00"W.	1005.37
19-35	S.24°22'00"W.	174.54
19-36	S.25°34'00"E.	871.30
19-37	S.36°11'00"W.	286.22
19-38	N.77°30'00"W.	244.81
19-39	S.75°28'00"W.	278.93
19-40	S.47°02'00"W.	179.01
19-41	S.17°49'00"E.	281.32
19-42	S.17°49'00"E.	153.52
19-43	S.50°21'00"W.	1192.38
19-44	S.50°21'00"W.	663.39
19-45	S. 1°09'00"W.	150.03
19-46	S.36°22'00"W.	291.81
19-47	S.12°55'00"W.	836.18
19-48	S. 9°33'00"W.	1433.89
19-49	S.13°28'00"E.	386.62
19-50	S.39°37'00"W.	701.01
19-51	S.59°33'00"W.	532.54
19-52	N.80°27'00"W.	459.37
19-53	S.74°00'00"W.	429.17
19-54	S.89°08'23"W.	661.40
19-55	N.15°33'00"E.	165.40
19-56	N.36°44'00"W.	722.38
19-57	S.79°32'00"W.	159.66
19-58	N.51°50'00"W.	475.72
19-59	N.21°27'00"W.	426.55
19-60	N.20°45'00"E.	556.07
19-61	N. 8°48'00"W.	398.69
19-62	N.33°31'00"W.	376.64
19-63	N. 7°46'00"W.	807.39
19-64	S.86°14'00"W.	137.30
19-65	S. 1°04'00"E.	433.07
19-66	S.13°33'00"W.	345.63
19-67	S.24°11'00"E.	461.48
19-68	S. 1°34'00"E.	255.10
19-69	S.29°21'00"W.	936.24
19-70	S.33°09'00"E.	643.76
19-71	S.47°18'00"E.	790.48
19-72	S.50°02'00"W.	150.69
19-73		
19-74	N. 0°16'37"W.	2628.65
19-75	N. 0°12'33"W.	90.00
19-76	N.50°10'00"W.	870.69
19-77	N. 0°12'37"W.	878.43
19-78	N.22°48'00"E.	710.98
19-79	N. 6°10'00"W.	457.52
19-80	N.23°43'00"W.	227.30
19-81	N.23°43'00"W.	709.87
19-82	N.64°50'00"W.	1131.34
19-83	N.44°01'00"W.	698.02
19-84	S.45°51'00"W.	238.32
19-85	S.45°23'00"E.	942.59
19-86	S.63°43'00"E.	820.21
19-87	S.15°36'00"E.	454.47
19-88	S.15°36'00"E.	571.36
19-89	S.37°28'00"W.	779.12
19-90	S.16°55'00"W.	154.62
19-91	S. 0°12'41"E.	1321.15
19-92	S. 0°14'43"E.	2623.35
19-93	S.89°15'11"E.	514.77
19-94		



DON PEDRO RESERVOIR
SHEET INDEX DIAGRAM

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R. E. Penney
RICHARD E. PENNEY, PRESIDENT

2,024,000 E | 2,026,000 E | 2,028,000 E | 2,030,000 E | 2,032,000 E

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000

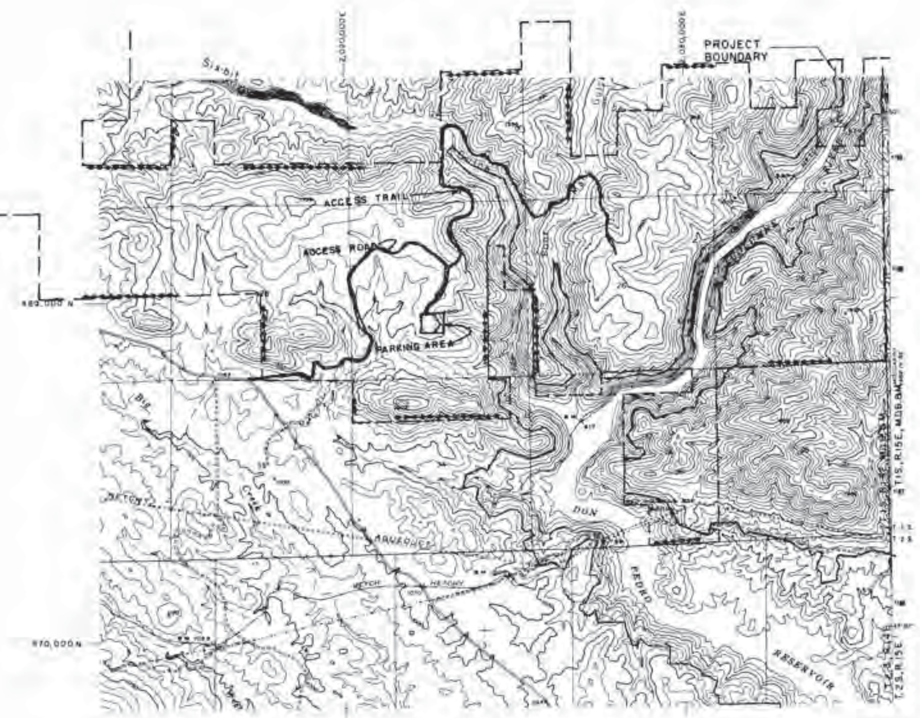
Contour Interval 10 Feet
Datum is Mean Sea Level
COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 19

PROJECT NO. 2299 CALIFORNIA
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT
DON PEDRO PROJECT
DON PEDRO RESERVOIR
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-103

2299-103



Scale: 1" = 2000'

2000 0 2000 4000 6000 8000 10,000

Contour Interval 50 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

LEGEND

PROJECT BOUNDARY
BOUNDARY OF PUBLIC LAND
PROPOSED HUNTING ACCESS RD.
PROPOSED HUNTING ACCESS TRAIL
PROPOSED PARKING LOT

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
R. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

ADDITIONAL LAND TO BE INCLUDED WITHIN PROJECT BOUNDARY TO PROVIDE HUNTING ACCESS.

TO BE ACQUIRED FROM PRIVATE OWNERSHIP.

Beginning at the S quarter section corner of section 28 TWP 1S, R. 14E M.D. B+M; thence along the south line of said section N 89° 08' 48" W 689.91 feet; thence N 0° 51' 12" E 40 feet; thence S 89° 08' 48" E 612.11 feet, thence on a tangent curve of which the radius is 280 feet, through a central angle of 12° 38' 42" a distance of 61.80 feet; thence N 78° 12' 30" E 15.78 feet to a point on the North - South quarter section line of said section 28; thence along said quarter section line S 0° 25' 28" E 50.21 feet to the point of beginning.

CONTAINING 0.64 ACRES.

OVER GOVERNMENT LAND.

Access Road.

A strip of land 40 feet wide on a curved location, the center of which (described to the point of intersection of the tangents) is as follows.

P.I. NO.	BEARING	DISTANCE	COORDINATES NORTH	COORDINATES EAST
2.	N. 78°12'34"E.	45.00'	477,718.39	2,017,560.21
		363.88'	Enter Government Land	
3.	N. 81°58'26"E.	157.40'		
4.	S. 84°30'42"E.	173.64'		
5.	N. 75°46'40"E.	153.81'		
6.	N. 85°37'47"E.	158.40'		
7.	N. 62°24'09"E.	112.15'		
8.	S. 85°39'29"E.	90.12'		
9.	S. 55°14'22"E.	67.39'		
10.	S. 39°56'15"E.	108.67'		
11.	N. 78°25'58"E.	91.91'		
12.	N. 49°17'17"E.	129.09'		
13.	N. 29°12'22"E.	67.16'		
14.	N. 02°12'01"E.	241.72'		
15.	N. 36°37'23"W	57.08'		
16.	N. 40°24'12"E.	83.01'		
17.	S. 42°26'56"E.	236.47'		
18.	S. 63°42'34"E.	158.35'		
19.	N. 44°04'18"E.	103.14'		
20.	N. 87°18'56"E.	189.54'		
21.	N. 58°19'03"E.	204.46'		
22.	N. 11°56'25"E.	210.18'		
23.	N. 85°37'02"E.	88.04'		
24.	S. 39°34'17"E.	55.78'		
25.	S. 56°17'55"E.	208.25'	478,370.94	2,020,075.46
26.	S. 76°04'16"E.	77.71'	478,255.39	2,020,248.71
27.	N. 82°59'53"E.	194.58'		
28.	N. 43°56'02"E.	158.26'		
29.	N. 27°51'41"E.	294.57'		
30.	N. 18°23'35"E.	279.16'		
31.	N. 19°40'16"W.	84.52'		
32.	N. 43°36'23"W.	192.00'		
33.	N. 23°30'00"W.	749.96'		
34.	N. 08°03'22"W.	385.69'		
35.	N. 18°39'47"W.	285.44'	480,187.95	2,020,338.83
36.	S. 33°55'33"E.	403.96'	480,740.11	2,020,162.33
37.	N. 41°50'38"E.	548.26'		
38.	N. 33°29'58"E.	175.65'		
39.	N. 72°57'18"E.	107.29'		
40.	S. 43°05'52"E.	147.74'		
41.	S. 68°10'02"E.	140.89'		
42.	S. 79°04'42"E.	343.61'		
43.	N. 72°17'58"E.	126.17'		
44.	N. 43°05'58"E.	302.83'		
45.	N. 74°50'18"E.	282.23'		
46.	S. 56°29'23"E.	442.14'	481,769.42	2,022,111.57
47.	S. 49°45'19"E.	799.86'		
48.	S. 14°53'30"W.	777.98'	481,008.57	2,023,090.75
49.	S. 41°59'19"W.	695.77'		
50.	S. 09°29'22"E.	56.97'	479,683.38	2,022,434.75

CONTAINING APPROX. 10.62 AC.

Parking Area.

The southeast quarter of the northeast quarter of the southwest quarter of section 27, TWP 1S, R. 14E M.D. B+M.

Cty. 10 acres

Access Trail.

A strip of land 30 feet wide beginning at approximately P.I. no. 46 of the access road and running Northerly, Easterly and Southerly around the reservoir arms in Six Bit Gulch and Poor Mans Gulch, a distance of approximately 14,500 feet to a point on the ridge North of the center of Section 26, TWP 1S, R. 14E.

Cty. Approx. 10 acres

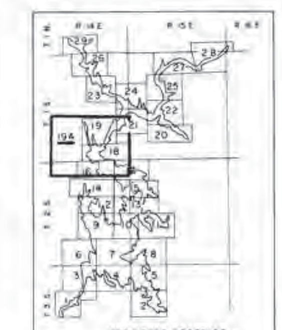


EXHIBIT K SHEET 19A

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

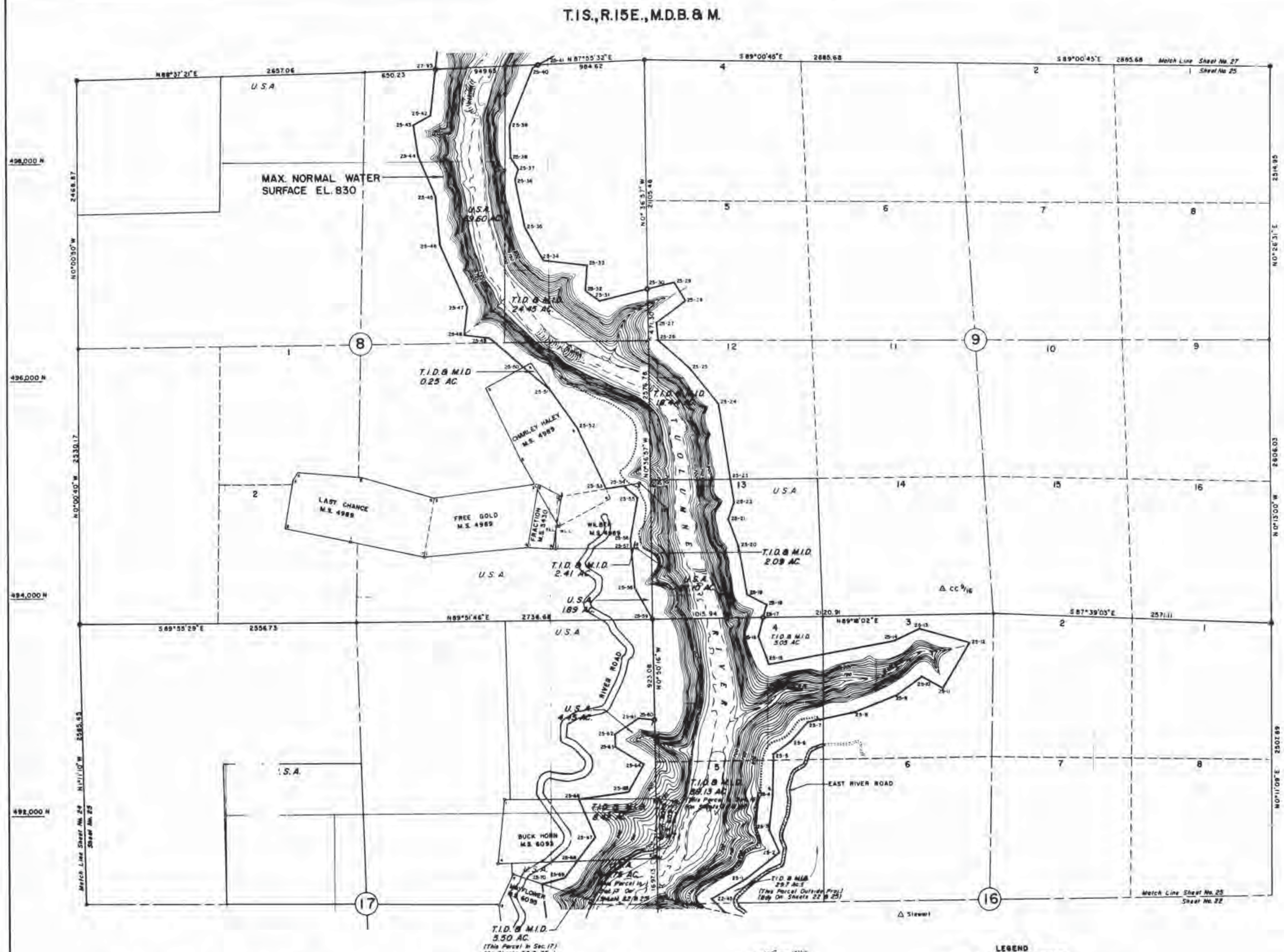
DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-104

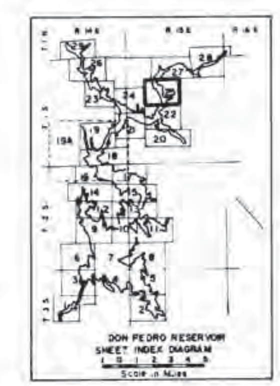
2299 - 104



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
22-45	N.59°26'00"E.	365.82
25-1	N.52°04'00"E.	385.47
25-2	N.23°31'00"W.	230.18
25-3	N. 5°42'00"E.	372.62
25-4	N. 0°56'00"E.	369.05
25-5	N.53°48'00"E.	203.21
25-6	N.40°52'00"E.	236.78
25-7	N.78°34'00"E.	433.61
25-8	N.68°34'00"E.	429.71
25-9	N.53°51'00"E.	284.82
25-10	S.60°21'00"E.	219.42
25-11	N.30°28'00"E.	487.25
25-12	N.74°16'00"W.	475.82
25-13	S.64°45'00"W.	253.19
25-14	S.79°25'00"W.	1177.43
25-15	N.21°41'00"W.	272.24
25-16	N.15°46'00"E.	182.16
25-17	N.15°45'00"E.	[illegible]
25-18	N.51°20'00"W.	211.65
25-19	N. 9°15'00"W.	447.80
25-20	N.20°47'00"W.	262.06
25-21	N.18°59'00"E.	166.00
25-22	N. 8°36'00"W.	216.86
25-23	N. 8°36'00"W.	705.38
25-24	N.[illegible]°01'00"W.	420.90
25-25	N.47°51'00"W.	287.53
25-26	N. [illegible]'00"W.	[illegible]
25-27	N.[illegible]'00"E.	[illegible].87
25-28	N.[illegible]'00"W.	195.[illegible]
25-29	S.75°00'00"W.	[illegible]
25-30	S.75°00'00"W.	[illegible]58.50
25-31	N.[illegible]°59'00"W.	15[illegible].80
25-32	N. [illegible]'00"E.	[illegible]
25-33	N.8[illegible]'00"W.	[illegible]89.55
25-34	N.[illegible]'00"W.	[illegible]
25-35	N.[illegible]°18'00"W.	[illegible]
25-36	N.15°10'00"E.	95.75
25-37		

NO.	BEARING	DIST.
25-37	N.35°16'00"W.	121.25
25-38	N. 1°20'00"W.	300.08
25-39	N.27°06'00"E.	574.18
25-40	N.61°55'00"E.	52.43
25-41		
27-93	S. 8°13'00"W.	426.78
25-42	S.59°19'00"W.	180.25
25-43	S. 8°28'00"E.	285.11
25-44	S.23°00'00"E.	401.93
25-45	S. 4°40'00"E.	455.51
25-46	S.23°44'00"E.	613.88
25-47	S. 4°59'00"W.	265.00
25-48	S.83°20'00"E.	232.57
25-49	S.49°30'00"E.	419.08
25-50	S.49°30'00"E.	308.25
25-51	S.35°14'00"E.	447.28
25-52	S.25°19'00"E.	621.15
25-53	N.80°38'13"E.	160.28
25-54	S.48°01'00"E.	165.74
25-55	S. 9°53'00"W.	384.70
25-56	S. 4°59'00"E.	84.87
25-57	S. 4°59'00"E.	361.90
25-58	S.29°12'00"E.	343.71
25-59	S. 0°50'16"E.	923.08
25-60	N.82°07'00"W.	152.66
25-61	S.55°42'00"W.	262.67
25-62	S. 1°57'00"E.	117.07
25-63	S.58°14'00"E.	305.81
25-64	S.28°25'00"W.	289.95
25-65	S.82°17'00"W.	469.84
25-66	S.23°39'00"E.	383.03
25-67	S.37°28'00"W.	284.04
25-68	S.37°28'00"W.	179.58
25-69	S.72°50'00"W.	221.60
25-70		



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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R.E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 25

PROJECT NO. 2299 CALIFORNIA

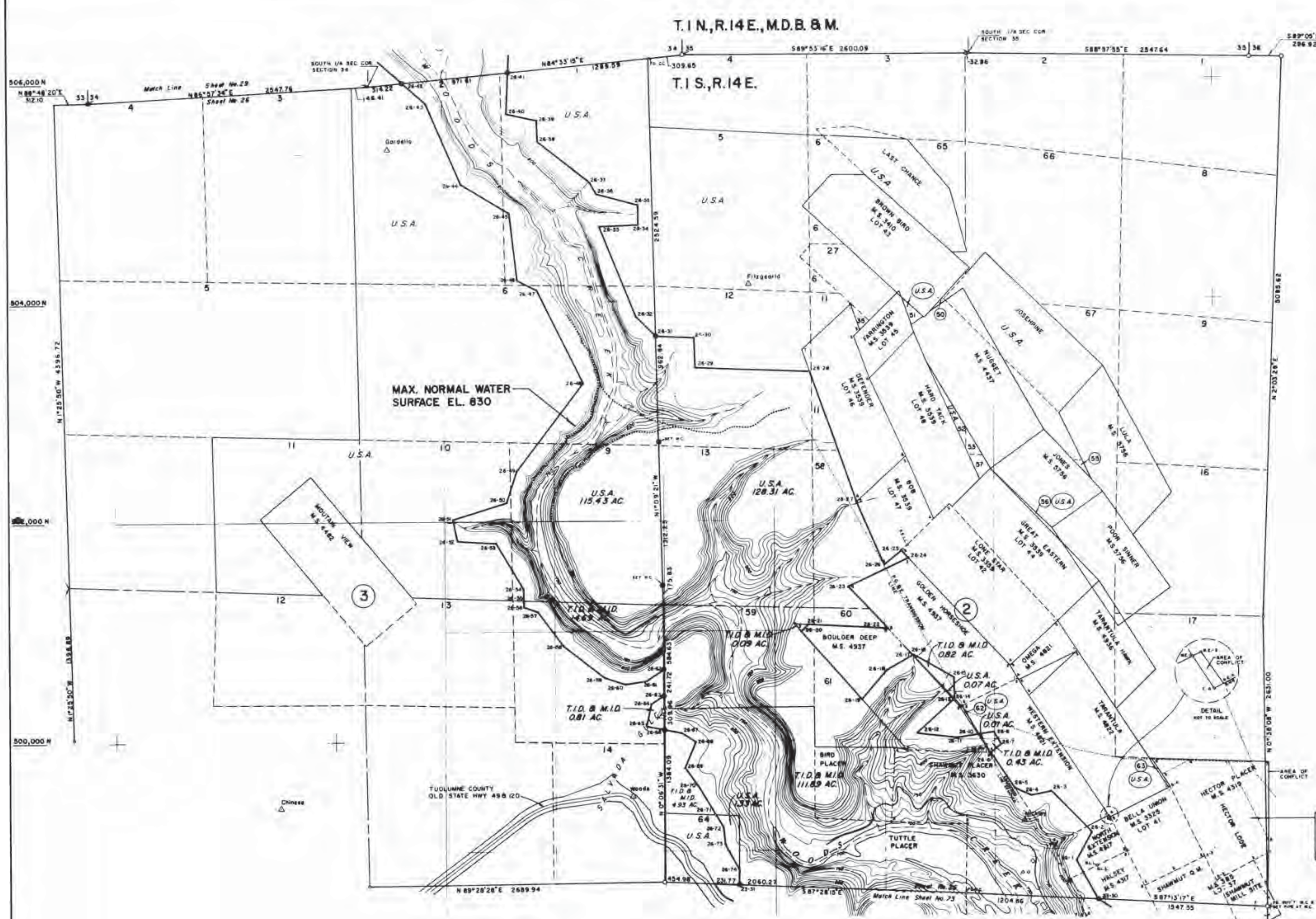
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

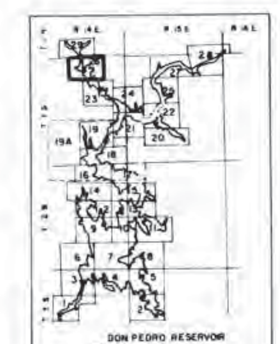
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-110



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
23-30	N.28°53'00"W.	405.38	26-37	N.51°20'00"W.	608.30
26-1	N.28°15'00"E.	287.26	26-38	N. 1°30'00"W.	192.07
26-2	N.44°09'00"W.	525.45	26-39	N.77°54'00"W.	286.36
26-3	S.79°08'00"W.	180.24	26-40	N. 2°55'00"E.	376.52
26-4	N.66°07'00"W.	161.56	26-41		
26-5	N.33°41'52"W.	389.47	26-42	S.48°22'00"E.	279.86
26-6	N.48°58'00"E.	115.05	26-43	S.23°19'00"E.	805.89
26-7	N.31°12'00"W.	127.42	26-44	S.59°19'00"E.	511.46
26-8	S.82°30'00"W.	128.61	26-45	S. 6°05'00"E.	613.45
26-9	S.82°30'00"W.	4.44	26-46	S.64°34'00"E.	204.86
26-10	S.82°30'00"W.	188.70	26-47	S.26°11'00"E.	951.69
26-11	N.84°37'00"W.	383.69	26-48	S.37°31'00"W.	1004.86
26-12	N.47°37'00"E.	457.42	26-49	S.18°08'00"W.	305.16
26-13	N.47°37'00"E.	9.23	26-50	S.73°28'00"W.	516.37
26-14	N. 1°06'00"W.	191.48	26-51	S.12°51'00"E.	197.95
26-15	N.60°52'00"W.	430.90	26-52	S.86°44'00"E.	350.51
26-16	S.59°47'00"W.	1.72	26-53	S.30°36'00"E.	503.04
26-17	S.59°47'00"W.	272.53	26-54	SOUTH	95.81
26-18	S.40°17'00"W.	349.85	26-55	SOUTH	61.19
26-19	N.41°25'13"W.	830.02	26-56	S.69°39'00"E.	132.26
26-20	N.46°37'00"E.	86.99	26-57	S.37°01'00"E.	382.00
26-21	S.86°46'24"E.	726.35	26-58	S.52°29'00"E.	477.83
26-22	N.43°01'43"W.	527.84	26-59	S.70°55'00"E.	195.76
26-23	N.64°51'14"E.	508.39	26-60	N.80°46'00"E.	199.58
26-24	N.42°18'36"W.	95.67	26-61	N.55°10'00"E.	184.50
26-25	S.48°20'32"W.	210.28	26-62	S. 0°06'31"E.	241.72
26-26	N.23°21'28"W.	634.14	26-63	S.52°12'00"W.	139.52
26-27	N.19°25'11"W.	1262.15	26-64	S.12°58'00"W.	209.34
26-28	N.87°38'44"W.	1037.89	26-65	S.80°10'00"E.	165.93
26-29	N. 0°59'11"W.	274.36	26-66	S.80°10'00"E.	161.89
26-30	N.87°38'44"W.	352.37	26-67	S.56°42'00"E.	153.16
26-31	N.46°40'00"W.	251.44	26-68	S.22°56'00"W.	254.08
26-32	N.21°32'00"W.	891.16	26-69	S.36°24'00"E.	193.81
26-33	N.88°43'00"E.	355.09	26-70	S.31°25'00"E.	317.34
26-34	N. 0°19'00"E.	180.00	26-71	S.31°25'00"E.	137.32
26-35	N.74°59'00"W.	390.22	26-72	S. 5°54'00"E.	155.82
26-36	N.31°27'00"W.	120.74	26-73	S.29°17'00"E.	270.07
26-37			26-74	S. 0°01'54"E.	134.10
			23-31		



DON PEDRO RESERVOIR SHEET INDEX DIAGRAM

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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Robert Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R.E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 26

PROJECT NO. 2299 CALIFORNIA

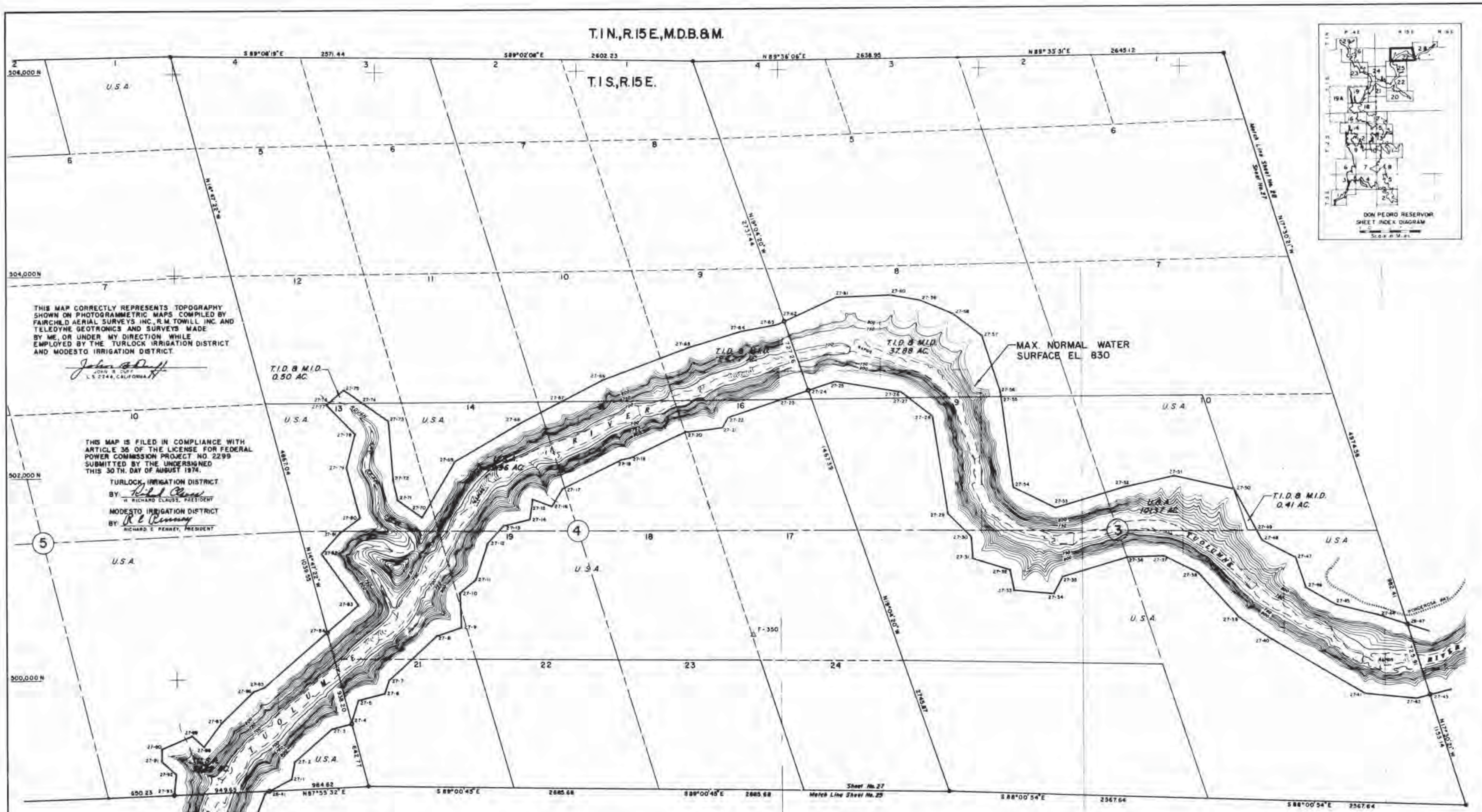
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-111



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John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

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TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Pennoy
RICHARD E. PENNEY, PRESIDENT

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
25-41	N.61°55'00"E.	251.33
27-1	N.10°04'00"E.	171.64
27-2	N.49°01'00"E.	494.06
27-3	N.76°48'00"E.	200.48
27-4	N.16°01'00"E.	245.74
27-5	N.76°10'00"E.	271.91
27-6	N.19°51'00"E.	141.40
27-7	N.47°24'00"E.	641.20
27-8	N.71°51'00"E.	756.78
27-9	N. 1°51'00"W.	341.18
27-10	N.49°00'00"E.	202.73
27-11	N.19°24'00"E.	373.20
27-12	N.40°42'00"E.	236.13
27-13	N.78°00'00"E.	273.99
27-14	N. 8°15'00"E.	202.09
27-15	S.69°27'00"E.	205.06
27-16	N.31°41'00"E.	205.64
27-17	N.64°11'00"E.	645.39
27-18	N.81°05'00"E.	103.25
27-19		

NO.	BEARING	DIST.
27-19	N.65°10'00"E.	592.83
27-20	N.83°44'00"E.	366.25
27-21	N.31°13'00"E.	115.76
27-22	N.71°49'00"E.	557.56
27-23	N.71°49'00"E.	284.53
27-24	N.71°49'00"E.	276.74
27-25	S.80°58'00"E.	656.13
27-26	S.51°45'00"E.	110.89
27-27	S.51°45'00"E.	297.83
27-28	S. 8°28'00"E.	971.58
27-29	S.44°30'00"E.	328.11
27-30	S. 2°53'00"E.	718.28
27-31	S.73°08'00"E.	392.90
27-32	S.11°42'00"E.	202.20
27-33	S.84°29'00"E.	394.83
27-34	N.28°04'00"E.	187.00
27-35	N.73°41'00"E.	668.96
27-36	N.89°03'00"E.	364.05
27-37	S.63°34'00"E.	379.69
27-38		

NO.	BEARING	DIST.
27-38	S.42°25'00"E.	594.58
27-39	S.55°52'00"E.	393.85
27-40	S.59°32'00"E.	1073.11
27-41	S.84°23'00"E.	500.49
27-42	N.76°49'00"E.	156.20
27-43		
28-47	N.71°50'00"W.	323.90
27-44	N.75°58'00"W.	428.80
27-45	N.59°46'00"W.	343.72
27-46	N.18°16'00"W.	309.59
27-47	N.62°19'00"W.	368.12
27-48	N.28°25'00"W.	118.40
27-49	N.28°25'00"W.	459.97
27-50	N.76°43'00"W.	611.08
27-51	S.77°52'00"W.	504.27
27-52	S.73°34'00"W.	717.32
27-53	N.63°29'00"W.	472.70
27-54	N. 7°16'00"W.	899.73
27-55	N. 7°16'00"W.	57.45
27-56		

NO.	BEARING	DIST.
27-56	N.17°48'00"W.	575.57
27-57	N.51°06'00"W.	366.23
27-58	N.67°18'00"W.	357.69
27-59	N.80°53'00"W.	296.75
27-60	S.88°18'00"W.	540.24
27-61	S.65°37'00"W.	569.46
27-62	S.65°37'00"W.	72.93
27-63	S.80°25'00"W.	366.12
27-64	S.73°40'00"W.	558.52
27-65	S.69°37'00"W.	889.75
27-66	S.63°01'00"W.	473.26
27-67	S.63°01'00"W.	479.34
27-68	S.59°39'00"W.	732.34
27-69	S.30°51'00"W.	639.53
27-70	N.53°44'00"W.	302.62
27-71	N.12°37'00"W.	205.98
27-72	N. 4°09'00"W.	580.52
27-73	N.54°52'00"W.	312.63
27-74	N.54°52'00"W.	224.21
27-75		

NO.	BEARING	DIST.
27-75	S.50°08'00"W.	200.68
27-76	S.50°08'00"W.	28.63
27-77	S.44°54'00"E.	405.17
27-78	S.14°50'00"W.	351.71
27-79	S.14°41'00"E.	512.75
27-80	S.54°18'00"W.	245.05
27-81	S.41°38'00"W.	276.96
27-82	S.35°31'00"E.	626.57
27-83	S.49°21'00"W.	414.31
27-84	S.49°21'00"W.	824.58
27-85	S.69°13'00"W.	11[illegible].52
27-86	S.46°07'00"W.	[illegible]
27-87	S.37°24'00"W.	299.61
27-88	N.47°29'00"W.	160.20
27-89	S.66°08'00"W.	323.69
27-90	S. 4°22'00"W.	118.34
27-91	S.48°06'00"E.	196.16
27-92	S. 6°13'00"W.	209.97
27-93		

2,046,000E 2,048,000E 2,050,000E 2,052,000E 2,054,000E 2,056,000E

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale
400 0 400 800 1200 1600 2000

Contour interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

EXHIBIT K SHEET 27

PROJECT NO. 2299 CALIFORNIA

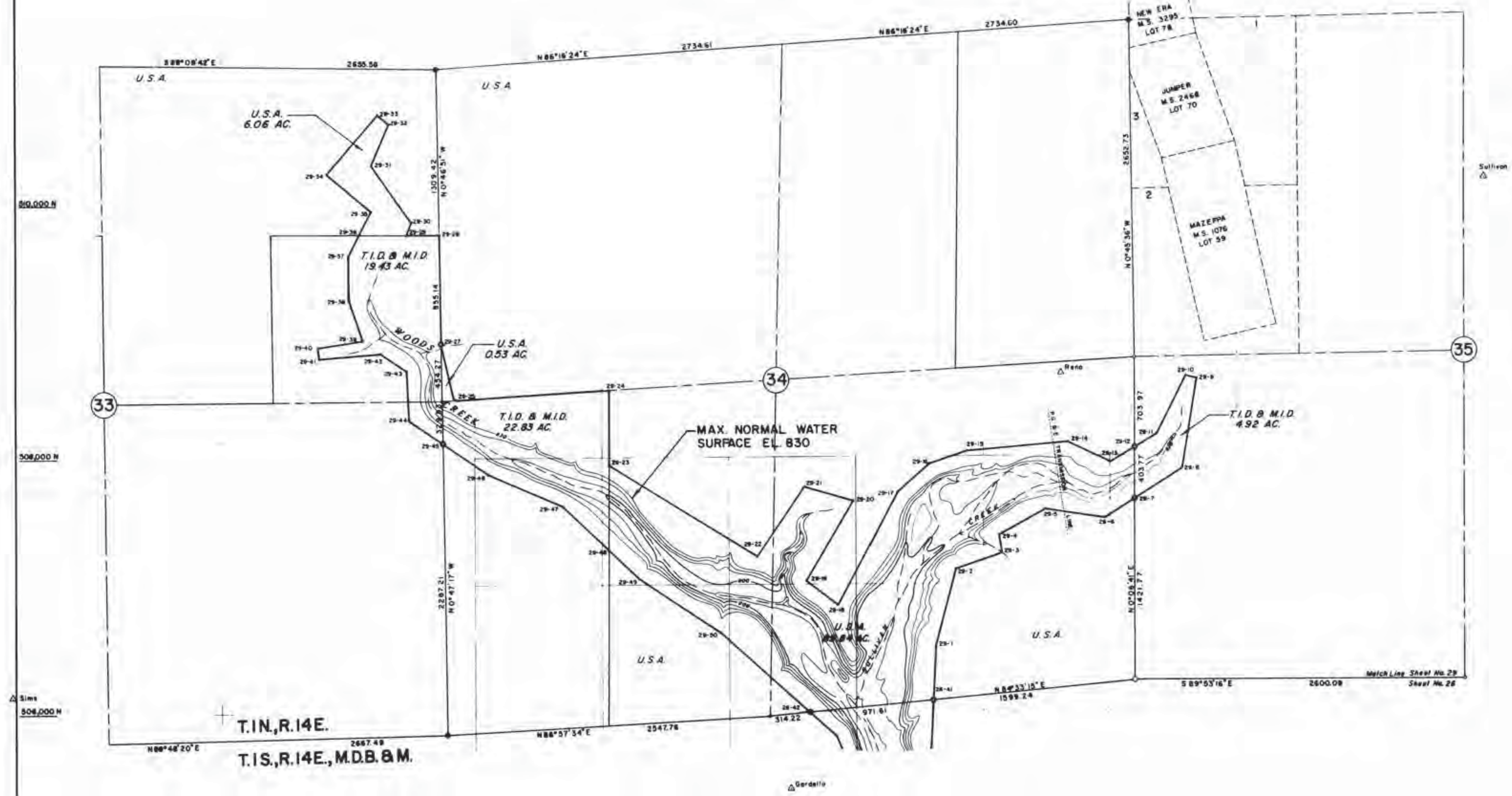
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

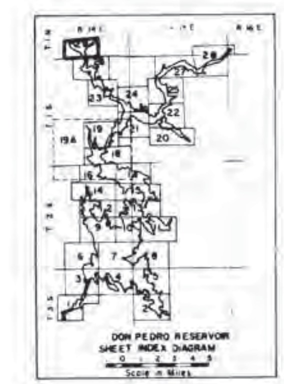
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-112



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
26-41			29-26		
	N. 2°55'00"E.	431.52		N.13°37'00"W.	454.65
29-1			29-27		
	N.15°03'00"E.	620.26		N. 0°46'51"W.	855.14
29-2			29-28		
	N.71°37'00"E.	380.42		N.89°39'57"W.	256.48
29-3			29-29		
	N. 8°27'00"W.	149.63		N.21°17'00"E.	119.45
29-4			29-30		
	N.61°48'00"E.	408.47		N.35°40'00"W.	545.32
29-5			29-31		
	S.81°45'00"E.	480.98		N.23°23'00"E.	355.19
29-6			29-32		
	N.57°22'00"E.	281.14		N.50°53'00"W.	117.29
29-7			29-33		
	N.57°22'00"E.	441.81		S.40°27'00"W.	615.00
29-8			29-34		
	N. 9°13'00"E.	711.20		S.49°54'00"E.	454.92
29-9			29-35		
	N.75°18'00"W.	82.71		S.26°58'00"W.	214.48
29-10			29-36		
	S.27°07'00"W.	508.95		S.26°58'00"W.	173.71
29-11			29-37		
	S.58°54'00"W.	202.27		S. 0°19'00"E.	359.01
29-12			29-38		
	S.58°54'00"W.	227.50		S.18°23'00"E.	332.99
29-13			29-39		
	N.64°54'00"W.	367.73		S.81°33'00"W.	353.84
29-14			29-40		
	S.85°25'00"W.	799.57		S. 6°25'00"E.	89.50
29-15			29-41		
	S.71°34'00"W.	309.90		N.85°22'00"E.	481.58
29-16			29-42		
	S.48°51'00"W.	337.34		S.55°12'00"E.	243.56
29-17			29-43		
	S.28°19'00"W.	999.54		S. 2°57'00"E.	389.51
29-18			29-44		
	N.51°41'00"W.	309.70		S.55°13'00"E.	320.80
29-19			29-45		
	N.31°03'00"E.	727.15		S.55°13'00"E.	440.11
29-20			29-46		
	N.73°41'00"W.	402.20		S.67°02'00"E.	633.17
29-21			29-47		
	S.33°49'00"W.	659.54		S.46°40'00"E.	501.07
29-22			29-48		
	N.58°28'00"W.	1374.80		S.46°40'00"E.	329.42
29-23			29-49		
	N. 0°13'22"E.	586.38		S.56°01'00"E.	769.38
29-24			29-50		
	S.86°37'40"W.	1705.30		S.48°22'00"E.	939.15
29-25			26-42		
	N.68°38'00"W.	15.30			
29-26					



THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John P. Duff
JOHN P. DUFF
L.S. 2248, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 38 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R.E. Penney
RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- △ PRIMARY HORIZONTAL CONTROL STATION

Scale
400 0 400 800 1200 1600 2000

Contour interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

2,018,000 E 2,020,000 E 2,022,000 E 2,024,000 E 2,026,000 E

EXHIBIT K SHEET 29

PROJECT NO. 2299 CALIFORNIA

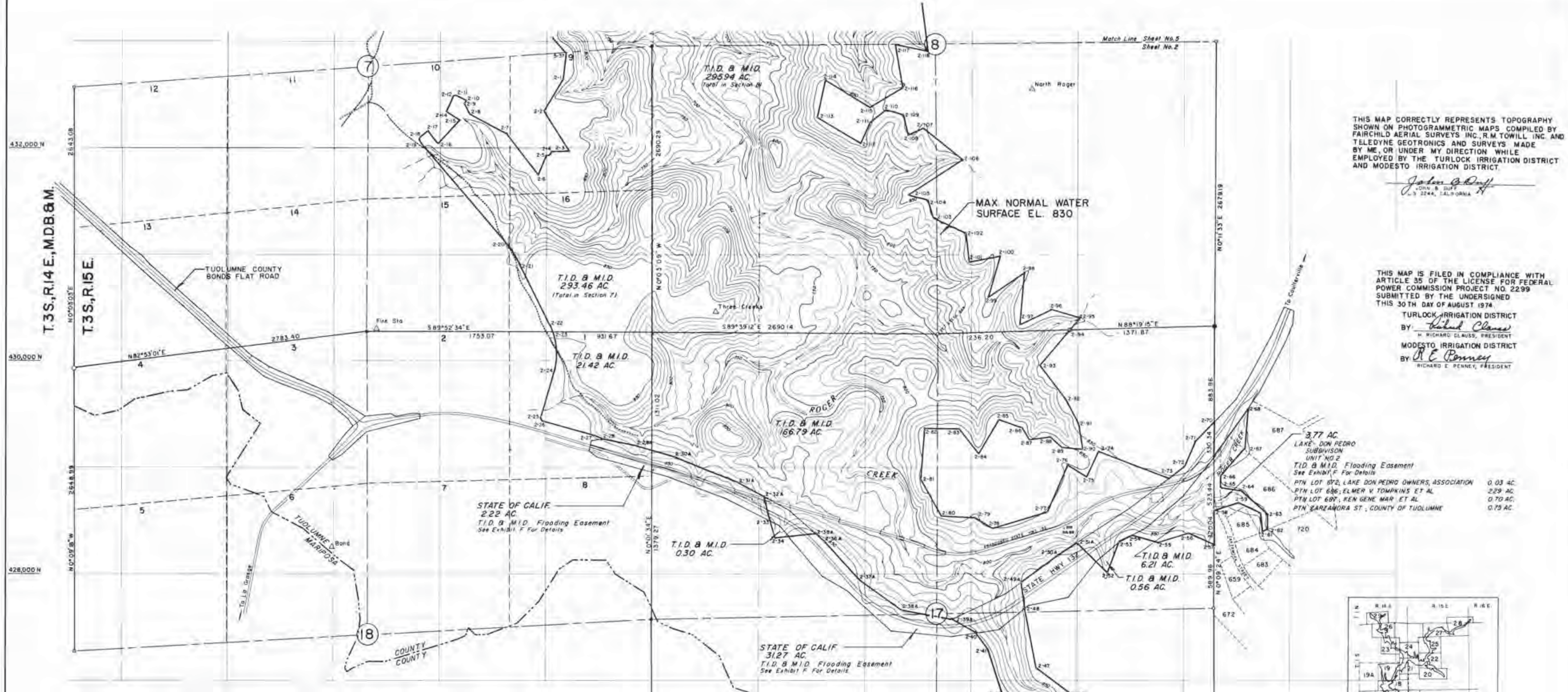
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-114



THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
5-37	S. 6°33'15"W.	238.86
2-1	S.30°36'09"W.	349.53
2-2	S.32°23'11"E.	449.37
2-3	S.86°27'39"W.	167.76
2-4	NON-TANGENT CURVE Δ=58°00'20" RT. R=60.00 L=60.74 CHORD S.58°50'56"W. 58.18	
2-5	S.22°16'18"W.	196.92
2-6	N.37°38'11"W.	487.21
2-7	N.62°15'23"W.	397.37
2-8	N.27°06'59"W.	110.00
2-9	N.25°56'24"E.	35.02
2-10	N.64°03'36"W.	97.58
2-11	TANGENT CURVE Δ=90°47'36" LT. R=25.00 L=39.62	
2-12	S.25°08'48"W.	53.31
2-13	TANGENT CURVE Δ=7°30'00" RT. R=740.00 L=96.87	
2-14	S.57°21'12"E.	155.00
2-15	S.42°06'04"W.	296.89
2-16	N.40°07'41"W.	155.00
2-17	S.49°52'19"W.	90.00
2-18	TANGENT CURVE Δ=90°00'00" LT. R=25.00 L=39.27	
2-19	S.40°07'41"E.	1263.75
2-20	TANGENT CURVE Δ=13°36'10" RT. R=940.00 L=223.17	
2-21	S.26°31'31"E.	632.04
2-22		

NO.	BEARING	DIST.
2-22	TANGENT CURVE Δ=7°39'24" RT. R=640.00 L=85.52	
2-23	CONTINUE ALONG CURVE Δ=34°46'07" RT. R=640.00 L=388.37	
2-24	S.15°54'00"W.	425.19
2-25	TANGENT CURVE Δ=90°00'00" LT. R=35.00 L=54.98	
2-26	S.74°06'00"E.	487.62
2-27	S.68°23'23"E.	100.50
2-28	S.79°48'38"E.	301.50
2-29A	S.74°06'00"E.	397.45
2-30A	S.67°22'25"E.	632.36
2-31A	S.61°24'09"E.	292.80
2-32A	S.14°26'55"E.	235.01
2-33	S.14°26'55"E.	168.13
2-34	N.81°21'41"E.	376.30
2-35A	S.49°36'33"E.	116.44
2-36A	S.41°51'00"E.	486.56
2-37A	S.54°20'17"E.	505.29
2-38A	S.80°17'28"E.	468.14
2-39A	S.60°58'47"E.	260.10
2-40	S.36°04'00"E.	194.10
2-41	S.17°10'00"E.	443.78
2-42	S.58°44'00"E.	414.17
2-43	S. 9°44'00"E.	242.49
2-44	S.42°30'00"E.	340.44
2-45	N. 2°08'00"E.	698.48
2-46	N.53°26'00"W.	414.61
2-47	N.10°14'15"W.	579.54
2-48		

NO.	BEARING	DIST.
2-48	N.10°14'15"W.	240.69
2-49A	N.53°15'53"E.	444.17
2-50A	N.56°33'11"E.	213.62
2-51A	S.43°19'00"E.	410.44
2-52	N.20°08'45"E.	333.29
2-53	N.63°35'23"E.	124.00
2-54	S.72°52'00"E.	264.90
2-55	N.71°49'00"E.	297.89
2-56	S.65°20'15"E.	267.21
2-57	N. 0°09'24"E.	320.04
2-58	N.71°19'00"E.	238.83
2-59	S.65°13'00"E.	232.56
2-60	S. 4°57'00"E.	172.75
2-61	N.66°35'51"E.	48.00
2-62	N. 1°34'00"E.	144.55
2-63	N.48°11'00"W.	343.48
2-64	N.80°51'00"W.	186.04
2-65	N. 0°09'24"E.	100.00
2-66	N.41°22'00"E.	337.72
2-67	N. 4°42'00"E.	381.87
2-68	S.35°31'43"W.	540.26
2-69	N. 0°09'24"E.	330.34
2-70	S.43°30'12"W.	272.07
2-71	S.21°34'03"W.	254.12
2-72	S.53°02'00"W.	179.81
2-73	N.69°32'00"W.	713.71
2-74	S.25°35'00"W.	259.42
2-75	N.59°08'00"W.	202.71
2-76	S.24°02'00"W.	476.30
2-77	S.72°43'00"W.	535.17
2-78	N.57°45'00"W.	198.65
2-79		

NO.	BEARING	DIST.
2-79	N.88°00'00"W.	316.19
2-80	N.28°45'00"W.	399.20
2-81	N. 3°36'00"E.	477.94
2-82	S.88°27'00"E.	331.12
2-83	S.38°27'00"E.	291.11
2-84	N.30°40'00"E.	368.56
2-85	S.69°41'00"E.	230.34
2-86	S.33°56'00"E.	132.57
2-87	N.82°08'00"E.	189.79
2-88	S.48°28'00"E.	152.31
2-89	S.85°17'00"E.	194.66
2-90	N. 8°26'00"W.	245.65
2-91	N.28°05'00"W.	252.76
2-92	N.37°20'15"W.	407.31
2-93	N.40°17'00"E.	428.72
2-94	N.40°17'00"E.	155.92
2-95	N.75°22'00"W.	281.11
2-96	S.65°55'00"W.	320.95
2-97	N. 5°04'00"E.	486.90
2-98	S.56°30'00"W.	414.92
2-99	N.16°38'00"E.	401.81
2-100	S.78°53'00"W.	300.65
2-101	N. 5°50'00"W.	275.43
2-102	N.64°44'00"W.	337.28
2-103	N.17°50'00"W.	179.63
2-104	N.76°43'00"W.	182.89
2-105	N.57°04'00"E.	608.84
2-106	N.52°09'00"W.	482.47
2-107	S.65°07'00"W.	152.12
2-108	N.13°54'00"W.	195.73
2-109	N.74°39'00"W.	170.06
2-110		

NO.	BEARING	DIST.
2-110	S.52°20'00"W.	188.22
2-111	S.23°50'00"W.	215.36
2-112	N.59°24'00"W.	477.46
2-113	N.12°04'00"E.	358.92
2-114	S.59°09'00"E.	491.52
2-115	N.59°32'00"E.	360.85
2-116	N.10°50'00"W.	404.71
2-117	S.80°32'00"E.	322.39
2-118		

TRUE GRID MAGNETIC
N

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

Revised July 15, 1980

EXHIBIT K SHEET 2

PROJECT NO. 2299 CALIFORNIA

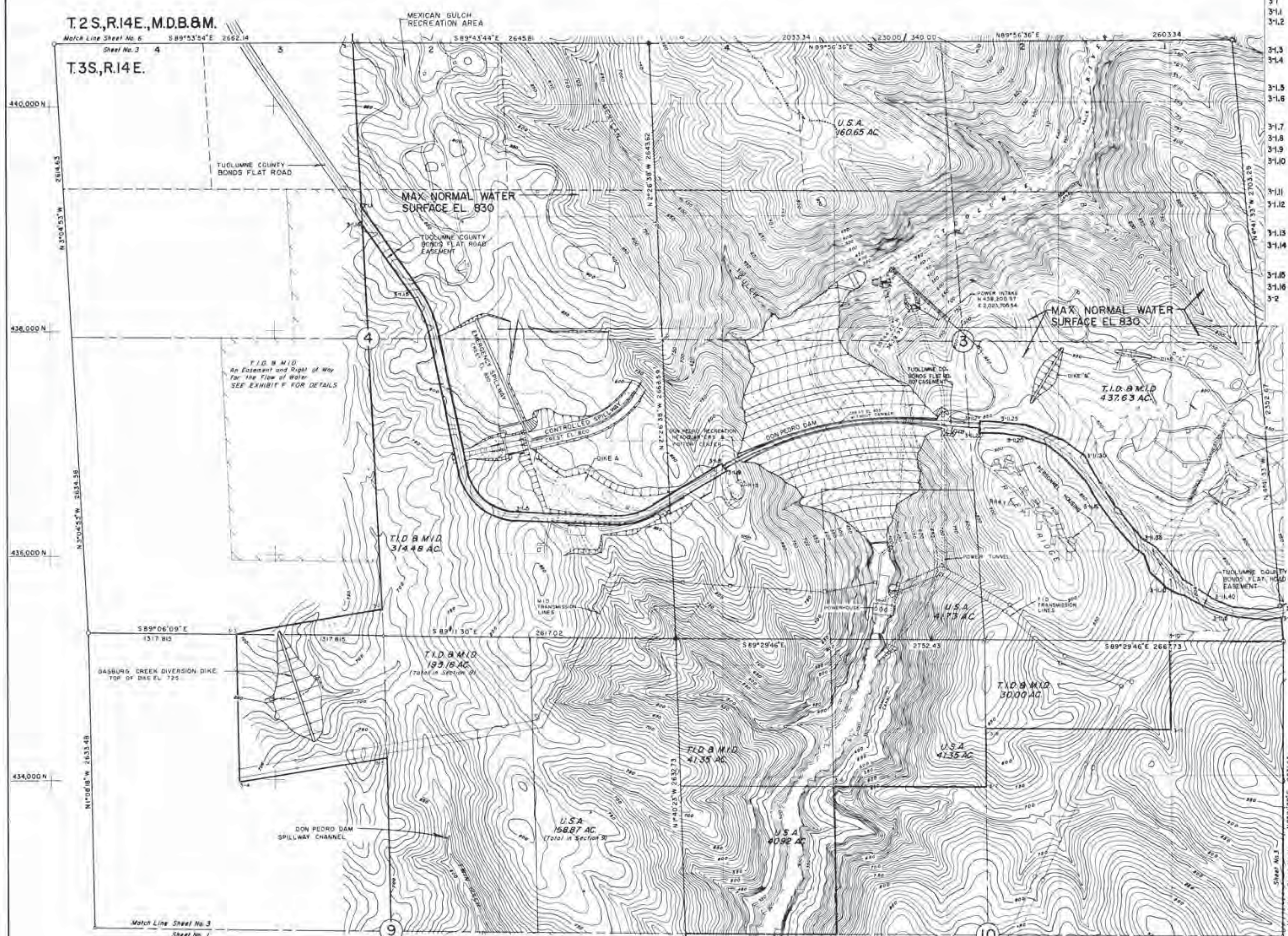
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-136



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.
3-1	S. 2° 46' 11" E.	1454.75	3-2	S. 80° 52' 22" W.	1323.28	3-11.17	N. 43° 07' 17" W.	241.81
3-1.1	S. 34° 40' 25" E.	880.42	3-3	S. 1° 15' 11" E.	1316.11	3-11.18	N. 50° 44' 09" W.	237.09
3-1.2	TANGENT CURVE △=22° 41' 35" RT. R=1158.52 L=458.85		3-4	N. 80° 52' 22" E.	1331.62	3-11.19	N. 69° 51' 23" W.	237.09
3-1.3	S. 11° 58' 50" E.	1244.05	3-5			3-11.20	N. 83° 23' 13" W.	187.96
3-1.4	TANGENT CURVE △=75° 21' 33" LT. R=459.95 L=604.96		1-4	N. 1° 03' 45" W.	1316.01	3-11.21	N. 87° 33' 46" W.	198.20
3-1.5	S. 87° 20' 23" E.	863.16	3-6	S. 89° 29' 30" E.	1362.18	3-11.22	N. 2° 20' 00" E.	105.00
3-1.6	TANGENT CURVE △=33° 02' 34" LT. R=659.93 L=380.59		3-7	N. 0° 27' 05" W.	523.80	3-11.23	N. 89° 28' 22" E.	100.12
3-1.7	N. 59° 37' 03" E.	720.06	3-8	S. 89° 29' 46" E.	1650.00	3-11.24	S. 84° 36' 57" E.	101.26
3-1.8	S. 30° 22' 57" E.	80.00	3-9	N. 0° 27' 05" W.	792.00	3-11.25	S. 83° 04' 47" E.	208.89
3-1.9	S. 59° 37' 03" W.	720.06	3-10	S. 89° 29' 46" E.	1017.73	3-11.26	S. 71° 45' 20" E.	104.95
3-1.10	TANGENT CURVE △=33° 02' 34" RT. R=739.93 L=426.72		3-11	N. 4° 41' 33" W.	216.54	3-11.27	S. 66° 01' 53" E.	104.95
3-1.11	N. 87° 20' 23" W.	863.16	3-11.1	S. 82° 25' 53" W.	32.12	3-11.28	S. 66° 01' 11" E.	160.10
3-1.12	TANGENT CURVE △=75° 21' 33" RT. R=539.95 L=710.18		3-11.2	S. 77° 14' 21" W.	104.94	3-11.29	S. 53° 34' 17" E.	227.26
3-1.13	N. 11° 58' 50" W.	1244.05	3-11.3	N. 86° 11' 05" W.	261.24	3-11.30	S. 28° 13' 51" E.	201.36
3-1.14	TANGENT CURVE △=22° 41' 35" LT. R=1078.52 L=427.17		3-11.4	N. 74° 30' 08" W.	104.33	3-11.31	S. 33° 50' 00" E.	322.42
3-1.15	N. 34° 40' 25" W.	751.92	3-11.5	N. 71° 54' 44" W.	156.31	3-11.32	S. 47° 46' 36" E.	50.99
3-1.16	S. 2° 46' 11" E.	3447.20	3-11.6	N. 61° 29' 22" W.	156.61	3-11.33	S. 30° 47' 21" E.	100.50
3-2			3-11.7	N. 59° 45' 46" W.	105.43	3-11.34	S. 40° 18' 29" E.	244.35
			3-11.8	N. 83° 09' 27" W.	64.02	3-11.35	S. 64° 18' 34" E.	105.43
			3-11.9	N. 61° 55' 51" W.	110.39	3-11.36	S. 45° 00' 00" E.	50.00
			3-11.10	N. 45° 00' 00" W.	200.00	3-11.37	S. 41° 11' 09" E.	300.67
			3-11.11	N. 16° 55' 40 W.	170.00	3-11.38	S. 28° 13' 09" E.	51.69
			3-11.12	N. 58° 51' 06" W.	103.82	3-11.39	S. 58° 18' 36" E.	332.01
			3-11.13	N. 40° 18' 46" W.	258.61	3-11.40	S. 67° 01' 46" E.	190.77
			3-11.14	N. 36° 30' 00" W.	250.00	3-11.41	S. 85° 50' 25" E.	286.92
			3-11.15	N. 27° 58' 10" W.	101.12	3-11.42	N. 76° 43' 38" E.	95.98
			3-11.16	N. 31° 49' 01" W.	122.48	3-11.43	N. 67° 56' 08" E.	42.60
			3-11.17			3-12		

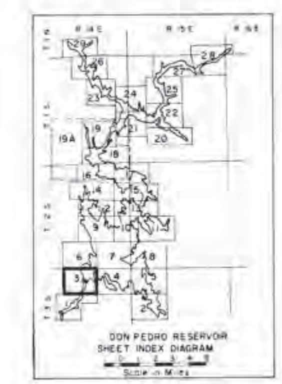
THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

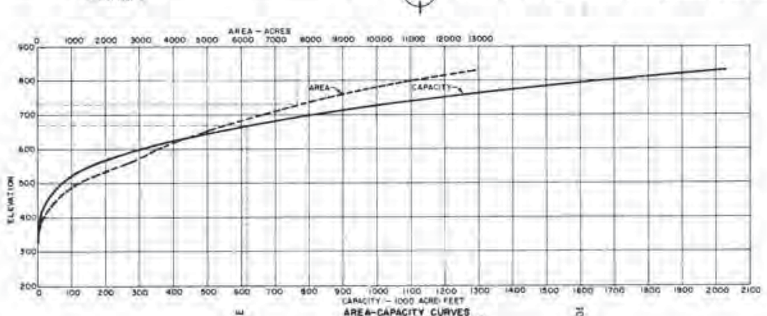
John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R. E. Penney
RICHARD E. PENNEY, PRESIDENT





AREA-CAPACITY CURVES
DON PEDRO RESERVOIR

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3.

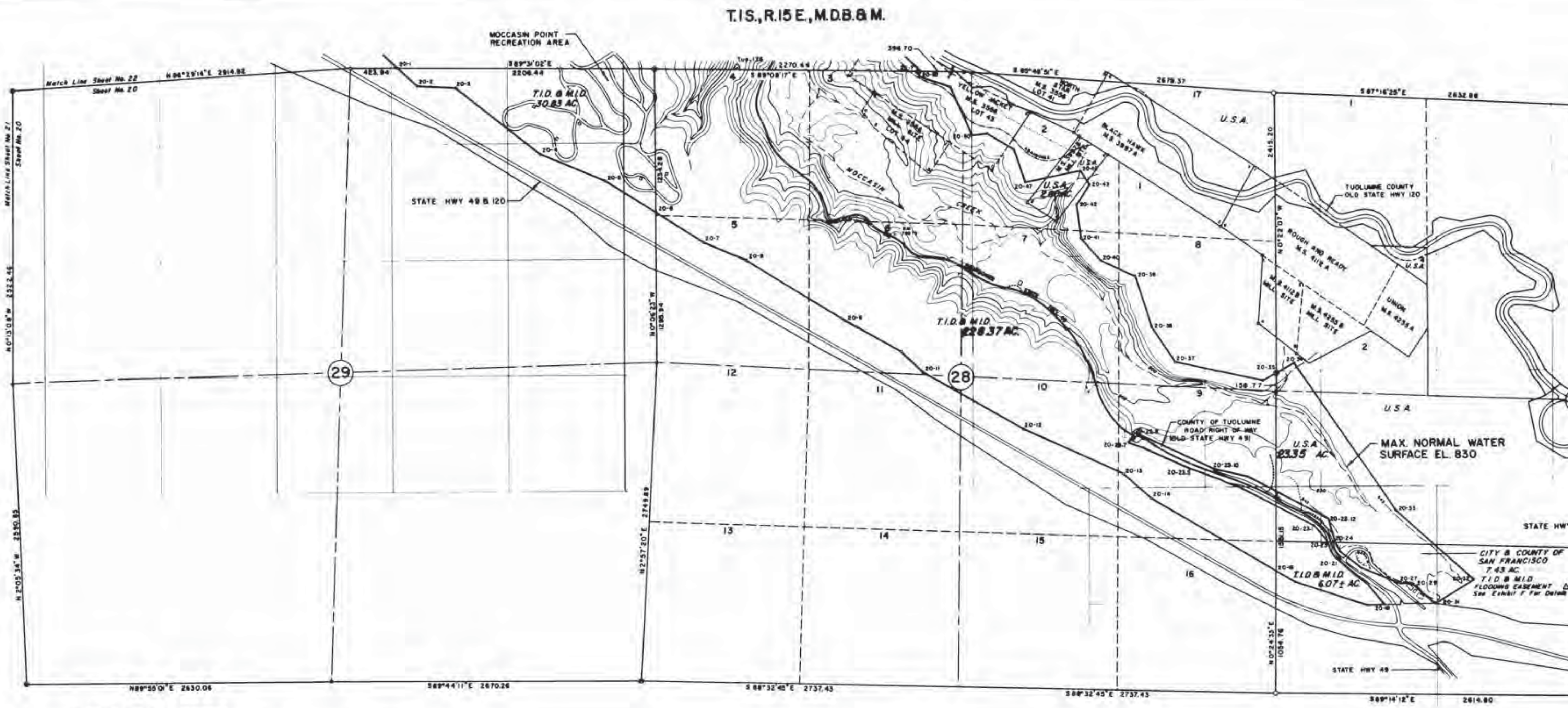
Revised July 15, 1980

EXHIBIT K SHEET 3

PROJECT NO. 2299 CALIFORNIA
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
DON PEDRO RESERVOIR
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-137



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
20-1	S.46°36'12"E.	226.97
20-2	S.87°01'43"E.	330.95
20-3	S.51°43'42"E.	929.85
20-4	S.67°12'05"E.	604.67
20-5	S.57°47'09"E.	505.63
20-6	S.57°47'09"E.	495.17
20-7	S.67°12'06"E.	403.11
20-8	S.58°21'29"E.	1000.45
20-9	S.60°04'35"E.	555.00
20-10	S.46°18'57"E.	252.24
20-11	S.60°04'35"E.	1000.00
20-12	S.65°32'44"E.	944.30
20-13	S.49°17'31"E.	320.66
20-14	S.59°22'00"E.	1239.11
20-15	S.59°22'00"E.	188.08
20-16	S.72°15'20"E.	653.36
20-17	S.89°26'29"E.	152.56
20-18	N.37°35'39"W.	223.20
20-19 ①	② N.53°21'24"W.	161.11±
20-20	③ N.49°27'12"W.	168.91±
20-21	④ TANGENT CURVE 26°27'12" RT. R=250.00 L=115.42	
20-22	⑤ N.23°00'00"W.	62.43±
20-23 ⑥	SEE RIGHT COLUMN	
20-24	S.28°42'32"E.	81.97
20-25	S.52°17'00"E.	228.82
20-26		

NO.	BEARING	DIST.
20-26	S.66°31'00"E.	366.35
20-27	N.86°03'00"E.	58.14
20-28	S.68°37'46"E.	74.10
20-29	S.46°18'43"E.	92.66
20-30	S.56°02'27"E.	143.99
20-31	N.57°38'00"E.	381.86
20-32	N.48°13'00"W.	905.56
20-33	N.34°20'00"W.	1545.97
20-34	S.60°30'00"W.	170.00
20-35	S.60°30'00"W.	138.81
20-36	N.77°37'00"W.	774.01
20-37	N.33°31'00"W.	385.83
20-38	N.17°11'00"W.	460.54
20-39	N.85°53'00"W.	325.42
20-40	N.41°03'00"W.	266.51
20-41	N. 6°54'00"W.	791.11
20-42	N.34°23'00"E.	207.20
20-43	N.34°54'00"W.	32.75
20-44	N.34°54'00"W.	112.34
20-45	S.78°18'00"W.	294.35
20-46	S.78°18'00"W.	193.79
20-47	N.17°58'00"W.	304.85
20-48	N.60°20'00"W.	264.69
20-49	S.85°16'00"W.	133.45
20-50	N.24°20'00"W.	458.74
20-51	N.71°04'00"W.	277.92
20-52	N.11°37'00"W.	42.78
22-7		

NO.	BEARING	DIST.
20-23	N. 39°55' 04" W.	182.32
20-23.1	N. 82°11' 12" W.	730.00
20-23.2	N. 69°40' 37" W.	143.96
20-23.3	N. 61° 06' 48" W.	33.12
20-23.4	N. 89°28' 06" W.	288.02
20-23.5	N. 68°32' 04" W.	439.46
20-23.6	N. 68°51' 02" W.	148.69
20-23.7	N. 33°50' 43" E.	102.34
20-23.8	S. 68°30' 29" E.	197.60
20-23.9	S. 63°17' 48" E.	556.34
20-23.10	S. 77° 06' 46" E.	305.86
20-23.11	S. 82° 11' 12" E.	780.13
20-23.12	S. 19° 24' 52" E.	206.46
20-24		

① TO SWLY BDY OF COUNTY RD R/W (OLD STATE HWY 49)
② ALONG COUNTY RD R/W
③ ALONG COUNTY RD R/W
④ ALONG COUNTY RD R/W
⑤ ALONG COUNTY RD R/W
⑥ TO NORTH LINE S 1/2 OF THE SW 1/4 OF SEC 27

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: H. RICHARD CLAUSE, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: RICHARD E. PENNEY, PRESIDENT

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

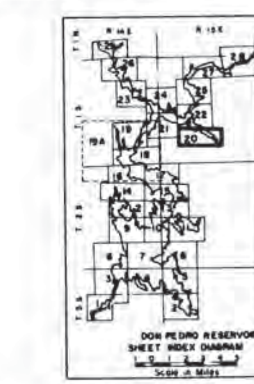


EXHIBIT K — SHEET 20

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

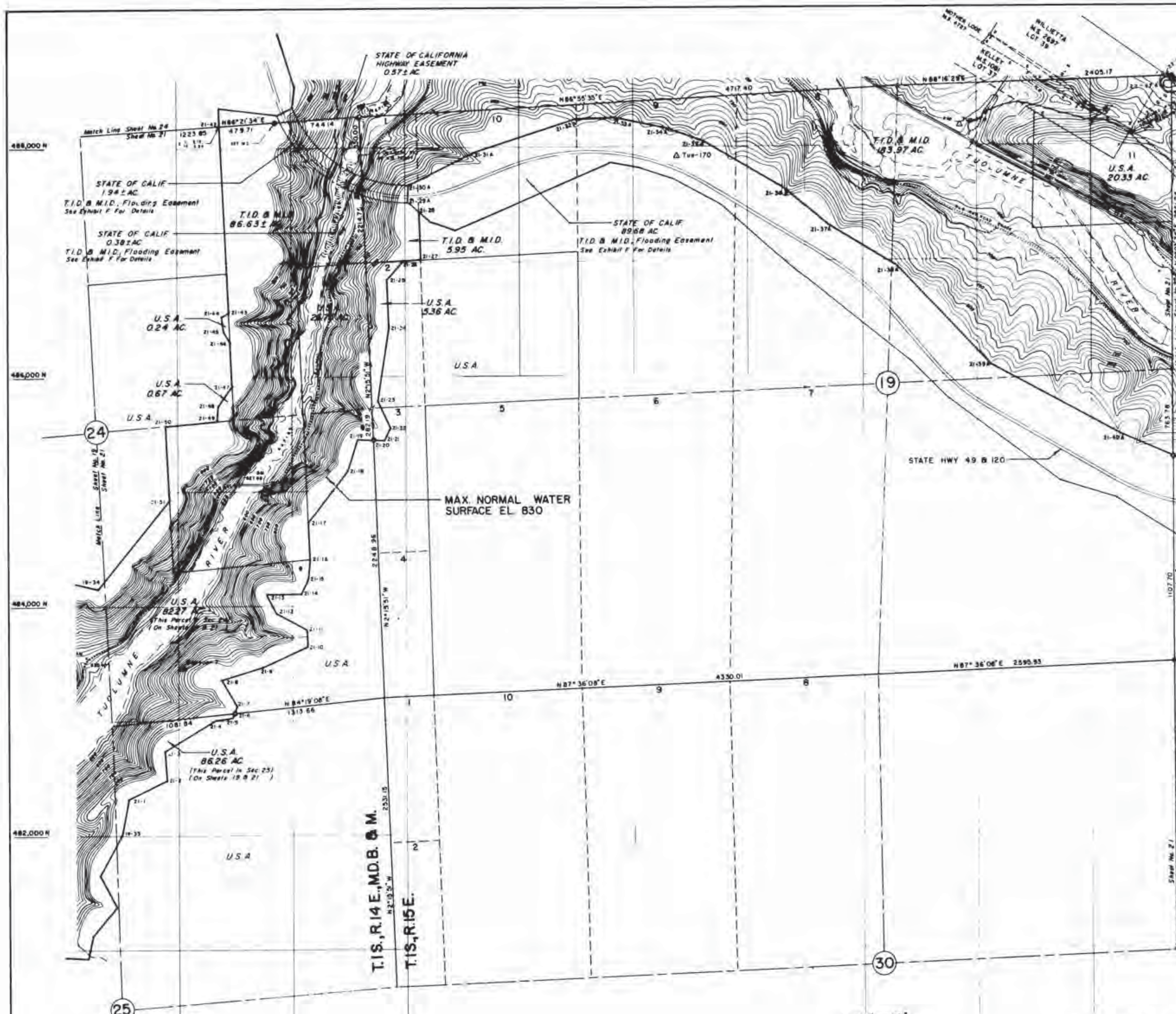
DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2,044,000 E — 2,046,000 E — 2,048,000 E — 2,050,000 E — 2,052,000 E — 2,054,000 E

Revised July 18, 1980

2299-141



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.
19-33	N.11°17'00"E.	322.22	21-27	N. 01° 32' 30" W.	432.02
21-1	N.64°25'00"E.	360.11	21-28	N. 47° 21' 25" W.	114.34
21-2	N. 3°20'00"W.	257.44	21-29A	N. 00° 22' 10" W.	146.00
21-3	N.58°45'00"E.	514.67	21-30A	N. 62° 48' 05" E.	619.25
21-4	N.82°36'00"E.	155.79	21-31A	N. 72° 19' 27" E.	960.18
21-5	N.19°56'00"E.	42.32	21-32A	N. 88° 11' 23" E.	343.78
21-6	N.19°58'00"E.	85.98	21-33A	S. 78° 27' 26" E.	469.24
21-7	N.30°20'00"W.	265.32	21-34A	S. 70° 06' 03" E.	346.57
21-8	N.73°00'00"E.	373.26	21-35A	S. 59° 21' 38" E.	829.53
21-9	N.64°58'00"E.	437.08	21-36A	S. 49° 31' 59" E.	506.36
21-10	N. 2°26'00"W.	141.13	21-37A	S. 59° 00' 36" E.	686.24
21-11	N.80°57'00"W.	298.57	21-38A	S. 43° 25' 40" E.	1180.65
21-12	N.27°22'00"W.	191.43	21-39A	S. 61° 26' 43" E.	1311.71
21-13	N.89°49'00"E.	302.00	21-40A	S. 67° 2' 23" E.	481.35
21-14	N.26°08'00"E.	136.79	21-41		
21-15	N. 2°56'00"E.	175.28	21-42	S. 2°34'38"E.	1625.16
21-16	N. 2°25'14"W.	322.00	21-43	S.56°43'00"W.	70.40
21-17	N.37°50'00"E.	572.91	21-44	S. 7°01'00"E.	130.98
21-18	N.16°57'00"E.	281.22	21-45	S.32°00'00"E.	102.58
21-19	S.87°38'00"E.	141.07	21-46	S. 2°34'36"E.	388.00
21-20	S.87°38'00"E.	98.14	21-47	S.34°47'00"W.	213.56
21-21	N.28°26'00"E.	123.94	21-48	S. 6°54'00"W.	135.71
21-22	N.24°37'00"W.	264.01	21-49	S.85°15'22"W.	457.96
21-23	N. 8°45'00"E.	831.34	21-50	S. 2°43'49"E.	646.00
21-24	N. 2°06'00"W.	436.29	21-51	S.38°54'00"W.	991.61
21-25	N.42°11'00"E.	213.72	19-34		
21-26	N.87°07'11"E.	150.75			
21-27					

22-87.5 TO 22-88.2 SEE SHEET 22

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2241 CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 38 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R.E. Penney
RICHARD E. PENNEY, PRESIDENT

Revised July 18, 1980

EXHIBIT K — SHEET 21

PROJECT NO. 2299 — CALIFORNIA

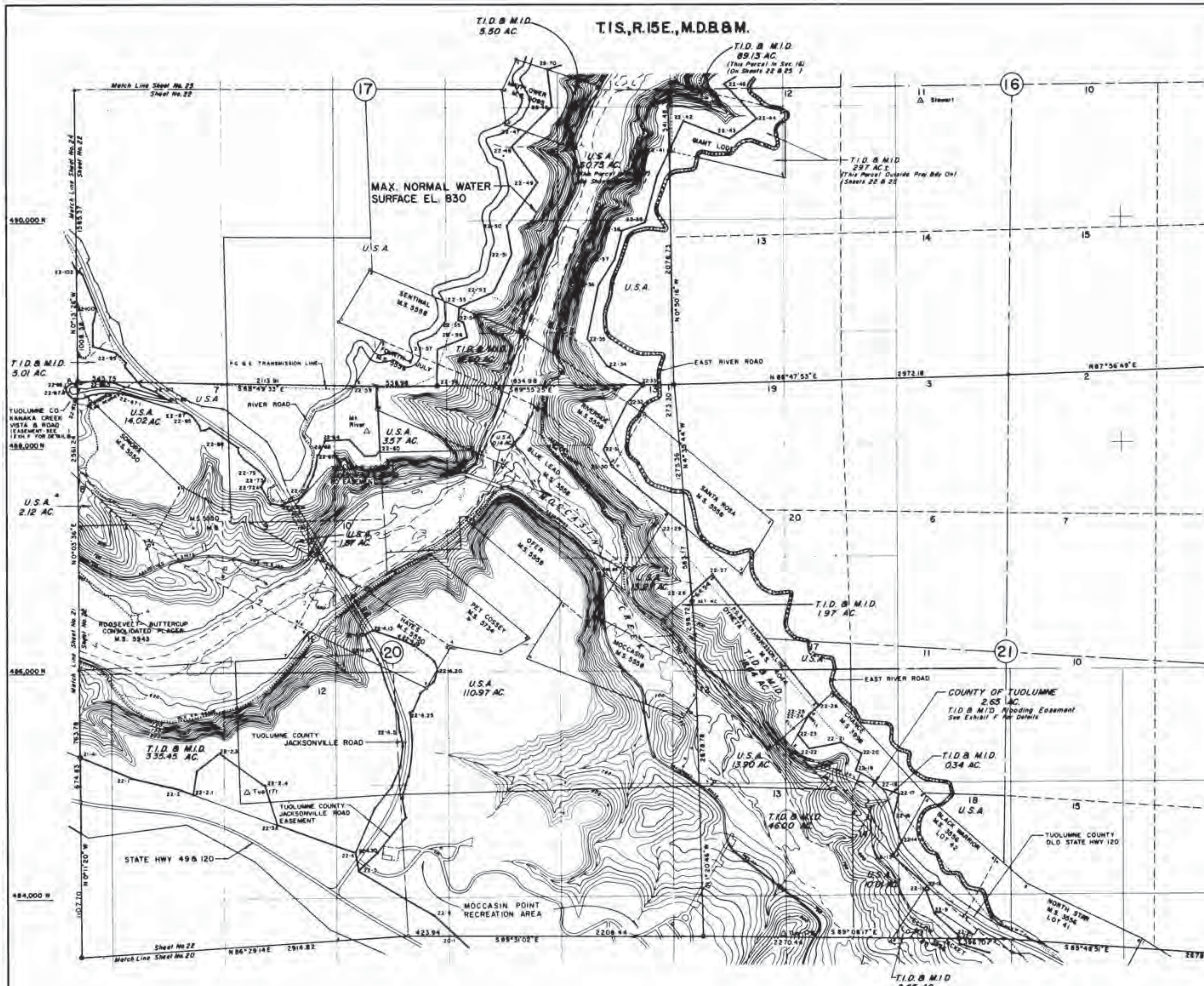
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-142

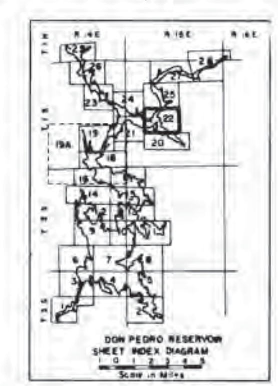


PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
22-2	S. 69°41'44"E.	122.50
22-2.1	N. 11°59'09"E.	200.00
22-2.2	N. 49°29'09"E.	260.00
22-2.3	S. 55°34'58"E.	500.00
22-2.4	S. 13°33'37"E.	387.62
22-3A	S. 70°40'27"E.	759.37
22-4	N. 24°14'29"E.	408.56
22-4.1	N. 39°19'15"E.	251.88
22-4.2	N. 22°18'51"E.	194.19
22-4.3	N. 8°10'38"E.	194.79
22-4.4	N. 10°54'15"W.	116.37
22-4.5	N. 6°16'36"W.	131.96
22-4.6	N. 20°04'20"W.	388.14
22-4.7	N. 15°17'50"W.	144.42
22-4.8	N. 29°06'45"W.	50.85
22-4.9	N. 29°26'13"W.	99.30
22-4.10	N. 19°47'31"W.	62.48
22-4.11	N. 26°41'10"W.	83.48
22-4.12	N. 58°30'15"E.	80.00
22-4.13	S. 67°34'21"E.	60.63
22-4.14	S. 71°23'45"E.	195.88
22-4.15	S. 65°55'31"E.	127.66
22-4.16	S. 54°03'23"E.	151.04
22-4.17	S. 50°21'11"E.	79.30
22-4.18	S. 16°01'46"E.	86.15
22-4.19	S. 16°14'38"E.	4.36
22-4.20	S. 15°36'45"W.	94.71
22-4.21	S. 48°10'19"W.	92.92
22-4.22	S. 50°18'46"W.	87.92
22-4.23	S. 22°52'36"W.	173.51
22-4.24	S. 57°01'28"W.	31.02
22-4.25	S. 4°23'46"E.	216.92
22-4.26	NON-TANGENT CURVE △=13°59'48"RT. R=1440 L=351.77 CHORD S. 6°31'34"W 350.90	
22-4.27	S. 16°13'47"W.	205.96
22-4.28	S. 11°36'30"E.	170.12
22-4.29	S. 38°12'55"W.	406.48
22-4.30	S. 49°52'00"W.	102.02
22-4.31	S. 48°07'16"W.	121.56
22-5		
22-87	N. 74°29'26"W.	608.10
22-87.1	N. 87°12'29"W.	118.94
22-87.2	S. 80°38'24"W.	113.84
22-87.3	S. 79°15'46"W.	97.48
22-87.4	S. 85°01'21"W.	103.32
22-87.5	NON-TANGENT CURVE △=101°39'28"RT. R = 65 L= 115.33	
22-87.6	N. 6°40'56"E.	38.73
22-88.1	TANGENT CURVE △=133°33'25"RT. R.= 55 L 128.21	
22-88.2	TANGENT CURVE △= 58°02'04"LT. R = 30 L 30.39	
22-88.3	N. 82°12'17"E.	157.58
22-88.4	S. 89°49'40"E.	115.00
22-88.5	S. 68°35'09"E.	125.02
22-88.6	S. 73°47'54"E.	429.24
22-89		

NO.	BEARING	DIST.
21-41		
22-1	S. 67°02'23"E.	485.97
22-2	S. 76°07'19"E.	451.26
22-3	S. 69°41'44"E.	554.56
22-4	S. 70°40'27"E.	1109.37
22-5	SEE LEFT COLUMN	
22-6	S. 58°56'52"E.	777.35
20-1	S. 46°36'12"E.	266.61
22-7	N. 11°37'00"W.	31.70
22-8	N. 47°27'00"W.	285.39
22-9	N. 22°09'10"W.	226.91
22-10	N. 42°52'44"W.	1.71
22-11	N. 33°23'34"E.	39.06
22-12	N. 48°43'15"W.	399.65
22-13		
22-14	NON-TANGENT CURVE △=10°31'36" RT. R= 429.88 L= 78.98 CHORD N. 19°08'32"W. 78.87	
22-15	N. 17°46'03"W.	147.25
22-16	N. 13°56'00"E.	210.38
22-17	N. 71°53'00"W.	166.96
22-18	NON-TANGENT CURVE △=27°30'11" LT. R= 584.83 L=280.73 CHORD N. 55°37'38"W. 278.04	
22-19	N. 19°21'00"E.	169.70
22-20	N. 83°04'00"W.	211.98
22-21	S. 78°49'00"W.	283.45
22-22	N. 38°03'00"W.	159.04
22-23	N. 29°13'24"E.	186.24
22-24	N. 29°13'24"E.	16.70
22-25	N. 47°55'35"E.	112.18
22-26	N. 38°49'00"W.	1495.76
22-27	S. 47°57'36"W.	248.46
22-28	N. 4°35'44"W.	583.17
22-29	N. 50°05'09"W.	854.08
22-30	N. 26°13'00"W.	175.09
22-31	N. 27°21'00"E.	462.98
22-32	N. 42°53'00"E.	211.98
22-33	N. 61°38'00"W.	362.59
22-34	N. 35°39'00"W.	300.27
22-35	N. 11°49'00"E.	493.45
22-36	N. 32°46'00"E.	256.86
22-37	N. 15°44'00"E.	269.09
22-38	N. 71°44'00"E.	216.93
22-39	N. 14°57'00"E.	427.12
22-40	N. 25°46'00"E.	247.65
22-41	N. 25°46'00"E.	295.68
22-42	S. 68°21'00"E.	436.36
22-43	N. 54°05'00"E.	300.04
22-44	N. 42°59'00"W.	422.40
22-45		
25-70	S. 7°14'00"E.	339.33
22-46	S. 45°48'00"W.	318.50
22-47	S. 45°48'00"W.	183.60
22-48	S. 35°31'00"E.	390.65
22-49	S. 35°51'00"W.	471.27
22-50	S. 9°34'00"E.	258.68
22-51		

NO.	BEARING	DIST.
22-51	S. 26°13'00"W.	373.33
22-52	S. 66°18'00"W.	334.58
22-53	S. 4°54'36"W.	110.41
22-54	S. 66°56'15"E.	50.00
22-55	S. 15°40'30"E.	134.50
22-56	S. 67°13'27"W.	282.59
22-57	S. 2°38'00"W.	327.36
22-58	N. 89°55'25"W.	338.98
22-59	S. 3°00'21"E.	587.00
22-60	S. 55°19'00"W.	48.36
22-61	S. 88°14'00"W.	97.05
22-62	N. 42°20'00"W.	197.50
22-63	S. 87°22'00"W.	217.23
22-64	S. 27°56'57"W.	147.20
22-65A	S. 9°27'44"W.	91.24
22-66A	S. 17°31'32"W.	99.62
22-67A	S. 21°48'05"W.	107.70
22-68A	S. 38°17'25"W.	121.04
22-69A	N. 70°01'01"W.	175.57
22-70A	N. 83°39'35"W.	90.55
22-71A	N. 30°27'56"W.	177.81
22-72A	N. 32°47'51"E.	77.46
22-73	N. 40°50'19"E.	7.44
22-74	N. 41°13'33"W.	85.21
22-75	N. 53°14'52"W.	46.09
22-76	N. 52°07'47"W.	111.27
22-77	N. 40°04'50"W.	82.18
22-78	N. 8°00'42"W.	47.63
22-79	N. 55°18'34"W.	105.61
22-80	N. 55°18'34"W.	201.39
22-81	S. 70°13'41"W.	43.01
22-82	S. 79°41'29"W.	35.36
22-83	N. 18°26'22"W.	50.00
22-84	N. 36°52'28"W.	63.24
22-85	N. 43°59'59"W.	50.99
22-86	N. 55°18'34"W.	50.00
22-87	SEE LEFT COLUMN	
22-89	N. 57°49'52"W.	154.78
22-90	N. 67°47'25"W.	119.45
22-91	N. 40°22'14"W.	43.11
22-92	N. 40°22'14"W.	179.86
22-93	N. 14°29'09"E.	37.10
22-94	N. 44°24'47"W.	82.13
22-95	N. 46°57'21"W.	47.82
22-96	N. 75°38'12"W.	206.88
22-97	N. 1°00'57"W.	209.24
22-98	N. 26°20'46"E.	26.90
22-99	N. 12°55'30"E.	105.69
22-100	N. 21°40'00"W.	343.00
22-101	N. 48°13'56"W.	73.39
22-102		



THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL, INC AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John H. Duff
JOHN H. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 36 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY H. Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R. E. Penney
RICHARD E. PENNEY, PRESIDENT

N

LEGEND
PROJECT BOUNDARY
FOUND CORNER
FOUND CORNER, SET PIPE
PROPORTIONED CORNER, SET PIPE
MONUMENT SET ON PROJECT BOUNDARY
PRIMARY HORIZONTAL CONTROL STATION

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3.

Revised July 15, 1980

EXHIBIT K SHEET 22

PROJECT NO. 2299 CALIFORNIA

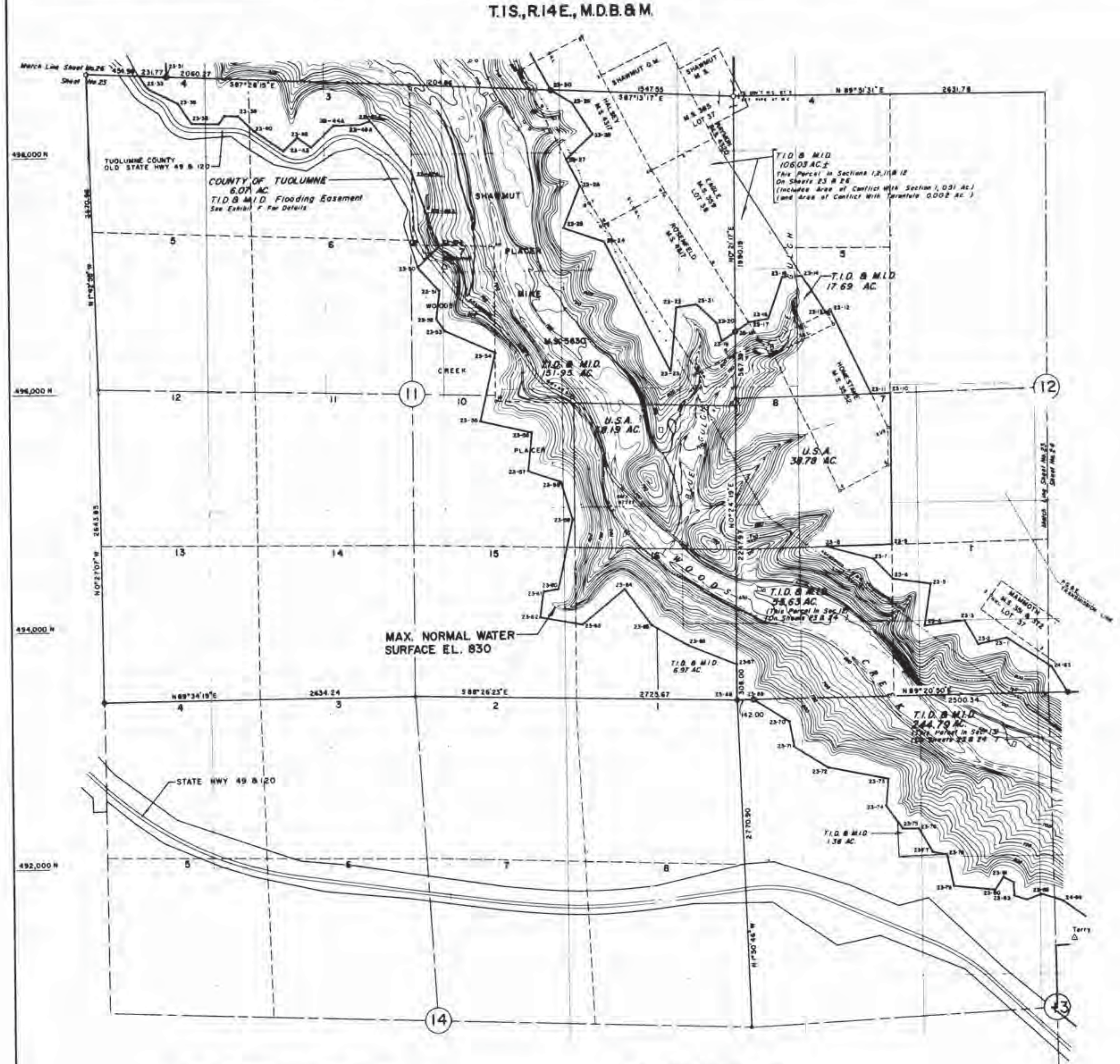
TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-143



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.	NO.	BEARING	DIST.	NO.	BEARING	DIST.
24-63	N.57°28'00"W.	446.70	23-30			23-58	S.16°29'00"E.	334.76
23-1	S.77°46'00"W.	251.15	23-31	N.87°28'15"W.	231.77	23-59	S.12°12'00"W.	605.68
23-2	N.28°10'00"W.	234.55	23-32	S.33°26'00"E.	95.83	23-60	S.81°56'00"W.	128.27
23-3	S.82°12'00"W.	345.45	23-33	TANGENT CURVE Δ=30°10'00"LT. R =150.00 L=78.98		23-61	S. 8°03'00"W.	221.18
23-4	N. 9°00'00"E.	364.48	23-34	S.64°45'25"E.	241.15	23-62	S.79°24'00"E.	364.22
23-5	N.82°22'00"W.	322.30	23-35	S.32°52'30"E.	207.04	23-63	N.49°34'00"E.	470.31
23-6	N.43°10'00"W.	236.18	23-36	S.88°37'00"E.	225.15	23-64	S.35°57'00"E.	386.65
23-7	N.73°58'00"W.	408.75	23-37	N.36°54'55"E.	86.03	23-65	S.61°01'00"E.	349.11
23-8	N.89°04'15"E.	556.23	23-38	S.88°37'00"E.	115.87	23-66	S.67°42'00"E.	451.28
23-9	N. 0°20'05"E.	1284.33	23-39	S.45°59'40"E.	192.33	23-67	S. 0°24'19"W.	308.00
23-10	S.88°47'38"W.	168.97	23-40	S.54°30'00"E.	295.14	23-68	N.89°20'50"E.	142.00
23-11	N.25°30'13"W.	789.52	23-41	N.46°19'00"E.	163.42	23-69	S.58°17'00"E.	348.35
23-12	S.63°17'32"W.	44.91	23-42	S.56°18'55"E.	145.98	23-70	S.10°29'00"E.	219.71
23-13	N.32°01'49"W.	375.48	23-43	N.45°45'11"E.	265.24	23-71	S.58°05'00"E.	340.47
23-14	S.84°42'00"W.	166.37	23-44A	N.88°27'44"E.	214.14	23-72	S.78°22'00"E.	515.60
23-15	S.19°36'00"W.	372.59	23-45A	N.71°42'10"E.	105.30	23-73	S. 4°59'00"W.	229.87
23-16	S.81°11'00"W.	164.64	23-46A	S.38°13'17"E.	528.92	23-74	S.35°39'08"E.	235.05
23-17	S.56°06'00"W.	136.16	23-47A	S.18°48'40"E.	455.33	23-75	S.87°28'00"E.	136.13
23-18	S.56°06'00"W.	144.94	23-48A	S.19°58'32"E.	200.00	23-76	S.30°37'00"E.	229.17
23-19	N.15°10'00"W.	160.59	23-49A	S.35°50'24"W.	267.65	23-77	S.77°58'00"E.	124.57
23-20	N.47°39'00"W.	230.05	23-50	S.42°47'00"E.	266.45	23-78	S.11°59'00"E.	268.69
23-21	S.82°55'00"W.	170.30	23-51	S. 6°23'00"W.	242.96	23-79	S.84°15'00"E.	349.44
23-22	S. 6°07'00"W.	543.13	23-52	S.34°36'00"E.	121.49	23-80	N.34°43'00"E.	122.89
23-23	N.26°09'00"W.	1234.34	23-53	S.65°06'00"E.	469.62	23-81	S.62°23'00"E.	97.06
23-24	N.70°40'00"W.	365.60	23-54	S.13°24'00"W.	586.23	23-82	S. 4°33'00"E.	113.38
23-25	N.22°13'00"E.	382.85	23-55	S.76°31'00"E.	446.22	23-83	S.71°24'00"E.	109.73
23-26	N.27°03'12"W.	254.00	23-56	S. 5°51'00"W.	323.69	23-84	N.68°26'00"E.	133.33
23-27	N.47°22'00"E.	313.56	23-57	S.71°00'00"E.	291.89	23-85	S.71°23'00"E.	197.33
23-28	N.33°14'00"W.	312.03	23-58			24-64		
23-29	N.56°47'00"W.	208.17						
23-30								

LEGEND

- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet

Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 38 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY: Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY: R E Penney
RICHARD E. PENNEY, PRESIDENT

Revised July 15, 1980

EXHIBIT K — SHEET 23

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

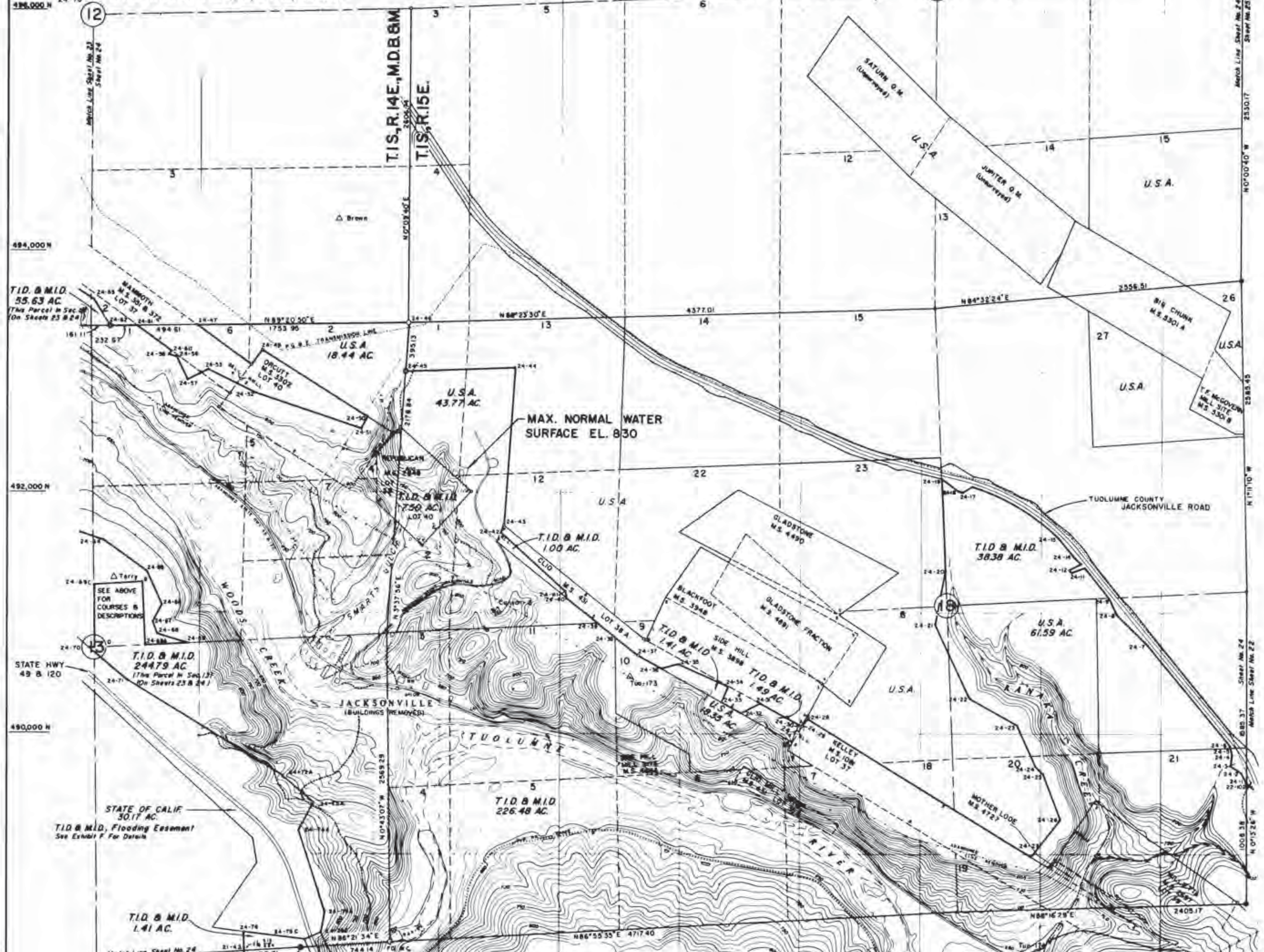
DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

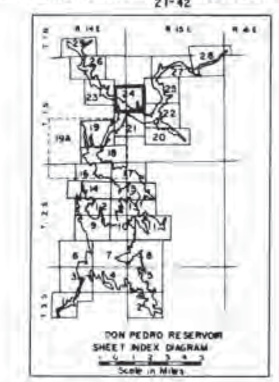
2299-144

24-69	S87°01'57"W 369.00 FT ±	Along the East-West ¼ Section line to the East line or the extension of the East line of a parcel of land conveyed by John and Lucy Terry to T.I.D. & M.I.D.
24-69A	N 0°44'47"W 524.00 FT ±	Along the East line of said parcel to the NE corner of said parcel
24-69B	S87°01'57"W 416.00 FT	Along the North line of said parcel to the NW corner of said parcel.
24-69C	S 0°44'47"E 524.00 FT ±	Along the West line of said parcel to the East-West ¼ Section line.
24-69D		
24-70	S87°01'57"W 32.13 FT ±	To the Ely bdy of St Hwy Tud 120 Rd



PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
22-102	N.48°13'56"W.	4.87
24-1	N.25°59'43"W.	85.44
24-2	N.58°09'08"W.	111.28
24-3	N. 7°40'03"E.	89.34
24-4	N.12°51'38"W.	57.25
24-5	N.12°51'38"W.	72.77
24-6	N.39°30'00"W.	1080.00
24-7	N.44°12'45"W.	365.24
24-8	N.27°34'04"W.	145.14
24-9	N.39°30'00"W.	329.00
24-10	S.70°28'58"W.	117.05
24-11	N.39°30'00"W.	30.00
24-12	N.63°18'28"E.	112.80
24-13	N.45°16'38"W.	99.34
24-14	N.39°47'17"W.	196.31
24-15	NON-TANGENT CURVE Δ=27°25'54" LT. R=1760.00 L=842.64 CHORD N.59°37'12"W. 834.62	
24-16	S.57°22'56"W.	93.82
24-17	N.75°53'57"W.	27.83
24-18	N.53°45'37"W.	169.36
24-19	S. 2°20'18"E.	761.82
24-20	S.10°57'00"W.	452.51
24-21	S.25°12'00"E.	690.69
24-22	S.61°26'00"E.	449.72
24-23	S.23°47'00"E.	377.00
24-24	S.47°22'00"E.	85.63
24-25	S.21°09'00"E.	407.33
24-26	S.38°33'00"W.	391.55
24-27	N.58°30'38"W.	2185.01
24-28	S.32°04'42"W.	76.56
24-29	N.61°01'18"W.	27.58
24-30	N.61°01'18"W.	376.00
24-31	S.62°33'00"W.	178.87
24-32	N.60°56'32"W.	193.00
24-33	N.26°16'00"E.	138.44
24-34	N.65°04'00"W.	455.46
24-35	S.74°46'00"W.	151.12
24-36	N.60°56'37"W.	215.00
24-37	N.51°19'46"W.	242.58
24-38	N.51°19'46"W.	193.53
24-39	N.51°19'46"W.	332.00
24-40	N. 9°07'00"W.	54.00
24-41	N.47°28'00"W.	722.72
24-42	N.22°16'05"E.	61.89
24-43	N. 3°37'56"E.	1310.65
24-44	S.88°23'30"W.	907.26
24-45	N. 3°37'56"E.	395.13
24-46	S.89°20'50"W.	1753.95
24-47	S.53°52'39"E.	554.83
24-48	N.36°56'11"E.	148.75
24-49	S.57°49'04"E.	1025.50
24-50	S.24°16'00"W.	111.21
24-51	N.71°18'00"W.	932.75
24-52	N.63°51'00"W.	431.13
24-53	S.62°33'00"W.	58.83
24-54	N.53°52'39"W.	11.96±
24-55	S.37°00'00"W.	24.86±
24-56	S.62°33'00"W.	110.58
24-57	N.25°16'00"W.	217.83
24-58	N.72°56'00"W.	63.75±
24-59	N.37°00'00"E.	40.22±
24-60	N.53°52'39"W.	546.80
24-61	S.89°20'50"W.	232.67
24-62	N.31°52'00"W.	263.19
24-63		
24-64	S.54°26'00"E.	4.8.66
24-65	S.24°27'00"E.	[illegible]02.09
24-66	S.27°21'00"W.	162.25
24-67	S.21°25'00"E.	109.68
24-68	S.73°24'00"E.	269.69
24-69	SEE DRAWING FOR BEAR & DISTANCES	
24-70	S.49°48'55"E.	410.11
24-71	S.58°25'16"E.	1506.88
24-72A	S.49°04'13"E.	34[illegible].81
24-73A	S.27°43'12"W.	257.17
24-74A	S.17°38'28"E.	713.92
24-75A	S. 7°27'39"W.	175.01
24-75B	S.67°58'51"W.	146.00
24-75C		
24-75C	N.83°05'27"W.	512.45
24-76	S. 0°43'57"E.	166.13
21-42		



LEGEND
- PROJECT BOUNDARY
- FOUND CORNER
- FOUND CORNER, SET PIPE
- PROPORTIONED CORNER, SET PIPE
- MONUMENT SET ON PROJECT BOUNDARY
- PRIMARY HORIZONTAL CONTROL STATION

Scale: 1" = 400'

400 0 400 800 1200 1600 2000

Contour Interval 10 Feet
Datum is Mean Sea Level

COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 35 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY R. Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R. E. Penney
RICHARD E. PENNEY, PRESIDENT

2,034,000 E 2,036,000 E 2,038,000 E 2,040,000 E 2,042,000 E

Revised July 15, 1980

EXHIBIT K SHEET 24

PROJECT NO. 2299 CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT

DON PEDRO RESERVOIR

TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-145

PROJECT BOUNDARY TRAVERSE

NO.	BEARING	DIST.
27-43		
	N.76°49'00"E.	199.15
28-1		
	N.69°31'00"E.	700.26
28-2		
	S.66°28'00"E.	708.94
28-3		
	N.31°48'00"E.	176.49
28-4		
	N.58°10'00"W.	959.30
28-5		
	N.13°34'59"E.	451.56
28-5A		
	N.24°46'31"E.	143.18
28-6A		
	N.33°41'24"E.	252.39
28-6B		
	S.87°49'08"E.	84.34
28-7A		
	N.21°36'00"E.	260.00
28-8		
	N.38°19'00"E.	1017.58
28-9		
	N.46°55'00"E.	199.57
28-10		
	N.46°55'00"E.	456.45
28-11		
	N.62°21'00"E.	564.49
28-12		
	N.75°37'00"E.	1252.23
28-13		
	S.87°31'00"E.	450.57
28-14		
	S.87°31'00"E.	220.06
28-15		
	N.76°19'00"E.	507.39
28-16		

NO.	BEARING	DIST.
28-16		
	N.43°45'00"E.	682.52
28-17		
	N.38°31'00"E.	1159.28
28-18		
	N.62°02'00"E.	985.06
28-19		
	N.55°54'00"E.	1214.71
28-20		
	N.35°22'00"E.	305.17
28-21		
	N.35°22'00"E.	2901.63
28-22		
	N.55°33'00"W.	378.22
28-23		
	S.35°18'00"W.	2347.48
28-24		
	S.35°18'00"W.	809.92
28-25		
	S.35°18'00"W.	97.39
28-26		
	S.67°54'00"W.	723.66
28-27		
	S.50°59'00"W.	508.36
28-28		
	S.71°25'00"W.	473.71
28-29		
	S.55°11'00"W.	420.27
28-30		
	S.43°50'00"W.	485.18
28-31		
	S.37°12'00"W.	865.01
28-32		

NO.	BEARING	DIST.
28-32		
	S.58°54'00"W.	503.35
28-33		
	N.77°32'00"W.	604.15
28-34		
	N.77°32'00"W.	211.08
28-35		
	S.72°14'00"W.	491.45
28-36		
	S.66°38'00"W.	498.73
28-37		
	S.72°49'00"W.	592.44
28-38		
	S.80°27'00"W.	642.63
28-39		
	S.48°30'00"W.	232.50
28-40		
	S.48°30'00"W.	436.28
28-41		
	S.37°50'00"W.	1320.59
28-42		
	S.31°38'00"W.	183.80
28-43		
	S.52°38'56"E.	89.78
28-43A		
	S.28°18'03"W.	147.65
28-43B		
	S.47°43'35"W.	74.33
28-43C		
	S.27°00'46"W.	286.23
28-44A		
	S.33°49'47"W.	200.31
28-44B		
	S.17°56'00"W.	255.00
28-45		
	S.60°54'00"W.	283.81
28-46		
	N.71°50'00"W.	214.96
28-47		

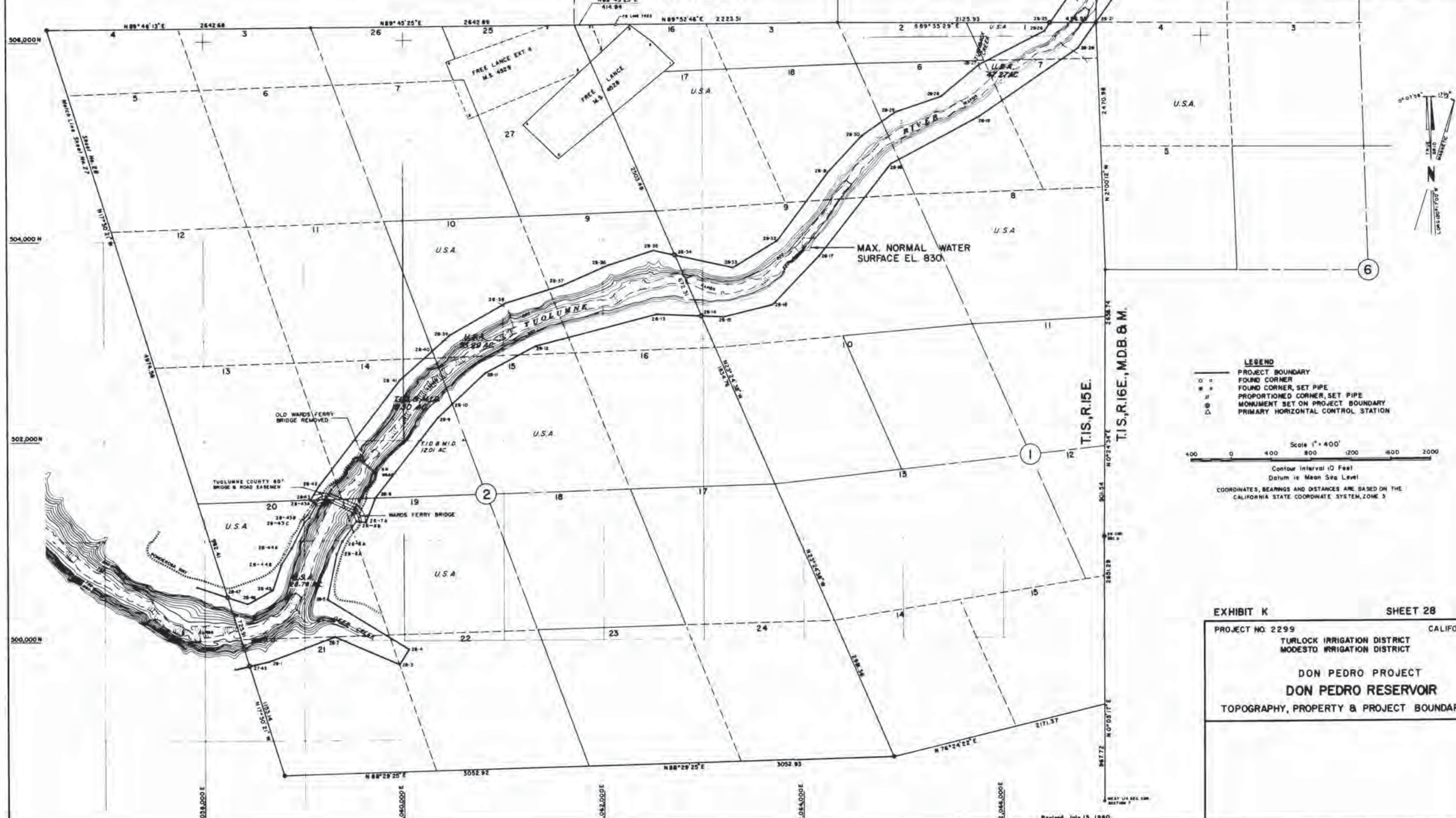
THIS MAP CORRECTLY REPRESENTS TOPOGRAPHY SHOWN ON PHOTOGRAMMETRIC MAPS COMPILED BY FAIRCHILD AERIAL SURVEYS INC., R.M. TOWILL INC. AND TELEDYNE GEOTRONICS AND SURVEYS MADE BY ME, OR UNDER MY DIRECTION WHILE EMPLOYED BY THE TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT.

John B. Duff
JOHN B. DUFF
L.S. 2244, CALIFORNIA

THIS MAP IS FILED IN COMPLIANCE WITH ARTICLE 38 OF THE LICENSE FOR FEDERAL POWER COMMISSION PROJECT NO. 2299 SUBMITTED BY THE UNDERSIGNED THIS 30 TH. DAY OF AUGUST 1974.

TURLOCK IRRIGATION DISTRICT
BY Richard Clauss
H. RICHARD CLAUSS, PRESIDENT

MODESTO IRRIGATION DISTRICT
BY R.E. Penney
RICHARD E. PENNEY, PRESIDENT



LEGEND
PROJECT BOUNDARY
FOUND CORNER
FOUND CORNER, SET PIPE
PROPORTIONED CORNER, SET PIPE
MONUMENT SET ON PROJECT BOUNDARY
PRIMARY HORIZONTAL CONTROL STATION

Scale 1" = 400'
400 0 400 800 1200 1600 2000
Contour Interval 10 Feet
Datum is Mean Sea Level
COORDINATES, BEARINGS AND DISTANCES ARE BASED ON THE CALIFORNIA STATE COORDINATE SYSTEM, ZONE 3

Revised July 15, 1980

EXHIBIT K — SHEET 28

PROJECT NO. 2299 — CALIFORNIA

TURLOCK IRRIGATION DISTRICT
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
DON PEDRO RESERVOIR
TOPOGRAPHY, PROPERTY & PROJECT BOUNDARY

2299-146

APPENDIX D

PROJECT DRAWINGS (CEII)

[*Contains Critical Energy Infrastructure Information -*

***Not Released to the Public*]**

APPENDIX E

DON PEDRO RECREATION AGENCY RULES AND REGULATIONS

Don Pedro Recreation Agency Rules & Regulations

adopted 8/3/99,
amended 5/29/01,
amended 8/31/10

RULES & REGULATIONS

The following definitions will be used for the purpose of these regulations.

DEFINITIONS

AGENCY:

The Don Pedro Recreation Agency, which is the organization charged with the responsibility for the operation and maintenance of the Recreation Area. The Agency has the jurisdiction to enforce all regulations in addition to any applicable local, State and Federal laws and ordinances within the Recreation Area. Citations/Notices to Appear may be issued by authorized personnel, and/or personal property towed/impounded in accordance with State law for violations of these regulations, ordinances, and laws.

ANNUAL BOAT PERMIT:

A boat permit that allows *day use* of the Recreation Area and is valid for a calendar year.

ANNUAL LAKESHORE CAMPING PERMIT:

A camping permit that allows lakeshore camping use of the Recreation Area and is valid for a calendar year.

ANNUAL PW PERMIT:

A personal watercraft permit that allows *day use* of the Recreation Area and is valid for a calendar year.

ANNUAL SC PERMIT:

A sleeping capacity boat permit that allows *day use* of the Recreation Area and is valid for a calendar year.

ANNUAL SECOND VEHICLE PERMIT:

A vehicle permit that allows *day use* of the Recreation Area and is valid for a calendar year, sold at a reduced rate when the vehicle's registered owner has already purchased an Annual Vehicle Permit or Annual Senior Citizen Vehicle Permit for another vehicle registered in his/her name.

ANNUAL SENIOR CITIZEN VEHICLE PERMIT:

A vehicle permit that allows *day use* of the Recreation Area and is valid for a calendar year, sold at a reduced rate for a vehicle whose registered owner is age 62 or over.

ANNUAL VEHICLE PERMIT:

A vehicle permit that allows *day use* of the Recreation Area and is valid for a calendar year.

APPROVED FIRE CONTAINER:

Any permanent barbecue on a pedestal or fire ring provided by the Agency in developed Campsites, or Agency approved portable metal container brought in by the user that is elevated off the ground and contains the fire.

BOAT TRAILER PARKING PERMIT:

Permit provided at developed facility for the purpose of leaving an unattended vessel trailer in any designated parking area while camping, houseboating, or otherwise using the Recreation Area. Permit does not cover parking of unattended trailers if owner is not utilizing the Recreation Area facilities at the time the trailer is being left in the designated parking area.

CAMPING:

Use of Recreation Area land for overnight accommodation. May include but is not limited to erecting a tent or shelter, arranging bedding, or using a parked or standing vehicle for staying overnight.

CAMPING HOURS:

Campsite check in time 4 p.m., check out time 2 p.m., occupancy of a campsite prior to 5 a.m. is considered campsite occupancy until 2 p.m. of that same day.

CAMPING MAXIMUM LENGTH OF STAY MAY 1 THROUGH SEPTEMBER 30:

Maximum length of stay is 2 weeks. Occupancy must be broken up by 2 nights between maximum stays.

CAMPING MAXIMUM LENGTH OF STAY OCTOBER 1 THROUGH APRIL 30:

Maximum length of stay is 3 months. Occupancy may be extended longer on a first come/first serve basis with no break in occupancy if campsite is not reserved.

CAMPSITE OCCUPANCY LIMIT:

8 persons.

DAY USE:

Use of Recreation Area for purposes other than overnight accommodation.

DAY USE FURNISHINGS:

All portable structures that are erected for shade and picnicking on a day use basis.

DAY USE HOURS:

Facility use between the hours of 5 a.m. and 10 p.m.

DEACTIVATED WEAPON:

A weapon that is rendered temporarily inoperable by being cased, packed away, or stored in such a manner that will prevent ready use.

DESIGNATED PARKING AREA:

Paved or otherwise surfaced area established for the purpose of parking vehicles and trailers. May be indicated by signage, proper striping, or obvious applicability for parking (such as for paved campsite parking pads).

DEVELOPED CAMPSITE:

Designated area (by number) that includes the tent pad, site furnishing pad and vehicle parking pad and area between these pads.

DEVELOPED FACILITY:

Designated area(s) within the Recreation Area that has been developed with permanent structures for Recreation use and is accessible only by Agency provided roadways.

DEVELOPED IMPROVEMENT:

Any structure or other object constructed or installed to enable the operation of the Recreation Area. Includes but is not limited to regulatory and hazard buoys, buildings, site furnishings, building furnishings, courtesy docks, roadways, signs and utility connections.

DISPERSED AREA:

Areas within the Recreation Area that are available for recreation use but have no Agency provided roadways.

DOMESTICATED ANIMALS:

Any animal that is referred to as a pet or that has been “tended” by humans, such as, but not limited to cats, dogs, potbellied pigs, rabbits, horses, and cows.

DREDGING:

All mining type activities other than panning as described above - includes sluice boxing, suction dredging, high banking, etc.

FIREWORKS:

Includes all fireworks described as “Safe and Sane” and all illegal fireworks as described by Federal, State and local laws.

GROUND FIRE:

Any fire that is built and ignited directly on the ground.

GROUP CAMPSITE OCCUPANCY LIMIT:

150 persons, 50 vehicles.

HOUSEBOAT:

Private or concessionaire owned vessels that are 10' or greater in width with sleeping capacity (built in plumbing), limited by a specific number of houseboat permits and subject to specific Agency Houseboat Rules and Regulations.

LITTER:

Any material, organic or inorganic, that is left anywhere within the Recreation Area other than in a proper receptacle.

MOTORIZED SCOOTER:

A two-wheeled device that has handlebars, is designed to be stood or sat upon by the operator, and is powered by a motor.

NIGHT FISHING:

Use of the Recreation Area for purposes of fishing between the hours of 5 p.m. and 10 a.m.

OCCUPANCY:

Authorized utilization of a given facility, location or area.

OPERATOR PROPELLED DEVICE:

Any device that is propelled by the person operating it, such as bicycles, skateboards, roller skates, and in-line skates.

OUTSIDE VENDOR:

Any person or entity that is or will be performing any type of work/duties for hire within the Recreation Area that does not fall within established Concessionaire Contract or other contract with the Agency.

PANNING:

Activity for the purpose of finding gold, accomplished by use of a pan no more than 18" in diameter and no motorized means of excavation.

PERMIT:

Authorization from the Agency to utilize the Recreation Area for a specific activity. Dependent upon type of activity, permit may or may not require a fee to be paid.

PERMITTED VESSEL:

Any vessel holding a use permit from the Agency.

PERSON:

Any human being of any age.

PERSONAL SAFETY EQUIPMENT:

Any equipment worn or to be worn by persons engaged in operator propelled device activities - bicycling, skateboarding, roller skating, in line skating, etc. - that may or may not be required by State law.

RECREATION AREA:

All lands and water available for recreation use that fall within the Federally Licensed New Don Pedro Project Boundary - FERC License #2299.

REFUSE:

Any material, organic or inorganic, that is deposited or left within the Recreation Area.

SLEEPING CAPACITY VESSEL:

A vessel less than 10' in width during transport and with built in plumbing.

TIME RESTRICTED PARKING or MOORING ZONE:

Designated parking or mooring areas that have limitations on the length of time (posted on signs) in which a vehicle or vessel may be parked or moored in the zone.

TOWING/IMPOUNDMENT:

Lawful seizure of specific personal property associated with a failure to comply with Agency regulations.

TRAILERS:

Any non-motorized mode of transportation on land to tow behind a vehicle for purpose of transporting living quarters, gear, supplies, vehicles or vessels.

UNATTENDED:

Any personal property that has not been watched, maintained, checked on or operated by the owner or authorized operator within a specific time period established by the Agency.

VEHICLE:

Any mode of motorized transportation for use on land.

VESSEL:

Any mode of motorized or non-motorized transportation for use on water.

WEAPON:

Any object having potential to injure or kill, threaten injury or death to any living creature or to damage any public or private property. Includes but is not limited to firearms, archery equipment, knives, laser pointers, traps, nets, vehicles, and vessels.

PROHIBITIONS

Section I:
GENERAL

1.01 INTERFERING WITH AGENCY EMPLOYEES

No person shall interfere with, harass, intimidate or threaten any Agency employee during the course of the employee's duties as charged by the Agency.

1.02 PERMITS

A) No person shall utilize the Recreation Area for any purpose without a valid permit from the Agency, except in authorized dispersed areas accessed by non motorized means.
B) No person shall utilize the Recreation Area without paying all applicable fees for required permits.
C) No person shall utilize the Recreation Area without displaying required permits in the designated location.
D) No person shall refuse to show their permit to Agency personnel upon request.
E) No person shall transfer their permit to another person without prior Agency approval.

1.03 ANIMALS - DOMESTIC AND WILD

A) No person shall maliciously, intentionally or negligently molest, hunt, disturb, injure, trap, net, poison, harm, kill, feed, touch, tease or spotlight any kind of animal, unless specifically authorized in accordance with State law and/or by the Agency.
B) No person shall bring or possess a domestic animal in the developed facilities of the Recreation Area, except as authorized by the Agency or if the animal is a seeing eye, signal or service dog under the immediate control of the physically impaired person.
C) No person shall allow domestic animals to run loose in areas of the Recreation Area where their presence is permitted.
D) No person shall place their domestic animal on a leash more than six (6) feet in length in the Recreation Area where their presence is permitted.
E) No person shall be allowed to bring a dog into the Recreation Area where their presence is permitted without proof of current rabies vaccination or current license.
F) No person shall deposit or leave any domestic animal unattended for any length of time within the Recreation Area.
G) No person shall introduce any non-native wild species or domestic animal into the Recreation Area.

1.04 PLANTS

No person shall willfully or negligently pick, dig up, cut, mutilate, destroy, injure, disturb, move, molest, burn or carry away any tree, plant or any portion thereof without a special permit from the Agency.

1.05 REFUSE/LITTER

A) No person shall litter or leave refuse of any type within the Recreation Area except in a receptacle or area designated for that purpose.
B) No person shall import any refuse from outside the Recreation Area and deposit such refuse within the Recreation Area without a special permit from the Agency.
C) No person shall place debris, construction materials and refuse including chemicals and containers resulting from the construction, remodeling or maintenance of houseboats, vessels, vehicles and concessionaire facilities in Agency waste receptacles or within the Recreation Area without a special permit from the Agency.
D) No person shall remove recyclable materials from Agency waste receptacles or designated Agency recycling containers without a special permit from the Agency.
E) No person shall rummage through or remove any items that are placed in or around any refuse or recycling receptacle without a special permit from the Agency.

1.06 FIRES

A) No person shall build or light a fire, such as a ground fire, outside of an approved fire container without a special permit from the Agency and a permit from the California Department of Forestry.
B) No person shall use a portable camp stove, barbecue, candle or lantern without a minimum ten (10) foot clearance to mineral earth around the unit.
C) No person shall build a fire using wood for fuel within or outside of a container in the dispersed area of the Recreation Area.
D) No person shall add to a fire any fuel that exceeds in size the length, width or height of the container being used.
E) No person shall leave any fire unattended at any time without complete extinguishment.

1.07 WEAPONS AND TRAPS

A) No person shall discharge in or across the developed facilities of the Recreation Area any weapon, except for Sworn Peace Officers or persons authorized by the Agency in the performance of official duties.
B) No person shall possess any weapon within the developed facilities of the Recreation Area that is not deactivated, except for Sworn Peace Officers or persons authorized by the Agency in the performance of official duties.
C) No person shall target practice with any weapon within the Recreation Area.

D) No person shall possess any weapon in the dispersed facilities that is not deactivated, except for persons hunting in accordance with State law, Sworn Peace Officers or persons authorized by the Agency in the performance of official duties.

1.08 FIREWORKS

No person shall possess, discharge, set off, or cause to be discharged, in or into any portion of the Recreation Area any firecrackers, torpedoes, rockets, fireworks, explosives, or substances harmful to the life or safety of persons, animals or property.

1.09 MINOR CHILDREN

A) No person under the age of sixteen (16) shall camp in the Recreation Area without being accompanied by a parent, guardian or adult person acting as a guardian.

B) No person between the ages of sixteen (16) and eighteen (18) shall camp in the Recreation Area without being accompanied by a parent, guardian or adult person acting as a guardian, unless they have prior authorization from the Agency and a written note from a parent or guardian including their approval for the minor to camp, and parent or guardian's emergency phone number.

C) No person under the age of eighteen (18) shall be outside of their campsite between the hours of 11:00 p.m. and 6:00 a.m. unless they are accompanied by a parent, guardian or adult person acting as a guardian.

1.10 CONDUCT

A) Peace and Quiet

I. No person shall conduct themselves so that they disturb others in the Recreation Area between the hours of 10 p.m. and 7 a.m.

II. No person shall, at any time, use electronic equipment, including but not limited to powered speakers or other machinery within the 5 MPH zone at any launch ramp, in the launch ramp preparation area, in or near any parking or developed camping and day use areas or vessel mooring areas of the Recreation Area at a volume which emits sound beyond the immediate individual camp, picnic site, vehicle, vessel or vessel mooring location without a special permit from the Agency. This prohibition does not apply to authorized emergency vessels or when equipment is being operated to request assistance or warn of a hazardous situation.

III. No person shall operate an engine driven electrical generator which emits sound beyond the immediate limit of the campsite or vessel mooring location between the hours of 10 p.m. and 7 a.m.

B) Disorderly Conduct

I. No person(s) shall engage in fighting in the Recreation Area.

II. No person shall conduct their communication in such a way that is verbally offensive, derisive, or annoying when such communication has a tendency to cause acts of violence by the person to whom, individually the remark is addressed.
III. No person shall make statements or actions toward another person that incites or produces imminent lawless action and is likely to incite or produce such action.
IV. No person shall urinate or defecate in public.
V. No person over the age of five (5) shall appear, swim, bathe, sunbathe, walk or otherwise be in the Recreation Area in such a manner that the genital/pubic hair area of the body and the breast of any female person at or below the areola is exposed to public view.

1.11 SANITATION

A) No person shall deposit waste, water, sewage or effluent from sinks, portable toilets, or any other source into or onto anything other than an appropriate disposal site as designated by the Agency.
B) No person shall fail to cooperate in maintaining restrooms in a neat and sanitary condition.
C) No person shall use restrooms set apart for the opposite gender.

1.12 TRESPASSING

A) No person shall enter any area that has been posted by the Agency as closed unless authorized by the Agency or a public officer acting within the scope of public duties.
B) No person shall drive around a gate or through a fence or remove, unlock, destroy or tamper with any door on any building or lock on any gate that has been placed by the Agency unless authorized by the Agency or a public officer acting within the scope of public duties.
C) No person shall violate any Agency order posting conditions and limitations for the use of any facility or area, or operation, use, size, type, permissible equipment, beaching, landing, launching, mooring, docking, or berthing of a vessel, boat, vehicle, or any other object.
D) No person shall build, install, leave, tie-up or secure any kind of developed improvement including but not limited to docks, permanent vessel mooring devices, trails, roadways, buildings, etc. within the Recreation Area land or waters without prior written authorization from the Agency.
E) No person shall access Recreation Area land or water from adjacent private property by use of a motorized vehicle.

1.13 VANDALISM

No person shall willfully deface, mar, paint, damage or destroy any developed improvement within the Recreation Area.

1.14 USE PERIODS

A) No person shall leave any portable furnishings utilized for day use in any dispersed area or other day use facility (such as the swimming lagoon, lakeshore or picnic area) overnight (outside of day use hours).

B) No person, vessel, or vehicle shall enter or be present after closing or in portions of the Recreation Area designated closed, except employees or persons authorized by the Agency on official business.

1.15 SOLICITING/OUTSIDE VENDORS

A) No person shall engage in soliciting, selling, or peddling any goods or services, or shall provide any services as an outside vendor within the Recreation Area unless they have an outside vendor permit for such activity from the Agency.

B) No person shall distribute, throw or deposit any handbills, circulars, pamphlets or advertisements, or affix to any tree, fence or structure any such handbill or advertisement unless authorized to do so by the Agency.

Section 2:

VEHICLES

2.01 MOTOR VEHICLE OPERATION

A) No person shall drive any vehicle off of designated roadways and parking pads or into any dispersed area of the Recreation Area.

B) No person shall operate within the Recreation Area <u>any</u> motorized vehicle that is not licensed for legal operation on public roadways unless they have a special permit from the Agency.

C) No person shall fail to observe posted regulatory traffic signs.

D) No person shall operate their vehicle in an unsafe manner.

E) No person shall ride in or upon any trailer in tow or upon any tailgate, hood, or other external portion of any vehicle not designed to legally carry passengers.

F) No person shall operate a vehicle without a valid drivers license or learners permit.

G) No person shall operate a vehicle under the influence of alcohol or other substance which impairs ability to drive.

H) No person shall operate a vehicle with an open container of alcohol in the vehicle.

I) No person shall operate any vehicle with loud exhaust between the hours of 10 p.m. and 7 a.m.

J) No person shall operate or allow to be operated any motorized scooter except as prescribed by Federal, State or local laws.

2.02 PARKING

A) <u>Vehicles</u>

I. No person shall park any vehicle in a location other than a designated parking area, unless authorized to do so by the Agency.

II. No person shall park any vehicle in a signed handicapped parking place without displaying the proper handicapped placarding/license on their vehicle.

III. No person shall park any vehicle in a manner to block or obstruct the exit of another vehicle already legally parked.

IV. No person shall park any vehicle in a time restricted parking zone for longer than the posted time allowance.

B) <u>Trailers</u>

I. No person shall leave any unattached/unattended boat trailer in any place other than a designated trailer parking area or campsite.

II. No person shall leave any unattached/unattended boat trailer in any designated trailer parking area without a boat trailer parking permit.

2.03 OPERATOR PROPELLED DEVICES

A) No person shall ride any operator propelled device within the Recreation Area without proper personal safety equipment as required by State law.
B) No person shall ride any skateboard within the developed facilities.
C) No person shall ride roller or in-line skates within the developed facilities without appropriate personal safety equipment including but not limited to helmet and pads.
D) No person shall ride any operator propelled device in an unsafe manner.
E) No person shall ride any operator propelled device in any area that is signed to prohibit its use in said area.
F) No person shall ride any operator propelled device in any manner that is discourteous or dangerous to themselves or other Recreation Area users.
G) No person on any operator propelled device shall fail to observe posted regulatory traffic signs.

Section 3

CAMPING AND PICNICKING

3.01 CAMPING

A) No person shall camp within the Recreation Area except in designated camping areas.

B) No person shall register for any campsite and then allow the overnight campsite occupancy limit to be exceeded.

C) No person shall occupy a campsite other than the one to which they have been registered.

D) No person shall occupy a campsite past the defined check out time if they have not acquired a permit to camp in that site for the coming night.

E) No person shall occupy a campsite for more than the defined maximum number of nights specific to the time of year.

F) No person shall occupy a campsite for a maximum length of time and then for a consecutive stay without observing the defined break in occupancy.

G) No person shall move any Agency provided campsite furnishing from one campsite to another.

3.02 PICNICKING

A) No person shall picnic in a developed camping area unless authorized to do so by the Agency.

B) No person shall move any Agency provided picnic site furnishing from one site to another.

Section 4

AQUATIC AND BOATING

4.01 VESSELS

No person shall bring into the Recreation Area any vessel that is 10 feet or greater in width (during transport on land) and/or is not legally transportable on public roads without a special permit unless specifically authorized by the Agency. Any vessel that requires registration numbers is required to have a use permit from the Agency.

4.02 ABANDONED VESSELS

A) No person shall leave any vessel (including houseboats) unattended for more than 24 hours beached, moored, stored, or parked within the Recreation Area outside of an Agency authorized, assigned mooring or storage facility.

B) No person shall leave, moor, beach or tie up any vessel overnight along the Dispersed Area shoreline unless they currently occupy an adjacent permitted campsite in a designated camp area or currently occupy an adjacent permitted houseboat or adjacent permitted sleeping capacity vessel.

4.03 MOORING TO BUOYS

No person shall moor their vessel to, hang on with a vessel to, or willfully remove and relocate any regulatory buoy, lake regulatory sign, hazard buoy, hazard marker, mooring buoy, supporting structures or beacon placed by the Agency or its authorized agents within the Recreation Area.

4.04 VESSEL OPERATION

A) No person shall operate or use any vessel, aquatic vehicle, or manipulate water skis, aquaplane, or similar device in a reckless or negligent manner so as to endanger the life, limb or property of any person, the Agency or any authorized Recreation Area user.

B) No person shall leave a vessel moored to an Agency or Marina courtesy dock, special use dock or floating restroom facility in excess of a posted maximum time limit.

C) No person shall moor any houseboat, private or rented, to an Agency courtesy dock, floating restroom facility, or to any buoy clearly marked “No Houseboats”.

D) No person shall leave, moor, beach, or tie up any houseboat or sleeping capacity vessel on the shoreline of the developed Recreation Area facilities overnight or in a manner during the day that creates congestion to a heavy use area (such as the launch ramp) unless authorized to do so by the Agency.

E) No person shall leave, moor, beach, tie up or secure any vessel in a manner which obstructs the navigation or access to any navigable water by any vessel.

F) No person shall leave, moor, tie up or secure any vessel to, otherwise use, or obstruct access to any Agency special use dock in conflict with a posted authorized reservation time period.

G) No person shall navigate a vessel at a speed in excess of five miles per hour and/or allow the vessel to produce a wake, with the exception of public safety/emergency vessels engaged in the course of duty, in any of the following areas:

I. An area where vessel speed is posted five miles per hour and/or no wake by means of authorized regulatory buoys or signs.

II. Within 100 feet of any person who is engaged in the act of bathing or swimming (not including waterskiing, or riding on an aquaplane or other type of motorized water transportation).

III. Within 200 feet of a moored or beached vessel, a floating dock or floating restroom facility to which boats are moored.

III. Within 200 feet of any authorized vessel engaged in the course of regulatory, hazard, or mooring buoy maintenance or installation.

4.05 OVERNIGHT VESSEL MOORING BY ADJACENT PROPERTY OWNERS

No person who owns property adjacent to the Recreation Area, or their friends, relatives or assignees shall be authorized to moor, store, or attach their vessel(s) to or near the shoreline overnight without specific written authorization from the Agency.

Section 5

PROSPECTING AND MINING

5.01 DREDGING

No person shall engage in the act of dredging within the Recreation Area.

5.02 PANNING

A) No person shall engage in panning in any developed facility of the Recreation Area without a special permit from the Agency.

B) No person shall leave any panning site in the dispersed area of the Recreation Area prior to restoring the area in which the panning took place to its original, natural condition.

5.03 METAL DETECTING

A) No person shall enter the developed facility of the Recreation Area for the purpose of metal detecting without a special permit from the Agency.

B) No person shall keep personal property (other than coins) found during the act of metal detecting in the dispersed areas of the Recreation Area without first having abided by the Agency Lost and Found policy.

ATTACHMENTS

ATTACHMENT 6

STUDY PLANS

6-1 - **Water Quality Assessment Study Plan**

6-2 - **Special-Status Amphibians and Aquatic Turtles Study Plan**

6-3 - **Special-Status Wildlife - Bats Study Plan**

6-4 - **Special-Status Plants Study Plan**

6-5 - **ESA-Listed Amphibians - California Tiger Salamander Study Plan**

6-6 - **ESA-Listed Amphibians - California Red-Legged Frog Study Plan**

6-7 - **ESA-Listed Wildlife - Valley Elderberry Longhorn Beetle Study Plan**

6-8 - **ESA- and CESA-Listed Plants Study Plan**

6-9 - **Historic Properties Study Plan**

6-10- **Native American - Traditional Cultural Properties and Ethnographic Study Plan**

ATTACHMENT 6-1

WATER QUALITY ASSESSMENT STUDY PLAN

DRAFT

ATTACHMENT 6-1

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

Water Quality Assessment Study Plan

February 2011

1.0 Project Nexus

The on-going operation and maintenance (O&M) of the Don Pedro Project (Project) may affect water quality. The effect may be direct (e.g., release of a pollutant from a Project facility), indirect (e.g., due to public recreation), or cumulative (i.e., combined effect of a Project-related activity with a non-project activity). This study investigates the potential Project effects to water quality.

For the purpose of this Study Plan, water quality parameters being analyzed are those listed in Table 1.0-1.

Table 1.0-1 Water quality parameters for Don Pedro Reservoir.

Parameter		Method	Target Reporting Limit µg/L (or other)	Hold Time
Basic Water Quality- Field				
Dissolved Oxygen	DO	SM 4500-O	0.1 mg/L	Field
Specific Conductance	-----	SM 2510 A	0.001 µmhos	Field
pH	-----	SM 4500-H	0.1 su	Field
Turbidity	-----	SM 2130 B	0.1 NTU	Field
Basic Water Quality - Laboratory				
Total Organic Carbon[1]	TOC	SM 5310	0.2 mg/L	28 d
Dissolved Organic Carbon	DOC	EPA 415.1 D	0.5/0.1	28 d
Total Dissolved Solids	TDS	EPA 2540 C/SM 2340 C	1 mg/L	7d
Total Suspended Solids	TSS	EPA 2520 D SM 2340 D	1 mg/L	7d
Inorganic Ions				
Total Alkalinity	-----	SM 2340 B	2000	14 d
Hardness (measured value)	-----	EPA 2340 B/SM 2340 C	1 mg/L as CaCO3	
Calcium	Ca	EPA 6010 B	30	180 d
Magnesium	Mg	EPA 6010 B	1	
Potassium	K	EPA 6010 B	500	180 d
Sodium	Na	EPA 6010 B	29	180 d
Chloride	Cl	EPA 300.0	20	28 d
Nutrients				
Nitrate-Nitrite	-----	EPA 300.0	2	28 d <pH 2
Total Ammonia as N	-----	EPA 4500-NH3/SM 4500-NH3	0.02	28 d <pH 2
Total Kjeldahl Nitrogen as N	TKN	SM 4500 N	100	28 d <pH 2

Parameter		Method	Target Reporting Limit µg/L (or other)	Hold Time
Total Phosphorous	TP	SM 4500-P	20	28 d <pH 2
Dissolved Orthophosphate	PO4	EPA 365.1/EPA 300.0	0.01	48 h at 4°C
Metals (Total and Dissolved)				
Arsenic (total and dissolved)	As	EPA 200.8/1632	53/0.004	180 d
Cadmium (total and dissolved)	Cd	EPA 200.8/1638	3.4/0.003	180 d
Copper (total and dissolved)	Cu	EPA 200.8/1638	5.4/0.01	180 d
Iron (total and dissolved)	Fe	EPA 200.8/1638	6.2/2.2	180 d
Lead (total and dissolved)	Pb	EPA 1638	0.005	180 d
Mercury (total)	Hg	EPA 1631	0.0002	28 d
Methylmercury (total and dissolved)	CH3Hg	EPA 1630	0.00005/0.00002	90 d
Selenium (total)	Se	EPA 200.8/1638	75	180 d
Silver (total and dissolved)	Ag	EPA 200.8/1638	7/0.03	180 d
Zinc (total and dissolved)	Zn	EPA 200.8/1638	1.8/0.3	180 d
Herbicides and Pesticides				
Aldrin	----	EPA 8081A	0.05/0.01	7d
Alpha-BHC (=alpha-HCH)	----	EPA 8081A	0.05/0.01	7d
Beta-BHC (=beta-HCH)	----	EPA 8081A	0.05/0.008	7d
Chlordane	----	EPA 8081A	0.5/0.08	7d
Chlorpyrifos	----	EPA 8141A	0.005/0.0024 mg/L	7d
Delta-BHC (=delta-HCH)	----	EPA 8081A	0.05/0.017	7d
Dieldrin	----	EPA 8081A	0.05/0.01	7d
Diazinon	----	EPA 8141A	0.005/0.0029 mg/L	7d
Endosulfan I	----	EPA 8081A	0.05/0.005	7d
Endosulfan II	----	EPA 8081A	0.05/0.01	7d
Endrin	----	EPA 8081A	0.05/0.0118	7d
Gamma-BHC (=gamma-HCH)	----	EPA 8081A	0.05/0.02	7d
Heptachlor	----	EPA 8081A	0.05/0.007	7d
Heptachlor Epoxide	----	EPA 8081A	0.05/0.02	7d
Toxaphene	----	EPA 8081A	2/0.3	7d
Bacteria				
Total coliform	----	SM 9221	1.1 MPN	24 h
Fecal coliform	----	SM 9221	1.1 MPN	24 h
Escherichia coli	*E. coli*	SM 9221	1.1 MPN	24 h
Petroleum Hydrocarbons				
Total Petroleum Hydrocarbons (gasoline range)	TPH-g	EPA SW8015B	50	14 d
Oil & Grease	O&G	Visual Observation	----	----

[1] Total organic carbon data may be used in calculations required to assess conformance with water quality objectives.

In addition, this study addresses the following issues identified in Section 6.0 of PAD:

- **Issue:** Effects of the Project and Project recreation on water quality (excluding water temperature) and compliance with CVRWQCB's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, fourth edition (Basin Plan).
- **Issue**: Effect of the Project on compliance with the State Water Resources Control Board's (SWRCB) Clean Water Act (CWA) Section 303(d) List of Total Maximum Daily Load (TMDL) Priority Schedule
- **Issue:** Water temperatures downstream of Don Pedro Reservoir are the subject of an ongoing study required by FERC in its July 2009 order. The Districts' study plan for the

conduct of this study was approved by FERC in May 2010 and the study is scheduled for completion in 2011. This study is entitled: Water Temperature Model Study Plan.

2.0 Agency Resource Management Goals

The State Water Resources Control Board (SWRCB) is the primary agency with jurisdiction over the Project's water quality. SWRCB's management goals are set forth in the CVRWQCB's *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins*, fourth edition (Basin Plan), which was initially adopted in 1998 and most recently revised by the SWRCB in 2010.

The Don Pedro Project and the areas upstream and downstream of the Project fall within three Basin Plan Hydro Units: (1) Hydro Unit 536, which includes the Tuolumne River upstream of the Project; (2) Hydro Unit 536.32, which includes Don Pedro Reservoir; and (3) Hydro Unit 535, which includes the Tuolumne River from Don Pedro Dam to the San Joaquin River. Designated beneficial uses in these three Hydro Units are described in Table 2.0-1.

Table 2.0-1 Beneficial uses of the Tuolumne River in the vicinity of the Don Pedro Project.

Designated Beneficial Use Description from Basin Plan, Section II		Designated Beneficial Use by HU from Basin Plan, Table II-1			
		Use	Source to Don Pedro Reservoir	Don Pedro Reservoir	Don Pedro Dam to San Joaquin River
			HU 536	HU 536.32	HU 535
Municipal and Domestic Supply (MUN)	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.	MUNICIPAL AND DOMESTIC SUPPLY	Existing	Potential	Potential
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation (including leaching of salts), stock watering, or support of vegetation for range grazing.	IRRIGATION	Existing	-----	Existing
		STOCK WATERING	Existing	-----	Existing
Industrial Process Supply (PRO)	Uses of water for industrial activities that depend primarily on water quality.	PROCESS	-----	-----	-----
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well re-pressuration.	SERVICE SUPPLY	-----	-----	-----
		POWER	Existing	Existing	-----
Water Contact Recreation (REC-1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.	CONTACT	Existing	Existing	Existing
		CANOEING AND RAFTING[1]	Existing	-----	Existing

Designated Beneficial Use Description from Basin Plan, Section II		Designated Beneficial Use by HU from Basin Plan, Table II-1			
		Use	Source to Don Pedro Reservoir	Don Pedro Reservoir	Don Pedro Dam to San Joaquin River
			HU 536	HU 536.32	HU 535
Non-Contact Water Recreation (REC-2)	Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beach-combing, camping, boating, tide-pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.	OTHER NON-CONTACT	Existing	Existing	Existing
Warm Freshwater Habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	WARM[2]	Existing	Existing	Existing
Cold Freshwater Habitat (COLD)	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	COLD[2]	Existing	Existing	Existing
Migration of Aquatic Organisms (MGR)	Uses of water that supports habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.	WARM[3]	-----	-----	-----
		COLD[4]	-----	-----	Existing
Spawning (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.	WARM[3]	-----	-----	Existing
		COLD[4]	-----	-----	Existing
Wildlife Habitat (WILD)	Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation or enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, or invertebrates), or wildlife water and food sources.	WILDLIFE HABITAT	Existing	Existing	Existing

1 Shown for streams and rivers only with the implication that certain flows are required for this beneficial use.
2 Resident does not include anadromous. Any hydrologic unit with both WARM and COLD beneficial use designations is considered COLD water bodies by the SWRCB for the application of water quality objectives.
3 Striped bass, sturgeon, and shad.
4 Salmon and steelhead.

In addition, Section 303(d) of the CWA requires that every two years each state submit to the U.S. Environmental Protection Agency (EPA) a list of rivers, lakes, and reservoirs in the state for which pollution control or requirements have failed to meet water quality standards. Based on a review of the SWRCB’s 2010 proposed list and its associated TMDL Priority Schedule, Don Pedro Reservoir has been identified as CWA §303(d) state impaired for mercury, and the lower Tuolumne River (Don Pedro Reservoir to San Joaquin River) as state impaired for diazinon, Group A Pesticides, and Unknown Toxicity (CRWQCB 2006). Group A Pesticides consist of aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexanes (including lindane), endosulfan, and toxaphene.

Additionally, the CVRWQB has proposed that Sullivan Creek (Phoenix Reservoir to Don Pedro Reservoir) and Woods Creek (north side of Don Pedro Reservoir to San Joaquin River) be listed as state impaired for *Escherichia coli* (*E. coli*). Dry Creek (tributary to lower Tuolumne River at Modesto) has been proposed as state impaired for chlorpyrifos, diazinon, *E. coli*, and unknown toxicity. However, these constituents have not been added to the 303(d) list, and therefore, there are no approved TMDL plans for them.

3.0 Study Goals

The goal of this study is to characterize existing water quality conditions in Don Pedro Reservoir and the lower Tuolumne River as measured at the discharge from the Project.

4.0 Existing Information and Need for Additional Information

Existing relevant and reasonably available information for the general Project area is documented in Section 5.2.1 of the PAD. Historic information suggests that water quality in Don Pedro Reservoir meets Basin Plan Water Quality Objectives. A data collection effort is needed to verify the water quality of the Project.

Water entering Don Pedro Reservoir from the Wild and Scenic Tuolumne River is well-oxygenated, cold water of high quality with few exceptions. As water flows through the reservoir, there are very few sources of potential water quality degradation, these being the minor tributaries (e.g., Woods, Sullivan, and Moccasin creeks) entering the reservoir and the recreation infrastructure at Don Pedro Reservoir (e.g., campsites and fuel stations). Subsequently, water leaving Don Pedro Reservoir remains of high quality and available data indicate that Basin Plan criteria are met.

Seasonal temperature stratification processes can play an important role in lake water quality conditions. Don Pedro Reservoir becomes thermally stratified in late spring and maintains a separation between the warmer waters of the top layer (i.e., epilimnion) and the cold water pool comprising the bottom layer (i.e., hypolimnion) until fall when turnover begins.

Since Don Pedro Dam was completed in 1971, dissolved oxygen levels in the reservoir's epilimnion have ranged between 7.6 and 8.4 milligrams per liter (mg/L) for August through November 1978 and 1979 (EPA 2010a). In the hypolimnion, dissolved oxygen levels recorded during discrete intermittent sampling ranged between 0.7 and 8.6 mg/L, and temperatures ranged between 2.3 to 14.0°C for the same time period (EPA 2010a).

Existing information provides a recent description of the general water quality of the Tuolumne River upstream and substantially downstream of the Project, while less is known about the water quality within and immediately downstream of the Project. Therefore, additional information regarding water quality in the Project will be gathered during the late summer when reservoir stratification is stable to obtain a data set that is representative of Project conditions and effects.

5.0 Study Methods

Water quality sampling will occur in the Tuolumne River upstream of Don Pedro, Woods Creek, Sullivan Creek, within Don Pedro Reservoir, and in the Tuolumne River immediately downstream of Don Pedro Dam. Bacteria samples will be collected from sites adjacent to recreation areas at Don Pedro Reservoir.

5.1 Study Area

The study area includes the Project Boundary and the Tuolumne River immediately below Don Pedro Dam. Recreation-related facilities and O&M activities that discharge wastewater to the reservoir or the Tuolumne River will also be identified and sampled.

5.2 General Concepts

The following general concepts apply to the study:

- Personal safety is an important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If modifications are made, field crews will follow the protocols in the study plan. If minor modifications are made, the Districts will document and report these modifications in the draft study report.
- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.

5.3 Study Methods

Study methods are separated into two elements for this Study Plan: Water Chemistry Element and Recreation Activity Element.

5.3.1 Water Chemistry Element

The study approach for the water chemistry element will consist of the following seven steps:

<u>Step 1 - Select Water Quality Sampling Locations.</u> To better understand the dynamics of the water chemistry and physical structure of Don Pedro Reservoir, water quality information will be collected in Woods Creek and Sullivan Creek prior to entering Don Pedro Reservoir; the Tuolumne River upstream of Don Pedro Reservoir; within Don Pedro Reservoir; and in the Tuolumne River immediately below Don Pedro Dam.

Timing of Sampling Events. Water chemistry samples will be collected in the late summer period (late August/Early September).

Sample Locations and Depths. In-reservoir water quality samples will be co-located with reservoir temperature profiles at two sites: one site between Upper and Middle Bays and one near the main dam (Table 5.3-1). At each reservoir location, water chemistry samples will be collected for laboratory analysis at two depths: within one meter above the bottom in the hypolimnion and one meter below the surface in the epilimnion. Field water quality measurements will be made at these same depths with a Hydrolab DataSonde 5 (Hydrolab).[1]

Table 5.3-1 Reservoir and stream reach sample locations.

Reservoir/Stream Reach	Sample Depth	Location
Woods Creek	Just below surface	Just prior to entering Don Pedro Reservoir
Sullivan Creek	Just below surface	Just prior to entering Don Pedro Reservoir
Don Pedro Reservoir	One meter below surface	Between Upper and Middle Bays
	One meter above bottom	
Don Pedro Reservoir - near Dam	One meter below surface	At deepest point in the reservoir near the dam
	One meter above bottom	
Tuolumne River just below Don Pedro Dam	Just below the surface	Below Don Pedro powerhouse

Analytical Parameters. All samples associated with the stream and reservoir sampling will be analyzed for the following parameters:

- Basic Water Chemistry - Field
- Basic Water Chemistry - Laboratory
- Inorganic Ions
- Metals
- Nutrients
- Herbicides and Pesticides

The methods associated with each parameter are listed in Table 1.0-1.

<u>Step 2 - Collect Data and Samples.</u> All data will be collected in accordance with standard quality assurance practices.

As water temperature (±0.1°C), dissolved oxygen (±0.2 mg/L), pH (±0.2 standard unit, or su), specific conductance (±0.001 µmhos/cm), and turbidity (±1 NTU) will be measured in the field using a Hydrolab DataSonde 5 or equivalent to meet the reporting limits in Table 1.0-1. Prior to and after each use, the instrument will be calibrated using manufacturer's recommended calibration methods. Any variances will be noted on the field data sheet and final report and recalibration or repair done as necessary. The Districts will note relevant conditions during each sampling event on the field data sheet (i.e., weather, air temperature, flow, description of

1 Or other similar instrument that has the same precision and accuracy.

location, floating material, and evidence of oil and grease). Sampling equipment will be thoroughly cleaned between sampling sites.

Surface samples will be collected using a grab sampling technique. Hypolimnetic samples will be collected using a Kemmerer bottle or equivalent to meet the reporting limits in Table 1.0-1. Each laboratory sample will be collected using laboratory-supplied clean containers. Water samples to be analyzed for metals will be taken using "clean hands-dirty hands" method[2] consistent with the EPA Method 1669 sampling protocol as described in *Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels* (EPA 1996). Samples requiring filtration before analysis will be filtered in accordance with standard protocols in the field.

All sample containers will be labeled with the date and time that the sample is collected, sampling site, or identification label; and handled in a manner consistent with appropriate chain-of-custody protocols. The sample container will be preserved (as appropriate), stored and delivered to a State of California certified water quality laboratory for analyses of the parameters listed in Table 1.0-1 in accordance with maximum holding periods for each parameter. A chain-of-custody record will be maintained with the samples at all times. Each sampling site location will be recorded using a GPS unit and the coordinates will be recorded in a field logbook. Sampling equipment will be thoroughly cleaned between sampling sites.

As part of the field quality assurance program, a field blank will be collected every day or every 10 samples, which ever is most frequent; duplicates and equipment rinsates will be collected every 10 samples[3] and submitted to the laboratory for analysis. A field blank is a sample of analyte-free water poured into a container in the field, preserved, and shipped to the laboratory with the samples. A field blank assesses any contamination from field conditions during sampling. A rinsate is a sample of analyte-free water poured over or through decontaminated field sampling equipment prior to the collection of samples. It assesses the adequacy of the decontamination processes. Trip blanks will be collected for every cooler used for samples of volatile organics and metals.

<u>Step 3 - Laboratory Analysis of Water Samples</u>. All laboratory analyses will be conducted using EPA Analytical Methods (EPA 2010) or Standard Methods (APHA et al. 2010) or equivalent method sufficiently sensitive to detect and report at levels necessary for evaluation against state and federal water quality standards. A California-certified laboratory will prepare and analyze water samples for the following surface water analytical parameters:

- Basic Water Chemistry - Laboratory
- Inorganic Ions
- Metals
- Nutrients
- Herbicides and Pesticides
- Bacteria
- Petroleum Hydrocarbons

[2] One member of a two-person sampling team is designated as "dirty hands"; the second member is designated as "clean hands." All operations involving contact with the sample bottle and transfer of the sample from the sample collection device to the sample bottle are handled by the individual designated as "clean hands." "Dirty hands" is all other activities that do not involve direct contact with the sample.

[3] Sometimes logistically only one sample is collected a day.

The analytes and target reporting limits associated with each parameter are listed in Table 1.0-1.

Step 4 - Compile Data and Perform Quality Assurance/Quality Control. All data will be verified and/or validated as appropriate. In brief, following field and laboratory analyses, which includes the laboratories' own QA/QC analysis, the Districts will subject all data to QA/QC procedures including, but not limited to: spot-checks of transcription; review of electronic data submissions for completeness; comparison of results to field blank and rinsate results; and, identification of any data that seem inconsistent. If such a datum is found, the Districts will consult with the laboratory to identify any potential sources of error before concluding that the datum is correct.

All verified chemical detections, including data whose results are "J" qualified,[4] will be used for this assessment. Should the laboratory need to re-extract samples and re-run the sample under different calibration conditions, the data identified by the laboratory, as the most certain, will be used. If field-sampling conditions, as measured by the field blank and the rinsate sample results, indicate that samples have been corrupted, the Districts will qualify the data accordingly.

Step 5 - Determine if Parameters are Consistent with Water Quality Objectives. Table 5.3-2 below shows the benchmark values that will be used to assist with the assessment of sample results and their consistency with the Basin Plan and other water quality objectives. The benchmark values in Table 5.3-2 were taken from the California Toxics Rule (CTR) (EPA 2000); the Basin Plan (CVRWQCB 1998); and bacterial water quality standards for recreational waters from EPA (2003).

Table 5.3-2 Benchmark values suggested for evaluating the protection of designated beneficial uses of Project waters.[1]

Basin Plan Water Quality Objective (Potentially Affected Beneficial Uses)	Symbol or Abbreviation	Benchmark Values	Reference	Notes
Bacteria (MUN, REC-1)				
Total coliform	----	< 10,000 MPN per 100 mL < 240 MPN per 100 mL (geometric mean);	EPA 2003	Water contact recreation, single-day sample; Water contact recreation, 30-day geometric mean
Fecal coliform	----	< 200 MPN per 100 mL (geometric mean); < 10% of samples > 400 MPN per 100 mL	CVRWQCB 1998	Water contact recreation, 30-day geometric mean; with individual samples not > 400 MPN/100 mL
Escherichia coli	E. coli	<126 MPN per 100 mL (geometric mean) <235 MPN per 100 mL in any single sample	EPA 2003	Water contact recreation, 30-day geometric mean
Biostimulatory Substances (COLD, SPAWN)				
Total Kjeldahl Nitrogen	TKN	None	----	----
Total Phosphorous	TP	None	----	----
Chemical Constituents (AGR, COLD, MUN)				
Alkalinity	----	20 mg/L	Marshack 2008	EPA AWQC; can affect water treatment
Arsenic	As	0.010 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Cadmium	Cd	5 µ/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Calcium	Ca	None	----	----

[4] Results with a "J" qualifier are results where the chemical was detected, but there is uncertainty in the quantity. The quantity is above the method detection limit, but below the reporting limit.

Basin Plan Water Quality Objective (Potentially Affected Beneficial Uses)	Symbol or Abbreviation	Benchmark Values	Reference	Notes
Chloride	Cl	250 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Chromium (total)	Cr (total)	50 µg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Copper	Cu	1 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Lead	Pb	15 µg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Mercury (inorganic)	Hg	0.002 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Nickel	Ni	0.1 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Nitrate	NO_3	45 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Nitirite	NO_2	1 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Nitrate + Nitrite	$NO_3 + NO_2$	10 mg/L (combined total)	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Potassium	K	None	----	----
Selenium	Se	0.05 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL[2]
Sodium	Na	20 mg/L	Marshack	Sodium Restricted Diet[3]
Specific conductance	----	150 µmhos	CVRWQCB 1998	Aquatic Life Protection
Zinc	Zn	5 mg/L	CDPH 2010 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Dissolved Oxygen (COLD, SPAWN)				
Dissolved Oxygen	DO	7.0 mg/L (minimum)	CVRWQCB 1998	Aquatic life protection
Floating Material (REC-1, REC-2)				
Floating Material	-----	Narrative Criteria	CVRWQCB 1998	Aesthetics - Absent by visual observation
Oil and Grease (REC-1, REC-2)				
Oil & Grease	-----	Narrative Criteria	CVRWQCB 1998	Aesthetics - Absent by visual observation
Total Petroleum Hydrocarbons	TPH	None	----	----
pH (COLD, SPAWN, WILD)				
pH	-----	6.5-8.5	CVRWQCB 1998	Aquatic life protection
Sediment and Settleable Solids (REC-2, SPAWN, WILD)				
Sediment	-----	Narrative Criteria	CVRWQCB 1998	See Geology and Soil Resources
Tastes and Odors (MUN)				
Aluminum	Al	0.2 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Chloride	Cl	250 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Copper	Cu	1.3 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Iron	Fe	0.3 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Silver	Ag	0.1 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Specific Conductance	-----	900 umhos	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Sulfate	SO_4	250 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Total Dissolved Solids	TDS	500 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]
Zinc	Zn	5 mg/L	CDPH 2005 cited in CVRWQCB 1998	Title 22 Secondary MCL[2]

Basin Plan Water Quality Objective (Potentially Affected Beneficial Uses)	Symbol or Abbreviation	Benchmark Values	Reference	Notes
Temperature (COLD, SPAWN)				
Temperature	-----	20oC (mean daily), T > 3-5oC (min)	Frost and Brown 1967; Elliott 1981	See Water Temperature Study
Toxicity (COLD, SPAWN, MUN) ***CTR values listed below generally assume Total Recoverable Concentrations (unfiltered)***[4,5]				
Ammonia as N (pH and Temp dependent)	NH_3-N	24.1 mg/L (CMC); 4.1-5.9 mg/L (CCC)	EPA 2000	CTR criteria over 0-20°C assuming pH 7.0
		5.6 mg/L (CMC); 1.7-2.4 mg/L (CCC)	EPA 2000	CTR criteria over 0-20°C assuming pH 8.0
		0.9 mg/L (CMC); 0.3-0.5 mg/L (CCC)	EPA 2000	CTR criteria over 0-20°C assuming pH 9.0
Arsenic	As	0.34 mg/L (CMC); 0.15 mg/L (CCC)	EPA 2000	CTR criteria
Cadmium (hardness dependent)	Cd	0.23 µg/L (CMC); 0.15 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 5 mg/L as $CaCO_3$
		0.4 µg/L (CMC); 0.34 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 10 mg/L as $CaCO_3$
		0.56 µg/L (CMC); 0.53 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 15 mg/L as $CaCO_3$
		0.83 µg/L (CMC); 0.95 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 25 mg/L as $CaCO_3$
Copper (hardness dependent)	Cu	0.83 µg/L (CMC); 0.72 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 5 mg/L as $CaCO_3$
		1.6 µg/L (CMC); 1.3 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 10 mg/L as $CaCO_3$
		2.34 µg/L (CMC); 1.84 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 15 mg/L as $CaCO_3$
		3.79 µg/L (CMC); 2.85 µg/L (CCC)	EPA 2000	CTR for unfiltered sample assuming hardness of 25 mg/L as $CaCO_3$
Lead (hardness dependent)	Pb	0.54 µg/L (CCC) 14 uµg/L (CMC)	EPA 2000	CTR for unfiltered sample assuming hardness of 25 mg/L as $CaCO_3$
Mercury	Hg	0.050 µg/L	EPA 2000 40 CFR 131.38	CTR/Federal Register. 5/18/00
Nitrate-Nitrite	NO_3-N+NO_2-N	10 mg/L (combined total)	CDPH 2010 cited in CVRWQCB 1998	Title 22 Primary MCL ("Blue baby Syndrome")
Silver (hardness dependent)	Ag	0.02 µg/L (CMC)instantaneous	EPA 2000	CTR for unfiltered sample assuming hardness of 5 mg/L as $CaCO_3$
		0.08 µg/L (CMC)instantaneous	EPA 2000	CTR for unfiltered sample assuming hardness of 10 mg/L as $CaCO_3$
		0.16 µg/L (CMC)instantaneous	EPA 2000	CTR for unfiltered sample assuming hardness of 15 mg/L as $CaCO_3$
		0.37 µg/L (CMC) instantaneous	EPA 2000	CTR for unfiltered sample assuming hardness of 25 mg/L as $CaCO_3$
Zinc (hardness dependent)	Zn	9.47 µg/L	EPA 2000	CTR for unfiltered sample assuming hardness of 5 mg/L as $CaCO_3$

Basin Plan Water Quality Objective (Potentially Affected Beneficial Uses)	Symbol or Abbreviation	Benchmark Values	Reference	Notes
		17.03 µg/L	EPA 2000	CTR for unfiltered sample assuming hardness of 10 mg/L as $CaCO_3$
		24.01 µg/L	EPA 2000	CTR for unfiltered sample assuming hardness of 15 mg/L as $CaCO_3$
		37.02 µg/L	EPA 2000	CTR for unfiltered sample assuming hardness of 25 mg/L as $CaCO_3$
Aldrin	----	3.0 µg/L	Marshack 2008	Ambient Water Quality Criteria
Chlordane	----	0.0043 µg/L	Marshack 2008	Ambient Water Quality Criteria
Chlorpyrifos	----	0.014 µg/L	Marshack 2008	Ambient Water Quality Criteria
Diazinon	----	0.05 µg/L[5]	Marshack 2008	Ambient Water Quality Criteria
Dieldrin	----	0.056 µg/L	Marshack 2008	Ambient Water Quality Criteria
Endosulfan	----	0.056 µg/L	Marshack 2008	Ambient Water Quality Criteria
Endrin	----	0.036 µg/L	Marshack 2008	Ambient Water Quality Criteria
Heptachlor	----	0.0038 µg/L	Marshack 2008	Ambient Water Quality Criteria
Heptachlor epoxide	----	0.0038 µg/L	Marshack 2008	Ambient Water Quality Criteria
alpha-Hexachlorocyclohexane	----	0.08 µg/L	Marshack 2008	Ambient Water Quality Criteria
beta-Hebachlorocyclohexane	----	0.08 µg/L[6]	Marshack 2008	Ambient Water Quality Criteria
delta-Hexachlorocyclohexane	----	0.08 µg/L[6]	Marshack 2008	Ambient Water Quality Criteria
gamma-Hexachlorocyclohexane	----	0.08 µg/L	Marshack 2008	Ambient Water Quality Criteria
Toxaphene	----	0.0002 µg/L	Marshack 2008	Ambient Water Quality Criteria
Turbidity (COLD, SPAWN, WILD, MUN)				
Turbidity	NTU	increase < 1 NTU for 1-5 NTU background; increase < 20% for 5-50 NTU background	CVRWQCB 1998	Aesthetics, disinfection, egg incubation

1 Note a chemical may be listed under more than one beneficial use.
2 CDPH Title 22 identified as minimum WQ thresholds, but acknowledged as insufficiently protective in some cases (CVRWQCB 1998)
3 Guidance level to protect those individuals restricted to a total sodium intake of 500 mg/day (Marshack 2008).
4 CMC: Criterion Maximum Concentration (one-hour acute exposure) for aquatic toxicity as defined by EPA (2000)
5 CCC: Criterion Continuous Concentration (four-day chronic exposure) for aquatic toxicity as defined by EPA (2000)
6 Value is for gama-hexachlorocyclohexane.

The CVRWQCB has adopted, by reference, California Title 22 maximum contaminant levels (MCL) for drinking water as Basin Plan objectives (CVRWQCB 1998), with the exception that more stringent criteria may apply as necessary for protection of specific beneficial uses. Hence, these values are adopted herein. It should be noted, however, that chemical concentrations that were originally intended to apply to finished tap water, rather than to untreated sources of drinking water, would be applied to the untreated reservoir or river water.

For water quality objectives related to aquatic toxicity,[5] the CTR (EPA 2000) will be evaluated. Section 131.38 of 40 CFR establishes Criterion Maximum Concentrations (CMC) as the highest concentration to which aquatic life can be exposed for a short period without deleterious effects and must be based on extended sample collection and one-hour averaging. The Criterion Continuous Concentrations (CCC) is defined as the highest concentration to which aquatic life can be exposed for an extended period of time (i.e., four days) without deleterious effects. When

5 Ammonia, nitrate, and trace metals.

single grab samples are collected, it is assumed that constituent concentrations are representative of the continuous ambient condition, and CCC values are therefore used as the appropriate criteria to compare against environmental samples. Because of differences in acute and chronic toxicity to aquatic organisms of many elements and compounds in Table 5.3-2 as well as variations with ambient water quality such as pH or hardness, several entries have multiple benchmarks to assist with their evaluation. The benchmarks for four of the metals addressed in this study plan (i.e., cadmium, copper, silver and zinc) are reported for unfiltered (i.e., total metals) samples from the CTR (EPA 2000), and calculated in 5 mg/L increments of hardness since the level at which each of these metals is reportedly toxic to aquatic life is lower at lower hardness levels. In addition, the CMC and CCC levels for ammonia are a function of both pH and temperature and are presented over a range of 0 to 20°C in pH increments of 1 su.

Step 6 - Consult with Project Operations Staff. If a water quality result suggests Basin Plan objectives are not being met, the Districts will consult with Project operations staff to identify Project O&M activities that typically occur in the area with the potential to adversely affect the parameter.

Step 7 - Prepare Report. As defined in Section 3.0, this sampling plan is intended to inform the Districts and relicensing participants on both the potential for Project operations to cause a Basin Plan Objective not to be met. The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Methods; (3) Results; (4) Conclusions; and (5) Description of Variances from the study plan, if any. A complete water quality data set will be provided as appendices to the report including time and location of each sample collected, sample specific performance (MRL), as well as electronic copies of laboratory results. The Districts will make the report available to relicensing participants upon completion.

5.3.2 Recreation Activity Element

The study approach for the recreation activity element will consist of the following seven steps:

Step 1 - Select Sampling Locations for Recreation-related Surveys. The condition of existing recreation facilities and dispersed recreation areas may adversely affect water quality at some near-shore locations adjacent to unmanaged and low-managed recreation facilities.

Timing of Sampling Events. In accordance with bacteria sampling protocols, bacteria samples will be collected on five different days within a 30-day period, including either the Independence Day or Labor Day holiday weekend (CVRWQCB 1998). A single petroleum hydrocarbon sample will be collected at each location during the holiday weekend included in the bacteria sampling.

Sample Locations and Depths. Recreation sample locations are listed in Table 5.3-3. At each near-shore sample location, surface water will be collected from the near surface (bacteria) and/or the surface (petroleum hydrocarbons). Samples will be collected either from shore or from a non-motorized boat.

Table 5.3-3 Recreation sample locations on Don Pedro Reservoir.

Recreation Area	Bacteria Sampling Site
Fleming Meadows	Marina
	Houseboat marina
	Boat launch
	Main campground loop
	Small campground loop
Blue Oaks	Boat ramp
	Picnic area
	Loop of campground
Moccasin Point	Boat ramp
	Marina
	Main campground loop
	Picnic area

Analytical Parameters. Water samples associated with the recreation-related sampling will be analyzed for the recreation suite of surface water analytical parameters:

- Bacteria
- Petroleum Hydrocarbons

Visual observations of oil and grease will be recorded in the field notebook.

Steps 2 through 7. as the remaining Steps 2 through 7 will follow the same steps as described in Section 5.3.1 above.

6.0 Schedule

The Districts anticipate the schedule to complete the study proposal as follows assuming FERC's Study Plan Determination is deemed final on December 31, 2011:

- Planning (Step 1)..TBA
- Field Work (Step 2)..TBA
- Data Compilation, QA/QC and Analysis (Steps 3 - 6) ....TBA
- Report Preparation (Step 7)..TBA

7.0 Consistency of Methodology with Generally Accepted Scientific Practices

The methods presented in this study plan also are consistent with those used in recent relicensings in California.

8.0 Deliverables

The Districts plan to prepare an Excel table that will include for each parameter measured the result of all seasons collected, along with sample-specific uncertainty, and sorted by sampling location. The table will be provided on a compact disc (CD) and appended to reports. Data that are greater than the benchmarks provided in Table 5.3-3 will be highlighted.

9.0 Level of Effort and Cost

Not yet estimated.

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ATTACHMENT 6-2

SPECIAL-STATUS AMPHIBIANS AND AQUATIC TURTLES

STUDY PLAN

DRAFT

ATTACHMENT 6-2

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

Special-Status Amphibians and Aquatic Turtles Study Plan

February 2011

1.0 Project Nexus

Certain operation and maintenance (O&M) activities and Project-related recreation at the Don Pedro Project (Project) have a potential to affect special-status amphibians (Class Amphibia) and aquatic turtles (Class Chelonia).[1] Two such special status-species may occur in the Project area: foothill yellow-legged frog (FYLF; *Rana boylii*) and western pond turtle (WPT; *Actinemys* [formerly *Emys* or *Clemmys*] *marmorata*). The Project may provide suitable habitat for these species. Water level changes in reservoir tributaries, ground-disturbing activities, recreation foot traffic, and vegetation clearing are Project-related activities that could directly and indirectly affect special-status amphibians and aquatic turtles and their habitat.

FYLF is a stream-associated species affected by seasonal flow regimes that influence water stage, velocity, and temperature. Project effects on water levels at the mouths of reservoir tributaries could affect habitat availability and suitability for all life stages. Project operations that may result in changes in water levels and velocity may affect the suitability of instream habitat and if water levels decline, has the potential to strand egg masses and tadpoles. However, the Don Pedro Reservoir is not likely to be suitable FYLF habitat. FYLF may occur in the Tuolumne River in the upper most reaches of Don Pedro Reservoir or in tributaries that flow into the reservoir; however, the Project does not include any facilities or features upstream of Don Pedro Reservoir, nor do the Districts perform any Project O&M activities upstream of Don Pedro Reservoir.

Project O&M activities may affect WPT if this species is present in the Project reservoirs, slow-moving stream reaches, or other water bodies within the Project Boundary tributary to the Project. The Project is well within the elevational range of this species. More specifically, Project water level changes could result in inundation of potential nesting habitat.

[1] For the purpose of this relicensing, special-status amphibians and aquatic turtles are considered those amphibian and aquatic turtle species: (1) potentially-occurring on U.S. Department of Interior, Bureau of Land Management (BLM) land and formally listed by BLM as a Sensitive Species; (2) listed by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) as Sensitive; (3) listed under the federal endangered Species Act (ESA) as Proposed or Candidate for listing as endangered or threatened or proposed for delisting; (4) listed under the California Endangered Species Act (CESA) as proposed for listing; or (5) formally listed by California Department of Fish and Game (CDFG) as a Species of Concern. Species listed as threatened or endangered under the ESA or CESA are addressed separately and not considered special-status for the purpose of the relicensing proceedings.

2.0 Resource Management Goals of Agencies Related to the Resource to be Studied

Two agencies are likely to have a direct interest in the two special-status species addressed by this Study Plan: CDFG and BLM. CDFG has designated these species as species of concern. BLM, which administers public land in the Project area, has issued resource management plans that also relate to these two species. MID and TID understand that BLM's resource management goals regarding special-status species, including special-status amphibians and aquatic turtles, are to maintain, improve or enhance native fish and wildlife populations and the ecosystems upon which they depend; ensure that all management activities and BLM authorization are consistent with the conservation needs of special-status species; manage special-status species habitat to assist in the recovery of listed species; protect and manage significant and sensitive resources on BLM lands; maintain and/or improve meadow and wetland habitat and riparian and aquatic habitat for all life stages of native fish, macroinvertebrates, other aquatic species, and special-status species; and to sustain and manage viable populations of the FYLF in the planning area.

3.0 Study Goals and Objectives

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

- Identify, compile, and map known occurrences of FYLF and WPT, including life history stage and associated habitat information as available. At a minimum, produce a map of known occurrences with a supplemental table that includes information on the location, date found, how many individuals (if available), and the source of the sighting (museum database, agency record, etc.).
- Identify and map habitats in the study area potentially suitable for FYLF and WPT, including potential WPT nesting habitat surrounding the Project reservoir, and evaluate the suitability of these habitats for the species.
- Document the distribution and abundance of FYLF and WPT in the study area.
- Perform FYLF and WPT surveys in suitable habitats where there is some evidence of a potential adverse Project effect.
- Compile incidental observations of FYLF and WPT and other aquatic special-status species and non-native amphibians, turtles, and crayfish from other aquatic studies.
- Provide information to enable an assessment of Project impacts.

4.0 Existing Information and Need for Additional Information

Existing and relevant information regarding known and potentially occurring locations of special-status amphibians and aquatic turtles in the Project vicinity is available from California Natural Diversity Database (CNDDB), museum records, and other sources. WPT is the only special-status turtle in the area (there are no special-status reptiles, i.e., Class Reptilia, snakes and lizards, in the area). This information and a life history description of each species, included in Section 5.3 of the PAD, are useful in identifying preferred habitats and documenting where the species have been found to date. Table 4.0-1 summarizes habitat requirements of each species by life stage.

Table 4.0-1 Special-status amphibians and aquatic turtle habitat requirements by life stage.[1]

Species	Egg Masses	Larvae/Hatchling Turtles	Adults
Foothill yellow-legged frog	Egg masses are deposited in low to moderate gradient streams, usually within shallow, edgewater areas of low velocity with cobble/boulder substrate in open, sunny areas with little riparian vegetation; often adjacent to low gradient cobble/boulder bars, tributary confluences, side and backwater pools, or pool tail-outs with coarse substrates. In small streams may occur in step pools and other microhabitats that meet basic conditions for substrate, water depth, and velocity.	Generally in low velocity segments of streams, such as edgewater habitat adjacent to riffles or cascades, in main channel pools, and plunge-pools that provide escape cover (e.g., substrate interstices, vegetation, and detritus for cover). Larvae, at least in early stages, show affinity to oviposition sites, but may disperse to shallow, warm, low velocity near-shore habitats with smaller substrate (i.e., gravel/sand) as the season progresses.	Perennial streams and ephemeral creeks with pools. Prefer areas that provide exposed basking sites and cool shady areas adjacent to water's edge. Shallow, flowing water, preferentially in small to moderate-sized streams with some cobble-sized substrate.
Western Pond Turtle	Upland, low gradient slopes (less than 15 degrees) with high clay or silt content in the vicinity of aquatic habitats. Eggs are deposited in a shallow excavation ("nest") in a dry location in summer. Nests are typically located on an unshaded slope that may be partly south-facing.	Hatchlings emerge from nests in spring. Require shallow water with dense submergent vegetation or short emergent vegetation.	Permanent ponds, lakes, reservoirs, low-flow regions of rivers, river side channels, and backwater areas. Isolated occurrences in lakes and reservoirs sometimes represent deliberate releases of pets. May also use seasonal streams or ponds when these are available. The presence of basking sites is important and these may be provided by emergent large woody debris, overhanging vegetation, rock outcrops, and mats of submergent vegetation. Deep pools and undercut banks may represent overwintering refugia. Often aestivate or overwinter in terrestrial habitats, including forests and riparian thickets, where they burrow in leaf litter.

[1] Sources of information: Ashton et al. 1997; Holland 1991; Rathbun et al. 1992; Jennings and Hayes 1994, PG&E 2001, Lind 2005; Vollmar 2002.

4.1 Western Pond Turtle

WPT is a habitat generalist occurring in a wide variety of aquatic habitats with still- or slow-moving water up to about 6,000-feet elevation; the species is uncommon in high-gradient streams (Jennings and Hayes 1994). Adult WPT have been documented traveling long distances from perennial watercourses for both aestivation and nesting, with long range movements to aestivation sites averaging about 820 feet and nesting movements averaging about 295 feet (Rathbun et al. 2002). Reese and Welsh (1997) documented WPT away from aquatic habitats for as much as seven months per year and suggested that terrestrial habitat use was at least in part a response to seasonal high flows.

WPT breeding activity may occur year-round in California, but egg-laying tends to peak in June and July in colder climates, when females begin to search for suitable nesting sites upslope from water. During the terrestrial period, Reese and Welsh (1997) found that radio-tracked WPT were burrowed in leaf litter.

Introduced species of turtles (e.g., red-eared sliders [*Trachemys scripta*]) may out-compete WPT for basking sites and the American bullfrog (*Lithobates catesbeianus*) [formerly *Rana catesbeiana*] is known to consume hatchling WPT.

There are several reports of WPT in the Project area including records at (1) Moccasin Creek; (2) Piney Creek, north of Lake McClure and east of Don Pedro Reservoir; and (3) Table Mountain; (4) First Creek; and (5) on an unnamed tributary west of Moccasin Peak. In most cases, existing information is too general to meet the objectives of the study. Additional information needed includes specific and current localities of the species and its habitats in relation to Project facilities; and sufficient information on normal Project O&M activities that might affect populations.

4.2 Foothill Yellow-Legged Frog

FYLF is a stream-adapted species and is not associated with ponds, lakes, or other lentic habitats. Current distribution of FYLF is predominately between 600 and 5,000 feet elevation (Moyle 1973, Laabs et al. 2002, Seltenrich and Pool 2002, ECORP Consulting, Inc. 2005). Within large streams, FYLF often occurs near tributaries, which may provide important seasonal habitats (e.g., in winter and during the hottest part of the summer) (VanWagner 1996; Seltenrich and Pool 2001). Breeding tends to occur in spring or early summer and eggs are laid in areas of shallow, slow moving, waters near the shore. FYLF are infrequent in habitats where introduced fish and American bullfrog occur (Jennings et al. 1994).

A review of CNDDB, Museum of Vertebrate Zoology, California Academy of Science, and BLM records from the Project area indicates that FYLF has five observations within the Project vicinity: (1) one occurrence at Hatch Lake (on BLM and private land); (2) one occurrence at Second Lake (on private land); (3) one occurrence near the confluence of Big Jackass Creek and Moccasin Creek (on BLM land); (4) one occurrence south of Table Mountain (on private land); and (5) one occurrence on an unnamed tributary west of Moccasin Peak.

In most cases, existing information is too general to meet the objectives of the study. Additional information needed includes (1) specific and current localities of the species and its habitats in relation to Project facilities and (2) more detailed information on normal Project O&M activities that might affect populations.

5.0 Study Methods and Analysis

5.1 Study Area

The study area consists of suitable aquatic habitats within the existing FERC Project Boundary and extends 0.5 mile from the normal maximum water surface elevation of the Project reservoir and Project-affected stream reaches, including the section of the Tuolumne River up to RM 79. In addition, the study area includes tributaries up to 1.0 mile upstream of the reservoirs. FYLF and WPT may make seasonal movements between tributaries and mainstem streams.

5.2 General Concepts and Procedures

The following general concepts and practices apply to the study:

- Personal safety is an important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed well in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. When modifications are made, the Districts' field crew will follow the protocols in this study plan. If minor modifications are made, the Districts will document and report these modifications in the draft study reports.
- If the Districts become aware that major variances may be needed to the FERC-approved study plan, the Districts will issue an e-mail to appropriate resource agencies to provide an opportunity for consultation regarding how to address the variance. The Districts will describe all variances and resolutions in the final study report.
- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.
- The Districts will provide training to field crews to identify other special-status species that may be encountered during the performance of this study plan. Training will include instructions in diagnostic features and habitat associations of such species. Field crews will also be provided laminated identification cards showing special-status species compared to other common species that may be encountered. All incidental observations will be reported. The purpose of this effort is to opportunistically gather data during the performance of the study plan. For all special-status species observations, the Districts will complete the appropriate CNDDB form or spreadsheet and transmit the form to the CNDDB. Districts will provide a copy of the CNDDB form or spreadsheet to BLM.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving (1) between tributaries and mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study will be completed in six steps, each of which is described below. Prior to conducting fieldwork, the necessary CDFG scientific collection permits will be obtained. Field investigation will adhere to accepted decontamination guidelines to minimize the likelihood of transmitting diseases (USFWS 2005).

5.3.1 Step 1 - Identify and Map Known Occurrences

Known occurrences of FYLF and WPT will be mapped and identified based on agency consultation and review of the latest existing information, including a query of the CNDDB, agency records, museum records, and consultation with regional experts. The map will be supplemented with a table that includes information on the exact location, date found, how many individuals (if available), and the source of the sighting (museum database, agency record, etc.).

5.3.2 Step 2 - Identify and Map Potential Habitat

Available data sources will be reviewed to identify areas of potentially suitable habitat for each of the two special-status species based on the description of habitat elements presented in Table 4.0-1. Data sources may include aerial photographs and Google Earth, National Wetland Inventory maps, USGS 1:24,000 topographic quadrangles, hydrologic data, and other sources of information that would allow for assessment of habitat conditions within the study area.

Potential WPT nesting (oviposition) habitat within the Project Boundary will be identified and mapped in GIS based on certain attributes associated with known WPT nest sites, including distance from aquatic habitats, percent slope, aspect, and soil type (Holland 1991, pers. comm., Don Ashton, USFS). The mapping criteria for WPT are defined as follows:

- Within 100 m of the Project reservoir and other water bodies associated with the Project;
- Slope of 2 to 15 degrees;
- Southeast, south or southwest aspect;
- Canopy cover of less than 10 percent; and
- Compacted soils of clay or loam (this criterion will be used if suitable soil maps exist).

A field reconnaissance may be conducted at specific locations to assess on-site habitat conditions for FYLF and WPT if other data sources are not adequate to this purpose. Sites will be logged by GPS position, photographs will be taken of each site from various angles, and a preliminary habitat assessment will be conducted. Pertinent habitat characteristics to be recorded will include habitat type, hydrologic regime, vegetation types (e.g., aquatic, emergent, overhanging, and canopy), gradient, aquatic substrate, and stream channel form.

5.3.3 Step 3 - Select Survey Sites

Based on the results of Step 2, a representative set of sites with potentially suitable aquatic habitat within or immediately adjacent to the Project Boundary will be selected for FYLF and WPT surveys. The selection of survey sites will take into account site-specific conditions, including safety, accessibility (i.e., road or trail access, topography), permission from landowners to survey on private lands, and potential impact from Project O&M activities. To the extent reasonable, WPT survey sites will be co-located with other relicensing study sites.

5.3.4 Step 4 - Conduct Surveys and Compile Incidental Observations

Foothill Yellow-Legged Frog

Visual Encounter Survey Procedures

Surveys for FYLF will occur during the breeding season and will follow the visual encounter survey (VES) standard protocols developed by Pacific Gas & Electric Company (PG&E) for hydroelectric project applications (Seltenrich and Pool 2002; PG&E and Nevada Irrigation District [NID] 2008).

Specifically, two surveyors working in tandem will search stream banks, back channel areas, and potential instream habitats for FYLF walking slowly while one observer scans ahead. Habitats along each bank will be searched. To aid in the detection of eggs and larvae, surveyors will use a viewing box in shallow margin areas. In water too deep to survey by wading, or where substrate configuration (e.g., large boulders) or other factors render the viewing box ineffective, snorkeling will be employed in appropriate habitats during searches where safely accessible. Survey site length will range from 750 to 1,000 meters based on the extent of suitable habitat and access. Data collected during each survey includes:

- **Sampling Site:** time of survey (start, end and total search effort), GPS locations (start and end), weather conditions, and water and air temperatures (at start, mid-day, and end of survey) in both the channel margin and main channel, and;
- **Observation**: lifestage, sex, size, GPS location, as well as associated habitat data based on procedures described in Seltenrich and Pool 2002 and as updated in PG&E and NID (2008).

Survey Schedule

Three FYLF VES visits per site will be conducted; two visits in the spring/early summer for the detection of eggs and early tadpoles, and one in the late summer/early fall to detect older tadpoles and recently metamorphosed frogs. The first spring visit will be completed when river temperatures have reached a daily average of 11°C and/or when breeding has been verified in one or more comparison sites or the survey sites. Following the initial VES, surveyors will complete a habitat characterization of each study location, following standard operating procedures (PG&E and NID 2008). A reduced (single visit) VES effort may be performed in locations where the primary objective is to confirm habitat suitability.

Western Pond Turtle

The distribution of WPT will be evaluated by two means (1) visual surveys at representative suitable sites within the Project Boundary as selected in Step 3, and (2) compilation of opportunistic observations incidental to the performance of other field studies for the relicensing (e.g., foothill yellow-legged frog surveys, California red-legged frog habitat assessments, botanical surveys, etc.). Incidental observations of turtles will include identification (i.e., WPT, exotic species, such as red-eared slider, or “unknown species”), estimated size, turtle behavior (e.g., basking on log), location, time, and a brief description or photograph of the habitat.

In general, incidental observations of WPT are most likely to occur during studies that involve quiet observation (e.g., scanning a site with binoculars), snorkeling, rafting or boat work associated with deep pools and backwaters. Turtles may also be observed when a site is first approached (WPT typically dive from basking sites when approached even at a long distance [Holland 1991; Reese undated]) or on roads when turtles make overland movements. Personnel performing other studies will be trained in how best to observe WPT. Field crews will also be instructed to document skeletal remains and evidence of WPT nests, such as the scrapes produced by females when digging nest-holes, signs of nests opened by predators, and remnants of hatched eggshells.

Visual surveys for WPT are adapted from USGS (2006) and will be supplemented by deployment of artificial basking platforms at survey sites where appropriate (Alvarez 2006). The use of basking platforms is an efficient and effective technique that has been shown to substantially increase detection rates, particularly at sites where existing basking sites are limited (Alvarez 2006). Surveys will be conducted at a time of day and under weather conditions when turtles are likely to be basking (e.g., sunny mornings May-July). Sites will be initially searched by binoculars from a distance to identify potential basking locations, such as sunlit rocks, logs, exposed banks, and floating vegetation. If turtles are observed, the species, number, and relative size of turtles will be recorded. The observer will then slowly and quietly approach the site, assume a suitable viewing position, and continue to scan the site for at least 30 minutes, focusing on basking sites and the surrounding water. Splashes of water that may signify a turtle entering the water will be noted. The length of time devoted to scanning each site will be recorded; and the locations of turtle sightings and possible evidence of WPT, including splashes, and locations where photographs are taken will be marked on a sketch of the site. Observers will also identify locations where the addition of artificial basking platforms may increase the likelihood of turtle detections. Artificial basking platforms will be placed at survey sites in suitable open water areas where potential basking substrates are scarce or obscured by vegetation. Each floating platform will consist of a rough-textured rectangular wood board; additional floatation at one end; and a tethered concrete anchor (Alvarez 2006). Platforms will be left in place for five to seven days to allow turtles to become acclimated and adopt platforms for basking. Sites will then be surveyed again for basking turtles.

Where turtles are found the following data will be collected: (1) presence and name of exotic plant species; (2) presence of exotic turtles or bullfrogs; (3) percent overhead canopy; (4) percent submergent and emergent vegetation; (5) type of upland and riparian vegetation community; (6) presence and type of potential aquatic refugia (undercut banks, submerged tree roots, woody debris, rock crevices, aquatic submerged vegetation, emergent vegetation, and floating material); and (7) presence and type of any recent site disturbance. At the beginning of each survey, the following data will be recorded: date, observer, time, general weather description, ambient air temperature, average wind speed, water temperature, and estimated water velocity. Changes in weather conditions during surveys that could affect turtle detection (e.g., increased cloud cover or wind) will be noted. All survey sites will be photographed from multiple vantage points and the following information recorded: presence or absence of slow moving water and water depths ≥0.5 m; quantity (none, few, or many) and types of basking sites (sunny rocks, open banks, fallen logs, and other); aquatic and streamside refugia, and upland habitat.

Survey sites for WPT will be assessed for the presence of American bullfrog by listening for calls, scanning suitable areas with binoculars or spotting scope for egg masses and basking frogs, and looking in shallow edges for larvae. After a site has been surveyed for WPT from a stationary position, at least one observer will walk along the shoreline listening and scanning ahead for jumping frogs—juvenile American bullfrogs often vocalize as they jump in alarm.

This study is not specifically designed to trap or capture WPT or other turtles. However, when a turtle is observed during this or other studies, capture may be attempted if feasible and without injuring or unduly stressing the animal. Field staff will be authorized by CDFG permits to capture WPT. Turtles that are captured will be measured (amphibian and turtle study teams will use calipers; other study teams will use a ruler photographed next to the turtle. Captured turtles will be categorized by sex (if determinable) and photographed in dorsal (carapace) and ventral (plastron) view alongside a ruler for later measurements and estimating age (counting scutal rings).

The Districts will complete and submit the appropriate California Native Species Field Survey Form to the CNDDB.

5.3.5 Step 5 - Prepare, Format and Quality Assurance/Quality Control Data

Following field surveys, the Districts will develop GIS maps depicting special-status species occurrences, potential habitat, project facilities and features, and other information collected during the study. Field data will then be subject to quality assurance and quality control (QA/QC) procedures, including spot-checks of transcription and comparison of GIS maps with field notes.

5.3.6 Step 6 - Prepare Report

The Districts will prepare a report that includes the following sections: (1) Study Goals and Objectives; (2) Methods and Analysis; (3) Results; (4) Discussion; and (5) Description of Variances from the FERC-approved study plan, if any. At a minimum, the following summaries/data presentations will be provided in the report with the supporting data (in Excel spreadsheet and GIS layers, as appropriate):

- Presence/absence of each special-status species by survey period (e.g., spring, summer), sample reach tributary, and river.
- Abundance of FYLF egg masses by survey period and location.
- Abundance of FYLF tadpoles/tadpole groups by survey period and location.
- Abundance of FYLF young-of-the-year (metamorphs), subadults, and adults by survey period and location.
- Descriptive summaries of FYLF egg mass and tadpole habitat characteristics (at least n, mean, minimum, maximum, and standard error values) overall and by site.
- Numbers of WPT detections by life stage (e.g., juvenile or adult) in the Project reservoir, Project-affected streams, or other study locations.
- Maps of and descriptive information on the occurrence of potential WPT nesting habitat and its relationship to the study area.

6.0 Schedule

The Districts anticipate the schedule to complete the study as follows:

- Identify and Map Habitat, and Select Survey Sites (Steps 1-3) .... November 2011-April 2012
- Conduct Surveys (Step 4) .... May 2012-September 2012
- Prepare Report (Step 5) .... September 2012-March 2013
- QA/QC (Step 6) .... November 2012-March 2013

7.0 Consistency of Methodology with Generally Accepted Scientific Practices

This study is generally consistent with the goals, objectives, and methods outlined for recent FERC hydroelectric relicensing efforts in California, and uses well established data from CDFG and other reputable sources for the analysis.

8.0 Level of Effort and Cost

Not yet estimated.

9.0 References Cited

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ATTACHMENT

ATTACHMENT 1

CALIFORNIA NATIVE SPECIES FIELD SURVEY FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): ______

For Office Use Only

Source Code	______	Quad Code	______
Elm Code	______	Occ. No.	______
EO Index No.	______	Map Index No.	______

Reset

California Native Species Field Survey Form

Send Form

Scientific Name:

Common Name:

Species Found? ☐ Yes ☐ No ______ If not, why?

Total No. Individuals ______ Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? ______ Yes, Occ. # ☐ no ☐ unk.

Collection? If yes: ______ Number ______ Museum / Herbarium

Reporter: ______

Address: ______

E-mail Address: ______

Phone: ______

Plant Information

Phenology: ______% vegetative ______% flowering ______% fruiting

Animal Information

______ # adults ______ # juveniles ______ # larvae ______ # egg masses ______ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: ______ Landowner / Mgr.: ______

Quad Name: ______ Elevation: ______

T____ R____ Sec ____, ____ ¼ of ______¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): ______

T____ R____ Sec ____, ____ ¼ of ______¼, Meridian: H☐ M☐ S☐ GPS Make & Model ______

DATUM: **NAD27** ☐ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy ______ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates:

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): ______
- ☐ Compared with specimen housed at: ______
- ☐ Compared with photo / drawing in: ______
- ☐ By another person (name): ______
- ☐ Other: ______

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes☐ no☐

ATTACHMENT 6-3

SPECIAL-STATUS WILDLIFE - BATS STUDY PLAN

DRAFT

ATTACHMENT 6-3

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

Special-Status Wildlife - Bats Study Plan

February 2011

1.0 Project Nexus

The on-going operation and maintenance (O&M) of the Don Pedro Project (Project) may potentially affect special-status[1] bats. Specifically, Project features may provide suitable roosting, breeding or hibernating habitat for identified special-status bat species. Recreation facilities and activities may disturb potential habitat. Project O&M activities such as vegetation management (e.g., hazard tree removal) may disturb current habitats used by special-status bats. Project operations could affect riparian habitats that may be used by bats for roosting. This study focuses on the potential for Project O&M activities and recreation activities to affect special-status bat species.

Table 1.0-1 provides the target list of special-status bats for this study, including the following information for each species: special status, general habitat type, and recorded occurrence within the Project Boundary.

Table 1.0-1 Special-status bat species known to occur or likely to occur within the Project Boundary.

Species	Special Status[1]	Suitable Habitat Type	Occurrence in Project Boundary
Yuma myotis *Myotis yumanensis*	BLMS	Roosts in buildings, mines, caves, and crevices; feeds over water (0 to 10,800 feet) but uncommon to rare above 8,400 feet.	Two CNDDB2 occurrence s: (1) bridge adjacent to Highway 49 and (2) bridge near intersection of Highway 120 and Jacksonville Road.

[1] Special-status wildlife are considered those wildlife species that are: found on U.S. Department of Interior (USDOI), Bureau of Land Management (BLM) land and formally listed by BLM as a Sensitive Species (BLM-S); listed under the federal Endangered Species Act (ESA) as Proposed or a Candidate for listing as endangered or threatened or proposed for delisting; listed under the California Endangered Species Act (CESA) as Proposed or a Candidate for listing as endangered or threatened or proposed for delisting; formally listed by California Department of Fish and Game (CDFG) as a Species of Special Concern (SSC). Species listed as threatened or endangered under the ESA or CESA are addressed separately and not considered special-status for the purpose of the relicensing proceedings. There are no ESA- or CESA-listed bat species expected to occur within the Project Boundary or in the area surrounding the Project Boundary.

Species	Special Status[1]	Suitable Habitat Type	Occurrence in Project Boundary
Long-eared myotis *Myotis evotis*	BLMS	Roosts in buildings, crevices and snags; feeds along habitat edges, in open habitats, and over water (0 to 8,800 feet at least).	Potentially occur within suitable habitat.
Fringed myotis *Myotis thysanodes*	BLMS	Roosts in buildings, mines, caves, snags and crevices; feeds in open habitats and over water (4,300 to 7,200 feet).	Potentially occur within suitable habitat.
Western small-footed myotis *Myotis ciliolabrum*	BLMS	Roosts in caves, buildings, mines, crevices, and under bridges; feeds over streams, ponds, and springs (0 to 8,800 feet).	Potentially occur within suitable habitat.
Western red bat *Lasiurus blossevillii*	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).	CNDDB occurrence southeast of Moccasin, adjacent to Highway 49.
Spotted bat *Euderma maculatum*	BLMS, SSC	Arid deserts, grasslands, and mixed conifer forests (0 to 9,800 feet).	CNDDB occurrence 2.2 miles southeast of Standard; intersection of Woodham-Carne Road and Yosemite Road.
Townsend's big-eared bat *Corynorhinus townsendii*	BLMS, SSC	Roosts in buildings, mines, tunnels, and caves; feeds along habitat edges (0 to 10,365 feet).	CNDDB occurrence at mine on Quartz Mountain, 2.1 miles south of Jamestown.
Pallid bat *Antrozous pallidus*	BLMS, SSC	Roosts in caves, crevices, and buildings; feeds in a variety of open habitats (8,000 ft).	Five CNDDB 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.
Western mastiff bat *Eumops perotis*	BLMS, 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 CNDDB occurrences: (1) one mile southwest of Yosemite Junction, south 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.

1 Status: BLMS: Bureau of Land Management Sensitive Species
SSC: California Department of Fish and Game Species of Special Concern

2 CNDDB: California Natural Diversity Database.

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

2.0 Agency Resource Management Goals

Agencies with management responsibilities related to bats include the U.S. Fish and Wildlife Service (USFWS), U.S. Bureau of Land Management (BLM) on federal lands managed by BLM; and the California Department of Fish and Game (CDFG).

The BLM's resource management goals regarding special-status species, including special-status bats, are to maintain, improve or enhance native populations and the ecosystems upon which they depend; ensure that all BLM management activities and authorizations are consistent with the conservation needs of special-status species; manage special-status species habitat to assist in the recovery of listed species; protect and manage significant and sensitive resources on BLM lands; and to maintain and/or improve meadow and wetland habitat and riparian and aquatic habitat for all life stages of special-status species.

3.0 Study Goals

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 a Project effect includes both of the following:

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

4.0 Existing Information and Need for Additional Information

Existing and relevant information regarding known and potentially occurring special-status bats in the Project Boundary is available from the CDFG's California Wildlife Habitat Relationships (CWHR) program and the California Natural Diversity Data Base (CNDDB). Existing information is too general to meet the goal of the study. Additional information needed to address the study goal is to identify specific locations of any special-status bats in relation to Project facilities and normal Project O&M activities that might affect these special-status species.

5.0 Study Methods

5.1 Study Area

The study area consists of the area within the Project Boundary, including road bridges within the Project Boundary.

Specific sampling sites will be selected based on the results of a reconnaissance survey (see Section 5.3, Methods), taking into consideration habitat suitability, accessibility, and the overall objective of sampling a broad range of habitat types and localities within the Project Boundary. Specific target sites will be sampled once in late July or early August, which corresponds to the peak of bat activity; and then again in late September or early October which corresponds to fall migration. Sampling during these two periods increases the likelihood of detecting special-status bats that may be present in a given season.

5.2 General Concepts and Procedures

The following general concepts apply to the study:

- Personal safety is an important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If modifications are made, field crews will follow the protocols in the study plan.
- If the Districts become aware of the need for any major variances to the study plan, the Districts will issue an e-mail to appropriate resource agencies to provide an opportunity for consultation regarding how to address the variance. The Districts will describe all variances and resolutions in the final study report.
- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.
- The Districts will provide training to field crews to identify other special-status species that may be encountered during the performance of this study. Training will include instructions in diagnostic features and habitat associations of such species. Field crews will also be provided laminate identification sheets showing special-status species compared to other common species that may be encountered. All incidental observations will be reported. The purpose of this effort is to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) moving between basins; and (3) moving between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study approach will consist of the following four steps:

<u>Step 1 - Initial Reconnaissance.</u> In February 2012, the Districts will evaluate all recreation facilities, bridges, dams, powerhouses, and adits within the study area. At each location, the Districts will visually inspect the exterior and interior of buildings and the underside of associated supports of bridges for active bat roosts and signs of past use including guano and

urine staining. Any observed bat activity will be documented with photographs. The location of the occurrences found during the initial reconnaissance will be recorded by GPS, stored in the Project GIS database, and displayed on Project maps. The Districts will use the information collected during the initial reconnaissance to prioritize locations that will be targeted for focused special-status bat surveys described in Step 2.

The following types of bat roosts will be considered during the assessment:

- **Maternity Roosts** - A maternity roost is a feature that provides protection from the elements and predators, and provides the correct thermal environment for reproduction. Maternity roosts tend to be warmer in temperature because breeding females need to maintain a high metabolism to aid in lactation. Juvenile bats 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 remains between 70 and 90°F; however, Townsend's big-eared bat 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 often prefer 66°F or higher.
- **Day Roosts** - A day roost is a feature where bats are able to 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 Roost** - A night roost is a feature used by bats to rest between foraging bouts, to allow digestion of prey, to escape from predators, as shelter from weather, and possibly for social purposes. Night roosts are typically sites or structures that retain heat to aid the bat in maintaining the higher metabolism necessary for digestion.
- **Winter Hibernacula** - Areas used by bats during colder winter months. During this time, bats enter torpor, receiving nourishment from their fat storage gained during summer months. Many species will awaken for brief periods of time to stretch, but will resume torpor. Bats, such as the Townsends big-eared bat, will hibernate for short periods of time and will often resume feeding behavior during warm winter spells (Tuttle and Taylor 1998). According to 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 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).

<u>Step 2 - Focused Surveys.</u> The Districts will conduct surveys at locations where evidence of bat activity is found and has a reasonable chance of being affected by Project O&M and/or recreation activities. Surveys will include acoustic and mist netting survey methods. Surveys will be conducted near dusk as bats begin to emerge from their roosts. The Districts will obtain the appropriate CDFG permits and approvals prior to beginning the surveys. Each survey location will be sampled twice during the study: once during the peak reproductive period (July-August); and once during the fall migration (late September or early October). Sampling methods are described below.

- **Acoustic Sampling** - Acoustic sampling will be conducted during peak bat activity using an Anabat SD1 bat detector system (Titley Electronics) to identify bat species. The Anabat system detects bat ultrasonic echolocation calls and converts them into sonograms.

Analook computer software uses the sonograms to identify bat species (O'Farrell et al. 1999). Acoustic sampling will be performed in conjunction with mist net sampling.

- **Mist Net Sampling** - Mist net surveys will be conducted from sunset to approximately 1 AM. Captured bats will be identified to species level. Additional information including sex, age, reproductive status, forearm measurement, and weight will be recorded.
- **Long-Term Acoustic Monitoring (LTAM**) - At two sites, selected in consultation with the appropriate resource agencies, LTAM will be conducted. LTAM will involve the deployment of Anabat SD1 bat detectors for monitoring of bat activity and species identification over time. The Districts will deploy the LTAM equipment in select areas adjacent to Project facilities such as the dam or powerhouse. Deployment of the LTAM equipment will be from early March through October in order to capture spring migration; young rearing; peak bat activity; and fall migration.

  Inspection of the LTAM equipment and retrieval of acoustic data will occur on a monthly basis. However, in order to ensure that all equipment is functioning properly, the Districts will perform an initial inspection of the equipment and download all data recorded no more than two weeks after initial deployment. The second visit will occur four weeks after initial deployment and if no malfunctions have occurred, all remaining visits will be at four week intervals. If at any time a malfunction occurs, it will be immediately corrected by removal of the equipment currently in service and replacement with proper functioning equipment. For all equipment that requires replacement, the Districts will perform inspections and data downloads at week two and four after deployment, and if no malfunctions have occurred, all remaining visits will be at four week intervals.

  The Anabat SD1 bat detectors will be coupled with an external power source (e.g., 12-volt battery) for long-term deployment, and EME Systems Bat-Hats to aid in acoustic data collection. Additionally, a small solar panel will be used to maintain the charge of the battery to prevent frequent visits to the site for battery replacement. Acoustic data will be saved directly to a compact flash memory card. The LTAM equipment will be programmed to collect data from approximately one hour before sunset until sunrise. The unit will remain off during the daytime. If a unit is stolen or vandalized twice, the Districts will not reinstall the unit.

Step 3 - Quality Assurance/Quality Control Review. The Districts will perform a QA/QC review of all data, including maps, recordings, identifications, and sightings will be performed. To minimize variation in acoustic data between LTAM sites, each Anabat SD1 detector will be calibrated in accordance with Larson and Hayes 2000.. A subset of the acoustic sampling data as well as the LTAM data will go through QA/QC review. After acoustic call files have been identified to species or species groups, 10 percent of the identified files will be randomly selected and subject to a QA/QC review to verify accurate identification. QA/QC of the acoustic data will be qualitative (visual check of call shape against calls from a similar species) and quantitative (comparison of maximum and minimum frequencies, characteristic frequencies, and call duration against known parameters for the identified species). The QA/QC procedure will be performed by a qualified biologist who did not participate in the analysis of acoustic call files. The initial reconnaissance data and mist net sampling data will also be reviewed to verify all data fields have been filled in on the data sheets. All map figures that will be used in study reports will go through a QA/QC review as well. This will include a review of mist netting and LTAM site locations in the Project Boundary. The data collected will be analyzed to assess the potential for specific Project activities to impact any special-status bats.

Step 4 - Prepare Report. The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Study Methods; (3) Results; (4) Discussion; and (5) Description of Variances from the study plan, if any. The Districts will make the report available to relicensing participants when completed.

6.0 Schedule

The Districts anticipate the following schedule for completion of the study plan:

- Planning (Step 1) .... January 2012 to July 2012
- Fieldwork (Step 2) .... March 2012 to October 2012
- QA/QC Review and Data Analyses (Step 3) .... November 2012 to December 2012
- Report Preparation (Step 4) .... January 2013 to February 2013

7.0 Consistency of Methodology with Generally Accepted Scientific Practices

This study is consistent with the goals, objectives, and methods outlined for recent FERC hydroelectric relicensing efforts in California, and uses well established methodologies developed in consultation with CDFG on similar projects.

8.0 Level of Effort and Cost

Not yet estimated.

9.0 References Cited

California Department of Fish and Game. 2008. California Interagency Wildlife Task Group. CWHR version 8.2 personal computer program. Sacramento, CA.

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ATTACHMENT 6-4

SPECIAL-STATUS PLANTS STUDY PLAN

DRAFT

ATTACHMENT 6-4

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

Special-Status Plants Study Plan

February 2011

1.0 Project Nexus

Certain aspects of operation and maintenance (O&M) of the Don Pedro Project (Project) may have the potential to affect special-status[1] plants. These effects may be direct (e.g., result of ground disturbing activities, such as mechanical or chemical clearing of vegetation or trampling of plants), indirect (e.g., due to recreation activity that results in erosion of adjacent land) or cumulative (i.e., caused by a Project activity in association with a non-Project activity, such as loss of habitat due to the introduction of invasive plants from a non-Project vector). This study evaluates Project O&M and recreation activities to assess their potential to impact special-status plants.

Plants listed under the federal Endangered Species Act (ESA) or the State of California Endangered Species Act (CESA) are addressed in a separate study plan. Only special-status plants otherwise not listed as FT (federally threatened), FE (federally endangered), ST (state threatened), and SE (state endangered) are addressed in this Special-Status Plants Study Plan.

2.0 Agency Resource Management Goals

The Bureau of Land Management (BLM) has developed specific management goals related to the protection and management of special-status plants. In its 2008 Sierra Resource Management Plan (SRMP), the BLM provides the following guidance for management of sensitive species:

> *In compliance with existing laws, including the BLM multiple use mission as specified in the Federal Land Policy and Management Act (FLPMA), the BLM shall designate sensitive species and implement measures to conserve these species and their*

[1] For the purposes of this Relicensing, special-status plants are considered those plants that are: 1) found on U.S. Department of Interior (USDOI), Bureau of Land Management (BLM) land and formally listed by BLM as Sensitive (BLM-S); 2) listed under the federal ESA as Proposed or a Candidate for listing as endangered or threatened or proposed for delisting; 3) listed under the CESA as proposed for listing; 4) found on the California Native Plant Society (CNPS) Inventory of Rare Plants and formally listed as a CNPS 1, 2 or 3 plant (CNPS 1, CNPS 2, CNPS 3); or 5) Found on the California Department of Fish and Game's (CDFG) list of California Rare (SR) species listed under the Native Species Plant Protection Act of 1977. Special-status plants do not include plants that are listed as threatened or endangered under the ESA or CESA.

habitats,…, to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA [Endangered Species Act of 1973]…

On BLM administered lands, the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat, by determining to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species. (BLM 2008a)

In addition, BLM's SRMP provides general guidelines for managing habitat to assist in the recovery of listed species, and preserving and protecting species that have been given special-status by the BLM (BLM 2008a, 2008b). The SRMP also includes management guidelines for the Red Hills Area of Critical Environmental Concern (ACEC), part of which lies within the Project Boundary.

3.0 Study Goals

The goal of this study is to provide information to determine the extent to which certain Project O&M activities and/or recreational activities may have the potential to adversely affect special-status plant species. A Project effect may exist if both of the following occur:

- A special-status plant species is found to occur within the study area as defined in Section 5.1; and
- A specific Project O&M activity has a reasonable possibility of having an adverse effect on the special-status plant species found.

The goal of this study is to gather the information necessary to perform this analysis and evaluate the Project's potential to adversely affect special-status plants.

4.0 Existing Information and Need for Additional Information

Existing and relevant information regarding known and potentially occurring special-status plants in the Project Boundary is available from the California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants database (CNPS 2010) and the California Natural Diversity Database (CNDDB) (CDFG 2010). Database queries included all U.S. Geological Survey (USGS) 1:24,000 topographic quadrangles that include the existing Project Boundary and the surrounding quadrangles. Quadrangles containing the Project Boundary include Chinese Camp, La Grange, Moccasin, Penon Blanco Peak, Sonora, and Standard. Based on this information, as well as the Project's elevation range and habitats in this region of the Tuolumne River, the Districts identified 31 plants species that are listed as special-status and may have a reasonable potential to be affected by Project O&M and/or recreation activities.

Table 4.0-1 provides for each of the special-status plant species: (1) status; (2) flowering period; (3) elevation range; (4) habitat requirements; and (5) recorded occurrences in the general Project area.

Table 4.0-1 Target list of special-status plant species for the Don Pedro Project.

Common Name / Scientific Name	Status[1]	Flowering Period	Elevation Range (feet)	Habitat Requirements	Occurrence in area surrounding Project[2,3]
Henderson's bent grass *Agrostis hendersonii*	CNPS3	Apr-Jun	200-1,100	Valley and foothill grasslands, vernal pools	New Melones Dam
Jepson's onion *Allium jepsonii*	CNPS1B BLM-S	Apr-Aug	950-4,500	Chaparral, cismontane woodland, lower montane coniferous forest	**Sonora**, Tuolumne
Three-bracted onion *Allium tribracteatum*	CNPS 1B	Apr-Aug	3,600-10,000	Chaparral, lower montane coniferous forest, upper montane coniferous forest, volcanic soils	Columbia SE, Twain Harte
Rawhide Hill onion *Allium tuolumnense*	CNPS 1B, BLM-S	Mar-May	950-2,000	Cismontane woodland, serpentine	**Sonora, Chinese Camp, Moccasin**
Nissenan Manzanita *Arctostaphylos nissenana*	CNPS 1B, BLM-S	Feb-Mar	1,400-3,650	Closed-cone coniferous forest, chaparral	**Sonora**
Big-scale balsamroot *Balsamorhiza macrolepis var. macrolepis*	CNPS 1B, BLM-S	Mar-Jun	290-3,500	Chaparral, cismontane woodland valley and foothill grassland, sometimes serpentine	Hornitos
Hoover's calycadenia *Calycadenia hooveri*	CNPS 1B	Jul-Sep	200-1,000	Cismontane woodland, valley and foothill grassland	**La Grange**, Snelling, Merced Falls, Cooperstown, Keystone
Red Hills soaproot *Chlorogalum grandiflorum*	CNPS 1B, BLM-S	May-Jun	800-4,250	Chaparral, cismontane woodland, lower montane coniferous forest, serpentine, gabbroic and other soils	**Chinese Camp, Sonora** New Melones Dam, Keystone
Small's southern clarkia *Clarkia australis*	CNPS 1B	May-Aug	2,600-6,900	Cismontane woodland, lower montane coniferous forest	Tuolumne, Twain Harte, Coulterville, Hornitos
Mariposa clarkia *Clarkia biloba* ssp. *australis*	CNPS 1B, BLM-S	May-Jul	1,000-3,500	Chaparral, cismontane woodland, serpentine	**Sonora**, Tuolumne, Twain Harte, Coulterville, Hornitos
Beaked clarkia *Clarkia rostrata*	CNPS 1B, BLM-S	Apr-May	190-1,700	Cismontane woodland, valley and foothill grassland	**Penon Blanco Peak, Moccasin**, New Melones Dam, Cooperstown, Snelling, Merced Falls, Coulterville, Hornitos
Hoover's cryptantha *Cryptantha hooveri*	CNPS 1A	Apr-May	0-500	Inland dunes, valley and foothill grassland	Cooperstown
Mariposa cryptantha *Cryptantha mariposae*	CNPS 1B, BLM-S	Apr-Jun	600-2,200	Chaparral, serpentine	**La Grange, Chinese Camp Sonora**, Keystone, Coulterville, Hornitos
Dwarf downingia *Downingia pusilla*	CNPS 2	Mar-May	0-1,500	Valley and foothill grassland, vernal pools	**La Grange**, Cooperstown, Snelling, Merced Falls
Tuolumne button-celery *Eryngium pinnatisectum*	CNPS 1B	May-Aug	700-10,000	Cismontane woodland, lower montane coniferous forest, vernal pools, mesic	**Standard, Sonora, Chinese Camp, Moccasin**, New Melones Dam, Columbia
Spiny-sepaled button-celery *Eryngium spinosepalum*	CNPS 1B	Apr-May	250-900	Valley and foothill grassland, vernal pools	**La Grange**, New Melones Dam, Snelling, Merced Falls

Common Name / Scientific Name	Status[1]	Flowering Period	Elevation Range (feet)	Habitat Requirements	Occurrence in area surrounding Project[2,3]
Tuolumne fawn lily *Erythronium tuolumnense*	CNPS 1B, BLM-S	Mar-Jun	1,600-4,200	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest	**Standard**, Columbia, Columbia SE, Tuolumne, Twain Harte
Stink-bells *Fritillaria agrestis*	CNPS 4	Mar-Jun	0-5,200	Chaparral, cismontane woodland, pinyon and juniper woodland, valley and foothill grassland	**Sonora, Chinese Camp, Penon Blanco Peak**
Delicate bluecup *Githopsis tenella*	CNPS 1B	May-Jun	3,500-6,500	Chaparral, cismontane woodland	**Chinese Camp**
Bisbee Peak rush-rose *Helianthemum suffrutescens*	CNPS 3	Apr-Jun	100- 2,800	Chaparral, often serpentine, gabbroic or Ione soils	**Sonora**
Parry's horkelia *Horkelia parryi*	CNPS 1B, BLM-S	Apr-Sep	250-3,500	Chaparral, cismontane woodland, Ione formation	Coulterville
Tuolumne iris *Iris hartwegii* ssp. *columbiana*	CNPS 1B	May-Jun	1,200-4,700	Cismontane woodland, lower montane coniferous forest	Columbia, Columbia SE
Knotted rush *Juncus nodosus*	CNPS 2	Jul-Sep	0-6,600	Meadows, seeps, marshes, swamps	**La Grange**, Cooperstown
Congdon's lomatium *Lomatium congdonii*	CNPS 1B, BLM-S	Mar-Jun	900-7,000	Chaparral, cismontane woodland, serpentine	**Sonora, Chinese Camp, Moccasin**, New Melones Dam, Keystone
Stebbins' lomatium *Lomatium stebbinsii*	CNPS 1B	Mar-May	4,000-6,500	Chaparral, lower montane coniferous forest, gravelly, volcanic clay	Twain Harte
Shaggyhair lupine *Lupinus spectabilis*	CNPS 1B, BLM-S	Apr-May	800-2,800	Chaparral, cismontane woodland, serpentine	**Sonora, Moccasin**, New Melones Dam, Groveland, Coulterville, Hornitos
Slender-stemmed monkeyflower *Mimulus filicaulis*	CNPS 1B, BLM-S	Apr-Aug	2,800-6,000	Cismontane woodland, lower montane coniferous forest, meadows and seeps, upper montane coniferous forest, vernally mesic	Groveland
Pansy-faced monkeyflower *Mimulus pulchellus*	CNPS 1B	Apr-Jul	1,900-6,700	Lower montane coniferous forest, meadows and seeps, vernally mesic, often disturbed areas	**Standard**, Angels Camp, Groveland, Twain Harte
Veiny monardella *Monardella douglasii* ssp. *venosa*	CNPS 1B	May-Jul	150-1,500	Cismontane woodland, valley and foothill grassland, heavy clay	New Melones Dam
Merced monardella *Monardella leucocephala*	CNPS 1A	May-Aug	100-500	Valley and foothill grassland	**La Grange**, Cooperstown
Red Hills ragwort *Packera clevelandii*	CNPS 1B, BLM-S	Jun-Jul	800-1,400	Cismontane woodland, serpentine seeps	**Chinese Camp**, Moccasin

1 Special-status:
BLM-S: Bureau of Land Management Sensitive Plant Species
CNPS: California Native Plant Society listed species
- 1A: Species presumed extinct in California
- 1B: Species considered rare or endangered in California and elsewhere
- 2: Species considered rare or endangered in California but more common elsewhere

3: More information needed about this species
4: Limited distribution; watch list

[2] Occurrence in area surrounding Project was based on a nine-quad CNPS quadrangle search.

[3] Quads that are fully or partially included within the Project Boundary are indicated by bold font; quads surrounding, but not included within the Project Boundary are listed in regular font.

There were CNDDB records for 30 special-status plant occurrences located within a one-mile buffer of the Project Boundary. There were nine occurrences of Rawhide Hill onion, six occurrences of Red Hills soaproot, four occurrences each of Congdon's lomatium and Red Hills ragwort, two occurrences each of shaggyhair lupine (*Lupinus spectabilis*), Mariposa cryptantha (*Cryptantha mariposae*), and stink-bells (*Fritillaria agrestis*) and one occurrence of Tuolumne button-celery (*Eryngium pinnatisectum*). Congdon's lomatium, shaggyhair lupine, Rawhide Hill onion, Red Hill ragwort, Red Hills soaproot and Mariposa cryptantha are all BLM-S. The dates on the reports ranged from 1937 to 2007 (CDFG 2010).

A botanical survey of the Red Hills Management Area (now the Red Hills ACEC) was completed in 1984. The surveys located Rawhide Hill onion (*Allium tuolumnense*), Congdon's lomatium (*Lomatium congdonii*), Red Hills soaproot (*Chlorogalum grandiflorum*) and Red Hills ragwort (*Packera clevelandii*) (BLM 1995).

Few of the available reports are from surveys within the Project Boundary and, of those that are, many are outdated.[2] Additional information needed to address the study goal is the specific location of special-status plants in relation to Project O&M activities, Project-related recreation, and other Project-related activities that might affect special-status plants.

5.0 Study Methods

5.1 Study Area

The study area consists of the area within the Project Boundary that is subject to Project-related O&M and/or recreation activities. The Districts have developed the following guidance for the specific study area:

- 100 feet around recreation facilities
- 60 feet around intakes, gatehouses, surge tanks, adits, portals and microwave/radar towers and other Project facilities
- 30 feet around ancillary facilities including stream gages and weirs
- 25 feet from centerline of access roads within the Project Boundary
- 20 feet around the perimeter of reservoirs and impoundments where erosion activity is apparent beyond the high-water mark or where soil types occur which are known to be preferred habitat for special-status plants
- 20 feet around the perimeter of powerhouses and switchyards
- 20 feet from centerline of managed trails

5.2 General Concepts

These general concepts apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.

[2] Annual or short-lived perennial species may require annual monitoring to accurately document population conditions, while long-lived perennials may only require surveys at five-year intervals (CDFG 2009).

- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If minor modifications occur, the field crews will follow the protocols in the study plan. All modifications will be documented and reported in the draft study report.
- If the Districts become aware of the need for major variances to the study plan, the Districts will issue an e-mail to the appropriate resource agencies to provide an opportunity for consultation regarding how to address the variance. The Districts will describe all variances and resolutions in the draft study report.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and the Districts' relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets.
- The Districts will provide training to field crews to identify special-status and ESA/CESA species that may be encountered coincidently during the performance of this study. Training will include instructions in diagnostic features and habitat associations of the above species. Field crews will also be provided laminate identification sheets showing the above species compared to other common species that may be encountered. All incidental observations will be reported in the appropriate report. The purpose of this effort is to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel [*Dreissena polymorpha*]). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study approach will consist of the following five steps:

Step 1 - Gather Data and Prepare for Field Effort. The Districts will identify and map known occurrences of special-status plants within the study area, and prepare field maps for use by survey teams. The maps will include aerial imagery, Project features, and known special-status plant occurrences. Survey timing will be planned based on blooming periods and herbarium collection dates.

Step 2 - Conduct Field Surveys. The Districts' surveyors will conduct special-status plant surveys that generally follow the CDFG's Protocols for Surveying and Evaluating Impacts to

Special Status Native Plant Populations and Natural Communities (CDFG 2009).[3] Field surveys will be conducted at the proper times of year when special-status plants potentially occurring in a given survey area and are both evident and identifiable. Surveys will use a random meander technique, and focus additional efforts in high-quality habitats or those with a higher probability of supporting special-status plants (e.g., serpentine outcrops). Surveys will be floristic in nature, documenting all species observed; taxonomy and nomenclature will be based on The Jepson Manual (Hickman 1993).

In the event special-status plants are found within the study area, surveyors will collect the following data, to the edge of the occurrence, or to 500 feet outside the Project Boundary, whichever is less:

- Digital photographs, if needed, to describe the occurrence, its habitat, and any potential threats (at least one digital photograph will be collected for each occurrence, with other photographs to document potential threats, or as needed.)
- Estimated area (approximate length and width) covered by the special-status plant population and estimated number of individual plants in the population. If plant population is estimated to cover an area greater than 0.1 acre, surveyors will delineate the occurrence boundary using a handheld GPS, collecting either polygon data, or sufficient point data that a realistic occurrence polygon can be constructed from the point data using GIS
- For occurrences less than 0.1 acre in size, location of the approximate center of the occurrence taken as point data using a handheld GPS unit
- Dominant and subdominant vegetation in the area, and topographic features
- Estimated distance to nearest Project facility, feature, or Project-related activity
- Activities observed in the vicinity of the population that have a potential to adversely affect the population (e.g., recreational trails and uses)
- Estimated phenology and descriptions of reproductive state

For all special-status species observations, the appropriate CNDDB form or spreadsheet will be completed. A copy of the CNDDB form or spreadsheet will be provided to BLM if the occurrence is on or immediately adjacent to federal lands.

The Districts' noxious weed field surveys will be conducted in conjunction with special-status plants surveys when feasible, but are expected to require separate survey work as well, to account for differences in plant phenology. For the purpose of the study, noxious weeds are defined as those plant species listed as "A," "B" or "C" by the California Department of Food and Agriculture (CDFA). Other invasive species to be recorded include species of concern to BLM that are not rated by the CDFA.

Two forms of noxious weed data will be collected and maintained, depending on the type and distribution of weeds located during survey efforts:

- Quantitative data: for discrete occurrences of weeds, data collected will include GPS-derived location, nearby sources of dispersal (e.g., roads), surrounding vegetation composition, and any nearby resource concerns (e.g., special-status plant occurrences), and

[3] For the purpose of this Relicensing and differing from the CDFG 2009 protocol, ESA- and CESA-listed plants are not considered special-status and are addressed in separate study proposals.

an estimate of area covered, within the following classes: <0.01 acre; <0.1 acre; <1 acre; <5 acres; >5 acres.

- Qualitative data: for widespread weeds, or for those weeds for which detailed mapping is unlikely to remain accurate (e.g., annual grasses, which change distributions yearly), the general distribution and extent within the study area will be described.

Known and potential noxious weed occurrences are listed in Table 5.3-1 (USDA-NRCS 2009; Cal-IPC 2006). A total of 29 noxious weeds are known, or have the potential, to occur within the general Project area.

General observations of areas of wetlands will also be recorded and mapped.

Step 3 - Compile Data and Perform Quality Assure/Quality Control. Following field surveys, the Districts will develop separate GIS maps depicting special-status plant and noxious weed occurrences, Project facilities, features, and specific Project-related activities which have the potential to affect the special-status species (e.g., dispersed use camping) and other information collected during the study including the complete floristic list. Field data will then be subject to QA/QC procedures, including spot-checks of transcription and comparison of GIS maps with field notes to verify locations of special-status plant occurrences.

Step 4 - Consult with the Districts' Project O&M Staff. Once the location of special-status plants and noxious weeds in the study area is determined, Project operations and DPRA staff will be consulted to identify Project O&M and recreation activities that typically occur in the area of the special-status plant populations or spread noxious weeds.

Step 5 - Prepare Report. The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Methods; (3) Results; (4) Discussion; and (5) Description of Variances from the study plan, if any. Districts will make the report available to relicensing participants upon completion.

6.0 Schedule

The Districts anticipate the following schedule for completion of the study plan:

- Planning (Step 1) .... January 2012 to March 2012
- First Study Season (Step 2) .... March 2012 to July 2012
- QA/QC Review (Step 3) .... August 2012
- Operations Staff Consultation (Step 4) .... August 2012
- Study Report Preparation (Step 5) .... September 2012 to December 2012

7.0 Consistency of Methodology with Generally Accepted Scientific Principles

This study is consistent with the goals, objectives, and methods outlined for FERC hydroelectric relicensing efforts in California, and uses standard botanical survey methods as defined by the CDFG.

Table 5.3-1 Target list of weeds for which occurrences will be recorded during performance of the Special-Status Plants Study

Common Name/ Scientific Name	CDFA Status[1]	Flowering Period	Elevation (ft)	Habitat
Russian knapweed *Acroptilon repens*	B	May-Sept	Below 6,200	Fields, roadsides, cultivated ground, disturbed areas
barbed goat grass *Aegilops triuncialis*	B	May-Aug	Below 3,300	Disturbed sites, cultivated fields, roadsides
tree-of-heaven *Ailanthus altissima*	Not rated	May	Below 6,600	Riparian areas, grasslands, oak woodland
giant reed *Arundo donax*	Not rated	Mar-Nov	Below 1,700	Riparian areas, floodplains, and ditches
lens-pod whitetop *Cardaria chalepensis*	B	Apr-Aug	Below 4,900	Wetlands
hoary cress *Cardaria* spp.	B	May-Aug	Below 4,900	Grasslands, meadows, riparian areas, wetlands, marshes
Italian thistle *Carduus pycnocephalus*	C	May-Jul	Below 3,300	Roadsides, pastures, waste areas
distaff thistle *Carthamus* spp.	A, B	July-Aug	Below 3,600	Disturbed sites
purple starthistle *Centaurea calcitrapa*	B	Jul-Oct	Below 3,300	Disturbed areas
diffuse knapweed *Centaurea diffusa*	A	Jun-Sep	Below 7,600	Fields, roadsides
Iberian starthistle *Centaurea iberica*	A	Jul-Oct	Below 3,300	Fields, roadsides, disturbed open sites, grasslands, overgrazed rangelands, and logged areas.
spotted knapweed *Centaurea maculosa*	A	July-Aug	Below 8,500	Open disturbed sites, grasslands, forested areas, roadsides
tocalote *Centaurea melitensis*	Not rated	Apr-July	Below 7,200	Open disturbed sites, grasslands, roadsides, waste places
yellow starthistle *Centaurea solstitialis*	C	Jun-Dec	Below 4,300	Pastures, roadsides, disturbed grassland or woodland
rush skeletonweed *Chondrilla juncea*	A	May-Dec	Below 2,000	Disturbed areas
Canada thistle *Cirsium arvense*	B	Jun-Sep	Below 5,900	Disturbed areas
bermudagrass *Cynodon dactylon*	C	Jun-Aug	Below 3,000	Disturbed areas
Scotch broom *Cytisus scoparius*	A	Mar-Jun	Below 3,300	Disturbed areas
oblong spurge *Euphorbia oblongata*	B	Apr-Aug	Below 3,300	Waste areas, disturbed sites, roadsides, fields

Common Name/ Scientific Name	CDFA Status[1]	Flowering Period	Elevation (ft)	Habitat
edible fig *Ficus carica*	Not rated	Apr-Aug	Below 2,700	Riparian woodland
Klamath weed *Hypericum perforatum*	C	Jun-Sep	Below 4,900	Rangeland areas and pastures (especially when poorly managed), fields, roadsides
Dyer's woad *Isatis tinctoria*	B	Apr-Jun	Below 3,300	Roadsides, fields, disturbed sites
perennial pepperweed *Lepidium latifolium*	B	Apr-Aug	Below 6,300	Beaches, tidal shores, saline soils, roadsides
purple loosestrife *Lythrum salicaria*	B	Jun-Sep	Below 5,300	Seasonal wetlands, ditches, cultivated fields
black locust *Robinia pseudoacacia*	Not rated	Apr-Jun	Below 6,300	Riparian areas, canyons
Russian thistle *Salsola tragus*	C	Jul-Oct	Below 8,800	Desert dunes and scrub, alkali playa
Chinese tallow tree *Sapium sebiferum*	Not rated	Apr-Jul	Below 2,700	Riparian areas
Spanish broom *Spartium junceum*	Not rated	Mar-Jun	Below 2,000	Open disturbed sites, grasslands, oak woodlands, riparian corridors, open forests
medusahead *Taeniatherum caput-medusae*	C	Apr-Jul	Below 6,900	Disturbed sites, grassland, openings in oak woodlands and chaparral

[1] CDFA Status:
A = Eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.
B = Eradication, containment, control, or other holding action at the discretion of the commissioner. State endorsed holding action and eradication only when found in a nursery.
C = Action to retard spread outside of nurseries at the discretion of the commissioner; reject only when found in a crop seed for planting or at the discretion of the commissioner (CDFA 2009).

8.0 Level of Effort and Cost

Not yet estimated.

9.0 References Cited

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ATTACHMENT 6-5

ESA-LISTED AMPHIBIANS - CALIFORNIA TIGER SALAMANDER STUDY PLAN

DRAFT

ATTACHMENT 6-5

**TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT**

**DON PEDRO PROJECT
FERC NO. 2299**

ESA-Listed Amphibians - California Tiger Salamander Study Plan

February 2011

1.0 Project Nexus and Issue

The Districts' on-going continued operation and maintenance (O&M) of the Don Pedro Project (Project) has the potential to affect the terrestrial and aquatic habitat of the California tiger salamander (CTS; *Ambystoma californiense*). California tiger salamander (Central Valley population) is listed as threatened under the federal Endangered Species Act (ESA) and as threatened under the California Endangered Species Act (CESA). Project O&M activities including ground disturbing activities, vegetation management, and routine maintenance at Project facilities may disrupt CTS habitat.

2.0 Agency Resource Management Goals

The U.S. Fish and Wildlife Service (USFWS) have jurisdiction as CTS are protected under the ESA. Listed threatened and endangered species are protected from take, defined as direct or indirect harm, unless a Section 10 permit is granted to an entity other than a federal agency or a Biological Opinion with incidental take provisions is rendered to a federal lead agency via ESA Section 7 consultation. Pursuant to the requirements of ESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally listed species may be present in the study area and determine whether the proposed federal action will jeopardize the continued existence of the species. Under ESA, habitat loss is considered to be an adverse effect to a species. In addition, the action agency is required to determine whether its action is likely to jeopardize the continued existence of any species that is proposed for listing under ESA or to result in the destruction or adverse modification of critical habitat proposed to be designated for such species (16 USC 1536[3], [4]).

The California Department of Fish and Game (CDFG) administers the CESA. The CTS (Central Valley population) is listed as a state-threatened species. On August 2, 2010, the Office of Administrative Law approved the Fish and Game Commission determination that CTS should be listed as a state-threatened species; the regulations became effective on August 19, 2010 (CDFG 2011). CESA prohibits the take (interpreted to mean the direct killing) of listed species under CESA (14 CCR Subsection 670.2, 670.5). Under CESA, state agencies are required to consult with CDFG when preparing CEQA documents. Consultation ensures that proposed projects or actions do not have an adverse effect on state-listed species. During consultation, CDFG determines whether take would occur and identifies "reasonable and prudent alternatives" for the project and conservation of special-status species. CDFG can authorize take of a state-listed species if an incidental take permit is issued by the Secretary of the Interior or Commerce in compliance with the federal ESA, or if the director of CDFG issues a permit under Section 2080 in those cases where it is demonstrated that the impacts are minimized and mitigated. Pursuant to the requirements of CESA, a state or local agency reviewing a proposed project within its jurisdiction must determine whether any state-listed species may be present in the project area and determine whether the proposed project will have a potentially significant impact upon such species. If significant impacts to state listed species are identified, the state lead agency must adopt reasonable and prudent alternatives as specified by CDFG to prevent or mitigate for impacts.

Critical habitat under the ESA for CTS was originally designated on August 23, 2005. On December 14, 2005, a portion of this critical habitat was excluded in order to avoid negative impacts on the finalization and implementation of the Santa Rosa Plains Conservation Strategy. The USFWS is currently re-proposing 74,223 acres of the Santa Rosa Plains as critical habitat and must make its final ruling by July 1, 2011 (USFWS 2009). Recovery criteria or a recovery plan has not yet been drafted for the CTS (Central Valley population).

3.0 Study Goals

The specific objectives of this study are to:

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

4.0 Existing Information and Need for Additional Information

Habitat for CTS consists of open terrain with vacant burrows or other refugia, in proximity to vernal pools or other appropriate ponds for breeding. Adult CTS spend little time at breeding sites and are otherwise terrestrial preferring open, rolling terrain or foothills, particularly in areas with ground squirrel or pocket gopher burrows. Although vacant or mammal-occupied burrows are evidently favored, CTS will also reside in crevices, loose soil, or under surface objects (Brode 2003). Adult CTS have been documented dispersing as far as 1.2 miles, although most individuals are believed to remain within about 2,300 feet of breeding sites (USFWS 2004).

Larvae and eggs are usually found in shallow, turbid, vernal or semi-permanent pools and ponds that fill during winter rains (Alvarez 2004b). Permanent ponds, stock ponds, and rarely intermittent streams or ditches may be used for breeding sites if fish are not present. CTS eggs are laid between December and February in small clusters or singly on submerged stems and leaves. Larvae usually transform in about four months (Behler and King 1979) as water recedes in late spring or summer, but may metamorphose in as little as 10 weeks (Jennings and Hayes 1994) or overwinter in permanent ponds (Alvarez 2004a).

Several occurrences of CTS are recorded in the California Natural Diversity Database (CNDDB) within the Project area quadrangles (La Grange 7.5-minute USGS quadrangle). These occurrences are recorded in the vicinity of La Grange, the Tuolumne River, and south of the Don Pedro Reservoir. The most recent record is from 2007 and is located along Big Creek, between McNulty Ridge and Bonds Flat Road, south of Don Pedro Reservoir. If suitable habitat for CTS occurs within the Project Boundary, CTS has the potential to occur.

Existing information is not adequate to meet the goal of the study. Information necessary to address the study goal includes a site-specific assessment of habitat suitability for CTS in relation to Project facilities and normal O&M activities that might affect CTS.

5.0 Study Methods

5.1 Study Area

The study area for the CTS habitat assessment consists of suitable aquatic and upland habitats within the existing FERC Project Boundary and extends 1.24 miles from the Project Boundary.

5.2 General Concepts

These general concepts apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via e-mail to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of entering the property. If access is not granted or is not feasible, the Districts will notify FERC and appropriate resource agencies via e-mail to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. When modifications are made, the Districts' field crew will follow the protocols in this study proposal. Any variance from the study plan will be documented and reported.
- If the Districts become aware of the need for major variances to the FERC-approved study plan, the Districts will issue an email to appropriate resource agencies to provide an opportunity for consultation regarding how to address the variance. The Districts will summarize in the final study report all variances and resolutions.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and the Districts' relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets.

- The Districts will provide training to field crews to identify special-status species that may be encountered coincidently during the performance of this study. Training will include instructions in diagnostic features and habitat associations of such species. Field crews will also be provided laminated identification sheets showing special-status species compared to other common species that may be encountered. All incidental observations will be reported in the appropriate report. The purpose of this effort is to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g. Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The Districts will perform the following five-step approach to completing the study plan:

<u>Step 1 - Site Assessments and Site Assessment Report.</u> The Districts will review available databases, including museum records, and consult with agencies to determine the nearest known occurrences of CTS to the study area. As required by the Interim Guidance on Site Assessment and Field Surveys for Determining *Presence* or a *Negative* Finding of the California Tiger Salamander (Guidance; USFWS 2003; Attachment 1), CTS occurrences within 3.1 miles of the Project Boundary and the closest CTS occurrence to the Project Boundary will be determined. Communications with the CDFG CNDDB and the Endangered Species Office of the USFWS will be documented.

Potential CTS breeding habitats within the Project Boundary and within 1.2 miles of the Project Boundary will be identified, characterized, and mapped based on review of existing aerial photography, National Wetland Inventory maps, and other pertinent resource agency GIS layers as available. Using available information, these aquatic habitat sites will be characterized by habitat type (e.g., natural seasonal pond, stock pond, or creek), surface area, depth, seasonality, topography, and types of associated aquatic or emergent vegetation.

Field visits to verify habitat characterizations and collect additional information described below will be performed at sites selected as follows:

- All potential breeding locations within the Project Boundary.
- Representative potential breeding locations that are publically accessible within 1.24 miles of the Project Boundary.

Information to be collected during field visits will include topography; soil type; plant communities; water body presence, location, types, and size; fossorial mammals detected; current land use, and a description of adjacent lands. Each site will be photographed to depict habitat and other notable findings. The presence of fish, American bullfrogs (*Lithobates catesbeianus*), and other incidental observations of amphibians will be noted. Upland habitats will be characterized based on description of upland vegetation communities, land uses, and any potential barriers to CTS movement.

Step 2 - Prepare, Format, and Quality Assurance/Quality Control Data. The Districts will develop GIS maps depicting known CTS occurrences, potential habitat, Project facilities and features, and other information collected during the study. Field data will then be subject to quality assurance and quality control (QA/QC) procedures, including spot-checks of transcription and comparison of GIS maps with field notes on locations of any CTS occurrences.

Step 3 - Consult with the Districts' Project Operations Staff. Operations staff will be consulted to identify typical Project O&M activities in areas of potential CTS habitat in the study area and to identify activities with the potential to adversely affect CTS.

Step 4 - Prepare Report. The Districts will prepare a report that includes the following sections: (1) Study Goals and Objectives; (2) Methods; (3) Results; (4) Conclusions; and (5) Description of Variances from the FERC-approved study plan, if any. Confidential information will not be included in the report, but provided to appropriate agencies.

The report will be submitted to USFWS, with separate submittals to BLM for any site assessments that take place on BLM lands. The report will include the following:

- Copies of data sheets
- Copies of field notes
- GPS data for all field visit sites
- List of known occurrences of CTS locations within the study area
- Photographs of the field visit sites including a map of photo locations
- GIS map of potential CTS habitat and locations of field visit sites
- Summaries of site habitat assessments
- Supporting data in Excel spreadsheet and GIS layers, as appropriate

Step 5 - Consult with USFSW. The Districts will consult with USFWS to determine if additional data gathering is needed and to discuss the potential Project effects on CTS.

5.4 Schedule

The Districts anticipate the schedule to complete the study proposal is as follows:

- Site Assessment (Step 1) .... November 2011 to March 2012
- QA/QC (Step 2).................... March 2012 to April 2012
- Operations Staff Consultation (Step 3) .... May 2012 to June 2012
- Report Preparation (Step 4).................... June 2012 to September 2012
- USFWS Consultation (Step 5) .... September 2012 to February 2013

5.5 Consistency of Methodology with Generally Accepted Scientific Practices

This study is consistent with the goals, objectives, and methods outlined for recent FERC hydroelectric relicensing efforts in California, and uses data from the USFWS, BLM, and other reliable sources for the analysis.

6.0 Reports

Besides the reports described above, the study results will be displayed in GIS maps and files that show locations of field site visits, habitat potentially suitable for CTS, and known CTS locations. Incidental observations of amphibians, turtles, and reptiles will also be described.

7.0 Level of Effort and Cost

Not yet estimated.

8.0 References Cited

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——. 2009. Sacramento Fish and Wildlife Office Species Account for California Tiger Salamander (*Ambystoma californiense*). Available online at: http://www.fws.gov/sacramento/es/animal-spp-acct/california_tiger_salamander.rtf.

ATTACHMENTS

ATTACHMENT 1

INTERIM GUIDANCE ON SITE ASSESSMENT AND FIELD SURVEYS FOR DETERMINING PRESENCE OR A NEGATIVE FINDING OF THE CALIFORNIA TIGER SALAMANDER

OCTOBER 2003

Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander
October 2003

The Santa Barbara County population of the California tiger salamander (Ambystoma californiense) was federally listed as endangered on September 21, 2000 (65 FR 57242). The Sonoma County Distinct Population Segment (DPS) of the California tiger salamander was listed as endangered on July 22, 2002 (67 FR 47727). The Central California DPS of the California tiger salamander was proposed for listing as threatened on May 23, 2003 (68 FR 28648). The Santa Barbara and Sonoma County DPSs were proposed for reclassification from endangered to threatened, on May 23, 2003 (68 FR 28648). The California Department of Fish and Game (Department) considers the California tiger salamander throughout its entire range to be a species of special concern.
(Special Animals List July 2003 http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/SPAnimals.pdf)

The Service and Department have received numerous requests for guidance in planning for the protection of the California tiger salamander (CTS) at the sites of proposed and existing land use activities. This document provides interim guidance for two procedures to accurately assess the likelihood of CTS presence in the vicinity of a project site, including: (1) an assessment of CTS locality records and potential CTS habitat in and around the project area; and (2) focused field surveys of breeding pools and their associated uplands to determine whether CTS are likely to be present.

Because CTS use aquatic and upland habitats during their life cycle, they may be present in either or both habitats on a given property. For sites with suitable breeding habitat, two consecutive seasons of negative larval surveys and a negative upland drift fence study in the intervening fall/winter are recommended to support a negative finding. For sites with no suitable aquatic breeding habitat, but where suitable upland habitat exists, two consecutive seasons of negative upland drift fence studies are recommended to support a negative finding.

If the following Guidance is followed completely, the results of these site assessments and field surveys will be considered valid by the Service and Department. Results of the site assessments and field surveys should be reported to the appropriate Service's Field Office, if appropriate the Service's Regional Office in Portland, Oregon pursuant to the terms and conditions of the permittee's section 10(a)(1)(A) recovery permit, and to the Department and other agencies or offices as required. Details regarding the recommended content and/or format of reports are provided throughout the remainder of this document.

Surveyors must obtain permission of the landowner before implementing any surveys or research on the CTS. **In locations where the CTS is federally listed surveyors should obtain a Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, prior to implementing the guidance.** For surveys that may ultimately be used in support of a negative finding, it is recommended that surveyors consult with Service biologists on their study design before beginning work. If surveyors are working in areas with other federally listed species that are likely to be captured incidentally during CTS surveys, surveyors should also possess a valid 10(a)(1)(A) permit for these species (e.g., California red-legged frog, vernal pool tadpole shrimp, etc.). For all locations, the surveyor should hold an active Scientific Collecting Permit from the Department that specifically names CTS surveys as an authorized activity. Authorization Number 9, without explicit permission for handling CTS, is not adequate for CTS surveys.

Site Assessment for the California tiger salamander

Available information about CTS and their habitats in the vicinity of the project should be used to determine the likelihood that CTS may occur there and if field surveys are appropriate. The project proponent should compile and submit to the Service and the Department the following information:

Element 1. Is the project site within the range of the CTS?

The surveyor should review the attached maps or referenced weblink to determine if the project site is within the range of the CTS. For Sonoma County, refer to the attached county map (Sonoma County pdf). For Santa Barbara County, refer to http://www.fws.gov/ventura/es/protocols/ctsfieldsurvey_protocols.pdf . For Monterey, San Benito, and San Luis Obispo counties, contact the Ventura Fish and Wildlife Office at the address provided below. For all other areas, refer to the attached map of California (all of California pdf).

Element 2. What are the known localities of CTS within the project site and within 3.1 miles (5.0 kilometers) (km) of the project boundaries?

This is to place the project site in a regional perspective. The surveyor should consult the California Natural Diversity Data Base (CNDDB) maintained by the Department to determine known localities of the CTS. The Sacramento or Ventura Fish and Wildlife Offices should be contacted for localities within their respective jurisdictions. Other information sources on local occurrences of CTS should be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resources managers and biologists from municipal, state, and Federal agencies, environmental groups, and herpetologists at museums and universities. The surveyor should note in their report all known CTS localities within the project site and within 3.1 miles of the project boundaries; if there are no localities within 3.1 miles, the nearest locality should be noted.

Element 3. What are the habitats within the project site and within 1.24 miles (2 km) of the project boundaries?

This distance is based on the observed mobility of the species. Describe the upland and aquatic habitats within the project site and within 1.24 miles of the project boundaries. Characteristics of the site that should be recorded include acreage, elevation, topography, plant communities, presence and types of water bodies, fossorial mammal species and their burrows, current land use, a description of adjacent lands, and an assessment of potential barriers to CTS movement. Use of aerial photographs is necessary to characterize potential breeding habitats that are not part of the project site under consideration. The aquatic habitats should be mapped and characterized (e.g., natural vernal pools, stockponds, drainage ditches, creeks, types of vegetation, surface area, depth, approximate drying date). Suitable upland habitat, including locations of underground refugia, for CTS should be mapped as well, with a focus on areas where small mammal burrows are located or are most dense.

Reporting and interpretation of the site assessment

Site assessments should include, but are not limited to, the following information: (1) photographs of the project site(s); (2) survey dates and times; names of evaluator(s); (3) a description of the site assessment methods used; (4) a list of CTS localities, as requested above; and (5) a map of the site(s) showing habitat as requested above. Maps should be of similar nature to a U.S. Geological Survey (USGS) 7.5-minute (1:24,000) topographic maps -or- Geographic Information System (GIS) data depicting the site(s) and the area within 5 kilometers (3.2 miles) of its boundaries. The report should be provided to the appropriate Service field office and Department regional office prior to initiating field surveys.

After completing items 1-3 of the site assessment (as above), send a report to the appropriate Service field office and Department regional office. Based on the information provided from the site assessment, the Service and Department will provide recommendations as to the appropriateness of field surveys. Surveys should not be initiated until recommended by the Service and Department.

Interim Presence/Negative Finding Survey Guidance for the California Tiger Salamander

Biological field surveys should be conducted for all sites with potential CTS habitat. Due to its unique life history, the CTS can be difficult to detect depending on weather and time of year. Aquatic sampling for larvae during spring months can be the most effective way to determine if CTS are present in a given area. However, especially if environmental conditions are unfavorable, CTS may not breed successfully in a given year. After metamorphosis CTS spend most of each year on land, emerging from refugia only occasionally, usually on rainy nights. CTS have been observed on land 1.24 miles from any potential breeding pool.

At sites that contain both upland habitat and potential breeding habitat (i.e., pools that contain standing water continuously for at least 10 weeks, extending into April), aquatic sampling during two breeding seasons and a drift fence study in the intervening winter should be conducted to support a negative finding. At sites that contain appropriate upland habitat only, but where there is a known or potential breeding site accessible within 1.24 miles, a two-year drift fence study should be conducted.

In years with little rainfall, upland emergence may be reduced and CTS may not breed. Field surveys conducted in years with at least 70% of average rainfall between September 1 and April 1, at the nearest National Oceanic and Atmospheric Administration climate station are most reliable. Data from survey seasons not meeting this criterion will also be considered; surveyors should provide strong justification that their data are reliable including but not limited to local climate (e.g., daily rainfall totals, pond filling date, pond drying date) and biological survey data (e.g., other species captured during each sampling interval).

Aquatic larval sampling

1. Aquatic larval surveys of potential breeding pools should be repeated three times each season. Surveys should be conducted once each in March, April, and May, with at least 10 days between surveys. **If pools are likely to dry prior to the completion of three surveys, the sampling schedule should be shifted accordingly.**

2. Captured CTS should remain in nets for the minimum amount of time necessary, but no longer than 5 minutes. During this time, larvae should not be kept out of water for more than 30 seconds. Photographs should document a representative sample of captured CTS.

3. Disruption to the pond's bottom should be minimized. Shallow areas where young larvae may occur should be traversed in the most direct and least disturbing manner possible.

4. Sampling should cease once presence has been determined to minimize disturbance of pool flora and fauna. If CTS are detected at a pond, subsequent visits to that pond are not necessary.

5. Ponds should be initially sampled using D-shaped or similar, long-handled dipnets with 1/8th inch (3.2mm) or finer mesh. If CTS larvae are not captured in the first 50 dipnet sweeps, covering representative portions of the pond, seines should be used.

6. If dipnetting has been unsuccessful, seines should be used to sample 100% of the surface area of ponds smaller than 1 acre and at least 30% of the surface area of larger pools, including a representative sample from different water depths and vegetated and non-vegetated areas. One eighth inch (3.2 mm) or finer mesh minnow seines with weights along the bottom and floats along the top edge should be used, with dowling or PVC pipe attached to the end of the seine so the bottom edge can be dragged along the bottom of the pool. Whenever possible, the seine should be pulled from one edge of the pond to the other.

7. Use of minnow traps will be considered on a case-by-case basis. Minnow trapping for CTS larvae should only be conducted in habitats that are too deep to adequately survey with dipnets and seines, or in which dense vegetation impedes normal dipnetting/seining activities. **In these cases the surveyor should submit to the Service a written minnow trap sampling design based on the requirements detailed below.** No minnow trapping should be conducted in ponds known to support state or federally threatened or endangered animals (e.g., California red-legged frogs (Rana aurora draytonii)). In areas where California red-legged frogs may occur, minnow trapping should be preceded by negative surveys following the Service guidelines for this species. To conduct minnow trap sampling in pools known to contain California red-legged frogs, surveyors must possess a valid Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended.

Minnow trapping should be conducted in the following manner:

a. Minnow traps should be monitored for three three-day intervals between March 1 and May 15 (for a total of nine days of trapping per site). Trapping intervals should be separated by at least ten days. Minnow trap surveys should immediately cease if CTS presence is determined.

b. Minnow trapping should be avoided during warm periods when air temperatures reach 80 degrees Fahrenheit or when water temperatures reach 70 degrees Fahrenheit or warmer, to prevent the possibility of mortality due to reduced oxygen availability.

c. Minnow traps should be deployed overnight and checked frequently enough to ensure that larvae are not killed or injured. Traps should be checked at least once per day.

d. A minimum of four traps should be placed in each pond. For larger ponds, traps should be distributed along the shoreline with no more than 75 ft (23 m) between traps. Each trap should be clearly marked with the name, telephone number, and State and Federal permit number of the surveyor. Traps should be anchored to stakes set near the shoreline. Steel braided fishing line or heavy cord works well for this purpose; galvanized wire and stainless steel wire should not be used because these wires may kink and break. If livestock are present, we recommend that the surveyor devise a method to anchor the trap in a manner to prevent entanglement of livestock. Brightly colored flagging should be affixed to each anchor point. For extra security, a float attached to each trap can aid in detection. If a minnow trap is lost, every effort should be made to recover it to avoid the possibility of leaving behind a trap that can kill a variety of species over time.

e. Traps should be deployed to the deepest parts of ponds and in shoreline areas with aquatic vegetation growth.

9. Data regarding the type and quality of each pool sampled should be recorded. At a minimum, these data should include the date and time, location, type of water body (e.g., vernal pool, seasonal wetland, artificial impoundment, etc.), dimension and depth of pond, water temperature, turbidity, presence of aquatic vegetation (submergent and emergent), and dominant invertebrates and all vertebrates observed. Photographs of pools and adjacent upland areas are helpful and copies should be included in the final report.

10. Surveyors should follow guidance below for disinfecting equipment and clothing after surveying a pond and before entering a new pond, unless the two ponds are hydrologically connected to one another. These recommendations are adapted from the Declining Amphibian Population Task Force's Code which can be found in their entirety at: http://www.open.ac.uk/daptf/ .

a. All dirt and debris, including mud, snails, plant material (including fruits and seeds), and algae, should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water. Cleaned items should be rinsed with clean water before leaving each study site.

b. Boots, nets, traps, etc., should then be scrubbed with either a 70 % ethanol solution, a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water), QUAT 128 (quaternary ammonium, use 1:60 dilution), or a 6% sodium hypochlorite 3 solution and rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

c. When working at sites with known or suspected disease problems, disposable gloves should be worn and changed between handling each animal.

d. Used cleaning materials (liquids, etc.) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

Upland Habitat Survey Methods

A drift fence study conducted during fall and winter is the primary method used to study CTS in upland habitats. To support a negative finding, an upland drift fence study should be included. Although less intrusive methods (see below) may also be used to determine presence of the CTS, these methods are less reliable and thus cannot be used to support a negative finding.

Because CTS have been observed to make breeding migrations of at least 0.6 miles (1 km), the project proponent or the Service may assume presence of CTS if a known breeding pond lies within 1 km and no significant barriers exist. Examples of significant physical barriers include high-density residential or urban development and Interstate Highways, while features such as golf courses, disked fields, and most paved roads are not considered barriers.

For sites with at least one accessible potential breeding pool, we recommend that a one-year drift fence study be conducted during the winter between two consecutive seasons of aquatic larval surveys (if presence of CTS was not established during the first season of aquatic sampling). We recommend that a two year drift fence study be conducted if: 1) a site has suitable upland habitat and a potential breeding pool lies within 1.2 miles (2 km); 2) on-site ponds cannot be adequately sampled using aquatic methods (e.g., deep impoundments with known presence of California red-legged frogs); or 3) if non-native predators or poor water quality may preclude detection of CTS during larval sampling (i.e., due to mortality of the larvae).

1. We recommend that a proposal to conduct a drift fence study be submitted in writing to the Service and the Department. The results of studies not approved by the Service and Department may not be accepted in support of a negative finding. The proposal should include an aerial photograph of the study site indicating all potential on- and off-site breeding locations identified in the site assessment and an overlay with the proposed drift fence study design clearly delineated. We recommend that drift fence study designs incorporate the following:

   a. **For sites with at least one suitable breeding pond** (i.e., ponds that contain standing water for at least 10 continuous weeks in most years), the ponds should be surrounded by drift fences installed 10 - 50 ft from the high water line. Sections of drift fence should be spaced regularly around the pond, focusing on areas where salamanders are most likely to be captured. We recommend that each section of fence be at least 30 ft (9.2 m) long, and that the total distance between fence sections be no greater than the total length of installed fence (i.e., >50% of the circumference fenced). There should be no more than 33 ft (10 m) between pitfall traps, and drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.

   b. **For all sites**, we also recommend upland drift fences. Unless a strong rationale can be presented, drift fence equaling at least 90% of the site perimeter should be installed. The exact placement of fences should be selected to maximize the probability of capturing CTS (e.g., in grassland areas with high densities of mammal burrows; along site boundaries closest to identified potential breeding pools; with pitfalls situated away from areas where flooding is likely). Pitfalls should be spaced less than 33 ft apart. To the extent possible drift fences and pitfalls should be placed to minimize the number of flooded buckets. Each section of fence should be a minimum of 30 ft (9.2 m) long, unless topography, property lines, or other circumstances dictate. Upland drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.

2. Arrays should be approved and constructed by 15 October. Beginning on or before October 15, pitfall buckets should be opened before sunset if there was any rain during the day or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability (based on the nearest National Weather Service forecast - available at http://www.wrh.noaa.gov/Sacramento/). Traps should be open each night and checked each morning until no rain has fallen within the preceding 24 hours. Nights of high relative humidity (greater than 75% relative

humidity) should be considered equivalent to rain events once onsite or nearby seasonal wetlands have become inundated with standing water, regardless of its depth, surface area, or duration. The above guidance should be followed until 20 nights of surveying under the proper conditions has been conducted. After 20 nights of surveying is completed, and until March 15, pitfall buckets should be opened before sunset if there was any rain during the day, or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability. Traps will be checked the next morning, and unless it is still raining or more rain is forecast, the traps can be closed until the next rain event.

3. Drift fences should be constructed from a material that is durable, weather resistant, and **appropriate for the area in which it will be installed; proposals should describe the materials to be used**. Examples include aluminum flashing, silt fencing, untreated wood particle board, shade cloth, window screen, Vexar plastic mesh, etc. Hardware cloth may be useful for short segments of fence that experience heavy overland water flow. Drift fences should be buried at least 3 inches (8 cm) underground and extend at least 1 ft (31 cm) above the ground. All drift fences require regular inspections and maintenance, especially after each significant storm event. If drift fences are installed incorrectly and/or have insufficient maintenance this may call into question the reliability of the data. Unless special authorization is received from the Service and Department to maintain drift fences through non-sampling months, drift fencing should be disassembled by April 1.

4. Pitfall traps should not be placed in a manner that will disturb or destroy rodent burrows or other refugia that could be used by CTS.

5. Excessive pitfall flooding may invalidate a study. To avoid flooding traps should be placed preferentially in slightly elevated locations where flooding is less likely. Pitfalls in locations likely to flood should be free of holes. If ground saturation forces a pitfall out of the soil it can be weighted down with cement, gravel or other suitable materials.

6. All pitfall traps should have a rigid lid that closes securely. When not in use, traps should be closed in a manner that precludes entry by CTS and other animals.

7. Pitfall traps should be cylindrical, non-galvanized, metal or plastic containers. They should be at least 2-gallons in size and 8 in (20 cm) deep.

8. Each pitfall trap should contain noncellulose sponges or other nontoxic absorbent material which should be kept moist at all times.

9. Each pitfall trap should have a rigid cover with legs one to two inches high to provide shade and shed water during extreme rain events.

10. When in use, pitfall traps should be checked as often as necessary, but at a minimum one time a day, with one of these checks occurring between one hour before sunrise and noon. Whenever possible, traps should be opened just before dark and checked and closed the following morning.

11. When not in use, the drift fence and pitfall traps should be inspected weekly to ensure the system has not been disturbed by vandals, wildlife, fallen trees, wind, etc. Repairs to fences should be completed prior to the next night of sampling.

12. Pitfall traps should be placed as far as possible from ant nests. If an ant nest develops within 10 feet of an existing pitfall trap, the pitfall trap should be moved, removed from the field, or closed.

13. Captured CTS should be released as near as possible to the point of capture, in a manner that maximizes their survival. CTS should be released into the mouth of a small mammal burrow or other suitable refugia. CTS should be

watched after release to be sure that they are in a safe location and are not susceptible to increased predation risk.

14. Once a CTS is captured, all traps and drift fences should be emptied and removed within 24 hours, and holes in the ground which contain traps should be filled in.

15. In addition, to minimize mortality of small mammals that may become trapped during surveys, each pitfall trap should also incorporate either jute twine, as described in Karraker (2001; http://www.fs.fed.us/psw/rsl/projects/wild/karraker/karraker4.pdf), a rodent safe-house as described in Padgett-Flohr and Jennings (2001), or other material as approved by the Service and Department.

16. Each pitfall trap should be marked with the name, telephone number, and Department permit number.

Other methods

Other methods, such as visual egg surveys, night driving, nocturnal surveys, fiber optic scoping and cover-boards, may be used to determine presence of the CTS, but these techniques may not be accepted in support of a negative finding. Deviations from this guidance may be approved on a case-by-case basis if a strong rationale can be presented.

Reporting

If one or more CTS are captured or detected a representative sample of the embryo(s), larva(e), or transformed salamander(s) should be photographed. The Service and the Department should be contacted by telephone within 3 working days if CTS are captured. If any mortality of California tiger salamander occurs, specimens should be collected, preserved by freezing, and the Service and the Department contacted by telephone within 1 work day.

For each survey location, a final report detailing the survey results should be submitted to the Service and the Department within one month of the last site visit. The written report should include, but is not be limited to, the following information: names of surveyors and copies of permits and authorizations, a description and map at the appropriate resolution of the type and quality of upland and aquatic habitats and land uses at the site; a map indicating the location of water bodies sampled for larvae; a map indicating the location of drift fences and pitfalls. The survey report also should include survey methods used, the dates and times of surveys, rainfall totals by date, nightly minimum temperatures, number and length of dipnet sweeps made, number of passes with seine, total estimated area seined, records of upland and aquatic animals captured, and pond water temperature, turbidity, and maximum depth at each aquatic sampling. If CTS are detected on the site, the report should include a map indicating the precise location of all CTS observations and captures, the number of CTS egg masses, larvae, sub-adults and adults observed, and photographic verification of CTS from the site. Site photographs may also be helpful in interpreting survey results. For the Department, survey reports should also include CNDDB field locality forms. Locality information should be in the form of UTM or latitude/longitude (degree, minute, second) coordinates.

In the case of a negative finding including a season with 70% of average rainfall, additional information (e.g., pond filling/drying dates, quantity and timing of rainfall during each sampling interval, temperatures) supplied by the surveyor, may assist the Service and the Department in their decision whether or not to accept the data.

Contact Information:

U.S. Fish and Wildlife Service

For an application or guidance on how to obtain a Federal permit or for reporting, please contact:

For areas within the Great Valley hydrobasin:	U.S. Fish and Wildlife Service Sacramento Fish and Wildlife Office

Attn: Permit Coordinator 2800 Cottage Way, W-2605
Sacramento, California 95825
(916) 414-6547
For hydrobasins south of and including Santa Cruz County:

U.S. Fish and Wildlife Service
Attn: Permit Coordinator
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B Ventura, California 93003
(805) 644-1766

http://www.fws.gov/endangered/permits/

Please refer to http://www.fws.gov/ventura/areas/responsibilities.html or http://www.fws.gov/sacramento/sfwo_jurisdiction.htm for a map showing U.S. Fish and Wildlife Office jurisdictions.

California Department of Fish and Game

For Department reporting or questions regarding land use activity guidance, a map of regional offices and telephone numbers is available at http://www.dfg.ca.gov/regions/regions.html

For State of California Scientific Collecting permit applications and information, please contact:
California Department of Fish and Game
License and Revenue Branch
3211 S Street
Sacramento, California 95816
(916) 227-2271

For additional State permit information, please refer to:

http://www.dfg.ca.gov/hcpb/ceqacesa/ceqacesa.shtml (How to Obtain a Scientific Collecting Permit)

http://www.dfg.ca.gov/hcpb/ceqacesa/rsrchpermit/mou/whenneedmou.shtml (When is the MOU Required?)

http://www.dfg.ca.gov/licensing/pdffiles/fg1476.pdf (Scientific Collecting Regulations)

http://www.dfg.ca.gov/licensing/pdffiles/fg1379e.pdf (Scientific Collecting Permit Attachment)

ATTACHMENT 6-6

ESA-LISTED AMPHIBIANS - CALIFORNIA RED-LEGGED FROG STUDY PLAN

DRAFT

ATTACHMENT 6-6

**TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT**

**DON PEDRO PROJECT
FERC NO. 2299**

ESA-Listed Amphibians - California Red-Legged Frog Study Plan

February 2011

1.0 Project Nexus

The Districts' on-going operation and maintenance (O&M) of the Don Pedro Project (Project) have a potential to affect the California red-legged frog (CRLF; *Rana draytonii*), a federally threatened species listed under the federal Endangered Species Act (ESA), and potentially occurring in the Project area. These effects could involve activities related to Project operations that impact suitable habitat or to Project-related recreation activities.

2.0 Agency Resource Management Goals

The U.S. Fish and Wildlife Service (USFWS) administers the ESA related to federally listed threatened and endangered species. The ESA prohibits any person from "taking" a listed species. Consultation with USFWS is required to ensure than any federal action is not likely to jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of critical habitat. The Districts are unaware of specific management goals for CRLF specifically relevant to the Project.

The California Department of Fish and Game (CDFG) administers the California Endangered Species Act (CESA). CRLF is currently listed as a species of special concern (CSC). The CESA requires state lead agencies preparing California Environmental Quality Act (CEQA) documents to consult with CDFG regarding potential impacts of projects on state-listed species. If jeopardy is determined for listed species, the state lead agency must consider adopting reasonable and prudent actions as provided by CDFG.

The Bureau of Land Management (BLM administers federal lands in the immediate Project area. BLM's resource management goals regarding special-status species, including special-status amphibians and aquatic reptiles, are to maintain, improve or enhance native populations and the ecosystems upon which they depend; ensure that all BLM management activities and authorizations are consistent with the conservation needs of special-status species; manage special-status species habitat to assist in the recovery of listed species; protect and manage significant and sensitive resources on BLM lands; to maintain and/or improve meadow and wetland habitat and riparian and aquatic habitat for all life stages of special-status species; and to sustain and manage viable populations of the CRLF in the BLM planning area.

3.0 Study Goals

The goal of this study is to provide current and useful information to the relicensing participants concerning CRLF and its relationship to the Don Pedro Project. The specific objectives of this study are as follows:

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

4.0 Existing Information and Need for Additional Information

Existing relevant information regarding known or potentially occurring locations of special-status amphibians and reptiles in the Project area is available from California Natural Diversity Database (CNDDB), museum records, and other sources. This information and a life history description of CRLF, included in Section 5.3 of the Districts' PAD, are useful in identifying preferred habitats and documenting where the species have been found to date. Table 4.0-1 summarizes CRLF habitat requirements by life stage, and briefly summarizes historically known occurrences in the Project area.

Table 4.0-1 California red-legged frog habitat requirements by life stage and summary of records in the Project area.

Egg Masses	Larvae	Juveniles and Adults	Occurrence in Project Area[1]
In ponds or backwater pools of streams, usually attached to emergent vegetation (cattail and bulrush). Sometimes found at sites without emergent vegetation (e.g., some stock ponds). The presence of dense riparian vegetation (particularly willows) is also a positive indicator of suitable breeding habitat. Permanently or seasonally flooded water bodies may be used.	Same habitat as eggs; also in slow-moving, shallow riffle zones, and shallow margins of pools. Larvae spend most time in submergent vegetation or organic debris.	Frogs may stay at breeding sites or move to summer habitats. Emergent and/or riparian vegetation, undercut banks, semi-submerged root masses; open grasslands with seeps or springs with dense growths of woody riparian vegetation, willows; cattail, bulrush, and willow are good indicators for suitable habitat. Associated with deep (<0.7 - 1.5 m), still or slow-moving water. Juveniles prefer open, shallow aquatic habitats with dense submergent vegetation.	No known occurrences in Project area; nearest known recent occurrence is at Piney Creek, where adult CRLF were last observed in 1984 and the species is presumed to be extirpated at this location (USFWS 2002). Piney Creek is within the Merced River drainage and flows into the northwest arm of Lake McClure, 0.97 miles from Don Pedro Reservoir.

[1] Records were reviewed from the following sources: CAS (2010); CDFG (2010); MVZ (2010); USFWS (2005).

The historical range of the CRLF includes the west slope foothills of the Sierra Nevada Range, although only about six populations are known to be extant in the Sierra Nevada region, most of which contain few adults (Shaffer et al. 2004; USFWS 2006).

The CRLF occupies a fairly distinct habitat, combining both specific aquatic and riparian components. Aquatic habitat consists of low-gradient freshwater bodies, including ponds, marshes, sag ponds, dune ponds, stock ponds, lagoons, seeps, springs, and backwaters within streams and creeks, where water remains long enough for breeding and development of young to occur (i.e., a minimum of 20 weeks) (Jennings and Hayes 1994; USFWS 2006). While CRLF can occur in either seasonal or perennial streams or ponds, populations generally cannot be sustained in streams in which surface water disappears before metamorphosis (July to September) during most years. The adults require dense, shrubby or emergent riparian vegetation closely associated with deep (2 to 4.5 feet) still or slow moving water, but frogs have been observed in shallow sections of streams and ponds that are devoid of vegetative cover. Locations with the highest densities of CRLF are associated with deep-water pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha* spp.). Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. Also, the species is known to utilize well-vegetated riparian zones for foraging habitat and facilitating dispersal. During summer, CRLF often disperse from breeding habitat to forage and seek aestivation habitat if water is not available (USFWS 2002).

Telemetry and other detection methods indicate that CRLF utilize small-mammal burrows, moist leaf litter, water troughs, incised streambed channels, and other moist sites as much as 200 feet from riparian areas (Jennings and Hayes 1994; USFWS 2002, 2006, 2008). CRLF has also been found up to 100 feet from water in adjacent dense riparian vegetation. The absence or near-absence of introduced predators such as American bullfrog (*Lithobates catesbeianus*) and predatory fish, particularly centrarchids (i.e., bass and sunfishes), is generally predictive of habitat quality (Hayes and Jennings 1988). Freshwater wetlands, plunge pools in intermittent streams, seeps, and springs that are not suitable for breeding may provide habitat for aestivation, shelter, foraging, predator avoidance, and juvenile dispersal. During wet periods, long distance dispersal of up to a mile may occur between aquatic habitats, which may require traversing upland habitats or ephemeral drainages (USFWS 2006).

The Districts have not found any existing information that indicates CRLF presence within the Project Boundary or Project area; however, based on the species elevational range (below 5,000 feet), the Districts acknowledge that the absence of records for the Project area does not preclude the possibility that CRLF is present. However, the robust population of basses and sunfish in Don Pedro Reservoir may be indicative of unsuitable habitat for CRLF.

Information necessary to address the study goals include a site-specific assessment of habitat suitability for CRLF in relation to Project facilities and normal O&M activities that might affect CRLF.

5.0 Study Methods

5.1 Study Area

The study area for the CRLF habitat assessment consists of suitable aquatic habitats within the existing FERC Project Boundary and extends one mile from the Project Boundary.

5.2 General Concepts and Procedures

The following general concepts and practices apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed well in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the FERC-approved study plan in the field to accommodate actual field conditions. When minor modifications are made, the Districts field crew will follow the protocols in the FERC-approved study.
- When the Districts become aware of the need for any major variances to the FERC-approved study plan. Any modifications will be documented and reported. If the Districts become aware of the need for any major variances to the FERC-approved study plan, the Districts will issue an e-mail to appropriate resource agencies to provide an opportunity for consultation regarding how to address the situation. The Districts will describe in the final study report all variances and resolutions.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (three meter data collection accuracy under ideal conditions), or similar units. GPS data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and the Districts' relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets.
- The Districts will provide training to field crews to identify special-status species that may be encountered coincidently during the performance of this study. Training will include instructions in diagnostic features and habitat associations of such species. Field crews will also be provided laminated identification sheets showing special-status species compared to other common species that may be encountered. All incidental observations will be reported in the appropriate report. The purpose of this effort is to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel [*Dreissena polymorpha*]). This is of primary importance when moving: (1) between tributaries and

mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The steps below outline the Districts' approach to performing the study:

Step 1 - Site Assessment. Known occurrences of CRLF within the study area will first be identified, based on agency consultation, museum records, and other existing information. Locations of habitats in the study area potentially suitable for CRLF breeding will then be identified and mapped based on review of existing aerial photography or Google Earth, National Wetland Inventory (NWI) maps, on-the-ground photographs, and other pertinent GIS layers as available.

After habitat mapping is completed, field visits to potentially suitable aquatic habitat will be conducted in accordance with *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog, August 2005* (Guidance; Attachment 1; USFWS 2005). The Districts will select locations in the study area for site evaluations in order to further characterize habitats. A Habitat Site Assessment Data Sheet (Appendix D of USFWS 2005) will be completed at each site that is examined, along with photographs depicting habitat and other notable findings. Areas that do not appear to represent suitable habitat will not be field examined but will instead be characterized from aerial imagery, existing site photographs, and other existing descriptive information. CRLF are typically associated with low gradient streams (Hayes and Jennings 1988), backwaters, and lentic habitat with emergent vegetation. Large, deep backwater pool areas; ponds, and reservoir edges with appropriate vegetation characteristics may constitute suitable habitat for CRLF; other potential habitats as described in USFWS (2005) will also be considered. Locations for site evaluations will be selected as follows:

- All potential breeding locations within the existing Project Boundary.
- Representative breeding locations which are publicly accessible within 1 mile of the Project Boundary.

Aquatic habitats will be mapped and characterized by habitat type (e.g., pond, creeks, or pool), apparent seasonality, dominant vegetation type (e.g., emergent or overhanging shrubs), water depth at the time of the site assessment, bank-full depth, stream gradient (i.e., percent slope), substrate, and description of bank. The presence of fish, non-native crayfish, American bullfrog, and other incidental observations of amphibians and reptiles will be noted. Upland habitats will be characterized based on description of upland vegetation communities, land uses, and any potential barriers to CRLF movement.

Step 2 - Prepare, Format, and Quality Assurance/Quality Control Data. Following field assessment, the Districts will develop GIS maps depicting known CRLF occurrences site assessment locations, potential habitat, Project facilities and features, and other information collected during the study. Field data will then be subject to quality assurance and quality control (QA/QC) procedures, including spot-checks of transcription and comparison of GIS maps with field notes.

Step 3 - Consult with the Districts' Project O&M Staff. Project operations staff will be consulted to identify typical O&M activities of potential CRLF habitat in the study areas to identify the potential for Project activities to adversely affect CRLF.

Step 4 - Prepare Report. The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Methods; (3) Results; (4) Conclusions; and (5) Description of Variances from the FERC-approved study proposal, if any. Confidential information will not be included in the report, but provided to appropriate agencies.

This report will be submitted to USFWS, with submittals to BLM for any site assessments that take place on BLM lands. The report will include the following:

- Copies of data sheets
- Copies of field notes
- GPS data for all field reconnaissance sites
- List of known occurrences of CRLF locations within the study area
- Photographs of the reconnaissance sites including a map of photo locations
- GIS map of potential CRLF habitat
- Summaries of site habitat assessments
- Supporting data in Excel spreadsheet and GIS layers, as appropriate

Step 5 - Consult with USFWS. Districts will consult with USFWS to determine if additional data gathering is needed and to discuss the potential for Project activities to affect CRLF.

6.0 Schedule

The Districts anticipate the following schedule for completion of the study:

- Site Assessment (Step 1) .... November 2011 to March 2012
- QA/QC (Step 2) .... March 2012 to April 2012
- Consult with Districts' Project O&M Staff (Step 3) .... May 2012 to June 2012
- Prepare Report (Step 4) .... June 2012 to September 2012
- Consult with USFWS (Step 5) .... September 2012 to February 2013

7.0 Consistency of Methodology with Generally Accepted Scientific Practices

This study is consistent with the goals, objectives, and methods outlined for most recent FERC hydroelectric relicensing efforts in California where CRLF has a potential to be affected.

8.0 Level of Effort and Cost

Not yet estimated.

9.0 References Cited

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ATTACHMENTS

ATTACHMENT 1

REVISED GUIDANCE ON SITE ASSESSMENTS AND FIELD SURVEYS FOR THE CALIFORNIA RED-LEGGED FROG, AUGUST 2005

U.S. Fish and Wildlife Service

Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog

August 2005

I. Introduction

The U.S. Fish and Wildlife Service (Service) issued guidance on conducting site assessments and surveys for the California red-legged frog (*Rana aurora draytonii*) (CRF) on February 18, 1997 (1997 Guidance). Since then, the Service has reviewed numerous CRF site assessments and surveys results, accompanied wildlife biologists in the field during the preparation and performance of site assessments and CRF surveys, and consulted with species experts on the effectiveness of the 1997 Guidance. Based on our review of the information, the Service has determined that the survey portion of the 1997 Guidance is less likely to accurately detect CRF than previously thought, especially in certain portions of the species range and particularly where CRF exist in low numbers. In response to the need for new guidance, the Service has prepared this *Revised Guidance on Site Assessment and Field Surveys for the California Red-legged Frog* (Guidance).

Similar to the 1997 Guidance, two procedures are recommended in the new Guidance to accurately assess the likelihood of CRF presence in the vicinity of a project site: (1) an assessment of CRF locality records and potential CRF habitat in and around the project area and, (2) focused field surveys of breeding pools and other associated habitat to determine whether CRF are likely to be present.

Because CRF are known to use aquatic, riparian, and upland habitat, they may be present in any of these habitat types, depending on the time of year, on any given property. For sites with no suitable aquatic breeding habitat, but where suitable upland dispersal habitat exists, it is difficult to support a negative finding with the results of any survey guidance. Therefore, this Guidance focuses on site assessments and surveys conducted in and around aquatic and riparian habitat.

This Guidance was developed by the Service's Sacramento Fish and Wildlife Office in coordination with the Ventura Fish and Wildlife Office. Input by field biologists and scientists experienced in surveying for the CRF was also used in the development of this Guidance.

If the following Guidance is followed in its entirety, the results of the site assessments and surveys will be considered valid by the Service for two (2) years, unless determined otherwise on a case-by-case basis by the appropriate Service Fish and Wildlife Office. After two (2) years, new surveys conducted under the most current Service Guidance may be required, if deemed necessary by the appropriate Service Fish and Wildlife Office.

Modifications of this Guidance for specific projects or circumstances may be approved by the appropriate Fish and Wildlife Office; however, we strongly recommend that all modifications be reviewed and approved by the Service prior to implementation.

II. Permit Requirements

Unless otherwise authorized, individuals participating in site assessments and surveys for CRF may **NOT** take the California red-legged frog during the course of site assessments or survey activities. Take may only be authorized via section 7 or section 10 of the Endangered Species Act of 1973, as amended. Typically, take associated with survey activities is authorized via issuance of section 10(a)(1)(A) permits. For reference, an application for a section 10(a)(1)(A) permit is available through the appropriate Fish and Wildlife Office or online at: http://forms.fws.gov/3-200-55.pdf.

The site assessment and survey methods recommended in this Guidance do NOT require the surveyor to have a permit. As stated below, the surveyor must be otherwise qualified to conduct the surveys.

It is the responsibility of the surveyor to ensure all other applicable permits are obtained and valid (*e.g.,* state scientific collection permits), and that permission from private landowners or land managers is obtained prior to accessing a site and beginning site assessments and surveys.

III. Site Assessments

To prevent any unnecessary loss of time or use of resources, it is essential that completed site assessments be submitted to the appropriate Service Fish and Wildlife Office for review in order to obtain further guidance from the Service before conducting surveys.

<u>Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting a site assessment to prevent the spread of parasites and diseases to CRF and other amphibians.</u>

Careful evaluation of the following information about CRF and their habitats in the vicinity of a project or other land use activities is important because this information indicates the likelihood of the presence of CRF. This information will help determine whether it is necessary to conduct field surveys.

To conduct a site assessment for CRF, complete the data sheet in Appendix D and return it with any necessary supporting documentation to the appropriate Service Fish and Wildlife Office for review prior to initiating surveys. The following information is critical to completing a proper site assessment:

1. **Is the site within the current or historic range of the CRF?**

Since knowledge of the distribution of the CRF is likely to change as new locality information becomes available, biologists are expected to contact the appropriate Fish and Wildlife Office (see section IV below) to determine if a project site is within the range of this species.

2. **Are there known records of CRF at the site or within a 1.6-kilometer* (1-mile) radius of the site?**

The biologist should consult the California Natural Diversity Data Base (CNDDB) maintained by the California Department of Fish and Game's (CDFG) Natural Heritage Division as a starting point to determine if there are reported localities of CRF within a 1.6-kilometer (1-mile) radius of the site. Information on the CNDDB is attached to the end of this document. Data entry into the CNDDB is not always current nor do all surveyors submit reports to the CNDDB, thus it is essential that other information sources on local occurrences of CRF be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resource managers and biologists from municipal, State, and Federal agencies, environmental groups, and herpetologists at museums and universities. The biologist should report to the Service all known CRF records at the project site and within a 1.6-kilometer (1-mile) radius of the project boundaries. One-point-six (1.6) kilometers (1 mile) was selected as a proximity radius to a project site based on telemetry data collected by Bulger *et al.* (2003), rounded to the nearest whole mile. This distance may be subject to change when new data becomes available, or based on site-specific conditions, so it is advised that surveyors check with the appropriate Service Fish and Wildlife Office to ensure they are using the most up-to-date information.

> *** IMPORTANT**: One-point-six (1.6) kilometers (1 mile) radius is a general guideline. The appropriate Service Fish and Wildlife Office will advise surveyors of the most appropriate distance for each specific project location on a case-by-case basis.

3. **What are the habitats within the project site and within 1.6 kilometers* (1 mile) of the project boundary?**

In order to properly characterize the habitat within 1.6 kilometers (1 mile) of the project site, individuals conducting site assessments must visit the project site and as much of the surrounding habitat within 1.6 kilometers (1 mile) of the project site as possible. Aerial photographs, maps, and other resources should be consulted as well to ensure all possible accessible habitats are considered. Based on this reconnaissance assessment, the surveyor shall describe the upland and aquatic habitats within the project site and within 1.6 kilometers (1 mile) of the project boundary. The aquatic habitats should be mapped and characterized (*e.g.*, ponds vs. creeks, pool vs. riffle, ephemeral vs. permanent (if ephemeral, give date it goes dry), vegetation (type, emergent, overhanging), water depth at the time of the site assessment, bank full depth, stream gradient (percent slope), substrate, and description of bank). The presence of bullfrogs (*Rana catesbeiana*) and other aquatic predators such a centrarchid fishes (bass, perch, sunfish) should be documented even though their presence does not negate the presence of CRF. Upland habitats should be characterized by including a description of upland vegetation communities, land uses, and any potential barriers to CRF movement. The information provided in Appendix A serves as a guide to the features that will indicate possible CRF habitat.

4. Report the results of the site assessment

A site assessment report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1) Copies of the data sheet provided at Appendix D;

2) Copies of field notes and all other supporting documentation including:

   A. A list of all known CRF localities within 1.6 kilometers* (1 mile) of the project site boundaries;
   B. Photographs of the project site (photopoints shall be indicated on an accompanying map);
   C. A map of the site showing all of the habitat types and other important features as well as the location of any species detected during the site assessment within 1.6 kilometers (1 mile) of the project site boundaries. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;
   D. A description of the project and/or land use that is being proposed at the site.

Based on the information provided in the site assessment report, the Service will provide guidance on how CRF issues should be addressed, including whether field surveys are appropriate, where the field surveys should be conducted, and whether incidental take authorization should be obtained through section 7 consultation or a section 10 permit pursuant to the Endangered Species Act.

IV. Field Surveys

<u>Surveyors are encouraged to implement the decontamination guidelines provided in Appendix B before conducting surveys to prevent the spread of parasites and diseases to CRF and other amphibians.</u>

To avoid and minimize the potential of harassment or harm to CRF, no additional surveys will be conducted in an area once occupancy has been established, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

<u>The Service should be notified in writing (*e.g.*, email) by the surveyor within three (3) working</u>

days once a CRF is detected. The Service will provide guidance to the surveyor regarding the need to collect additional information such as population size, age class, habitat use, *etc*.

A. Qualifications of Surveyors

Surveyors must be familiar with the distinguishing physical characteristics of all life stages of the CRF, other anurans of California, and with introduced, exotic species such as the bullfrog and the African clawed frog (*Xenopus Laevis*) prior to conducting surveys according to this Guidance.

Surveyors must submit their qualifications to the Service along with their survey results.

A field guide should be consulted (*e.g.*, Wright and Wright 1949; Stebbins 2003) to confirm the identification of amphibians encountered during surveys. Surveyors also should be familiar with the vocalizations of the CRF and other amphibians found in California. Recordings of these vocalizations are available through various sources (*e.g.*, Davidson 1995). Surveyors that do not have experience with the species are required to obtain training on locating and identifying CRF adult, larval and egg stages before survey results are accepted. Training may include attendance at various workshops that have an emphasis on the biology of the California red-legged frog, accompanied by an appropriate level of field identification training; field work with individuals who possess valid 10(a)(1)(A) permits for the CRF; and experience working with ranids and similar taxa.

In some localities more intensive surveys (*e.g*., dip-netting larvae and adults) may be desirable to document the presence of CRF. In order to conduct such focused surveys a valid section 10(a)(1)(A) permit is required (refer to introduction section for information on how to apply for a section 10(a)(1)(A) permit). Applicants will be considered qualified for a section 10(a)(1)(A) permit if they meet the Service's most current qualification requirements. At a minimum, prospective applicants must:

1) Possess a Baccalaureate degree in biology, ecology, a resource management-related field, or have equivalent relevant experience;
2) Have completed course work in herpetology and study-design/survey-methodology or have equivalent relevant experience;
3) Have verifiable experience in the design and implementation of amphibian surveys or research or have equivalent relevant experience;
4) Have verifiable experience handling and identifying a minimum of 10 CRF, or similar ranid species, comprised of a minimum of 5 adults and a combination of larva and juveniles;
5) Obtain a minimum of 40 hours of field experience through assisting in surveys for the CRF during which positive identification is made;
6) Have familiarity with suitable habitats for the species and be able to identify the major vegetative components of communities in which California red-legged frog surveys or

research may be conducted.

7) Have familiarity with and be able to identify native and non-native amphibians that may co-occur with the listed species.

B. Survey Periods

Surveys may begin anytime during January and should be completed by the end of September. Multiple survey visits conducted throughout the survey-year (January through September) increases the likelihood of detecting the various life stages of the CRF. For example, adult frogs are most likely to be detected at night between January 1 and June 30, somewhere in the vicinity of a breeding location, whereas, sub-adults are most easily detected during the day from July 1 through September 30.

Due to the geographic and yearly variation in egg laying dates, it is not possible to specify a range of dates that is appropriate for egg surveys throughout the range of the CRF. The following table summarizes the best approximated times to survey for CRF egg masses.

Geographic Area	Best Survey Period*
Northern California along the coast and interior to the Coast Range (north of Santa Cruz County)	January 1 and February 28
Southern California along the coast and interior through the Coast Range (south of, and including Santa Cruz County)	February 25 and April 30
Sierra Nevada Mountains and other high-elevation locations	Should not begin before April 15

Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval prior to conducting the surveys.

Survey Methodology

This Guidance recommends a total of **<u>up to</u>** eight (8) surveys to determine the presence of CRF at or near a project site. Two (2) day surveys and four (4) night surveys are recommended during the breeding season; one (1) day and one (1) night survey is recommended during the non-breeding season. Each survey must take place at least seven (7) days apart. At least one survey must be conducted prior to August 15th. The survey period must be over a minimum period of 6 weeks (*i.e.,* the time between the first and last survey must be at least 6 weeks). Throughout the species' range, the non-breeding season is defined as between July 1 and September 30.

If CRF are identified at any time during the course of surveys, no additional surveys will be conducted in the area, unless the surveying effort is part of a Service-approved project to determine actual numbers of frogs at a site.

The following methodology shall be followed unless otherwise specified, or approved by the appropriate Service Fish and Wildlife Office:

1) Upon arrival at the survey site, surveyors should listen for a few minutes for frogs calling, prior to disturbing the survey site by walking or looking for eye shine using bright lights. If CRF calls are identified, the surveyor should note this information on the survey data sheet and note the approximate location of the call. Once the survey begins, the surveyor should pay special attention to the area where the call originated in an attempt to visually identify the frog.

2) The most common method of surveying for CRF is the visual-encounter survey. This survey is conducted either during daylight hours or at night by walking entirely around the pond or marsh or along the entire length of a creek or stream while repeatedly scanning for frogs. This procedure allows one to scan each section of shore from at least two different angles. Surveyors should begin by first working along the entire shoreline, then by entering the water (if necessary and no egg masses would be crushed or disturbed), and visually scanning all shoreline areas and all aquatic habitats identified in the site assessment. Generally, surveyors shall focus on all open water to at least 2 meters (6.5 feet) up the bank. When wading, surveyors must take maximum care to avoid disturbing sediments, vegetation, or larvae. When walking on the bank, surveyors shall take care to not crush rootballs, overhanging banks, and stream-side vegetation that might provide shelter for frogs. Surveys must cover the entire area, otherwise the remaining survey area must be surveyed the next day/night that weather conditions allow (both visits would constitute one day/night survey).

3) Day surveys may be conducted on the same day as a night survey.

   The main purpose of day surveys during the breeding season is to look for larvae, metamorphs, and egg masses; the main purpose of day surveys during the non-breeding season is to look for metamorphosing sub-adults, and non-breeding adults. Daytime surveys shall be conducted between one hour after sunrise and one hour before sunset.

4) Night surveys

   The main purpose of night surveys is to identify and locate adult and metamorphosed frogs. Conditions and requirements for conducting night surveys are as follows:

   A. Night surveys must commence no earlier than one (1) hour after sunset.
   B. Due to diminished visibility, surveys should not be conducted during heavy rains, fog, or other conditions that impair the surveyor’s ability to accurately locate and identify frogs.
   C. Nighttime surveys shall be conducted with a Service-approved light such as a Wheat Lamp, Nite Light, or sealed-beam light that produces less than 100,000 candle watt. Lights that the Service does not accept for surveys are lights that are either too dim or too bright. For example, Mag-Light-type lights and other

types of flashlights that rely on 2 or 4 AA's/AAA's, 2 C's or 2 D batteries. Lights with 100,000 candle watt or greater are too bright and also would not meet Service requirements.

D. The Service approved light must be held at the surveyor's eye level so that the frog's eye shine is visible to the surveyor.
E. The use of binoculars is a must in order to effectively see the eye shine of the frogs. Surveys conducted without the use of binoculars may call in to question the validity of the survey.

5) Weather conditions.

Weather and visibility conditions must be consistent throughout the duration of the survey; if weather conditions become unsuitable, the survey must be completed at another time when conditions are better suited to positively locating and identifying frogs. Suitable conditions are as follows:

A. Air temperature at the survey site must be at least 10 degrees Celsius (50 degrees Fahrenheit). Frogs are less likely to be active when temperatures are below 10 degrees Celsius (50 degrees Fahrenheit).
B. Wind speed must not exceed 8 kilometers/hour (5 miles/hour) at the survey site. High wind speeds affect temperatures and the surveyor's ability to hear frogs calling.
C. Surveys must be conducted under clear to partly cloudy skies (high clouds are okay) but not under dense fog or during heavy rain, as stated above. Surveys may be conducted during light rains.

Surveyors should carefully consider weather conditions prior to initiating a survey. Ask yourself, "Can I collect accurate, reliable data under the existing weather conditions" prior to proceeding with the survey. Weather conditions will be taken into account when the data is reviewed by the appropriate Service Fish and Wildlife Service Office.

6) Decontamination of equipment

In an effort to minimize the spread of terrestrial and aquatic pathogens, all aquatic survey equipment including chest waders, wet suits, float tubes, kayaks, shall be decontaminated before entering potential CRF habitat using the guidelines in Appendix B. Careful attention shall be taken to remove all dirt from boots, chest waders, wetsuits, float tubes, kayaks, and other equipment before placing equipment into the water.

7) Unidentified larvae, sub-adults, and adults

If the larval life stage is the only life stage detected and the larvae are not identified to species (or similarly, if sub-adult or adult frogs are observed but not identified to species), the surveyor must either return to the habitat to identify the frog in another life stage or obtain the appropriate permit (*e.g.*, section 10(a)(1)(A) permit) authorization allowing the surveyor to handle CRF and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

8) Reporting results of the surveys

A species survey report shall be provided to the appropriate Fish and Wildlife Office for review. Reports should include, but are not limited to, the following information:

1. Copies of the data sheets provided at Appendix E;

2. Copies of field notes and all other supporting documentation including:

    A. Photographs of all CRF observed during the survey and of the habitat where each individual was located, if possible without harming or harassing the individual;
    B. A map of the site showing the location of any species detected during the survey. Maps shall be either copies of those portions of the U.S. Geological Service 7.5-minute quadrangle map(s) *or* geographic information system (GIS) data;

Based on the information provided in the site assessment report and the survey results, the Service will provide guidance on how CRF issues should be addressed through the section 7 or section 10 processes.

All information on CRF distribution resulting from field surveys shall be sent to the California Natural Diversity Database (CNDDB). CNDDB forms shall be completed, as appropriate, for each listed species identified during the survey(s) and submitted to the California Department of Fish and Game, Wildlife Habitat Data Analysis Branch, 1807 13th Street, Suite 202, Sacramento, California 95814, with copies submitted to the appropriate Service Fish and Wildlife Office. Each form sent to the CDFG shall have an accompanying 1:24,000 scale USGS map (or an exact scale photocopy of the appropriate portion(s) of the map) -or- Global Information System (GIS) data coverage of the site. Copies of the form can be obtained from the CDFG at the above address (telephone: 916-324-3812) or online at: http://www.dfg.ca.gov/whdab/html/animals.html. Additional information about the CNDDB is available in Appendix C.

The Service may not accept the results of field surveys conducted under this Guidance for any of the following reasons:

A. if the appropriate Service Fish and Wildlife Office was not contacted to review the results of the site assessment prior to field surveys being conducted;
B. if field surveys were conducted in a manner inconsistent with this Guidance or with

survey methods not previously approved by the Service;

C. if field surveys were incomplete;
D. if surveyors were not adequately qualified to conduct the surveys;
E. if the reporting requirements, including submission of CNDDB forms, were not fulfilled.

IV. Service Contacts

There are three Service Fish and Wildlife Offices within the range of the CRF (see Map 1). The appropriate office to contact regarding site assessments or survey authorization depends on the location where the surveys are to be conducted.

For project sites and land use activities in Santa Cruz, Monterey, San Benito, San Luis Obispo, Santa Barbara, and Ventura Counties, portions of Los Angeles and San Bernardino Counties outside of the Los Angeles Basin, and portions of Kern, Inyo and Mono Counties east of the Sierra Crest and south of Conway Summit, contact:

Ventura Fish and Wildlife Office,
2493 Portola Road, Suite B
Ventura, California, 93003
(805/644-1766).

For project sites and land use activities in all other areas of the State south of the Transverse Ranges, contact:

Carlsbad Fish and Wildlife Office
Attn: Recovery Permit Coordinator
6010 Hidden Valley Road
Carlsbad, California, 92009
(760/431-9440).

For project sites and land use activities in all other areas of the State, contact:

Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825
(916/414-6600).
(916/414-6713, fax)

For information on section 10(a)(1)(A) recovery permits, contact:

Regional Office,
Eastside Federal Complex
911 N.E., 11th Avenue
Portland, Oregon 97232-4181
(503/231-6241)

* These are independent offices overlapping with the Sacramento Fish and Wildlife Office. Their work primarily focuses on salmonid restoration, fishery monitoring and Forest Plan Implementation.

Map 1. Map of California showing jurisdictional boundaries of Service Fish and Wildlife Offices.

References

Davidson, C. 1995. Frog and toad calls of the Pacific Coast: Vanishing Voices. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York. 27 pp. +1 cassette.

Stebbins, R.C. 2003. A field guide to western reptiles and amphibians. Third edition. Houghton Mifflin Company, New York, New York. 533 pp.

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Appendix A.
California red-legged frog identification and ecology.

1. Identification

The following information may aid surveyors in the identification of California red-legged frogs and similar species. However, all surveyors are expected to consult field guides (Wright and Wright 1949; Davidson 1995; Stebbins 2003) for further information.

General Description
The California red-legged frog (*Rana aurora draytonii*), is a relatively large aquatic frog ranging from 4 to 13 centimeters (1.5 to 5 inches) from the tip of the snout to the vent. From above, the California red-legged frog can appear brown, gray, olive, red or orange, often with a pattern of dark flecks or spots. The skin usually does not look rough or warty. The back of the California red-legged frog is bordered on either side by an often prominent dorsolateral fold of skin running from the eye to the hip. The hindlegs are well-developed with large webbed feet. A cream, white, or orange stripe usually extends along the upper lip from beneath the eye to the rear of the jaw. The undersides of adult California red-legged frogs are white, usually with patches of bright red or orange on the abdomen and hindlegs. The groin area can show a bold black mottling with a white or yellow background.

Adults
Positive diagnostic marks should be used to accurately distinguish California red-legged frogs from other species of frogs that may be observed. A positive diagnostic mark is an attribute of the animal that will not be found on any other animal likely to be encountered at the same locality. The following features are positive diagnostic marks that, if observed, will distinguish California red-legged frogs from foothill yellow-legged frogs (*Rana boylii)* and bullfrogs *(Rana catesbeiana)*:

a. Prominent dorsolateral folds (thick upraised fold of skin running from eye to hip) on any frog greater than 5 centimeters (2 inches) long from snout to vent. Young yellow-legged frogs can show reddish folds; these usually fade as the frogs mature.

b. Bright red dorsum.

c. Well defined stripe as described above running along upper lip.

Since California red-legged frogs are often confused with bullfrogs, surveyors should note those features that might be found on bullfrogs that will rarely be observed on California red-legged frogs. These features are:

a. Absence of the dorsolateral fold.
b. Bright yellow on throat.
c. Uniform bright green snout.
d. Tympanum (ear disc) distinct and much larger than eye.

Please note that some frogs may lack all of the above characteristics given for both California red-legged frogs and bullfrogs. Surveyors should regard such frogs as unidentified, unless it is clearly identified as another species.

California red-legged frogs are cryptic because their coloration tends to help them blend in with their surroundings, and they can remain immobile for great lengths of time. When an individual California red-legged frog is disturbed, it may jump into the water with a distinct “plop.” The California red-legged frog may do this either when the surveyor is still distant or when a surveyor is very near. Bullfrogs exhibit similar behavior but will often emit a “squawk” as they dive into the water. Because a California red-legged frog is unlikely to make such a sound, a “squawk” from a fleeing frog will be considered sufficient to positively identify the frog as a bullfrog.

Larvae
Tadpoles may be trapped and handled only by those with a valid 10(a)1(A) permit. California red-legged frog larvae range from 14 to 80 millimeters (0.5 to 3.25 inches) in length. They are greenish to generally brownish color with darker marbling and lack distinct black or white spotting or speckling. Large California red-legged frog larvae often have a wash of red coloration on their undersides and a very small single row of evenly spaced whitish or gold flecks along the side where the dorsolateral fold will develop. Other features to look for to identify California red-legged frog larvae include: eyes set well in from the outline of the head (contrasts with treefrogs (*Hyla* spp.)), oral papillae on both the sides of the mouth and the bottom of the mouth (contrasts with *Bufo* spp.), well developed oral papillae on the sides of the mouth (contrasts with other subspecies of red-legged frogs (*Rana aurora* spp.) and spadefoot toads (*Scaphiopus* spp.)), generally mottled body and tail with few or no distinct black spots on tail fins (contrasts with bullfrogs), and two to three tooth rows on the top and bottom (contrasts with foothill yellow-legged frogs).

Eggs
California red-legged frogs breed during the winter and early spring from as early as late November through April and May. Adults engage in courtship behaviors that result in the female depositing from 2,000 to 6,000 eggs, each measuring between 2 and 3 millimeter (0.1 inches). California red-legged frog eggs are typically laid in a mass attached to emergent vegetation near the surface of the water, where they can be easily dislodged. However, egg masses have been detected lying on the bottom of ponds. The egg mass is well defined and

about the size of a softball. Eggs hatch within 6 to 14 days after deposition at which time the newly hatched larvae are delicate and easily injured or killed. California red-legged frog larvae transform into juvenile frogs in 3.5 to 7 months.

During the time that red-legged frog egg surveys are conducted, other amphibian eggs may be found including those of Pacific treefrogs, spadefoot toads, California tiger salamanders, and newts. Bullfrogs and foothill yellow-legged frogs lay their eggs later in the season. Field guides should be consulted for additional information on egg identification.

2. Habitat

California red-legged frogs occur in different habitats depending on their life stage, the season, and weather conditions. Rangewide, and even within local populations, there is much variation in how frogs use their environment; in some cases, they may complete their entire life cycle in a particular habitat (*i.e.,* a pond is suitable for all life stages), and in other cases, they may seek multiple habitat types (U.S. Fish and Wildlife Service 2002).

Breeding habitat
All life history stages are most likely to be encountered in and around breeding sites, which are known to include coastal lagoons, marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds. California red-legged frog eggs are usually found in ponds or in backwater pools in creeks attached to emergent vegetation such as *Typha* and *Scirpus*. However, they have been found in areas completely denuded of vegetation. Creeks and ponds where California red-legged frogs are found most often have dense growths of woody riparian vegetation, especially willows (*Salix* spp.) (Hayes and Jennings 1988). The absence of *Typha, Scirpus,* and *Salix* at an aquatic site does not rule out the possibility that the site provides habitat for California red-legged frogs, for example stock ponds often are lacking emergent vegetation yet they provide suitable breeding habitat. California red-legged frog larvae remain in these habitats until metamorphosis in the summer months (Storer 1925; Wright and Wright 1949). Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds.

Summer habitat
California red-legged frogs often disperse from their breeding habitat to forage and seek summer habitat if water is not available. In the summer, California red-legged frogs are often found close to a pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also take shelter in small mammal burrows and other refugia on the banks up to 100 meters from the water any time of the year and can be encountered in smaller, even ephemeral bodies of water in a variety of upland settings (Jennings and Hayes 1994; U.S. Fish and Wildlife Service 2002).

Upland habitat
California red-legged frogs are frequently encountered in open grasslands occupying seeps and

springs. Such bodies may not be suitable for breeding but may function as foraging habitat or refugia for dispersing frogs. During periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats (U.S. Fish and Wildlife Service 2002).

3. Movement

California red-legged frogs may move up to 3 kilometers (1.88 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water (Rathbun *et al.* 1993). Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger 1998). California red-legged frogs have been observed to make long-distance movements that are straight-line, point to point migrations rather than using corridors for moving in between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions. On rainy nights California red-legged frogs may roam away from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from the water after the first winter rains, causing sites where California red-legged frogs were easily observed in the summer months to appear devoid of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year.

References for Appendix A

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Appendix B.
Recommended Equipment Decontamination Procedures

In an effort to minimize the spread of pathogens that may be transferred as result of activities, surveyors should follow the guidance outlined below for disinfecting equipment and clothing after entering a pond and before entering a new pond, unless the wetlands are hydrologically connected to one another:

i. All organic matter should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water or potentially contaminated sediments. Cleaned items should be rinsed with clean water before leaving each study site.

ii. Boots, nets, traps, hands, *etc*. should be scrubbed with either a 75% ethanol solution, a bleach solution (0.5 to 1.0 cup per 1.0 gallon of water), Quat-128™ (1:60), or a 6% sodium hypochlorite 3 solution. Equipment should be rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided (*e.g.,* clean in an area at least 100 feet from aquatic features). Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

iii. Used cleaning materials (liquids, *etc*.) should be disposed of safely, and if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

iv. Additionally, the surveyors shall implement the following when working at sites with known or suspected disease problems: disposable gloves should be worn and changed between handling each animal. Gloves should be wetted with water from the site or distilled water prior to handling any amphibians. Gloves should be removed by turning inside out to minimize cross-contamination.

Appendix C.
General instructions for filling out CNDDB field survey forms

The Natural Diversity Data Base (NDDB) is the largest, most comprehensive database of its type in the world. It presently contains more than 33,000 site specific records on California's rarest plants, animals, and natural communities. The majority of the data collection effort for this has been provided by an exceptional assemblage of biologists throughout the state and the west. The backbone of this effort is the field survey form. We are enclosing copies of Natural Diversity Data Base (NDDB) field survey forms for species and natural communities. We would greatly appreciate you recording your field observations of rare, threatened, endangered, or sensitive species and natural communities
(elements) and sending them to us on these forms.

We are interested in receiving forms on elements of concern to us; refer to our free publications: *Special Plants Lis*t, *Special Animals List,* and *Natural Communities List* for lists of which elements these include. Reports on multiple visits to sites that already exist in the NDDB are as important as new site information as it helps us track trends in population/stand size and condition. Naturally, we also want information on new sites. We have enclosed an example of a field survey form that includes the information we like to see. It is especially important to include a xeroxed portion of a USGS topographic quad with the population/stand outlined or marked (see back of enclosed example).

Without the map, your information will be mapped less accurately, as written descriptions of locations are frequently hard to interpret. Do not worry about filling in every box on the form; only fill out what seems most relevant to your site visit. Remember that your name and telephone number are very important in case we have any questions about the form.

If you are concerned about the sensitivity of the site, remember that the NDDB can label your element occurrence "Sensitive" in the computer, thus restricting access to that information. The NDDB is only as good as the information in it, and we depend on people like you as the source of that information. Thank you for your help in improving the NDDB.

Copies of the NDDB form can be obtained from the CDFG at the above address (telephone: 916-324-3812) *or* online at: http://www.dfg.ca.gov/whdab/html/animals.html.

Appendix D.
California Red-legged Frog Habitat Site Assessment Data Sheet

This data sheet is to assist in the data collection of California red-legged frog habitat in the vicinity of projects or other land use activities, following the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance), issued by the U.S. Fish and Wildlife Service. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance.

The “Site Assessments” section of the Guidance details the data needed to complete a site assessment. When submitting a complete site assessment to the Service (one that has been done following the Guidance), one data sheet should be included for each aquatic habitat identified. If multiple aquatic habitats are identified within the project site, then multiple data sheets should be completed. A narrative description of the aquatic, riparian, and upland habitats should be provided to characterize the breeding habitat within the project site and the breeding and dispersal habitat within 1.6 kilometers (1 mile) of the project site. In addition to completing this data sheet, field notes, photographs, and maps should be provided to the appropriate Fish and Wildlife Service Office, as requested in the “Site Assessments” section of the Guidance.

Appendix D.

California Red-legged Frog Habitat Site Assessment Data Sheet

Site Assessment reviewed by_____________________ _________ ______________________________

(FWS Field Office) **(date)** **(biologist)**

Date of Site Assessment: _______________

(mm/dd/yyyy)

Site Assessment Biologists: _________________________ _________________________

(Last name) **(first name)** **(Last name)** **(first name)**

_________________________ _________________________

(Last name) **(first name)** **(Last name)** **(first name)**

Site Location:____

(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ____

Brief description of proposed action:

1) Is this site within the current or historic range of the CRF (circle one)? YES NO

2) Are there known records of CRF within 1.6 km (1 mi) of the site (circle one)? YES NO

If yes, attach a list of all known CRF records with a map showing all locations.

GENERAL AQUATIC HABITAT CHARACTERIZATION

(if multiple ponds or streams are within the proposed action area, fill out one data sheet for each)

POND:

Size: ___________________________ Maximum depth: ________________

Vegetation: emergent, overhanging, dominant species: _____________________________

____

____

Substrate: ____

____

Perennial or Ephemeral *(circle one).* If ephemeral, date it goes dry: ________________________

Appendix D.

California Red-legged Frog Habitat Site Assessment Data Sheet

STREAM:

Bank full width: ________________

Depth at bank full: ______________

Stream gradient: ________________

Are there pools (circle one)? YES NO

If yes,

Size of stream pools: ________________________

Maximum depth of stream pools: ______________

Characterize non-pool habitat: run, riffle, glide, other: ___________________________

____

____

Vegetation: emergent, overhanging, dominant species: ___________________________

____

____

Substrate: ____

____

Bank description: ____

____

____

Perennial or Ephemeral *(circle one)*. If ephemeral, date it goes dry: _______________________

Other aquatic habitat characteristics, species observations, drawings, or comments:

Necessary Attachments:

1. All field notes and other supporting documents
2. Site photographs
3. Maps with important habitat features and species location

Appendix E.
California Red-legged Frog Survey Data Sheet

This data sheet is to assist in the data collection during surveys for California red-legged frogs in areas with potential habitat. This data sheet is intended to assist in the preparation of a final report on the field surveys as detailed in the August 2005, *Revised Guidance on Site Assessment and Field Surveys for California Red-legged Frogs* (Guidance) issued by the U.S. Fish and Wildlife Service (Service). Before completing this data sheet, a site assessment should have been conducted using the Guidance and the Service should have been contacted to determine whether surveys are required. Prior to collecting the data requested on this form, the biologist should be familiar with and understand the Guidance. To avoid and minimize the potential of harassment to California red-legged frogs, all survey activities shall cease once an individual California red-legged frog has been identified in the survey area, unless prior approval has been received from the appropriate Service Fish and Wildlife Office. The Service shall be notified within three (3) working days by the surveyor once a California red-legged frog is detected, at which point the Service will provide further guidance. Surveys should take place in consecutive breeding/non-breeding seasons (*i.e.*, the entire survey period, including breeding and non-breeding surveys should not exceed 9 months). It is important that both the breeding and non-breeding survey be conducted during the time period specified in the Guidance. Site specific conditions may warrant modifications to the timing of survey periods, modifications must be made with the Service's approval. The survey consists of two (2) day and four (4) night surveys during the breeding season and one (1) day and one (1) night surveys during the non-breeding season.

All California red-legged frog life stages should be surveyed for. Surveyors may detect larvae but not be able to identify this life stage to species as handling any life stage of the California red-legged frog necessitates a valid 10(a)(1)(A) permit. If the larval life stage is the only life stage detected and the larvae are not identified to species, the surveyor must either return to the habitat to identify the frog in another life stage or have a valid 10(a)(1)(A) permit allowing the surveyor to handle California red-legged frogs and larvae. In order for the Service to consider a survey to be complete, all frogs encountered must be accurately identified.

Appendix E.
California Red-legged Frog Survey Data Sheet

Survey results reviewed by____________________ ________ ______________________________
(FWS Field Office) (date) (biologist)

Date of Survey: __________ **(mm/dd/yyyy)**

Survey Biologist: __________________________________
(Last name) (first name)

Survey Biologist: __________________________________
(Last name) (first name)

Site Location:____
(County, General location name, UTM Coordinates or Lat./Long. or T-R-S).

****ATTACH A MAP** (include habitat types, important features, and species locations)**

Proposed project name: ____
Brief description of proposed action:

Type of Survey (circle one): **DAY NIGHT BREEDING NON-BREEDING**

Survey number (circle one): **1 2 3 4 5 6 7 8**

Begin Time:_________________________ **End Time:**__________________________

Cloud cover:_________________________ **Precipitation:**________________________

Air Temperature:_____________________ **Water Temperature:**__________________

Wind Speed:_________________________ **Visibility Conditions:**_________________

Moon phase:_________________________ **Humidity:**___________________________

Description of weather conditions: ____
____

Brand name and model of light used to conduct surveys: ______________________________

Were binoculars used for the surveys (circle one)**?** **YES NO**
Brand, model, and power of binoculars: ____

Appendix E.
California Red-legged Frog Survey Data Sheet

AMPHIBIAN OBSERVATIONS

Species	# of indiv.	Observed (O) Heard (H)	Life Stages	Size Class	Certainty of Identification

Describe potential threats to California red-legged frogs observed, including non-native and native predators such as fish, bullfrogs, and raccoons: ______________________________________

____

____

____

____

Other notes, observations, comments, *etc.*

Necessary Attachments:

4. All field notes and other supporting documents
5. Site photographs
6. Maps with important habitat features and species locations

ATTACHMENT 2

CALIFORNIA NATIVE SPECIES FIELD SURVEY FORM

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): ____________

For Office Use Only

Source Code	____	Quad Code	____
Elm Code	____	Occ. No.	____
EO Index No.	____	Map Index No.	____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name:

Common Name:

Species Found? ☐ Yes ☐ No ____________ If not, why?

Total No. Individuals ______ Subsequent Visit? ☐ yes ☐ no

Is this an existing NDDB occurrence? ______ (Yes, Occ. #) ☐ no ☐ unk.

Collection? If yes: ______ (Number) ____________ (Museum / Herbarium)

Reporter: ____________

Address: ____________

E-mail Address: ____________

Phone: ____________

Plant Information

Phenology: ____% vegetative ____% flowering ____% fruiting

Animal Information

____ # adults ____ # juveniles ____ # larvae ____ # egg masses ____ # unknown

☐ wintering ☐ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: ____________ Landowner / Mgr.: ____________

Quad Name: ____________ Elevation: ____________

T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): ____________

T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐ GPS Make & Model ____________

DATUM: **NAD27** ☐ **NAD83** ☐ **WGS84** ☐ Horizontal Accuracy ____________ meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☐ ***OR*** Geographic (Latitude & Longitude) ☐

Coordinates:

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use:

Visible disturbances:

Threats:

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): ____________
- ☐ Compared with specimen housed at: ____________
- ☐ Compared with photo / drawing in: ____________
- ☐ By another person (name): ____________
- ☐ Other: ____________

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

ATTACHMENT 6-7

ESA-LISTED WILDLIFE - VALLEY ELDERBERRY LONGHORN BEETLE STUDY PLAN

DRAFT

ATTACHMENT 6-7

**TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT**

**DON PEDRO PROJECT
FERC NO. 2299**

ESA-Listed Wildlife - Valley Elderberry Longhorn Beetle Study Plan

February 2011

1.0 Project Nexus and Issue

Certain aspects of the on-going operation and maintenance (O&M) of the Don Pedro Project (Project) may potentially affect valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) (VELB) populations. Project O&M activities including vegetation management and routine maintenance at Project facilities may disrupt VELB habitat. This study focuses on the presence of VELB habitat, which may potentially be affected by Project O&M and/or Project-related recreation activities.

VELB is a terrestrial wildlife species that is listed as threatened (FT) under the federal Endangered Species Act (ESA). VELB has a reasonable potential to occur in the Project Boundary and may be affected by certain Project O&M or recreation activities.

2.0 Agency Resource Management Goals

The U.S. Fish and Wildlife Service (USFWS) administers the ESA as it relates to VELB. Potential impacts to VELB are also of interest to the Bureau of Land Management (BLM) on federal lands administered by the BLM. Therefore, both USFSW and BLM have management responsibility related to VELB.

USFWS has issued conservation guidelines for the beetle (USFWS 1999), which include survey protocols and compensation requirements for elderberries with one or more stems measuring 1.0 inch or greater in diameter at ground level that may be directly or indirectly impacted by the construction or operation of a project. Where impacts to plants are anticipated as a result of an action, elderberry plants with stems that meet the 1.0-inch-diameter threshold on or adjacent to the site must be thoroughly searched for beetle exit holes and the number of stems tallied by diameter size class and location (i.e., riparian or upland) for determination of compensation ratios. Elderberry plants lacking stems 1.0 inch or greater in diameter at ground level are considered unsuitable for use by the beetle and are not protected under the guidelines. Surveys are valid for a period of two years.

The BLM's resource management goals are consistent with the ESA and BLM implementing policy. The ESA, Section 7(a)(1) states:

> *All federal agencies shall… utilize their authorities in furtherance of the purposes of this Act, by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.*

BLM's implementing policy for ESA compliance in Manual 6840 states:

> *Policy. Actions authorized by BLM shall further the conservation and/or recovery of federally listed species…*
>
> *Section 7(a)(1) (Conservation Programs). Section 7(a)(1) requires the BLM to use its authorities to further the purposes of the ESA by implementing programs for the conservation of threatened and endangered species and the ecosystems on which they depend. Ways in which BLM can carry out these responsibilities include, but are not limited to:*
>
> *Determining to the extent practicable, the occurrence, distribution, population, and habitat condition of all ESA-listed species on BLM-administered lands…*
>
> *Monitoring and evaluating ongoing management activities to ensure conservation objectives for listed species are being met (BLM 2008a).*

BLM's Sierra Resource Management Plan (SRMP) (BLM 2008b) provides general guidelines for sustaining existing VELB populations on BLM land and sustaining and managing viable habitat for VELB through conservation and management of its host plant, elderberry.

3.0 Study Goals

The goal of this study is to provide information to the relicensing participants concerning VELB presence and distribution within the Project Boundary. The specific objective of this study is to gather information, including:

- Identify and map the location of appropriate elderberry shrubs.
- Classify habitat where shrubs are found into riparian or non-riparian, and whether shrubs are isolated or clumped.
- Document the presence or absence of VELB or evidence of VELB when surveys are performed.

4.0 Existing Information and Need for Additional Information

VELB ranged historically throughout the Central Valley, extending upstream in river canyons in the Sierra Nevada foothills to an elevation of about 3,000 feet. The beetle is completely dependent upon its host plant, elderberry, which is a common component of the remaining riparian forests and adjacent uplands. The beetles' use of elderberries is not readily apparent; often the only exterior evidence is an exit hole created by the larva just prior to pupation. The life cycle takes one or two years to complete with most of that time spent as larva living within the stems of the plant. Adults generally emerge from late March through June, and adults are short-lived (USFWS 1999).

All existing and available information regarding previous surveys in the Project are outdated. The Districts located a total of four California Natural Diversity Database (CNDDB) reports spanning from 2000 to 2007. These reports pertained to two occurrences in each of two USGS 7.5-minute quadrangles: Sonora and Standard. Of these, two are reported VELB sightings and two are reports of VELB exit holes (CDFG 2010). None of the reported occurrences are located in the Project Boundary.

Existing information is not adequate to meet the goal of the study. Information necessary to address the study goal includes a current assessment of elderberry plants and VELB in the Project.

5.0 Study Methods

5.1 Study Area

The study area consists of the area within the Project Boundary where Project O&M and/or recreation activities may potentially impact VELB habitat. Specifically, the study will be performed within the following study sites:

- 100 feet around developed recreation facilities and regularly used undeveloped recreation sites
- 60 feet around intakes, gatehouses, surge tanks, adits, portals and microwave/radar towers and other Project facilities
- 30 feet around ancillary support facilities including stream gages and weirs
- 25 feet from centerline of access roads within the Project Boundary
- 20 feet around the perimeter of powerhouses and switchyards
- 20 feet from centerline of managed trails

5.2 General Concepts

These general concepts apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If minor modifications are made, the field crews will follow the protocols in this study plan. These modifications will be documented and reported in the draft study reports.
- When the Districts become aware that major variances made be needed to the study plan, the Districts will issue an e-mail to appropriate resource agencies to provide an opportunity

for consultation regarding how to address the variance. The Districts will describe all variances and resolutions in the final study report.

- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.
- The Districts will provide training to field crews to identify species that may be encountered during the performance of this study. Training will include instructions in diagnostic features and habitat associations of such species. Field crews will also be provided laminate identification sheets showing special-status species compared to other common species that may be encountered. All incidental observations will be reported. The purpose of this effort is to opportunistically gather data during the performance of the study. For all special-status species observations, the Districts will complete the appropriate CNDDB form or spreadsheet and transmit the form to the CNDDB. Districts will provide a copy of the CNDDB form or spreadsheet to BLM.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

For all ESA-listed species observations, the Districts will complete the appropriate CNDDB form or spreadsheet and transmit the form to the CNDDB. The Districts will provide a copy of the CNDDB form or spreadsheet to BLM if VELB is located on BLM-administered lands.

5.3 Study Methods

The study will be completed in six steps, each of which is described below.

<u>Step 1 - Known Occurrences.</u> The Districts will identify and map known occurrences of elderberry plants and VELB within the study area.

<u>Step 2 - Conduct Field Surveys for Elderberry Plants.</u> In conjunction with the Special-Status Plants Study, the Districts will document all occurrences of elderberry within the study area with GPS and take photographs of each occurrence. Occurrences will be documented by classifying the largest stem at ground level of the shrub into one of three categories: (1) greater than or equal to one inch but less than or equal to three inches; (2) greater than three inches but less than five inches; and (3) greater than five inches. Classify the habitat surrounding the shrub as either riparian or non-riparian. Indicate whether the shrub was isolated or part of a larger clump.

<u>Step 3 - Conduct Surveys for Evidence of VELB.</u> All elderberry shrubs with one or more stems measuring 1.0 inch or greater in diameter at ground level that occur within the study area must be thoroughly searched for beetle exit holes (external evidence of beetle presence). The exit holes should be characterized as to whether they are recent (shavings may be present) or not.

Incidental observations of VELB on the plants will be noted and reported to the appropriate agencies (see Section 6.0).

Step 4 - Compile Data and Perform Quality Assurance/Quality Control. Following field surveys, the Districts will develop GIS maps depicting VELB occurrences, potential habitat, Project facilities, and features, and other information collected during the study. Field data will then be subject to quality assurance and quality control (QA/QC) procedures, including spot-checks of transcription and comparison of GIS maps with field notes on locations of any VELB occurrences.

Step 5 - Consult with the Districts' Project Operations and DPRA Staff. Once the locations of VELB and habitat in the study area are defined, Project operations and DPRA staff will be consulted to identify O&M and recreation activities in those areas that may have the potential to adversely affect the population.

Step 6 - Prepare Report. The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Methods; (3) Results; (4) Conclusions; and (5) Description of Variances from the FERC-approved study proposal, if any. Confidential information will not be included in the report, but provided to appropriate resource agencies.

6.0 Study-Specific Consultation

The Districts, as FERC's non-federal representatives, intend to undertake this study as part of their informal consultation under Section 7 of the ESA, and plan to consult with USFWS prior to, during, and following study implementation.

7.0 Schedule

The Districts anticipate the following schedule for completion of the study plan.

- Planning (Step 1) .... January-March 2012
- Field Season (Step 2).. March-July 2012
- Compile Data and QA/QC Review (Steps 3 and 4) .... August 2012
- Operations and DPRA Staff Consultation (Step 4) .... August 2012
- Study Report Preparation (Step 5) .... September-December 2012

8.0 Consistency of Methodology with Generally Accepted Scientific Principles

This study is consistent with the goals, objectives, and methods outlined for recent FERC hydroelectric relicensing efforts in California, and uses methods from the USFWS, BLM, and other expert sources.

9.0 Level of Effort and Cost

Not yet estimated.

10.0 References Cited

California Department of Fish and Game. 2010. Biogeographic Data Branch. California Natural Diversity Database (CNDDB). [Online] URL: www.dfg.ca.gov/biogeodata/cnddb/ pdfs/TEPlants.pdf. (Accessed July 6, 2010.)

USDOI, Bureau of Land Management. 2008a. BLM Manual 6840 - Special Status Species Management.

——. 2008b. Sierra Resource Management Plan and Record of Decision. February 2008. Folsom, California.

USDOI, U.S. Fish and Wildlife Service. 1988. Endangered Species Act of 1973 [(16 U.S.C. 1531-1544, 87 Stat. 884)], as amended through the 100th Congress

——. 1999. Conservation Guidelines for the Valley Elderberry Longhorn Beetle. U.S. Fish and Wildlife Service, Sacramento, California.

ATTACHMENT 6-8

ESA- AND CESA-LISTED PLANTS STUDY PLAN

DRAFT

ATTACHMENT 6-8

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

ESA- and CESA-Listed Plants Study Plan

February 2011

1.0 Project Nexus

Certain activities associated with the on-going operation and maintenance (O&M) of the Don Pedro Project (Project) and/or Project-related recreation activities may have the potential to affect plants listed under the federal Endangered Species Act (ESA) as endangered (FE) or threatened (FT) and/or plants listed under the California Endangered Species Act (CESA) as endangered (SE) or threatened (SD). These effects may be direct (i.e., result of ground disturbing activities, such as mechanical or chemical clearing of vegetation or trampling of plants), indirect (i.e., due to activities, such as soil compaction, which limits plant growth) or cumulative (i.e., caused by a Project activity in association with a non-Project activity, such as loss of habitat due to the introduction of invasive plants from a non-Project vector). This study evaluates the potential for Project-related activities to impact ESA- or CESA-listed plants.

Special-status plants[1] are addressed in a separate study plan: the Special-status Plants Study Plan. Note that if a plant is listed as FT, FE, ST or SE, but also meets the definition of a special-status plant, that plant species is addressed under this ESA- and CESA-listed plants study plan.

2.0 Agency Resource Management Goals

Two resource agencies have management responsibilities related to over ESA-listed plants at the Project: the U.S. Bureau of Land Management (BLM) on federal lands administered by BLM; and the U.S. Fish and Wildlife Service (USFWS) which has responsibility for administering the ESA. In addition, where an ESA-listed plant is also listed under the CESA, the California Department Fish and Game (CDFG) may have management responsibility for the plant species.

[1] For the purposes of this Relicensing, special-status plants are considered those plants that are: (1) found on U.S. Department of Interior (USDOI), Bureau of Land Management (BLM) land and formally listed by BLM as Sensitive (BLM-S); (2) listed under the federal ESA as Proposed or a Candidate for listing as endangered or threatened or proposed for delisting; (3) listed under the CESA as proposed for listing; (4) found on the California Native Plant Society (CNPS) Inventory of Rare Plants and formally listed as a CNPS 1, 2 or 3 plant (CNPS 1, CNPS 2, CNPS 3); or (5) Found on the California Department of Fish and Game's (CDFG) list of California Rare (SR) species listed under the Native Species Plant Protection Act of 1977. Special-status plants do not include plants that are listed as threatened or endangered under the ESA or CESA.

BLM's resource management goals are consistent with the ESA and BLM implementing policy. The ESA, Section 7.(a)(1) states:

> *All federal agencies shall… utilize their authorities in furtherance of the purposes of this Act, by carrying out programs for the conservation of endangered species and threatened species listed pursuant to section 4 of this Act.*

BLM's implementing policy for ESA compliance in Manual 6840 states:

> *Actions authorized by BLM shall further the conservation and/or recovery of federally listed species…*
>
> *Section 7(a)(1) (Conservation Programs). Section 7(a)(1) requires the BLM to use its authorities to further the purposes of the ESA by implementing programs for the conservation of threatened and endangered species and the ecosystems on which they depend. Ways in which BLM can carry out these responsibilities include, but are not limited to:*
>
> > *determining to the extent practicable, the occurrence, distribution, population, and habitat condition of all ESA-listed species on BLM-administered lands; and*
> >
> > *Monitoring and evaluating ongoing management activities to ensure conservation objectives for listed species are being met (BLM 2008a).*

BLM's Sierra Resource Management Plan (SRMP) (BLM 2008b) provides general guidelines for managing ESA-listed plants. These guidelines include managing edaphically unique areas that often support both sensitive plant species and federally listed species to assist in the recovery of listed species, and coordinating with the USFWS on implementation of recovery plans for ESA-listed plants to promote the recovery of listed species. The SRMP also includes management guidelines for the Red Hills Area of Critical Environmental Concern (ACEC), part of which lies within or adjacent to the Project Boundary.

The USFWS' management goal for ESA-listed plants is to recover listed species to levels where protection under the Act is no longer necessary (USFWS 1988).

Two agencies have management responsibilities for CESA-listed plants within the Project. The BLM in California recognizes species listed by the State of California under CESA as BLM-sensitive species. BLM guidance for sensitive species states:

> *In compliance with existing laws, including the BLM multiple use mission as specified in Federal Land Policy and Management Act (FLPMA), the BLM shall designate sensitive species and implement measures to conserve these species and their habitats….to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA (Endangered Species Act of 1973)…*
>
> *On BLM administered lands, the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of the species habitat, by determining the extent practicable, the distribution,*

abundance, population condition, current threats, and habitat needs for sensitive species… (BLM 2008a).

BLM's SRMP (BLM 2008b) provides general guidelines for managing special-status species. These guidelines include managing unique edaphic areas that support unusual floras to both conserve BLM-sensitive species, including state-listed species. There is also discussion of coordination with CDFG on implementation of recovery plans and conservation strategies for CESA-listed plants and promoting the recovery of state-listed species. The SRMP also includes management guidelines for the Red Hills Area of Critical Environment Concern (ACEC).

The CDFG also has management responsibility for CESA-listed plants. The CESA requires state lead agencies preparing California Environment Quality Act (CEQA) documents to consult with CDFG regarding potential impacts of projects on state-listed species. The state lead agency must adopt reasonable and prudent alternatives as specified by CDFG to prevent jeopardizing the continued existence of the CESA-listed plant.

3.0 Study Goals

The goal of this study is to provide information to determine the extent to which Project O&M and/or recreational activities may have the potential to adversely affect ESA- or CESA-listed plant species. A Project affect may occur if each of the following conditions are met:

- An ESA- or CESA-listed plant species is found to occur within the study area; and
- A specific Project O&M or recreation activity has a reasonable possibility of having an adverse effect on the ESA- or CESA-listed plant species found.

The goal of this study is to gather the information necessary to identify whether Project-related activities have the potential to impact ESA- or CESA-listed plant species.

4.0 Existing Information and Need for Additional Information

Existing and relevant information regarding known and potentially occurring ESA- and CESA-listed plants in the Project area is available from the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants database (CNPS 2010), the USFWS Endangered Species Program (USFWS 2010) and the California Natural Diversity Database (CNDDB) (CDFG 2010). Data base queries included all U.S. Geological Survey (USGS) 1:24,000 topographic quadrangles that include the existing Project Boundary and the surrounding quadrangles. Quadrangles containing the Project Boundary include Chinese Camp, La Grange, Moccasin, Peno Blanco Peak, Sonora, and Standard. Based on this information, as well as the Project's elevation range and potential habitats, 10 plants species were identified that are listed as FT, FE, SE, or ST and that have a reasonable potential to be affected by the Project.

Table 4.0-1 provides the following information for each of these ESA- and CESA-listed target plant species: status; flowering period; elevation range; habitat requirements; and recorded occurrence in the general Project area.

Table 4.0-1 Target list of ESA-listed plant species for the Don Pedro Project.

Common Name/ Scientific Name	Status[1]	Flowering Period	Elevation Range (feet)	Habitat Requirements	Occurrence in Area Surrounding the Project[2,3]
Chinese Camp brodiaea *Brodiaea pallida*	CNPS 1B, FT, SE	May-Jun	1,000-1,250	Ultramafic, valley and foothill grassland, cismontane woodland, vernal streambeds, often serpentine	**Chinese Camp, Sonora**, New Melones Dam
Succulent owl's clover *Castilleja campestris* ssp. *succulenta*	CNPS 1B, FT, SE	Apr-May	150-2,500	Vernal pools	Cooperstown, Snelling, Merced Falls
Hoover's spurge *Chamaesyce* hooveri	CNPS 1B, FT	Jul-Sep (Oct)	75-900	Vernal pools	Cooperstown, Turlock Lake
Delta button-celery *Eryngium racemosum*	CNPS 1B, SE	Jun-Oct	0-350	Riparian scrub	Turlock Lake
Colusa grass *Neostapfia colusana*	CNPS 1B, FT, SE	May-Aug	0-700	Vernal pools	Cooperstown, Turlock Lake
Hairy Orcutt grass *Orcuttia pilosa*	CNPS 1B, FE, SE	May-Sep	100-700	Vernal pools	Cooperstown, Turlock Lake
Layne's ragwort *Packera layneae*	CNPS 1B, FT, SR	Apr-Aug	0-3,300	Chaparral, cismontane woodland, serpentine or gabbroic, rocky	**Chinese Camp, Moccasin**
Hartweg's golden sunburst *Pseudobahia bahiifolia*	CNPS 1B, FE, SE	Mar-Apr	0-500	Cismontane woodland, valley and foothill grassland	**La Grange**, Cooperstown, Snelling, Merced Falls, Tuolumne
Greene's tuctoria *Tuctoria greenei*	CNPS 1B, FE, SR	May-Jul (Sep)	0-3,600	Vernal pools	Cooperstown
Red Hills vervain *Verbena californica*	CNPS 1B, FT, ST	May-Sep	800-1,400	Cismontane woodland, valley and foothill grassland, usually serpentine seeps and creeks	**Sonora, Chinese Camp**, Keystone

[1] Special-status:
FE: Federal Endangered Species
FT: Federal Threatened Species
SE: California Endangered Species
SR: California Rare Species
ST: California Threatened Species
CNPS: California Native Plant Society listed species
1B: Species considered rare or endangered in California and elsewhere

[2] Occurrence in area surrounding Project results based on a CNPS nine quadrangle search.

[3] Quads that are fully or partially included within the existing Project Boundary are indicated by bold font; quads surrounding, but not included within the Project Boundary are listed in regular font.

There were CNDDB records for 10 ESA-listed plant occurrences located within a one-mile buffer of the Project Boundary. There were five occurrences each of Layne's ragwort and Red Hills vervain (CDFG 2010). A botanical survey of the Red Hills Management Area (now the Red Hills ACEC) was completed in 1984. The surveys located the ESA-listed Layne's ragwort (*Packera layneae*) and California vervain (*Verbena californica*) (BLM 1985).

Few of the available reports are from surveys within the Project Boundary, and, of those that are, many are outdated.[2] Additional information needed to address the study goal is the specific location of ESA- and CESA-listed plants in relation to Project O&M activities, Project recreation, and any other Project-related activities that might affect listed plants.

5.0 Study Methods

5.1 Study Area

The study area consists of the area within the Project Boundary where Project-related O&M or recreation activities have the potential to affect ESA- or CESA-listed plant species. Specifically, the study area consists of:

- 100 feet around recreation facilities
- 60 feet around intakes, gatehouses, surge tanks, adits, portals and microwave/radar towers, and other Project facilities
- 30 feet around ancillary support facilities including stream gages and weirs
- 25 feet from centerline of access roads within the Project Boundary
- 20 feet around the perimeter of the reservoir, from high-water mark where erosion is occurring above the high-water mark and/or where soil types occur that are known to be preferred habitats for listed plant species.
- 20 feet around the perimeter of powerhouses and switchyards
- 20 feet from centerline of managed trails

5.2 General Concepts

These general concepts apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If minor modifications are made, field crews will follow the protocols in the study plan. The Districts will document and report these modifications in the draft study report.

[2] Annual or short-lived perennial species may require annual monitoring to accurately document population conditions, while long-lived perennials may only require surveys at five-year intervals (CDFG 2009).

- If the Districts become aware that major variances may be needed to the study plan, the Districts will issue an e-mail to the appropriate resource agencies to provide an opportunity for consultation regarding how to address the variance. The Districts will describe all variances and resolutions in the final study report.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (three meter data collection accuracy under ideal conditions), or similar units. GPS data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and the Districts' relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets.
- The Districts will provide training to field crews to identify other special-status species that may be encountered during the performance of this study. Training will include instructions in diagnostic features and habitat associations of the above species. Field crews will also be provided laminate identification sheets showing the above species compared to other common species that may be encountered. All incidental observations will be reported. The purpose of this effort is to opportunistically gather data during the performance of the study. For all special-status species observations, the Districts will complete the appropriate CNDDB form or spreadsheet and transmit the form to the CNDDB. The Districts will provide a copy of the CNDDB form or spreadsheet to BLM.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel [*Dreissena polymorpha*]). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) between basins; and (3) between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study will be completed in five steps:

Step 1 - Gather Data and Prepare for Field Effort. The Districts will identify and map known occurrences of ESA- and CESA-listed plants within the study area, and prepare field maps for use by survey teams. The maps will include aerial imagery, Project features, and known plant occurrences. Survey timing will be planned based on blooming periods and herbarium collection dates.

Step 2 - Conduct Field Surveys. The Districts' surveyors will conduct plant surveys that generally follow the CDFG's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFG 2009).[3] Field surveys will be conducted at the proper times of year when ESA- and CESA-listed plants potentially occurring in a given survey area and are both evident and identifiable. Surveys will use a random meander technique, and focus additional efforts in high-quality habitats or those with a higher probability of supporting plants (e.g., serpentine outcrops).

[3] For the purpose of this relicensing and differing from the CDFG 2009 protocol, ESA- and CESA-listed plants are not considered special-status and are addressed in separate study proposals.

Surveys will be floristic in nature, documenting all species observed; taxonomy and nomenclature will be based on The Jepson Manual (Hickman 1993).

In the event ESA- and/or CESA-listed plants are found within the study area, surveyors will collect the following data, to the edge of the occurrence, or to 500 feet outside the Project Boundary, whichever is less:

- Digital photographs, if needed, to describe the occurrence, its habitat, and any potential threats (at least one digital photograph will be collected for each occurrence, with other photographs to document potential threats, or as needed.)
- Estimated area (approximate length and width) covered by the occurrence and estimated number of individual plants in the population. If a plant occurrence is estimated to cover an area greater than 0.1 acre, surveyors will delineate the occurrence boundary using a handheld GPS, collecting either polygon data, or sufficient point data that a realistic occurrence polygon can be constructed from the point data using GIS
- For occurrences less than 0.1 acre in size, location of the approximate center of the occurrence taken as point data using a handheld GPS unit
- Dominant and subdominant vegetation in the area, and topographic features
- Estimated distance to nearest Project facility, feature, or Project-related activity
- Activities observed in the vicinity of the occurrence that have a potential to adversely affect the population (e.g., recreational trails and uses)
- estimated phenology and descriptions of reproductive state

For all ESA- and CESA-listed species observations, the Districts will complete the appropriate CNDDB form or spreadsheet and transmit the form to the CNDDB. The Districts will provide a copy of the CNDDB form or spreadsheet to BLM.

<u>Step 3 - Prepare Data and Quality Assure/Quality Control.</u> Following field surveys, the Districts will develop GIS maps depicting ESA- and CESA-listed plant occurrences, Project facilities, features, and specific Project-related activities (e.g., dispersed use camping) and other related information collected during the study, including the complete floristic list. Field data will then be subject to QA/QC procedures, including spot-checks of transcription and comparison of GIS maps with field notes to verify locations of ESA- and CESA-listed plant occurrences.

<u>Step 4 - Consult with the Districts' Project Operations and DPRA Staff.</u> Once the location of ESA- and CESA-listed plants in the study area is determined, Project operations and DPRA staff will be consulted to identify Project O&M and recreation activities that occur in the area of the plant occurrences that have a potential to adversely affect the species.

<u>Step 5 - Prepare Report.</u> The Districts will prepare a report that includes the following sections: (1) Study Goals; (2) Methods; (3) Results; (4) Discussion; and (5) Description of Variances from the study plan, if any. The Districts will make the report available to relicensing participants upon completion.

6.0 Study-Specific Consultation

The Districts will notify USFWS within five working days if ESA-listed plants are detected at any location and will notify the BLM if the occurrence is located on or immediately adjacent to BLM-administered land.

The Districts, as FERC's non-federal representatives, intend to undertake this study as part of their informal consultation under Section 7 of the ESA, and plan to consult with USFWS prior to, during, and after study implementation.

The Districts will notify CDFG within five working days if CESA-listed plants are detected at any location and will notify BLM if the occurrence is located on or immediately adjacent to BLM-administered land.

7.0 Schedule

The Districts anticipate the following schedule for the completion of the study plan:

- Planning (Step 1) .... January 2012 to March 2012
- Field Season (Step 2)... March 2012 to July 2012
- QA/QC Review (Step 3) .... August 2012
- Operations and DPRA Staff Consultation (Step 4) .... August 2012
- Study Report Preparation (Step 5) .... September 2012 to December 2012

8.0 Consistency of Methodology with Generally Accepted Scientific Principles

This study is consistent with the goals, objectives, and methods outlined for FERC hydroelectric relicensing efforts in California, and uses standard botanical survey methods as defined by the USFWS and CDFG.

9.0 Level of Effort and Cost

Not yet estimated.

10.0 References Cited

California Department of Fish and Game. 2009. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities. Available at: www.fws.gov/sacramento/es/.../Listed_plant_survey_guidelines.PDF.

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California Native Plant Society. 2010. Inventory of Rare and Endangered Plants (online edition, v7-08a). California Native Plant Society. Sacramento, California. [Online] URL: http://www.cnps.org/inventory. (Accessed July 6, 2010.)

Hickman, J.C., editor. 1993. The Jepson Manual, 3rd Edition. University of California Press, Berkeley, California.

U.S. Department of the Interior, Bureau of Land Management. 1985. Final Red Hills Management Plan and Environmental Assessment. Bakersfield, California.

——. 2008a. BLM Manual 6840 - Special Status Species Management.

——. 2008b. Sierra Resource Management Plan and Record of Decision. February 2008. Folsom, CA.

U.S. Department of the Interior, U.S. Fish and Wildlife Service. 1988. Endangered Species Act of 1973 [(16 U.S.C. 1531-1544, 87 Stat. 884)], as amended through the 100th Congress.

ATTACHMENT 6-9

HISTORIC PROPERTIES STUDY PLAN

DRAFT

ATTACHMENT 6-9

TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT

DON PEDRO PROJECT
FERC NO. 2299

Historic Properties Study Plan

February 2011

1.0 Project Nexus

Together, Turlock Irrigation District (TID) and Modesto Irrigation District (MID), both public agencies, own the Don Pedro Project (FERC Project No. 2299) located in Tuolumne County, California. Continued operation and maintenance (O&M) of the Don Pedro Project (Project) may affect historic properties that are listed on or eligible for listing on the National Register of Historic Places (NRHP). The effect may be direct (e.g., result of ground disturbing activities), indirect (e.g., public access to recreation areas) or cumulative (e.g., caused by a Project activity in combination with other non-Project activities). Certain Project operations and maintenance (O&M) activities may effect historic properties within the Project Boundary or outside the Project Boundary if a result of Project-related activities.

Several terms used throughout this Study Plan warrant definition.

- **Historic Properties.** This term is defined under 36 CFR § 800.16(l)(1), as prehistoric or historic sites, buildings, structures, objects, districts, or traditional cultural properties (TCP)[1] included in or eligible for inclusion in the National Register of Historic Places (NRHP). Historic properties are identified through a process of evaluation of specific criteria found at 36 CFR § 60.4.
- **Cultural Resources.** For the purpose of this study plan, this term is used to mean any prehistoric or historic district, site, building, structure, object, or TCP, regardless of its National Register eligibility.

2.0 Agency Resource Management Goals

A new FERC license for the Project may permit activities that "…cause changes in the character or use of historic properties, if any such historic properties exist…" (36 CFR § 800.16(d)). FERC must therefore comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations at 36 CFR 800. These regulations require the head of any federal department or independent agency having authority to license any undertaking to take into account the effects of the undertaking on historic properties.

[1] Traditional Cultural Properties (TCPs) are addressed in a separate study proposal (Native American Traditional Cultural Properties Study).

As provided for in 18 CRF § 5.5(e), the Districts will request that FERC designate them as FERC's non-federal representatives for purposes of initiating consultation under Section 106 of the NHPA and implementing regulations found at 36 CFR § 800.2(c)(4).

Additionally, the State Historic Preservation Officer (SHPO), in accordance with section 101(b)(3) of NHPA "…advises and assists Federal agencies in carrying out their Section 106 responsibilities…" by ensuring historic properties are taken into account early in the planning and development processes.

The U.S. Bureau of Land Management (BLM) Mother Lode Field Office has management responsibility within the Project's Area of Potential Effects (APE) on any federal lands administered by BLM. The primary goal of BLM is that FERC comply with Section 106 and that historical properties are appropriately considered and managed. As defined in 36 CFR 800.16(d), the APE is "...the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." For the Don Pedro Project, the APE has been initially defined as all lands within the Project Boundary.

The State of California also has an interest within the Project's APE. Section 5.11(d)(2) states that an applicant for a new license must in its proposed study "Address any known resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied." If the State of California provides a brief written description of their interest in the resource to be addressed in this study, TID and MID will insert the full description. If not, prior to issuing the PAD, TID and MID will describe to the best of its knowledge and understanding of the relevant management goals of the State of California in the resource addressed in this study.

Study results may be used in the development of Project facilities and/or license terms of the new license for the purpose of protecting or treating impacts to historic properties that would result from continued Project O&M, or for the purpose of enhancing historic properties that would be affected by continued Project O&M. These facilities, operations and management activities, which are referred to collectively as protection, mitigation and enhancement (PM&E) measures, could include development of a Historic Properties Management Plan (HPMP)[2] that would describe and implement PM&E measures for historic properties potentially affected by continued Project O&M. A HPMP is a plan for considering and managing effects on historic properties that may occur from constructing, operating, and maintaining hydropower, transmission, and distribution projects, and establishes a decision-making process for considering those effects. Because it is not possible to determine all of the effects of various activities that may occur over the course of a license, FERC typically requires, as a license condition, that a licensee develop and implement a HPMP that considers and manages effects on historic properties throughout the term of the license. For hydropower licensing actions, FERC typically completes Section 106 by entering into a Programmatic Agreement (PA) or Memorandum of Agreement (MOA) with the Advisory Council on Historic Preservation (ACHP) and the SHPO that typically requires the licensee to develop and implement a HPMP. Additionally, FERC requires that a licensee

[2] While not a part of this study, the information developed by this and other relicensing studies may be used to develop a HPMP in consultation with interested parties, and include a final HPMP including evidence of consultation in the Final License Application when filed with FERC.

develop the HPMP in consultation with various other federal, state, tribal, and non-government parties that have interests in the project.

3.0 Study Goals

The study goal is to assist FERC in meeting its compliance requirements under Section 106 of the NHPA, as amended, by determining if licensing of the Project will have an adverse effect on historic properties. The objective of this study is to identify archaeological sites and historic architecture within the APE, formulate a plan to evaluate their eligibility to the NRHP, if needed, and identify Project-related effects on those resources.

To address effects on historic properties, as required under Section 106, the APE is defined as all lands within the FERC Project Boundary. It is possible that the studies implemented as part of the relicensing process may identify Project-related activities that have the potential to affect historic properties outside the FERC Project Boundary. It is also possible that during relicensing, Project improvements may be proposed that are outside the current FERC Project Boundary. If such areas are identified, the APE will expand in accordance with 36 CFR 800.4(a)(1) in consultation with the SHPO, BLM, Tribes, and other interested parties, as appropriate. Additional cultural surveys will be completed as part of this study if the APE is expanded.

4.0 Existing Information and Need for Additional Information

Section 5.8 of the PAD describes existing, relevant, and reasonably available information regarding cultural resources. This information is summarized below.

To gather existing, relevant, and reasonably available information regarding cultural resources in the Project APE and vicinity, the Districts performed a records search in July 2010 at the Central California Information Center (CCIC) of the California Historical Resources Information System at California State University (CSU), Stanislaus in Turlock. In addition to identifying historic properties, this research also served to obtain background information pertinent to understanding the archaeology, history, and ethnohistory of the Project vicinity and APE. The data gathering area included the Project APE, plus an additional 0.25-mile buffer beyond, to identify previously recorded cultural resources and previous cultural studies that may require consideration during the Project.

The records search included reviews of cultural resources records and site location maps, historic General Land Office (GLO) plats, NRHP, California Register of Historic Resources, Office of Historic Preservation Historic Property Directory, *California State Historic Landmarks* (1996), *California Inventory of Historic Resources* (1976), historic topographic maps, and the Caltrans Bridge Inventory.

The records search indicates that the Project area is highly sensitive for prehistoric and historic-era properties and that some areas within the Project have been subject to previous cultural surveys (see Section 5.8 in the PAD). However, the research also revealed that: many areas within the APE have not yet been surveyed for cultural remains and a portion of previously surveyed areas should be reexamined to meet current professional standards for identifying historic properties. To accomplish this, and to meet the study plan objective, additional archival research and field surveys are necessary. This study plan will be used to guide efforts in acquiring the additional information.

The existing information described below is not adequate to meet the goal of the study. Information necessary to address the study goal includes site-specific cultural resources inventory.

4.1 Summary of Record Searches

4.1.1 Previous Cultural Studies

The above-described records search identified 43 previous cultural resource investigations within 0.25-mile of the Project APE, of which 18 fall within the APE. The investigations date from the 1960s to 2009 and were conducted prior to a variety of different ground disturbing developments, to include water control/treatment facilities, utilities, housing developments, mining activities, road/highway construction, recreation facilities, and grazing leases. Two of the previous investigations are articles from *The Quarterly of the Tuolumne Historical Society*, and one is comprised of documentation of monuments and plaques of the E Clampus Vitus organization.

4.1.2 Previously Recorded Archaeological Sites

The records search identified 146 known archaeological sites previously documented within 0.25 mile of the Project APE, of which 61 fall within the Project APE. Of the 146 sites within 0.25 mile of the APE, one includes both prehistoric and protohistoric components, five sites have both prehistoric and historic-era cultural remains, six sites did not have any information on file at the Information Center and therefore are unknown as to their site type, 57 sites are prehistoric in age, and 77 sites are historic in age. Of the 61 sites within the APE, 32 are prehistoric, 21 are historic, six are those sites with no site form, and two are multi-component, with both prehistoric and historic-era cultural remains. The prehistoric components typically include flaked stone with and without bedrock milling stations, with both short- and long-term occupation sites represented. The historic components are predominantly represented by refuse scatters and/or remains of habitation structures/buildings. According to the Office of Historic Preservation's *Archaeological Determinations of Eligibility* list and the *Directory of Properties in the Historic Property Data File* on file at the CCIC, of the 146 sites recorded in the vicinity of the Project APE, four have been determined eligible for inclusion on the NRHP, all of which are located within the APE. The remaining 142 resources remain unevaluated for the NRHP.

4.1.3 Potential Historic Sites

Historic period USGS topographic quadrangles and GLO plats were reviewed during the records search to identify locations of potential historic-era sites and features within the Project APE and within 0.25 mile of the Project APE. This resulted in the identification of well over 50 locations where unrecorded historic period sites or features may be present. These sites and features include potential roads and trails, the town site of Jacksonville, buildings, mines, ditches, the Hetch Hetchy Railroad/Yosemite Short Line Railroad, the Hetch Hetchy Aqueduct, and other features.

Historic period maps often provide a general idea of where sites may be located but are not necessarily accurate. Today's maps and mapping standards are not translatable to the past and plots cannot be taken as exact. Because of the disparity between historic period maps and modern maps, it is not known if physical attributes associated with the potential sites and features still exist, are accessible, or if the remains are within the APE. Potential site locations will be plotted on field maps prior to fieldwork and the survey crew will carefully scrutinize such areas for physical remains.

5.0 Study Methods

5.1 Study Area

The study area is the APE, which includes all lands, Project facilities, and features within the Project Boundary. If, at a later time, the Districts propose Project activities that are outside of the study area that may affect resources addressed by this study proposal, the study area will be expanded, if necessary, to include these areas. As required under Section 106 [36 CFR § 800.4(a)(1)], maps depicting the APE will be submitted to the SHPO for formal review, comment, and approval. The proposed APE (Project Boundary) is shown in Appendix C of the PAD.

5.2 General Concepts and Procedures

The following general concepts apply to the study:

- Personal safety is an important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed well in advance of performance of the study. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor modifications to the study plan in the field to accommodate actual field conditions. If modifications are required, the field crews will follow the protocols in this study plan. All modifications will be documented and reported in the draft study reports.
- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) moving between basins; and (3) moving between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study approach will consist of the following six steps:

Step 1 - Obtain SHPO Approval of APE. As required under Section 106 [36 CFR § 800.4(a)(1)], the Districts will submit maps depicting the APE to the SHPO for formal review, comment, and concurrence. Once approved, the maps including SHPO's concurrence letter will be filed with FERC.

The Districts may request that SHPO concur with a modified APE during the study if the Districts determine that the Project affects historic properties outside the previously SHPO-approved APE.

Step 2 - Archival Research. Information has been obtained from the record search that identified previous cultural surveys and recorded archaeological and historic-era properties within or directly adjacent to the APE. Archival research will also be conducted at the repositories listed below to obtain additional information specific to the prehistory and history of the Project area, the hydroelectric system in whole, and its individual features. The results of the archival research will serve as the basis for preparing the prehistoric and historic contexts against which archaeological and historic-era properties may be evaluated. Historical photographs located during the archival research may be cited in the text as figures, unless they are subject to copyright laws. Previous NRHP evaluations of resources, if they exist, will be used as much as possible. The places to be contacted or visited shall include:

- Bancroft Library, University of California, Berkeley
- California State Library, California History Room and Government Publications
- Bureau of Land Management, Motherload Field Office Data Files
- Turlock Museum and Archives
- Modesto Museum and Archives
- Sacramento History Center and Archives
- Sierra Miwuk Tribal Archives

Step 3 - Field Survey. FERC is required to make a reasonable and good faith effort to identify historic properties that may be affected by the Project. As described at 36 CFR § 800.4(b)(1), this may be accomplished through sample field investigations and/or field surveys that are implemented in accordance with the Secretary of the Interior's Standards and Guidelines for Identification (NPS 1983). FERC is also required to consider any other applicable professional standards and tribal, state, or local laws or procedures to complete the identification of historic properties.

Archaeological Field Survey. To assist FERC in meeting its compliance obligations, and to develop appropriate management measures for historic properties identified within the APE, a field survey will be performed to verify locations of previously recorded cultural resources and to examine all accessible lands not previously surveyed or which were surveyed to less than adequate standards. Areas within the APE that cannot be accessed in a safe manner (e.g., certain locations containing dense vegetation, or unsafe slopes) will not be included within the survey or recording of archaeological and historic-era properties; these areas will be identified in the resulting survey report and an explanation for survey exclusion will be provided.

The field survey will be supervised and/or conducted by qualified, professional archaeologists (i.e., individuals who meet the Secretary of the Interior's Standards for professional archaeologists). The purpose of the field survey is to: (1) examine lands which have not been previously surveyed; (2) examine lands previously surveyed but where the field strategy is unknown; and (3) examine lands previously surveyed but for which the field strategy does not meet current professional standards, as defined in the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (NPS 1983).

If conditions allow, lands will be examined that are typically inundated by the Project reservoir but which may become accessible during the survey season as a result of normal reservoir draw-downs.

Locations of previously recorded cultural resources will be verified and the sites re-recorded only if their existing site records or other documentation do not meet current standards for recording, or if the condition and/or integrity of the property has changed since its previous recording. Newly discovered cultural resources, including isolated finds, will be fully documented following the recordation procedures outlined in *Instructions for Recording Historical Resources* (OHP 1995), which utilizes state of California Department of Parks and Recreation (DPR) forms DPR 523 A-L. A sketch map for each site recorded or re-documented will be drawn to-scale and the property photographed. The locations of all archaeological sites and isolates documented during the survey will be plotted by the Districts' cultural resources specialist or cultural consultant onto the appropriate USGS 1:24,000-scale topographic map at the time of discovery. Field personnel will use a GPS receiver to document the location of cultural resources (including isolates) recorded during the survey, which will be plotted onto the appropriate USGS topographic quadrangle using the UTM coordinate system. GPS data related to recordation of historic properties will adhere to DPR specifications for accuracy and site specific procedures. Additionally, the areas examined will be plotted onto the appropriate USGS 7.5-minute topographic quadrangle for comparison with previous survey coverage maps.

Archaeological surveys that occur on BLM lands will require valid permits. The Districts or, as appropriate, their consultants will obtain all required permits prior to examining BLM lands. The Districts also will notify BLM when fieldwork is scheduled to begin. All artifacts encountered during the field survey will be left in place; no artifacts will be collected during the field survey.

Historic-Era Inventory of the Built Environment. A field inspection, documentation, and subsequent NRHP evaluation (see below) of any historic-era built environment resources will be undertaken by qualified, professional individuals meeting the Secretary of the Interior Standards for Architectural and Engineering Documentation. Individual components will be recorded or re-recorded to meet current DPR standards. This will include digital color photography and sketch maps of each built resource and each associated feature.

Discovery and Treatment of Human Remains. If an inadvertent discovery of human remains occurs on federal lands, the person making the discovery shall follow the procedures outlined in 43 CFR § 10(4)(b) of the Native American Graves Protection and Repatriation Act (NAGPRA), requiring that they immediate notify the BLM and affected Tribes, as appropriate, by telephone, and provide written confirmation of the discovery. All work in the immediate area of the discovery will cease and the area will be secured to protect the remains. The Districts' cultural resources specialist will consult with the affected tribes to contact the lineal descendent and ascertain the cultural affiliation, as outlined in NAGPRA under 43 CFR § 10(14), in order to otherwise abide by NAGPRA to determine the disposition of the discovered human remains (43 CFR § 10[6]).

On privately owned lands, the California Penal Code (CPC), California Health and Safety Code (CH&SC), and California Public Resources Code (CPRC), also prohibit damage, defacement, or disinterment of human remains without legal authority, and establish civil and criminal penalties for actions associated with private landholdings. Although the CH&SC and CPRC technically apply only to those portions of the APE not under federal jurisdiction, in practice the law is applied throughout the area. Criminal sanctions provided for in the CPC, CH&SC, and CPRC would be above and beyond the penalties authorized by the Archaeological Resources Protection Act (ARPA). Other state laws and codes may also apply.

<u>Step 4 - National Register of Historic Places Evaluation.</u> During documentation of archaeological sites and features in Step 3, the Districts will also document the condition of each resource to assist in identifying potential Project-related affects and level of integrity to provide recommendations for NRHP eligibility or evaluations. All previously unevaluated sites that can be evaluated at this phase, based on the documented remains, background research, and site conditions, will be formally evaluated for SHPO consultation and concurrence. Any NRHP evaluations completed for sites located on federal agency lands will be submitted to the appropriate agency for review prior to obtaining SHPO concurrence. Archaeological resources requiring further field efforts or additional archival research to complete NRHP evaluations will be identified and included in the Districts' PM&Es for implementation and management outside the study plan, likely under a FERC-approved HPMP, unless more immediate action is deemed necessary to address Project-related effects.

The Districts will utilize the National Register criteria for all sites to be evaluated, which are defined in 36 CFR 60.4, and which include the following:

> **National Register Criteria for Evaluation.** The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
>
> (a) that are associated with events that have made a significant contribution to the broad pattern of our history;
> (b) that are associated with the lives of persons significant in our past;
> (c) that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
> (d) that have yielded, or may be likely to yield, information important to prehistory or history.

Evaluation of Historic Project System Features

Previously evaluated historic Project systems or individual features will not be re-evaluated unless substantial changes in their conditions have been observed and documented during the study, or the evaluation is more than ten years old. If deemed appropriate by a qualified, professional cultural resources specialist, individual historic-era features may be evaluated together as a district.

All previously unevaluated historic-era Project features will be formally evaluated for eligibility to the NRHP. The evaluation will consist of three tasks: (1) development of a historic context for the APE using archival research; (2) examination of each historic feature to document and assess the level of integrity, both individually and as an element of a potential Hydroelectric Historic District; and 93) the historical information and the physical site data obtained during background and field research will be used to evaluate the eligibility of each Project feature individually and as part of a potential historic district for inclusion on the NRHP.

<u>Step 5 - Identify and Assess Potential Project Effects on National Register-Eligible Properties.</u> As required under 36 CFR § 800.5, the Districts will identify and assess, in consultation with the SHPO, BLM, and potentially affected Indian tribes, any adverse effects on historic properties or potential historic properties resulting from Project O&M. Adverse effects are defined as follows:

> *An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative (36 CFR § 800.5(a)(1).*

<u>Step 6 - Reporting.</u> The Districts will prepare a report that includes the following sections: (1) Study Goals and Objectives; (2) Methods and Analysis; (3) Results; (4) Conclusions; and (5) Description of Variances from the FERC-approved study plan, if any. Upon completion of the field studies, cultural maps provided with the Districts' report will clearly depict the following on USGS 1:24,000 topographic maps: the study areas examined; inventory coverage, including intensity of coverage; and locations of cultural resources identified within the study areas.

Copies of the final report and detailed locations of identified properties may be withheld from public disclosure in accordance with Section 304 (16 U.S.C. 4702-3) of the NHPA (as amended). Concurrence of report recommendations will be sought from the SHPO. Draft versions of the report will be provided to BLM, tribes, and other parties, as appropriate.

6.0 Study-Specific Consultation

The Districts will engage in the following study-specific consultation:

- The Districts will obtain SHPO's concurrence with the APE (Step 1).
- The Districts will notify potentially affected tribes and BLM prior to the start of the field survey to provide the proposed field schedule (Step 3).
- Any NRHP evaluations completed for cultural resources located on lands managed by federal agencies (i.e., Forest Service, BLM, etc.) will be provided to the federal agency, as appropriate, for review prior to submittal to SHPO for concurrence (Step 4).

7.0 Schedule

The Districts anticipate the following schedule for completion of the study:

- Field Work (Steps 1, 2, and 3) .... January 2012 - October 2012
- Office Work (Steps 4 and 5) .... October 2012 - December 2012
- Consultation .... As needed and Quarterly Reports
- Report Preparation (Step 6).. December 2012 - February 2013

The results of the study will be reported in Exhibit E of the License Application, which will include a summary of the information and findings of the Study Plan. Figures and other pertinent data supporting the summary in Exhibit E will be appended to the License Application. The cultural records and other sensitive information will be included in a Confidential appendix withheld from public disclosure, in accordance with Section 304 (16 U.S.C. 4702-3) of the NHPA as amended.

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

The proposed study methods discussed above are consistent with the study methods followed in several recent relicensing projects (i.e., French Meadows Transmission Line Project, FERC No. 2479; Merced River Hydroelectric Project, FERC No. 2179; Yuba-Bear Hydroelectric Project, FERC No. 2266). These methods have been accepted by the participating Indian Tribes, agencies, and other interested parties associated with those projects. The methods presented in this study plan also are consistent with the ACHP's guidelines for compliance with the requirements of Section 106 of the NHPA found at 36 CFR 800.

9.0 Level of Effort and Cost

Not yet estimated.

10.0 References Cited

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ATTACHMENT 6-10

NATIVE AMERICAN

TRADITIONAL CULTURAL PROPERTIES AND ETHNOGRAPHIC STUDY PLAN

DRAFT

ATTACHMENT 6-10

**TURLOCK IRRIGATION DISTRICT
AND
MODESTO IRRIGATION DISTRICT**

**DON PEDRO PROJECT
FERC NO. 2299**

**Native American
Traditional Cultural Properties and Ethnographic Study Plan**

February 2011

1.0 Project Nexus

Turlock Irrigation District (TID) and Modesto Irrigation District (MID), both public agencies, own the Don Pedro Project (FERC No. 2299) located in Tuolumne County, California. Certain on-going operation and maintenance (O&M) and/or recreation activities at the Don Pedro Project (Project) may affect Traditional Cultural Properties (TCP). The effect may be direct (e.g., result of ground disturbing activities), indirect (e.g., public access to Project areas) or cumulative (e.g., caused by a Project activity in combination with other past, present, and reasonably foreseeable future projects). This study focuses on the potential for Project-related activities to affect TCPs.

TCPs are not automatically considered historic properties[1]. As defined under 36 CFR 800.16(l), historic properties are prehistoric or historic sites, buildings, structures, objects, districts, or locations of traditional use or beliefs that are included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Historic properties are identified through a process of evaluation against specific criteria found at 36 CFR 60.4.

To be considered a historic property, a TCP must have integrity and meet at least one of the National Register criteria. When a place of traditional practices is evaluated as eligible for listing on the NRHP, it is termed a TCP. TCPs are defined as any property that is "…eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" [NR Bulletin 38 (Parker and King 1998:1)].

TCPs are further defined in National Register Bulletin 38 (Parker and King 1998:1) as:

1. Locations associated with the traditional beliefs of a Native American group about its origins, its cultural history, or the nature of the world.

[1] Historic properties other than TCPs are addressed in a separate study proposal (Historic Properties Study) in the relicensing.

2. A rural community, whose organization, buildings and structures, or patterns of land use reflect the cultural traditions valued by its long-term residents.
3. An urban neighborhood that is the traditional home of a particular cultural group, and that reflects its beliefs and practices.
4. Locations where Native American religious practitioners have historically gone and are known or thought to go to today, to perform ceremonial cultural rules of practice.
5. Locations where a community has traditionally carried out economic, artistic or other cultural practices important in maintaining its historic identity.

The Project nexus with TCPs is the potential effect the Project could have on traditional/tribal spiritual areas and other traditional uses in the Project Boundary or adjacent locations that are affected by Project activities. These include, but are not limited to: uses of geologic formations (i.e., landmarks); retrieval of fish for both ceremonial and spiritual purposes; gathering of plants for food, medicinal purposes and traditional uses (e.g., basket making); use of signal points including sightlines for fire signals; and access by Tribe members to and transit on trails and banks of the Tuolumne River traditionally used by Tribes.

2.0 Agency Resource Management Goals

FERC licenses may permit activities that may "…cause changes in the character or use of historic properties, if any such historic properties exist…" (36 CFR § 800.16[d]). FERC must therefore comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations at 36 CFR Part 800 that require any federal department or independent agency having authority to license any undertaking to take into account the effects of the undertaking on historic properties.

As provided for in 18 CFR § 5.5(e), the Districts under separate cover will request that FERC designate them as FERC's non-federal representative for purposes of initiating consultation under Section 106 of the NHPA and the implementing regulations found at 36 CFR § 800.2(c)(4).

Additionally, the State Historic Preservation Officer (SHPO), in accordance with section 101(b)(3) of NHPA "…advises and assists Federal agencies in carrying out their Section 106 responsibilities…" by ensuring historic properties are taken into account early in the planning and development processes.

The Bureau of Land Management (BLM) also has management responsibility for federal lands within the Project's Area of Potential Effects (APE). As defined in 36 CFR 800.16(d), the APE is "...the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist." For the Don Pedro Project, the APE has been initially defined as all lands within the Project Boundary.

The State of California also retains an interest within the Project APE. Section 5.11(d)(2) states that an applicant for a new license must in its proposed study "Address any known resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied."

3.0 Study Goals

The study goal is to assist FERC in meeting its compliance requirements under Section 106 of the NHPA, as amended, by determining if licensing of the Project will have an adverse effect on TCPs. The objective of this particular study is to identify TCPs that may potentially be affected by Project O&M, evaluate their eligibility to the NRHP, and identify Project-related activities that may affect TCPs, including locations of ethnographic use.

The term TCP has been in use only in recent decades, thus many older historic studies, oral traditions, and other background materials identified during this study may not use this term specifically, although in principal the information may address what is now termed TCP. Working with indigenous/aboriginal people and gathering any pertinent studies, information, or reports that are used to identify significant indigenous/aboriginal sites will contribute to the understanding of TCPs, and possibly other locations of tribal importance, taking into account relevant tribal values and knowledge as required in FERC's relicensing guidelines. In addition to the Tribal consultation process described more fully in Section 6.3 of this study proposal, significant, relevant studies conducted by ethnographers, graduate students, cultural journalists, and oral historians that are archived in public and private libraries will be reviewed and the relevant data included in the study results.

4.0 Existing Information and Need for Additional Information

Sections 5.8 and 5.10 of the PAD describe existing, relevant, and reasonably available information regarding cultural resources. This information is summarized below.

A records search was conducted during July of 2010 at the Central California Information Center (CCIC) of the California Historical Resources Information System at California State University (CSU), Stanislaus in Turlock. The records search included reviews of cultural resources records and site location maps, historic General Land Office (GLO) plats, NRHP, California Register of Historic Resources, Office of Historic Preservation Historic Property Directory, *California State Historic landmarks* (1996), California Inventory of Historic Resources (1976), historic topographic maps, and the Caltrans Bridge Inventory.

The records search included all lands within the Project APE and a 0.25-mile buffer beyond. The purpose of the record search was to identify any previously recorded TCPs that may be in the APE or in the vicinity of the APE, and to identify characteristic resource types previously identified within the APE and vicinity to help in the preparation of an ethnographic context for the area and/or any potential TCP documentation. The records search also included a 0.25-mile buffer beyond the APE to allow adequate coverage and flexibility for Project planning.

The records search did not identify any TCPs or Indian Trust Assets (ITA) within the APE.

ITAs are legal interests in assets held in trust by the federal government for Indian tribes or individual Indians. Assets can be real property, physical assets or intangible property rights. A characteristic of an ITA is that it cannot be sold, leased or otherwise alienated without the United States government's approval. Examples of ITAs are lands, including reservations and public domain allotment; minerals; water rights; hunting and fishing rights; other natural resources;

money or claims. ITAs do not include things in which a tribe or individuals have no legal interest. For example, off-reservation sacred lands or archaeological sites in which a tribe has no interest are not ITA.

Additionally, the Districts contacted the California Native American Heritage Commission (NAHC) at the beginning of September 2010 to obtain a listing of tribal groups who should be contacted regarding the Project. The NAHC has yet to provide a tribal contact list for the Project. However, the Districts have identified a number of Indian Tribes that may have an interest in the relicensing based on the proximity of these groups' traditional territory to the Project APE. The list compiled by the Districts is provided in Table 4.0-1. Additional groups that might be identified by the NAHC, subsequent to this PAD, will be added.

Table 4.0-1 Tribal contact list compiled by the Districts.

Central Sierra Me-Wuk Cultural & Historic Reba Fuller, Spokesperson PO Box 699 Tuolumne, CA 95379	North Fork Mono Tribe Ron Goode, Chairperson 13396 Tollhouse Road Clovis, CA. 93611
Chukchansi Tribe; Choinumni/Mono Lorrie Planas 2736 Palo Alto Clovis, CA 93611	North Fork Rancheria Delores Roberts, Chairperson PO Box 929 North Fork, CA93643
Chukchansi Tribe Emmaline Hammond PO Box 852 Oakhurst, CA 93644	North Fork Rancheria Mr. Michel Demers, Tribal Administrator P.O. Box 929 North Fork, CA 93643
North Fork Mono Rancheria Judy Fink, Tribal Chairperson P.O. Box 929 North Fork , CA 93643	Southern Sierra Miwuk Nation Jay Johnson, Spiritual Leader 5235 Allred Road Mariposa, CA 956338-9357
Southern Sierra Miwuk Nation Anthony Brochini, Chairperson PO Box 1200 Mariposa, CA 95338	Southern Sierra Miwuk Nation Les James, Spiritual Leader PO Box 1200 Mariposa, CA 95338
Tuolumne Band of Me-Wuk Indians Stanley Rob Cox, Cultural Resources Dept. P.O. Box 699 Tuolumne, CA 95379	Tuolumne Band of Me-Wuk Indians Kevin Day, Chairperson P.O. Box 699 Tuolumne, CA 95379
Chicken Ranch Rancheria of Me-Wuk Melissa Powell, Cultural Resources Coordinator P.O. Box 1159 Jamestown, CA 95327	

Prior to mid-September 2010 public meetings for the Project relicensing, the Districts sent letters to the Tribal contacts inviting them to the meetings for an initial public introduction to the Project relicensing. Included in these letters was a request for relevant information related to the relicensing. The Tribal contacts were also referred to the public relicensing website and given the names and contact information for the Districts.

To date, no concerns or potential TCPs or ITAs have yet been identified by the Tribes within the APE or 0.25 mile beyond.

5.0 Study Methods

5.1 Study Area

The study area is the APE, which includes all lands, Project facilities and features within the Project Boundary and Project-affected locations outside the Project Boundary. The APE may be modified if Project O&M activities occur outside the Project Boundary. As required under Section 106 [36 CFR § 800.4(a)(1)], maps depicting the APE will be submitted to the SHPO for formal review, comment, and approval.

5.2 General Concepts and Procedures

The following general concepts apply to the study:

- Personal safety is the most important consideration of each fieldwork team. If the Districts determine the information cannot be collected in a safe manner, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- The Districts will make a good faith effort to obtain permission to access private property where needed in advance of entering the property. If access is not granted or river access is not feasible or safe, the Districts will notify FERC and appropriate resource agencies via email to discuss alternative approaches to perform the study.
- Field crews may make minor variances to the study plan in the field to accommodate actual field conditions. If modifications are required, field crews will follow the protocols in this study plan. All modifications will be documented and reported in the draft study reports.
- Global Positioning System (GPS) data will be collected in a manner that meets or exceeds the federal government's "National Map Accuracy Standards" for published maps. All GPS data will be in the Universal Transverse Mercator (UTM) Coordinate System, using the North American Datum 1983 and stored in Environmental Science Research Institute (ESRI) Shapefile format. After a Shapefile has undergone a quality assurance/quality control (QA/QC) review and after all metadata have been documented, the Districts will provide the Shapefile to resource and land management agencies upon request.
- Field crews will be trained on and provided with materials (e.g., Quat) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g., zebra mussel [*Dreissena polymorphaI*]). This is of primary importance when moving: (1) between tributaries and mainstem reaches; (2) moving between basins; and (3) moving between isolated wetlands or ponds and river or stream environments.

5.3 Study Methods

The study approach will consist of the following seven steps:

Step 1 - Obtain SHPO Concurrence on the APE. As required under Section 106 [36 CFR § 800.4(a)(1)], the Districts will submit maps depicting the APE to the SHPO for formal review, comment, and concurrence. Once approved, the maps including SHPO's concurrence letter will be filed with FERC.

The Districts may request that SHPO concur with a modified APE during the study if the Districts determine that the Project affects historic properties outside the previously SHPO-approved APE.

Step 2 - Archival Research. The Districts performed initial archival research in preparation of the Pre-Application Document. In this step, the Districts will, at a minimum, conduct additional archival research at the following places, as appropriate:

- Bancroft Library, University of California, Berkeley
- California State Library, California History Room and Government Publications
- Bureau of Land Management, Motherload Field Office Data Files
- Turlock Museum and Archives
- Modesto Museum and Archives
- Sacramento History Center and Archives
- Sierra Miwuk Tribal Archives
- Other appropriate Tribal, private, state, or federal repositories identified during the research

Step 3 - Tribal Consultation and Identification of Resources. Following the ethnographic literature review in Step 1, the next step in identifying potential TCPs will involve extensive Tribal consultation. Consultation and any fieldwork and potential TCP documentation shall be undertaken in accordance with Section 106 of the NHPA, as amended, and shall be consistent with National Register Bulletin No. 38, *Guidelines for Evaluating and Documenting Identification of Traditional Cultural Properties*.

In order to facilitate Tribal consultation, the Districts intend to retain a qualified, professional ethnographer who meets the standards for ethnography as defined in Appendix II of National Register Bulletin No. 38. The Districts will coordinate its selection of the ethnographer with the assistance of affected Tribes and other interested cultural/Tribal stakeholders.

The ethnographer, in consultation with designated Tribal representatives (e.g., Tribal Chair), will determine the scope and breadth of interviews. The ethnographer will then contact the appropriate Tribe(s) and interested Tribal and cultural stakeholders to arrange for interviews at a time and location acceptable to those Tribal Interviewees. Tribal interviewees and the ethnographer may need to visit the APE together to accurately define potential TCPs. If necessary, the Districts will arrange for an initial introductory meeting between the Districts, Tribal representatives, and the ethnographer.

Interviews may be conducted on a one-on-one basis with the ethnographer. The oral traditions and information collected during the interviews will be used to help define potential TCPs in the APE and to assist in making sound judgments and management decisions in Project planning.

All information gathered will be kept confidential and respectfully documented by the ethnographer.

If participating Indian Tribes do not wish to disclose the locations of any potential TCPs, the Districts will instead work with the Tribes to identify the general issues and concerns that the Tribe(s) may have regarding potential impacts of the Project upon resources known to the Tribe(s) and work and with the Tribes and appropriate land management agencies to develop agreeable measures to address these concerns.

Step 4 - Archaeological Site Visit. Tribal interviewees or a physically capable Tribal representative and the ethnographer may want to visit archaeological sites identified during the study or during the Historic Properties Study. The purpose of the visit would be to provide Tribal representatives the opportunity to examine prehistoric archaeological sites encountered during the Historic Properties Study fieldwork, and for the ethnographer to obtain additional information on potential TCPs. After the site visit(s) Tribal representatives may choose to share additional TCP information. BLM will be involved with any site visits on BLM-administered land. BLM will request to meet in advance, those tribal representatives who wish to visit prehistoric sites on BLM-administered land. This is prudent and reasonable as BLM has ongoing management obligations for resources on lands under their management, regardless of whether these resources within the FERC project boundary. BLM keeps information about archaeological sites confidential.

Step 5 - National Register of Historic Places Evaluation. Following completion of Step 4, the Districts' ethnographer will evaluate the eligibility of identified TCPs for listing on the NRHP using data collected from the field studies described above. The NRHP codifies the criteria used to evaluate most cultural resources at 36 CFR 60.4, as follows:

> *National Register Criteria for Evaluation. The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and*
>
> *(a) that are associated with events that have made a significant contribution to the broad pattern of our history;*
> *(b) that are associated with the lives of persons significant in our past;*
> *(c) that embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;*
> *(d) that have yielded, or may be likely to yield, information important to prehistory or history.*

However, amendments to the NHPA in 1992 [§101(d)(6)(A)] specify that properties of traditional religious and cultural importance to an Indian Tribe may be determined eligible for inclusion in the NRHP because of their "association with cultural practices or beliefs of a living community that are: (1) rooted in that community's history; and (2) are important in maintaining the continuing cultural identity of the community." Therefore, a TCP can only be significant if it meets these two criteria. Formal evaluations will be submitted to the SHPO for concurrence.

Step 6 - Identify and Assess Potential Project Effects on National Register-Eligible Properties. As required under 36 CFR § 800.5, the Districts will identify and assess, in consultation with the SHPO, BLM, and potentially affected Indian Tribes, any adverse effects on TCPs resulting from Project O&M. Adverse Effects are defined as follows:

> *An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative (36 CFR § 800.5(a)(1)).*

Step 7 - Reporting. The Districts will prepare a report that includes the following sections: (1) Study Goals and Objectives; (2) Methods and Analysis; Results; (3) Conclusions; and (5) Description of Variances from the FERC-approved study plan, if any. The report will include the evaluation plan with a detailed assessment of Project effects. Copies of this report will be provided to the affected Indian Tribes, BLM, SHPO, CSU, Stanislaus, CCIC, and FERC. Copies of the final report and detailed locations of identified properties will be withheld from public disclosure in accordance with Section 304 (16 U.S.C. 4702-3) of the NHPA (as amended). Concurrence on report recommendations will be sought from SHPO. BLM and other interested parties will review the cultural report, evaluation plan, and other documents, before they are sent to SHPO for concurrence.

6.0 Study-Specific Consultation

The Districts will engage in the following study-specific consultation:

- Consultation with FERC, SHPO, affected Native American representatives, and BLM as described in Section 5.3.

7.0 Schedule

The Districts anticipate the following schedule for completion of the study:

- Planning/Pre-field Arrangements .... January 2012 - February 2012
- Field Work (Steps 1, 2, and 3) .... March 2012 - December 2012
- Office Work (Steps 4 ,5, and 6) .... January 2013 - July 2013
- Study Proposal Consultation .... As needed and Quarterly Reports
- Report Preparation (Step 7) .... August 2013 - October 2013

The results of the Study Plan will be reported in Exhibit E of the License Application, which will include a summary of the information and findings of the Study Plan. Figures and other pertinent data supporting the summary in Exhibit E will be appended to the License Application. The cultural records and other sensitive information will be included in a confidential appendix withheld from public disclosure, in accordance with Section 304 (16 U.S.C. 4702-3) of the NHPA as amended.

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

The proposed study methods discussed above are consistent with the study methods followed in several recent relicensing projects (i.e., French Meadows Transmission Line Project - FERC No. 2479; Merced River Hydroelectric Project - FERC No. 2179; Yuba-Bear Hydroelectric Project - FERC No. 2266). These methods have been accepted by the participating Indian Tribes, agencies, and other interested parties associated with those projects. The methods presented in this study plan also are consistent with the ACHP's guidelines for compliance with the requirements of Section 106 of the NHPA found at 36 CFR 800 and with the related guidance set forth in National Register Bulletin 38.

9.0 Level of Effort and Cost

Not yet estimated.

10.0 References Cited

Federal Energy Regulatory Commission and Advisory Council on Historic Preservation. 2002. Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects. Washington, D.C.

Parker, Patricia L., and Thomas F. King. 1998. Guidelines for Evaluating and Documenting Traditional Cultural Properties. Revised. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, National Register, History, and Education Division, Washington, D.C.